

# THE TWELFTH ROYAN INTERNATIONAL RESEARCH AWARD

Reproductive Biomedicine & Stem Cell.....



**SEPTEMBER 2011**

TEHRAN - IRAN

THE THIRTEENTH  
 **ROYAN**

INTERNATIONAL  
RESEARCH AWARD

Reproductive Biomedicine & Stem Cell

Deadline for Application: April, 2012



&

**Kazemi Prize, 2012**

*In commemoration of Dr. Kazemi, the late founder of Royan Institute*



SEPTEMBER, 2012  
TEHRAN - IRAN

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In the name of  
**GOD**

The Twelfth  
**ROYAN**  
INTERNATIONAL RESEARCH AWARD



**Dr. Saeid Kazemi Ashtiani**  
*The Late Founder of ROYAN Institute*



ROYAN  
Institute

**ACECR**

Iranian Academic Center for Education, Culture and Research (ACECR)



**Cover Legend:**

A colony of human bone marrow mesenchymal stem cells labeled by QD525 nm  
Photographer: Sara Vaziri

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## FOREWORD

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On behalf of the Iranian Academic Center for Education, Culture and Research it is my pleasure to announce that Royan Institute founded by the late Dr Saeid Kazemi Ashtiani has evolved into a source of pride for Iran, the Oriental Cradle of Art and Science.

Improvement of health index is one of the criteria of countries development and Royan Institute as a scientific research center, affiliated to ACECR, has taken major steps in this regard.

The 12<sup>th</sup> Royan International Award is an attempt to provide an arena for healthy scientific international competition in the fields of Stem Cell & Reproductive Biomedicine in Iran.

We believe that with cooperation among scientific organizations and societies the knowledge can grow among scientists and researchers, and Royan Award is playing its role in establishing these relations between scientists and scientific organizations.

I appreciate my colleagues in Royan Institutes whose endeavors led this Award to a success which certainly evolves and develops further.

My thanks also goes to the board of Jury and all the researchers who participate in this Award with their invaluable papers.

**Yadegari MH, PhD**  
President of ACECR



## INTRODUCTION



I am so pleased that the 12<sup>th</sup> international Award has been taken into national and international scientists' consideration like previous years. Every year thousands of articles in the fields of Stem Cell Biology and Reproductive Biomedicine get published in the prestigious scientific journals worldwide, and each article makes a specific progress in the related field of science, however some of them are more efficacious. Royan Award and all peer events provide the scientific competition, praising and encouraging these outstanding researchers for their invaluable steps toward humanity health improvement.

This year we received 281 research articles from 43 countries. The thematic classification of papers clarifies that most of the articles, 89 papers, are sent in relevant to Stem Cell filed, 75 papers related to Embryology field and 65 to Andrology and Female Infertility fields, each. Like the previous Awards the jury board including 170 national and international referees evaluated all the papers with high accuracy.

Kazemi Prize is presented to honor the distinguished scientists with significant steps toward Stem Cell and Biology progress. Current year, the nomination committee decided to present Kazemi Prize to Prof Hans Schöler the outstanding scientist of Germany, the president of Max Planck Institute for Molecular Biomedicine.

I would like to express my sincere appreciation to all participants who have sent us their valuable research papers to be evaluated, and all respected referees without whom this Award would not have been such a success. I would also like to convey my thanks to the executive committee for the extraordinary contribution they have made.

The Royan Institute annual report is published in the Award book. I admire all my colleagues for all their efforts in Royan scientific promotion.

I am so delightful that all Royan researchers and staffs are following the excellent aims which Dr Saeid Kazemi Ashtiani, the late founder of Royan Institute, was thinking about during his life. May God bless his soul in peace!

**Gourabi H, PhD**

Award Chairman and Royan Institute President

## ROYAN AWARDS

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Royan International Research Award was founded by the late director of Royan Institute, Dr Saeid Kazemi Ashtiani with the aim of encouraging the researchers, appreciating their efforts and preparing a friendly scientific atmosphere for researchers to exchange their knowledge and experiences. Kazemi had wonderful ideas to bring researchers together and motivate them to increase their efforts and perform high level researches via this research award. Royan's staff lost their beloved director in January 2006 by heart attack, may he rest in peace.

This annual award is extending into a higher quality event every year, increasing the scientific level and number of the submitted papers. The research papers are evaluated through an intense jury procedure by Award's national and international Jury board to whom our special thanks goes. Each year the prominent researches with outstanding help in solving problems in reproduction and stem cell fields, are announced, appreciated and rewarded.

As comparing the researches in different fields is very difficult and finding the best researches with variations in methods, implements and results is almost impossible, from the eighth award the same prizes are distributed among winners in different fields of reproductive biomedicine and stem cell such as: female infertility, epidemiology, ethics, andrology, embryology, reproductive imaging, genetics, stem cell biology and technology, and regenerative medicine.

### **Nomination and Selection Procedure of Award**

The submitted research articles are categorized according to seven scientific groups: female infertility, reproductive genetics, reproductive health (epidemiology and ethics), embryology, andrology, reproductive imaging, stem cell biology and technology and animal biotechnology. Each article is ranked according to its relevancy, impact factor, and an innovation score.

After the articles are sorted, each scientific group selects their nominees and sends them to national and international referees for evaluation.

Each referee evaluates at most 5 research articles, related to his/her field of interest, qualitatively in Likert scale according to these norms:

- Relevancy to the award subjects
- Creativity and innovation
- Methodology and research design
- Problem solving
- Applicability on human

Evaluation of the articles by the juries has been discussed in the board of juries and their decisions have been approved by scientific board of the institute. Finally, international and national winners are selected and invited to present their researches in Royan twin congress on Reproductive Biomedicine and Stem Cell Biology and Technology which is held almost in September every year and will receive their prizes in a special ceremony in the second night of congress.

**Note:** It is obligatory for the winners to attend the ceremony and present their research articles in the congress.






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**The First Royan International Research Award** | September 2000 | Received Papers: 72
 

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**THE FIRST**  
**ROYAN**  
 INTERNATIONAL  
 RESEARCH AWARD  
 Reproductive Biomedicine & Stem Cell



September 2000

**International Winners:**

- **First Place:** Mohamed Mitwally, Canada  
Comparison of an Aromatase Inhibitor with Clomiphene Citrate for Induction of Ovulation
- **Second Place:** Ali Ahmady, Canada  
Cell and Molecular Investigation of the Fertilizing Ability of Dead Sperm
- **Third Place:** Weihau Wang, USA  
Spindle Observation in Living Human Eggs with Pollaries Microscope and Its Use in Assisted Human Reproduction
- **Fourth Place:** Simon Marina Avendano, Spain  
HIV-Seropositive Can Be Fathers without Infecting the Women or Child
- **Fifth Place:** Jaffar Ali, Qatar  
Formulation of a Protein-Free Medium for Human Assisted Reproduction

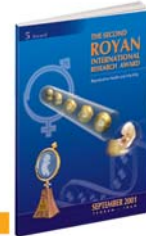
**Iranian Winners:**

- Mohammad Hossein Nasr-Esfahani  
Sperm Chromatin Status and Male Infertility
- Mahnaz Ashrafi  
Effect of Metformin on Ovulation and Pregnancy Rate in Women with Clomiphene Resistant PCOS
- Mohammad Ebrahim Parsanezhad  
Section of the Cervical Septum Doesn't Impair Reproductive Outcome

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**The Second Royan International Research Award** | September 2001 | Received Papers: 78

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**International Winners:**

- **First Place:** Ri-Cheng Chian, Canada  
A New Treatment for Women with Infertility Due to Polycystic Ovarian Syndrome: Immature Oocyte Retrieval Followed in-vitro Maturation
- **Second Place:** Ma'asouma Makhseed, Kuwait  
The Possible Immunological Basis of Repeated Pregnancy Loss
- **Third Place:** Esmail Behboodi, USA  
Production of Goats by Somatic Cell Nuclear Transfer
- **Fourth Place:** Sayeed Unisa, India  
Reproductive, Demographic and Behavioral Causes of Infertility in India
- **Fifth Place:** Ahmed Mohammed Saleh, Saudi Arabia  
Effect of Laparoscopic Ovarian Drilling on Serum Vascular Endothelial Growth Factor (VEGF), and on Insulin Response to Oral Glucose Tolerance Test in Women with PCOS

**Iranian Winners:**

- Hossein Baharvand  
Improvement of Blastocyst Development in-vitro and Overcoming the Blastocyst Collapse and Its Effective Factor(s) in Sequential Culture Media
- Marzieh Nojomi  
Epidemiology of Infertility in the West of Tehran 2000-2001
- Gholamreza Pourmand  
Effect of Renal Transplantation on Sperm Quality and Sex Hormones Level




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**The Third Royan International Research Award** | September 2002 | Received Papers: 212
 

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**International Winners:**

- **First Place:** Marco Filicori, Italy  
Novel Approaches to Ovulation Induction: The Critical Role of Luteinizing Hormone Activity in Regulating Folliculogenesis
- **Second Place:** Klaus G. Steger, Canada  
Influence of Histone-Prothmine-Exchange on Male Infertility
- **Third Place:** Franck Pellestor, France  
Chromosomal Investigations in Human Gametes: Study of the Interchromosomal Effect in Sperm of Chromosomal Rearrangement Carriers and Mechanisms of Non Disjunction in Oocytes
- **Fourth Place:** Ghazala S. Basir, Hong Kong  
The Effect of High Estradiol Levels on Endometrial Development in Assisted Reproduction Technology: Evaluation of Sonographic Doppler Haemodynamic and Morphometric Parameters
- **Fifth Place:** Mohamed Ali Bedaiwy, USA  
Transplantation of Intact Frozen-Thawed Mammalian Ovary with Vascular Anastomosis: A Novel Approach

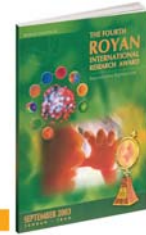
**Iranian Winners:**

- Saeed Alborzi  
Laparoscopic Salpingoovolysis. Is There Any Place for Second Look Laparoscopy?
- Saeed Rahbar  
Laser Assisted Hatching in Young Women Significantly Increases Pregnancy and Implantation Rates
- Shir Ahmad Sarani  
Morphological Evidence for the Implantation Window in Human Luminal Endometrium  
Special Winner in Reproductive Health
- V. I. Sodestrom- Anttila, Finland  
Embryo Donation-Outcome & Attitude Among Embryo Donors & Recipient

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**The Fourth Royan International Research Award** | September 2003 | Received Papers: 222
 

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**International Winners:**

- **First Place:** Yong-Mahn Han, South Korea  
Abnormal Structural Integrity and Reprogramming in the Cloned Embryos
- **Second Place:** Lucille E. Voullaire, Australia  
Chromosome Abnormality In Human Embryos Diagnosed Using Comparative Genomic Hybridization: Its Relationship to Infertility
- **Third Place:** Mauro Maccarrone, Italy  
Low Fatty Acid Amide Hyrolase and Anandamide Levels Are Associated with Failure to Achieve an Ongoing Pregnancy after IVF and Embryo Transfer
- **Fourth Place:** Ali Honaramooz, USA  
Sperm from Neonatal Mammalian Testes Grafted in Mice
- **Fifth Place:** Jan M.R. Gerris, Belgium  
Elective Single Embryo Transfer Halves the Twinning Rate without Decrease in the Total Ongoing Pregnancy Rate of an AVF/ICSI Program

**Iranian Winners:**

- Mohammad Ebrahim Parsanezhad  
Ovarian Stromal Blood Flow Changes After Laparoscopic Ovarian Cauterization in Women with Polycystic Ovary Syndrome
- Mojdeh Salehnia  
Vitrification of Ovarian Tissue
- Jaleh Zolghadri  
Successful Pregnancy Outcome with IUI in Patients with Unexplained Recurrent Miscarriage, Whose Male Partners Have Low Score Hypo-Osmotic Swelling Test




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**The Fifth Royan International Research Award** | September 2004 | Received Papers: 199
 

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**International Winners:**

- **Second Place:** Alfonso Guterrez-Adan, Spain  
Long Term Effect of in vitro Culture of Mouse Embryos with Serum on mRNA Expression of Imprinting Genes, Development and Behavior
- **Second Place:** Maciej K. Kurpisz, Poland  
Reactive Oxygen Species and "Male Factor" of Infertility
- **Third Place:** Michel von Wolf, Germany  
Glucose Transporter Proteins (GLUT) in Human Endometrial-Expression, Regulation and Function throughout the Menstrual Cycle and in Early Pregnancy
- **Fourth Place:** Sophie Lambard, France  
Human Male Gamete Quality: Place of Aromatase and Estrogens
- **Fifth Place:** Naojiro Minami, Japan  
A Novel Maternal Effect Gene, Oogenesisin: Involvement in Zygotic Gene Activation and Early Embryonic Development in the Mouse

**Iranian Winners:**

- Seyed Javad Mowla  
Catsper Gene Expression in Postnatal Development of Mouse Testis and in Subfertile Men with Deficient Sperm Motility
- Mohammad A. Khalili  
Restoration of Spermatogenesis by Adenoviral Gene Transfer into Injured Spinal Cords of Rats
- Mojdeh Salehnia  
Ultrastructural, Histochemical and Morphometric Studies of Mouse Reproductive Tract after Ovarian Induction

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**The Sixth Royan International Research Award** | September 2005 | Received Papers: 198
 

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**International Winners:**

- **First Place:** Kathyjo Ann Jackson, USA  
Therapeutic potential of stem cells
- **Second Place:** Carmen Belen Martinez-Madrid, Belgium  
Ficoll Density Gradient Method for Recovery of Isolated Human Ovarian Primordial Follicles
- **Third Place:** Federico Alejandra Calegari, Germany  
Tissue-Specific Manipulating of Gene Expression of Mouse Embryos Using in Utero Electroporation
- **Fourth Place:** Maryam Kabir-salmani, Japan  
Different Roles of  $\alpha_5\beta_1$  and  $\alpha_v\beta_3$  Integrins in the IGF-I-Induced Migration of the Human Extravillous Trophoblast Cells
- **Fifth Place:** Zhenmin Lei, USA  
Testicular Phenotype in Luteinizing Hormone Knockout Animals and the Effect of Testosterone Replacement Therapy

**Iranian Winners:**

- Seyed Javad Mowla  
The Profile of Gene Expression Changes During the Neural Differentiation of Bone Marrow Stromal Cells (BMSCs)
- Jaleh Zolghadr  
Pregnancy Outcome Following Laparoscopic Tubal Ligation of Hydrosalpinx Tube in Patients with Early Recurrent Abortion

Finally, this year we got more papers and the jury procedure was more difficult. The papers were very close together in scientific level, so a hairsplitting jury procedure was needed to find out the best of them.




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**The Seventh Royan International Research Award** | September 2006 | Received Papers: 221
 

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**International Winners:**

- **First Place:** James Affram Adjaye, Germany  
A) Whole-Genome Approaches for Large-Scale Gene Identification and Expression Analysis in Mammalian Preimplantation Embryos & B) Primary Differentiation in the Human Blastocyst: Comparative Molecular Portraits of Inner Cell Mass and Trophectoderm Cells
- **Second Place:** Tian-hua Huang, China  
Detection and Expression of Hepatitis B Virus X Gene in One and Two-Cell Embryos from Golden Hamster Oocytes in-vitro Fertilized with Human Spermatozoa Carrying HBV DNA
- **Third Place:** Adrian Richard Eley, UK  
Ooptosis of Ejaculated Human Sperm Is Induced by Co-Incubation with Chlamydia Trachomatis Lipopolysaccharide
- **Fourth Place:** Lone Schmidt, Denmark  
Does Infertility Cause Marital Benefit? An Epidemiological Study of 2250 Women and Men in Fertility Treatment
- **Fifth Place:** Louis Chukwuemeka Ajonuma, Hong Kong  
Molecular and Cellular Mechanisms Underlying Abnormal Fluid Formation in the Female Reproductive Tract: The Critical Role of Cystic Fibrosis Transmembrane Conductance Regulators

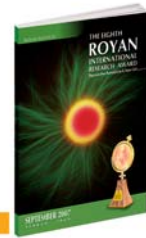
**Iranian Winners:**

- Mohammadreza Baghban Eslaminejad  
Polarized Culture Systems and Their Effects on Embryo Development
- Mansoureh Movahedin  
New Approaches to Assess the Success and Enhance the Efficiency of Male Germ Cell Transplantation in the Mouse
- Ashraf Alleyassin  
Comparison of Unilateral and Bilateral Transfer of Injected Oocytes into Fallopian Tubes: A Prospective Randomized Clinical Trial

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**The Eighth Royan International Research Award** | September 2007 | Received Papers: 248

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**International Winners:**

Best research project in stem cell field

- Chiba Shigeru, Japan  
Role of Notch Signaling in Normal and Neoplastic Hematopoietic Stem Cells and Clinical Application of Notch Signal Modifiers

Best research project in reproductive genetics field

- Françoise Dantzer, France  
Poly (ADP-Ribose) Polymerase-2 Contributes to the Fidelity of Male Meiosis I and Spermiogenesis

Best research project in female infertility field

- Seyed Mohammad Moazzeni, Iran  
Dendritic Cells and Pregnancy: A Bidirectional Relationship to Protect the Semiallogenic Fetus

Best research project in embryology field

- Bjorn Johannes Oback, New Zealand  
Nuclear Donor Choice, Sperm Mediated Activation and Embryo Aggregation: A Multi-Pronged Approach to Sequentially Improve Cattle Cloning Efficacy

Best research project in andrology field

- Reddanna Pallu, India  
Role of Cyclooxygenases in Male Reproduction

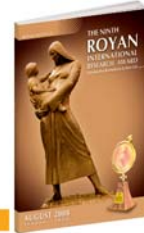
**Iranian Winners:**

- Ramin Radpour  
Novel Mutations and (TG)M(T)N Polymorphism in Iranian Males with Congenital Bilateral Absence of the Vas Deferens
- Mohammad Ebrahim Parsanezhad  
Hysteroscopic Metroplasty of the Complete Uterine Septum, Duplicate Cervix, and Vaginal Septum
- Mehri Azadbakht  
Apoptosis in Mouse Embryos Co-Cultured with Polarized or Non-Polarized Uterine Epithelial Cells Using Sequential Culture Media





The Ninth Royan International Research Award | September 2008 | Received Papers: 202



International Winners:

Best research project in stem cell field

- Su-Chun Zhang, USA  
Human Embryonic Stem Cells as a Tool of Discovery

Best research project in reproductive genetics field

- Smita Mahale, India  
Structural, Functional and Molecular Aspects of Follicle Stimulating Hormone Receptor: Applications in Designing Receptor Targets and Management of Female Infertility

Best research project in female infertility field

- Federico Prefumo, Italy  
Uterine Doppler Investigations and Trophoblast Biology in Early Pregnancy

Best research project in female infertility field

- Saeed Alborzi, Iran  
Laparoscopic Metroplasty in Bicornuate and Didelphic Uterus

Best research project in embryology field

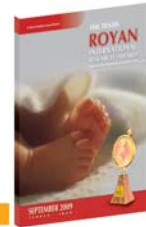
- Leen.Vanhoutte, Belgium  
Nuclear and Cytoplasmic Maturation of in vitro Matured Human Oocytes After Temporary Nuclear Arrest by Phosphodiesterase 3-Inhibitor

Best research project in andrology field

- T.O.Ogata, Japan  
Haplotype Analysis of the Estrogen Receptor Alpha Gene in Male Genital and Reproductive Abnormalities

Iranian Winners:

- Ali Fathi  
The Molecular Mechanisms Controlling Embryonic Stem Cells (Escs) Proliferation and Differentiation
- Fardin Fathi  
Characterizing Endothelial Cells Derived from the Murine Embryonic Stem Cell Line CCE



#### International Winners:

Best research project in stem cell field

- Yi Liu, China  
Dental Stem Cells-Based Tissue Regeneration in a Large Animal Model

Best research project in reproductive genetics field

- Wai-sum OO, China  
Adrenomedullin in Male and Female Reproduction

Best research project in female infertility field (share)

- Sherman Silber, USA  
A Series of Monozygotic Twins Discordant for Ovarian Failure: Ovary Transplantation (Cortical versus Microvascular) and Cryopreservation

Best research project in female infertility field (share)

- Melinda Halasz, Hungary  
What Harbours the Cradle of Life? The Progesterone-Dependent Immunomodulation

Best research project in embryology field

- Geetanjali Sachdeva, India  
Molecular Assessment of the Uterine Milieu during Implantation Window in Humans and Non-Human Primates

Best research project in andrology field

- Paolo Chieffi, Italy  
PATZ1 Gene Has a Critical Role in the Spermatogenesis and Testicular Tumours

#### Iranian Winners:

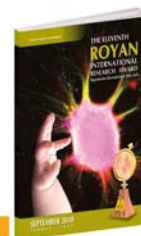
- Hossein Mozdarani  
Reduction of Induced Transgenerational Genomic Instability in Gametes Using Vitamins E and C, Observed as Chromosomal Aneuploidy and Micronuclei in Preimplantation Embryos
- Seyed javad Mowla  
OCT4 Spliced Variants Are Differentially Expressed in Human Pluripotent and Nonpluripotent Cells
- Mohammad Reza Safarinejad  
Evidence Based Medicine on the Pharmacologic Management of Premature Ejaculation




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**The Eleventh Royan International Research Award** | September 2010 | Received Papers: 358
 

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**International Winners:**

Best research project in regenerative medicine field

- Stefano Pluchino, Italy  
Human Neural Stem Cells Ameliorate Autoimmune Encephalomyelitis in Non-Human Primates

Best research project in stem cell biology & technology field

- Hooman Sadri-Ardekani, Iran-The Neatherlands  
Propagation of Human Spermatogonial Stem Cells in vitro

Best research project in female infertility field

- Louis Chukwuemeka Ajonuma, Nigeria  
New Insights into the Mechanisms Underlying Chlamydia Trachomatis Infection Induced Female Infertility

Best research project in reproductive genetics field

- Anu Bashamboo, France  
Mutations in NR5A1 Associated with Ovarian Insufficiency

Best research project in embryology field

- Mohammad Hossein Nasr-Esfahani, Iran  
New Era in Sperm Selection for ICSI Procedure

**Iranian Winners:**

- Serajoddin Vahidi  
Prevalence of Primary Infertility in the Islamic Republic of Iran in 2004-2005
- Tahereh Ma'dani  
Improvement of Pregnancy Rate in ART Cycles
- Mehrdad Noruzinia  
MTHFR Promoter Hypermethylation in Testicular Biopsies of Patients with Non-Obstructive Azoospermia: The Role of Epigenetics in Male Infertility
- Abbas Piryaee  
Differentiation Capability of Mouse Bone Marrow-Derived Mesenchymal Stem Cells into Hepatocyte-Like Cells on Artificial Basement Membrane Containing Ultraweb Nanofibers and Their Transplantation into Carbon Tetrachloride Injured Liver Model

## TABLE OF TITLES | SORTED BY NAME |

No	Name	Country	Title
1	<b>Abbasi, Sepideh</b>	Canada	Effects of Recipient Mouse Strain, Sex and Gonadal Status on the Outcome of Testis Tissue Xenografting
2	<b>Abdelaziz, Hanan</b>	Egypt	Effect of Food Restriction on Ghrelin in Adult Male Rats and Its Relation to Male Reproductive Hormones
3	<b>Abdul-Rasheed, Omar</b>	Iraq	Coenzyme Q10 and Male Infertility
4	<b>Abu Hashim, Hatem</b>	Egypt	Letrozole versus Combined Metformin and Clomiphene Citrate for Ovulation Induction in Clomiphene-Resistant Women with Polycystic Ovary Syndrome: A Randomized Controlled Trial
5	<b>Agachan, Bedia</b>	Turkey	Genetic Variants of Vascular Endothelial Growth Factor and Risk for the Development of Endometriosis
6	<b>Agarwal, Ashok</b>	USA	Sperm Viability, Apoptosis, and Intracellular Reactive Oxygen Species Levels in Human Spermatozoa Before and After Induction of Oxidative Stress
7	<b>Agrawal, Suraksha</b>	India	Genetic Association of Phase I and Phase II Detoxification Genes with Recurrent Miscarriages Among North Indian Women
8	<b>Ahmad, Iqbal</b>	USA	Retinal Potential of Nucleic Acid- and Non-Nucleic Acid-Derived Induced Pluripotent Cells: Therapeutic Implications in Glaucoma and Age-Related Macular Degeneration
9	<b>Akbari Sene, Azadeh</b>	Iran	The Correlation Between Serum and Peritoneal Fluid Ca125 Level in Women with Pelvic Endometriosis
10	<b>Akbari Sene, Azadeh</b>	Iran	The Correlation Between Sexual Practices and the Development of Antisperm Antibodies
11	<b>Alam, Mohammad</b>	Japan	Induction of Spermatogenic Cell Apoptosis in Prepubertal Rat Testes Irrespective of Testicular Steroidogenesis: A Possible Estrogenic Effect of Di(N-Butyl) Phthalate
12	<b>Alberio, Ramiro</b>	UK	Pig Epiblast Stem Cells Depend on Activin/Nodal Signaling for Pluripotency and Self-Renewal
13	<b>Alberti, Luiz</b>	Brazil	Orchiectomy Affecting Cicatrization Process
14	<b>Alborzi, Saeed</b>	Iran	A Comparison of Combined Laparoscopic Uterine Artery Ligation and Myomectomy versus Laparoscopic Myomectomy in Treatment of Symptomatic Myoma
15	<b>Alborzi, Saeed</b>	Iran	A Comparison of Histopathologic Findings of Ovarian Tissue Inadvertently Excised with Endometrioma and Other Kinds of Benign Ovarian Cyst in Patients Undergoing Laparoscopy versus Laparotomy
16	<b>Alborzi, Saeed</b>	Iran	A Comparison of the Effect of Short-Term Aromatase Inhibitor (Letrozole) and GnRH Agonist (Triptorelin) versus Case Control on Pregnancy Rate and Symptom and Sign Recurrence After Laparoscopic Treatment of Endometriosis
17	<b>Al-Jaroudi, Dania</b>	Saudi Arabia	Prevalence of Abnormal Cervical Cytology Among Subfertile Saudi Women
18	<b>Allahbadia, Gautam</b>	India	Embryo Transfer Using the Sureview Catheter-Beacon in the Womb
19	<b>Almeida, Duarte</b>	Portugal	The Phenotype of Hirsute Women: A Comparison of Polycystic Ovarian Syndrome and 21-Hydroxylase Deficient Non-Classic Adrenal Hyperplasia
20	<b>Amidu, Nafiu</b>	Ghana	Incidence of Sexual Dysfunction: A Prospective Survey in Ghanaian Females
21	<b>Amini-Nik, Saeid</b>	Canada	A Novel Source of Skin Progenitor Cells : Regulation of Scar Size by PAX7 Expressing Cells through a B-Catenin Mediated Process
22	<b>Ardehali, Reza</b>	USA	Identification of Cardiovascular Progenitors from Human Embryonic Stem Cells
23	<b>Asadi, Malek Hossein</b>	Iran	OCT4b1, A Novel Spliced Variant of OCT4, Is Highly Expressed in Gastric Cancer and Acts as an Antiapoptotic Factor
24	<b>Ashkar, Fazl</b>	Canada	Thyroid Hormone Supplementation Improves Bovine Embryo Development in vitro



No	Name	Country	Title
25	<b>Ashrafi, Mahnaz</b>	Iran	The Effect of Low Dose Human Chorionic Gonadotropin on Follicular Response and Oocyte Maturation in PCOS Patients Undergoing IVF Cycles: A Randomized Clinical Trial of Efficacy and Safety
26	<b>Asselin, Eric</b>	Canada	Expression of COX-1 and COX-2 in the Endometrium of Cyclic, Pregnant and in a Model of Pseudopregnant Rats and Their Regulation by Sex Steroids
27	<b>Aumari, Amira</b>	Syria	Controlling Directional Migration of Neural Stem Cells Electrically
28	<b>Avery, Stuart</b>	Singapore	The Role of SMAD4 in Human Embryonic Stem Cell Self-Renewal and Stem Cell Fate
29	<b>Bak, Chong Won</b>	Korea	Natural Course of Severe Oligozoospermia in Infertile Male: Influence on Future Fertility Potential
30	<b>Baka, Stavroula</b>	Greece	Matrix Metalloproteinases 2 and 9 and Their Tissue Inhibitors in the Follicular Fluid of Patients with Polycystic Ovaries Undergoing in vitro Fertilization
31	<b>Balasinor, Nafisa</b>	India	Molecular Mechanism of Estrogen Action in Spermiation
32	<b>Barri, Pedro</b>	Spain	Endometriosis-Associated Infertility. Surgery and IVF: A Comprehensive Therapeutic Approach
33	<b>Barroso, Gerardo</b>	USA	The Effect of Age on the Expression of Apoptosis Biomarkers in Human Spermatozoa
34	<b>Behboodi, Esmail</b>	Canada	Establishment of Goat Embryonic Stem Cells from in vivo Produced Blastocyst-Stage Embryos
35	<b>Beigi Boroujeni, Mandana</b>	Iran	The Effect of Co-Culture System, Erythropoietin and Bone Morphogenetic Protein 4 on the Differentiation of Embryonic Stem Cells to Erythroid Colonies
36	<b>Bohlmann, Michael</b>	Germany	Hysteroscopic Findings in Women with Two and with More First Trimester Miscarriages
37	<b>Bongso, Ariff</b>	Singapore	The Nature and Properties of Human Umbilical Cord Wharton's Jelly Stem Cells: Its Benefits for Cord Blood Bank Storage, Cell Based Therapies and as Anticancer Agents
38	<b>Brinton, Louise</b>	USA	Cancer Risk Among Infertile Women with Androgen Excess or Menstrual Disorders (Including Polycystic Ovary Syndrome)
39	<b>Bruedigam, Claudia</b>	The Netherlands	A New Concept Underlying Stem Cell Lineage Skewing That Explains the Detrimental Effects of Thiazolidinediones on Bone
40	<b>Bühler, Marta</b>	Argentina	Involvement of the Dehydroleucodine Alpha-Methylene-Gamma-Lactone Function in GVBD Inhibition in Bufo Arenarum Oocytes
41	<b>Busso, Dolores</b>	Chile	Female Infertility Due to Anovulation and Defective Steroidogenesis in NPC2 Deficient Mice
42	<b>Byskov, Anne Grete</b>	Denmark	Human Primordial Germ Cells Migrate along Nerve Fibers and Schwann Cells from the Dorsal Hind Gut Mesentery to the Gonadal Ridge
43	<b>Carvalho, Hernandes</b>	Brazil	Insulin Affects Tissue Organization and the Kinetics of Epithelial Cell Death in the Rat Ventral Prostate After Castration Published in Journal of Andrology
44	<b>Cecconi, Sandra</b>	Italy	In vitro Maturation of Mammalian Oocytes
45	<b>Celi, Pietro</b>	Australia	Interactions Between Nutritional and Opioidergic Pathways in the Control of LH Secretion in Male Sheep
46	<b>Chauhan, Nagendra</b>	India	Ayurvedic Rasayana Herbs as a Sex Health Tonic
47	<b>Chieffi, Paolo</b>	Italy	Down-Regulation of Estrogen Receptor-B Associates with Transcriptional Coregulator Patz1 Delocalization in Human Testicular Seminomas
48	<b>Chong, Samuel</b>	Singapore	Simplified PGD of Common Determinants of Hemoglobin Bart's Hydrops Fetalis Syndrome Using Multiplex-Microsatellite PCR
49	<b>Christopikou, Dimitra</b>	Greece	Spindle and Chromosome Configurations of Human Oocytes Matured in vitro in Two Different Culture Media
50	<b>Cobellis, Gilda</b>	Italy	2-AG Regulates Sperm Motility
51	<b>Cooney, Austin</b>	USA	Canonical Wnt/b-Catenin Regulation of Liver Receptor Homolog-1 (LRH-1) Mediates Pluripotency Gene Expression
52	<b>Daadi, Marcel</b>	USA	Human Neural Stem Cell Grafts Modify Microglial Response and Enhance Axonal Sprouting in Neonatal Hypoxic-Ischemic Brain Injury
53	<b>Dahl, Edgar</b>	Germany	Religion, Reproduction and Public Policy: Disentangling Morality from Theology
54	<b>Dai, Jianwu</b>	China	Isoforms of OCT4 Contribute to the Confusing Diversity in Stem Cell Biology

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55	<b>Davis, Tracy</b>	USA	Progesterone Inhibits Oxytocin and Prostaglandin F2alpha Stimulated Increases in Intracellular Calcium Concentrations in Small and Large Ovine Luteal Cells
56	<b>Delgado, Mario</b>	Spain	Human Adipose-Derived Mesenchymal Stem Cells Reduce Inflammatory and T Cell Responses and Induce Regulatory T Cells in vitro in Rheumatoid Arthritis
57	<b>Delle-Piane, Luisa</b>	USA	Effect of the Method of Conception and Embryo Transfer Procedure on Mid-Gestation Placenta and Fetal Development in an IVF Mouse Model
58	<b>Deshpande, Pallavi</b>	UK	Using Poly(Lactide-Co-Glycolide) Electrospun Scaffolds to Deliver Cultured Epithelial Cells to the Cornea
59	<b>Devireddy, Ram</b>	USA	Evaluation of Methylcellulose and Dimethylsulfoxide as the Cryoprotectants in a Serum Free Freezing Media for Cryopreservation of Adipose Derived Adult Stem Cells
60	<b>Ding, Zhide</b>	China	Endoplasmic Reticulum Protein 29 (ERP29), A Protein Related to Sperm Maturation Is Involved in Sperm-Oocyte Fusion in Mouse
61	<b>Djemil, Bencharif</b>	France	Freezing Canine Sperm: Comparison of Semen Extenders Containing Equex® and LDL (Low Density Lipoproteins)
62	<b>Dochi, Osamu</b>	Japan	Factors Affecting Reproductive Performance in Holstein Cows and Improvement of Pregnancy in Repeat Breeding Holstein Cattle
63	<b>Donkol, Ragab</b>	Egypt	Imaging in Male-Factor Obstructive Infertility
64	<b>Edenhofer, Frank</b>	Germany	Engineering Cell-Permeant FLP Recombinase for Tightly Controlled Inducible and Reversible Overexpression in Embryonic Stem Cells
65	<b>Eggen, Bart</b>	The Netherlands	Regulation of Chromatin Structure in ES Cells
66	<b>Ekeke, Emeka</b>	Nigeria	Solving the Problem of Infertility Among Christians: A Bioethical Appraisal
67	<b>Erceg, Slaven</b>	Spain	Transplanted Oligodendrocytes and Motoneuron Progenitors Generated from Human Embryonic Stem Cells Promote Locomotor Recovery After Spinal Cord Transection
68	<b>Esteves, Sandro</b>	Brazil	Clinical Outcome of Intracytoplasmic Sperm Injection in Infertile Men with Treated and Untreated Clinical Varicocele
69	<b>Ewuola, Emmanuel</b>	Nigeria	Growth and Reproductive Assessment of Rabbit Bucks Fed Dietary Fumonisin B1
70	<b>Falzone, Nadia</b>	South Africa	Comparison Between Propidium Iodide and 7-Aminoactinomycin-D for Viability Assessment during Flow Cytometric Analyses of the Human Sperm Acrosome
71	<b>Fanfani, Francesco</b>	Italy	Discoid or Segmental Rectosigmoid Resection for Deep Infiltrating Endometriosis: A Case-Control Study
72	<b>Faridi, Rehan</b>	India	Killer Immunoglobulin-Like Receptors (KIR) and HLA-C Allorecognition Patterns Implicative of Dominant Activation of Natural Killer Cells Contribute to Recurrent Miscarriages
73	<b>Feng, Qiang</b>	USA	Hemangioblastic Derivatives from Human Induced Pluripotent Stem Cells Exhibit Limited Expansion and Early Senescence
74	<b>Florio, Pasquale</b>	Italy	Evaluation of Endometrial Activin a Secretion for Prediction of Pregnancy After Intrauterine Insemination.
75	<b>Florio, Pasquale</b>	Italy	A Randomized Controlled Study Comparing Harmonic versus Electrosurgery in Laparoscopic Myomectomy.
76	<b>Fouladi-Nashta, Ali</b>	UK	Diverse Effects of Polyunsaturated Fatty Acids on Oocyte Maturation and Development in vitro
77	<b>Franco Jr, Jose</b>	Brazil	Comparison of Day 2 Embryo Quality After Conventional ICSI versus Intracytoplasmic Morphologically Selected Sperm Injection (IMSI) Using Sibling Oocytes
78	<b>Franco Jr, Jose</b>	Brazil	Motile Sperm Organelle Morphology Examination (MSOME): Intervariation Study of Normal Sperm and Sperm with Large Nuclear Vacuoles
79	<b>Frank, Markus</b>	USA	EGFR-1 Expressed by Malignant Melanoma-Initiating Cells Is Required for Tumor Growth
80	<b>Freter, Rasmus</b>	Japan	Transcriptional Quiescence of Adult Stem Cells
81	<b>Fuchs, Dietmar</b>	Austria	Urine Neopterin Concentrations as a Marker for Successful Blastocyst Implantation After Assisted Reproductive Technologies
82	<b>Fuentes Garcia, Ariel</b>	Chile	Recent Cigarette Smoking and Assisted Reproductive Technologies Outcome



No	Name	Country	Title
83	<b>Garcia-Vazquez,</b> Francisco	Spain	Production of Transgenic Piglets Using ICSI–Sperm Mediated Gene Transfer in Combination with Recombinase Reza
84	<b>Gaspar,</b> Robert	Hungary	Nociceptin Inhibits Uterine Contractions in Term-Pregnant Rats by Signaling through Multiple Pathways
85	<b>Goh,</b> Victor	USA	Sleep, Sex Steroid Hormones, Sexual Activities, and Aging in Asian Men
86	<b>Goldberg,</b> Erwin	USA	Ldhc: the Ultimate Testis-Specific Gene
87	<b>Golipour,</b> Azadeh	Canada	Functional Genomics Reveals a BMP Driven Mesenchymal-to-Epithelial Transition in the Initiation of Somatic Cell Reprogramming
88	<b>Gotoh,</b> Noriko	Japan	An FGF4-FRS2Alpha-Cdx2 Axis in Trophoblast Stem Cells Induces BMP4 to Regulate Proper Growth of Early Mouse Embryos
89	<b>Griffin,</b> Darren	UK	Male Fertility, Chromosome Abnormalities, and Nuclear Organization
90	<b>Gupta,</b> Mukesh	Korea	Effect of Vitrification and Beta-Mercaptoethanol on ROS Activity and in vitro Development of Oocytes Vitrified Before or After in vitro Fertilization
91	<b>Gupta,</b> Neelam	India	Improvement of in vitro Oocyte Maturation with Lectin Supplementation and Expression Analysis of Cx43, GDF-9, FGF-4 and Fibronectin mRNA Transcripts in Buffalo (Bubalis Bubalis)
92	<b>Gutkowska,</b> Jolanta	Canada	The Mechanism of Cardio-Protective Action of Oxytocin
93	<b>Harding,</b> Sian	UK	Functional and Morphological Maturation of Implanted Neonatal Cardiomyocytes as a Comparator for Cell Therapy
94	<b>Haron,</b> Abd Wahid	Malaysia	Effect of Sugars on Characteristics of Boer Goat Semen After Cryopreservation
95	<b>Henkel,</b> Ralf	South Africa	Leukocytes and Intrinsic ROS Production May Be Factors Compromising Sperm Chromatin Condensation Status
96	<b>Herlihy,</b> Amy	Australia	Assessing the Risks and Benefits of Diagnosing Genetic Conditions with Variable Phenotypes through Population Screening: Klinefelter Syndrome as an Example
97	<b>Herraez,</b> Paz	Spain	Fertilization Capacity with Rainbow Trout DNA-Damaged Sperm and Embryo Developmental Success
98	<b>Hinton,</b> Barry	USA	P-MAPK1/3 and DUSP6 Regulate Epididymal Cell Proliferation and Survival in a Region-Specific Manner in Mice
99	<b>Hirsch,</b> Emmet	USA	Synergy Between Viral and Bacterial Toll-Like Receptors Leads to Amplification of Inflammatory Responses and Preterm Labor in the Mouse
100	<b>Hong,</b> Seung	USA	Vitrification of Oocytes Produces High Pregnancy Rates When Carried Out in Fertile Women
101	<b>Hossain,</b> Amjad	USA	Spontaneously Developed Tail Swellings (SDTS) Influence the Accuracy of the Hypo-Osmotic Swelling Test (HOS-Test) in Determining Membrane Integrity and Viability of Human Spermatozoa
102	<b>Hossain,</b> Md.	Japan	Metabolism of Exogenous Fatty Acids, Fatty Acid-Mediated Cholesterol Efflux, PKA and PKC Pathways in Boar Sperm Acrosome Reaction
103	<b>Hosseini,</b> Morteza	Iran	Development of an Optimized Zona-Free Method of Somatic Cell Nuclear Transfer in the Goat
104	<b>Huang,</b> Yen-Hua	Taiwan	Characterization of a Novel Cell-Surface Protein Expressed in Human Sperm
105	<b>Huang,</b> George	USA	IPS Cells Reprogrammed from Mesenchymal-Like Stem/Progenitor Cells of Dental Tissue Origin
106	<b>Ijaz,</b> Ahmad	Pakistan	Assessment of Nili-Ravi Buffalo (Bubalis Bubalis) Semen by MTT Reduction Assay
107	<b>Illmensee,</b> Karl	Greece	Human Embryo Twinning with Applications in Reproductive Medicine
108	<b>Issa,</b> Yaser	Norway	Fecundability Among Newly Married Couples in Agricultural Villages in Palestine: A Prospective Study
109	<b>Izadpanah,</b> Reza	USA	Persistent High Glucose Concentrations Alter the Regenerative Potential of Mesenchymal Stem Cells
110	<b>Jalili,</b> Ali	Canada	The Role of Complement Components C1q and C5a in Hematopoietic Stem/Progenitor Cell Mobilization/Homing

