

ROYAN INSTITUTE

THE SIXTEENTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

Reproductive Biomedicine & Stem Cell



SEPTEMBER 2015
TEHRAN - IRAN

THE SEVENTEENTH
ROYAN
INTERNATIONAL RESEARCH AWARD
Reproductive Biomedicine & Stem Cell
Deadline for Application: April, 2016

Kazemi Prize, 2016
In commemoration of Dr. Kazemi, the late founder of Royan Institute

SEPTEMBER, 2016
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In the Name of

GOD

The Sixteenth
ROYAN

INTERNATIONAL RESEARCH AWARD



Dr Saeid Kazemi Ashtiani
The Late Founder of ROYAN Institute



Cover Legend:

It Is Not the Moon!

It is the migration of Neural Crest Cells emerged from human embryonic stem cells, Royan H6 plated on poly L-ornitin / Laminin coated dish.

(Photographer: Ali Fathi- Royan Institute)

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Foreword



On behalf of the Iranian Academic Center for Education, Culture and Research (ACECR) I take this opportunity to commemorate the late Dr Saeid Kazemi Ashtiani, the founder of Royan Institute whose endeavor along with his colleagues led to holding Royan Research Award in the field of infertility and stem cell research.

Organizing Royan 16th International Research Award and making it generally accepted by the national and international researchers is a confirmation to this event's success till now.

Royan Institute as one of the successful research centers of ACECR has brilliant services and records in national and international level in Reproductive Biomedicine, Stem Cell Research, and Animal Biotechnology. In addition, through holding Royan Research Award and the Congresses besides, it attempts to enhance the scientific level of the aspiring young of knowledge and science within the country and establish fruitful international relationships.

I, hereby, appreciate my colleagues at Royan Institute who every year hold this great scientific event. I hope this scientific movement, whose leaders are prominent Iranian researchers, be effective in promoting the science and solving the society's health problems.

Tayyebi HR, PhD

President of Academic Center for Education, Culture and Research (ACECR)



Introduction



Fortunately, Royan 16th international research award has been accompanied with the agreement made between our country and the delegates from international community in regard with peaceful nuclear program. And since the first Royan Award prize giving ceremony coincided with the unpleasant terrorist news of September 11th, 2000, it left a bad effect on attracting many international scientists through the years. However, we should certainly appreciate the scientists who despite such negative and inappropriate propaganda, have attended this event as well as Royan International Congress these years. So, with the improvement of political situation, we hope to see more scientists make their presence in the events of this kind in Iran, and the most important, to establish principle scientific collaborations.

Royan award has been established with the aim of creating appropriate scientific relationships with universities and research centers as well as encouraging young researchers to follow scientific and innovative activities. With great fortune, despite all aforementioned problems, Royan Award has established close relationship with the scientists and researchers worldwide. Also, the presence of award winners in Iran along with having a visit at Royan Institute has had proper feedbacks like the one by Dr Sophie Rousseaux published in the international journal of developmental biology which led the scientists in the world to knowing more about Iran's scientific movement.

This year, award secretariat has received 204 projects from about 47 countries. As previous years, the projects were evaluated by national and international referees and finally 5 international and 2 national winners were announced which will be awarded through the ceremony.

Another important issue in this year, is the presence of Prof Robert Langer's at Royan to receive the third Kazemi Prize. Kazemi Prize is an award to commemorate the efforts made by Dr Saeid Kazemi Ashtiani; the late founder of Royan Institute and revive his memories. It is established to make the young, who love science, familiar with the current scientific brilliants and geniuses in the world. We do deeply appreciate prof Langer for accepting our invitation, despite his busy schedule and remote distance to Iran.

Royan Award owes its success to strong and perseverant executive board, bound and prominent jury board, and the participants in this event. I wish to extend my gratitude to all of them and hope to replace the issues which endanger international peace and stability with the scientific competitions; like this.

Gourabi H, PhD

Award Chairman and Royan Institute President

Royan Awards



Royan International Research Award was founded by the late director of Royan Institute, Dr Saeid Kazemi Ashtiani with the aim of encouraging researchers, appreciating their efforts and preparing a friendly scientific atmosphere for them 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, reproductive genetics, stem cell biology and technology, regenerative medicine, and biotechnology.

Nomination and Selection Procedure of Award

The submitted research articles are categorized according to nine scientific groups: female infertility, reproductive genetics, epidemiology, ethics, embryology, andrology, reproductive imaging, stem cell biology and technology and 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 prize award ceremony.

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



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

THE FIRST
ROYAN
INTERNATIONAL
RESEARCH AWARD
■ September 2000

1



Reproductive Biomedicine & Stem Cell

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

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

THE SECOND ROYAN INTERNATIONAL RESEARCH AWARD

September 2001

Reproductive Biomedicine & Stem Cell

2



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



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

THE THIRD
ROYAN
INTERNATIONAL
RESEARCH AWARD

September 2002

Reproductive Biomedicine & Stem Cell

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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-Protamine-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

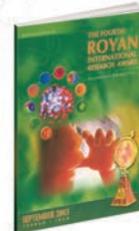
Iranian Winners:

- **Saeed Alborzi**
Laparoscopic Salpingoovulysis. 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

THE FOURTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

September 2003

4



Reproductive Biomedicine & Stem Cell

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



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

THE FIFTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

■ September 2004

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Reproductive Biomedicine & Stem Cell

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 through out 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, Oogenesis: Involvement in Zygotic Gene Activation and Early Embryonic Development in the Mouse

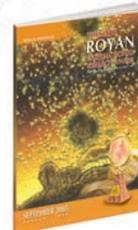
Iranian Winners:

- **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

THE SIXTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

September 2005

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Reproductive Biomedicine & Stem Cell

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.



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

**THE SEVENTH
ROYAN
INTERNATIONAL
RESEARCH AWARD**

September 2006

Reproductive Biomedicine & Stem Cell

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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**
Opoptosis 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

THE EIGHTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

September 2007

Reproductive Biomedicine & Stem Cell

8



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

THE NINTH ROYAN INTERNATIONAL RESEARCH AWARD

September 2008

Reproductive Biomedicine & Stem Cell

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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 projects in female infertility field (share)

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

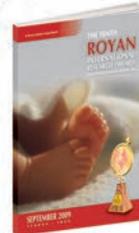
Iranian Winners:

- **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

THE TENTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

September 2009

Reproductive Biomedicine & Stem Cell



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 projects in female infertility field (share)

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



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

THE ELEVENTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

September 2010

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Reproductive Biomedicine & Stem Cell

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 Netherlands
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 Bashambo**, 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 Piryaei**
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

THE TWELFTH ROYAN INTERNATIONAL RESEARCH AWARD

September 2011

Reproductive Biomedicine & Stem Cell



International Winners:

Best research project in regenerative medicine field

- **Lorenzo Piemonti, Italy**
Bone Marrow as Ideal Microenvironment for Human Islet Transplantation to Treat Type 1 Diabetes (ClinicalTrials.gov Identifier: NCT01345227)

Best research project in stem cell biology & technology field

- **Hiromitsu Nakauchi, Japan**
Heterogeneity and Hierarchy Within the Most Primitive Hematopoietic Stem Cell Compartment

Best research project in female infertility field

- **Elizabeth Stewart, USA**
Safely Extending Focused Ultrasound Surgery for Uterine Leiomyomas to Women Who Desire Future Pregnancies

Best research project in reproductive genetics field

- **Paul Thomas, Australia**
Identification of SOX3 As an XX Male Sex Reversal Gene in Mice and Humans

Best research project in embryology field

- **Steve Tardif, UK**
Infertility with Impaired Zona Pellucida Adhesion of Spermatozoa from Mice Lacking TauCstF-64

Best research project in epidemiology & ethics fields

- **Heping Zhang, 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

Iranian Winners:

- **Morteza S. Hosseini**
Development of an Optimized Zona-Free Method of Somatic Cell Nuclear Transfer in the Goat
- **Jaleh Zolghadri**
Relationship Between Abnormal Glucose Tolerance Test and History of Previous Recurrent Miscarriages, and Beneficial Effect of Metformin in These Patients: A Prospective Clinical Study
- **Batool Rashidi**
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



THE THIRTEENTH ROYAN INTERNATIONAL RESEARCH AWARD

September 2012

Reproductive Biomedicine & Stem Cell

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International Winners:

Best research project in stem cell biology & technology field

- **Chengcheng (Alec) Zhang, USA**
Ex Vivo Expanded Hematopoietic Stem Cells Overcome the MHC Barrier in Allogeneic Transplantation

Best research project in andrology field

- **Kristian Almstrup, Denmark**
Screening of Subfertile Men for Testicular Carcinoma in Situ by an Automated Image Analysis-based Cytological Test of the Ejaculate

Best research projects in female fertility field (share)

- **Wenjie Zhu, China**
Transvaginal Ultrasound-guided Ovarian Interstitial Laser Treatment in Anovulatory Women with Polycystic Ovary Syndrome: A Randomized Clinical Trial on the Effect of Laser Dose Used on the Outcome
- **Kaei Nasu, Japan**
Role of Mevalonate-Ras Homology (Rho)/Rho-associated Coiled-Coil-Forming Protein Kinase-mediated Signaling Pathway in the Pathogenesis of Endometriosis-associated Fibrosis

Best research project in reproductive genetics field

- **Signe Atlmäe, Sweden**
Interactome of Human Embryo Implantation: Identification of Gene Expression Pathways, Regulation, and Integrated Regulatory Networks

Best research project in embryology field

- **Laura Cecilia Giojalas, Argentina**
Sperm Chemotaxis towards Progesterone, a Guiding Mechanism That May Be Used to Select the Best Spermatozoa for Assisted Reproduction

Iranian Winner:

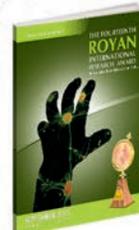
- **Alireza Pouya**
Human Induced Pluripotent Stem Cells Differentiation into Oligodendrocyte Progenitors and Transplantation in a Rat Model of Optic Chiasm Demyelination

THE FOURTEENTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

September 2013

Reproductive Biomedicine & Stem Cell

14



International Winners:

Best research project in stem cell biology & technology field

- **Antonio Uccelli, Italy**
Mesenchymal Stem Cells Shape Microglia Effector Functions Through the Release of CX3CL1

Best research project in reproductive genetics & andrology fields

- **Pierre F Ray, France**
Search for Genetic Causes of Male Infertility

Best research project in female infertility field

- **Paola Panina Bordignon, Italy**
The Selective Vitamin D Receptor Agonist Elocalcitol Reduces Development of Endometriosis and Formation of Peritoneal Adhesion in a Mouse Model

Best research project in embryology field

- **Mariano Buffone, USA**
Role of Actin Cytoskeleton During Mouse Sperm Acrosomal Exocytosis

Iranian Winners:

- **Ashraf Moini**
Risk Factors Associated with Endometriosis Among Iranian Infertile Women

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THE FIFTEENTH
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INTERNATIONAL
RESEARCH AWARD

September 2014



Reproductive Biomedicine & Stem Cell

International Winners:

Best research project in regenerative medicine field

- **Anne S. Baron-Van Evercooren**, France
Role of Endogenous Neural Precursor Cells in Multiple Sclerosis

Best research project in stem cell biology & technology field

- **Milena Bellin**, Netherlands
Human Pluripotent Stem Cells for Modelling and Correcting Long-QT Syndrome

Best research project in andrology & reproductive genetics fields

- **Sophie Rousseaux**, France
Male Genome Programming, Infertility and Cancer

Best research project in female infertility field

- **Christiani Andrade Amorim**, Belgium
New Steps Towards the Artificial Ovary

Best research project in embryology & biotechnology fields

- **Guoping Fan**, USA
Transcriptome Dynamics of Human and Mouse Preimplantation Embryos Revealed by Single Cell RNA-sequencing

Best research project in ethics field

- **Kristien Hens**, Netherlands
Towards the Transparent Embryo? Dynamics and Ethics of Comprehensive Pre-implantation Genetic Screening

Iranian Winners:

- **Seyedeh Nafiseh Hassani**
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184	Vaithilingam, Vijayaganapathy	Australia	Beneficial Effects of Coating Alginate Microcapsules with Macromolecular Heparin Conjugates-in vitro and in vivo Study
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195	Xinyi, Wu	China	Isolation and Transplantation of Corneal Endothelial Cell–Like Cells Derived from in-vitro-Differentiated Human Embryonic Stem Cells
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International Winner

Winners

Female Infertility

Endometrial Secretome and Its Role in Uterine Functions

Objective:

Earlier it was believed that uterine fluid (uf) or secretions are not relevant after the embryo implantation in humans. However, recent reports suggest that uterine secretions continue to play important role till the first trimester of human pregnancy. Evidences also suggest that uf mirrors endometrial functions or dysfunctions. Considering the relevance of uf in endometrial functions, studies were undertaken 1) to develop human uf proteomes; 2) to identify uf proteins that display differential abundance during the receptive phase and also 3) to assess the functional relevance of differentially abundant proteins using an animal model.

Material and Methods:

2D-PAGE and gel-free Isobaric Tag for Relative and Absolute Quantitation (iTRAQ) were employed. Samples were collected in the pre-receptive (i.e. day two post-ovulation, n=7) or receptive phase (i.e. day six post-ovulation, n=7) of the menstrual cycles, from regularly cycling healthy fertile women. Receptive phase samples were also collected from women with unexplained infertility. Further, to test the functional significance, rats (*Rattus norvegicus*) were used as an experimental model. Samples were collected in the proestrous (n=8) and metestrous (n=8) phases of estrous cycles and also from pregnant rats (n=18) during day 3-5 post-coitum (p.c.).