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111	<b>Jiang, Ming</b>	USA	Functional Remodeling of Benign Human Prostatic Tissues in vivo by Spontaneously Immortalized Progenitor and Intermediate Cells
112	<b>Jovanovic, Aleksandra</b>	South Africa	The Effect of Hyperstimulation on Transforming Growth Factor Beta1 and Beta2 in the Rat Uterus: Consequences for Embryo Implantation
113	<b>Jun, Lin</b>	China	Phosphatase of Regenerating Liver-3: A Novel and Promising Marker in Human Endometriosis
114	<b>Kandukuri, Lakshmi</b>	India	Germline Study of AR Gene of Indian Women with Ovarian Failure
115	<b>Kemper, Kristel</b>	The Netherlands	The AC133 Epitope, but Not the CD133 Protein, Is Lost Upon Cancer Stem Cell Differentiation
116	<b>Khaki, Arash</b>	Iran	Anti-Oxidative Effects of Citro_Flavonoids on Spermatogenesis in Rat
117	<b>Khalid, Muhammad</b>	UK	The Regulation of Hyaluronan Synthesis, Its Signalling Mechanism and Topical Application for Cervical Relaxation in the Ewe
118	<b>Khan, Faizan</b>	India	Association of Y Chromosome Microdeletions with Spermatogenic Impairment and Infertility in Human Males with High Concentration of Seminal Hexachlorocyclohexane (HCH)
119	<b>Kim, Seung-Hyun</b>	Korea	Bone Marrow-Derived Stromal Cells from Amyotrophic Lateral Sclerosis Patients Have Diminished Stem Cell Capacity
120	<b>Kim, Byung Soo</b>	Korea	Undifferentiated Propagation of the Human Embryonic Stem Cell Lines, H1 and HSF6, on Human Placenta-Derived Feeder Cells without Basic Fibroblast Growth Factor Supplementation
121	<b>Kim, Kye Seong</b>	Korea	Mir-124a Is Important for Migratory Cell Fate Transition during Gastrulation of Human Embryonic Stem Cells
122	<b>Kobayashi, Yasuhisa</b>	Japan	Sexually Dimorphic Expression of Gonadotropin Subunits in the Pituitary of Protogynous Honeycomb Grouper ( <i>Epinephelus Merra</i> ): Evidence That Follicle-Stimulating Hormone (FSH) Induces Gonadal Sex Change
123	<b>Kobayashi, Masayuki</b>	Japan	Cloning of cDNAs Encoding Structurally Related Homeoproteins from Preimplantation Mouse Embryos: Their Involvement in the Differentiation of Embryonic Stem Cells
124	<b>Kodati, Vijayalakshmi</b>	India	Tumor Necrosis Factor Alpha -C850T Polymorphism Is Significantly Associated with Endometriosis in Asian Indian Women
125	<b>Koegler, Gesine</b>	Germany	DLK-1 as a Marker to Distinguish USSC and MSC in Cord Blood
126	<b>Kucuk, Mert</b>	Turkey	Effect of Energy Expenditure and Physical Activity on the Outcomes of Assisted Reproduction Treatment
127	<b>Kumar, Pradeep</b>	India	Progesterone-Induced Reorganization of NOX-2 Components in Membrane Rafts Is Critical for Sperm Functioning in <i>Capra Hircus</i>
128	<b>Kumbak, Banu</b>	Turkey	Ovarian Stimulation in Women with High and Low Body Mass Index: GnRH Agonist versus GnRH Antagonist
129	<b>Kunova, Michaela</b>	Czech	Development of Humanized Culture Medium with Plant-Derived Serum Replacement for Human Pluripotent Stem Cells
130	<b>Laurie, Andrew</b>	New Zealand	Preimplantation Genetic Diagnosis for Hemophilia a Using Indirect Linkage Analysis and Direct Genotyping Approaches
131	<b>Lei, Zhenmin</b>	USA	The Role of RXFP2 in Mediating Androgen-Induced Inguinoscrotal Testis Descent in LH Receptor Knockout
132	<b>Levine, Fred</b>	USA	Pancreatic Beta-Cell Neogenesis by Direct Conversion from Mature Alpha-Cells
133	<b>Liehr, Thomas</b>	Germany	Genotype-Phenotype Correlation in Patients with Small Supernumerary Marker Chromosomes
134	<b>Lokman, Pieter</b>	New Zealand	Regulation of Previtellogenic Oocyte Growth in Teleost Fish - Does It Come Down to Androgens, Metabolic Hormones and Transforming Growth Factor-Beta Family Members?
135	<b>Lopes, Ana</b>	Australia	Oxygen Consumption and ROS Production Are Increased at the Time of Fertilization and Cell Cleavage in Bovine Zygotes
136	<b>Mahmoudi, Touraj</b>	Iran	Calcitropic Hormones, Insulin Resistance and the Polycystic Ovary Syndrome
137	<b>Malo, Aurelio</b>	USA	Effects of Genetic Captive-Breeding Protocols on Sperm Quality and Fertility





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138	<b>Mardanian, Farahnaz</b>	Iran	Diagnostic Value of Prostate-Specific Antigen (PSA) in Women with Polycystic Ovary Syndrome (PCOS)
139	<b>Mateo, Rafael</b>	Spain	Changes in Fatty Acid Profiles in Testis and Spermatozoa of Red Deer Exposed to Metal Pollution
140	<b>Matunis, Erika</b>	USA	Epigenetic Regulation of Stem Cell Maintenance in the Drosophila Testis via the Nucleosome-Remodeling Factor Nurf
141	<b>Mendeluk, Gabriela</b>	Argentina	Assessment of Human Sperm Protein Tyrosine Phosphorylation by Immunocytochemistry in a Clinical Andrology Laboratory. Preliminary Data
142	<b>Merviel, Philippe</b>	France	Predictive Factors for Pregnancy After Intrauterine Insemination (IUI): An Analysis of 1,038 Cycles and a Review of the Literature.
143	<b>Miao, Dengshun</b>	China	Defective Female Reproductive Function in 1,25(OH) <sub>2</sub> D Deficient Mice Results from an Indirect Effect Mediated by Extracellular Calcium and/or Phosphorus
144	<b>Milan, Peiman</b>	Iran	Effect of Methanol Extract of Polygonum Avicular on Sperm Parameter
145	<b>Milán, Miguel</b>	Spain	Redefining Advanced Maternal Age as an Indication for Preimplantation Genetic Screening
146	<b>Mirilas, Petros</b>	Greece	Effect of Testis Nondescent or Orchidopexy on Antisperm Antibodies and Testis Histology in Rats
147	<b>Mishra, Pradyumna</b>	India	Stress Induced Premature Senescence: Friend or Foe of Ovarian Tumorigenesis?
148	<b>Misro, Man</b>	India	Effect of Chronic Oestrogen Administration on Androgen Receptor Expression in Reproductive Organs and Pituitary of Adult Male Rat
149	<b>Mizuno, Reiko</b>	Japan	Increase in Male Fetal Deaths in Japan and Congenital Anomalies of the Kidney and Urinary Tract
150	<b>Moccia, Francesco</b>	Italy	Store-Operated Ca <sup>2+</sup> Entry Is Expressed in Human Endothelial Progenitor Cells
151	<b>Mondal, Mohan</b>	India	Characterization of Mithun (Bos Frontalis) Ejaculates and Fertility of Cryopreserved Sperm
152	<b>Moreno, Ricardo</b>	Chile	TACE/ADAM17 Is Involved in Physiological and Etoposide-Induced Germ Cell Apoptosis during Rat Spermatogenesis
153	<b>Murrell, Dedee</b>	Australia	First Double-Blind RCT of Intradermal Allogeneic Fibroblast Therapy for Generalized Severe Recessive Dystrophic Epidermolysis Bullosa
154	<b>Naessen, Tord</b>	Sweden	Steroid Profiles in Ovarian Follicular Fluid in Women with and without Polycystic Ovary Syndrome, Analyzed by Liquid Chromatography-Tandem Mass Spectrometry
155	<b>Nagy, György</b>	Hungary	Salsolinol (SAL), a Dopamine (DA) Derived Endogenous Prolactin Releasing Factor (PRF), Inhibits Copulatory Behavior
156	<b>Nakamura, Yoshiaki</b>	Japan	Germline Replacement by Transfer of Primordial Germ Cells into Partially Sterilized Embryos in the Chicken
157	<b>Nakauchi, Hiromitsu</b>	Japan	Heterogeneity and Hierarchy within the Most Primitive Hematopoietic Stem Cell Compartment
158	<b>Nandi, Sumanta</b>	India	Identification, Purification, Characterization (Biochemical and Functional) of a Novel Follicular Fluid Peptide: Application in Management of Female Infertility
159	<b>Nasiri, Ebrahim</b>	Iran	The Effect of Retinoic Acid on in vitro Maturation and Fertilization Rate of Mouse Germinal Vesicle Stage Oocytes
160	<b>Nasr, Ahmed</b>	Egypt	Effect of N-Acetyl-Cysteine After Ovarian Drilling in Clomiphene Citrate-Resistant PCOS Women: A Pilot Study
161	<b>Navarro-Costa, Paulo</b>	Portugal	Incorrect DNA Methylation of the DAZL Promoter CpG Island Associates with Defective Human Sperm
162	<b>Nayak, Bibhukalyan</b>	Singapore	In vitro Study of Stem Cell Communication via Gap-Junctions for Fibrocartilage Regeneration at Enteses
163	<b>Ndiaye, Kalidou</b>	USA	Molecular Characterization and Expression of DERL1 in Bovine Ovarian Follicles and Corpora Lutea
164	<b>Nishida, Masato</b>	Japan	Conservative Surgical Management for Diffuse Uterine Adenomyosis
165	<b>Nishimura, Takashi</b>	Japan	Local Radiation Therapy Inhibits Tumor Growth through the Generation of Tumor-Specific CTL: Its Potentiation By Combination with Th1 Cell Therapy
166	<b>Nouri, Mohammad</b>	Iran	Effects of Chronic Heat Stress on Testicular Structures, Serum Testosterone and Cortisol Concentrations in Developing Lambs

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167	<b>Novotna</b> , Bozena	Czech	Effect of Different Activation Modes on DNA Integrity of Porcine M II Oocytes Matured in vitro
168	<b>Nowroozi</b> , Mohammad Reza	Iran	Is Karyotyping and Y Chromosome Microdeletion Study Necessary in Men Candidate for ICSI?
169	<b>Nowroozi</b> , Mohammad Reza	Iran	Serum Inhibin B Concentration as a Prognostic Factor for Prediction of Sperm Retrieval in Testis Biopsy of Patients with Azoospermia
170	<b>Nowroozi</b> , Mohammad Reza	Iran	Antisperm Antibody Formation Following Vasectomy
171	<b>Oktay</b> , Kutluk	USA	Ovarian Cryopreservation and Transplantation for Fertility Preservation for Medical Indications: Report of an Ongoing Experience
172	<b>Orendi</b> , Kristina	Austria	The Choriocarcinoma Cell Line Bewo: Syncytial Fusion and Expression of Syncytium-Specific Proteins
173	<b>Othman</b> , Ibrahim	Saudi Arabia	Microsurgical and Nonmagnified Subinguinal Varicocelectomy for Infertile Men: A Comparative Study
174	<b>Oyama</b> , Rie	Japan	Anti-Mullerian Hormone and 3D-Power Doppler Histogram: Markers of Ovarian Function with in vitro Fertilization Treatment
175	<b>Panepucci</b> , Rodrigo	Brazil	Increased Levels of NOTCH1, NF-Kb, and Other Interconnected Transcription Factors Characterize Primitive Sets of Hematopoietic Stem Cells
176	<b>Parmegiani</b> , Lodovico	Italy	“Physiologic ICSI”: Hyaluronic Acid (HA) Favors Selection of Spermatozoa without DNA Fragmentation and with Normal Nucleus, Resulting in Improvement of Embryo Quality
177	<b>Parmegiani</b> , Lodovico	Italy	Sterilization of Liquid Nitrogen with Ultraviolet Irradiation for Safe Vitrification of Human Oocytes or Embryos
178	<b>Payne</b> , Christopher	USA	Sin3a Is Required by Sertoli Cells to Establish a Niche for Undifferentiated Spermatogonia, Germ Cell Tumors, and Spermatid Elongation
179	<b>Pei</b> , Gang	China	A Mesenchymal-to-Epithelial Transition Initiates and Is Required for the Nuclear Reprogramming of Mouse Fibroblasts
180	<b>Pei</b> , Gang	China	E-Cadherin-Mediated Cell-Cell Contact Is Critical for Induced Pluripotent Stem Cell Generation
181	<b>Pereira</b> , Carlos-Filipe	UK	Heterokaryon-Based Reprogramming for Pluripotency
182	<b>Pesce</b> , Maurizio	Italy	Production of Human CD133+ Cells Under Good Manufacturing Practice: A Step Forward to Translation in Cardiovascular Cell Therapy
183	<b>Piccirillo</b> , Sara	Italy	Functional and Molecular Characterization of Cancer Stem Cells in Human Glioblastoma
184	<b>Piemonti</b> , Lorenzo	Italy	Bone Marrow as Ideal Microenvironment for Human Islet Transplantation to Treat Type 1 Diabetes (Clinicaltrials.gov Identifier: NCT01345227)
185	<b>Pires</b> , Eusebio	India	Multiplicity of Auto-Antigens in Human Ovarian Autoimmunity
186	<b>Maria</b> , Grazia	Italy	Pain and Ovarian Endometrioma Recurrence After Laparoscopic Treatment of Endometriosis: A Long-Term Prospective Study
187	<b>Potdar</b> , Pravin	India	Human Breast Cancer Stem Cells – in vitro Model System to Study Mechanism of Breast Cancer and Identification of Molecular Target for Breast Cancer Therapy
188	<b>Potdar</b> , Pravin	India	BRCA1 and BRCA2 Germ Line Mutation Studies in Indian Breast Cancer Patients to Identify Early Diagnostic Bio-Markers for Evaluation of Breast Cancer Risk Factor in Their Family Members
189	<b>Pribenszky</b> , Csaba	Hungary	Time-Lapse Based Elective Single Embryo Transfer, and the First Baby Born by the Method
190	<b>Quesenberry</b> , Peter	USA	Expression of Cell-Cycle Related Genes with Cytokine-Induced Cell Cycle Progression of Primitive Hematopoietic Stem Cells
191	<b>Rahmani</b> , Azam	Iran	Psychosomatic Disorders in Infertile Couples
192	<b>Rahmani</b> , Azam	Iran	Men Involvement in Reproductive Health
193	<b>Rashidi</b> , Batool	Iran	Simvastatin Effects on Androgens, Inflammatory Mediators, and Endogenous Pituitary Gonadotropins Among Patients with PCOS Undergoing IVF: Results from a Prospective Randomized Placebo-Controlled Clinical Trial
194	<b>Razzaque</b> , Mohammed	USA	Dietary and Genetic Evidence for Phosphate Toxicity Accelerating Mammalian Aging













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195	Renwick, Pamela	UK	Preimplantation Genetic Haplotyping: 127 Diagnostic Cycles Demonstrating a Robust, Efficient Alternative to Direct Mutation Testing on Single Cells
196	Resende, Rodrigo	Brazil	Intracellular Ca <sup>2+</sup> Regulation during Neuronal Differentiation of Murine Embryonal Carcinoma and Mesenchymal Stem Cells
197	Revelli, Alberto	Italy	Slow-Freezing-Induced Changes of Birefringent Structures in Human Oocytes Are Related to Responsiveness to Ovulation Induction
198	Rodriguez-Sosa, Jose	Canada	Development of Strips of Ovine Testes After Xenografting under the Skin of Mice and Co-Transplantation of Exogenous Spermatogonia with Grafts
199	Sabour, Davood	Germany	Identification of Genes Specific to Mouse Primordial Germ Cells through Dynamic Global Gene Expression
200	Sacks, Gavin	Australia	Detailed Analysis of Peripheral Blood Natural Killer (NK) Cells in Women with Recurrent Miscarriage
201	Salehpour, Saghar	Iran	N Acetyl Cysteine, a Novel Remedy for Poly Cystic Ovarian Syndrome
202	Salehpour, Saghar	Iran	Evaluation of Homocysteine Levels in Patients with Polycystic Ovarian Syndrome
203	Salmassi, Ali	Germany	Important Role of Macrophage Colony-Stimulating Factor during Menstrual Cycle and Early Pregnancy Phase in Ovarian Stimulated IVF-Patients
204	Santalo, Josep	Spain	Analysis of Several Parameters Influencing the Derivation of Mouse Embryonic Stem Cell Lines from Isolated Blastomeres
205	Saremi, Nasim	Malaysia	Determination of Stem Cell Localization in Term Human Placenta by Immunohistochemical Study
206	Saric, Tomo	Germany	Fibroblasts Facilitate the Engraftment of Embryonic Stem Cell-Derived Cardiomyocytes on Three-Dimensional Collagen Matrices and Aggregation in Hanging Drops
207	Sarraj, Mai	Australia	Fetal Testis Dysgenesis and Compromised Leydig Cell Function in Tgfr3 (Betaglycan) Knockout Mice
208	Schalken, Jack	The Netherlands	Stem Cell Characteristics of Prostate Cancer Cell Lines
209	Sekhavat, Leila	Iran	Pre-Pregnancy Obesity Can Increase the Risk of Cesarean Section
210	Sekhavat, Leila	Iran	Role of Maternal Anaemia and Preterm Birth
211	Sekhavat, Leila	Iran	A Randomised Placebo-Controlled Trial to Determine the Effect of Iron Supplementation on Neonatal Outcome in Pregnant Women with Normal Hemoglobin (Hb=11-13)
212	Sekhavat, Leila	Iran	The Prevalence of Polycystic Ovaries in a Population of Randomly Selected Healthy Women of Reproductive Age
213	Seppan, Prakash	India	Therapeutic Efficacy of Mucuna Pruriens (Linn.) on Male Sexual Behavior, Sperm Parameters and Oxidative Stress Induced Structural Alteration of Corpus Caverosum in Diabetic Rat
214	Sereni, Maria Isabella	Italy	Intraoperative Contact Ultrasonography during Open Myomectomy for Uterine Fibroids
215	Sergeev, Sergey	Russian Federation	A New Model for Stem Cells Transdifferentiation After in vitro Transplantation in Neural Tissue
216	Seyedhassani, Mohammad	Iran	Molecular Study of Internal Apoptotic Pathway BAX and BCL2 Genes and Mitochondrial Genome in Idiopathic Repeated Pregnancy Loss
217	Shahhoseini, Maryam	Iran	Epigenetic Analysis of Human Embryonal Stem Cells during Neural Differentiation Induced by Retinoic Acid
218	Shahrokhi, Somayeh	Iran	The Expression of CD44 in Cord Blood CD34+Cells Affected by Substance P
219	Sharma, Indu	India	In vitro Effects of Atorvastatin on LPS-Induced Gene Expression in Endometriotic Stromal Cells
220	Sharp, Richard	USA	Moral Attitudes and Beliefs Among Couples Pursuing PGD for Sex Selection
221	Shetty, Ashok	USA	Medial Ganglionic Eminence-Derived Neural Stem Cell Grafts Ease Spontaneous Seizures and Restore GDNF Expression in a Rat Model of Chronic Temporal Lobe Epilepsy
222	Silber, Sherman	USA	Duration of Fertility After Fresh and Frozen Ovary Transplantation
223	Sills, E Scott	Ireland	A Descriptive Study of Selected Oocyte, Blood and Organ/Tissue Donation Features Among Fertility Patients in Ireland
224	Singh, Rajender	India	Mitochondria, Spermatogenesis and Male Infertility

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225	<b>Singh, Harmeet</b>	UK	Early Stages of Implantation as Revealed by an in vitro Model
226	<b>Singh, Kiran</b>	India	MTHFR A1298C Polymorphism and Idiopathic Male Infertility
227	<b>Sironen, Anu</b>	Finland	Molecular Genetics of the Immotile Short Tail Sperm Defect
228	<b>Soleimani, Reza</b>	Belgium	Xenotransplantation of Cryopreserved Human Ovarian Tissue into Murine Back Muscle
229	<b>Spencer, Jessica</b>	USA	Discontinuation of RLH Two Days Before HCG May Increase the Number of Oocytes Retrieved in IVF
230	<b>Stewart, Elizabeth</b>	USA	Safely Extending Focused Ultrasound Surgery for Uterine Leiomyomas to Women Who Desire Future Pregnancies
231	<b>Strauer, Bodo</b>	Germany	The Acute and Long-Term Effects of Intracoronary Stem Cell Transplantation in 191 Patients with Chronic Heart Failure: the Star-Heart Study
232	<b>Sumer, Huseyin</b>	Australia	Reprogramming of Somatic Cells After Fusion with iPS and Ntes Cells
233	<b>Syrigos, Kostas</b>	Greece	Effects of Taxane-Based Chemotherapy on Inhibin B and Gonadotropins as Biomarkers of Spermatogenesis
234	<b>Takabayashi, Chikako</b>	Japan	Support for Infertility Treatment in Japan: Differences in Perceptions Between Female Clients and Staff
235	<b>Talebi, Alireza</b>	Iran	Effects of Ethanol Consumption on Chromatin Condensation and DNA Integrity of Epididymal Spermatozoa in Rat
236	<b>Tang, Liping</b>	USA	The Effect of Incorporation of SDF-1 $\alpha$ into PLGA Scaffolds on Stem Cell Recruitment and the Inflammatory Response
237	<b>Tanrikut, Cigdem</b>	USA	Adverse Effect of Paroxetine on Sperm
238	<b>Tanriover, Gamze</b>	Turkey	Presence of the Brain Proteins Cerebral Cavemous Malformation-2 and Cerebral Cavemous Malformation-3 in Rat Testis and Their Potential Role in Experimental Varicocele
239	<b>Tardif, Steve</b>	UK	Infertility with Impaired Zona Pellucida Adhesion of Spermatozoa from Mice Lacking Taucstf-64
240	<b>Taylor, Hugh</b>	USA	A Novel Mutation of Hoxa13 in a Family with Hand-Foot-Genital Syndrome and the Role of Polyalanine Expansions in the Spectrum of Müllerian Fusion Anomalies
241	<b>Teng, Shu-ChUn</b>	Taiwan	KLF4-Dependent Telomerase Activation in Stem Cells
242	<b>Tezuka, Ken-Ichi</b>	Japan	Dental Pulp Cells for Induced Pluripotent Stem Cell Banking
243	<b>Thomas, Paul</b>	Australia	Identification of SOX3 as an XX Male Sex Reversal Gene in Mice and Humans
244	<b>Tokaç, Mehmet</b>	Turkey	Autologous Transplantation of Arterial Cells Improves Cardiac Function in a Rabbit Model of Infarcted Myocardium
245	<b>Trosko, James</b>	USA	Oct4 Expression in Adult Human Stem Cells: Evidence in Support of the Stem Cell Theory of Carcinogenesis
246	<b>Tskitishvili, Ekaterine</b>	Japan	Oxidative Stress-Induced S100B Protein Expression from Placenta and Amnion Might Affect Soluble Endoglin Release from Endothelial Cells: Pathophysiologic Implications in Pre-Eclampsia
247	<b>Udolph, Gerald</b>	Singapore	Pregnancy-Associated Progenitor Cells Differentiate and Mature into Neurons in the Maternal Brain
248	<b>Usui, Hirokazu</b>	Japan	The Risk of Post-Molar Gestational Trophoblastic Neoplasia Is Higher in Heterozygous Than in Homozygous Complete Hydatidiform Moles
249	<b>Van Den Broeck, Uschi</b>	Belgium	Predictors of Psychological Distress in Patients Starting IVF-Treatment: Infertility Specific versus General Psychological Characteristics
250	<b>Vázquez, M. Isabel</b>	Argentina	Effects of Treatment with a Prostaglandin Analogue on Developmental Dynamics and Functionality of Induced Corpora Lutea in Goats
251	<b>Venkataramana, Neelam</b>	India	Open-Labeled Study of Unilateral Autologous Bone-Marrow-Derived Mesenchymal Stem Cell Transplantation in Parkinson's Disease
252	<b>Vikram, Ajit</b>	India	Insulin-Resistance Associated Compensatory Hyperinsulinemia and Prostatic Hyperplasia
253	<b>Wan, Andrew</b>	Singapore	The Effect of Matrix Stiffness on Mesenchymal Stem Cell Differentiation in a 3D Thixotropic Gel











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254	Wang, Hsei-Wei	Taiwan	Functional Module Analysis Reveals Differential Osteogenic and Stemness Potentials in Human Mesenchymal Stem Cells from Bone Marrow and Wharton's Jelly of Umbilical Cord
255	Wang, Songlin	China	Allogeneic Dental Stem Cell-Mediated Tissue Regeneration in Swine
256	Wang, Guoyun	China	Neuroendocrine Cells in Eutopic Endometrium of Women with Endometriosis
257	Wang, Shu-Li	Taiwan	Association Between Phthalate Exposure and Glutathione S-Transferase (GST) M1 Polymorphism in Adenomyosis, Leiomyoma, and Endometriosis
258	Wang, Zengyan	China	Embryo Vitrification Affects the Methylation of the H19/ Igf2 Differentially Methylated Domain and the Expression of H19 and Igf2
259	Wang, Fei	USA	High-Efficiency Induction of Neural Conversion in Hescs and Hipses with a Single Chemical Inhibitor of TGF-Beta Superfamily Receptors
260	Wang, Hse-Wei	Taiwan	SNAIL Regulates Interleukin-8 Expression, Stem-Cell-Like Activity, and Umorigenicity of Human Colorectal Carcinoma Cells
261	Watanabe, Hiroyuki	Japan	Fertilizability, Developmental Competence, and Chromosomal Integrity of Oocytes Microinjected with Pre-Treated Spermatozoa in Mice
262	Wei, Jian-Jun	USA	Cellular Senescence in Usual Type Uterine Leiomyoma
263	Xella, Susanna	Italy	Embryo Quality and Implantation Rate in Two Different Culture Media: ISM1 versus Universal IVF Medium
264	Yamazaki, Yukiko	USA	Direct Effects of Retinoic Acid on Entry of Fetal Male Germ Cells into Meiosis in Mice
265	Yang, Wucai	China	Polymorphisms in the 5' Upstream Region of the FSH Receptor Gene, and Their Association with Superovulation Traits in Chinese Holstein Cows
266	Yaniz, Jesus	Spain	Bacteriospermia in the Ram
267	Yeoh, George	Australia	Liver Cancer Stem Cells Are Present in "Normal" Tissue Adjacent to Hepatocellular Carcinoma
268	Ying, Jackie	Singapore	The Effect of Matrix Stiffness on Mesenchymal Stem Cell Differentiation in a 3D Thixotropic Gel
269	Zarei, Masoumeh	Iran	Assessment of Apoptosis Marker in Novel Sperm Selection Procedure
270	Zhang, John	USA	Minimal Ovarian Stimulation (Mini-IVF) for IVF Utilizing Vitrification and Cryopreserved Embryo Transfer
271	Zhang, Heping	USA	Decision Trees for Identifying Predictors of Treatment Effectiveness in Clinical Trials and Its Application to Ovulation in a Study of Women with Polycystic Ovary Syndrome
272	Zhang, Hao	China	Some Variations of the TSSK2 Gene May Be Associated with Impaired Spermatogenesis
273	Zheng, Yixian	USA	The Coupling of Cell Division, Cell Morphogenesis, and Cell Fate Specification in Preimplantation Embryos
274	Zhi, Liu	China	Male Infertility in China: Laboratory Finding for AZF Microdeletions and Chromosomal Abnormalities in Infertile Men from Northeastern China
275	Wen, Liang	China	Functional Studies of Acid Transporter in Cultured Rat Epididymal Cell
276	Zhu, Wenjie	China	Injection of Day 2 Embryo Culture Supernatant into the Uterine Cavity Didn't Improve Pregnancy Rates of Day 3 Embryo Transfer in Patients Who Underwent in vitro Fertilization-Embryo Transfer: A Randomized Clinical Trial
277	Zoheir, Khairy	Egypt	A Rapid Method for Sexing the Bovine Embryo
278	Zolghadri, Jaleh	Iran	Relationship Between Abnormal Glucose Tolerance Test and History of Previous Recurrent Miscarriages, and Beneficial Effect of Metformin in These Patients: A Prospective Clinical Study
279	Zolghadri, Jaleh	Iran	The Value of Hysteroscopy in Diagnosis of Chronic Endometritis in Patients with Unexplained Recurrent Spontaneous Abortion
280	Zribi, Nassira	Tunisia	Effects of Cryopreservation on Human Sperm Deoxyribonucleic Acid Integrity

## NOMINEES | ANDROLOGY |














<b>Balasinor, Nafisa</b>	 India	Molecular Mechanism of Estrogen Action in Spermiation
<b>Cobellis, Gilda</b>	 Italy	2-AG Regulates Sperm Motility
<b>Esteves, Sandro</b>	 Brazil	Clinical Outcome of Intracytoplasmic Sperm Injection in Infertile Men with Treated and Untreated Clinical Varicocele
<b>Lei, Zhenmin</b>	 USA	The Role of RXFP2 in Mediating Androgen-Induced Inguinoscrotal Testis Descent in LH Receptor Knockout
<b>Mirilas, Petros</b>	 Greece	Effect of Testis Nondescent or Orchidopexy on Antisperm Antibodies and Testis Histology in Rats
<b>Rodriguez-Sosa, Jose</b>	 Canada	Development of Strips of Ovine Testes After Xenografting Under the Skin of Mice and Co-Transplantation of Exogenous Spermatogonia with Grafts
<b>Seppan, Prakash</b>	 India	Therapeutic Efficacy of Mucuna Pruriens (Linn.) on Male Sexual Behavior, Sperm Parameters and Oxidative Stress Induced Structural Alteration of Corpus Cavernosum in Diabetic Rat
<b>Sironen, Anu</b>	 Finland	Molecular Genetics of the Immotile Short Tail Sperm Defect
<b>Talebi, Ali Reza</b>	 Iran	Effects of Ethanol Consumption on Chromatin Condensation and DNA Integrity of Epididymal Spermatozoa in Rat
<b>Tanriover, Gamze</b>	 Turkey	Presence of the Brain Proteins Cerebral Cavernous Malformation-2 and Cerebral Cavernous Malformation-3 in Rat Testis and Their Potential Role in Experimental Varicocele



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<b>Asselin, Eric</b>	 Canada	Expression of COX-1 and COX-2 in the Endometrium of Cyclic, Pregnant and in a Model of Pseudopregnant Rats and Their Regulation by Sex Steroids
<b>Franco Jr, Jose</b>	 Brazil	Comparison of Day 2 Embryo Quality After Conventional ICSI versus Intracytoplasmic Morphologically Selected Sperm Injection (IMSI) Using Sibling Oocytes
<b>Hosseini, Morteza</b>	 Iran	Development of an Optimized Zona-Free Method of Somatic Cell Nuclear Transfer in the Goat
<b>Huang, Yen-Hua</b>	 Taiwan	Characterization of a Novel Cell-Surface Protein Expressed in Human Sperm
<b>Lopes, Ana</b>	 Australia	Oxygen Consumption and ROS Production Are Increased at the Time of Fertilization and Cell Cleavage in Bovine Zygotes
<b>Nandi, Sumanta</b>	 India	Identification, Purification, Characterization (Biochemical and Functional) of a Novel Follicular Fluid Peptide: Application in Management of Female Infertility
<b>Oktay, Kutluk</b>	 USA	Ovarian Cryopreservation and Transplantation for Fertility Preservation for Medical Indications: Report of an Ongoing Experience
<b>Silber, Sherman</b>	 USA	Duration of Fertility After Fresh and Frozen Ovary Transplantation
<b>Sironen, Anu</b>	 Finland	Molecular Genetics of the Immotile Short Tail Sperm Defect
<b>Tardif, Steve</b>	 UK	Infertility with Impaired Zona Pellucida Adhesion of Spermatozoa from Mice Lacking Taucstf-64











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<b>Amidu, Nafiu</b>	 Ghana	Incidence of Sexual Dysfunction: A Prospective Survey in Ghanaian Females
<b>Brinton, Louise</b>	 USA	Cancer Risk Among Infertile Women with Androgen Excess or Menstrual Disorders (Including Polycystic Ovary Syndrome)
<b>Dahl, Edgar</b>	 Germany	Religion, Reproduction and Public Policy: Disentangling Morality from Theology
<b>Ekeke, Emeka</b>	 Nigeria	Solving the Problem of Infertility Among Christians: A Bioethical Appraisal
<b>Fuentes Garcia, Ariel</b>	 Chile	Recent Cigarette Smoking and Assisted Reproductive Technologies Outcome
<b>Goh, Victor</b>	 USA	Sleep, Sex Steroid Hormones, Sexual Activities, and Aging in Asian Men
<b>Issa, Yaser</b>	 Norway	Fecundability Among Newly Married Couples in Agricultural Villages in Palestine: A Prospective Study
<b>Kucuk, Mert</b>	 Turkey	Effect of Energy Expenditure and Physical Activity on the Outcomes of Assisted Reproduction Treatment
<b>Milán, Miguel</b>	 Spain	Redefining Advanced Maternal Age as an Indication for Preimplantation Genetic Screening
<b>Sharp, Richard</b>	 USA	Moral Attitudes and Beliefs Among Couples Pursuing PGD for Sex Selection
<b>Takabayashi, Chikako</b>	 Japan	Support for Infertility Treatment in Japan: Differences in Perceptions Between Female Clients and Staff
<b>Van Den Broeck, Uschi</b>	 Belgium	Predictors of Psychological Distress in Patients Starting IVF-Treatment: Infertility Specific versus General Psychological Characteristics
<b>Zhang, Heping</b>	 USA	Decision Trees for Identifying Predictors of Treatment Effectiveness in Clinical Trials and Its Application to Ovulation in a Study of Women with Polycystic Ovary Syndrome















## NOMINEES | FEMALE INFERTILITY |














<b>Alborzi, Saeed</b>	 Iran	A Comparison of Histopathologic Findings of Ovarian Tissue Inadvertently Excised with Endometrioma and Other Kinds of Benign Ovarian Cyst in Patients Undergoing Laparoscopy versus Laparotomy
<b>Ashrafi, Mahnaz</b>	 Iran	The Effect of Low Dose Human Chorionic Gonadotropin on Follicular Response and Oocyte Maturation in PCOS Patients Undergoing IVF Cycles: A Randomized Clinical Trial of Efficacy and Safety
<b>Florio, Pasquale</b>	 Italy	Evaluation of Endometrial Activin a Secretion for Prediction of Pregnancy After Intrauterine Insemination
<b>Hong, Seung</b>	 USA	Vitrification of Oocytes Produces High Pregnancy Rates When Carried Out in Fertile Women
<b>Oktay, Kutluk</b>	 USA	Ovarian Cryopreservation and Transplantation for Fertility Preservation for Medical Indications: Report of an Ongoing Experience
<b>Rashidi, Batool</b>	 Iran	Simvastatin Effects on Androgens, Inflammatory Mediators, and Endogenous Pituitary Gonadotropins Among Patients with PCOS Undergoing IVF: Results from a Prospective Randomized Placebo-Controlled Clinical Trial
<b>Silber, Sherman</b>	 USA	Duration of Fertility After Fresh and Frozen Ovary Transplantation
<b>Stewart, Elizabeth</b>	 USA	Safely Extending Focused Ultrasound Surgery for Uterine Leiomyomas to Women Who Desire Future Pregnancies
<b>Zolghadri, Jaleh</b>	 Iran	Relationship Between Abnormal Glucose Tolerance Test and History of Previous Recurrent Miscarriages, and Beneficial Effect of Metformin in These Patients: A Prospective Clinical Study
<b>Zolghadri, Jaleh</b>	 Iran	The Value of Hysteroscopy in Diagnosis of Chronic Endometritis in Patients with Unexplained Recurrent Spontaneous Abortion

## NOMINEES | REPRODUCTIVE GENETICS |








<b>Balasinor, Nafisa</b>	 India	Molecular Mechanism of Estrogen Action in Spermiation
<b>Chieffi, Paolo</b>	 Italy	Down-Regulation of Estrogen Receptor-B Associates with Transcriptional Coregulator PATZ1 Delocalization in Human Testicular Seminomas
<b>Faridi, Rehan</b>	 India	Killer Immunoglobulin-Like Receptors (KIR) and HLA-C Allorecognition Patterns Implicative of Dominant Activation of Natural Killer Cells Contribute to Recurrent Miscarriages
<b>Herlihy, Amy</b>	 Australia	Assessing the Risks and Benefits of Diagnosing Genetic Conditions with Variable Phenotypes through Population Screening: Klinefelter Syndrome as an Example
<b>Lei, Zhenmin</b>	 USA	The Role of RXFP2 in Mediating Androgen-Induced Inguinoscrotal Testis Descent in LH Receptor Knockout
<b>Liehr, Thomas</b>	 Germany	Genotype-Phenotype Correlation in Patients with Small Supernumerary Marker Chromosomes
<b>Navarro-Costa, Paulo</b>	 Portugal	Incorrect DNA Methylation of the DAZL Promoter CpG Island Associates with Defective Human Sperm
<b>Sabour, Davood</b>	 Germany	Identification of Genes Specific to Mouse Primordial Germ Cells through Dynamic Global Gene Expression
<b>Thomas, Paul</b>	 Australia	Identification of SOX3 as an XX Male Sex Reversal Gene in Mice and Humans
<b>Usui, Hirokazu</b>	 Japan	The Risk of Post-Molar Gestational Trophoblastic Neoplasia Is Higher in Heterozygous Than in Homozygous Complete Hydatidiform Moles




## NOMINEES | STEM CELL BIOLOGY & TECHNOLOGY |

<b>Beigi Boroujeni, Mandana</b>	 Iran	The Effect of Co-Culture System, Erythropoietin and Bone Morphogenetic Protein 4 on the Differentiation of Embryonic Stem Cells to Erythroid Colonies
<b>Erceg, Slaven</b>	 Spain	Transplanted Oligodendrocytes and Motoneuron Progenitors Generated from Human Embryonic Stem Cells Promote Locomotor Recovery After Spinal Cord Transection
<b>Frank, Markus</b>	 USA	EGFR-1 Expressed by Malignant Melanoma-Initiating Cells Is Required for Tumor Growth
<b>Golipour, Azadeh</b>	 Canada	Functional Genomics Reveals a BMP Driven Mesenchymal-To-Epithelial Transition in the Initiation of Somatic Cell Reprogramming
<b>Murrell, Dedee</b>	 Australia	First Double-Blind RCT of Intradermal Allogeneic Fibroblast Therapy for Generalized Severe Recessive Dystrophic Epidermolysis Bullosa
<b>Nakauchi, Hiromitsu</b>	 Japan	Heterogeneity and Hierarchy within the Most Primitive Hematopoietic Stem Cell Compartment
<b>Pereira, Carlos-Filipe</b>	 UK	Heterokaryon-Based Reprogramming for Pluripotency
<b>Piccirillo, Sara</b>	 Italy	Functional and Molecular Characterization of Cancer Stem Cells in Human Glioblastoma
<b>Piemonti, Lorenzo</b>	 Italy	Bone Marrow as Ideal Microenvironment for Human Islet Transplantation to Treat Type 1 Diabetes (Clinicaltrials.gov Identifier: NCT01345227)
<b>Shahhoseini, Maryam</b>	 Iran	Epigenetic Analysis of Human Embryonal Stem Cells During Neural Differentiation Induced by Retinoic Acid
<b>Strauer, Bodo</b>	 Germany	The Acute and Long-Term Effects of Intracoronary Stem Cell Transplantation in 191 Patients with Chronic Heart Failure: The STAR-Heart Study
<b>Wang, Songlin</b>	 China	Allogeneic Dental Stem Cell-Mediated Tissue Regeneration in Swine
<b>Ying, Jackie</b>	 Singapore	The Effect of Matrix Stiffness on Mesenchymal Stem Cell Differentiation in a 3D Thixotropic Gel

## NOMINEES | REPRODUCTIVE IMAGING |

<b>Barri, Pedro</b>	 Spain	Endometriosis-Associated Infertility. Surgery and IVF: A Comprehensive Therapeutic Approach
<b>Brinton, Louise</b>	 USA	Cancer Risk Among Infertile Women with Androgen Excess or Menstrual Disorders (Including Polycystic Ovary Syndrome)
<b>Donkol, Ragab</b>	 Egypt	Imaging in Male-Factor Obstructive Infertility
<b>Oyama, Rie</b>	 Japan	Anti-Mullerian Hormone and 3D-Power Doppler Histogram: Markers of Ovarian Function with in vitro Fertilization Treatment
<b>Sereni, Maria Isabella</b>	 Italy	Intraoperative Contact Ultrasonography during Open Myomectomy for Uterine Fibroids
<b>Stewart, Elizabeth</b>	 USA	Safely Extending Focused Ultrasound Surgery for Uterine Leiomyomas to Women Who Desire Future Pregnancies
<b>Vázquez, M. Isabel</b>	 Argentina	Effects of Treatment with a Prostaglandin Analogue on Developmental Dynamics and Functionality of Induced Corpora Lutea in Goats

## NOMINEES | ANIMAL BIOTECHNOLOGY |

<b>Behboodi, Esmail</b>	 Canada	Establishment of Goat Embryonic Stem Cells from in vivo Produced Blastocyst-Stage Embryos
<b>Dochi, Osamu</b>	 Japan	Factors Affecting Reproductive Performance in Holstein Cows and Improvement of Pregnancy in Repeat Breeding Holstein Cattle
<b>Garcia-Vazquez, Francisco</b>	 Spain	Production of Transgenic Piglets Using ICSI-Sperm Mediated Gene Transfer in Combination with Recombinase Reca
<b>Hosseini, Morteza</b>	 Iran	Development of an Optimized Zona-Free Method of Somatic Cell Nuclear Transfer in the Goat



## WINNERS | INTERNATIONAL WINNER |

### EMBRYOLOGY



#### Steve Tardif, PhD

■ UK

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### Infertility with Impaired Zona Pellucida Adhesion of Spermatozoa from Mice Lacking TauCstF-64

**Objective:** Fertilization is a multistep process requiring spermatozoa with unique cellular structures and numerous germ cell-specific molecules that function in the various steps. In the highly coordinated process of male germ cell development, RNA splicing and polyadenylation help regulate gene expression to ensure formation of functional spermatozoa. Male germ cells express tauCstF-64 (Cstf2t gene product), a paralog of the X-linked CstF-64 protein that supports polyadenylation in most somatic cells. We previously showed (PNAS 2007) that loss of tauCstF-64 causes male infertility because of major defects in mouse spermatogenesis. This infertility mouse model was identified as oligoasthenoteratozoospermia, an infertility condition diagnosed in the human population.