Results:

Our studies demonstrated higher abundance of uf alpha-1 antitrypsin precursor and apolipoprotein A-1 in the receptive phase, than in the nonreceptive phase, in regularly cycling women (Parmar et al, 2008). iTRAQ revealed identities of 127 proteins in the human uf. Of these, 27 proteins displayed differential abundance in the receptive (R) phase, compared to the pre-receptive (PR) phase. High Mobility Group Binding Protein 1 (HMGB1), one of the differentially abundant proteins displayed less abundance in the R phase than in the PR phase; in secretions as well as in endometrial tissues. Interestingly rats also revealed a lesser abundance of HMGB1 in the receptive phase, compared to that in the nonreceptive phase uf (Bhutada et al, 2013). Thus, human and rat data indicated an association of endometrial receptivity with a decline in the levels of uf HMGB1. A significant decline was also observed in the expression of endometrial HMGB1 on the day of implantation in pregnant rats. Further, recombinant HMGB1 (0.25-1.5ug/horn) was administered on day three p.c. in mated rats. The horns administered with HMGB1 showed pregnancy failure, whereas those with saline remained unaffected. This indicated the detrimental effect of an excess of extracellular HMGB1 on pregnancy in rats. Also, morphological changes in the endometrium, an increase in the expression of luminal epithelial $\text{NF } \kappa \text{ } \beta$; and also various inflammatory molecules such as Receptor for Advanced Glycation End Products, Tumor necrosis factor-alpha and interleukin-6; were observed in HMGB1 treated rats, when compared with untreated rats (Bhutada et al, 2014). Significantly higher expression of endometrial HMGB1 was also observed during the receptive phase in the women with unexplained infertility, compared with healthy proven fertile women.

Conclusion:

Our study, for the first time, employed iTRAQ, a gel-free approach to characterize human uf proteome. The study also demonstrated that an excess of extracellular HMGB1 in the receptive phase induces inflammatory changes in the endometrium which interfere with pregnancy.

Keywords:

Uterine fluid, Proteomics, HMGB1, Inflammation, Pregnancy



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Dr Geetanjali Sachdeva did her doctorate in Human Genetics from Jawaharlal Nehru University, New Delhi, India. She worked as a post-doctoral fellow at National Institute of Immunology, New Delhi and also at National Cancer Institute, National Institutes of Health, Frederick, USA. She has been a faculty at National Institute for Research in Reproductive Health, Indian Council of Medical Research, Mumbai since 1997. Her major research interests are the mechanisms contributing to endometrial receptivity, early pregnancy, and endometriosis. Recently her group has ventured into the area of conventional and nonconventional steroid signaling in prostate cancer pathogenesis. Dr Sachdeva has 45 peer-reviewed publications and five book chapters to her credit. She has received national and international awards for her research. She is a member of the editorial board of the PLOS One journal. She is also a reviewer for journals like Human Reproduction, Biology of Reproduction, Life Sciences, Reproductive Biomedicine Online and Reproduction.

International Winner

Embryology



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Dr Priyanka Parte achieved her PhD in Biochemistry in the year 2000 after completing two Masters Degrees in Applied Biology and Reproductive Biology, respectively. She began her research career in the area of Neuroendocrinology where she worked on neuroendocrine regulation of Hypothalamus-pituitary-gonadal axis and was involved in studying the role of estrogen in spermatogenesis and male fertility. On a Rockefeller Foundation fellowship from Oct 1994-Sept 1996 she worked with Dr Richard Sharpe and Phillipa Saunders at the MRC Reproductive Biology Unit, University of Edinburgh, Scotland, UK, where she studied the effect of endocrine disrupters on spermatogenesis. She did her post-doctoral research with Prof David Kupfer, Dept of Biochemistry and Molecular Pharmacology at the UMASS Medical School at Worcester, MA from May, 2003 to May 2004 on an NIH Fellowship. Back to India, she concentrated her research efforts in the area of Gamete Biology. Presently her research is focused towards understanding the molecular mechanisms underlying sperm motility and developing tools towards selection of good quality sperm for assisted reproductive technologies. She has 33 publications till date in peer reviewed International journals.

Tubulin Reversible Acetylation – Driving the Moves and the Moves Behind the Drive

Objective:

Asthenozoospermia accounts for almost 50% of the cases of male infertility. Our study investigating phosphoproteins differentially expressed in asthenozoosperm has identified the phosphoproteins relevant to sperm motility and the signature molecules likely to be altered in asthenozoospermia. The 66 phosphoproteins differentially expressed included four alpha tubulin isoforms which were differential expressed in individuals with poor sperm motility; an increase in TUBA3E and TUBA4A and decrease in TUBA3C and TUBA8. Isoforms TUBA3C, TUBA4A and TUBA8 are reported to be abundantly present in the testis. Of these, TUBA3C and TUBA4A are known to be acetylatable isoforms. Their differential expression in asthenozoosperm prompted us to investigate the role of reversible acetylation of alpha tubulin in sperm motility.

Material and Methods:

Alpha tubulin, acetylated α tubulin, and isoforms TUBA3C, TUBA4A, and TUBA8 were investigated in Percoll separated human sperm and HDAC6 in rat sperm by Western blot analyses, Flow cytometry, Real-time RT-PCR and IIF localization and data statistically analyzed. The observations were analyzed in silico for obtaining further insights. Interaction between HDAC6 and α Tubulin was elucidated by IIF co-localization and Co-immunoprecipitation studies. Sperm HDAC6 activity, motility and status of Ac α -tubulin was investigated in the presence of HDAC inhibitors Trichostatin A, Tubastatin A and Sodium Butyrate.

Results:

The differential expression of these isoforms was validated in the normal- and asthenozoosperm at protein and transcript level. Investigation of acetyl α tubulin expression revealed a reduction in tubulin acetylation in asthenozoosperm. The decrease in TUBA3C and increase in TUBA4A transcripts, both being acetylatable isoforms of alpha tubulin, could be elucidated on the basis of transcription factors binding to the promoters of the respective isoforms while the reduction in acetyl alpha tubulin in asthenozoosperm could be explained on the basis of decreased TUBA3C and the association of HDAC6 with TUBA4A. However the presence of HDAC6 on sperm had not been hitherto reported. In this study we have demonstrated for the first time the presence of HDAC6 transcript and protein in testicular- and caudal-sperm of rat and further by co-localization and coimmunoprecipitation studies we showed that HDAC6 interacts with alpha-tubulin and they colocalize in the mid piece and principal piece of sperm flagella. Using HDAC inhibitors we further demonstrated that HDAC6 in sperm is catalytically active and inhibitors of HDAC6 increase acetylation and restrict sperm motility.

Conclusion:

Our data suggests an association between reversible α tubulin acetylation and sperm motility. We show that alpha tubulin acetylation is reduced in sperm of asthenozoospermic individuals. Paradoxically, our experiments in the rat sperm show that inhibition of HDAC6 increase alpha tubulin acetylation but restrict sperm motility. The persistent expression of HDAC6 on the sperm flagella in the presence of HDAC6 inhibitor hints at a possible role for HDAC6 possibly as a microtubule associated protein(MAP). On the basis of our observations with the human and rat sperm and the available literature on microtubule stability in atat1 KO mice, we conclude that HDAC6 may act as a MAP and maintain dynamic instability in sperm flagella, and that dynamic instability may be a pre-requisite for normal sperm motility.

Keywords:

Acetylated Alpha-tubulin, Deacetylase Activity, HDAC6, HDAC Inhibitor, Sperm Motility



Identifying and Overcoming an Epigenetic Barrier for SCNT Reprogramming

Objective:

Despite successful cloning of many mammalian species, the cloning efficiency is extremely low compared to that of IVF raising the possibility of the existence of epigenetic barrier preventing successful cloning.

Material and Methods:

Using comparative transcriptome analysis comparing transcriptomes of IVF and SCNT embryos and that of donor cells, we identified epigenetic barrier and find a simple way to overcome the barrier.

Results:

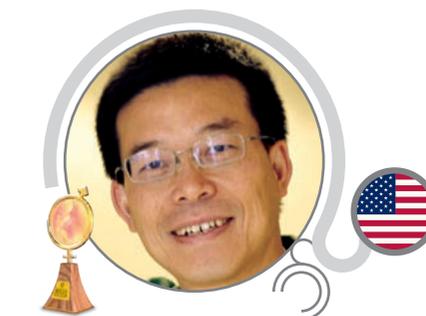
We identified that the Suv39h deposited H3K9me3 in somatic cells is an epigenetic barrier preventing zygotic genome activation and thus preventing successful development of the SCNT embryos. We find that by injecting mRNA encoding a H3K9me3 demethylase can overcome this epigenetic barrier to achieve high efficient cloning.

Conclusion:

Suv39h deposited H3K9me3 in somatic cell is an epigenetic barrier for SCNT, which can be overcome by injecting mRNA of Kdm4d into the one-cell embryo to achieve high efficient cloning.

Keywords:

SCNT, Epigenetic Barrier for Cloning, Suv39h, Kdm4d, ZGA



Yi Zhang, PhD

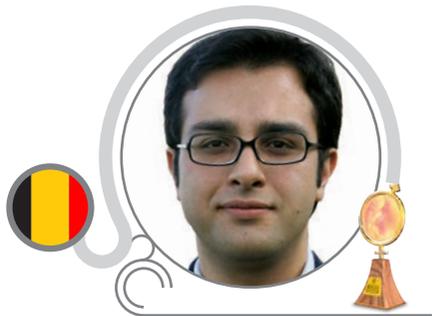
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Dr Zhang is currently an Investigator of the Howard Hughes Medical Institute and a Fred Rosen Chair Professor of the Department of Genetics and Department of Pediatrics of the Harvard Medical School. He is also a senior Investigator of PCMM of the Boston Children's Hospital. The major interest of Dr Zhang is to understand the epigenetic regulation in early development, stem cell reprogramming, differentiation, reward-related learning and memory, and how dysregulation of chromatin modifying enzymes contribute to various human diseases. His group contributed to the identification and characterization of several classes of epigenetic enzymes that include histone methyltransferases, JmjC-containing histone demethylases, histone H2A ubiquitin E3 ligase, and the Tet family of 5-methylcytosine dioxygenases. Dr Zhang was Top 10 author of high-impact papers by ScienceWatch in Genetics and Molecular Biology, and is also one of the most influential scientists in the world in the past 10 years.

International Winner

Reproductive Genetics



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Masoud Zamani Esteki is a computational geneticist working at the Centre for Human Genetics, Leuven University Hospital, KU Leuven (Belgium). He has recently accomplished his PhD in Molecular and Developmental Genetics at the same university. In preparation of his doctoral research, he first obtained an MSc degree in Bioinformatics followed by an Advanced Master degree in Artificial Intelligence, Engineering and Computer Science (ECS), both from KU Leuven. Prior to that, he acquired a BSc degree in Genetics at the Shahid Chamran University of Ahvaz (Iran). During the course of his PhD research, he developed, applied and translated an ensemble of innovative genome analysis approaches, including the haplarithmisis concept, which uncovers the allelic architecture of entire genomes in DNA derived from many cells down to a single cell.

Concurrent Whole - Genome Haplotyping and Copy-Number Profiling of Single Cells

Objective:

Methods for haplotyping and DNA copy-number typing of single cells are paramount for studying genomic heterogeneity and enabling genetic diagnosis. Before analyzing the DNA of a single cell by microarray or next-generation sequencing, a whole-genome amplification (WGA) process is required, but it substantially distorts the frequency and composition of the cell's alleles. As a consequence, haplotyping methods suffer from error-prone discrete SNP genotypes (AA, AB, BB) and DNA copy-number profiling remains difficult because true DNA copy-number aberrations have to be discriminated from WGA artifacts.

Material and Methods:

Here, we developed a single-cell genome analysis method that reconstructs genome-wide haplotype architectures as well as the copy-number and segregational origin of those haplotypes by employing phased parental genotypes and deciphering WGA-distorted SNP B-allele fractions via a process we coin haplarithmisis.

Results:

Our approach proved accurate on 55 embryos from 12 couples carrying either autosomal dominant, recessive or X-linked Mendelian disorders, or simple or complex translocations. The method allowed diagnosing an embryo for multiple monogenic disorders at once, and, in contrast to current PGD for translocation cases, it enabled distinguishing embryos that inherited normal chromosomes from embryos that inherited a balanced configuration of the rearranged derivative chromosomes.

Conclusion:

We demonstrate that the method can be applied as a generic method for preimplantation genetic diagnosis (PGD) on single cells biopsied from human embryos, enabling diagnosis of disease alleles genome wide as well as numerical and structural chromosomal anomalies. Moreover, meiotic segregation errors can be distinguished from mitotic ones. The method, therefore, facilitates genetic selection of embryos, and broadens the range of classic PGD.

Keywords:

Single-Cell Genomics, Haplotyping, Copy Number Typing, Reproductive Genomics, Embryo Genomics



International Winner

Stem Cell Biology and Technology

DNA Oxidation Towards Totipotency in Mammalian Development

Objective:

Mammalian development begins with a single cell resulted from the fertilization of a sperm and an oocyte. The early embryonic genome undergoes profound epigenetic reprogramming to prepare for development. We try to understand the biological significance and mechanisms of epigenetic reprogramming.

Material and Methods:

We used biochemical assays to detect oxidation product of 5-methylcytosine in DNA and identify the responsible oxidases. The significance of 5mC oxidation was confirmed by mouse gene targeting experiments.