**Material and Methods:** This unique mouse model was produced by targeted disruption of Cstf 2t gene that this encoding protein is related to polyadenylation in germ cells. This present studies used procedures like sperm immunofluorescence, in vitro fertilization and electron microscopy to determine the cause and the severity of this infertility.

**Results:** Surprisingly, although Cstf2t<sup>-/-</sup> males produce very few recognizable spermatozoa, some of the spermatozoa produced were motile. This led us to ask whether these Cstf2t<sup>-/-</sup> sperm were fertile. A motile cell-enriched population of spermatozoa from Cstf2t<sup>-/-</sup> males dispersed cumulus cells of cumulus-oocyte complexes normally. However, motile spermatozoa from Cstf2t<sup>-/-</sup> males failed to fertilize cumulus-intact mouse eggs in vitro. In addition, sperm adhesion to the zona pellucida (ZP) of cumulus-free eggs was significantly decreased, indicating tauCstF-64 is required for production of spermatozoa capable of ZP interaction. Acrosomal proteins involved in sperm-ZP recognition, including zonadhesin, proacrosin, SPAM1/PH-20, and ZP3R/sp56, were normally distributed in the apical head of Cstf2t<sup>-/-</sup> spermatozoa.

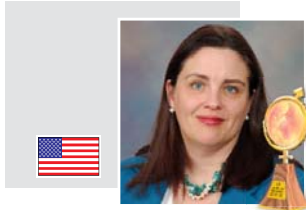
**Conclusion:** We conclude that tauCstF-64 is required not only for expression of genes involved in morphological differentiation of spermatids, but also for genes having products that function during interaction of motile spermatozoa with eggs. To our knowledge, this is the first demonstration that a gene involved in polyadenylation has a negative consequence on sperm-ZP adhesion and fertility.

**Keyword:** Fertilization, gamete biology, infertility, oligoasthenoteratozoospermia, polyadenylation, sperm, sperm-egg adhesion, in vitro fertilization

Dr. Tardif earned his PhD degree in 2003 at Laval University, Canada, by studying the phosphorylation events involved during sperm capacitation. He then pursued his training at Texas Tech University Health Sciences Center, USA, where his post-doctoral research revisited the well established sperm-egg adhesion concept. To determine the potential causes of male infertility, he used infertile CstF64-deficient mice as a model. Dr. Tardif received the Lalor Foundation fellowship in 2005, and several prestigious awards including the "Outstanding Trainee Investigator Award" (American Society of Andrology, 2007). Dr. Tardif is now conducting his research at Dundee University, UK, which aims to elucidate post-translational modifications that are necessary for male gametes to become functional and adhere to the egg. His current research also includes the development of diagnostic tools to identify sperm that are competent to fertilize or dysfunctional.

## WINNERS | INTERNATIONAL WINNER |

### FEMALE INFERTILITY & REPRODUCTIVE IMAGING



**Elizabeth Stewart, MD**

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Dr. Elizabeth AnNella (Ebbie) Stewart is Professor of Obstetrics and Gynecology at Mayo Clinic. She received her B.A. in molecular biology from Vanderbilt University and her M.D. from Harvard Medical School. She is board-certified in Obstetrics and Gynecology and Reproductive Endocrinology. Dr. Stewart founded the first comprehensive Fibroid Center at Harvard Medical School (Brigham and Women's Hospital). She has authored many scientific publications on basic and clinical research ([http://mayoresearch.mayo.edu/mayo/research/staff/Stewart\\_E73.cfm](http://mayoresearch.mayo.edu/mayo/research/staff/Stewart_E73.cfm)) and a book *Uterine Fibroids: The Complete Guide*. She is currently conducting an NIH-funded randomized clinical trial of minimally invasive treatment options for women with fibroids ([clinicaltrials.gov](https://clinicaltrials.gov), NCT00995878).

### Safely Extending Focused Ultrasound Surgery for Uterine Leiomyomas to Women Who Desire Future Pregnancies

**Objective:** Focused ultrasound surgery (FUS) is a novel noninvasive surgery that results in localized tissue necrosis without any breach of the skin or other body orifice. MRI guidance provides anatomic visualization and real time thermal feedback. Our goal is to safely extend this therapy to women who desire future pregnancies.

**Material and Methods:** We have undertaken 4 multisite trials of FUS treatment and are currently conducting two randomized clinical trials (RCTs) comparing FUS to other therapies (NCT00730886 and NCT00995878, [clinicaltrials.gov](https://clinicaltrials.gov)). Because of the novel nature of the therapy, for initial clinical trials we excluded women desiring fertility to avoid possible harm. However, we tracked women who reported subsequent pregnancy.

**Results:** We have pioneered FUS therapy to achieve a FDA and CE-approved therapy for symptomatic uterine fibroids. We have also reported on a cohort of women who have achieved pregnancies following FUS therapy. In this cohort, women had a mean age at treatment of 37.2 + 4.6 years and 39% were at least 40 years old at the time of treatment. Mean time to conception was 8 months. Thirty-eight percent of these women had never been pregnant and 58 % had never had a delivery. Live births occurred in 41% of pregnancies and an additional 20% of women had an ongoing pregnancy beyond 20 weeks at the time of report. The spontaneous and elective abortion rates were 28% and 11%, respectively. Sixty-four percent of women had a vaginal delivery and the mean birth weight was 3.3 kgs. There were no low birth weight infants and no pattern of maternal or neonatal complications. We are currently preparing a report on a RCT of FUS vs. myomectomy for couples with unexplained infertility, distortion of the endometrial cavity and non-hysteroscopically resectable fibroids (NCT00730886) and conducting a RCT of FUS and uterine artery embolization (UAE).

**Conclusion:** FUS is a novel noninvasive therapy for uterine fibroids. Despite the fact that fibroids are associated with higher complication rates during pregnancy, labor and delivery and an increased risk of cesarean delivery, presumably by interfering with uterine contractility pregnancy outcomes following FUS therapy are promising. Mean time to pregnancy is similar to case series of UAE treatment, with increased delivery rates and lower cesarean section rates. This work is or has been supported by clinical trial agreements with InSightec Inc (Dallas TX USA and Haifa, Israel) and grants RC1 063312 and R01 060503 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health, (Bethesda, MD USA).

**Keyword:** Uterine fibroids, leiomyomas, surgery, ultrasound, pregnancy



## WINNERS | INTERNATIONAL WINNER |

### REPRODUCTIVE GENETICS



#### Paul Thomas, PhD

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Prof Thomas completed his Ph.D. at the University of Adelaide in 1994. He then moved to the National Institute for Medical Research (London, UK) and completed a 3 year post-doctoral position with the late Dr. Rosa Beddington, FRS, who was a world-leader in the field of developmental biology. In 1998, he returned to Australia with the support of an Australian National Health and Medical Research Fellowship and established his own research group focusing on the genetics of brain development and disease at the Murdoch Childrens Research Institute in Melbourne. In 2006, he moved to the University of Adelaide and is currently supported by a prestigious Pfizer Australia Research Fellowship. He has published more than 50 primary research articles including a recent paper in the Journal of Clinical Investigation showing that SOX3 gain-of-function is associated with XX male sex reversal in mice and humans.

### Identification of SOX3 as an XX Male Sex Reversal Gene in Mice and Humans

**Objective:** Mammals utilise an XX/XY system of sex determination in which the Y-linked gene SRY (Sex-determining region Y) exerts a dominant masculinising influence on sexual development. Sex chromosome homology and comparative sequence studies suggest that SRY evolved from the related SOX3 gene on the X chromosome, although there is no direct functional evidence to support this hypothesis. The overall objective of this study was to determine whether SOX3 expression in the bipotential gonad can trigger male development by functioning as a surrogate for SRY. To address this important question, we utilised a unique transgenic mouse model in which Sox3 expression is ectopically activated in the gonad. In addition, to determine whether SOX3 gain-of-function could cause XX male sex reversal in humans, we screened a cohort of SRY-negative 46 XX male sex reversal patients for chromosomal rearrangements at the SOX3 locus.

**Material and Methods:** We generated a Sox3 transgenic (Tg) mouse line termed Sr (Sex reversed) using a 36 kb mouse Sox3 genomic fragment containing an IRES-EGFP reporter cassette inserted into the 3' UTR of the Sox3 gene. This transgene was ectopically expressed in the developing XX gonads due to a position effect. To determine whether SOX3 rearrangements are associated with XX male sex reversal, we screened 16 SRY-negative 46, XX male patients for copy number variation using Affymetrix 6.0 whole genome SNP (7 patients) and Illumina 1M (9 patients) microarrays.

**Results:** Analysis of more than 500 adult Sr transgenic mice revealed that the Sox3 transgene induced complete XX male sex reversal with a penetrance of approximately 80%. As the genetic switch that triggers male development occurs during embryonic development, we performed a careful analysis of early gonad development in XX hemizygous transgenic (Tg/+) embryos. Key early events of the testis differentiation pathway including Sox9 upregulation, Sertoli cell differentiation, testis cord formation, and generation of a male-specific vasculature all occurred in XX Tg/+ gonads. These data suggest that SOX3 may function as a molecular switch, activating the testis differentiation pathway via a mechanism that is functionally analogous to SRY. To investigate this further, we performed cotransfection assays using the recently identified Sox9 testis-specific enhancer element (TESCO) and showed that SOX3, like SRY, had modest transactivation activity and functioned synergistically with steroidogenic factor-1 (SF1) in this context. In addition, genetic rescue experiments showed that Sox3 failed to induce XX testis development in gonads that lacked Sox9. Consistent with the Sr mouse model, we also identified unique genomic rearrangements of the SOX3 regulatory region in three patients with XX male sex reversal.

**Conclusion:** Together, these data indicate that Sox3 gain-of-function in the developing gonad induces testis development by functioning as a surrogate for Sry. Our findings also provide important functional evidence to support the longstanding hypothesis that Sox3 is the evolutionary precursor of Sry and suggest that rearrangements of SOX3 are a relatively frequent cause of XX male sex reversal in humans.

**Keyword:** XX male sex reversal, Disorders of Sexual Development, SOX3, SRY, evolution of sex determination

## WINNERS | INTERNATIONAL WINNER |

### STEM CELL BIOLOGY & TECHNOLOGY



#### Hiromitsu Nakauchi, PhD

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Prof. Hiromitsu Nakauchi obtained his M.D. from Yokohama City University School of Medicine and his Ph.D. in immunology from the University of Tokyo Graduate School of Medicine. He isolated CD8 genes during his post-doc period at the Laboratory of Prof. Leonard Herzenberg, Stanford University. After returning to Japan, he began working on hematopoietic stem cells in his laboratory in RIKEN. In 1994, he became Professor of Immunology at the University of Tsukuba where he determined the phenotype of mouse hematopoietic stem cells (HSCs) and succeeded in bone marrow reconstitution by single HSCs. Since April 2002, he has been a Professor of Stem Cell Therapy at the Institute of Medical Science of the University of Tokyo (IMSUT). In 2008, he was appointed as the director of the newly established Center for Stem Cell Biology and Regenerative Medicine at the IMSUT. The goals of his work are to clarify the mechanisms of hematopoietic stem cell self-renewal and to contribute to the fields of stem cell/gene therapy and regenerative medicine.

### Heterogeneity and Hierarchy within The Most Primitive Hematopoietic Stem Cell Compartment

**Objective:** The mechanism of self-renewal and many other biological properties of hematopoietic stem cells (HSCs) largely remain unknown. Long-term multilineage reconstitution of lethally irradiated mouse bone marrow has been used as a gold standard to define the functionality of HSCs. Of interest is that the donor-derived myeloid/lymphoid ratio in reconstituted mice reportedly indicates the degree of self-renewal potential in transplanted HSCs. If a variety of HSCs exist, HSCs may exhibit and define hierarchical organization within the most primitive hematopoietic compartment. Alternatively, heterogeneity of HSCs may be generated during development of the hematopoietic system and remain fixed thereafter. To address questions of functional diversity and hierarchy in HSCs, HSC subsets with distinct properties must first be isolated prospectively.

**Material and Methods:** To identify candidate cell-surface markers that could prospectively identify functionally distinct HSCs, we screened a large number of antibodies and identified those with heterogeneous staining patterns on CD34-KSL cells. These candidates were then tested for functional differences *in vivo*. In this way, we found that expression of CD150 (Kiel et al., 2005) could be used to enrich for long-term repopulating cells (LTRCs) with distinct reconstitution kinetics patterns. CD34-KSL cells were subdivided into CD150<sup>high</sup>, CD150<sup>med</sup>, and CD150<sup>neg</sup> fractions, and the functions of these cells were compared at the clonal level using single-cell transplantation and cultures.

**Results:** CD34-KSL cells were divided, based on CD150 expression, into three fractions: CD150<sup>high</sup>, CD150<sup>med</sup>, and CD150<sup>neg</sup> cells. Compared with the other two fractions, CD150<sup>high</sup> cells were significantly enriched in HSCs, with great self-renewal potential. *In vitro* colony assays revealed that decreased expression of CD150 was associated with reduced erythroblast/megakaryocyte differentiation potential. All three fractions were regenerated only from CD150<sup>high</sup> cells in recipient mice. Using single-cell transplantation studies, we found that a fraction of CD150<sup>high</sup> cells displayed latent and barely detectable myeloid engraftment in primary recipient mice but progressive and multilineage reconstitution in secondary recipient mice.

**Conclusion:** Our data imply that self-renewal potential, biased differentiation manner, and reconstitution kinetics are predetermined by an intrinsic program within HSCs. Future studies should clarify the physiological and pathological roles of these HSC subsets in the hematopoietic system.





## WINNERS | INTERNATIONAL WINNER |

### REGENERATIVE MEDICINE



#### Lorenzo Piemonti, MD

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### Bone Marrow as Ideal Microenvironment for Human Islet Transplantation to Treat Type 1 Diabetes (ClinicalTrials.gov Identifier: NCT01345227)

**Objective:** The goal of this study is to evaluate safety and efficacy of bone marrow (BM) as site for pancreatic islet transplantation in humans. Our hypothesis is that BM represents a better site than liver (currently the location of choice for this procedure) thanks to its potential capacity to favor islet engraftment in face of a similar easiness of access. To address our hypothesis we propose herein a randomized phase I/II trial to compare BM and liver as sites for islet transplantation in patients with type 1 diabetes (T1D).

**Material and Methods:** A pilot study has been approved by the Italian Regulatory Agencies in August 2009. We were permitted to perform single intra BM islet infusion at the level of the iliac crest in patients having contraindications for intraportal infusion. Until now 8 patients were recruited: 4 Islet Auto Transplant (IAT, #1, #5, #6, #8), 2 Islet After Kidney (IAK, #2, #4), 2 Islet Transplant Alone (#3, #7).

**Results:** A needle for BM aspiration (14 G) was inserted into the superior-posterior iliac crest and islet suspension (1:2.5; tissue:Ringer's Lactate solution) was infused (median volume 8 ml; min-max: 2.5-20 ml). The entire intraBM-injection procedure lasted 8-15 min from the beginning of anaesthesia (short propofol sedation). No complications occurred during the islet infusion. Patient #1 died at day 5 for IAT unrelated fatal bleeding. All the other patients are alive without any intraBM-Tx related complication (median follow-up 368 days). In all recipients islets engrafted successfully as shown by the presence of postTx circulating C-peptide >0.5 ng/ml and by the presence of insulin producing cells and/or molecular markers of endocrine tissue at bioptic follow up. IAT maintained Tx function during the time, while IAK and ITA lost it with timing similar to patients intraportally infused and treated with the same immunosuppression.

**Conclusion:** Intra BM islet infusion is a safe and feasible. Efficacy needs to be tested in a randomized, phase II trial in which patients will be randomized to receive islets into either the liver or the BM.

**Keyword:** Beta cell replacement, diabetes, human

Lorenzo Piemonti (LP) M.D. graduated (magna cum laude) from the University of Milan in 1994. At the University of Milan LP also specialized in "Endocrinology and Metabolic Diseases" in 2000 and in "Micro and Experimental Surgery" in 2004. Between 1994 and 1996 LP worked as a research fellow in the Laboratory of Cellular Immunology at the Institute for Pharmacological Research "Mario Negri" (under the supervision of Prof Alberto Mantovani). In 2002 LP was recruited to the San Raffaele Scientific Institute (HSR) in Milan as Senior Investigator and in 2005 he became group leader in the Department of Diabetes and Transplant Immunology. In 2008 LP was promoted to Director of the Pancreatic Islet Transplantation Program and Director of the Islet Isolation Facility at HSR-DRI. LP's research activity has almost been entirely focused on pancreatology (diabetes and pancreatic cancer), from the pathogenesis and prevention of diabetes to the pathophysiology of beta cell replacement. LP authored a total of 78 original articles (16 as first author and 29 as last author) published in peer-reviewed international journals (H index of 24, total citation index of 2.806, average citation index of 140.3 per year, citation index 2010: 321). LP is member of the Editorial Board of The Open Surgery Journal (2008-present) and Cell Transplantation-The Regenerative Medicine Journal (2009-present). In 2011 (2011-2015) was promoted to member of the European Pancreas and Islet Transplantation Association (EPITA) Committee of the European Society for Organ Transplantation (ESOT).

## WINNERS | INTERNATIONAL WINNER |

### EPIDEMIOLOGY & ETHICS



**Heping Zhang, PhD**

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Heping Zhang is Professor of Biostatistics, Child Study, and Statistics at Yale University. He received his early education in China and pursued his Ph.D. at Stanford University in the United States. In the past two decades, he has been applying and developing statistical methods in biomedical research including reproductive sciences. He is the Principal Investigator of the data coordinating centers for two major national research networks including the Reproductive Medicine Network funded by the National Institute of Child Health and Human Development. He has authored over 170 peer-reviewed articles and books on topics including expert systems, genomics, and clinical trials. He has received several prestigious awards for his contribution in science and statistics.

### Decision Trees for Identifying Predictors of Treatment Effectiveness in Clinical Trials and Its Application to Ovulation in a Study of Women with Polycystic Ovary Syndrome

**Objective:** Double-blind, randomized clinical trials are the preferred approach to demonstrate the effectiveness of one treatment against another. The comparison is, however, made on the average group effects. While patients and clinicians have always struggled to understand why patients respond differently to the same treatment, and while much hope has been held out for the nascent field of predictive biomarkers (e.g., genetic markers), there is still much utility in exploring whether it is possible to estimate treatment efficacy based on demographic and baseline variables.

**Material and Methods:** The Pregnancy in Polycystic Ovary Syndrome (PPCOS) study was a prospective, multi-center, randomized clinical trial comparing three ovulation induction regimens: clomiphene citrate (CC), metformin and the combination of the two. There were 446 women who ovulated in response to the treatments among the entire 626 participants. In this report, we focus on the 418 women who received CC (alone or combined with metformin) to determine if readily available baseline physical characteristics and/or easily obtainable baseline measures could be used to distinguish treatment effectiveness in stimulating ovulation. We used a recursive partitioning technique and developed a node-splitting rule to build decision tree models that reflected within-node and within-treatment responses.

**Results:** Overall, the combination of CC plus metformin resulted in an increased incidence of ovulation compared to CC alone. This is particularly so in women with relatively larger left ovarian volumes ( $>19.5$ ), and a left ovarian volume  $<19.5$  was related to treatment outcomes for all subsequent nodes. Women who were older, who had higher baseline insulin, higher waist-to-hip circumference ratio, or higher sex hormone-binding globulin (SHBG) levels had better ovulatory rates with CC alone than with the combination of CC plus metformin.

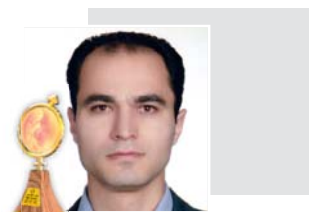
**Conclusion:** PCOS is a phenotypically diverse condition. Both baseline laboratory and clinical parameters can predict ovulatory response in women with polycystic ovary syndrome undergoing ovulation induction. Without a priori hypotheses with regard to any predictors, the observation regarding left ovary volume is novel and worthy of further investigation and validation.

**Keyword:** Polycystic Ovary Syndrome; Decision Trees; Clinical Trials



## WINNERS | NATIONAL WINNER |

### EPIDEMIOLOGY & ETHICS



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### Development of an Optimized Zona-Free Method of Somatic Cell Nuclear Transfer in the Goat

**Objective:** Goat species has the most promising advantages to be used for transgenic production of recombinant proteins. However, broad application of transgenic goats has been hampered by very low efficiency of somatic cell cloning in this species.

**Material and Methods:** Therefore, this study for the first time developed an improved zona-free method of goat somatic cell nuclear transfer (SCNT) that has both ease of operation and efficiency. The main steps involved were: (1) optimization of in vitro oocyte maturation, (2) parthenogenetic activation of zona-free oocytes, (3) SCNT of zona-free anaphase II to telophase II (All-TII) oocytes that subverted the need for long term UV-exposure of the oocytes, and (4) in vitro culture of groups of cloned embryos in wells in a highly efficient continuous serum-free embryo medium to the blastocyst stage before transfer to the recipients.

**Results:** Percentages of transgenic blastocyst production were 22.3 and 33.1% for adult and fetal cell lines, respectively. After transfer of cloned and transgenic blastocysts, 28.6 and 36.4% of the recipients were confirmed pregnant and 75 and 33.3% of the pregnancies resulted in the delivery of viable offspring, respectively.

**Conclusion:** To our knowledge, this is the first report of successful live and survived birth of cloned and transgenic offspring (harboring human tissue plasminogen activator gene) through a whole procedure of in vitro oocyte maturation and embryo development to the blastocyst stage, and in this study the in vitro efficiencies of cloned and transgenic embryo production were significantly higher than the available reports.

**Keyword:** Goat, Transgenesis, Zona-free SCNT, htPA

Morteza S. Hosseini (DVM, PhD) has been working on different aspects of mammalian in vitro embryo production since 2003. His doctorate investigated the effect of cumulus cells on developmental competence of in vitro matured sheep oocytes focusing on cumulus cells-oocyte interactions. The team he worked with is a well recognized animal biotechnology research group worldwide for their achievements in cloning domestic and endangered animal species, and the production of the herd of transgenic goat producing human-tissue-plasminogen activator in the milk. His research area of interest is cellular reprogramming and oocyte competence.

## WINNERS | NATIONAL WINNER |



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Dr. Jaleh Zolghadri is fellowship of infertility and an associate professor of OB/GYN ward in Shiraz University of medical sciences. Her field of interests are gynecology endoscopy, infertility, and recurrent abortions. She is the chief of the infertility research center at Shiraz University of medical sciences. Her main researches and publications includes recurrent abortions and infertility. She has the membership of the following societies; ASRM, AAGL, MEFS, ISRM.

### Relationship Between Abnormal Glucose Tolerance Test and History of Previous Recurrent Miscarriages, and Beneficial Effect of Metformin in These Patients: A Prospective Clinical Study

**Objective:** to determine the incidence of an abnormal glucose tolerance test in patients with recurrent spontaneous abortion and whether metformin would safely reduce the rate of first trimester spontaneous abortions in patients without polycystic ovary syndrome (PCOS) as well as with PCOS and an abnormal glucose tolerance test.

**Material and Methods:** Patients with a history of recurrent spontaneous abortion and women with a history of normal full term pregnancy. The incidence of abnormal carbohydrate metabolism was determined. Metformin and placebo were given to women with an abnormal glucose tolerance test and who had recurrent spontaneous abortions

**Results:** Twenty-nine of the patients in the group with recurrent spontaneous abortion were found to have an abnormal glucose tolerance test result compared with just four (5.4%) patients in the normal pregnancy group. The abortion rate was significantly reduced after metformin therapy in patients without PCOS in comparison to the placebo group (15% vs. 55%).

**Conclusion:** This study indicates an important link between an abnormal glucose tolerance test and a history of recurrent abortion. It was also found that metformin therapy improves the chances of a successful pregnancy in patients with an abnormal glucose tolerance test.

**Keyword:** Recurrent abortion, Glucose tolerance test, Metformin



## WINNERS | NATIONAL WINNER |

### Simvastatin Effects on Androgens, Inflammatory Mediators, and Endogenous Pituitary Gonadotropins Among Patients with PCOS Undergoing IVF: Results from a Prospective Randomized Placebo-Controlled Clinical Trial

**Objective:** to evaluate effects of simvastatin on selected biochemical parameters and reproductive outcome among patients with polycystic ovary syndrome (PCOS) who undergo in vitro fertilization (IVF).

**Material and Methods:** PCOS patients were randomized to receive either oral simvastatin 20mg/d (n=32) or placebo (n=32) in a prospective, double-blind randomized clinical trial (NCT 005-75601) in parallel with controlled ovarian hyperstimulation for IVF. All patients were determined to be at average risk for cardiovascular disease, based on high sensitivity C-reactive protein (hsCRP) measurement at entry. Following an eight-week treatment interval concluding at periovulatory hCG administration, selected clinical and laboratory parameters were measured.

**Results:** Mean serum total testosterone level decreased by 25% in the simvastatin group, compared to a 10% reduction in the placebo group ( $p < 0.001$ ). A trend of lower serum LH levels was noted in experimental and control groups (29 vs. 22%, respectively) although this difference was not significant ( $p > 0.05$ ). Neither fasting insulin nor QUICKI were significantly impacted by simvastatin ( $p > 0.05$ ). As expected, total cholesterol was not modified among placebo patients but was significantly reduced following simvastatin ( $p = 0.001$ ). Additionally, hsCRP and VCAM-1 were both significantly lower after simvastatin therapy compared to controls ( $p \leq 0.005$ , for both). At study completion, no important change in BMI was observed in either group ( $p \geq 0.60$ ). While oocyte maturation rate, fertilization rate and clinical pregnancy rate were all higher following simvastatin, none of these improvements were statistically significant.

**Conclusion:** This report presents data from the first prospective, randomised, placebo-controlled clinical investigation of simvastatin in the setting of PCOS and IVF. Simvastatin appears to be compatible with gonadotropin therapy for IVF and can offer beneficial endocrine and cardiovascular effects for PCOS patients who undergo embryo transfer. While the observed improvements in reproductive function were mild, the reductions in hsCRP and VCAM-1 following simvastatin treatment were significant, suggesting the need for further clinical trials to clarify simvastatin's impact on reproductive physiology.

**Keyword:** statins , polycystic ovary syndrome, reproduction , IVF



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Batool Hossein Rashidi studied medicine at Tehran University of Medical Sciences (TUMS) from 1977-85. She is specialized in Obstetrics and Gynecology from TUMS. In 1989 she joined the Obstetrics and Gynecology department in TUMS as an assistant professor. In 1995-97 she completed her fellowship training in IVF and laparoscopy. Currently, she is an associate professor and the research deputy in Vali-e-Asr Reproductive Health and Research Center at TUMS. Her main research interest includes reproductive endocrinology in particular new treatment modalities in PCOS and reproductive health.

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● <b>Laible, Götz, PhD</b> (New Zealand)	● <b>Niknejadi, Maryam, MD</b> (Iran)
● <b>Larijani, Bagher, MD, PhD</b> (Iran)	● <b>Noruzinia, Mehrdad, MD, PhD</b> (Iran)
● <b>Larijani, Tahereh, MD</b> (Iran)	● <b>Nouri, Mohammad, PhD</b> (Iran)
● <b>Lee, Bonghee, DVM, PhD</b> (Korea, Republic of)	● <b>Nowroozi, Mohammad Reza, MD</b> (Iran)
● <b>Lee, Gabsang, DVM, PhD</b> (USA)	● <b>Oback, Björn, PhD</b> (New Zealand)
● <b>Lee, Kai-Fai, PhD</b> (Hong Kong)	● <b>Omani Samani, Reza, MD</b> (Iran)
● <b>Lipshultz, Larry, MD</b> (USA)	● <b>Ott, Michael, MD</b> (Germany)
● <b>Maccarrone, Mauro, PhD</b> (Italy)	● <b>Pacey, Allan, PhD</b> (UK)
● <b>Mackay-Sim, Alan, PhD</b> (Australia)	● <b>Parsanezhad, Mohammad Ebrahim, MD, PhD</b> (Iran)
● <b>Ma'dani, Tahereh, MD</b> (Iran)	● <b>Pebay, Alice, PhD</b> (Australia)
● <b>Mahdi, Abbas Ali, PhD</b> (India)	● <b>Piryaee, Abbas, PhD</b> (Iran)
● <b>Mahfouz, Reda Z, MD</b> (USA)	● <b>Pluchino, Stefano, MD, PhD</b> (UK)
● <b>Malekafzali, Hossein, PhD</b> (Iran)	● <b>Pourmand, Gholamreza, MD</b> (Iran)
● <b>Martino, Gianvito, MD</b> (Italy)	● <b>Ramezanzadeh, Fatemeh, MD</b> (Iran)
● <b>Mathur, P.P., PhD</b> (India)	● <b>Redi, Carlo Alberto, PhD</b> (Italy)
● <b>McElreavey, Ken, PhD</b> (France)	● <b>Rezazadeh, Mojtaba, PhD</b> (Iran)
● <b>McNatty, Ken, PhD</b> (New Zealand)	● <b>Rostami, Sirous, MD</b> (Iran)
● <b>Mirshokraei, Pezhman, PhD, DVM</b> (Iran)	● <b>Sabbaghian, Marjan, PhD</b> (Iran)
● <b>Modarressi, Mohamad Hossein, MD, PhD</b> (Iran)	● <b>Sabeti, Shokofeh, MD</b> (Iran)
● <b>Moein, Mohammad Reza, MD</b> (Iran)	● <b>Sadeghi, Mohamad Reza, PhD</b> (Iran)

● <b>Sadighi Gilani</b> , Mohammad Ali, MD	(Iran)	● <b>Soleimani</b> , Masoud, PhD	(Iran)
● <b>Sadrkhanlou</b> , Rajabali, DVM	(Iran)	● <b>Spadafora</b> , Corrado, PhD	(Italy)
● <b>Saeidi</b> , Hojjatollah, PhD	(Iran)	● <b>Tahmasebpour</b> , Ahmad Reza, MD	(Iran)
● <b>Safarinejad</b> , Mohammad Reza, MD	(Iran)	● <b>Tajik</b> , Parviz, PhD	(Iran)
● <b>Safdarian</b> , Leila, MD	(Iran)	● <b>Tehranejad</b> , Ensieh, MD	(Iran)
● <b>Salehpour</b> , Saghar, MD	(Iran)	● <b>Thorn</b> , Petra, PhD	(Germany)
● <b>Salman-Yazdi</b> , Reza, MLD	(Iran)	● <b>Thornhill</b> , Alan, PhD	(UK)
● <b>Sanati</b> , Mohammad Hossein, PhD	(Iran)	● <b>Vahidi</b> , Serajoddin, MD	(Iran)
● <b>Saric</b> , Tomo, MD, PhD	(Germany)	● <b>Van Der Horst</b> , Gerhard, PhD	(South Africa)
● <b>Schlegel</b> , Peter, MD	(USA)	● <b>Verma</b> , Paul, PhD	(Australia)
● <b>Shahhoseini</b> , Maryam, PhD	(Iran)	● <b>Vosough Taghi Dizaj</b> , Ahmad, MD	(Iran)
● <b>Shahverdi</b> , Abdolhossein, PhD	(Iran)	● <b>Xia</b> , Enlan, MD	(China)
● <b>Shahzadeh Fazeli</b> , Seyed Abolhassan, MD, PhD	(Iran)	● <b>Yadav</b> , P.S., PhD	(India)
● <b>Sheikhha</b> , Mohammad Hasan, MD, PhD	(Iran)	● <b>Zahedi</b> , Farzaneh, MD	(Iran)
● <b>Shirazi</b> , Abolfazl, PhD	(Iran)	● <b>Zamani</b> , Mahdi, PhD	(Iran)
● <b>Sills</b> , Eric Scott, MD	(Ireland)	● <b>Ziaee</b> , Seyed Amir Mohsen, MD	(Iran)

## BOARD | EXECUTIVE COMMITTEE |

● <b>Abdollahian</b> Enayatollah, BSc	● <b>Kashfi</b> Fahimeh, MSc
● <b>Aghdami</b> Nasser, MD PhD	● <b>Maghari</b> Zahra, BSc
● <b>Ahmadi</b> S.Ebrahim, MSc	● <b>Mohseni Meybodi</b> Anahita, PhD
● <b>Alizadeh</b> Leila, BSc	● <b>Najafi Far</b> Fatemeh, BA
● <b>Alizadeh</b> S.Kamal, BSc	● <b>Niknejhad</b> Fatemeh, BSc
● <b>Baghban Eslaminejad</b> Mohammadreza, PhD	● <b>Ommami Samani</b> Reza, MD
● <b>Behnam Manesh</b> Shima, MSc	● <b>Sabbaghian</b> Marjan, PhD
● <b>Daliri</b> Leila, MSc	● <b>Shahverdi</b> Abdolhossein, PhD
● <b>Ezabadi</b> Zahra, MSc	● <b>Shahzadeh Fazeli</b> Abolhassan, PhD MD
● <b>Gourabi</b> Hamid, PhD	● <b>Tavassolian</b> Rahim, BSc
● <b>Hadi</b> Mahdi, BSc	● <b>Vosough</b> Ahmad, MD
● <b>Jafarpour</b> Farnoush, PhD, DVM	● <b>Zarei Moradi</b> Shabnam, MSc
● <b>Jahangiri</b> Nadia, MSc	● <b>Zarrabi</b> Morteza, MD





## KAZEMI PRIZE

### About Kazemi Prize

Dr. Saeid Kazemi Ashtiani was born in March 1961 in Tehran. Upon completion of his high school at the age of 18, he was admitted to Iran Medical University to pursue his studies in the field of Physiotherapy. He graduated in 1991 and subsequently in 1993 he started his postgraduate education in the field of Anatomy (Embryology branch) in Tarbiat Mo-daress University. He received his Doctorate Degree with Distinction In 1998.

Dr. Kazemi established Royan Research Institute in 1991. This institute renders advanced medical services to infertile couples. The center is also one of the most important and active research centers in the Middle East.

Dr. Kazemi and his colleagues at Royan Infertility Research Center could achieve a tremendous success in 2003 by establishing human embryonic stem cell line. This great scientific achievement has earned a high position for Iran among the other top 10 countries having access to this advanced technology at that time.

He was not only a scientist who led a lot of principle research projects in the field of stem cell and cloning but a great manager as well. He was the Head of ACECR, Iran Medical University Branch, Head of Royan Research Institute, guest instructor and lecturer of many Iranian Medical universities, Manager and chief of Quarterly Scientific and Research Journal of Yakhteh, Head of Ethical research committee in Royan Institute, and an active member of Iranian society for reproductive biomedicine as well as Iran Anatomical Science Society. Dr. Saeid Kazemi also presided Royan International Award, which was held six times from 2000-2005. His short fruitful life was ended in 2006 when he died of a sudden heart attack.

To respect his efforts and revive his memories amongst national and international scientists as well as nonscientists, Iran supreme leader, Ayatollah Khamenei recommended establishing a yearly prize in biology entitled "Kazemi Prize" which will be awarded to a scientist who made an extraordinary progress in the biological sciences. Kazemi Research Award is for appreciation of extreme effort of the scientist who dedicates his/her life to make progress in human life and relief people's pain.

A nomination committee consisting of prominent national and international scientists is the working body that evaluates the nominees and presents its recommendations to the scientific board of the institute. The scientific board is responsible for the final selection of the prize laureates. The first Kazemi Prize awarded to Prof. Rudolf Jaenisch one of the most innovative and creative scientists in the field of developmental biology, gene regulation, stem cell biology and stem cell-mediated therapies in 2010. And this year the prize will be awarded to Prof. Hans Robert Schöler.



**Prof. Hans Robert Schöler**

■ Germany

Professor Dr. Hans R.Schöler is a world-renowned stem cell biology researcher who has made significant contributions to the field over the past 30 years. A topic that has intrigued him since he was a student concerns the characteristics that distinguish between soma and germline in mammals.

Dr. Schöler has continuously expanded his field of research while maintaining the underlying perspective of a molecular biologist. First, he studied the biochemical interactions of DNA topoisomerases as part of his diploma thesis, then he investigated the function and regulation of transcription factors and their role in cellular and developmental biology, and finally, he examined factors involved in reproductive biology. His capability to span and bridge distinctly different research areas is evidenced by publications in top-notch journals in all these areas. Also attesting to his broad and continuously expanding base is the variety of leadership positions he has held. He first headed a research group in the Gene Expression Programme of the European Molecular Biology Laboratory (EMBL) at the University of Heidelberg, and then was a professor of Reproductive Physiology at the University of Pennsylvania and Director of the Center of Animal Transgenesis and Germ Cell Research. Since 2004, he has served as Director of the Max Planck Institute for Molecular Biomedicine in Munster, heading the Department

of Cell and Developmental Biology; he also is an adjunct professor in the Department of Biochemistry at the University of Pennsylvania. Finally, he is a full professor at the Medical School of the Westphalian Wilhelms University in Munster, and an adjunct professor (with a laboratory) and member of the successful German Excellence Initiative REgenerative Biology to Reconstructive Therapy (REBIRTH) at the prestigious Medical School Hanover (MHH).

When he wrote his PhD thesis, the tools required to study complex biological questions at the molecular level were rather lacking. Mammalian gene regulation and function had only just begun to be analysed, and viruses provided the first insights into cellular function. Using discrete regulatory elements of SV40 and other viruses, he developed an *in vivo* competition assay that provided the first evidence that cellular factors mediate the activity of transcriptional viral (Cell 1984) and cellular enhancers (Science 1986), settling a long-standing controversial issue. He studied the activity of such factors by *in vitro* transcription assays and helped define the binding sites of specific nuclear factors (EMBO j. 1986; Nature 1987). To make preimplantation embryos amenable to biochemical analysis, he developed a micro-extraction assay that used fewer than 100 cells. With this assay, he tested several binding sites for factors that are not found in somatic cells but are specifically expressed by pluripotent cells of the preimplantation mouse embryo and cells of the germ cell lineage - the two principal parts of the mammalian germline. This led to the identification of Oct4 and several other proteins, which were described in two back-to-back EMBO papers, establishing a solid basis for further studies by his research group and others. cDNA cloning and detailed analysis suggested that the POU transcription factor Oct4 plays an important role in the mammalian germline (Nature 1990, EMBO J 1990, Dev Biol 1994, Development 1996, and Dev Cell 2001). Subsequent papers confirmed that Oct4 is also essential for the pluripotency and survival of germline cells (Cell 1998; EMBO Rep 2004). Recently, Hans Schöler's laboratory found that Oct4 alone is sufficient to induce pluripotency in adult neural stem cells, thus also demonstrating the central role of this transcription factor in establishing pluripotency (Nature 2008; 2009; Cell 2009). Subsequent work was on obtaining a better understanding of pluripotent cells (Cell Stem Cell 2010; Cell 2010a) and the molecular process of reprogramming (Cell 2010b; Nature Cell Biology 2011). The article "Generation of Induced Pluripotent Stem Cells Using Recombinant Proteins" published in Cell Stem Cell in 2009 reported an early attempt to reprogram somatic cells without viruses.

As Oct4 is both a crucial component and an ideal marker for pluripotency, Dr. Schöler has also used it as a marker to study the process of reprogramming after somatic cell nuclear transfer into oocytes and during fusion of somatic and pluripotent cells (Stem Cells 2004). His laboratory provided the first evidence that mouse embryonic stem cells could be induced to differentiate into eggs, provoking a tremendous splash in scientific journals and in the media. This publication paved the way for a completely new area of research, and the implications for society at large are still being discussed.

Hans Schöler has also had a strong interest in structural biology as a prerequisite to understanding processes at the molecular level.

For more than 10 years, Hans Schöler's research group has investigated Sox2 and elucidated the role of the heterodimer complex of Sox2 and Oct4 on DNA (Gene s Dev 1998; 2003). Six years after publishing the crystal structure of a POU/HMG/DNA ternary complex, it was chosen as "Molecule of the Month" by the Protein Data Bank, highlighting its relevance in pluripotency and cellular reprogramming.

Hans Schöler is considered as one of the leading researchers in stem cell biology worldwide. He is a member of the editorial boards of the top-notch journals in his field, including Cell, Cell Stem Cell, and Stem Cells. He is also a member of the German Academy of Sciences Leopoldina and of three Academies of Sciences located in different German Federal States in 2008, he shared the prestigious Robert Koch Prize with Drs. Irving L. Weissman and Shinya Yamanaka for his critical contributions to stem cell biology and in recognition of his groundbreaking work on the derivation of eggs from stem cells.

In recognition of his important contributions to the field of stem cell biology, he received one of the highest honours by the Ulsan National Institute of Science and Technology (UNIST) and had a new stem cell institute named after him - the "Hans Schöler Stem Cell Research Center."

His laboratory is at the forefront of studies into cellular reprogramming mediated by nuclear transfer, cell-cell fusion, or transduction by viruses or proteins. Using induced stem cell (iPS) cell technology, his laboratory can, in principle, generate any type of cell from patients who suffer from a genetic disease.

# ANNUAL REPORT



## Royan Institute

Royan Institute is a world-renowned center committed to multi-disciplinary, campus-wide, integration and collaboration of scientific, academic, and medical personnel for understanding male/female infertility, embryo development, stem cell biology, biotechnology. Royan Institute provides comprehensive services for the treatment of infertility, regenerative medicine/cell therapy and production of recombinant proteins.

Royan Institute was established in 1991 by the late Dr. Saeid Kazemi Ashtiani (may he rest in peace) in Tehran, Iran. The center supports innovation, excellence and the highest ethical standards focusing on increasing the success rate of infertility treatment alongside embryo health. Furthermore, this center supports the placement of stem cell research findings into operation in cell therapy and disease treatment with the purpose of increasing the level of health.