Results:

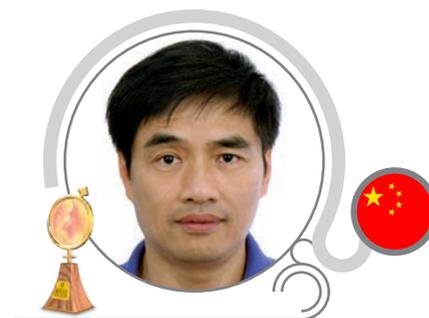
We find that 5-methylcytosine (5mC), the most abundant type of base modification in DNA, is oxidized to 5-hydroxymethylcytosine (5hmC) as well as 5-carboxymethylcytosine (5caC) in mouse zygotes. In vitro, the Tet family of dioxygenases oxidize 5mC to 5caC under physiologically relevant conditions (e.g. in the presence of 1mM ATP). In zygotes, the Ten-eleven-translocation protein Tet3 is responsible for the genome-wide oxidation of 5mC to 5hmC and 5caC. Deficiency of zygotic Tet3 impedes demethylation at the paternal Oct4 and Nanog genes and delays the reactivation of Oct4 in early embryos. The heterozygous mutant embryos lacking maternal Tet3 suffer increased developmental failures. Importantly, oocytes lacking Tet3 also show impaired reprogramming of injected somatic cell nuclei. In addition, MEFs deficient in all Tet genes were unable to be reprogrammed by Yamanaka factors

Conclusion:

We conclude that Tet-mediated oxidation is important for DNA demethylation and gene activation in the early embryo following natural fertilization, as well as for the reprogramming in somatic cell nuclear transfer and factor-based iPSC generation.

Keywords:

Epigenetic Reprogramming, DNA Demethylation, Enzymatic DNA Oxidation, Cell Pluripotency



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Dr Xu is a principal investigator at the Institute of Biochemistry and Cell Biology (IBCB), Chinese Academy of Sciences, Shanghai. He trained for PhD at the Max Planck Institute for Molecular Genetics, Berlin. He conducted his postdoctoral training at Columbia University, New York. Dr Xu established the DNA metabolism research group in 2001 under the auspices of Max Planck research group at Shanghai IBCB, where his team investigates the importance of DNA methylation (5-methylcytosine) in stem cells and development. In 2011 his team described a role for Tet DNA dioxygenases in oxidation of 5-methylcytosine to 5-carboxymethylcytosine and the involvement of a DNA glycosylase – TDG in active demethylation, a critical step for the epigenetic reprogramming of early embryos and throughout development.

National Winner

Reproductive Genetics



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Maryam Shahhoseini received her BSc degree in Microbiology in 1998 from Department of Biology, University of Tehran. In a straight line, she started her MSc degree in Biochemistry at the Institute of Biochemistry & Biophysics (IBB), University of Tehran, and was graduated in 2001 as the 1st rank student. She continued her education at PhD level in Biochemistry at the same department (IBB) and was graduated in 2007 as the 1st rank student. Immediately after dissertation, she joined Royan Institute as an academic staff. Now, she is the Associate Professor of Genetic Department, and the leader of "Epigenetic Sub-group" in Royan Institute.

Since 2007, she has managed several genetic/epigenetic projects in the fields of Reproduction and Stem Cell Biology. Parallel, she has been the invited academic lecturer of Department of Biotechnology, Faculty of Sciences, University of Tehran, teaching Molecular Biology, Molecular Genetics, Molecular Biotechnology, and Gene Expression Regulation courses.

Expression Profile of Macrophage Migration Inhibitory Factor (MIF) Signaling Pathway as a Potential Biomarker in Pathophysiology of Endometriosis

Objective:

MIF via its receptor, CD74, initiates a signaling cascade that leads to proliferation and survival of cells. Also, MIF binding to CD74 activates p38 signaling pathways that lead to positive effect on the expression of COX-2. The aim of this study was to evaluate the gene expression profile of MIF, CD74 and COX-2 in normal, ectopic and eutopic endometrium during menstrual cycle. The expression level of MIF protein in peripheral blood samples of patients was another variable factor checked in this study.

Material and Methods:

Quantitative real-time polymerase chain reaction (Q-PCR) was performed using cDNA and primers for MIF, CD74 and COX-2. Also, protein level of MIF in blood serum was measured by ELISA assay.

Results:

The mean relative expression of MIF, CD74 and COX-2 genes were significantly higher in ectopic endometrium in compare to eutopic and control endometrium. However, there were significantly variations in mRNA expression of these genes in normal, ectopic and eutopic endometrium during menstrual cycle. Also women with endometriosis had significantly higher circulating levels of MIF protein as compared to normal controls.

Conclusion:

Higher expression of MIF, CD74 and COX-2 genes in ectopic endometrium can be considered as a molecular biomarker for endometriosis development and pathophysiology. Variation in the expression of these genes in normal, ectopic and eutopic endometrium during menstrual cycle could play an essential role in reproduction, inflammation and endometrium reconstruction.

Keywords:

MIF, CD74, COX-2, Endometriosis



National Winner

Stem Cell Biology and Technology

Bioinspired Substrates Direct the Fate of Stem Cells

Objective:

Bioinspired materials can mimic the stem cell environment and modulate stem cell differentiation and proliferation. In this context, biomaterials can mimic the biological microenvironments (i.e., niches) of stem cells and specifically affect the in vitro differentiation that is necessary for clinical application. In vivo, the appropriate differentiation, proliferation, and maintenance of potency are regulated by either stem cells or their specific niches. In this study, biomimetic micro/nanoenvironments were fabricated by cell-imprinted substrates based on mature human keratinocyte morphological templates and also smart nanoenvironments were obtained by cell-imprinted substrates based on mature and dedifferentiated chondrocytes as templates.

Material and Methods:

This substrate was characterized by SEM, AFM, Fluorescent and Confocal microscopy. Toxicity of PDMS to stem cells was evaluated using an MTT-assay. The gene expression analysis of differentiated cells, were detected by Real Time PCR, array analysis and computer simulation study.

Results:

The data obtained from atomic force microscopy and field emission scanning electron microscopy revealed that the keratinocyte-cell-imprinted poly (dimethylsiloxane) casting procedure could imitate the surface morphology of the plasma membrane, ranging from the nanoscale to the macroscale, which may provide the required topographical cell fingerprints to induce differentiation. Gene expression levels of the genes analyzed (involucrin, collagen type I, and keratin 10) together with protein expression data showed that human adipose-derived stem cells (ADSCs) seeded on these cell-imprinted substrates were driven to adopt the specific shape and characteristics of keratinocytes. The observed morphology of the ADSCs grown on the keratinocyte casts was noticeably different from that of stem cells cultivated on the stem-cell-imprinted substrates. Since the shape and geometry of the nucleus could potentially alter the gene expression, we used molecular dynamics to probe the effect of the confining geometry on the chain arrangement of simulated chromatin fibers in the nuclei. Additionally, rabbit adipose derived mesenchymal stem cells (ADSCs) seeded on these cell-imprinted substrates were driven to adopt the specific shape (as determined in terms of cell morphology) and molecular characteristics (as determined in terms of gene expression) of the cell types which had been used as template for the cell-imprinting.

Conclusion:

The results obtained suggested that induction of mature cell shapes onto stem cells can influence nucleus deformation of the stem cells followed by regulation of target genes. This might pave the way for a reliable, efficient, and cheap approach of controlling stem cell differentiation toward human cells for wound healing applications.