### Mission:

The mission of Royan Institute which is in line with the country's plan for science and the developmental program of ACECR includes:

- Research and development of science and technology in biology, biotechnology and the medical areas of reproduction and stem cells.
- Treatment of infertile patients and hard to treat diseases by the efficient use of research findings.
- Commercialization of research findings to be offered as services or biological products for meeting the needs of hi-tech and scientific requirements of society.
- Education and promotion of scientific findings at national and international levels.

### Vision:

For achieving excellence in research and technology at an international level, Royan Institute aims to be:

- A pioneer in science, innovation and technological development in the field of biological sciences.
- A scientific authority in stem cells, reproductive biomedicine and biotechnology.
- Efficient in improving the society's health.

## Royan consists of three Research Institutes, each of which focus on different fields of research

1. Royan Institute for Reproductive Biomedicine (RI-RB)
2. Royan Institute for Stem Cell Biology and Technology (RI-SCBT)
3. Royan Institute for Animal Biotechnology (RI-AB)

## Departments

### Reproductive Biomedicine Departments

- Gynecology and Endocrinology
- Andrology
- Embryology
- Reproductive Genetics
- Reproductive Imaging
- Epidemiology and Reproductive Health
- Infertility Clinic

### Stem Cell Biology and Technology Departments

- Regenerative Medicine
- Molecular Systems Biology
- Stem Cells and Developmental Biology
- Cell Therapy Center

### Animal Biotechnology Departments

- Reproduction and Development
- Molecular Biotechnology
- Cell and Molecular Biology
- Dairy Assist Center
- Laboratory Animal Core Facility

## Overview of the Institute's Developments

- The first IVF child born in Tehran (1993)
- The first ICSI child born in Tehran (1995)
- Iran's second success in open testicular biopsy to treat severe male infertility (1996)
- The first frozen embryo child born in Iran (1996)
- The first ICSI birth by frozen sperm of a gonadectomized man in Iran (1999)
- The first human embryonic stem cell line established in Iran and the region (2003)
- The first PGD child born in Iran (2004)
- First time use of adult stem cells in the treatment of MI during CABG in Iran (2004)
- Production of insulin producing cells from human embryonic stem cells (2004)
- Culture of human limbal stem cells on chorionic membrane (2004)
- Establishment of the first Private Cord Blood Bank in Iran (2005)
- The first IVM-IVF sheep born in Iran (2006)
- The first cloned sheep born in Iran (2006)
- Establishment of mouse and human induced pluripotent stem cells (iPS) (2008)
- The first cloned goat born in Iran (2009)
- A new method for treatment of Vitiligo by cell transplantation (2009)
- The first transgenic goats born in Iran (2010)
- The first calves born from vitrified in vitro developed embryos in Iran (2011)
- Establishment of cell therapy Per-hospital (2011)

## Royan Institute for Reproductive Biomedicine (RI-RB)

Royan Institute for Reproductive Biomedicine, founded in 1991, consists of six departments and one clinic actively working on different aspects of infertility and the development of new methods for infertility treatment.

Its vision is to improve the population's health through infertility treatments and giving infertile families the hope of having children.

In this regard, RI-RB's mission is to research different aspects of infertility and its treatment in order to increase the success rate alongside improving embryo health.

### RI-RB Departments:

- Gynecology and Endocrinology
- Andrology
- Embryology
- Reproductive Genetics
- Reproductive Imaging
- Epidemiology and Reproductive Health
- Infertility Clinic

## Royan Institute for Stem Cell Biology and Technology (RI-SCBT)

Royan Institute for Stem Cell Biology and Technology (RI-SCBT) was established in 2002 to promote research on general stem cell biology in Iran. Since early 2010, it has continued its activities in three departments and one center:

1. Stem Cells and Developmental Biology
2. Molecular Systems Biology
3. Regenerative Medicine
4. Cell Therapy Center

RI-SCBT's vision is to efficiently put stem cell research findings into operation in disease treatment with the aim of improving health. RI-SCBT's mission is to generate insights into the biology of stem cells through basic research and to provide the foundation needed for novel therapies from regenerative medicine.

## Royan Institute for Animal Biotechnology (RI-AB)

Royan Institute for Animal Biotechnology was initially established in 2004 as the first research branch of Royan Institute. It is located in Isfahan Province, which is famous for its architecture, rivers and handicrafts, and is known as the city of "blue tiles".

Royan Institute for Animal Biotechnology was established with the purpose of advancing research in reproduction, development, cell and molecular biology, in addition to the fields of bioengineering and reproductive technology. In this regard, this Institute has focused on somatic cell nuclear technology (SCNT), interspecies-SCNT, transgenesis, the establishment of novel sperm selection methods for assisted reproductive technology, cell differentiation, production of recombinant proteins and the cell biology of peroxisomes. The endeavors of Royan Institute for Animal Biotechnology have made us the pioneer of animal cloning in Iran and the Middle East. Therefore, this Institute is well known for its cloned animals, Royana and Hanna, the first cloned sheep and goat in Iran; and Bovana, the first calf born with IVF. Areas of interest at our Institute are: gene reprogramming during SCNT, transgenesis, sperm cell biology, the role of sub-cellular organelles in differentiation and recombinant protein technology. In addition, the Institute is providing a comprehensive and coordinated "bench to production" approach in recombinant protein technology, animal farming and the establishment of methods to increase the efficiency of assisted reproductive techniques

### RI-AB departments and center:

- Reproduction and Development
- Molecular Biotechnology
- Cell and Molecular Biology
- Dairy Assist Center

The institute's vision is to attain new heights in biotechnology research, shaping biotechnology into a premier precision tool of the future for creation of wealth, ensuring social justice and efficiently bridging science with daily life.

## Endocrinology and Female Infertility Department of RI-RB

### Message from the Department Head

The goal of our department is to perform applied research in order to achieve the best and easiest strategies for diagnosis and improving ART outcomes. Our department focuses on the following: treatment and research on PCOS, recurrent abortion, endometriosis, poor responders and recurrent implantation failures. Moreover, this department undertakes various research on ovulation induction, COH and ART/ET methods. The mission and vision of our group includes evaluation and treatment of infertile couples; new guidelines for improving IVF outcomes; achieving new strategies for diagnosing the causes of infertility, ovulation induction and COH; improving methods for oocyte and embryo culture, and endometrial preparation; and the promotion of prenatal care.

Dr. Mahnaz Ashrafi

### Research Assistants

- E. Amirchaghmaghi, MD, PhD (Immunology student)
- A. Arabipour, MSc
- N. Jahangiri, MSc
- Sh. Jahanian, MSc
- K. Kiani, MSc
- F. Malekzadeh, MSc
- L. Mohamadi Yeganeh, MSc

### Other Members

- S. Jalali, BSc
- M. Joudmardi, BSc
- M. Keshvarian
- A. Sanati, BSc
- L. Shajarehpour Salavati, BSc
- Z. Zolfaghari, BSc

### Student Theses

- 2 PhD thesis
- 7 MSc thesis

### Publications

- Zangeneh M, Mahdavi A, Amini E, Siadat SD, Karimian L. Pyomyoma in a premenopausal woman with fever of unknown origin. *Obstetrics & Gynecology*. 2010;116(2):528-30.
- Madani T, Ashrafi M, Jahangiri N, Bahman Abadi A, Lankarani N. Improvement of pregnancy rate by modification of embryo transfer technique. *Fertility & Sterility*. 2010;94(6):2424-6.
- Tehraninejad ESH, Azimi Nekoo E, Ezabadi Z, Rashidi R, Amirchaghmaghi E, Pour Matroudi E. Half dose, long-acting GnRH agonist Dipherelin is comparable with daily injections of short acting GnRH agonist (in IVF/ICSI cycles). *Archives of Medical Science*. 2010;6(6):945-949.
- Tehraninejad E, Saedi T, Sacdi S, Hossein Rashidi B, Azimineko E, Jahangiri N. Comparison of in vitro fertilization success in patients with polycystic ovary syndrome and tubal factor. *Gynecological Endocrinology*. 2011;27(2):117-120.
- Moini A, Sarrafion F, Arabipour A. A possible role for familial thrombophilia in women with polycystic ovarian syndrome. *Gynecological Endocrinology*. 2011;27(2):80-85.

This department, established in 1995, began to research new strategies and advanced methods for the diagnosis and treatment of female infertility and recurrent abortion with the purpose of increasing the implantation rate.



### Head of Department Mahnaz Ashrafi, MD

■ Gynecologist  
ashrafim@royaninstitute.org

### Biography

Educational Background: Obstetrics & Gynecology Specialty, Iran University of Medical Science, Tehran, Iran (1985-1989)  
General Physician, Tehran University of Medical Science, Tehran, Iran (1977-1984)

### Promotion

Associate Professor, Faculty of Medicine, Iran University of Medical Science (2005-Present)  
■ Assistant Professor, Faculty of Medicine, Iran University of Medical Science (1989-2005)  
■ Head of Endocrinology and Female Infertility Department, Royan Institute (1989-Present)

### Research Scientists

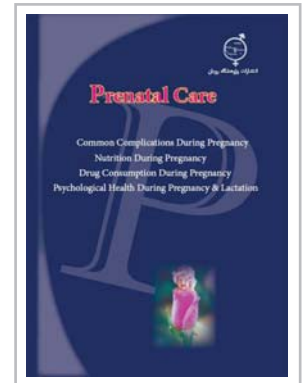
R. Aflatoonian, MD, PhD  
F. Ghaffari, MD, (Gynecologist)  
M. Hafezi, MD, (Gynecologist)  
M. Hemat, MD, (Gynecologist)  
R. Hoseyni, MD, (Endocrinologist)  
T. Madani, MD (Gynecologist)  
A. Moini, MD, (Gynecologist)  
F. Ramezanali, MD, (Gynecologist)  
E. Shahrokh Tehrani Nejad, MD, (Gynecologist)  
M. Shiva, MD, (Gynecologist)  
M. Zangeneh, MD

### Books

- Prenatal care  
Authors: Dr. T Madani, Dr. M Shiva
- Looking for the dream child  
(A collection of stories on infertility)  
Authors: Dr. SH Alizadegan, N Eizadyar

### News and Events

1. PCOS Symposium: July 23, 2010  
This symposium covered such subjects as the epidemiology of PCOS, living with PCOS, phenotypes of PCOS, appropriate diets for PCOS patients, management of OHSS in PCOS patients, etc.
2. Precongress workshop of office hysteroscopy: September 13, 2010  
This precongress covered an introduction to diagnosis and operative procedures of office hysteroscopy.
3. Precongress of implantation: September 14, 2010  
This precongress covered the following subjects: introduction to physiological aspects of implantation, introduction to factors causing implantation failure, treatment methods in recurrent implantation failure, etc.
4. CME Program of infertility 1 & 2: January 25-27, 2010  
This program introduced infertility issues and modern procedures of assisted reproductive techniques. Subjects covered included: recurrent implantation failure and recurrent abortion, poor ovarian response, OHSS, male and female reproductive surgery, GIFT-ZIFT, etc.



### Core Facilities

Female Infertility Basic Research Laboratory

### Head

Reza Aflatoonian, MD, PhD (Molecular Reproductive Medicine) Dr. Aflatoonian obtained his PhD in reproductive medicine, in addition to a post-doctorate in molecular medicine at the University of Sheffield. He has published at least 20 international articles and more than 50 international abstracts.

### Introduction

The Female Infertility Basic Research Laboratory is a cell and molecular research lab established in 2010, which researches the field of reproduction.

### Staff

A. Janan, MSc (Developmental Biology)

### Awards

Iranian Winner of The 11th Royan International Research Award.

Madani T, Ashrafi M, Ghaffari F, Kiani K, Jahangiri J, Bahman abadi A, Hosseini F, Lankarani N. Improvement of pregnancy rate in ART cycles. An oral presentation at the 11th Congress on Reproductive Biomedicine and the 6th Congress on Stem Cell Biology and Technology. September 24-26, 2010, Tehran, Iran.

### Journal Clubs

No.	Name	Date	Title
1	Dr. Roya Hoseini	May, 25 2010	Obesity and Female Fertility
2	Dr. Maryam Hafezi	June 8, 2010	Thrombotic Tests in Recurrent Abortion

### Staff, Student .and Publication Charts

## Andrology Department of RI-RB

### Message from the Department Head

The Andrology Department provides the most advanced scientific protocols for the diagnosis and treatment of male fertility. This new male infertility management depends on specialized proper evaluation of the male factor by clinical examination for testicular size, determining the presence of varicocele, performing a hormonal profile, scrotal Doppler examination and semen analysis, according to World Health Organization standards. Different modalities are available in this Unit for the management of low sperm count, low sperm motility and increased sperm abnormality.

Our mission is to improve diagnostic and therapeutic methods by using the results of investigative projects, applying these results and using stem cells to treat patients who have incomplete spermatogenesis. Providing quality health care for infertile males, educating the lay and professional communities on the latest treatments for male fertility and enhancing the understanding of male infertility issues by developing research projects are the vision of this department.

Dr. Mohamad Ali Sadighi Gilani

### Introduction of Department

The first step in infertility management is to evaluate the couple. Male factor infertility accounts for approximately 50% of all infertility cases. Thus, in order to study male factor infertility, it is necessary to use appropriate diagnostic and therapeutic techniques. The intent of this research department is to develop new diagnostic methods and treatments for male factor infertility.

### Goals of the department

- Determining the etiology of spermatogenesis, sperm function and ejaculation disorders
- Determining the etiology of azoospermia, genetic and maturation disorders
- Determining the etiology of dry and retrograde ejaculation

### Main activities of the Andrology Department

- Improving diagnostic and therapeutic methods
- Determining the etiology of spermatogenesis, as well as functional and ejaculation disorders

Programs	Directors
Clinic	Mohamad Ali Sadighi Gilani, MD,Urologist
Education and research	Marjan Sabbaghian,PhD



### Head of Department Mohamad Ali Sadighi Gilani ,MD

■ Urologist  
ali.sadighi@royaninstitute.org

Faculty of Medicine, Iran University of Medical Science, Tehran, Iran  
MD from Faculty of Medicine, Iran University of Medical Science, Tehran, Iran

### Biography

Dr. Sadighi Gilani was born in 1954. He studied Geology at Shiraz University in 1970 and continued his education, earning an MSc degree at the School of Mines & Technology, South Dakota, USA in 1977. Afterwards, he began his study of medical sciences at the University of Medical Science of Iran in 1980. Then, in 1992, he completed his residency training in the Urology Department at Hashemi-Nejad Hospital, University of Medical Science of Iran. From 1992 to 1993, he was trained as an observer in the Institute of Urology and Nephrology, London, UK. In 1995, he completed his master training for No Scalpel Vasectomy (WK) under Professor Li, in Tehran, Iran by P.C.I. in addition to training for Vasectomy, also with Professor Li in Tehran, Iran By P.C.I.

### Research Scientist

M. Azizi, MD  
F. Dadkhah, MD Urologist  
F. Farrahi, MD, Urologist  
R. Salman Yazdi, MD

### Research Assistants

S.J. Hosseini, MD, Urologist  
A. Nour Mohammadi, MD  
M. Zarrabi, MD, General Physician

## Clinic

**Group Leader**  
**Mohamad Ali Sadighi**  
**Gilani ,MD**

Providing quality health care for infertile males, educating the lay and professional communities on the latest treatments for male fertility and enhancing understanding of male infertility issues by developing research projects are the vision of this department.

### Publications

- Sadighi Gilani MA, Vaziri The relationship between occupation and semen quality, IJFS.
- Sadighi Gilani MA, Ahmadi H. Use of PCR to detect Mycoplasma hominis and Ureaplasma urealyticum from semen samples of infertile men who referred to Royan Institute in 2009. Yakhteh.
- Salman Yazdi R, Seyfinejad A. Generation of human induced pluripotent stem cells from a Bombay individual: Moving towards "universal donor" red blood cells. Biochem Biophys Res Commun.
- Salman Yazdi R. The effect of adding oral estradiol to progesterone as luteal phase support in ART cycles – a randomized controlled study. Archives of Medical Science.
- Sadighi Gilani MA, Jannat Alipoor F, Eftekhari-Yazdi P. The effect of FBS concentration on cryopreservation of isolated spermatogonial cells from neonatal mouse by MACS method. Journal of Iranian Anatomical Sciences.
- Sadighi Gilani MA, Ahmadi H. Detection of Mycoplasma hominis and Ureaplasma urealyticum from semen samples of infertile men referred to Royan Institute in 2008. JIUMS.
- Sadighi Gilani MA, Ahmadi H. Comparison of culture with PCR for detection of Mycoplasma hominis and Ureaplasma urealyticum in semen samples of infertile men referring to the Royan Institute in 2009. JIUMS.

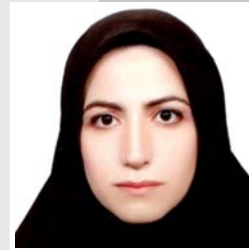


## Education and research

The mission of this group is to improve diagnostic and therapeutic methods by focusing on characterization of the molecular mechanisms underlying spermatogenesis and male infertility, and using the results of investigative projects for patient treatments.

### Publications

- Sabbaghian M, Nematgorgani M. Protein-protein interactions leading to aggregating: Perspectives on mechanism, significance and control. Journal of the Iranian Chemical Society.
- Modarresi T, Sadeghi MR, Sabbaghian M. Isolation and recognition of spermatogenic cells lineages from mouse testis. Yakhteh.
- M, Sabbaghian. Homology modeling, docking, molecular dynamics simulation, and structural analyses of coxsackie virus B3 2A protease: An enzyme involved in the pathogenesis of inflammatory myocarditis. Int J Biol Macromol. 2011 Jun 2.
- Sabbaghian M, Meybodi AM, Rahimian M, Sadighi Gilani MA. Occurrence of 47,X,i(X)(q10),Y Klinefelter variant with hypogonadotropic hypogonadism. Fertil Steril. 2011 Jun 22.



### Group Leader

**Marjan Sabbaghian ,PhD**

■ Biochemistry

[m.sabbaghian@royaninstitute.org](mailto:m.sabbaghian@royaninstitute.org)

### Biography

Marjan Sabbaghian obtained an MSc in Biochemistry in 2002 and a PhD in Biochemistry in 2009 from the Institute of Biochemistry and Biophysics, University of Tehran. She joined Royan Institute in May 2009. Dr. Sabbaghian is the head of the Andrology Laboratory at Royan Institute. Her research interests focus on characterization of the molecular mechanisms underlying spermatogenesis and male infertility.

### Research Assistants

A. Daliri MD

H. Hosseinifar MSc, Cellular and Molecular Biology

T. Modarresi MSc, Developmental Biology

R. Nakhjavani BSc, Biology

### Graduated Students

M. Azad MSc, Biochemistry

M. Shafipour MSc, Biochemistry

M. Vafaie, MSc, Cellular and Molecular Biology

## News and Events

### Workshops

1. Assessment of Sperm DNA Fragmentation in Male Infertility, August 2010.

#### Workshop Introduction

In this workshop, researchers were trained on the following methods used to assess chromatin damage: AOT (acridine orange test), SCSA (sperm chromatin structure assay), SCD (sperm chromatin dispersion test) and CMA3 (chromomycin A3). The clinical applications of the abovementioned assays were discussed. Physicians and biologists who hoped to increase their knowledge about the clinical aspects of DNA fragmentation assessment found this workshop useful.

2. VS Aspiration, August 2010.

#### Workshop Introduction

TRUS-guided SV aspiration is generally accepted as a potential test for the diagnosis of partial ejaculatory duct obstruction. This procedure confirms the presence of intact spermatogenesis, ruling out more proximal obstruction, obviating the need for testicular biopsy. This workshop was held in the surgery room at Royan Institute and attended by urologists, radiologists and other staff.

3. First Aid, 2010.

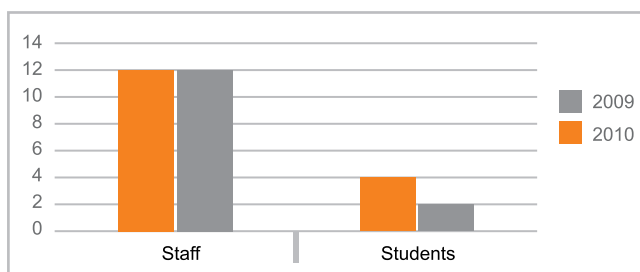
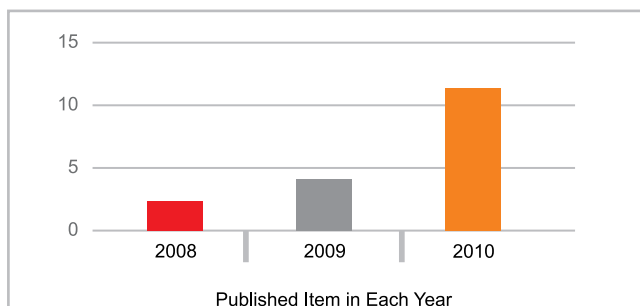
#### Workshop Introduction

It is important to know First Aid in order to assist oneself or others who may be injured. The Andrology Department taught a basic first aid program that was of great benefit for the Royan staff.

### Journal Clubs

No	Name	Date	Title
1	Dr. Mohammad Ali Sadighi Gilani	24 August, 2010	Vasovasostomy
2	Dr. Farid Dadkhah	7 December, 2010	Hormonal Disorder and Male Infertility
3	Dr. Mohammad Ali Sadighi Gilani	8 March, 2011	Hypogonadotropic Hypogonadism

### Publication and Staff Chart



## Embryology Department of RI-RB

### Introduction of Department

The Department of Embryology, founded in 1995, is part of Royan Institute's Reproductive Biomedicine and Stem Cell Research. During the preceding decade, a fundamental description of human and animal experimental studies have emerged in the field of embryology. The focuses of this department are: to increase the quality of gametes and embryos, study the molecular aspects of gamete maturation and embryo development, perform embryo co-culture with various types of somatic cells, study molecular aspects of gamete and embryo freezing, in vitro maturation of animal and human gametes (IVM), molecular and cellular events of embryo implantation, three-dimensional cell culture for designing an endometrial biomodel, nuclear transfer, animal cloning and transgenesis, and sperm chromatin deficiency.

### The embryology department consists of five groups

- Oocyte Biology
- Sperm Biology
- Embryo Biotechnology
- Implantation Biology
- Clinical Research

### Goals of the department

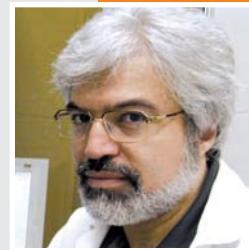
- Increasing the numbers of high quality human embryos by using different culture techniques
- Producing transgenic goats with selected genes
- Establishing a vitrified ovarian tissue bank

The mission of embryology department of RI-RB is to research different aspects of infertility and its treatment in order to increase the success rate in addition to improving embryo health.

Its vision is to improve embryo quality through infertility treatment and therefore give the hope of having children to infertile couples.

### The main researches of the department

- Human factor IX production in a transgenic goat by nuclear transfer
- Vitrification of mouse, sheep and human ovarian tissues
- DNA methylation pattern in embryos
- Assessment of bovine sexed semen preceding cryopreservation with egg yolk-based and soybean lecithin-based extenders
- Reproduction of a miniature Caspian horse with the use of frozen semen



### Head of Department

**Mojtaba Rezazadeh Valojerdi, PhD**

■ Anatomy (Full Professor)  
m.rezazadeh@royaninstitute.org

### Biography

Mojtaba Rezazadeh Valojerdi obtained his PhD degree (1990) in Anatomy from University of Glasgow in UK. At present, he is full professor in Anatomy and Embryology at University of Tarbiat Modarres, and Head of the Embryology Department at Royan Fertility and Infertility Research Center, Tehran. He is member of Research and Ethics committees at University of Tarbiat Modarres and has more than 200 publications in national and international journals. He serves as ad-hoc reviewer or is in the Editorial Board of different national journals dealing with Cell Biology and Human Reproduction. His current research interests include assisted reproduction, embryo cryopreservation, and differentiation of stem cells.

## Embryo Biotechnology



**Group Leader**  
**Poopak Eftekhari-Yazdi, PhD**  
eftekhari@royaninstitute.org

### Biography

Dr. Eftekhari-Yazdi obtained her BSc degree from the Department of Biology at Azad University of Mashhad in 1994. She received her MSc in Histology and Embryology from Tarbiat Modarres University in 1997 after which she began her PhD in the field of Anatomy at Tarbiat Modarres University, Department of Anatomy in 1997 and she joined the Embryology Laboratory at Royan Institute. Her PhD thesis was Human embryo fragmentation and the effect removal on embryo development. Her supervisor was Professor Valojerdi. She currently works as Director of the IVF Lab. At Royan Institute, her major research interests are epigenetic, proteomics and secretoms of embryos of production of cloning and transgenic embryos.

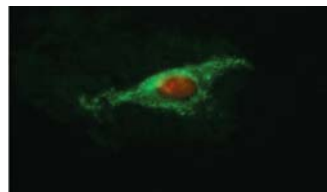
### Laboratory Head

A. Dalman, MSc

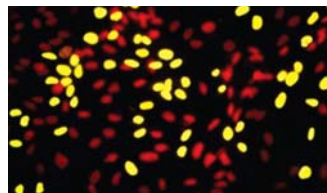
### Research Assistants

R. Fakheri, BSc  
M. Hadi, BSc  
M. Rajabpour Niknam, MSc  
Z. Vahabi, BSc

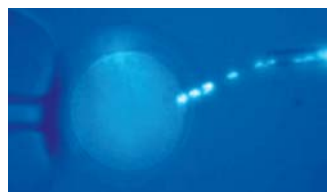
The production of a transgenic goat with human coagulation factor IX gene in its milk is one of our priorities in this sub-branch. We are also interested in the production of all kinds of transgenic animals that contain useful proteins that can later be used in the research laboratory or pharmaceutical industry. Above all, we are researching the role of epigenetics on the growth and development of gametes and embryos. One of the newest issues under research is the study of proteom and secretom in embryos, and the selection of embryos with high quality development based on these two items. This subcategory has had the honor to determine the best way to synchronize necessary cells for nuclear transfer into an enucleated oocyte in order to increase the number of cloned embryos. One of the most significant activities of this sub-branch during last two years has been the production of two transgenic goats (Sangool and Mangool) with milk containing human coagulation factor IX. Additionally, another significant activity of this sub-branch is the production of colonized mice embryos with the use of an electric Piezo technique.



An apoptotic mouse embryonic fibroblast cell after Annexin V staining.



DNA synthesis detected by BrDU incorporation. Green nuclei: S phase of cell cycle, Red nuclei: other phases of the cell cycle.



Hoechst staining of mouse oocytes for meiotic spindle detection and subsequent enucleation procedure.

### Publications

- Dalman A, et al. **Synchronizing cell cycle of goat fibroblasts by serum starvation causes apoptosis.** *Reprod Domest Anim.* (2010).
- B Ebrahimi, MR Valojerdi, P Eftekhari-Yazdi, et al. **In vitro maturation, apoptotic gene expression and incidence of numerical chromosomal abnormalities following cryotop vitrification of sheep cumulus-oocyte complexes.** *Assist Reprod Genet.* 2010.
- B Ebrahimi, MR Valojerdi, P Eftekhari-Yazdi, et al. **IVM and gene expression of sheep cumulus-oocyte complexes following different methods of vitrification.** *Reprod Biomed Online.* 2010.

## Oocyte Biology

The Oocyte Biology group is interested in ovarian biology and the regulation of mammalian oocyte development, the development of oocyte maturation techniques, and particularly cryopreservation of oocytes and ovarian tissue in experimental models. The research program of this group spans basic discovery research to applied research and clinical trials. A key objective of the discovery research program is to obtain the ability of having a bank for the cryopreservation of oocytes and ovarian tissue.

The group works primarily in animal models but is also actively engaged in pre-clinical trials and commercial translation of research to develop new treatments for female infertility.

### Publications

- B Ebrahimi, MR Valojerdi. **Ultrastructural Changes of Sheep Oocytes Follow Vitrification by Different Methods and In Vitro Maturation.** Journal of Iranian Anatomical Sciences. 2010; 8: 1-12.
- S Tavana, H Eemani, M Azarnia, AH Shahverdi, P Eftekhari-Yazdi. **Effects of Crocus sativus L. extract on in-vitro maturation, fertilization and embryo development of mouse oocytes.** Yakhteh. 2010. (In press.)
- Fathi R, Valojerdi MR, Eimani H, Hasani F, Eftekhari-Yazdi P, Azhdari Tafti Z, Tahaei LS. **Sheep ovarian tissue vitrification by two different dehydration protocols.** CryoLetter. 2011-07-05.
- R Fathi, MR Valojerdi, P Eftekhari-Yazdi, H Alipour, F Hasani. **Development of four-cell mouse embryos after re-vitrification.** CryoLetter. (In press.)
- B Ebrahimi, MR Valojerdi, P Eftekhari-Yazdi, H Baharvand. **Ultrastructural changes of sheep cumulus-oocyte complexes following different methods of vitrification.** Zygote. 2011; 17:1-13.
- LSTahaei, H Eimani, P Eftekhari-Yazdi, B Ebrahimi, R Fathi. **Effects of retinoic acid on maturation of immature mouse oocytes in presence and absence of granulosa cell co-culture system.** J Assist Reprod Genet. (In press.)
- A Behbahanian, H Emani, B Zeinali, P Eftekhari-Yazdi, H Gourabi, A Shahverdi. **Heterotopic autotransplantation of vitrified mouse ovary.** Eproductive Medicine and Biology. (In press.)
- B Ebrahimi, MR Valojerdi, P Eftekhari-Yazdi, H Baharvand. **In vitro maturation, apoptotic gene expression and numerical chromosomal abnormalities following vitrification of sheep cumulus-oocyte complexes.** J Assist Reprod Genet. (In press.)
- A Golkar-Naranji, H Eimani, F Samadi, S Hasani, A Shahverdi, P Eftekhari-Yazdi, M Kamalinejad. **Effect of Papaver rhoeas extract on in vitro maturation and developmental competence of immature mouse oocytes.** Reproductive Medicine and Biology. 2010; 9(4):211-215.



**Group Leader**  
**Hossein Eimani, PhD**  
 h.eimani@royaninstitute.org

### Biography

Hussein Eimani received his PhD from Tarbiat Modarres University, Tehran, Iran. His research area focused on oocyte in-vitro maturation, in-vitro folliculogenesis and vitrification. Further training and specialization in infertility and assisted reproductive technology was undertaken at the Royan Institute, Iran. He is now an Associate Professor in embryology. His research focuses on maturation of immature oocytes and animal cloning, which has led to numerous publications in national and international journals

### Laboratory Head

LS.Tahaei, MSc

### Research Assistants

R. Fathi, PhD student  
 A. Golkar, MSc  
 NS Guneh Farahani, MSc  
 M. Saber, MSc  
 S Tavana MSc

### Student Trainee

NS. Abtahi  
 S. Aeinehvand  
 P. Jamalzaei

## Sperm Biology



**Group Leader**  
**Abdolhossein Shahverdi,**  
**PhD**

shahverdi@royaninstitute.org

**Biography**

Dr. Shahverdi was born in 1963 in Iran. He received his BSc in Audiology from Iran University in 1986. Subsequently, he passed his MSc and PhD courses in Anatomical Science at Tarbiat Modarres University, and received a PhD degree in 2007. His thesis was entitled "Developmental and Ultrastructural Studies of Zygotes derived from Reconstructed Oocytes Using Nuclear Transfer and Activated Sperms". Dr. Shahverdi has been working as an associate professor and academic member of Royan Institute since 1990. He is the head of the Sperm Biology Group in the Royan Embryology Department. He is a member of the Iranian Society for Anatomy, Iranian Society of Fertility and Sterility, editorial board of Iranian Journal of Fertility & Sterility, and executive board of the Cell Journal (Yakhteh). He has published 48 ISI articles and presented 45 abstracts at national and international congresses. His main research interests are the biology of sperm of different species, different factors which influence sperm capacities and germ cell characteristics.

**Research Scientist**

B. Ebrahimi, PhD

**Research Assistants**

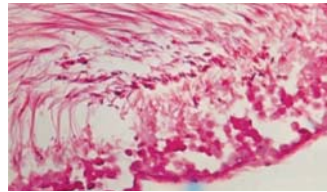
Sh, Abbasi, MSc  
H. Alipour, DVM  
V. Esmaili Borzabadi, MSc  
M. Sharbatoghli, MSc

**Student Trainees**

L. Rashki  
A. Matini Behzad  
T. Rezaei

In this group, we focus on different factors affecting sperm biology, such as environmental, nutritional and free radicals, to name a few. In addition, we investigate the correlation of these factors with fertility. Group staff are interested in researching molecular mechanisms involved in sperm maturation and morphogenesis in different cases of infertility. Additionally, sperm and testis cryopreservation have been successfully performed in this laboratory. Effects of cryopreservation techniques and different protocols of sperm processing on DNA fragmentation, membrane integrity and mitochondrial membrane potential were assessed in this group. Our next goal is to plan research regarding germ cell characteristics and its differentiation to spermatozoa.

This subgroup has held four workshops on "Sperm Functional Tests" and "Sperm Class Analyzer System" in the past two years.



Spermatogenesis in seminiferous tubules in the rat.



Endangered Caspian miniature horse (Sperm preservation was performed by the Sperm Biology Group).

**Publications**

- M Koruji, H Azizi, AH Shahverdi, H Baharvand. Mouse and Human Spermatogonial Stem Cells. *Yakhteh Medical Journal* 2010;12(2):147-58.
- H Alipour, M Sharbatoghli, P Eftekhari Yazdi, A Shahverdi, M Taghi Daneshzadeh, M Afshani, SJ Mirian, H Hamidi, AR Mohammadi, MR Valojerdi. Pregnancy in the Miniature Caspian horse using frozen semen cryopreserved with the EquiPRO®. (Under Review).
- M Sharbatoghli, MR Valojerdi, M Amanlou, F Khosravi, MA Jafa-abadi. Relationship of Sperm DNA Fragmentation Index, Apoptosis and Mitochondrial Membrane Potential with Semen Variables and Laboratory Outcome after Intracytoplasmic Sperm Injection. (Under Review).
- V Esmaili, AH Shahverdi, AR Alizade, A Towhid, H Alipour. Fatty Acid Profiles of Ram's Sperm after Removed Fat Source. (Under Review).
- V Esmaili, AH Shahverdi, AR Alizade, H Alipour, M Chehrizi. Effect of Fatty Acids Supplemented Diets and Vitamin E on the Characteristics of Fresh and Frozen-thawed Semen in Ram. (Under Review)
- L Rashki Ghaleno, MR Valojerdi, EJ Zamin, M Chehrizi, M Sharbatoghli, R Salman Yazdi. The Effects of Sperm Preparation Methods on Conventional Semen Parameters, Intracellular ROS, DFI, MMP and Apoptosis in Normospermic Semen Samples. (Under Review).

## Clinical Research

Assisted Reproductive Technology (ART) refers to a range of laboratory techniques that combine sperm and egg for fertilization. Since the birth of the first in vitro fertilization (IVF) or 'test tube' baby in 1978, the field of IVF has been transformed with several technological discoveries that have led to a remarkable expansion of the treatable conditions as well as an outstanding increase in making possible the dreams of many couples to conceive. The embryology laboratory, where embryos are produced, grown and nourished during an IVF cycle, is one of the key components of a fertility center. While patients don't necessarily know what happens behind the scenes during an IVF cycle or how their embryos are produced, having a state-of-the-art embryology laboratory is what separates an average from an excellent fertility center.

The clinical part of embryology department of RI-RB gives our patients access to some of the most accomplished and national renowned fertility specialists in the field. A wide range of advanced ART services are also available, including:

- Intra uterine insemination (IUI)
- In vitro fertilization (IVF)
- Intracytoplasmic sperm injection (ICSI)
- Assisted hatching
- In vitro maturation (IVM)
- Blastocyst culturing
- Embryo cryopreservation
- Preimplantation genetic diagnosis (PGD)
- Donor oocyte (egg) services
- Oocyte cryopreservation (egg freezing) services

After fertilization, embryos are cultured in the embryology laboratory. This is done under very strict conditions in specialized media in an incubator. Embryos are typically transferred back into the uterus at either the cleavage stage (on day 3 after retrieval) or the blastocyst stage (on day 5 after the retrieval).

The clinical part of embryology department of RI-RB offers extensive training in routine and advanced laboratory tests in assisted reproduction techniques (IUI, IVF/ ICSI), gamete cryopreservation and PGD. Through one-on-one training in laboratory procedures, candidates develop technical expertise in all of the essential techniques, including comprehensive semen analysis, sperm preparation procedures, assisted reproduction (IVF/ICSI) techniques and cryopreservation protocols for semen, testicular and oocytes/embryos. At the completion of the program, candidates receive a Certificate of Training recognizing their achievements. Also, in addition to patient treatment we focus on research about some aspects of preimplantation embryo. These aspects are:

- IVM
- IMSI and best approaches to sperm selection
- Cryopreservation of gamete and embryo
- Low fertilization
- Effect of oxidative stress on sperm and oocyte

### Publications

- Ashrafi M, Jahangiri N, Hasani F, Akhond M, Madani T. The factors affecting the outcome of frozen-thawed embryo transfer cycle. *Taivanies J Obst Gynecol*. 2011.
- Fathi R, Rezazadeh Valojerdi M, Eftekhari-Yazdi P, Alipour H, Hasani F. Development of four-cell mouse embryos after re-vitrification. *CryoLetter*. In press.
- Fathi R, Rezazadeh Valojerdi M, Eimani H, Hasani F, Eftekhari-Yazdi P, Azhdari Tafti Z, Tahaei L. Sheep ovarian tissue vitrification by two different dehydration protocols. *CryoLetter*, 2011.
- Ghafari F, Eftekhari-Yazdi P, Kiani K.A case report of bilateral tubal ectopic pregnancy following the five embryo transfer. *Archive of medical science(In press)*.
- Taei A, Gourabi H, Seifinejad A, Totonchi M, Shahbazi E, Valojerdi MR, Eftekhari-Yazdi P, Karimian L, Baharvand H. Derivation of new human embryonic stem cell lines from preimplantation genetic screening and diagnosis-analyzed embryos. *In Vitro Cell Dev Biol Animal*, 2010.

### Group Director

**Poopak Eftekhari-Yazdi, PhD**

Eftekhari@royaninstitute.org

### Laboratory Head

L. Karimian, MSc

### Research Assistants

M. Akhondi, PhD  
 A. Behbahanian, MSc  
 M. Fazl, MSc  
 F.Hasani, MSc  
 B. Movaghar, PhD  
 N. Nasiri, MSc  
 MR. Valojerdi, PhD

### Technician Staff

M. Badrkhani  
 HR. Fouladi  
 M. Heshmati  
 N. Mohajer-Soltani  
 H. Nargesi  
 E. Reihani  
 M. Soleimani  
 B. Zeinolabedini

## Implantation



### Group Leader

**Bahar Movaghar, PhD**

b.movaghar@royaninstitute.org

### Biography

Bahar Movaghar received her BSc From Tehran Medical University in Physiotherapy in 1997. She continued her education at Tarbiat Modarres University in Tehran and joined Royan Institute for her graduating course under the supervision of Professor Rezazadeh, and graduated in 2001. She started her PhD at Tarbiat Modarres University and worked on her thesis, which was entitled "Regeneration of transected rat sciatic nerve using in vitro transdifferentiated BMSCs", under the supervision of Professor Taki Tiraihi. Dr. Movaghar obtained her PhD in 2007. She currently works as a member of the academic staff in the Embryology Department at Royan institute. Her major research interest is molecular mechanisms involved in implantation.

### Research Assistants

M. Khojastefard, MSc

### Student Trainee

M. Jahangiri

In the Implantation Group, we are interested in molecules and pathways that effect implantation. We are also working on endometrial receptivity and its ultrastructural and molecular changes during ovarian stimulation. Some of the inflammatory and growth factors in blastocysts that are effective in implantation are investigated in our group. We intend to study epigenetical changes in blastocysts obtained from hormone-stimulated mice in the near future. Our group has also researched embryo freezing and the epigenetical effects of vitrification on some of the genes involved in embryo and placenta growth that showed these genes were down regulated after embryo vitrification. Epigenetic changes have an important role in this process.

### Publications

- Effect of vitrification on histone modification of regulatory region of H19,Igf2,Mest,Oct4 genes in two-cell mouse embryos and resulted blastocysts. Jahangiri M.
- Effect of vitrification on Histon Modification of regulatory region H19-Igf2 in mouse embryo. Sahraei S.

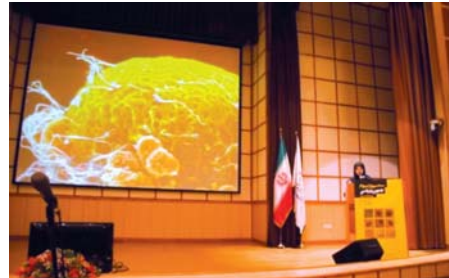


## News and Events

- First Royan Institute Embryology Symposium

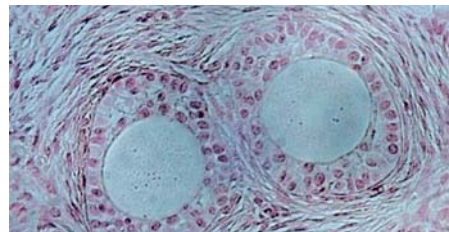
Scientific manager: Poopak Eftekhari-Yazdi  
 Executive managers: A.Dalman and Dr. H.Alipour  
 24-25 Feb., 2011

A total number of 266 participants attended the First Embryology Symposium held on February 24th and 25th, 2011 at Royan Institute. The symposium topics presented by 27 invited speakers covered the following areas: Embryo research papers in spermatogenesis, spermatogonial stem cells, sperm chromatin structure, the role of ROS in sperm biology, diagnostic tests in sperm biology, sperm analysis using CASA, folliculogenesis, oocyte maturation and its applications, ultrastructure of the ovarian follicles, fertilization, embryo quality and growth assessment, epigenetic findings in preimplantation embryos, various types of cell death and embryo fragmentation, implantation and molecular mechanisms involved in the process of ovulation and implantation, the dimensions of biology-molecular nest embryo selection, embryo tissue engineering geology, embryo cryopreservation, preserving fertility in men and women, ovarian tissue transplant procedures, assisted reproductive techniques, application of embryonic stem cells in, history and simulation applications, simulation techniques, methods of gene transfer into cells to produce transgenic animals, and bioethics research by faculty members of the Royan Research Institute in Embryology.