Keywords:

Stem Cells, Biomimicking, Cell Fate, Differentiation, Smart Substrates



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Morteza Mahmoudi received his PhD from Institute for Nanoscience and Nanotechnology at Sharif University of Technology with specialization on the biomedical applications of superparamagnetic iron oxide nanoparticles. He is Director of NanoBio Interaction Laboratory at Tehran University of Medical Sciences. He is the leading expert on the bionanointerfaces and stem cell nano-based engineering. He was visiting Professor at University of Illinois at Urbana Champaign and Stanford School of Medicine. He has received numerous awards for his work on nanobiointeractions and stem cell nanotechnologies including 11th Kharazmi Young Festival Award (2009), Razi Festival Young Researcher National Award (2012), Sixth-Ninth Festival National Awards of Iran Nanotechnology Initiative Council (2010-2014), Distinguished Researcher of Iran's Ministries (2013), and Stanford University Seed Grants Women's Heart Health Program (2015). He has also introduced new technology in stem cell differentiation using pseudo 3D smart substrates.



Board Juries

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Rashidi, Batool, MD	Iran

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Ray, Pierre F., PhD	France
Redi, CarloAlberto, PhD	Italy
Rezazadeh, Mojtaba, PhD	Iran
Ringe, Jochen, PhD	Germany
Rizk, Mohamed Mostafa, MD	Egypt
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Sabbaghian, Marjan, PhD	Iran
Sadeghi, Mohamad Reza, PhD	Iran
Sadighi Gilani, Mohammad Ali, MD	Iran
Safarinejad, Mohammad Reza, MD	Iran
Salman Yazdi, Reza, DCLS	Iran
Saric, Tomo, MD, PhD	Germany
Satarian, Leila, PhD	Iran
Schlegel, Peter, MD	United States
Shahhoseini, Maryam, PhD	Iran
Shahverdi, Abdolhossein, PhD	Iran
Shahzadeh Fazeli, Seyed Abolhassan, MD, PhD	Iran
Shiva, Marzieh, MD	Iran
Sipp, Douglas, BA	Japan
Sofkitis, Nikolaos, MD, PhD	Greece
Stewart, Elizabeth, MD	United States
Strauer, Bodo, MD, FRCP, FACC, FESC	Germany
Sumi, Shoichiro, MD, PhD	Japan
Tahamtani, Yaser, PhD	Iran
Taheri Panah, Robabeh, MD	Iran
Tapia, Natalia, PhD	Germany
Tardif, Steve, PhD	United States
Totonchi, Mehdi, PhD	Iran
Ural, Ali, MD	Turkey
Van der Veen, Fulco, PhD	Netherlands
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Viville, Stéphane, PhD	France
Vosough Taghi Dizaj, Ahmad, MD	Iran
Wai-Sum, O, PhD	Hong Kong
Wang, Dong-An, PhD	Singapore
Yadav, Prem, PhD	India
Zamani, Mahdi, PhD	Iran
Zamanian, Mohammadreza, MD, PhD	Iran
Zerbini, Gianpaolo, MD, PhD	Italy
Zhang, Chengcheng, PhD	United States
Zhou, Jiawei, PhD	China
Zolghadri, Jaleh, MD	Iran

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Abbasy, Homayoun, MD	Iran	Eftekhari-Yazdi, Poopak, PhD	Iran
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Aflatoonian, Reza, MD, PhD	Iran	Englert, Yvon, MD*	Belgium
Afsharian, Parvaneh, PhD	Iran	Eshrati, Babak, PhD	Iran
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Ahmadi, Firoozeh, MD	Iran	Farzadi, La'ya, MD	Iran
Akhlaghpoor, Shahram, MD	Iran	Ferrara, James L.M., MD, DSc	USA
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Ashrafi, Mahnaz, MD	Iran	Hosseini, Ahmad, PhD	Iran
Azin, Seyed Ali, MD, PhD	Iran	Hosseini, Jalil, MD	Iran
Azin, Seyyed Mohammad, PhD Student	Iran	Hosseini, Roya, MD	Iran
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Baharvand, Hossein, PhD	Iran	Jalali, Mohsen, PhD	Iran
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Milanifar, Alireza, MD, PhD Student	Iran
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Mohammad, Kazem, PhD	Iran
Mohseni Meybodi, Anahita, PhD	Iran
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Nakatsuji, Norio, PhD	Japan
Namazi, Hamidreza, MD, PhD Student	Iran
Nasr-Esfahani, Mohammad Hossein, PhD	Iran
Nazari Tavakkoli, Saeid, PhD	Iran
Nematollahi-mahani, Seyed Nouredin, PhD	Iran
Niknejadi, Maryam, MD	Iran
Nouri, Mohammad, PhD	Iran
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Olsson, Anna, DVM	Portugal
Omani Samani, Reza, MD, PhD Student	Iran
Parsanezhad, Mohammad Ebrahim, MD	Iran
Parsapour, Alireza, MD, PhD Student	Iran
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Pennings, Guido, PhD	Belgium
Petraglia, Felice, MD	Italy
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Poureisa, Masoud, MD	Iran
Raffaella, Fabbri, PhD	Italy
Rajabi, Sareh, PhD	Iran
Ramezanzadeh, Fatemeh, MD	Iran
Rashidi, Batool, MD	Iran
Ray, Pierre F, PhD	France
Redi, CarloAlberto, PhD	Italy
Repping, Sjoerd, PhD	Netherlands
Rezania moalem, Mohamad Reza, MA	Iran
Rezazadeh, Mojtaba, PhD	Iran
Richters, Juliet, PhD	Italy
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Sadeghi, Mohamad Reza, PhD	Iran

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Saeidi, Hojjatollah, PhD	Iran
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Shamsi pour, Mansur, PhD Student	Iran
Shariatinasab, Sadegh, PhD Student	Iran
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Taga, Tetsuya, PhD	Japan
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Voet, Thierry, PhD	Belgium
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Weichert, Alexander, MD	Germany
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Ezabadi, Zahra, MSc

Gourabi, Hamid, PhD

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Hosseinifar, Hani, MSc

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Kazemi Prize

2015



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 Modares 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. In 2010 the first Kazemi Prize was 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 2011 the second Kazemi Prize was awarded to Prof Hans Robert Schöler a world-renowned researcher who has made significant contributions to the field of stem cell biology over the past 35 years. And this year the prize will be awarded to Prof Robert S. Langer.

Professor Robert S. Langer is the David H. Koch Institute Professor. Dr Langer has written over 1,300 articles. He also has over 1,080 patents worldwide. Dr Langer's patents have been licensed or sublicensed to over 300 pharmaceutical, chemical, biotechnology and medical device companies. He is the most cited engineer in history (h-index 211).

He served as a member of the United States Food and Drug Administration's SCIENCE Board, the FDA's highest advisory board, from 1995 -- 2002 and as its Chairman from 1999-2002.

Dr Langer has received over 220 major awards. He is one of 4 living individuals to have received both the United States National Medal of Science (2006) and the United States National Medal of Technology and Innovation (2011). He also received the 2002 Charles Stark Draper Prize, considered the equivalent of the Nobel Prize for engineers, the 2008 Millennium Prize, the world's largest technology prize, the 2012 Priestley Medal, the highest award of the American Chemical Society, the 2013 Wolf Prize in Chemistry, the 2014 Breakthrough Prize in Life Sciences and the 2014 Kyoto Prize. He is also the only engineer to receive the Gairdner Foundation International Award; 82 recipients of this award have subsequently received a Nobel Prize. In 2015, Dr Langer received the Queen Elizabeth Prize for Engineering. Among numerous other awards Langer has received are the Dickson Prize for Science (2002), Heinz Award for Technology, Economy and Employment (2003), the John Fritz Award (2003) (given previously to inventors such as Thomas Edison and Orville Wright), the General Motors Kettering Prize for Cancer Research (2004), the Dan David

Prize in Materials Science (2005), the Albany Medical Center Prize in Medicine and Biomedical Research (2005), the largest prize in the US for medical research, induction into the National Inventors Hall of Fame (2006), the Max Planck Research Award (2008), the Prince of Asturias Award for Technical and Scientific Research (2008) and the Terumo International Prize (2012). In 1998, he received the Lemelson-MIT prize, the world's largest prize for invention for being "one of history's most prolific inventors in medicine." In 1989 Dr Langer was elected to the Institute of Medicine of the National Academy of Sciences, and in 1992 he was elected to both the National Academy of Engineering and to the National Academy of Sciences, and in 2012 he was elected to the National Academy of Inventors.

Forbes Magazine (1999) and Bio World (1990) have named Dr Langer as one of the 25 most important individuals in biotechnology in the world. Discover Magazine (2002) named him as one of the 20 most important people in this area. Forbes Magazine (2002) selected Dr Langer as one of the 15 innovators worldwide who will reinvent our future. Parade Magazine (2004) selected Dr Langer as one of 6 "Heroes whose research may save your life." Dr Langer has received honorary doctorates from many universities, for example: Harvard University, the Mt. Sinai School of Medicine, Yale University, University of Western Ontario (Canada), Boston University and Hanyang University (South Korea). He received his Bachelor's Degree from Cornell University in 1970 and his Sc.D. from the Massachusetts Institute of Technology in 1974, both in Chemical Engineering.



Kazemi Prize 2015
Professor Robert S. Langer

Royan Institute

www.royaninstitute.org



Royan Institute

Royan Institute is a world-renowned center committed to multidisciplinary, campus-wide, integration and collaboration of scientific, academic, and medical personnel for understanding male/ female infertility, embryo development, stem cell biology, and 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 aligned with the country's comprehensive scientific roadmap and the Iranian Academic Center for Education, Culture and Research (ACECR) development plan, can be categorized in the following aspects:

- Research and development of science and technology in the fields of reproductive biomedicine, stem cells and biotechnology
- Education and promotion of scientific findings at national and international levels
- Commercialization of research findings to offer services and biological products for the purpose of resolving the country's specialized needs
- Treatment of infertile patients and difficult-to-treat diseases by the efficient use of research findings

Vision

Royan Institute is a center of excellence in research and technology at an international level, a pioneer in development of science, technology and innovation of biological sciences, and an internationally renowned authority on stem cells science, reproduction, biotechnology, and regenerative medicine alongside its effective role in improving the society's health.

Royan Consists of Three Research Institutes and a Core Facility

1. Royan Institute for Reproductive Biomedicine (RI-RB)
2. Royan Institute for Stem Cell Biology and Technology (RI-SCBT)
3. Royan Institute for Biotechnology (RI-B)
4. Laboratory Animal Core Facility

Royan Institute for Reproductive Biomedicine (RI-RB)

Royan Institute for Reproductive Biomedicine, founded in 1991, consists of six departments and one infertility 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 on different aspects of infertility and its treatment in order to increase the success rate alongside improving embryo health.

RI-RB Departments:

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

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

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

- Stem Cells and Developmental Biology 16 Research Programs
10 Core Facilities
- Regenerative Medicine 6 Research Programs
5 Core Facilities

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 Biotechnology (RI-B)

Royan Institute for 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 handcrafts, and is known as the city of "blue tiles".

Royan Institute for 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 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 this 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-B Groups:

- Cellular Biotechnology- Genetic Laboratory
- Cellular Biotechnology- Stem Cell Laboratory
- Molecular Biotechnology- Recombinant Protein Laboratory
- Reproductive Biotechnology- Andrology Laboratory
- Reproductive Biotechnology- Embryology Laboratory

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.

Overview of the Institute

- 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 pre-hospital (2011)
- Establishment of Stem Cell Bank (2011)
- The first healthy child birth after Molecular PGD for beta-thalassemia in Iran (2012)
- Birth of eight cloned goats through the simplified method of SCNT in Iran (2013)
- Birth of the first cloned wild ram as an endangered species in Iran (2015)



Royan Institute for Reproductive Biomedicine (RI-RB)

Endocrinology and Female Infertility Department of RI-RB

Introduction

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

Goals

- Evaluation and treatment of infertile couples
- New guidelines for improving IVF outcomes
- Achieving new strategies for diagnosing infertility causes
- Ovulation induction and COH
- Improving methods for oocyte and embryo culture
- Endometrial preparation
- The promotion of prenatal care

Articles

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Andrology Department of RI-RB

History and Introduction

This department was established in 1995 and started to research on male infertility factors. 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 treatment for male factor infertility.

Goals

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

Main Activities

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



Articles

1. Shafipour M, Sabbaghian M, Shahhoseini M, Sadighi Gilani MA. **Comparative Expression Analysis of Septin 14 in Testes of Infertile Men with Normal Spermatogenesis and Spermatogenic Failure.** Iran J Reprod Med. 2014; 12(3):205-8.
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Embryology Department of RI-RB

History and Introduction

The Department of Embryology, founded in 1995, is a part of Royan Institute's Reproductive Biomedicine. During the preceding decade, a fundamental description of human and animal experimental studies has emerged in the field of embryology.

The main focuses of this Department are:

- Increasing the quality of gametes and embryos
- Studying molecular aspects of gamete maturation and embryo development
- Performing embryo co-culture with various types of somatic cells
- Studying molecular aspects of gamete and embryo freezing
- In vitro maturation of animal and human gametes
- Evaluating molecular and cellular events of embryo implantation
- Three-dimensional culture of cells to design an endometrial biomodel
- Three-dimensional culture of follicles in order to acquire good quality oocytes
- Performing nuclear transfers
- Performing animal cloning and transgenesis
- Finding the best method for preserving gametes, ovarian, and testicular tissues

Goals

- Increasing the number of high quality human embryos
- Producing transgenic animals with selected genes
- Establishing in vitro human follicle culture following ovarian tissue cryopreservation



The mission of the RI-RB Embryology Department is the performance of multiple research regarding different aspects of fertility preservation and different treatments of infertility in order to improve embryo health and increase the pregnancy success rate.

Its aim is to make the wish of having children for infertile couples come true, and to give a promising future to them.