- Significance of computerized sperm analysis in humans and different animals
- Sperm functional tests in the diagnosis and treatment of infertility (pre-congress)
- Vitrification Workshop

Last spring, we held a workshop on embryo freezing with emphasis on the vitrification method, which was attended by eight participants. This practical workshop included a course on embryo freezing history in addition to the materials and solutions used in the vitrification method. The aim of this workshop was for participants to gain practical skills in vitrification using the cryotop system and warming of embryos.



- Oocyte, Embryo and Ovarian Tissue Staining Techniques, September 12, 2010

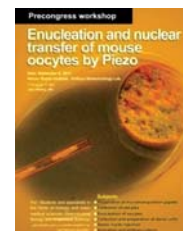
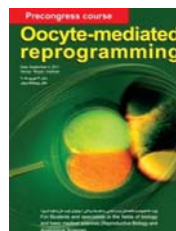
This was a workshop on oocyte, embryo and ovarian tissue staining techniques held at Royan Institute. Most biological samples naturally do not stain. Staining tissue samples, oocytes and embryos with the intent to create contrast and colors for microscopic examination were discussed. Therefore, this workshop on staining techniques provided training for students. The workshop is held every two years at Royan Institute.



- Embryo Transfer Workshop

Scientific manager: Poopak Eftekhari-Yazdi  
 Executive managers: A.Dalman and A.Farrokhi  
 February 9, 2011

- Course on Oocyte-mediated reprogramming  
 Scientific managers: Drs. Michele Boiani and Poopak Eftekhari-Yazdi  
 Executive managers: A.Dalman and Z. Vahabi  
 September 3, 2011



- Workshop on Enucleation and nuclear transfer of mouse oocytes by Piezo

Scientific managers: Dr. Michele Boiani and A. Dalman  
 Executive managers: Z.Vahabi, M.Rajabpour Niknam, M.Hadi  
 September 4, 2011

- Workshop of Sperm Functional Tests in the Diagnosis and Treatment of Infertility September 6, 2011: V.Esmaili, m.sharbatoghli, M.sabbaghian H.hoseinifar.L.rashki

**Award**

A Dalman: Award in the photo contest of Mardomak

**Journal Clubs**

No.	Name	Title
1.	S Askarian	RNAi
2.	F Hassani	ART
3.	L Tahaei	Human ovarian tissue transplantation
4.	Z Vahabi	Cell cycle inhibitors
5.	N Farahani	PCR
6.	M Sharbatogli	DNA fragmentation detection
7.	H Alipour	Sperm analysis
8.	S Tavana	Effect of Crocus sativus extract on invitro maturation mouse oocyte & development
9.	M Zandevakili	The effects of angiogenesis factors (VEGF,IL_6) on heterograft mouse ovaries
10.	M Fazel	Cytogenesis
11.	A Golkar	Effect of Papaver rhoeas extract on invitro maturation and development of immature mouse oocytes
12.	M Hadi	GLP
13.	M Jahangiri	Chromatin immunoprecipitation
14.	R Fatahei	Comparison of the maturation genes expression in mouse preantral follicles following ovarian tissue vitrification by needle immerse and solid surface methods
15.	A Dalman	Enucleation and nuclear transfer of mouse oocytes by Piezo
16.	ADalman	Reprogramming in mammalian oocytes
17.	A Dalman	Advances in embryo culture platforms: Novel approaches to improve preimplantation embryo development through modifications of the microenvironment

## Reproductive Genetics Department of RI-RB

### Message from the Department Head

There is more and more attention toward genetic sciences, especially among biology and medicine researchers. Genetic background of many diseases with unknown origin is well understood now and many others are in research process. Successful treatment of infertility with assisted reproduction techniques (ART) has many unknown points which discovery of any of them can help to use these treatments more efficiently. Reproductive genetics can help to discover these unclear points and to find new treatments strategies.

Last year we organized specialized subgroups to make our future program more convenient. Assigning more specialized staffs and providing suitable infrastructures can make fruitful future. My colleagues have planned to continue their programs for recognizing the genetic factors related to recurrent abortions, fail ART, poor responding to ovarian stimulation medication, epigenetic factors related to infertility and embryo development, genetic manipulation of cells to produce recombinant proteins and transgenic animals.

I would like to express my thanks from my valuable colleagues for their efforts during last year, and extend invitation to all genetic scientists for collaboration in our research program.

Dr. Hamid Gourabi

### Introduction of Department

The Genetics Department was established in 2001. Some routine activities of this department include: genetic counseling, lymphocyte karyotyping, preimplantation genetic diagnosis (PGD), as well as molecular diagnostic tests which include the diagnosis of Y chromosomal microdeletions and certain mutations in candidate genes that may be related to the causes of abortions or failed ART.

The major research interests in this department are genetic causes of male and female infertility, recurrent spontaneous abortion (RSA), genetic factors leading to azoospermia, mutations leading to congenital agenesis of the vas deferens, preimplantation genetic diagnosis, pharmacogenetics, and epigenetic and gene expression profiles of early embryogenesis.

The production of recombinant proteins by genetic manipulation in different host cells in addition to the joint production of transgenic animals in a project with the Embryology Group is another main activity of this department.

Activities carried out in collaboration with Royan Institute for Stem Cell Research are karyotyping of stem cell lines following various manipulations, epigenetic and genetic studies of stem cells and iPS cells, in addition to other common research interests.

#### Goals of the department

- To improve implantation rates and health of embryos by preimplantation genetic screening and diagnosis
- To assist physicians with prescribing medicine for controlled ovarian stimulation via pharmacogenetics
- Genetic follow up of newborns conceived by ART
- Evaluation of candidate genes related to recurrent abortion in the Iranian population
- Epigenetic studies of oocytes, sperm and embryos

The mission of the Genetics Department is basic research on genetic and epigenetic factors that may influence fertility, embryo development and implantation, bringing these research results to the clinical setting with the purpose of improving the health



### Head of Department Hamid Gourabi, PhD

■ Medical Physics (Radiobiology)  
gourabi@royaninstitute.org

#### Biography

Dr Hamid Gourabi obtained his PhD degree in 1997 from Tarbiat Modarres University. He was a faculty member of Iran Medical Sciences University until 2001. Dr. Gourabi has been a member of Royan Institute's board of directors since its establishment, and he joined as a faculty member in 2003. Since 2004, he has been the Head of the Genetics Department at Royan Institute. His main research interests are reproductive genetics and radiobiology of stem cells. Dr. Gourabi has more than 60 published papers, mostly in international scientific journals.

#### Academic Staff of:

- ACECR since 1993
- Iran Medical University, 1997-2001
- Royan Institute since 2001
- Director of PGD Lab since 2002

of patients and newborns, as well as the production of pharmaceutical proteins through transgenic animals.

This department's vision is to use genetic science to understand the reasons for infertility, discover better treatments, and ensure the health of patients and newborns following ART.

#### Overview of the department in 2010

In 2010, 13 research projects were carried out in our departments and 20 projects were undertaken in collaboration with other departments. Ten MSc and 2 PhD theses were ongoing. However, ten master students have completed their theses during the past year. Eight oral presentations and 25 posters were presented in different national and international congresses. The department's published papers (19) have been listed separately under each program. Additionally, six hands-on workshops were held during the past year.

Clinically, more than 1800 genetic consultations, 2000 karyotypes, 850 AZF-microdeletion tests and 250 PGD tests were performed.

Programs	Directors
Epigenetics	Maryam Shahhoseini, PhD
Genetic Engineering	Mohammad Hossein Sanati, PhD
Medical Genetics	Anahita Mohseni Meybodi, PhD
PGD	Hamid Gourabi, PhD
Pharmacogenetics	Parvaneh Afsharian, PhD

## Epigenetics

Epigenetics refers to DNA and chromatin modifications that persist from one cell division to the next without any changes in the underlying DNA sequence. Some epigenetic changes show transgenerational inheritance meaning that these changes can be passed from one generation to the next. Epigenetics plays an important role in cellular differentiation, allowing distinct cell types to have specific characteristics despite sharing the same DNA sequence. Some examples of epigenetic processes include imprinting, gene silencing, paramutation, X chromosome inactivation, reprogramming, position effect, maternal effects, heterochromatinization and some carcinogenesis. The mechanisms of epigenetic inheritance systems can be categorized into at least four routes by which epigenetic changes persist over time. These routes include DNA methylation, chromatin modifications/variations, non-coding RNAs and ATP-dependent chromatin remodeling.

Because of the critical importance of epigenetics in regulation of development and cellular function/fate, the main interest of this research group is to study the molecular mechanisms of the cellular memory and function, with special focus on DNA and chromatin modifications on the marker genes of different cellular processes..

Since the main focus at Royan Institute is to assist infertile couples using assisted reproductive technologies (ARTs), this subgroup has recently opened a new field of epigenetic alterations during ARTs.

This sub-group has held two workshops on Epigenetics Methods during the recent two years, observing different methods of epigenetic analyses at the single gene as well as whole genome levels



### Publications

- Shalhoseini M, Favaedi R, Baharvand H, Sharma V, Stunnenberg HG. **Evidence for a dynamic role of the linker histone variant H1x during retinoic acid induced differentiation of NT2 cells.** FEBS Lett. 2010; 548:4661-4664.
- Shalhoseini M, Tae A, Zare N, Hosseini Salekdeh GH, Baharvand H. **Epigenetic analysis of human embryonic carcinoma cell line NT2 during neural differentiation induced by retinoic acid.** Biochem.Cell Biol 2010;88:527-538.
- Totonchi M, Tae A, Seifinejad A, Tabebordbar M, Rassouli H, Farrokhi A, Gourabi H, Baharvand H. **Feeder- and serum-free establishment and expansion of human induced pluripotent stem cells.** Int. J Dev Biol. 2010;54:877-886.
- Jadalih M, Shalhoseini M. **Epigenetic and cellular memory.** Cell J. year;12:311-318.
- Seifinejad A, Tae A, Totonchi M, et al. **Generation of human induced pluripotent stem cells from a Bombay individual: Moving towards "universal-donor" red blood cells.** Biochem Biophys Res Commun 2010; 391:329-334.
- Movaghar B, Sahraei S, Farrokhi A, Shalhoseini M. **The effect of vitrification on expression level of imprinting genes (H19, Igf2 and Mest) in mouse embryo.** Reprod Biomed 2010; 20( Suppl. 1):39.
- Shalhoseini M, Saeed S, Marks H, Stunnenberg HG. **Evidence for a dynamic role of the histone variant H2A.Z in epigenetic regulation of normal/carcinoma switch.** FEBS J. 2011; 278 (Suppl. 1):8.
- Favaedi R, Akhoond MR, Shalhoseini M. **Comparative epigenetic analysis of Oct4 regulatory region in RA-induced differentiated NT2 cells under adherent and non-adherent culture conditions.** 2011; In press.
- Saeed S, Logie C, Francoijs K, Frigè G, Romanenghi M, Nielsen FG, Shalhoseini M, et al. **Alterations in chromatin accessibility characterize the ATRA induced epigenome of APL cells.** 2011; In press.



### Group Leader

**Maryam Shalhoseini, PhD**  
m.shalhoseini@Royaninstitute.org

### Biography

Maryam Shalhoseini received her BSc degree in Microbiology in 1998 from the Department of Biology, University of Tehran. Simultaneously, she began her MSc degree in Biochemistry at the Institute of Biochemistry & Biophysics (IBB), University of Tehran, and graduated in 2001 as the 1st rank student. She continued her education at the PhD level in Biochemistry in the same department (IBB) and graduated in 2007 as the 1st rank student. Immediately after completing her dissertation, she joined the Stem Cell Department of Royan Institute with the purpose of establishing techniques to investigate molecular mechanisms of stem cells through differentiation. Two years later, she moved to the Genetics Department, but she still collaborates with the Stem Cell Department. She has managed several epigenetic and genetic projects in collaboration with the Embryology, Gynecology and Andrology Departments at Royan. Since 2007, she has also been an invited academic lecturer at the Department of Biotechnology, Faculty of Sciences, University of Tehran, teaching molecular biology and molecular biotechnology courses to BSc and MSc students. Her major research interest is epigenetic aspects of development and reproductive medicine.

### Research Assistants

R. Favaedi, MSc  
M. Totonchi, PhD Student

### Graduated Students

H. Ansari.  
S. Ashrafi  
M. Azad  
F. Azizi  
Kh. Fallah Zadeh  
M. Shafeipour  
F. Shokraee  
Z. Taghizadeh

## Genetic Engineering



### Group Leader

**Mohammad H Sanati, PhD**  
mh.sanati@royaninstitute.org

#### Biography

**Educational Qualifications:**1991-1996: Phd (Biotechnology) At Biotechnology Research Group, School Of Biological and Environmental Sciences, Murdoch University, Western Australia  
**1985-1988:** MSc (Biochemistry), Biochemistry Department, School of Medical Sciences, Tarbiat Modarres University, Tehran, Iran  
**1977-1984:** BSc (Chemistry), Chemistry Department, School of Sciences, Ferdowsi University, Mashhad, Iran

**Work Experiences:**2006- Current: Researcher At The Medical Genetic Department, National Institute For Genetic Engineering And Biotechnology, Tehran, Iran.

**1997-2005:** President of the National Institute for Genetic Engineering and Biotechnology, Tehran, Iran.

**1996:** Full-time researcher in Murdoch University, production of recombinant monoclonal antibody against the Rizhoctomi Saloon antigens in "Phage Display System".

**1995:** Part-time research assistant (work on multiple sclerosis diseases), Murdoch University, Western Australia

**1994:** Demonstrator (practical molecular biology for undergraduate students), Murdoch University, Western Australia.

#### Research Assistants

A. Amiri Yekta, MSc  
N. Fatemi, MSc student

#### Graduated Students

M. Ahanjan  
S. Ebrahimi  
Z. Elyasi Gorji  
M. Ghanbari  
M. Khoshbakht  
S. Saeeda  
A. Zahabi

Biotechnology is a field of applied biology that involves the use of living organisms and bioprocesses in engineering, technology, medicine and other fields requiring bioproducts. Biotechnology also utilizes these products for manufacturing purposes. Modern use of similar terms includes genetic engineering as well as cell- and tissue culture technologies. The concept encompasses a wide range of procedures (and history) for modifying living organisms according to human purposes-going back to domestication of animals, cultivation of plants and "improvements" to these through breeding programs that employ artificial selection and hybridization. By comparison to biotechnology, bioengineering is generally thought of as a related field with its emphasis more on higher systems approaches (not necessarily directly altering or using biological materials) for interfacing with and utilizing living things.

Biotechnology draws on the pure biological sciences (genetics, microbiology, animal cell culture, molecular biology, biochemistry, embryology, cell biology) and in many instances is also dependent on knowledge and methods from outside the sphere of biology (chemical engineering, bioprocess engineering, information technology, biorobotics). Conversely, modern biological sciences (including concepts such as molecular ecology) are intimately entwined and dependent on the methods developed through biotechnology and what is commonly thought of as the life sciences industry. Modern biotechnology is often associated with the use of genetically altered microorganisms such as E. coli or yeast for the production of substances such as synthetic insulin or antibiotics. It can also refer to transgenic animals or transgenic plants, such as Bt corn. Genetically altered mammalian cells, such as Chinese hamster ovary cells (CHO), are also used to manufacture certain pharmaceuticals. Another promising new biotechnology application is the development of plant-made pharmaceuticals.

#### Ongoing projects:

- Human factor IX production in transgenic goat by nuclear transfer, since 2007
- Production of recombinant human and animal fertility hormones, since 2011

This sub-group has held annual two workshops on elementary techniques in molecular biology and gene cloning, and DNA analysis.

#### Publications

- Amir Amiri Yekta, Azam Dalman, Poopak Eftekhari-Yazdi, Mohammad Hossein Sanati, Hamid Gourabi\*. **Production of transgenic goats, carrying human coagulation factor IX cDNA, by nuclear transfer of transfected fetal fibroblasts.** IEEE.;journal 2011;149-154.
- Fazeli AS, Nasrabadi D, Sanati MH, Pouya A, Ibrahim SM, Baharvand H, Salekdeh GH. **Proteome analysis of brain in murine experimental autoimmune encephalomyelitis.** Proteomics 2010 Aug;10(15):2822-32.

## Medical Genetics



### Group Leader

**Anahita Mohseni Meybodi, PhD**

[anahitamohseni@royaninstitute.org](mailto:anahitamohseni@royaninstitute.org)

### Biography

Anahita Mohseni Meybodi was born in 1976. She began working at Royan Institute from 2000 when she started her MSc thesis. She worked on "Human sperm various genetic abnormalities and male infertility" and graduated in 2003 from Islamic Azad university, Science & Research branch. She obtained her PhD degree in 2008 in the field of Medical Genetics from Tarbiat Modarres University, Tehran, Iran. Her PhD project researched Fanconi anemia patients and the mechanisms of how they repair DNA damages induced by different agents. She currently works as an academic staff and Director of the Medical Genetics Laboratory at Royan institute. She supervises a couple of research projects. Her major research interest has been gene polymorphisms and their role in male and female infertility.

### Research Assistants

S.N. Almadani, MD  
Kh. Anissi Hemaseh, MSc  
O. Asadpour, MSc  
M. Bazrgar, PhD student  
R. Habibi, MSc  
H. Kalantari, MSc  
Z. Mansouri, MSc  
N. Masoodi, MSc student  
Sh. Zarei Moradi, MSc

### Student trainee

M. Moazenchi

The original goals of medical genetics and reproductive medicine were to maximize fertility, access appropriate genetic testing, and provide prenatal genetic testing and counseling. There are well-described associations between genetic and reproductive abnormalities, for which genetic testing is now being explored.

With recent advances in genetic screening and a better understanding of the genetic background of certain diseases, genetic evaluation is playing an important role in the work-up of various medical problems, including reproductive failure. Reproductive failure refers to both the inability to conceive (infertility) and the inability to carry a pregnancy successfully to term (spontaneous abortion or recurrent abortion). Embryos that do not carry a full chromosomal complement are likely to be lost soon after implantation or do not implant at all. Genetic abnormalities (numerical or structural aberrations) play a role in at least 50% of early pregnancy losses. Karyotyping of the parents is now a routine procedure during the work-up of recurrent abortions. Infertility is another form of reproductive failure, and genetic screening plays an increasingly important role in its evaluation. In vitro fertilization (IVF) provides us with a unique situation in which not only the parents but also the embryo can be screened.

Pregnancy rates are between 35% and 50% following IVF treatment among women younger than 40 years. If pregnancy is not achieved during the first 2 or 3 cycles, genetic testing, when available, should be offered to the couples. This could be useful in those selected cases in which preimplantation genetic diagnosis could identify healthy embryos, possibly improving outcome. In other cases, early genetic testing of couples could identify those for whom the use of donor gametes would be indicated. Now through the assistance of reproductive and genetic medicine, 'medical miracles' allow the detection of genetic disorders through prenatal diagnosis and the ability of infertile individuals to become genetic parents. Referred to as the 'new parenthood', these technologies allow for the conception of genetically exceptional babies by eliminating genetic defects and enhancing desirable qualities as well as the ability of individuals with a genetic disorder to reproduce without transmitting a given disorder. Such technological advances have influenced consumer (and often caregiver) expectations of reproductive medicine and medical genetics that result in unrealistic or misguided anticipations of feasibility, success and applicability of these medical interventions. Furthermore, the ability of reproductive medicine and medical genetics to facilitate the conception of a healthy infant has become fraught with moral dilemmas and technological complications.

### Publications

- Sabbaghian M, Mohseni Meybodi A, Rahimian M, Sadighi Gilani MA. (2011) **Occurrence of 47,X,i(X)(q10),Y Klinefelter variant with hypogonadotropic hypogonadism: A case report**, Fertility and Sterility. In press.
- Bazrgar M, Peiravian F, Abedpour F, Karimi M. **Causes for hospitalization and death in Iranian patients with Beta Thalassemia Major**. Ped Hematol Oncol. 2011; 28(2):134-9.
- Haratian K, Mohseni Meybodi A, Zari Moradi SH, Vosough P. **Detection of high risk human papillomavirus DNA sequences in head and neck squamous cell carcinoma in Iranian Fanconi anemia patients**. Yakhteh Medical Journal. 2010;12(1):43-50.
- Ghodsizadeh A, Taei A, Totonchi M, Seifinejad A, Gourabi H, Pournasr B, Aghdami N, Malekzadeh R, Almadani N, Hosseini Salekdeh GH, Baharvand H. **Generation of liver disease specific induced pluripotent stem cell along with efficient differentiation to functional hepatocyte-like cells**. Stem Cell Rev and Rep. 2010; 6:622-632
- Salahshourifar I, Karimi H, Tavakolzadeh T, Beheshti Z, Maeda T, Aviv H, Gourabi H **Constitutional telomeric dysfunction in an azoospermic male with extensive telomeric association**. American Journal of Medical Genetics. 2010; 152A:2413-2416.
- Habibi R, Shiva M, Mokhtari P, Gourabi H. **Implantation and pregnancy outcome in relation to coagulopathies inherited**. The Ulster Medical Journal. 2011;in press.

## PGD

### Group Leader

**Hamid Gourabi, PhD**

[gourabi@royaninstitute.org](mailto:gourabi@royaninstitute.org)

### Research Assistants

M.Bazrgar ,PhD student

M.Fakhri,MSc

H.Vaziri,MSc

### Student trainees

F.Abassi

M.Hassanpour

M.Khosravi

R.Rafiee

M.Rahimian

Development of assisted reproduction technology (ART) and therefore availability of embryos in in vitro conditions has made genetic diagnosis of the embryos prior to implantation possible, enabling couples to avoid termination of pregnancy after routine prenatal diagnosis. Now, preimplantation genetic diagnosis (PGD) can improve IVF efficiency by preselection of euploid embryos for transfer, and has become an integral part of assisted reproduction.

The idea of preimplantation genetic diagnosis goes back to 1967 when Edwards and Gardner succeeded in sexing rabbit embryos at the blastocyst stage. The medical society waited until 1989 to use similar technology in humans for the avoidance of genetic diseases. In 1989, Hanyside and his colleagues implemented PGD for sex determination of embryos because of an X-linked disease. The indications for performing this technique soon widened and gradually more ART centers offered this service to their patients. to date, over 10000 PGD cycles have been performed worldwide with more than 1500 healthy births. The PGD technique has a great value for those countries, which according to their religious and ideological laws have banned abortion.

Royan Institute started its PGD program in 2003 and since that time, PGD services have been offered to infertile patients in cases such as failed ART, age factor, idiopathic abortions, structural chromosomal aberrations in couples and family balancing (with strict rules). Now PGD for single gene defects is also being performed, particularly for beta thalassemia. The PGD Department at Royan Institute is a pioneer in this field in Iran.. Our department also offers PGD services to other infertility clinics.

### Publications

- Taei A, Gourabi H, Seifinejad A, Totonchi M, Shahbazi E, Rezazadeh Valojerdi M, Eftekhari P, Karimian L, Baharvand H. **Derivation of new human embryonic stem cell lines from preimplantation genetic screening and diagnosis-analyzed embryos.** In vitro Cell Dev Biol Anim. 2010 Apr;46(3-4):395-402.
- Karimian L, Gourabi H. **Recurrent implantation failure in IVF/ICSI cycles.** International Journal of Fertility and Sterility, Summer 2010, 4 (Supplement 1)



## Pharmacogenetics

Group Leader

Hamid Gourabi, PhD



Group Leader

**Parvaneh Afsharian, PhD**

pafshar@royaninstitute.org

### Biography

Parvaneh Afsharian received her first BSc in Chemistry. One year later, she graduated with a Biology degree (BSc) from the Biology Department of Ferdowsi University of Mashhad. Her MSc degree was in Genetics at Azad University, Tehran. Her project (Chromosomal abnormalities in patients with the pubertal and reproductive failures) was undertaken in the Clinical Genetics Department of the Iranian Blood Transfusion Organisation in collaboration with Royan Institute. In 2000, she began her research in the Genetics Department at Royan Institute. As one of the academic staff of ACECR and three years later, she moved to the Department of Medicine in Karolinska Institute (KI), Stockholm, Sweden to start her PhD research in pharmacogenetics of bone marrow transplantation chemotherapy. Immediately after completing the PhD program in 2007, she started her first postdoc in experimental cancer medicine under supervision of Professor M. Hassan at the Lab-Medicine Department of Karolinska Institute. In 2008, she joined Professor Inge Olsson's group at Lund University to investigate localization of target therapy in hematopoietic stem cells. Since 2011, she began working as an academic member and Director of the Pharmacogenetics Group at Royan Institute. Her major research interest has been pharmacogenetics aspects of reproductive medicine and infertility.

### Research Assistants

M.Khosravi Far, MSc

Z.Mansouri, MSc

N.Masoodi, MSc student

A.Mohseni Meybodi, PhD

Sh.Zari Moradi, MSc

Each individual can respond to the same doses of a drug in a different way, regarding to their own genetic variation patterns. Pharmacogenetics (PG) is the study or clinical testing of these genetic variations that give rise to differing responses to drugs. PG also refers to genetic differences in metabolic pathways that can affect individual responses to drugs, both in terms of the therapeutic effect as well as adverse effects. Thus, PG studies are committed to selecting the best therapy for every patient with a minimum risk of complications. Furthermore, these studies allow the development of clinical tests based on the presence of profiles of biomolecules and other biological markers useful for routine diagnosis.

Since genetic variations play an important role in reproductive medicine, pharmacogenetics studies open a new field to modify and develop treatments for infertile couples. For instance, the application of PG to assisted reproductive techniques (ART) will help clinicians to improve the efficacy of hormone treatments routinely applied during ART protocols. As an example, FSH- and estrogen-receptors are genetic markers involving controlled ovarian hyperstimulation. Clinical studies have demonstrated that the p.N680S polymorphism of the FSH-receptor gene determines a lesser ovarian response to FSH stimulation in patients undergoing IVF. In women with homozygous Ser/Ser in their FSH-receptor, the FSH receptor appears to be more resistant to treatment. Therefore, genotyping of patients scheduled for ovarian stimulation could be an attractive tool to individualize FSH dosing according to genetic differences in ovarian sensitivity. Therefore, pharmacogenetics can assist physicians with prescribing medicine to achieve the controlled ovarian stimulation.

### Ongoing Research Titles

- Study the relationship between polymorphisms of FSH receptor gene and type of response to ovarian stimulation
- Gene expression and gene polymorphism study of the estrogen receptor (ER) and aromatase (CYP19) in infertile men (referred to Royan Institute)
- Assessment of prolactin receptor gene mutations in infertile patients with idiopathic hyperprolactinemia in comparison with normal controls

## News and Events

### Workshops

#### 1. Primary Methods in Molecular Biology

Theory & Practical subjects: GLP, Gene expression biology, Primer design, DNA extraction, RNA extraction, DNase treatment, RT-PCR, Gel electrophoresis and Data analysis.

Scientific Manager: Mehdi Totonchi, Executive Manager: Amir Amiri Yekta,, 8-9 June 2010

#### 2. Second workshop on: "Culture, Harvest and Banding of Human Lymphocyte Chromosomes".

Theory & Practical subjects: Culture of lymphocytes, Harvesting of lymphocytes, Smear preparation, G banding of chromosomes, Introduction on karyotyping.

Scientific Manager: Anahita Mohseni Meybodi, Executive Manager: Shabnam Zari Moradi, 21-23 June 2010

#### 3. Genetic Engineering & Molecular Cloning.

Theory & Practical subjects: Genetic engineering, Cloning of a PCR product into T/A vector, Transformation of recombinant vector into bacterial host, Colony pick up and Colony PCR, Plasmid extraction, Digestion, Gel electrophoresis and analysis.

Scientific Manager: Amir Amiri Yekta, Executive Manager: Mehdi Totonchi. 29-30 June 2010

#### 4. Chromatin Immunoprecipitation (ChIP) in Epigenetic Analyses.

Theory & Practical subjects: A preface to epigenetics, Molecular mechanisms of gene regulation, ChIP as a powerful tool for studying chromatin modification and variations, Whole genome mapping using ChIP-on-Chip- sequencing, Nuclei isolation, Soluble chromatin preparation, Immunoprecipitation, DNA recovery, Real-time PCR and Data analysis.

Scientific Manager: Maryam Shahhosseini, Executive Manager: Raha Favaedi. 13-14 August 2010

#### 5. First workshop on "Genetic Counseling in Infertility & Obstetric Centers".

Theory & Practical subjects: Principles and indications of clinical genetic counseling, Pedigree drawing milestones (theoretical and practical), Genetic inheritance patterns, Chromosomal abnormalities, Genetic aspects of recurrent miscarriage, Genetic screening in obstetric clinic, Prenatal and neonatal screening, Principles and indications of PGD and PGS, Genetic approach in an infertility center.

Scientific Manager: Seyed Navid Almadani, Executive Manager: Shabnam Zari Moadi, 8-9 December 2010

#### 6. First workshop on "FISH (Hands-on workshop on Fluorescent In Situ Hybridization)"

Theory & Practical subjects: Interphase lymphocyte slide preparation by direct harvest, Interphase FISH, Metaphase FISH, Whole chromosome paints.

Scientific and Executive Manager: Hamed Vaziri Nasab 1-2 March 2011.

### Core Facilities

1. Cytogenetics lab
2. Molecular genetics lab
3. Epigenetics Lab
4. DNA Bank
5. Sequencing

### DNA Bank

#### Introduction

A DNA bank is a repository of DNA, usually used for research. The Royan DNA Bank, for example, collects the DNA of male and female infertile patients and couples with repeated miscarriages, for scientific research. Most DNA provided by DNA banks is used for studies that attempt to determine the reason behind idiopathic infertility and abortion, as well as to investigate genetic diseases related to infertility and abortion.

#### Males:1071

- azoospermia:800
- oligo spermia:56
- CF:90
- Hypo-hypo:28
- Globozo spermia:58
- BMI>30:5
- Control:34

#### Females:201

- POF:8
- Poor responder:30
- PCO:13
- PCO+Art fail:24
- PCO+Art fail+OHSS:24
- PCO+OHSS:5

- PCO+OHSS+Hyper prolactinemia:5
- OHSS:3
- Control-OHSS:30
- Hyper prolactinemia:15
- Hyper prolactinemia+ART fail+PCO:4
- Hypo-hypo:1
- CF:5
- Control:35

**Couple:962**

- ART Fail:108
- Abortion:359
- Control:14

**Total:2234**

**Awards**

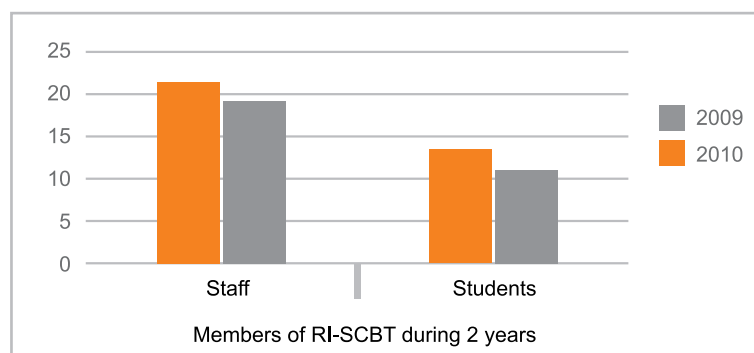
3<sup>rd</sup> place at the 24<sup>th</sup> International Kharazmi Award, (Feb 5, 2011) by:

Hosein Mozdarani\*, Maziar Mahdavi, Setareh Khashaee, Elmina Nazari, Mahdieh Salimi, Farin Aghdai, Lili Samak, Anahita Mohseni Meybodi, Hamid Alizadeh Nili. Sperm DNA damage effect on induced chromosome rearrangements in fertilization and embryogenesis.

**Journal Clubs**

No.	Name	Date	Title
1.	Mehdi Totonchi	January, 15, 2010	Epigenetics in early embryo development
2.	Shabnam Moradi	February, 5, 2010	SNPs of the FSH receptor genes: Implantation for human reproduction
3.	Anahita Mohseni Meybodi	March, 11, 2010	FMRI gene mutations and their roles in female infertility
4.	Maryam Shahhoseini	April, 1, 2010	Nuclear organization and epigenetic regulation
5.	Amir Amiri Yekta	May, 12, 2010	Transgenesis
6.	Masoud Bazrgar	June, 3, 2010	Chromosomal instability and ART: A major piece of the puzzle
7.	Khosravi Mona	July, 7, 2010	Role of maternal KIR repertoire and parental HLA-C genotype in recurrent spontaneous abortion
8.	Abassi Fatemeh	August, 14, 2010	Analysis of relation between endothelial nitric oxide synthase gene polymorphism and miscarriage
9.	Hassan Pour Marzieh	September, 18, 2010	The role of ROS in cell and its effect on cell epigenetics
10.	Navid Almadani	October, 16, 2010	Genetic aspects of recurrent miscarriages
11.	Mehdi Totonchi	November, 13, 2010	Molecular mechanism in pre-implantation embryos
12.	Roghaieh Habibi	December, 11, 2010	Epigenetic reprogramming of the X chromosome

**Staff and Student chart**



## Epidemiology and Reproductive Health Department of RI-RB



**Head of Department**  
**Dr. Reza Omani Samani, MD**  
■ Bioethics  
samani@royaninstitute.org

### Biography

Dr Samani achieved his MD from University of Iran Medical Science in 1996. He has been working in this department since 2001. He has been involved mostly in ethical issues of infertility. By this background he applied for PhD of Bioethics in Tehran University of Medical Science and he was accepted there in early 2011. He currently works as Head of the department of Epidemiology and Reproductive Health in Royan Institute.

### Message from the Department Head

This department was established in 1999 in Royan Institute. The aim of this department was to perform extensive researches on epidemiological aspects of infertility and reproduction, in addition to reproductive and sexual health. In 2000, after the establishment of an ethical committee in the Institute, ethics was added to the duties of this department. In 2003 the department was divided into three subgroups: Biostatistics, Epidemiology and Bioethics. Then, in 2008, the Bioethics subgroup was changed to "Bioethics and Law" because of numerous legal issues in infertility treatment and reproduction and the extensive number of researches ongoing in this field. Finally in 2010, three subgroups were changed to: Biostatistics and Methodological subgroup; Reproductive Health; Epidemiological and Social subgroup; Bioethical, Legal and Religion subgroup and Psychological subgroup.

Dr. Reza Omani Samani

### Introduction of Department

The Epidemiology and Reproductive Health Department was established in 2000 with the aim to promote reproductive health by epidemiological research in the field of reproduction. This department is responsible for checking all research proposals in three faculties and gives both methodological and statistical consultation.

This department undertakes multicentre research between Iran and other countries in the following areas:

- Frequency, incidence and influencing factors for all subfertility and infertility types
- Environmental and occupational factors affecting fertility and reproduction
- Psychosocial issues affecting infertile couples, their treatment and coping mechanisms
- Experiences, quality of life, marital and sexual satisfaction of infertile couples, even after IVF failure
- Ethical issues, legislation and guidelines in assisted reproduction
- Statistical models and methods for research in reproduction and genetics in addition to the cellular and molecular fields
- Animal ethics

The mission of this department is the promotion of reproductive health in Iran.

Reproductive health is an important aspect of general health and involves people of all ages within the society, from an embryo to the elderly. Focusing on sexual and reproductive health guarantees the future health of a society by ensuring healthy children and healthy adults. Finally, its job involves research into all reproduction related areas including social, medical, psychological and ethical issues, with the vision of ensuring the health of the society. Overview of the department in 2009:

- Initiated numerous researches in addition to the continuation of previously started projects
- Symposium was carried out under the name of Legal Validity and Content of Consents Used in Medicine
- Conduction of a Reproductive Ethics Session for Continuing Medical Education
- The department focuses on:
  - Social and occupational factors influencing reproduction and fertility
  - Attitudes, knowledge and practice of the society regarding reproductive issues
  - Quality of life, marital and sexual satisfaction and influential factors among infertile couples
  - Psychological issues of infertility and interventions to improve them
  - Statistical methods to increase the accuracy of statistical analysis
  - Ethical, legal and religious aspects of reproduction
- The department's main activities and researches:
  - Ethical, legal and religious issues regarding embryo donation from fertile couples

- Knowledge, attitude and practice of Iranian patients, experts and personnel toward stem cell research and the therapeutic potential of stem cell research in the context of cardiovascular disease
- Establishment of ethical guidelines and legislation in the assisted reproductive treatment field
- Applying an artificial neural network to predict the outcome of ART cycles in patients who refer to Royan Infertility Center
- The Islamic view of embryo reduction
- Posthumous assisted reproduction from an Islamic view
- Marital satisfaction in fertile and infertile couples
- Ethical and legal issues regarding animal cloning
- Evaluation of ART in HIV discordant couples from ethical, legal, religious and medical aspects
- Knowledge and attitude about cord blood banking in pregnant women of Tehran

Programs	Directors
Religious, Legal and Jurisprudence of ART	Mohammad Reza Rezaniya Moalem, PhD
Epidemiologic Aspect of Infertility	Gholamreza Khalili, MD
Socio-economic Aspects of ART	Seyed Ali Azin, MD

## Islamic Aspect of ART



**Group Leader**  
**Mohammad Reza Rezaniya Moalem, MSc**  
r.rezania@royaninstitute.org

### Biography

He achieved his BA in law from the University of Tehran in 1996 and continued his education at the University of Qom. Dr. Moalem graduated with MA of Private Law in 1999. He has been working in this department since 2005, mostly in the area of ethical and jurisprudential issues of infertility. In 2009 he graduated from the University of Shaheed Motahhari with a PhD.

### Research Assistants

L.Alizadeh  
M.Azin  
Sh.Behnammanesh  
M.Haji Ismail  
N.Lankarani  
M.Mozafari  
R.Omani Samani  
M.Oudi  
M.Sadeghi

Assisted reproductive technologies are widely practised around the world for the treatment of all forms of infertility. Currently, the application of this technology is common in the Islamic world. This group discusses derivation of Islamic rulings and its impact on the ethics of contemporary issues, including family formation and assisted reproduction. It is important for Muslims worldwide to know the current situation of Islamic decrees about assisted reproduction, especially Shi'ah Muslims, because in Shi'ah Islam third party assisted reproduction is accepted. as the law in Iran and many other Islamic countries are based on Islam, legal researches and pursuing guidelines and legislations is another aim of this group.

### Publications

- Rezaniya Moalem, Mohammad Reza. Fatwa for physical exam in IVF, IVF babies from religious, legal and jurisprudence overview. Tehran. Dec 2010.
- Bagheri Lankarani N, Samani Omani R. Embryo reduction: Islamic view. IFFS. 2010.
- Oudi M, Omani Samani R, Mozafari M, Merghati ST, Karbasi Zadeh M. Evaluation of assisted reproductive technology (ART) treatment in human immunodeficiency virus (HIV) discordant couples from ethical, legal, religious and medical aspects.
- Behnammanesh, Shima. The consideration of ethical principles noted in terms of using laboratory animals. Journal of Ethics in Science and Technology. 2010.
- Alizadeh L, Samani RO, Merghati ST, Combined surrogacy and gamete donation: Parent-child rights. (Farsi) Journal of Medical Ethics and History of Medicine. Supplement. Winter 2010; pp:12-20.
- Alizadeh L, Hasani F, Mozaffari S, Omani Samani R. Patient attitudes toward the fate of their frozen embryos after the end of cryopreservation time. IFFS. Munich; 2010.
- Alizadeh L, Omani Samani R. Letter to Editor: Attitude of male and female subjects towards oocyte donation in Shiraz, Reproduction and Infertility. 2010.

## Epidemiology and Biostatistics in ART

Worldwide, infertility is a major public health problem that has been encountered more during recent years. Clinically, a couple is considered to be infertile after at least one year without contraception and without pregnancy (Weinberg and Wilcox 1998; Savitz et al. 2002). Factors affecting fertility can vary in different parts of the world. The epidemiological knowledge about infertility in Iran is sparse. Fertility treatment developed substantially during the 1980's and Royan Institute is one of largest infertility centers in our country. Many infertile men and women from different geographical areas and different ethnic groups throughout the country refer to this center. It is tried to study important variables such as psychosocial, demographic, social, and geographical among others which impact fertility. Also, the associations between those variables among women and men in ART through epidemiological methodology such as case-control, retrospective cohort or interventional studies are included. It is my hope that the activities of this group can be effective in providing important data about the epidemiologic and etiologic factors of infertility in this part of the world in addition to showing the priority of future plans for complementary assessment and preventive programs in the general population.

### Publications

- Vafaei M, Hosseini J, Shiravi A, Gilani MA, Farrahi F, Dadkhah F, Khalili G. The comparison of diagnostic TESE &TESA in nonbtructiveazoospermic patients. SEEM. Istanbul, Turkey; 2010.
- Ashrafi M, Jahangiri N, Hassani F, Akhond MR, Madani T. The factors affecting the outcome of frozen-thawed embryo transfer cycle. TJOG. 2010.
- Ashrafi M, Kazemi Ashtiani S, Malekzadeh F, Amirchaghmaghi E, Eshrati B, Kashfi F, Shabani F. Symptoms of natural menopause among Iranian women living in Tehran, capital of Iran. In Press: IJRM. Winter 2010.
- Mahnaz Ashrafi, Saeed Kazemi Ashtiani, Farideh Malekzadeh, Elham Amirchaghmaghi, Fahimeh Kashfi, Babak Eshrati, Fatemeh Shabani. Symptoms of natural menopause among Iranian women living in Tehran, Iran. IJFS. 2010.
- Moini A, Zadeh Modarress SH, Amirchaghmaghi E, Mirghavam N, Khafri S, Akhoond MR, Salman Yazdi R. The effect of adding oral estradiol to progesterone as luteal phase support in ART cycles: A randomized controlled study. Archives of Medical Science. 2011; 7(1):112-116.
- Chehrazi M, Samimi A, Rezazadeh Valojerdi M, Omani Samani R. Bayesian analysis application and advantages in sperm biology researches – a practical example. IFFS. 2010.
- Leila Rashki Ghaleno, Mojtaba Rezazadeh Valojerdi, Ehsaan Jaan Zamin, Mohammad Chehrazi, Mina Sharbat Oghli, Reza Salman Yazdi. Evaluation of sperm preparation methods and their correlation with conventional semen parameters, intracellular ROS, DFI, MMP and apoptosis in normospermic semen samples. International Journal of Andrology.
- Akhlaghi AA, Eslaminejad B, Falahi F, Nazarian H, Omani Samani R. Factor analysis: A good practical way for selection of appropriate housekeeping gene in rat mesenchymal stem cell and its differentiated lineages. ESHRE. Rome, Italy; June 2010.
- Ashraf Moini, Kiandokht Kiani, Akram Bahmanabadi, Mohammad Reza Akhoond, Ali Asghar Akhlaghi. Improvement in pregnancy rate by removal of cervical discharge prior to embryo transfer in ICSI cycles: A randomized clinical trial. The Australian and New Zealand Journal of Obstetrics and Gynecology. 9 JUN, 2011.
- Sarah Ranjbarvaziri, Sahar Kiani, Ali Asghar Akhlaghi, Ahmad Vosough, Hossein Baharvand, Nasser Aghdami. Quantum dot labeling using positive charged peptides in human hematopoietic and mesenchymal stem cells. Biomaterials. 2011 (online 5 May 2011).
- Dibaj SH, Omani Samani R. Letter to Editor. J Reprod Infertil. 2011;12(2):165-165.



**Group Leader**  
**Gholamreza Khalili, MD**  
 rkhalili@royaninstitute.org

### Biography

Dr. Khalili has been involved with epidemiology and reproductive health for the past two years as a research fellow. He obtained his MD from the University of Tehran in 1999. Since 2001, Dr. Khalili has continued his education at the University of Tehran as a PhD student in the field of Epidemiology.

### Research Assistants

M.Akhoond  
 A.AsgharAkhlaghi  
 M.Chehrazi  
 Sh.Dibaj  
 L.Mounesan  
 S.Sazvar  
 F.Shabani  
 M.Shamsipour

## Reproductive Health



### Group Director

#### Ali Azin, MD

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#### Biography

Dr. Azin has been involved with the Epidemiology and Reproductive Health group for past two years as a research fellow. He received his MD from Azad University, Tehran in 1994. He continued his education at the University of Iran Medical Science in the field of Social Medicine and graduated in 2004.

#### Research Assistants

Z.Ahmadi  
Z.Ezabadi  
Sh.Irani  
N.Izadyar  
M.Karimi  
F.Malekzadeh.  
Sh.Sabeti

One side of every innovation in the field of medicine and medically related high-technology are human beings. Moreover, throughout history it has not been found that all peoples live outside of societies, thus implying that humans are social and cultural animals. Humans, similar to creatures, have the necessary and basic needs for survival. Therefore, the main difference between humans and other animals is their culture and economical system that enables them to live with each other and improve their quality of life.

ART, an innovation arising from this system that helps to maintain and improve quality of life. Therefore, not only is quality of life supposed to be studied in the process of constructing ART, but also it intended to do research on how it works, who local socio-economic system accept, change and internalize that, and what intended or unintended consequences are.

Female sexual dysfunction among infertile women referring to Royan Institute. (Project in2010)



**News and Events**

**Work shops**

- 2-3/6/2010: Research methodology: Intermediate level. Basic Research Methodology, Preference with clinical colleagues.
- 2-3/6/2010: Design of clinical trial protocol. Two day event for researchers interested in conducting clinical trials, to improve their general knowledge in statistics.
- 16-17/6/2010: Two day event focusing on using Microsoft Office Word and learning search engines such as Google and Pub Med.
- 21-22/7/2010: Ethical issues in assisted reproductive techniques. Two day group workshop in infertility treatment.
- 4/8/2010: Data cleaning for biomedical researchers.
- 3/10/2010: Data interpretation. One day workshop for biomedical researchers.
- 18-19/10/2010: Sexual health. Two day workshop for Medical professionals.
- 8-9/11/2010: Qualitative studies. for biomedical researchers.
- Advanced Methodology workshop: April 17-19 2010

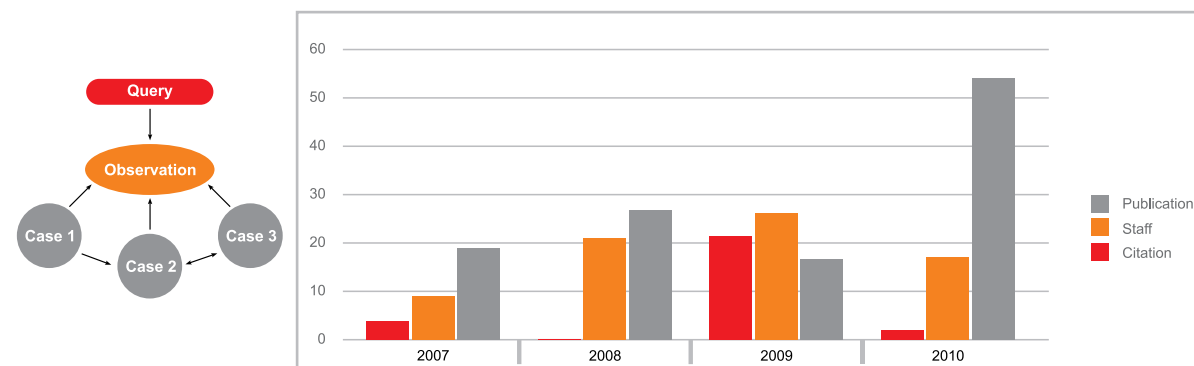
This workshop was held at Royan Institute. The objective of this work shop was to orient participants to different types of research methodology in the health field by focusing on clinical trial studies. Participants in this workshop were introduced to design and analysis of cross-sectional studies, case-control, cohort, clinical trials and medical issues, such as types of errors. For better understanding, issues were developed for practical work in groups and under direct supervision.

- Clinical Trial Design Workshop: July 13-14 2011  
For medical and paramedical researchers  
Introducing clinical trial phases  
Introducing different designs: parallel, cross-over, sequential  
Monitoring trial progress  
Interim analysis  
Treatment allocation  
Size of trials  
Statistical analysis in RCT
- 14/6/2011: Endnote (elementary level).
- 25-27/7/2011: Qualitative Methodology workshop (elementary).  
This workshop is for medical and paramedical groups. The following items will be discussed in this workshop:  
Define Qualitative Research  
Pretest  
How to choose a topic and introduce types of qualitative research.  
Qualitative Research Methodology  
Advantages of Qualitative Research  
Qualitative Research Design  
Types of Research Methodology  
To show the measuring tools in qualitative research  
Report Writing

**Post-test Journal Clubs**

No.	Name	Date	Title
1.	Samani Omani R.	01/05/2010	Ethics in ART
2.	Bagheri Lankarani, N	01/12/2010	Consort

**Staff, Publication and Citation chart**



Publications and staff during a four year period.

## Reproductive Imaging Department of RI-RB



**Head of Department**  
**Firoozeh Ahmadi, MD**  
■ Radiologist  
f\_ahmadi@royaninstitute.org

### Biography

Educational background : Radiology, Iran University of Medical Science, Tehran, Iran (1994-1997)  
General physician, Iran University of Medical Science, Tehran, Iran (1986-1993)

### Research Scientists

M. Niknejadi MD, Radiologist  
M. Salamati MD, Radiologist  
A. Vosough MD, Radiologist  
F. Zafarani , MSc student

### Research Assistants

F. Akhbari ,BSc  
H. Haghighi, BSc  
Sh. Irani , PhD  
N. Nasiri , MSc  
Z. Rashidi ,BSc  
F. Nicknejadi ,BSc student

### Other members

J. Abolhasani  
F. Ghaderi  
A. Poyan  
M. Rozbehani  
F. Tehrani ,BSc  
N. Tamhidi

### Student trainee

M. Rohaninejad

### Message from the Department Head

The total number of infertile couples has increased over the past two decades and the usefulness of imaging for fertility treatment and ART is expanding. The physical and psychological impact of infertility can be crushing to the infertile person and their family.

The goals of our department are to conduct research in the field of male and female infertility in order to provide modern, high quality services for infertile couples.

The mission of our department is to achieve excellent patient care through high quality state of the art medical imaging services; to educate skilled professionals in basic and clinical medical sciences; and to create, evaluate and disseminate knowledge and technology. Additionally our mission is to provide innovative solutions for improving the health of the general public.

This department's vision is to perform national and international multicenter research with the collaboration of universities and other infertility centers to provide educational courses in reproductive imaging for radiologists and gynecologists in addition to fellowships.

Overview of the group in 2011

- Projects: Continuing projects in the assessments of female and male infertility, and fetal screening anomalies with more focus on:
  - Ultrasonographic chart standardization for Iranian fetuses in order to study early prenatal abnormalities
  - Comparative studies of different imaging modalities for assessment of female/ male infertility and fetal screenings to determine diagnostic accuracy with regards to golden standards
  - Hysterosalpingography for evaluation of endometrial cavity and complete evaluation of both tubes
  - 3D sonohysterographic studies for the detection of intrauterine structural abnormalities and mullerian anomalies
  - Diagnostic and interventional imaging in male infertility
- Education: to provide leadership and knowledge in the field of reproductive medicine.
  - Short reproductive imaging course (2-4 weeks)
  - Long reproductive imaging course ( 2-6 months)
- Special clinical services
  - Ultrasonography of the female and male reproductive tract abdominal and vaginal 2D/3D/live 3D/color and power Doppler and transrectal ultrasonic imaging
  - 3D sonohysterography
  - Hysterosalpingography
  - Contrast delineation of the vas deferens and seminal vesicles (vasography)

Dr.Firoozeh Ahmadi

## Ultrasonography and Sonohysteroscopy

The Reproductive Imaging Department was established in 2008 with the intent to focus on infertility assessment as well as evaluation of pregnancies in both the clinic and research areas. Female and male infertility assessments using 2D/3D/live 3D ultrasound of the uterus, ovaries and male genital tract, color and power Doppler imaging, 3D sonohysterography, ultrasound tubal patency, transrectal ultrasonic imaging of the reproductive tract, hysterosalpingography, contrast delineation of the vas deferens and seminal vesicles (vasography) have been performed in our department.

In addition, the department offers a fellowship in reproductive imaging for radiologists in order to establish a high standard of education and training for clinical practice and scientific investigation.

### Publications

- F Ahmadi, F Zafarani, H Haghghi, M Niknejadi, A Vosough Taqi Dizaj. **Application of 3D Ultrasonography in Detection of Uterine Abnormalities: Pictorial Review.** Int J Fertil Steril, 2011;4(4):144-7.
- M Niknejadi, F Ahmadi, F Zafarani, GH Khalili, F Ghaderi, Z Rashidi. **Diagnostic Accuracy of Transvaginal Sonography in Infertile Patient with Endometrial Polyps.** Int J Fertil Steril, 2010; 3(4):157-60.
- F Ahmadi, F Zafarani, H Haghghi, M Niknejadi. **Ectopic Pregnancy in Cesarean Section Scar: A Case Report.** Int J Fertil Steril, 2010;4(3):140-2.
- M Niknejadi, F Ahmadi, H Haghghi. **Twin Pregnancy with Holoprosencephaly in One Fetus and Down Syndrome in the Other.** Iranian Journal of Radiology, 2010;7(4):221-4.
- A Pirestani, M Hosseini, M Hajian, M Frouzanfar, F Moulavi, P Abedi, H Gourabi, A Shahverdi, A Vosough Taqi Dizaj, M Nasr Esfahani. **Effect of Ovarian Cyclic Status on In vitro Embryo Production in Cattle.** Int J Fertil Steril, 2011;4(4):144-7.
- M Nasr-Esfahani, M Hosseini, M Hajian, M Forouzanfar, S Ostadhosseini, P Abedi, Y Khazaei, K Dormiani, K Ghaedi, M Forouzanfar, H Gourabi, AH Shahverdi, A Vosough, H Vojgani. **Development of an Optimized Zona-Free Method of Somatic Cell Nuclear Transfer in the Goat Cell Reprogram.** 2010;13(2):157-70.
- L Khodadadi, S Shafeyan, M Sotoudeh, A Vosough Dizaj, A Shahverdi, N Aghdami, H Baharvand. **Intraepidermal Injection of Dissociated Epidermal Cell Suspension Improves Vitiligo** Arch Dermatol Res 2010;302(8):593-9.
- D Nasrabadi, MR Larjani, A Fathi, H Gourabi, A Vosough Dizaj, H Baharvand, GH Salekdeh. **Nuclear Proteome Analysis of Monkey Embryonic Stem Cells during Differentiation.** Stem Cell Rev 2010;6(1):50-61.
- S Ranjbar vaziri, S Kiani, A Akhlaghi, A Vosough, H Baharvand, N Aghdami. **Quantum Dot Labeling using Positive Charged Peptides in Human Hematopoietic and Mesenchymal Stem Cells.** Biomaterials 2011;32(22):195-205.

### Group Leader

**Firoozeh Ahmadi, MD**

■ Radiologist

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## News and Events

### Workshops

- Pre-congress workshop of 3D of Scrotal Lesion, 14/09/2010

This workshop was organized by the Department of Reproductive Imaging to provide an overview of the role of 3D, 3DXI as a diagnostic procedure in detecting scrotal mass lesions. The Chairman of this pre-congress was Dr. Salah Elwagdy. This pre-congress was a great success and attended by around 20 radiologists.

- Pre-congress workshop of Application of Color Doppler Sonography in Fetal Assesment,13/09/2010

This workshop was organized by the Department of Reproductive Imaging to provide an overview of the role of Doppler ultrasound in prenatal fetal assessment. The selective use of fetal Doppler leads to significant reduction in prenatal mortality and morbidity. The Chairman of this pre-congress was Dr. Haghhighat Khah. This pre-congress was a highly successful and attended by around 26 radiologists.

- Pitfalls of Mammography and Breast Sonography, 03/12/2010

This workshop was organized by the Department of Reproductive Imaging to provide an overview of the pitfalls of breast ultrasound and mammography. The Chairs of this pre-congress were Drs. Salamati, Jolayee and Kalantari. Over 25 radiologists attended this highly successful workshop.

- The Second Trimester Fetal Genetic and Anomaly Screening, 14/01/2011

This workshop was organized by the Department of Reproductive Imaging to provide an overview of the detail of fetal anatomy in the 2nd trimester according to ultrasonography. The Chairman of this successful pre-congress was Dr. Tahmasebpor and it was attended by over 25 radiologists.

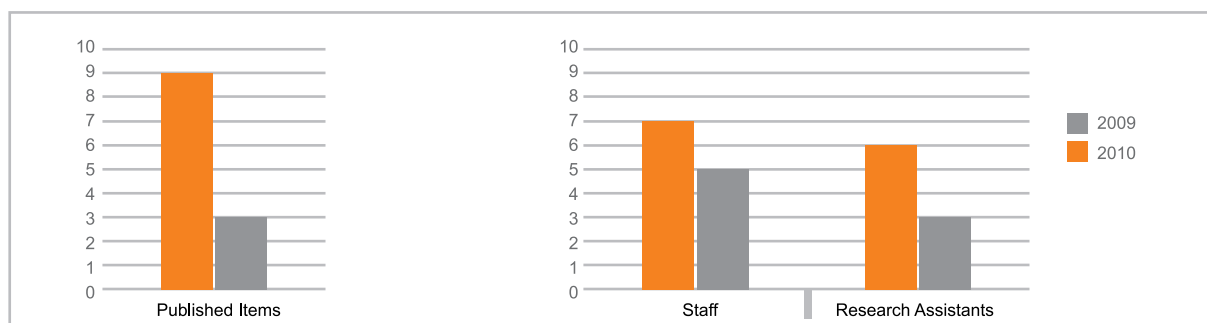
- Biophysical Profile (BPP),19-21/01/2010

Biophysical Profile (BPP) and Hystrosonography are two workshops held during the 3rd annual Congress of Women Imaging. These workshops were organized by Jondishapor University in Ahvaz. The presenters were Drs. Ahmadi and Salamati from the Department of Reproductive Imaging.

### Journal club

No.	Name	Date	Title
1.	Dr. Masoomeh Salamati	June 8, 2010	Breast Screening in ART Cycle

### Staff and Publication Charts



## Royan Infertility Clinic

Royan Infertility Clinic is the second clinic for the treatment of infertility in Iran and the first one in Tehran. Although there are more than 50 infertility clinics throughout Iran, after 18 years of experience in this field and due to the high rate of success, many patients prefer to have their treatments in this clinic. Each year we have numerous foreign patients who come to Iran for infertility treatment. Different services including diagnostic and operative laparoscopy, IUI, ovulation induction, IVF, ICSI, PGD, PESA/TESE, microscopic TESA, vasovasostomy, vasoepididymostomy, TURD, gamete and embryo cryopreservation, assisted hatching, karyotyping, molecular genetic tests such as Factor V Leiden, Factor II and MTHFR gene, as well as others routinely offered to patients.

Royan Infertility Clinic includes different sections for the assessment of different aspects of infertility and developing the best treatment methods:

- Endocrinology Clinic
- Endoscopy Clinic
- Endometriosis Clinic
- Recurrent Abortion Clinic
- Prenatology Clinic
- IVF Failure Clinic
- Male Infertility Clinic
- Psycho- Social Support and Counseling Clinic
- Genetic Counseling Clinic
- Imaging modalities such as rectal and vaginal ultrasonography

### Statistics of Royan Infertility Clinic Activities and Treatment Cycles in 2010-2011:

Total number of Visited Patients + Specialized Counseling	115785
Genetic Counseling	1849
Psychological Counseling	902
Diagnostic Laparoscopy	119
Diagnostic Hysteroscopy + Office Hysteroscopy	834
Laparohysteroscopy	106
Hysterosonography	792
Varicocelectomy	131
PESA/TESE	1780
PGD	225
Embryo Transfer & Freezing	1286
IUI	2516
ZIFT	15
ICSI/IVF cycle	4965
Specialized Sonography + Radiology	15583
Operative Hysteroscopy	630
Monitoring Sonography	41255
Operative Laparoscopy	152



### Group Leader

**Tahereh Ma'dani, MD**

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### Biography

Dr Tahereh Ma'dani obtained her medical degree in 1984 from Shiraz University of Medical Sciences, Iran, and completed her obstetrics and gynecology specialty in 1989 at Iran University of Medical Sciences. She then took up a post as an Associate Professor, Iran University of Medical Sciences. Her current position is as Head of the Endocrinology and Infertility Department, Reproductive Medicine Research Centre, Royan Institute. She is especially interested in assisted reproductive technology (OHSS, IVM) and reproductive immunology. She has managed several research projects and has a range of national and international publications, including presentations.

## Royan Institute for Stem Cell Biology and Technology (RI-SCBT)



**Head of Department**  
**Hossein Baharvand, PhD**  
baharvand@royaninstitute.org

### Biography

Born in 1972, Hossein Baharvand obtained his PhD degree in 2004 in the field of Developmental Biology. He is currently an Associate Professor, Head of Department of Stem Cells and Developmental Biology at Royan Institute (2002-now) and Head of the Department of Developmental Biology at the University of Science and Culture (2006-now). He established the first mouse and human embryonic stem cells in Iran (2003). Later, his team has generated several mouse and human embryonic and induced pluripotent stem cells (2008) and in addition, they are working on adult stem cells. These works(?) have enabled them to pursue many avenues in both translational research and regenerative medicine. He has published 113 international and 96 national peer-reviewed papers, as well as 3 chapters in international books, 6 books in Persian and translated 3 books into Persian. He is editor of the "Trends in Stem Cell Biology and Technology" book (2009, Humana Press, Springer, USA). Dr. Baharvand is an editorial board member of eight international journals. He has won 17 national and international awards, and presented as an invited speaker in several meetings. In 2010, he won a gold medal, the "ISESCO Science and Technology Prize" in 2010" in the field of Biology.

### Introduction

Royan Institute for Stem Cell Biology and Technology (RI-SCBT), formerly known as the Department of Stem Cells, was first established in 2002 to promote research on general stem cell biology in Iran.

Thereafter, the Department of Stem Cells expanded to twelve main research groups that conduct studies on stem cells and developmental biology, molecular systems' biology, and regenerative medicine.

Throughout, our vision has been to make stem cell research findings applicable in disease treatment to improve public health.

Therefore, today, RI-SCBT is providing a comprehensive and coordinated "bench to bedside" approach to regenerative medicine, as well as a greater understanding of fundamental biology of stem cells, developmental biology, development of translational research of stem cell therapeutics and administration of new cell-therapy approaches that can restore tissue function to patients.

### Message from the Institute Director

Over the past year, Royan Institute for Stem Cell Biology and Technology (RI-SCBT) maintained its leading role in stem cell research in Iran, solely due to the great efforts undertaken by its scientific board, research assistants and the entirety of its valuable members. During this year, our ongoing studies are categorized into different research programs including: biology of pluripotent stem cells, epigenetic reprogramming, hepatocytes, pancreatic beta cells, neural cells, germ cells, mesenchymal stem cells/bone and cartilage cells, cardiomyocytes and endothelial cells, cancer and hematopoietic stem cells, molecular systems' biology, regenerative medicine and a public cord blood bank. This approach has enabled us to manage our research fields more precisely and assist with accelerating our research. We have also founded and began more valuable research programs during this year, such as "epigenetic reprogramming" and "cancer stem cells". These programs are ongoing in three departments: Stem cells and Developmental Biology, Molecular Systems' Biology and Regenerative Medicine.

The reorganization of professional services into eight separate "core facilities" was one of our most important improvements during the last year. This change had a great impact on the availability of our research to these services in addition to improving their scientific quality and quantity. Now that our research assistants and technical staff are engaged in core facilities, both have more time to focus on their specific fields.

Establishment of new research programs and equipping new core facilities provided a good opportunity for RI-SCBT to recruit new members as students and research assistants.

For our publications, we have a noticeable improvement in the quality of publications during this year. The number of our international publications as well as the numbers of their citations shows a tangible increase in comparison with last year.

"Royan International Congress on Stem Cell Biology and Technology" is the most important international scientific event in this field, of which last year there were more than 800 stem cell researchers in attendance. The congress is a valuable chance for Iranian researchers to exchange ideas with scientists from other nations.

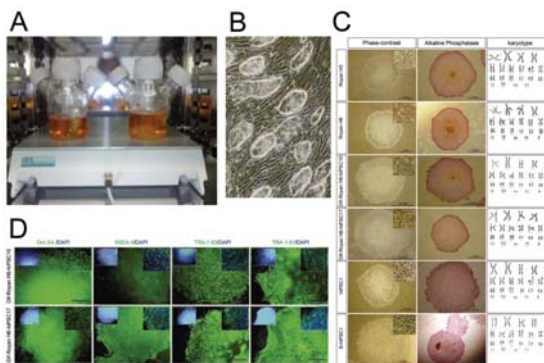
Developing stem cell science in Iran is one of the important goals of RI-SCBT; regarding this objective, we have organized more than 20 workshops and educational symposiums on different subjects in addition to a summer course that focuses on germ cells and pre-implantation embryology. Training and updating our members' knowledge is an inseparable part of our research. Thus, in addition to seriously pursuing Journal Clubs' weekly meetings, several internal workshops were held specifically for our Institute's researchers.

Our mission is "to generate insights into the biology of stem cells through basic research and to provide the foundation needed for novel therapies from regenerative medicine". We are approaching this great goal in our Cell Therapy Center by means of the Program of Regenerative Medicine; a goal that is the final aim of all the scientific efforts performed at RI-SCBT.

Dr. Hossein Baharvand

## Biology of Pluripotent Stem Cells

Our first priority was the derivation and maintenance of embryonic stem cells from mice and humans. Accordingly, we could derive 11 lines of human embryonic stem cells and more than 170 lines of mouse embryonic stem cells from 2002 until now. In recent years, we have focused on the generation of new embryonic stem cell lines by new signaling pathways, induced pluripotent stem cells, the biology of embryonic stem cells and induced pluripotent stem cells, mechanisms of pluripotency, optimization the culture and maintenance of pluripotent stem cells and the scale-up culture of these cells for biomedical applications.



A) Scale up culture of embryonic stem cells by spinner flasks. B) Morphology of mouse embryonic stem cells. C) Characterization of human embryonic stem cells and human induced pluripotent stem cells. D) Immunostaining of human induced pluripotent stem cells for some specific pluripotency markers.

### Publications

- Long-Term maintenance of undifferentiated human embryonic and induced pluripotent stem cells in suspension. Larijani MR, Seifinejad A, Pournasr B, Hajihoseini V, Hassani SN, Totonchi M, Yousefi M, Shamsi F, Salekdeh GH, Baharvand H. *Stem Cells Dev.* 2011 Feb 24. [Epub ahead of print]
- Presence of a ROCK inhibitor in extracellular matrix supports more undifferentiated growth of feeder-free human embryonic and induced pluripotent stem cells upon passaging. Pakzad M, Totonchi M, Taei A, Seifinejad A, Hassani SN, Baharvand H. *Stem Cell Rev.* 2010 Mar;6(1):96-107.
- Generation of liver disease-specific induced pluripotent stem cells along with efficient differentiation to functional hepatocyte-like cells. Ghodsizadeh A, Taei A, Totonchi M, Seifinejad A, Gourabi H, Pournasr B, Aghdami N, Malekzadeh R, Almadani N, Salekdeh GH, Baharvand H. *Stem Cell Rev.* 2010 Dec;6(4):622-32.
- Derivation of new human embryonic stem cell lines from preimplantation genetic screening and diagnosis-analyzed embryos. Taei A, Gourabi H, Seifinejad A, Totonchi M, Shahbazi E, Valojerdi MR, Eftekhari P, Karimian L, Baharvand H. *In Vitro Cell Dev Biol Anim.* 2010 Apr;46(3-4):395-402. Epub 2010 Feb 23.
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### Group Leader

Hossein Baharvand, PhD



### Chief Researcher

**Seyedeh Nafiseh Hassani**

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### Biography

Seyedeh Nafiseh Hassani received her BSc in Cell and Molecular Biology from Tehran University in 2002. She continued her education in same field at Khatam University in Tehran. She passed her thesis by Dr. Rafati at Pasteur Institute and graduated with an MSc in 2005. In 2008, she began a PhD degree in Developmental Biology in a joint program between Royan Institute and the University of Science and Culture. Currently, she is working on her PhD thesis under the supervision of Dr Baharvand. Her major research interest is pluripotent signaling pathways in stem cells.

### Research Assistants

Saeed Abasalizadeh, MSc  
Sepideh Mollamohamadi, BSc  
Mohammad Pakzad, MSc  
Mehran Rezaei, BSc  
Azam Samadian, BSc  
Adeleh Taei, BSc

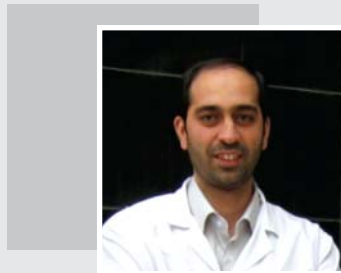
### Student

Adeleh Taei, MSc

## Epigenetic Reprogramming

### Group Leader

Hossein Baharvand, PhD



### Chief Researcher

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#### Biography

Mehdi Totonchi was born in 1979 in Badrood, Esfahan, Iran. He studied for a BSc in Biology at the University of Bu-Ali Sina in Hamedan from 1997-2002. In 2005, he received his MSc in the field of Molecular Genetics at Azad University of Research Sciences. For the next three years, he was a research assistant in the Department of Genetics and Stem Cells at Royan Institute. There, he was involved in the generation of the first induced pluripotent stem cell (iPSC) in Iran. In 2008, he began his PhD at the joint program of the University of Science and Culture and Royan Institute in the field of Developmental Biology.

#### Research Assistants

Maryam Hajikaram, MSc  
 Ali Seifinejad, MSc

#### Student

Sharif Moradi, PhD

Epigenetic reprogramming, which can be considered the biological breakthrough of the decade, can be categorized into in vitro and in vivo trials. In recent years, there has been an increased interest in the study of induced pluripotent stem cell (iPSC) biology and cell fate conversion because of the potential of iPSC in regenerative medicine, disease modeling, drug discovery and in vitro analysis of development, which have led scientists to enthusiastically embrace this field.

Our group performs its assignments both as a viral transduction core facility and in independent research projects. Since the establishment of first iPSC lines, our group decided to narrow its activities to some major fields, including:

A. Establishment of patient specific iPSCs, genetic correction and functional analysis of these cells in order to study the disease mechanisms, development and disease modeling for drug discovery trials. iPSC technology has provided scientists with patient-derived pluripotent stem cells that can be differentiated towards interesting cells affected by certain diseases. To reach this goal, we have established iPSC lines from some diseases.

B. Movement towards production of iPSCs. Regarding this, we have launched some projects to generate safer iPSCs using small molecules, recombinant proteins and synthetic mRNAs.

C. Direct transdifferentiation of terminally differentiated cells and studying cell fate conversion. Due to the importance of this issue in regenerative medicine, our group has set this goal as one of its highest priorities and enthusiastically follows this plan.

D. Computational modeling of genetic/epigenetic mutual interaction within pluripotent and differentiated cells. The Waddington landscape approach to this problem has recently provided insights into several key issues of differentiation. Our aim is to develop a computational platform for quantitative analysis and prediction of events during pluripotency and differentiation.

#### Publications

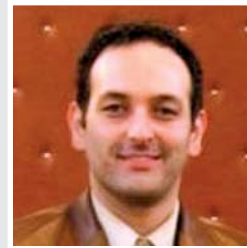
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- Generation of liver disease-specific induced pluripotent stem cells along with efficient differentiation to functional hepatocyte-like cells. Ghodsizadeh A, Taei A, Totonchi M, Seifinejad A, Gourabi H, Pournasr B, Aghdami N, Malekzadeh R, Almadani N, Salekdeh GH, Baharvand H. *Stem Cell Rev*. 2010 Dec;6(4):622-32.
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## Hepatocytes

### Group Leader

Hossein Baharvand, PhD



### Chief Researcher

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### Biography

Behshad Pournasr received his BSc in Cell and Molecular Biology from the Faculty of Science, Tehran University in 2000. He continued his education at Isfahan University of Medical Sciences. He joined the Department of Immunology and worked under the supervision of Dr Pourazar, completing his study in 2003. He began working at Royan Institute from 2006 as a research assistant. In 2009, he began a PhD position in Developmental Biology in a joint program between Royan Institute and the University of Science and Culture. His major research interest is the biology of hepatocytes and hepatogenesis.

### Research Scientist

Abbas Pyriaee, PhD

### Research Assistants

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Arefeh Ghodsizade, MSc  
Maryam Miryounesi, MSc  
Mohsen Moslem, PhD  
Masoud Vosough, PhD

Cell-based therapy with the hope of replacement of new hepatocytes in the injured organ motivates scientists to produce large amounts of the cells *ex vivo*. Having the functional hepatocyte in the lab, one needs to have extensive knowledge regarding real, functional hepatocytes that can be obtained in a primary culture from the liver. It is also necessary to have the basic knowledge of mechanisms involving liver formation during embryogenesis which can be simulated in the lab by using pluripotent stem cells as well as a rodent model.

Therefore, our group has focused on hepatocyte differentiation of pluripotent stem cells as well as direct conversion of accessible cells such as fibroblasts to hepatocytes; a new era called transdifferentiation. The main goal of our group is improving the condition of patients suffering from liver disease as well as discovering unknown basic phenomena that occurs during human hepatogenesis with the use of pluripotent stem cells as models.

### Publications

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- Generation of liver disease-specific induced pluripotent stem cells along with efficient differentiation to functional hepatocyte-like cells. Ghodsizadeh A, Taei A, Totonchi M, Seifinejad A, Gourabi H, Pournasr B, Aghdami N, Malekzadeh R, Almadani N, Salekdeh GH, Baharvand H. *Stem Cell Rev.* 2010 Dec;6(4):622-32.
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## Pancreatic Beta Cells

### Group Leader

Hossein Baharvand, PhD



### Chief Researcher

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#### Biography

Ali Farrokhi completed his BSc degree in Genetics from Shahid Chamran University of Ahvaz in 2003. In 2004, he became a research assistant at Royan Institute. He received his MSc in Cell and Molecular Biology from Tehran University in 2007. From 2007 until now, he has been the pancreatic  $\beta$ -cell chief researcher at Royan Institute.

#### Research Assistants

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Hossein Nezari, MSc

#### Students

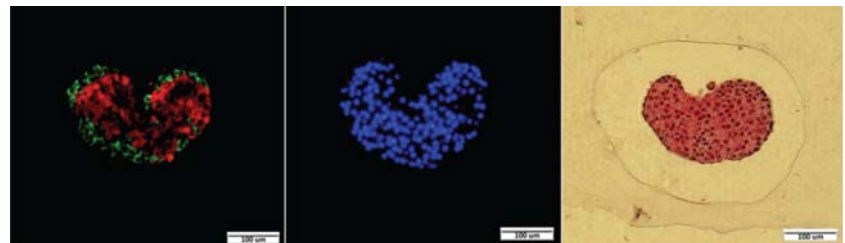
Azadeh Moradmand, MSc  
Mojdeh Sojoodi, MSc  
Yaser Tahamtani, PhD

Our group is looking for a new cell sources to use as cell therapy for type1 diabetes. Type 1 diabetes mellitus (T1DM) is one of the most common metabolic disorders, particularly in childhood. T1DM is characterized by the autoimmune destruction of the insulin producing,pancreatic  $\beta$ -cell. For this reason, there is a compelling need for a renewable source of cells that could replace pancreatic  $\beta$ -cells.

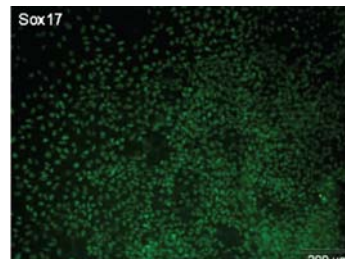
There are several approaches being considered for the generation of  $\beta$ -cells: the first, directing the differentiation of embryonic stem cells, induced pluripotent stem (iPS) cells, adult pancreatic cells and tissue adult stem cells to the  $\beta$ -cell lineage. The second is based on conversion of another terminally differentiated cell to  $\beta$ -cells in a process called lineage reprogramming. The third approach is to promote the replication of existing  $\beta$ -cells either in vivo or in vitro.

There are several reports of differentiation of cell populations into  $\beta$ -cells, definitive endoderm, and pancreatic progenitors, using growth factors and small molecules. However, the final step of directed differentiation to generate functional, mature  $\beta$ -cells in sufficient quantities has yet to be achieved in vitro.

Our group's areas of focus include the effect of extracellular matrix on differentiation of human embryonic stem cells to insulin producing cells; manipulating signaling pathways to enhance differentiation of human pluripotent stem cells to insulin producing cells by growth factors and small molecules; and conversion of another terminally differentiated cell to  $\beta$ -cells.



Islet of Langerhans cultured in vitro, red: Insulin, green: Glucagon, blue: Nuclei.



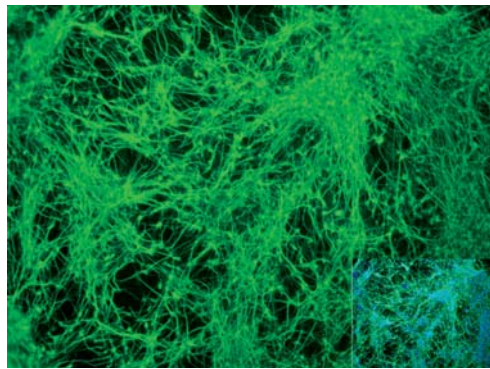
Sox 17 positive definitive endoderm cells produced from human embryonic stem cells by using small molecules as inducers.

## Neural Cells

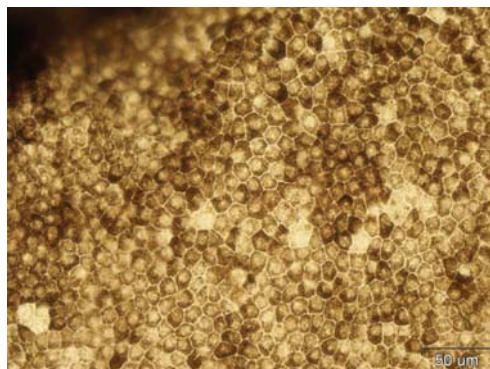
### Group Leader

Hossein Baharvand, PhD

The availability of self-renewing stem cells has provided new perspectives for the development of neuroregenerative therapies. A key focus of our research is the derivation of defined neurons and glia from embryonic and induced pluripotent embryonic stem cells. Using a variety of differentiation protocols and transplantation and disease models, we are exploring the potential for these cells to integrate into the nervous system and contribute to functional repair.



Neural progenitor cells in the presence of small molecule CHIR.



Retinal pigmented epithelium (RPE) cell-derived pluripotent stem cells.

### Publications

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### Research Scientist

Sahar Kiani, PhD

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### Biography

Sahar Kiani received her BSc from the Department of Biology at Azad University in 2001. She continued her education in the Medical University of Mashhad. She joined the laboratory of Professor Boskabady at the Medical University of Mashhad and graduated with an MSc in Physiology in 2003. Then, she began her PhD at Tarbiat Modarres University and Royan Institute, emphasizing the electrophysiology of human embryonic stem cells during neural differentiation, in the laboratory of Professor Baharvand at Royan Institute in 2006 and graduated in 2010. She currently works as a member of the academic staff at Royan Institute. Her major research interest has been motor neurons, particularly spinal cord injuries.

### Research Assistants

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Ali Fathi, PhD  
Ali Rahjouei, MSc  
Fereshteh Sargholi, MSc  
Azadeh Zahabi, MSc  
Maryam Yousefi, MSc

- Electrospun nanofibrillar surfaces promote neuronal differentiation and function from human embryonic stem cells. Shahbazi E, Kiani S, Gourabi H, Baharvand H. *Tissue Eng Part A*. 2011 Jul 8.
- Application of conductive polymers, scaffolds and electrical stimulation for nerve tissue engineering. Ghasemi-Mobarakeh L, Prabhakaran MP, Morshed M, Nasr-Esfahani MH, Baharvand H, Kiani S, Al-Deyab SS, Ramakrishna S. *J Tissue Eng Regen Med*. 2011 Apr;5(4):e17-35.
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- The expression of peroxisomal protein transcripts increased by retinoic acid during neural differentiation. Ostadsharif M, Ghaedi K, Hossein Nasr-Esfahani M, Mojbafan M, Tanhaie S, Karbalaie K, Baharvand H. *Differentiation*. 2011 Feb;81(2):127-32. Epub 2010 Dec 9.
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- Neuronal induction and regional identity by co-culture of adherent human embryonic stem cells with chicken notochords and somites. Salehi H, Karbalaie K, Razavi S, Tanhaee S, Nematollahi M, Sagha M, Nasr-Esfahani MH, Baharvand H. *Int J Dev Biol*. 2011;55(3):321-6.
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- Evidence for a dynamic role of the linker histone variant H1x during retinoic acid-induced differentiation of NT2 cells. Shahhoseini M, Favaedi R, Baharvand H, Sharma V, Stunnenberg HG. *FEBS Lett*. 2010 Nov 19;584(22):4661-4. Epub 2010 Oct 26.
- Effect of poly-L-lysine coating on retinoic acid-loaded PLGA microspheres in the differentiation of carcinoma stem cells into neural cells. Nojehdehian H, Moztarzadeh F, Baharvand H, Mehrjerdi NZ, Nazarian H, Tahriri M. *Int J Artif Organs*. 2010 Oct;33(10):721-30.
- Epigenetic analysis of human embryonic carcinoma cells during retinoic acid-induced neural differentiation. Shahhoseini M, Taei A, Mehrjerdi NZ, Salekdeh GH, Baharvand H. *Biochem Cell Biol*. 2010 Jun;88(3):527-38.
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## Germ Cells

Group Leader

Hossein Baharvand, PhD



Research Scientist

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Biography

Abdolhossein Shahverdi received his PhD in Anatomy from Tarbiat Modarres University in 2007. Since 1999, he is the Vice President of the Department of Research and Education, an Assistant Professor and academic member of Royan Institute.

Students

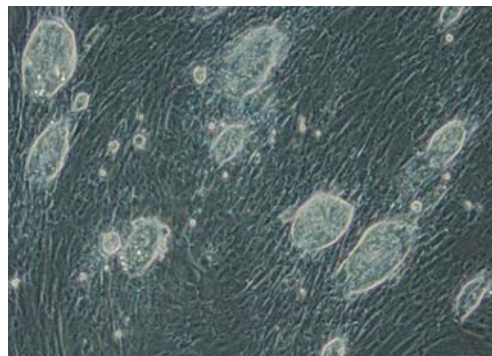
Mohsen Abolfathi, MSc  
Farnoosh Attari, PhD  
Faezeh Moraveji, MSc

### Publications

- Tavakolifar F, et al. The effect of laminin and gelatin extracellular matrix on short-term cultivation of neonate mouse spermatogonial stem cells, Jjournal of Iranian Anatomical Sciences . 2010;8:37-48.

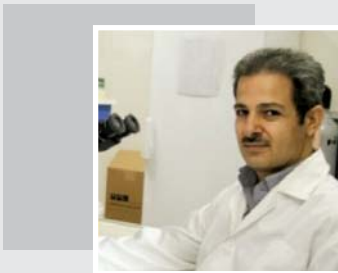
Spermatogonial stem cells (SSCs) are unipotent precursor cells for sperm generation in the testis. SSCs represent an extremely low proportion (0.02%–0.03%) of the cells of the testis, but they can be isolated and propagated in vitro. More recently, it was found that these cells can be reprogrammed spontaneously to multipotent cells in vitro and have the capability to differentiate into various differentiated cell lineages. In fact, these multipotent cells can act like embryonic stem (ES) cells in their differentiation properties and in the morphology and growth characteristics of the colonies they form in culture. Thus, they are named ES-like cells. These findings made the field more exiting, and several reports have commented on the possible uses of these SSC-derived ES-like cells, including regenerative medicine. Furthermore, these cells may provide new opportunities to study genetic diseases in various cell lineages. However, the rate of conversion of testicular cells to ES like cells is too low and our aim is to increase this rate in an efficient way.

Our group seeks to find an efficient way to culture human and mouse spermatogonial stem cells. Moreover, we are attempting to induce pluripotency in testicular cells with different reagents.



ES-like cells derived from testicular cells at day 6.

## Bone and Cartilage/Mesenchymal Stem Cells



**Group Leader**  
**Mohammad R. Baghban Eslaminejad, PhD**  
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### Biography

Dr. Mohamad Reza Baghban Eslaminejad graduated with a degree in Anatomical Sciences from Tarbiat Modarres University in 2004. Since then, he has worked as an academic staff member at Royan Institute, a major center for stem cell research in Iran. In early days of his employment, he established a lab for mesenchymal stem cells (M.SCs) in Royan Institute. The aim of the lab is to pave the way for M.SCs application in reconstructing bone and cartilage defects. To do so, he has published several (about 80) international and national papers on M.SCs. Some of his major achievements include the introduction of a novel method for the purification of murine M.SCs, presenting a novel surface marker for murine M.SCs and the innovation of an efficient method for M.SCs seeding onto bone 3D scaffolds. At the present, his research has reached the clinical trial stage: using M.SCs for human skeletal repair.

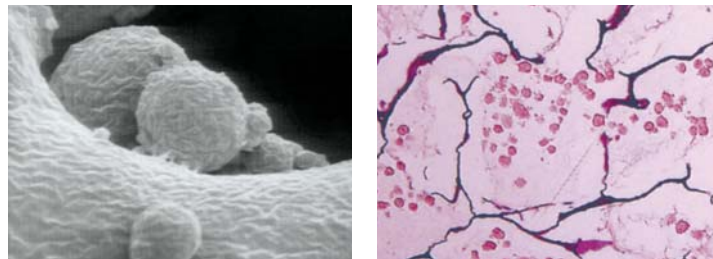
### Research Assistants

Nesa Fani, MSc  
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Shahrbano Jahangir, MSc  
Hamid Nazarian, MSc  
Forough Azam Sayyehpour, MSc  
Leila Taghiar, MSc  
Elham Zomorrodian, MSc

### Students

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Mohammad Ghasemzade, PhD  
Tahereh Karimi, PhD  
Fateme Safari, MSc  
Mohammad Ali Zaare', PhD

The Adult Stem Cell lab focuses on investigating mesenchymal stem cells (M.SCs) with the aim of making it possible to apply M.SCs in the regeneration of bone and cartilage defects in humans. To achieve this goal, the lab has initially designed several researches regarding M.SC basic biology, such as determining an efficient method for their isolation, and optimization of their osteogenic and chondrogenic differentiation. Additionally, some researchers have utilized M.SCs and their regenerative potential in animal models to fabricate bone and cartilage constructs. Additionally, clinical trials regarding bone and cartilage tissue defects are ongoing in collaboration with the Regenerative Medicine Program.



M.SCs loaded on a scaffold 3D pore system.

### Publications

- Study of the structure of canine mesenchymal stem cell osteogenic culture. Eslaminejad MB, Taghiyar L. *Anat Histol Embryol.* 2010; 39:446–55.
- Mesenchymal stem cells from murine amniotic fluid as a model for preclinical investigation. Baghban Eslaminejad M, Jahangir S, Aghdami N. *Arch Iran Med.* 2011 Mar;14(2):96-103.
- Comparison of proliferation and osteoblast differentiation of marrow-derived mesenchymal stem cells on nano- and micro hydroxyapatite contained composite scaffolds. Baghban Eslaminejad MR, et al. *Iranian Journal of Biotechnology,* 2010; 8(4)
- Biocompatibility evaluation of nano-rod hydroxyapatite/gelatin coated with nano-HAp as a novel scaffold using mesenchymal stem cells. Baghban Eslaminejad MR, et al. *Journal of Biomedical Materials Research.* 2010; 92(A):1244–1255.

## Cardiomyocytes and Endothelial Cells

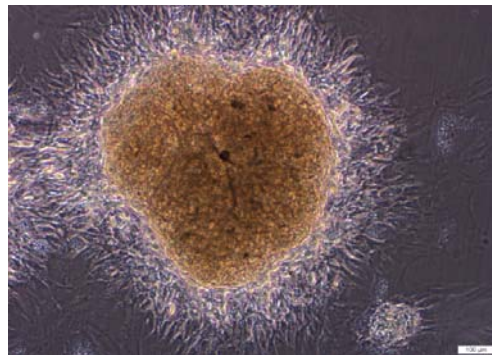
Our group seeks to explore the biological mechanisms of cardiomyocytes. Additionally, we research methods for proliferation and differentiation of different types of stem cells such as human embryonic stem cells, iPS, and cardiac stem cells to cardiomyocytes and modification of these methods for gaining functional cardiomyocytes with the same characteristics as a real cardiomyocyte.

Differentiation of human embryonic stem cells (hESCs) into cardiomyocytes with current protocols is inefficient, which has led to limited application of these potent cells in drug discovery and clinics. ISL1 is one of the cardiac transcription factors whose overexpression can improve the expression of cardiac-specific markers. However, genetic manipulation of hESCs is labor intensive and has low efficiency. On the other hand, these cells are not safe enough for clinic use. As a result, we have tried to enhance the cardiac differentiation efficiency of hESCs by transduction of the ISL1 protein.

Human induced pluripotent stem cells (hiPSCs) have the potential to provide an unlimited source of cardiomyocytes that offers a precious tool for drug discovery and regenerative medicine. However, this application is limited due to difficulties in large-scale expansion of hiPSCs in adherent culture conditions and insufficient efficiency of differentiation protocols. In order to overcome these problems, we present an efficient protocol for expansion and differentiation of hiPSCs in suspension as spheroids.

Separation and culture of cardiac stem cells from heart biopsies is another activity in this group. Expansion and differentiation of these cells can increase our knowledge about heart regeneration in patients with congenital heart disorders (i.e., VSA or ASD).

Following these activities, we have created animal models for heart disease such as cardiomyopathy by doxorubicin and infarction by ligation of LAD in rats in order to test the functionality of our differentiated cells.



Cardiac stem cells derived sphere plated during cardiomyogenic differentiation.

### Publications

- Quantum dot labeling using positive charged peptides in human hematopoietic and mesenchymal stem cells. Ranibarvaziri S, Kiani S, Akhlaghi A, Vosough A, Baharvand H, Aghdami N. *Biomaterials*. 2011;32(22):5195-205.
- Lack of beneficial effects of granulocyte colony-stimulating factor in patients with subacute myocardial infarction undergoing late revascularization: A double-blind, randomized, placebo-controlled clinical trial. Karimabad HM, Shabestari M, Baharvand H, Vosough A, Gourabi H, Shahverdi A, Shamsian A, Abdolhoseini S, Moazzami K, Marjanimehr MM, Emami F, Bidkhorri HR, Hamedanchi A, Talebi S, Farrokhi F, Jabbari-Azad F, Fadavi M, Garivani U, Mahmoodi M, Aghdami N. *Acta Cardiol*. 2011;66(2):219-24.



### Group Leader

**Nasser Aghdami, MD, PhD**

nasser.aghdami@royaninstitute.org

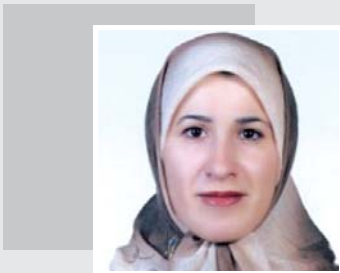
### Biography

Nasser Aghdami received his MD from Urmia University of Medical Sciences in 1998 and his PhD in Immunology from Tarbiat Modarres University in 2007. From 2006-2008 he was the Head of the Transplantation Laboratory at Royan Institute. From 2008 Since 2008 he is the Head of the Department of Regenerative Medicine and Royan Cell Therapy Center.

### Students

Bahareh Adhami Mojarad, MSc  
 Manijeh Ajdari, MSc  
 Faranak Fattahi, MSc  
 Hananeh Fonodi, MSc  
 Xaniar Ghazi Zadeh, MD  
 Mehrnaz Namiri, PhD  
 Sareh Rajabi, PhD  
 Sadaf Vahdat, MSc

## Cancer and Hematopoietic Stem Cells



### Group Leader

#### Marzieh Ebrahimi PhD

mebrahimi@royaninstitute.org

#### Biography

Marzieh Ebrahimi received her BSc in Cell and Molecular Biology from the Department of Biology at Tehran University in 1996. To pursue the underlying sciences in more depth, she obtained a Master's degree and PhD in Immunology from the Medical Faculty at Tarbiat Modarres University in 2000 and 2007, with a focus on tumor therapy by chemical component and activation of DCs. Since July 2009- July 2010, she worked in the Oncology Surgery, ZLF, Unihospitale of Basel, Switzerland as a postdoctoral fellow. In Jun 2009, she received an award from the Iranian Presidential Office, Center for Women and Family Affairs as a Woman Elite. Dr. Ebrahimi began research in field of stem cells in the Department of Stem Cells at Royan Institute in 2003 as a researcher and in 2007 she got an assistant professor. Currently, she is the leader of the Hematopoietic and Cancer Stem Cells Group, the Royan Public Cord Blood Bank programs, and Head of the Cytometry Laboratory.

#### Research Scientist

Saeed Abroun, PhD

#### Research Assistants

Amir Hossein Baghsheikhi, BSc  
Javad Firouzi, BSc  
Maryam Momeni, MSc

#### Students

Motahareh Rajabi, MSc  
Fatameh Shokraee, MSc

Hematopoietic stem cells (HSCs) are responsible for the constant renewal of blood and immune cells. Since more than 50 years ago, these cells have been developed to treat many diseases. Research in this area is an integrated research discipline that seeks to understand how different cells emerge from a stem cell source, which developmental pathway promotes HSCs differentiation, how the micro environment affects efficiency of cell function and other questions in the field of basic research. Also, many questions must be addressed in patients who receive HSCs for treatment in different disease areas. With this intent, the Hematopoietic Stem Cells Group began its activity in 2005. The main goal in this group is the high throughput expansion of HSCs using bioreactors, evaluation of cord blood mesenchymal cells (UC-MSCs) effects on HSCs expansion efficacy, differentiation of HSCs into insulin secreting cells and the production of functional blood cells from different sources of stem cells, such as embryonic stem cells.

In 2009, research on cancer stem cells was added to the previous activities of our group, therefore our group name changed to the Hematopoietic and Cancer Stem Cells Group. The main focus of cancer stem cell research is on isolation and characterization of cancer stem cells from different types of solid cancers including, prostate, gastric, breast and melanoma cancers from patient tissue or cell lines. In addition, we are attempting to find and target the pathways activated in metastatic cells by using micro-RNAs and regulation of methylation or acetylation of epithelial mesenchymal transition (EMT) regulators.

#### Publications

- Potential role of heat shock proteins in neural differentiation of murine embryonal carcinoma stem cells (P19). Afzal E, Ebrahimi M, Arab Najafi SM, Daryadel A, Baharvand H. *Cell Biol Int*. 2011 Jul 1;35(7):713-20.
- Comparative analysis of chemokine receptor's expression in mesenchymal stem cells derived from human bone marrow and adipose tissue. Ahmadian Kia N, Bahrani AR, Ebrahimi M, Matin MM, Neshati Z, Almohaddesin MR, Aghdami N, Bidkhorri HR. *J Mol Neurosci*. 2011 Jul;44(3):178-85.
- Assessment of heat shock protein (HSP60, HSP72, HSP90, and HSC70) expression in cultured limbal stem cells following air lifting. Ebrahimi M, Mohammadi P, Daryadel A, Baharvand H. *Mol Vis*. 2010 Aug 18;16:1680-8.
- Enhanced functions of human embryonic stem cell-derived hepatocyte-like cells on three-dimensional nanofibrillar surfaces. Farzaneh Z, Pournasr B, Ebrahimi M, Aghdami N, Baharvand H. *Stem Cell Rev*. 2010 Dec;6(4):601-10.
- Midterm outcomes of autologous cultivated limbal stem cell transplantation with or without penetrating keratoplasty. Baradaran-Rafii A, Ebrahimi M, Kanavi MR, Taghi-Abadi E, Aghdami N, Eslani M, Bakhtiari P, Einollahi B, Baharvand H, Javadi MA. *Cornea*. 2010 May;29(5):502-9.
- The applications of bone marrow-derived stem cells to induce tolerance and chimerism in organ transplantation. Ebrahimi M, Aghdami N. *Int J Org Transplant Med*. 2010; Vol. 1 (4) 157-169.
- Contemporary immunotherapy of solid tumors: From tumor-associated antigens to combination treatments. Spagnoli GC, Ebrahimi M, Iezzi G, Mengus C, Zajac P. *Curr Opin Drug Discov Devel*. 2010 Mar; 13(2):184-92.



## Molecular Systems' Biology

The Department of Molecular Systems Biology emerged as a result of the new research model to analyze biological complexity and gain an understanding of how biological systems function, rather than the characteristics of isolated parts of a cell or organism. The department is integrating high-throughput “-omics” technologies such as genomics, epigenomics, transcriptomics and proteomics as well as bioinformatics in an interactive and collaborative environment.

Our mission is to apply “-omics” technologies supported by bioinformatics and functional analyses to understand molecular networks and mechanisms controlling embryonic stem cells self-renewal and the differentiation, as well as adult cell reprogramming into induced pluripotent stem cells.

Another goal of our group is to explore Y chromosome mapping and related diseases.

### Publications

- Defining pluripotent stem cells through quantitative proteomic analysis. Reiland S, Salekdeh GH, Krijgsveld J. *Expert Rev Proteomics*. 2011 Feb;8(1):29-42.
- Generation of liver disease-specific induced pluripotent stem cells along with efficient differentiation to functional hepatocyte-like cells. Ghodsizadeh A, Taei A, Totonchi M, Seifinejad A, Gourabi H, Pournasr B, Aghdami N, Malekzadeh R, Almadani N, Salekdeh GH, Baharvand H. *Stem Cell Rev*. 2010 Dec;6(4):622-32.
- Induced pluripotent stem cells: A new era for hepatology. Asgari S, Pournasr B, Salekdeh GH, Ghodsizadeh A, Ott M, Baharvand H. *J Hepatol*. 2010 Oct;53(4):738-51.
- Epigenetic analysis of human embryonic carcinoma cells during retinoic acid-induced neural differentiation. Shahhoseini M, Taei A, Mehrjardi NZ, Salekdeh GH, Baharvand H. *Biochem Cell Biol*. 2010 Jun;88(3):527-38.
- Proteome analysis of brain in murine experimental autoimmune encephalomyelitis. Fazeli AS, Nasrabadi D, Sanati MH, Pouya A, Ibrahim SM, Baharvand H, Salekdeh GH. *Proteomics*. 2010 Aug;10(15):2822-32.
- The Asia Oceania Human Proteome Organisation Membrane Proteomics Initiative. Preparation and characterisation of the carbonate-washed membrane standard. Peng L, Kapp EA, Fenyö D, Kwon MS, Jiang P, Wu S, Jiang Y, Aguilar MI, Ahmed N, Baker MS, Cai Z, Chen YJ, Van Chi P, Chung MC, He F, Len AC, Liao PC, Nakamura K, Ngai SM, Paik YK, Pan TL, Poon TC, Salekdeh GH, Simpson RJ, Sirdeshmukh R, Srisomsap C, Svasti J, Tyan YC, Dreyer FS, McLauchlan D, Rawson P, Jordan TW. *Proteomics*. 2010 Nov;10(22):4142-8
- An efficient and easy-to-use cryopreservation protocol for human ES and iPS cells. Baharvand H, Salekdeh GH, Taei A, Mollamohammadi S. *Nat Protoc*. 2010;5(3):588-94. Review.
- Nuclear proteome analysis of monkey embryonic stem cells during differentiation. Nasrabadi D, Larijani MR, Fathi A, Gourabi H, Dizaj AV, Baharvand H, Salekdeh GH. *Stem Cell Rev*. 2010 Mar;6(1):50-61.
- Identification of cytoplasmic and membrane-associated complexes in human embryonic stem cells using blue native PAGE. Shekari F, Taei A, Pan TL, Wang PW, Baharvand H, Salekdeh GH. *Mol Biosyst*. 2011 Jul 5. [Epub ahead of print]



### Group Leader

**Ghasem Hosseini Salekdeh, Ph.D**

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### Biography

Dr. Salekdeh's research work focuses on proteome and molecular systems biology. He is a council member of the Asia Oceania Human Proteome Organization (AOHUPO) and member of HUPO education committee. He is Director of the Human Y Chromosome Proteome Project (an official project of HUPO) and Chair of AOHUPO Embryonic Stem Cell (ESC) Membrane Proteome Initiative (AOHUPO ESC-MPI). On a national level, Dr. Salekdeh is a cofounder of the Iranian Proteomics Society and President-elect of this society since 2004. He is also the Head of the Molecular Systems Biology Department at Royan Institute. He is on a number of editorial boards, including the *Proteomics Journal*. He has received several awards and honors including, the National Biotechnology Award (2007), National Razi Medical Science Award for Advanced Technologies (2009), the Khwarizmi International Award for Fundamental Research (2010) and Hadavi award from the Iranian Academy of Medical Sciences (2010). He has published over 50 peer-reviewed international papers and has written a text book on Molecular Markers.

### Students

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Babak Arefnejad, PhD  
Faranak Fatahi, MSc  
Mahdieh Jadaliha, MSc  
Arefeh Jafarian, PhD  
Zohreh Jangravi, PhD  
Davood Nasrabadi, PhD  
Faeze Shekari, PhD  
Meghdad Yeganeh, MSc  
Maryam Yousefi, MSc

### Research Assistants

Mehdi Alikahni, MSc  
Ali Fathi, MSc  
Javad Ghrahchahi, MSc  
Vahid Haj Hosseini, BSc  
Seyyed Ahmad Mousavi, BSc  
Mostafa Naghavi, BSc  
Davood Nasrabadi, MSc  
Hasan Rasouli, MSc  
Seyed Shahaboddin Mirshahvaladi, BSc  
Lida Habibi Rezaii, MSc  
Mehdi Sharifi, MSc  
Faeze Shekari, MSc  
Sarah Tale Ahmad, MSc  
Haghighat Vakilian, MSc

## Regenerative Medicine

### Group Leader

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 Parvaneh Mohamadi, MSC  
 Zahra Orouji, MD  
 Atefeh Shahbazi, BSC  
 Ehsan Taghi Abadi, BSC  
 Fatemeh Vaezi, BSC  
 Azam Kouhkan, MD

### Technical Staff

Fatemeh Abassi, MSC  
 Vajihah Azimian, MSC  
 Ali Reza Goodarzi, MSC  
 Negar Karimi, MSC  
 Saeedeh Ebrahim Khani, MSC  
 Soura Mardpour, MSC  
 Mohammad Nezapour, BSC  
 Ehsan Taghi Abadi, MSC  
 Mohsen Tofighian, MSC  
 Sadaf Vahdat, BSC  
 Elham Yektadoost, BSC

### Active Committees in Royan Cell Therapy Center:

#### Committee of Dermatological Diseases:

Zahra Orouji, MD  
 Saeed Shafieyan, MD  
 Mohammad Rezvani, MD  
 Hamid Sharifeian, MD

#### Committee of Cardiovascular Disorders:

Hossein Ahmadi, MD  
 Ghassemi, MD  
 Behnam Molavi, MD  
 Nasser, MD  
 Mohammad Zafarghandi, MD

#### Committee of Orthopedic Disorders:

Abolfazl Aghoushi, MD  
 Mohsen Emadedin, MD  
 Ramtin Rouhipour, MD

#### Committee of Neurological Diseases:

Amiri, MD  
 Farzad Ashrafi, MD  
 Seyyed Masoud Nabavi (MD)  
 Shahriar Naffisi (MD)  
 Nouroozian (MD)  
 Shahidi (MD)

#### Committee of Cord Blood:

Alireza Zaali (MD)

#### Committee of Cord Blood:

Marzieh Ebrahimi (PhD)

#### Committee of Quality Control:

Marzieh Ebrahimi (PhD)

#### Committee of Urological Diseases:

Ashrafi (MD)

#### Committee of Ophthalmological Disorders:

Baradaran Rafiee (MD)

#### Committee of Gastroenterological Disorders:

#### Committee of Teeth and Oral Disorders:

### Publications

- Intraepidermal injection of dissociated epidermal cell suspension improves vitiligo. Khodadadi L, Shafieyan S, Sotoudeh M, Dizaj AV, Shahverdi A, Aghdami N, Baharvand H. Arch Dermatol Res. 2010 Oct;302(8):593-9.
- Safety and efficacy of granulocyte-colony-stimulating factor administration following autologous intramuscular implantation of bone marrow mononuclear cells: A randomized controlled trial in patients with advanced lower limb ischemia. Zafarghandi MR, Ravari H, Aghdami N, Namiri M, Moazzami K, Taghiabadi E, Fazel A, Pournasr B, Farrokhi A, Sharifian RA, Salimi J, Moini M, Baharvand H. Cytotherapy. 2010 Oct;12(6):783-91.

Currently, in medicine we use drugs, hormones, enzymes, vaccines, prosthetic substitution, surgical reconstruction and organ transplantation for regeneration of damaged tissue. These methods are all considered essential, but have their limitations. Side effects, invasion, donor limitation, toxicity and immunologic problems are major challenges in this era. Regenerative medicine is an emerging revolutionary approach in modern medicine as it delivers living tissue, stimulating the body's own natural healing process by activating the body's inherent ability to repair and regenerate. Regenerative medicine may help heal broken bones, severe burns, chronic wounds, heart damage, nerve damage and many other diseases. Regenerative medicine is a multidisciplinary field involving biology, medicine and engineering.

However, to see these methods in the clinic there is one way, by translation and clinical trials, for the Regenerative Medicine Department at Royan Institute for Stem Cell Biology and Technology, established in 2008, to move along this path. Royan's first clinical trial was in 2004 with the support of the Small Business Development Center (SBDC) as a breakthrough in application of stem cells on humans. This clinical trial was undertaken on patients with recent myocardial infarction followed by three other clinical trials, all at almost the same time. At the beginning of 2007, the same time as the Institute's movement to its new facilities, Royan's Cell Transplantation Laboratory was established as a separate facility. However, increasing the number of clinical trials to ten at the beginning of 2008, and finishing the trial projects in using melanocytes for treatment of vitiligo as well as successful culture and application of limbal stem cells on humans led us to establish the Regenerative Medicine Department at Royan Institute.

Now, we have more than 25 clinical trials in cell therapy. To improve and expand our projects and plans, we have defined different committees which aim to evaluate scientific matters in relation to cell therapy in order to improve the techniques and findings for better applications. These committees aim to create a relation between the clinical and basic science sectors to improve the research and studies conducted..

Below are listed a number of these committees:

1. Clinical committee of skin diseases
2. Clinical committee of cardio vascular diseases
3. Clinical committee of orthopedic diseases
4. Clinical committee of neurological diseases
5. Clinical committee of gastrointestinal diseases
6. Clinical committee of dental and periodontal diseases
7. Clinical committee of eye diseases
8. Clinical committee of the digestive system
9. Clinical committee of nephrology and urinary tract diseases
10. Scientific committee of cord blood
11. Quality control committee

Current medical services in the cell therapy center are as follows:

1. Transplantation of melanocytes for patients with vitiligo
2. Culture and transplantation of limbal stem cells
3. Culture and transplantation of fibroblasts
4. Culture and transplantation of chondrocytes
5. Transplantation of bone marrow stem cells or mesenchymal stem cells plus TCP to cure bone disorders
6. Producing fibrin glue for application in surgery

## Public Cord Blood Bank

Cord blood hematopoietic stem cells (HSCs) as well as bone marrow stem cells are responsible for the constant renewal of blood and immune cells. Since the first cord blood transplant performed in 1988 by Elian Gluckman, cord blood transplantation has been increasingly used as a new source of HSC, and many countries established cord blood banks. At that time, most attempts focused on differentiation of HSCs into other cells to develop new therapy in diseases that need stem cells. However, since 1988, cord blood stem cells are well known, but many questions remain to be addressed such as which kind of stem cells in cord blood or bone marrow help to reconstruct immunity and blood cells, which developmental pathway promotes HSCs expansion and differentiation, and numerous other questions. The Royan Public Cord Blood Bank was established in 2007. The main goal of this bank is the storage of high quality cord blood units, development of new methods for cryopreservation and thawing cells, improving quality control experiments to select the best units for transplantation and the development of new criteria for donors.

Selecting healthy donors, shipping cord blood units, processing the units using red blood cell depletion and decreasing volume and cryopreservation of cord blood samples are performed in the Public Cord Blood Bank. We have cryopreserved about 2650 units that include  $>5 \times 10^8$  cells which have successfully passed microbial testing, viral testing and the numbers of CD34+ cells as well as their colony forming potential before long term storage.

Royan Public Cord Blood Bank technicians are experts in freezing all types of stem samples such as bone marrow, peripheral blood, mesenchymal cells from different sources as well as fibroblasts and keratinocytes which come to our lab.

HLA typing of units gives us valuable genetic information about our Iranian nation.

Recently, our Research and Development Group began work on developing our techniques, standardizing our methods and producing products from cord blood serum.

We are happy that we can assist other researchers who work in the field of cord blood stem cells by providing cells for them.

### Group Leader

**Marzieh Ebrahimi PhD**

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### Technical Staff

Seyyed Mahdi Hosseini, BSc

Lida Mir Morsali, BSc

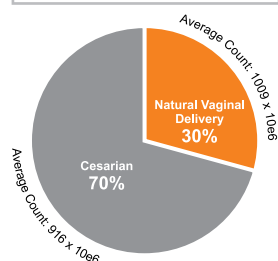
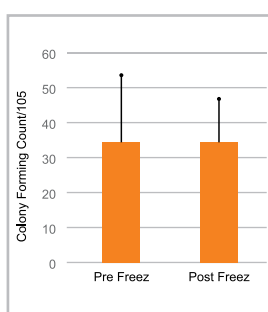
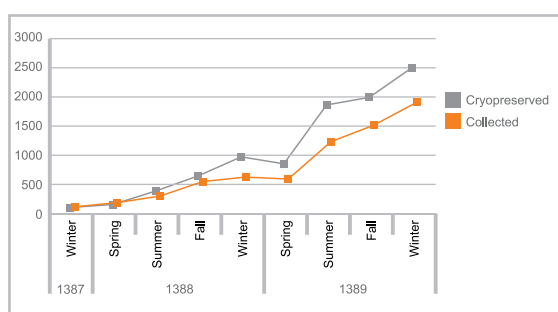
Monireh Mohammad, BSc.

Masoume Nouri, MSc

Niloufar Shayan, MSc

### Secretary

Fatemeh Soltan Alizadeh, BSc



## Core Facilities

### 1. Viral Transduction

#### Laboratory Head Mehdi Totonchi

##### Technical Staff

Maryam Hajikaram, MSc

RNA viruses, one of the diverse group of viruses, can infect a broad spectrum of cells from prokaryotic to eukaryotic. Among them, the Retroviridae family is more applicable in molecular biology studies. Retroviruses that replicate in the host cell by the enzyme reverse transcriptase, are one of the interesting viruses used in molecular biology. These viruses can incorporate into the host genome after the production of DNA from its RNA genome, by an integrase enzyme. The retroviral genome consists of 3 ORFs, including gag, pol and env genes. The core and structural proteins of the virus are encoded by the gag sequence; the enzymes required for its life cycle including RT, protease and integrase are encoded by the pol sequence; and coat proteins are encoded by the env gene. Regulatory sequences of the retrovirus genome consist of two long terminal repeats (LTRs) on both sides of the coding sequence. 5' LTR, which acts as a promoter and transcription start site and 3' LTR which is involved in posttranscriptional processing (i.e., polyadenylation). The packaging signal placed just after the 5'LTR is responsible for packaging all sequences as a retrovirus genome. Lentiviruses are other members of the Retroviridae family with complex a genome that could infect both dividing and non-dividing cells. By replacing viral genes with our gene of interest and placing a transgene juxtaposed to the packaging signal on one vector, and engineering viral coding genes on the other vectors, it is possible to produce recombinant viruses carrying the gene of interest that capable of transduction into any target cell.

We began our work by first establishing human iPS cells in 2008. Currently, we Have the capability to produce iPS cells from any cell type.

Other works currently ongoing in the Viral Transduction lab include:

1. RNAi trials for gene silencing and functional analysis studies,
2. Over-expression and ectopic expression of genes for functional analysis
3. PPI studies

### 2. Gene Targeting

#### Laboratory Head Ali Farrokhi

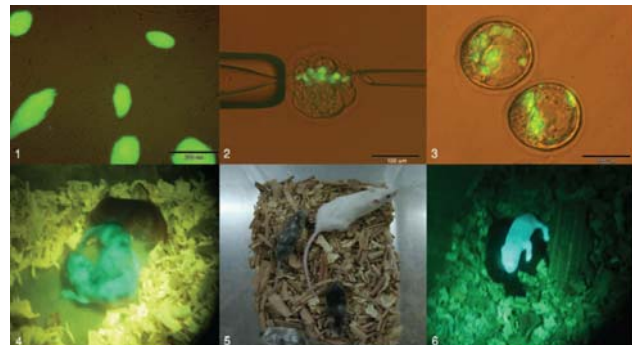
##### Technical Staff

Behrouz Asgari, BSc  
Saiedeh Sahraie, MSc  
Poya Tavakolrad, BSc

The Royan Transgenic Core Facility provides all appropriate procedures and technology for production of transgenic, knockout and knock-in mice. This Core offers the following services to Royan Institute as well as researchers from external institutions:

1. Pronuclear microinjection for the production of standard transgenic mice
2. ES blastocyst injection which involves injections of gene targeted mouse embryonic stem cells into blastocysts for the production of knockout and knock-in mice
3. Rederivation services
4. Embryo cryopreservation.

The facility provides consultation services for the design of transgenes, animal husbandry and genotypic analysis of transgenic animals.



### 3. Histology

This lab was established to provide histology services and support investigators associated with RI-SCBT. The mission of the Histology Core is to provide the necessary training and/or services that will enable investigators to study their research samples.

The Histology Core provides full service histology, training and equipment use for frozen tissues and tissues embedded in paraffin or resin and a variety of counterstaining procedures. Cell and tissue processing for transmission and scanning electron microscopy and ultra-thin sectioning for transmission electron microscopy are also available. Specialized histological procedures are available as well for unique samples such as in vitro cultured cells, tissues, embryos and engineered tissues.

The Core is managed and operated by a full-time histotechnologist with more than four years of experience in this field. The Core Director oversees all operations and assists in the interpretation and evaluation of histologic specimens.

**Services available:**

1. Training on any aspect of histology
2. Tissue processing for LM, IHC, IF, SEM and TEM
3. Decalcification of bone specimens
4. Sectioning for LM, IHC,IF, and TEM
5. Routine and special staining for LM and TEM



**Laboratory Head**  
**Abbas Piryaei**

**Technical Staff**

Zahra Ajdari, BSc  
Mostafa Najari-Asl, BSc

## 4. Cytometry and Imaging

### Laboratory Head Marzieh Ebrahimi

#### Technical Staff

Ehsan Janzamin, BSc  
Pardis Khosravani, MSc  
Fazel Sahraneshin Samani, MSc

This lab, established in 2007, is equipped with a FACS caliber. Flow cytometry, typically using fluorescent probes which bind to specific cell-associated molecules, allows for measurements of various phenotypic, biochemical and molecular characteristics of individual cells (or particles) suspended in a fluid stream. Since the latter part of 2010, we began to sort different types of stem cells using BD FACS Aria II.

The key aims of our facility are analyzing, sorting and imaging of numerous samples and cells needed by researchers. Moreover, to train users to obtain the best possible imaging and cytometry data for their experiments. Our cytometry facility is available for use by outside groups on a special basis.

#### A. Flow cytometry

Our mission is to provide state of the art multicolor flow cytometry services to the Research staff at RI-SCBT. Our educational program provides didactic lectures and hands-on experience with isolation, preparation and staining of all types of human and animal cells, instrument setup and acquisition, and data analysis.



A Becton-Dickinson FACS Calibur is available to provide analytic capability. The FACS Calibur has a five parameter analysis capability - forward and side scatter and three colors of fluorescence using 488 excitations. The instrument currently uses a MAC G5 computer for instrument control and data acquisition. The software running the FACS Calibur is CellQuest.

BD FACS Aria Cell Sorter improvements in fluidics and optics have allowed for higher speed sorting (25,000 events/sec at 70psi using a 70um nozzle) with enhanced overall sensitivity

#### B. Imaging

Immunostained cells or tissues can be observed as well as precise, high quality photographs taken by the BX51 and IX71 microscopes located in the imaging room.

## 5. Electrophysiology

The Electrophysiology Laboratory performs experiments pertaining to the functional analyses of differentiated cells. In this lab we can record inward ionic currents and action potentials of these cells with patch clamp recording. Additionally, we perform extracellular recording from the brain and spinal cord. Microelectrode array is a new setup in our lab that enables us to record extracellular events in cultured cells.

### Laboratory Head

**Sahar Kiani**

#### Research Assistant

Leila Satarian

#### Student

Zahra Valizadeh

## 6. Molecular Biology

The pivotal differences among different cell types, such as neurons, hepatocytes, osteocytes and blood cells are not due to the differences in DNA sequence of the genome but to the differential expression of tissue-specific genes during development. The Molecular Biology Core facility was established to help the researchers of RI-SCBT obtain molecular data for their cellular experiments.

Real-time PCR or quantitative real-time polymerase chain reaction is available in our laboratory. This technique enables investigators to evaluate low-abundance mRNAs, often obtained from their scarce cell cultures and tissue samples.

#### Activities and Services:

- Primer designing and banking
- RNA extraction from cultured cells or tissues samples
- Checking RNA purity and integrity
- cDNA synthesis (reverse transcription)
- PCR (polymerase chain reaction)
- Gel electrophoresis
- RT-PCR analysis
- Real-time PCR (ABI 7500 Applied Biosystem and Rotor Gene 6000 Corbett systems are available)
- Real-time PCR data analysis

### Laboratory Head

**Hossein Baharvand**

#### Technical Staff

Azam Samadian, BSc

Forough Azam Sayyahpour, BSc

## 7. Royan Stem Cell Bank

Stem cell biology, as a quickly growing field, provides researchers with the opportunity to conduct research in the field of developmental biology, drug screening, toxicology, disease modeling and cell therapy, thus moving towards personalized medicine. The need for strict supplies on preparation and use of stem cells including adult, embryonic and induced pluripotent stem cell lines exhorted Royan Institute to fund the establishment of a bank for stem cell lines derived from human and other mammals. The Royan Stem Cell Bank (RSCB) is committed to working closely with research and clinical organizations to prepare good quality controlled and well-characterized stem cell lines for both research utilization and clinical trials for many disorders.

### Laboratory Head

**Hossein Baharvand**

#### Research Assistant

Mohammad Pakzad, MSc

### News and Events

Stem Cells Application in Orthopedic Diseases | May 2010  
Scientific secretary: Dr. N. Aghdami

The 3<sup>rd</sup> Iranian Proteomics conference | May 26-27, 2010

The 6<sup>th</sup> and 7<sup>th</sup> Workshops for Culture and Maintenance of Mouse Embryonic Stem Cells

The 3<sup>rd</sup> Workshop for Culture and Maintenance of Human Embryonic Stem Cells

Stem Cell Therapy in Patients with Acute Myocardial Infarction, Candidates for CABG in Recent Years | June 2010  
Scientific secretary: Dr. N. Aghdami

1<sup>st</sup> Royan Institute International Summer School on Developmental Biology and Stem Cells | Tehran | July 12-15, 2010

Mesenchymal Stem Cells (Isolation, proliferation and differentiation) Workshop | September 13, 2010

2<sup>nd</sup> Royan Flow Cytometry and Cell Sorting Workshop | 27-29 October, 2010

Cell Therapy Workshop in Skin, Hair and Beauty | November 11-12, 2010

Scientific secretary: Dr. N. Aghdami

Limbal Stem Cell Transplantation Workshop | December 22-23, 2010

The Application of Stem Cells in Gastroenterology and Hepatology | January 6, 2011

Real-Time PCR Workshop | January 26-28, 2011

Bone and Cartilage Tissue Engineering Using Mesenchymal Stem Cells Workshop | January 27, 2011

Scientific Writing and Communication Skills and Scientific Integrity Course

The 6<sup>th</sup> Royan International Congress on Stem Cell Biology and Technology | September, 15-17, 2010

The Kazemi Prize for Bio-Medical Research Excellence | September 15, 2010

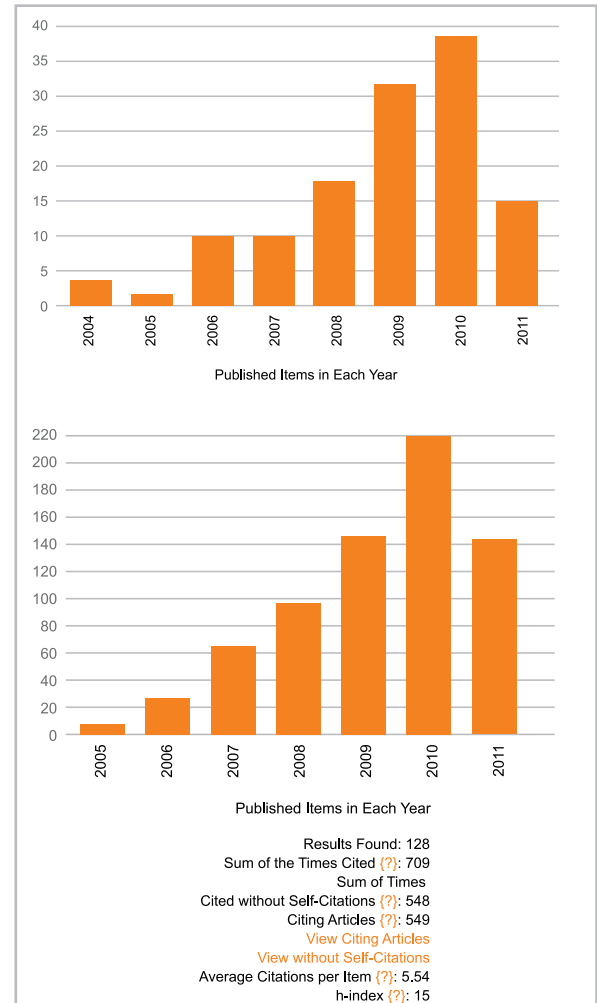
This annual award honors a scientist who made extraordinary progress in the field of biological science. The award includes a certificate, memorial statue and cash amount of 20000 USD. Candidates for this award are selected based on published research papers and by an international scientific board consisting of several high level international scientists in the field of biology.

The prize is in memory of Dr. Saeid Kazemi Ashtiani, founder of Royan Institute and pioneer of stem cell research in Iran. He dedicated his short life to science development and passed away at the age of 44, in January 2006. May he rest in peace.

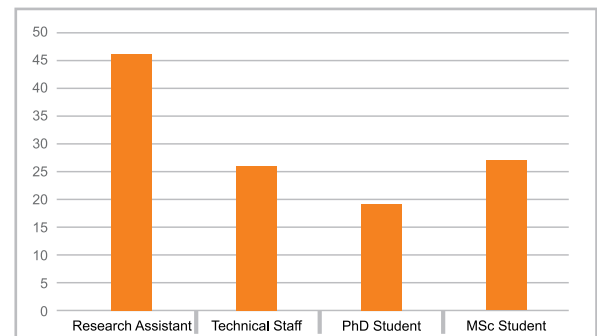
Professor Rudolf Jaenisch was selected to be the first Kazemi Research Award recipient in 2010. He received the prize on September 14, 2010 during the Gala Dinner Ceremony of the

6<sup>th</sup> Royan International Congress on Stem Cell Biology and Technology (September 15-17, 2010).

### Publications



Publication and citation statistics of RI-SCBT during the previous seven years.





### Awards

#### ISESCO Science Prize - 2010

Dr. Hossein Baharvand received the gold medal of the Islamic Educational, Scientific, and Cultural Organization "ISESCO Science and Technology Prize, 2010" in the field of Biology, at the fifth Islamic Conference of Ministers of Higher Education and Scientific Research, 19-21st October, 2010, in Kuala Lumpur, Malaysia.  
[www.ISESCO.org.ma](http://www.ISESCO.org.ma)



### Extracurricular activities

#### Ramadan ceremony

Each year, during one of the days of Ramadan (the holy fasting month of Muslims) an "Iftar" (evening meal to break the fast) ceremony is held in the RI-SCBT yard. The majority of RI-SCBT members and their families attend this spiritual and friendly gathering.



#### New Year celebration ceremony

According to our custom of the past few years; we celebrate the beginning of the New Year (Norooz: the Persian new year) with all colleagues of the Stem Cell Department reviewing the past year's memories. For this occasion, we showed a 20 minute movie which was produced by Hossein Nezari. This movie was a selection of pictures that various staff took during different situations (sometimes funny positions). It is interesting that everyone, including faculty members, have to pay their share for purchasing cookies, fruits (most importantly apples and oranges, according to Norooz customs) and gifts such as designed mugs. On March 12, 2011 the Norooz party was held in the Journal Club.



## Royan Institute for Animal Biotechnology (RI-AB)



### Mohammad Hossein Nasr Esfahani, PhD

■ Embryology  
University of Cambridge  
mh.nasr-esfahani@royaninstitute.org

#### Biography

Dr. Nasr Esfahani graduated in the field of embryology from the University of Cambridge, UK in 1991. He began his career in clinical embryology at Born Hall Assisted Reproductive Center in Cambridge, where the first IVF child was born and has been active since then as a clinical embryologist. In 1992, he started his academic career in Iran and became actively involved in research projects at Royan Institute. He established the Royan Institute for Animal Biotechnology in 2004. Since then, this group has achieved outstanding results under his supervision. Dr Nasr Esfahani has overseen numerous projects, and published 100 national and 81 international publications. He is the author of two books and he has written chapters in several books. Dr. Nasr Esfahani is the editor of IJFS and member of several editorial boards for different journals.

#### Message from the Institute Director

Recent advances over the last decade have shortened the gap between basic science and its applications. This phenomenon is at its utmost in the field of biotechnology. Therefore, at Royan Institute for Animal Biotechnology we hope to participate in this endeavor with the intent to improve the standard of life for mankind, assisting those in need. We believe this vision can only be accomplished by interactive, hands on science between experienced and young researchers. Thus we hope by encouraging interaction and providing the opportunity for scientific discussion between students and scientists, in addition to expanding our research facilities, to broaden our boundaries of science, making it applicable for those in need.

Dr. Mohammad H. Nasr Esfahani

#### Introduction

In 1983, the late Dr. Kazemi Ashtiani, the founder of Royan Institute, established the Royan Institute of Animal Biotechnology as the third branch of Royan Institute. Currently, this branch houses around 100 research faculty and students who work in five departments with the intent to expand scientific knowledge in their respective areas. The intensive seminar schedule in each department has encouraged interactivity and opportunity for scientific discussion between students and scientists to facilitate scientific progress in their fields. Therefore, in 2010 through this interactive and integrative science we have achieved a number of important results. These achievements included: i) the establishment of zona free somatic cell nuclear transfer (SCNT) in goats; ii) the effect of an epigenetic modifier on the outcome of SCNT and vitrified embryos; iii) the introduction of a novel approach for selection of intact sperm for ICSI based on sperm functional characteristics; iv) an understanding of the role of embryonic structure in neurogenesis based for the first time on assessing the role of PEP, a peroxisomal protein and PPAR  $\gamma$  in neurogenesis; and finally, v) the role of biotechnology in the production of biological products.

Programs	Directors
Embryology	Sayed Mortaza Hosseini, PhD student
Andrology	Marziyeh Tavalaei, MSc
Stem cell	Khadijeh Karbalaeei, PhD student
Genetics	Kamran Ghaedi, PhD
Recombinant Protein	Yahya Khazaei, PhD student

## Embryology

### Group Leader

Mohammad Hossein Nasr Esfahani, PhD



### Chief Researcher

**Morteza S. Hosseini, DVM**

smhosseini@royaninstitute.org

### Biography

Morteza S. Hosseini has been working on different aspects of in vitro embryo production since 2003. His doctorate investigated the effect of cumulus cells on developmental competence of in vitro matured sheep oocytes, focusing on cumulus cells-oocyte interactions. The team he is involved with are now an internationally recognized animal biotechnology research group for their achievements in cloning domestic and wild animal species and the production of a herd of transgenic goats that produce human tissue plasminogen activator in milk.

### Research Assistants

V. Asgari, MSc  
M. Forouzanfar, PhD  
M. Hajian, MSc  
F. Jafarpour, PhD  
Z. Nasiri, MSc  
S. Ostad Hosseini, DVM  
N. Sadeghi, DVM  
F. Shadanlo, MSc

### Lab technicians

N. Tanhaei Vash, BSc

### Student trainees

H. Abbasi, PhD  
M. Bahadorani, PhD  
A. Bakhtari, PhD  
E. Bonakdar, PhD  
F. Esmaeilzadeh, PhD  
S. Fekri, MSc  
Z. Gharibzadeh, MSc  
SH. Jafari, PhD  
S. Kargar, MSc  
M. Kiani, MSc  
MH. Sekhavati, PhD

The mechanisms of in vivo and in vitro embryo development are of paramount importance in the field of assisted reproductive technology (ART), dairy farming and biopharming. Although much effort has been put into the establishment of sequential media, further advances are required in order to overcome in vitro stress for embryo development. Therefore, optimization of culture media has remained a major goal of this group. In the field of somatic cell nuclear transfer (SCNT), despite great advances achieved in recent years, there is also a need to create species-specific protocols to achieve higher efficiency. This implies a focus on both cellular and molecular bases of cellular reprogramming. The search for an alternative method for production of transgenic animals may provide a useful platform for further studies. Cryopreservation of reproductive elements (sperm, oocyte and embryo) is another program scheduled in this department. Finally, there is a critical need to reconsider the efficiency of current in vitro oocyte maturation protocols to access maximum oocyte capability.

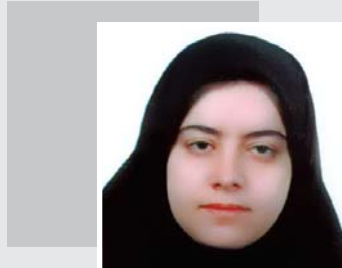
### Publications

- Hajian M, Hosseini M, Forouzanfar M, Abedi P, Ostadhosseini S, Moulavi F, Gourabi H, Amiri Yekta A, Kalantari A, Fotouhi Z, Iranpour R, Mahyar H, Nasr-Esfahani MH. **Conservation cloning of vulnerable Esfahan mouflon (*Ovis orientalis isphahanica*): in vitro and in vivo studies.** European Journal of Wildlife Research 2010
- Shadanloo F, Najafi MH, Hosseini SM, Hajian M, Forouzanfar M, Ghaedi K, Abedi P, Ostadhosseini S, Hosseini L, Eskandari-Nasab MP, Nasr Esfahani MH. **Sperm status and DNA dose play key roles in sperm/ICSI-mediated gene transfer in caprine.** Molecular Reproduction & Development 2010;77:868–875.
- Nasr-Esfahani MH, Hosseini SM, Hajian M, Forouzanfar M, Ostadhosseini S, Abedi P, Khazaei Y, Dormiani K, Ghaedi K, Forouzanfar M, Gourabi H, Shahverdi AH, Vosough AD, Vojgani H. **Development of an optimized zona-free method of somatic cell nuclear transfer in the goat.** Cellular Reprogramming 2011
- Forouzanfar M, Sharafi M, Hosseini SM, Ostadhosseini S, Hajian M, Hosseini L, Abedi P, Nili N, Rahmani HR, Nasr-Esfahani MH. **In vitro comparison of egg yolk-based and soybean lecithin-based extenders for cryopreservation of ram semen.** Theriogenology 2010;73(4):480-7.
- Jafarpour F, Hosseini SM, Hajian M, Forouzanfar M, Abedi P, Hosseini L, Ostadhosseini S, Gholami S, Nasr Esfahani MH. **Developmental competence and pluripotency gene expression of cattle cloned embryos derived from donor cells treated with 5-aza-2'-deoxycytidine.** International Journal of Fertility and Sterility 2011;4(4):148-55.
- Forouzanfar M, Hosseini SM, Hajian M, Molavi F, Abedi L, Nasr Esfahani MH. **Differential effect of medium on the ratio of ICM/TE of bovine embryos in a co-culture system.** International Journal of Fertility and Sterility. 2010;3(4):171-6.
- Asgari V, Hosseini SM, Ostadhosseini S, Hajian M, Nasr-Esfahani MH. **Time-dependent effect of post warming interval on microtubule organization, meiotic status, and parthenogenetic activation of vitrified in vitro matured sheep oocytes.** Theriogenology. 2010. (In press)
- Pirestani A, Hosseini SM, Hajian M, Forouzanfar M, Moulavi F, Abedi P, Gourabi H, Shahverdi A, Vosough Taqi Dizaj A, Esfahani MH. **Effect of ovarian cyclic status on in vitro embryo production in cattle.** International Journal of Fertility and Sterility. 2011;4(4):172-5.
- Ostad Hosseini S, Aghaee F, Hosseini SM, Hajian M, Forouzanfar M, Noorbakhshnia M, Gourabi H, Shahverdi AH, Vosough Taghi Dizaj A, Nasr-Esfahani MH. **Effect of culture condition and cell-permeable superoxide dismutase on levels of reactive oxygen species (ROS) production in "in vitro" produced sheep embryos.** Small Ruminant Research. 2011

## Andrology

### Group Leader

Mohammad Hossein Nasr Esfahani, PhD



### Chief Researcher

**Marziyeh Tavalae, MSc**

tavalae.m@royaninstitute.org

### Biography

Marziyeh Tavalae received her Master of Science degree in physiological science at Azad University, Damghan, Iran, in 2005 and is an academic member of Royan Institute, Tehran, Iran (Isfahan Campus). Her research interest is male infertility, focusing particularly on sperm functional tests, novel and routine sperm selection procedure and the etiology of varicocele. She has been involved in numerous projects and has published 22 international, 14 national citations and two books (Sperm: Identification and selection of sperm from the molecular and clinical aspect in ICSI candidates; and WHO laboratory manual for the examination and processing of human semen).

### Research Assistants

MR Deemeh, MSc

### Lab technicians

M. Arbabian, BSc

### Student trainees

S. Aghajanpoor, MSc  
S. Bahrami, MSc  
F. Basiri, MSc  
Z. Bateni, MSc  
N. Charehjooy, MSc  
S. Javadian, MSc  
M. Motiei, MSc  
E. Shaygannia, MSc  
M. Skandari, MSc  
A. Zahedi, MSc

This department focuses on male infertility and its main research interest is to improve the outcomes of male infertility treatment. This group has pioneered the establishment of novel sperm selection procedures to treat ICSI, the results of which have been published in international journals. The main goal of this department is to optimize sperm selection for ICSI and improve the healthy baby take home rate of ICSI through understanding sperm functional characteristics and sperm biology.

### Publications

- Aghajanpour S, Ghaedi K, Salamian A, Deemeh MR, Tavalae M, Moshtaghian J, Parrington J, Nasr-Esfahani MH. **Quantitative expression of phospholipase C zeta, as an index to assess fertilization potential of a semen sample.** Human Reproduction 2011. (In press)
- Azadi L, Abbasi H, Deemeh MR, Tavalae M, Arbabian M, Pilevarianand AA, Nasr-Esfahani MH. **Zaditen (Ketotifen), as mast cell blocker, improves sperm quality, chromatin integrity and pregnancy rate after varicocelectomy.** International Journal of Andrology 2010.
- Nasr-Esfahani MH, Tavalae M, Deemeh MR, Arbabian M, Parrington J. **Can assessment of total acrosin activity help predict failed or low fertilization rate ICSI for implementation of artificial oocyte activation?** The Open Andrology Journal 2010;2:19-26.
- Soleimani M, Tavalae M, Aboutorabi R, Adib M, Bahramian H, Janzamin E, Kiani A, Nasr-Esfahani MH. **Evaluation of Fas positive sperm and complement mediated lysis in subfertile individuals.** JARG 2010;27(8).
- Babazadeh Z, Razavi S, Tavalae M, Deemeh MR, Shahidi M, Nasr-Esfahani MH. **Sperm DNA damage and its relation with leukocyte DNA damage.** Reprod Toxicol 2010;29(1):120-4.
- Razavi SH, Nasr-Esfahani MH, Deemeh MR, Shayesteh M, Tavalae M. **Evaluation of zeta and HA-binding methods for selection of spermatozoa with normal morphology, protamine content and DNA integrity.** Andrologia. 2010;42(1):13-9.
- Hatami-Baroogh L, Razavi S, Zarkesh-Esfahani H, Tavalae M, Tanhaei S, Ghaedi K, Deemeh MR, Rabiee F, Nasr-Esfahani MH. **Evaluation of the leptin receptor in human spermatozoa.** Reprod Biol Endocrinol. 2010;8(1):17.
- Deemeh MR, Tavalae M, Ahmadi SM, Kalantari SA, Alavi Nasab SV, Najafi MH, Nasr Esfahani MH. **The first report of successful pregnancy after ICSI with combined DGC/Zeta sperm selection procedure in a couple with eleven repeated fail IVF/ICSI cycles.** International Journal of Fertility and Sterility. 2010;4(1):41-43.
- Tavalae M, Kiani A, Arbabian M, Deemeh MR, Nasr-Esfahani MH. **Flow cytometry: A new approach for indirect assessment of sperm protamine deficiency.** International Journal of Fertility and Sterility 2010;3(4):177-184.
- Nasr Esfahani MH, Abbasi H, Mirhosseini Z, Ghasemi N, Razavi SH, Tavalae M, Tanhaei S, Deemeh MR, Ghaedi K, Zamansoltani F, Rajaei F. **Can altered expression of HSPA2 in varicocele patients lead to abnormal spermatogenesis?** International Journal Fertility and Sterility. 2010;4(3):104-13.
- Moghimehfar F, Nasr-Esfahani MH. **Decisive factors in medical tourism destination choice: A case study of Isfahan, Iran and fertility treatments.** Tourism Management 2011.
- Fathi Z, Tavalae M, Kiani A, Deemeh MR, Modaresi M, Nasr Esfahani MH. **Flow cytometry: A novel approach for indirect assessment of protamine deficiency by CMA3 staining, taking into account the presence of M540 or apoptotic bodies.** International Journal of Fertility and Sterility 2011. (In press)

## Stem Cell

### Group Leader

Mohammad Hossein Nasr Esfahani, PhD

The Department of Stem Cells was established in 2005 to advance research on stem cell biology. This group works on different types of stem cells such as human and mouse embryonic stem cells, in addition to adult stem cells (bone marrow mesenchymal stem cells and dental pulp mesenchymal stem cells, which were first established by this group in Iran). This group has an interest in differentiating these cells into neurons for possible future clinical applications in neuro-degenerative disorders such as Parkinson and Alzheimer diseases. In addition, this group has focused on tissue engineering using nanofiber technology as well as drug screening using stem cells.

### Publications

- Ghasemi-Mobarakeh L, Prabhakaran M, Morshed M, Nasr-Esfahani MH, Baharvand M, Kiani S, Al-Deyab S. **Application of conductive polymers, scaffolds and electrical stimulation for nerve tissue engineering.** Journal of Tissue Engineering and Regenerative Medicine 2011.
- Niapour A, Karamali F, Karbalaie K, Kiani A, Mardani M, Nasr-Esfahani MH, Baharvand H. **Novel method to obtain highly enriched cultures of adult rat Schwann cells.** Biotechnol Lett. 2010.
- Ghasemi-Mobarakeh L, Prabhakaran MP, Morshed M, Nasr-Esfahani MH. **Bio-functionalized PCL anofibrous scaffolds for nerve tissue engineering.** Materials Science and Engineering 2010.
- Meamar R, Karamali F, Sadeghi HM, Etebari M, Nasr-Esfahani MH, Baharvand H. **Toxicity of ecstasy (MDMA) towards embryonic stem cell-derived cardiac and neural cells.** Toxicol In vitro. 2010.



### Chief Researcher

**Khadijeh Karbalaie, MSc**

karbalaie@royaninstitute.org

### Biography

Following graduation in the field of zoology (BSc), she became interested in cellular and molecular biology and obtained her MSc in this field. She joined Royan Institute as a research assistant in the Department of Stem Cell, being actively involved in different projects. Presently, she is a PhD student in Molecular Genetics (2010) in the Department of Biology, Faculty of Science at Isfahan University.

### Research Assistants

F. Karamali, MSc  
SH Khodaei, MSc  
M. Peymani, MSc

### Lab Technicians

M. Nematollahi, BSc  
A. Shoaraye Nejati, BSc

### Student trainees

MH. Beigi, MSc  
K. Dormiani, PhD  
P. Hosseinnia, PhD  
F. Jahanmard, MSc  
E. Maseali, PhD  
SMM. Mirhosseini, PhD  
A. Niapour, PhD  
MR. Piri, PhD  
A. Pourveiseh, MSc  
P. Rasekhian, PhD  
H. Salehi, PhD  
Z. Taghipour, PhD

## Recombinant Proteins

### Group Leader

Mohammad Hossein Nasr Esfahani, PhD



### Chief Researcher

**Yahya Khazaei, Pha MD**

khazaei@royaninstitute.org

#### Biography

Dr. Khazaei received his doctorate in Pharmacy (PharmD) in 1999 from the faculty of Pharmacy and Pharmaceutical Sciences at Isfahan University of Medical Sciences. His interest in molecular biology and pharmacy lead him to become a member of the group involved in recombinant proteins. He has been involved in different projects for the production of recombinant proteins from cell cultures and transgenic animals. Presently, he is involved in a PhD program in collaboration between Royan Institute and Utrecht University in the Netherlands.

#### Research Assistants

K. Dormiani, PhD  
L. Lachinani, MSc

#### Lab Technicians

MA. Forouzanfar, BSc

#### Student trainees

F. Abootalebi, MSc  
M. Forouzanfar, MSc  
L. Pirjamali, MSc  
N. Rezaei, MSc  
N. Sanei, MSc

Following the production of the first recombinant protein in 1978, insulin, extensive research has been undertaken for the purpose of producing other recombinant proteins. Different strategies can be utilized for the production of recombinant proteins, including proteins produced via bacteria, plants, cell culture and through milk production in transgenic animals. Although the production of recombinant proteins through the former methods might be the easiest and most straight-forward procedures; however, research has shown that the production of recombinant proteins through the latter method might be more functional due to post-translational modifications, which are similar to the native protein. Therefore, one of the main missions of this group is to master and establish efficient methods for producing recombinant proteins through cell culture and animal transgenesis

#### Publications

- Dormiani K, Khazaie Y, Forouzanfar M, Ghaedi K, Mofid MR, Karbalaie KH, Karamali FP, Calos M, Nasr-Esfahani MH. **Creation of tenecteplase-producing CHO cell line using site-specific integrase from the phage  $\phi$ C31.** *Yakhteh Medical Journal* 2010;12(2):207-214.

## Genetics

Understanding molecular mechanisms involved in cell differentiation is an interesting area for research and study. In this department, researchers are engaged in locating genetic and molecular factors responsible for neurogenesis at the cellular level. The peroxisome biogenesis factors required for the maintenance and integrity of peroxisomes are tested to discover their possible roles for neural cell differentiation. Furthermore, this department is interested in the role of genes and their related promoters in the neurogenesis process.

### Publications

- Ostadsharif M, Ghaedi K, Nasr-Esfahani MH, Tanhaei S, Karbalaie KH, Baharvand H. Sorting analysis of mouse peroxisomal protein by in vitro studies Iranian Journal of Biotechnology 2010;8(3).
- Ghasemi S, Ghaedi K, Nasr Esfahani MH, Tanhaei S, Rabeei F, Karbalaii KH, Baharvand H, Esmaili A. Intracellular localization of EGFP-mouse PPAR  $\gamma$  1 in bovine fibroblast cells. Yakhteh Medical Journal 2010;12(1):97-104.
- Ostadsharif M, Ghaedi K, Nasr-Esfahani MH, Mojbafan M, Tanhaei S, Karbalaie KH, Baharvand H. The expression of peroxisomal protein transcripts increased by retinoic acid during neural differentiation. Differentiation. 2010 In press



### Group Leader

**Kamran Ghaedi, PhD**

kamranghaedi@royaninstitute.org

### Biography

Dr. Kamran Ghaedi graduated in the field of Biology (BSc) from the University of Isfahan (1989) and Clinical Biochemistry (MSc) from Isfahan University of Medical Sciences (1993). He pursued his studies and obtained a PhD from Kyushu University (Fujiki's lab) in the field of Molecular Cell Genetics (1999). Dr. Ghaedi engaged in isolation and characterization of several Chinese hamster ovary cell defects in peroxisome assembly and biogenesis. He cloned *PEX3* and *PEX7* genes and published several highly reputed papers in this area. After completing his PhD, he was hired as post-doctoral researcher in the field of Molecular Biology by Japan Science and Technology (JST) in Kyushu University (Fujiki's lab) for two years. Dr. Ghaedi conducted his studies in the same lab as a post-doctoral fellow (Japan Society for Promotion of Science) and senior post-doctoral researcher (JST) for over four years. Dr. Ghaedi returned to Iran after working for ten years in the field of peroxisome biogenesis in mammals. Now, He is working on the involvement of genetic factors required for peroxisome biogenesis in neural differentiation of embryonic stem cells. He has been involved in the production of recombinant proteins such as t-PA.

### Student trainees

R. Adib, MSc  
F. Ghazvinizadehgan, MSc  
M. Hashemi, MSc  
S. Hosseini, MSc  
M. Jodeyri, MSc  
N. Mazaheri, MSc  
P. Mohammadinezhad, PhD  
T. Seifi, MSc  
M. Taheri, MSc

### Research assistants

A. Ghochani, MSc  
G. A. Kiani, MSc  
L. Lachinani, MSc  
A. Salamian, MSc  
S. Tanhaei, MSc

### Lab technicians

T. Izadi, BSc  
F. Rabiee, BSc

### Dairy Assist Center (DAC)

The Dairy Assist Center (DAC) is a newly designed center within the department of Reproduction and Development that provides research and developmental support for nationwide expansion of the dairy industry. Over the years, with excellent experience in the field of mammalian in vitro embryo development, embryo transfer and genetics, DAC has now gained prominence as a top-ranking research center whose purpose is to create the first joint effort to offer a continuum of academic, technical and applied collaboration with local and national industrial dairy complexes.

### Main missions of the DRC

#### 1. Sperm technologies

Although expensive, many farmers are concerned or even dissatisfied with the results of some semen batches used for artificial insemination. Here, they can accurately be informed of the quality of purchased semen with the use of a dozen semen tests such as: morphology, motility and integrity (DNA/plasmalemma/cytoplasm). The semen's fertilization potential can also be checked by IVF experiments.

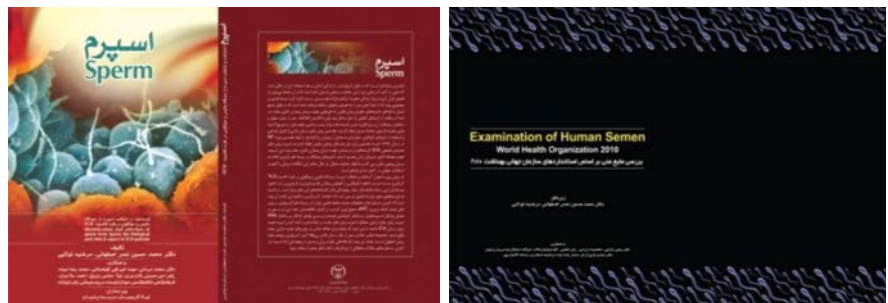
#### 2. Ovary and oocyte technology

Frequently, champion dairy cattle are eliminated due to sudden death, critical fractures or acute diseases. In these situations, there are only two biotechnological approaches to sustain the reproductive performances of these champions: a) obtaining immature oocytes to be used for either IVF or freezing and b) cryopreservation of ovarian tissue for future use.

#### 3. Embryo technologies

In order to assist those dairy owners who desire to increase the numbers of their champion cattle, several technologies have been established to distribute superior genetic constitutions throughout the country. Some of these technologies include: multiple ovulation (MO), artificial insemination (AI), embryo flushing, embryo transfer (ET), in vitro fertilization (IVF) with sexed semen, sperm sexing, intracytoplasmic sperm injection (ICSI), in vitro embryo culture, embryo sexing, embryo splitting, assisted zona drilling, embryo freezing and embryo banking.

### Books



### News

- Establishment of a molecular method for predication of failed fertilization post-ICSI
- Establishment of a herd of transgenic animals
- Production of cows with high milk production through IVF/cryopreservation
- Production of recombinant protein, TPA, from cell culture technology
- Establishment and full characterization of dental pulp stem cell line
- Establishment of diagnostic center for peroxisomal related disease.

### Core Facilities

- Animal farm
- Viral transduction
- Gene targeting
- Flow cytometry
- Molecular biology
- Royan Plasmid Bank
- Cell Culture Laboratory
- Molecular and Genetics Laboratory

### Awards

Winner of the 11th Royan Institute Award





**Grants**

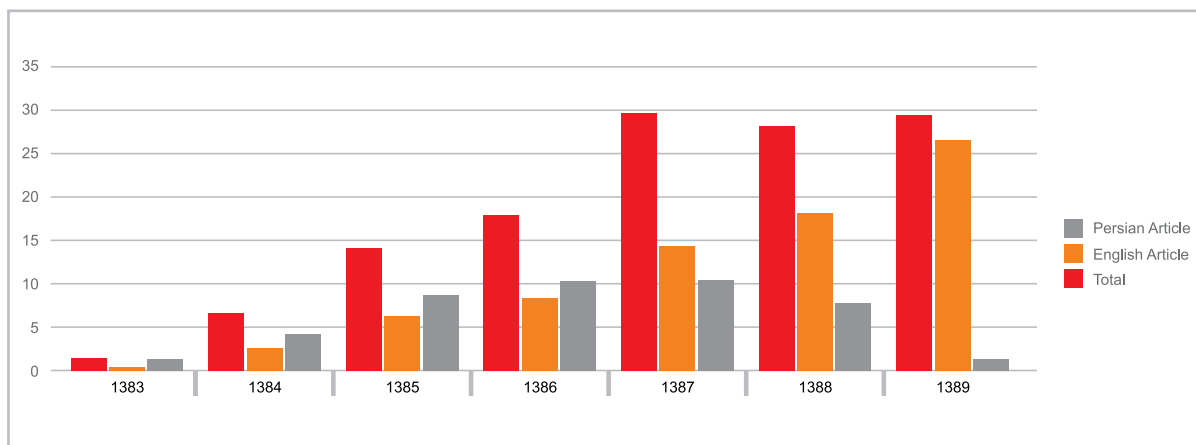
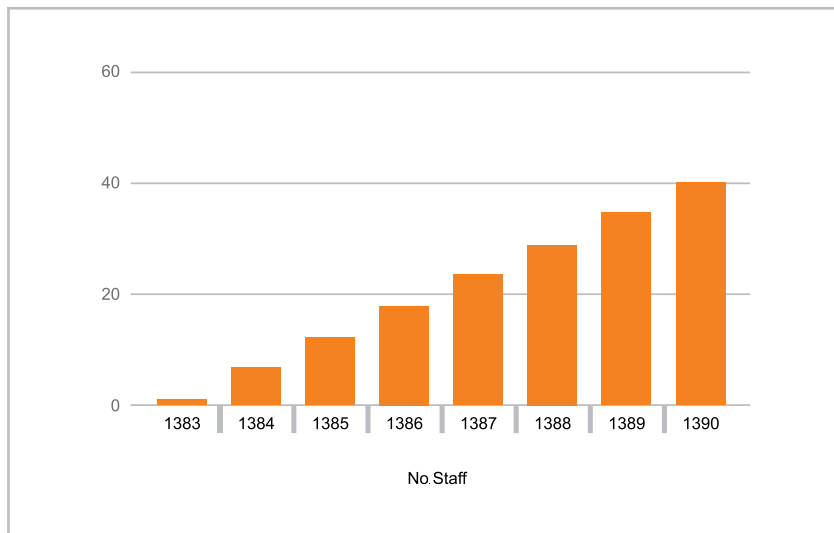
In addition to financial support from Royan Institute, RI-AB received research grants from the Stem Cell Development and Technology Council of Science and Technology Deputy of Iran Presidential, Islamic Azad University, Marvdasht and khorasgan branches for the following projects:

1. Construction of a minicircle carrying S/MAR elements and the NURR1 gene with the intent to evaluate this construct in NURR1 gene expression and dopaminergic neuronal differentiation from mouse embryonic stem cells.
2. A comparison of Menezes B2 and TCM-199 for in vitro production of bovine embryo on Vero cell co-culture
3. Enhancement of the milk productivity potential of traditional and semi-developed dairy herds in Isfahan Province through in vitro embryo production and embryo transfer technology

**Journal Clubs**

Name	Date	Total number
Embryology	Every Saturday	128
Genetic	Every Sunday	
Stem cell	Every Monday	
Andrology	Every Tuesday	
Recombinant protein	Every Wednesday	

**Staff and Publication Charts**



## Laboratory Animal Core Facility



### Head of Core Facility Mohammad Taghi Daneshzadeh, DVM

t.daneshzadeh@royaninstitute.org

#### Biography

Education Background  
High School Diploma in Experimental Sciences from Dehkoda High School, Karaj, Tehran, Iran, 1985  
D.V.M from Shahid Chamran (Jondi Shapoor) University, Ahwaz, Iran, 2001  
Work experiences  
Working in Laboratory Animal Science Department, Royan Institute, Tehran, Iran  
From: June 2005 to: Present  
Working in field of Inbred Mice breeding, Department of Laboratory Animal Science, Pasteur Institute of Iran  
From: Oct. 2001 to: Oct. 2004

#### Research Assistants

M Hajinasrollah, DVM  
GH Hajmoussa, DVM  
A Kheimah, BSc  
F Mostafaei, BSc  
A Nekukar, DVM

#### Introduction

The Laboratory Animal Science Core Facility of Royan Institute consists of the Laboratory Animal Facility, Research Farm and Primate Research Center.

This facility is a service unit that plays a national role in the education of those who work with experimental animals, by arranging courses in all categories within the animal research field.

Facilities exist for research on rodents (inbred, out bred, and SPF mice and rats), rabbits, sheep, goats, cattle, horses and other non-human primates. The unit provides services for all core facilities at Royan Institute.

Modern laboratory animal science builds on the three Rs of Russell and Burch:

- Replacement: Replace animal experiments where possible with alternatives
- Reduction: Reduce the number of experiments and number of animals in each experiment to an absolute minimum
- Refinement: Refine experiments such that animals undergo a minimum of discomfort

The primary aim of the Laboratory Animal Facility is to ensure that the three Rs are followed in practice. Within this unit, scientists responsible for the design of animal experiments must have graduated from one of the biomedical science fields. Additionally, scientists in this unit must have taken a course on laboratory animal science which concentrates on the humane and careful use of animals, and have included information on the alternatives and ethical aspects of animal experimentation.

The mission of the core facility is to discover and disseminate new knowledge about the biology and management of laboratory animals with the vision of expanding knowledge in laboratory animal sciences.

#### Common goals of the core facility

- To provide researchers with a relevant education, enabling them to achieve scientific pre-eminence in selected areas as well as to produce and support laboratory animals required for research
- To manage the Animal Care and Use Program of the Institute
- To supervise the overall program of laboratory animal housing and care
- To manage a preventive medicine program for disease control
- To advise the research staff on all aspects of the experimental use of animals, including experimental design, surgical, pre- and post-operative care, and experimental techniques

The Research Farm at Royan Institute began their activities on animals at the Jihad Research Complex in 2006. This center is equipped with a laboratory and operating room for embryo transfer and other specific operations.

The main approaches and accomplishments of this center are:

- Transgenic goats carrying human factor IX gene were produced by nuclear transfer in January 2010
- Birth of the first IVM-IVF goat in Iran
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The Primate Research Center was established in 2007 in conjunction with Loghman Hospital. Within this Center are individual and public maintenance rooms, a laboratory and operating room.

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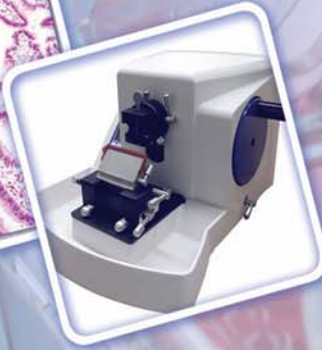
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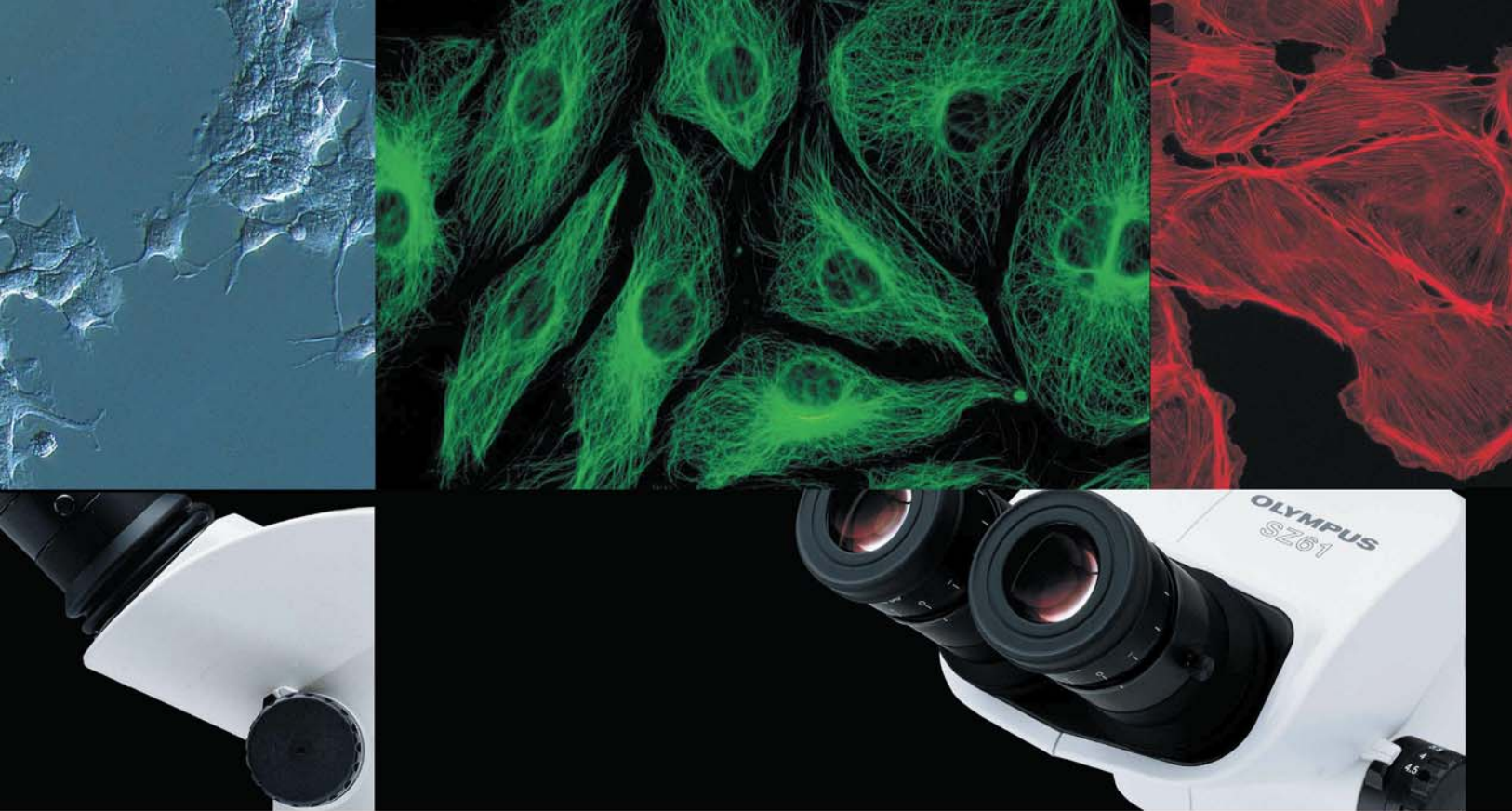


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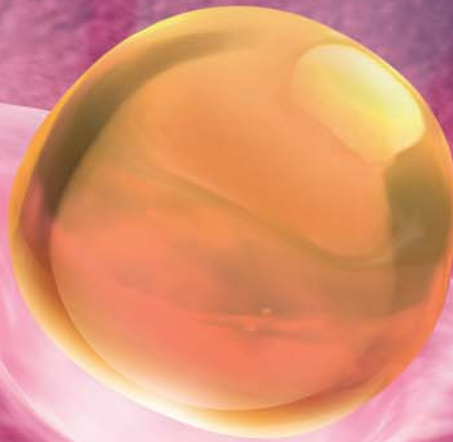
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References: 1- Yeko S.R et al. Fertility & Sterility 2004; 82 (Supp.2):s119. 2- Keck C. et al. Reproductive BioMedicine Online 2005;11(5):562-569. 3- Driebergen A, Baer G. Cur Med Res Opin 2003; 19(1): 41-46 4- Neuspiller N, Kelly E, Loumaye E, et al. 12th World Congress on In Vitro Fertilisation and Molecular Reproduction, Buenos Aires, Argentina, 16-19 March 2002. Abstract. 5- Balasch J. et al. Reproductive BioMedicine Online 2004;8(4):408-413. 6- Carizza C, Alam V, Yeko T, et al. European Society for Human Reproduction and Embryology (ESHRE), Madrid, Spain, 29 June-2 July 2003. Abstract. 7- R. Porter et al, Current Medical research and Opinion Vol. 24, No 3, 2008.



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Each cartridge delivers either 300 IU (equivalent to 22 micrograms) in 0.5 ml, 450 IU (equivalent to 33 micrograms) in 0.75 ml or 900 IU (equivalent to 66 micrograms) in 1.5 ml. **Indications:** • GONAL-f can be used to cause ovulation in women who are not ovulating and who have not responded to treatment with clomiphene citrate. • GONAL-f is used to bring about the development of several follicles (and therefore several eggs) for women undergoing assisted reproductive technologies such as in vitro fertilisation, gamete intra-fallopian transfer or zygote intra-fallopian transfer. • GONAL-f is used together with another hormone called lutropin alfa (recombinant human luteinising hormone) to cause ovulation in women who are not ovulating due to very low production of the fertility hormones (FSH and LH) by their pituitary gland. • GONAL-f is used in combination with another medicine, human chorionic gonadotrophin (hCG), to produce sperm in men who are infertile due to hormonal deficiency. **Contraindications:** • hypersensitivity to follicle stimulating hormone or to any of the other ingredients of GONAL-f • tumours of the hypothalamus and pituitary gland • ovarian enlargement or cyst not due to polycystic ovarian disease • gynaecological bleeding of unknown cause • ovarian, uterine or breast cancer • if you have irreversible testicular damage. The medicine should not be used when a condition exists which would make a normal pregnancy impossible, such as premature menopause, malformation of sexual organs or specific tumours of the womb. **Dosage & administration:** GONAL-f is administered by injection just under the skin (subcutaneous use). Women who are not ovulating and are having irregular periods or no periods at all. GONAL-f is usually given every day. The treatment should start within the first 7 days of the menstrual cycle. A commonly used dose starts at 75-150 IU FSH every day (0.12-0.24 ml). This may be increased by 37.5-75 IU at 7 or preferably 14 day intervals if necessary to obtain an adequate, but not excessive, response. The maximal daily dose is usually lower than 225 IU FSH (0.36 ml). If your doctor cannot see a response after 4 weeks of treatment, that treatment cycle should be abandoned. For the following cycle, your doctor will prescribe a treatment at a higher starting dose than in the abandoned cycle. When an optimal response is obtained, a single injection of another medicine (hCG) is administered 24-48 hours after the last GONAL-f injection. You are recommended to have sexual intercourse on the day of the administration of this second medicine and the following day. If an excessive response is obtained, treatment should be stopped and hCG withheld (see Possible side effects). For the following cycle, your doctor will prescribe a dosage lower than that of the previous cycle. Women undergoing ovarian stimulation for multiple follicular development prior to in vitro fertilisation or other assisted reproductive technologies. A commonly used dose for superovulation involves the administration of 150-225 IU (0.24-0.36 ml) of GONAL-f daily, commencing on days 2 or 3 of the treatment cycle. Treatment is continued until adequate follicular development has been achieved (as assessed by blood monitoring and/or ultrasound examination), with the dose adjusted according to your response, to usually not higher than 450 IU (0.72 ml) daily. Adequate follicular development is usually achieved on average by the tenth day of treatment (range 5 to 20 days). Then a single injection of a medicine used to induce final follicular maturation and containing 250 micrograms r-hCG or 5000 IU up to 10 000 IU human chorionic gonadotrophin (hCG) is administered 24-48 hours after the last GONAL-f injection. Women who are not ovulating, having no periods at all and have been diagnosed as FSH and LH deficient. GONAL-f is usually taken every day for up to five weeks simultaneously with injections of lutropin alfa. A commonly used dose starts with 75-150 IU (0.12-0.24 ml) of GONAL-f together with 75 IU of lutropin alfa. According to your response, your doctor may increase your dose of GONAL-f by preferably 37.5-75 IU at 7 to 14-day intervals. If your doctor does not observe a response of your ovaries after 5 weeks of treatment, that cycle should be abandoned. For the following cycle, your doctor may prescribe treatment at a higher starting dose of GONAL-f than in the abandoned cycle. When the desired response has been obtained, a single injection of 250 micrograms r-hCG or 5000 IU up to 10 000 IU hCG is given 24-48 hours after the last injections of GONAL-f and lutropin alfa. Infertile men with hormonal deficiency GONAL-f is usually prescribed at a dose of 150 IU (0.24 ml) three times a week in combination with another medicine (hCG) for at least 4 months. If you have not responded to treatment after this period, your treatment may carry on for at least 18 months. **Possible side effects:** The most commonly reported side effects are ovarian cysts, headache and local reactions at the injection site (pain, redness, bruising, swelling and/or irritation). Following treatment with human chorionic gonadotrophin is administered, a condition called ovarian hyperstimulation syndrome. This syndrome is characterised by large ovarian cysts. First symptoms of ovarian hyperstimulation are pain in the lower abdominal region, possibly in combination with nausea, vomiting and weight gain. Isolated cases of non-serious allergic reactions to GONAL-f have been reported. This occurs in less than 1 patient for each 10 000 treated. Ectopic pregnancy (embryo implanted outside the womb) may occur especially in women with a history of prior tubal disease. Men may experience some breast development, acne or weight gain due to treatment with hCG (between 1 and 10% of the patients). **Stability and storage:** Store at 2°C - 8°C (in a refrigerator). Do not freeze. Within its shelf-life, the product may be stored at or below 25°C for up to 28 days and must be discarded if not used. **Packaging:** GONAL-f is presented as a clear, colourless solution for injection in a pre-filled pen. - Gonal-f 300 IU pen: Each cartridge delivers 300 IU (equivalent 22 micrograms) in 0.5 ml, it is supplied in packs of 1 pre-filled pen and 5 needles for administration - Gonal-f 450 IU pen: Each cartridge delivers 450 IU (equivalent 33 micrograms) in 0.75 ml. It is supplied in packs of 1 pre-filled pen and 7 needles for administration. - Gonal-f 900 IU pen: Each cartridge delivers 900 IU (equivalent 66 micrograms) in 1.5 ml. It is supplied in packs of 1 pre-filled pen and 14 needles for administration.

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