Articles

1. Esmaeili V, Shahverdi AH, Alizadeh AR, Alipour H, Chehrizi M. **Saturated, Omega-6 and Omega-3 Dietary Fatty Acid Effects on the Characteristics of Fresh, Frozen–Thawed Semen and Blood Parameters in Rams.** *Andrologia.* 2014; 46: 42-49.
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Reproductive Genetic Department of RI-RB

History and Introduction

Department of Genetics 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 involve the diagnosis of Y chromosomal micro deletions 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 plus 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 mutual project with 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

- To improve implantation rates along with 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 Genetic 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 of patients and newborns, as well as the production of pharmaceutical proteins through transgenic animals.

The vision of this department is to perfect diagnosis and treatment of infertility based on reproductive genetic knowledge, which will lead to healthy newborns in a short period of time.

Articles

1. Shahverdi A, et al. **Fertility and Flow Cytometric Evaluations of Frozen-Thawed Rooster Semen in Cryopreservation Medium containing Low Density Lipoprotein.** *Theriogenology.* 2015; 83(1):78-85.
2. Fatemi N, et al. **TBHP-Induced Oxidative Stress Alters microRNAs Expression in Mouse Testis.** *Journal of Assisted Reproduction and Genetics.* 2014; 31(10): 1287-93.
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Epidemiology and Reproductive Health Department of RI-RB

History and Introduction

The Epidemiology and Reproductive Health Department was established in 1999 with the aim of doing extensive researches on epidemiological aspects of infertility and reproduction in addition to reproductive and sexual health. This department is responsible to check all research proposals in Royan three research institutes 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, genetics and 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 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, and therefore its vision is to ensure the health of the society.

Articles

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Reproductive Imaging Department of RI-RB

History and Introduction

Reproductive Imaging Department was established in 2008 to focus on infertility assessment as well as evaluation of pregnancies in both clinic and research fields.

During the last two decades, dynamic advances have been made in the evaluation and treatment of infertility. Imaging technique has been a significant breakthrough in the diagnosis and management of infertility. A broad range of imaging techniques, from the old and proven - such as hysterosalpingography- to the latest and cutting edge - such as three-dimensional hysosterography, has been employed.

After applying these advanced techniques in this department, we are able to upgrade the management of infertility and obstetric care, and thereby, positively provide better services for infertile couples.

The main goal of imaging department is to provide comprehensive evaluation of infertility using the latest knowledge and innovative research in order to provide the highest quality of infertility management and to monitor emergency obstetric care.

The mission of this research department is to expand clinical and fundamental research in reproductive imaging in order to provide modern strategies and improve clinical services for infertile couples.



The main aim of these projects classified as:

- Diagnostic accuracy investigation of imaging modalities (hysterosalpingography, hysterosonography and three-dimensional ultrasound)
- Role of imaging in (male & female) infertility management
- Fetal screening
- Measurement standards/ultrasound measurement charts appropriate for Iranian fetuses

The vision of this department is performing national and international multicentral researches and having collaboration with universities and other infertility centers to provide educational courses in diagnostic ultrasound including transvaginal, color Doppler, power Doppler, 3D/4D imaging and radiology for radiologist, gynecologist and fellowships.

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Royan Institute for Stem Cell Biology and Technology

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, Department of Stem Cells expanded to sixteen main research groups that conduct studies on stem cells and developmental biology and molecular systems' biology. Moreover Department of Regenerative Medicine consists of five main research groups which conduct research focused on translational and clinical studies using cell therapy. Throughout, the vision of RI-SCBT 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.



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Royan Institute for Biotechnology

History and Introduction

In 1983, the late Dr Kazemi Ashtiani, the founder of Royan Institute, along with Dr Nasr- Esfahani established Royan Institute for Biotechnology, as the third branch of Royan Research Institutes. At present, this branch homes around 100 researcher and students working in 5 departments to expand the science over their areas. The intensive seminar schedule in each department has encouraged interactivity and opportunity for scientific discussion between students and the scientists to facilitate the progress of science in their filed. Therefore, in 2010 through this interactive science, this department has achieved a number of important results, including establishment of zona free somatic cell nuclear transfer (SCNT) in goat, evaluation of epigenetic modifier on outcome of SCNT and vitrified embryos, introducing novel approach for selection of intact sperm for ICSI based on sperm functional characteristics, understanding the role of embryonic structure in neurogenesis, assessment of the role of PEP (a peroxisomal protein) and PPAR γ in neurogenesis and finally role of biotechnology in production of biological products.



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Laboratory Animal Core Facility

Introduction

The Laboratory Animal Science Core Facility of Royan Institute plays a national role in education of scholars performing ground researches on experimental animals, by organizing proficient gadget in all categories within the animal research fields. Each center has three major activities:

- Maintenance and breeding the animals
- Creating animal models with surgical manipulations or chemical interactions
- Research and develop animal modeling

Scientists of this service unit facility who are responsible for the design of animal experiments have to be graduated in Veterinary Medicine or one of biomedical science fields and must have taken a course on laboratory animal science which concentrates on humane and gentle handling of animals. They also should be aware of knowledge of alternative routes and ethical aspects of animal experimentation.

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

- Replacement: Replace animal experiments with alternatives whenever possible.
- Reduction: Reduce the number of experiments and number of animals in each experiment to an absolute minimum.
- Refinement: Refine experiments so that the 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.

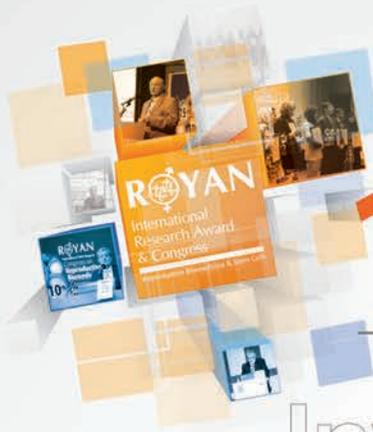
Goals

- Providing quality care for all animals used at Royan Institute
- Assisting researchers in their mission of quality research with respect to humane use of laboratory animals
- Providing researchers with a relevant education to enable them achieve scientific eminences in selected areas
- Producing, supporting and maintaining laboratory animals required for research
- Managing the animal care and having commitment to them
- Managing a preventive medicine program for disease control
- Advising research departments on all aspects of experimental use of animals, including experimental design, surgical, pre and post-operative care, oocyte and embryo harvesting, and experimental animal modeling establishment



Articles

1. Moghadasali R, Azarnia M, Hajinasrollah M, Arghani H, Nassiri SM, Molazem M, Vosough A, Mohitmafi S, Najarasl M, Ajdari Z, Yazdi RS, Bagheri M, Ghanaati H, Rafiei B, Gheisari Y, Baharvand H, Aghdami N. **Intra-renal Arterial Injection of Autologous Bone Marrow Mesenchymal Stromal Cells Ameliorates Cisplatin-Induced Acute Kidney Injury in a Rhesus Macaque Mulatta Monkey Model.** *Cytotherapy*. 2014; 16(6):734-49.
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Invited Speakers



Prof. Didier Stainier
Max Planck Institute for Heart and Lung
Research, Bad Nauheim, Germany



Prof. Dominique P. Pioletti
Director of the Laboratory of Biomechanical
Orthopedics, Lausanne, Switzerland



Prof. Ali H. Brivanlou
Laboratory of Stem Cell Biology and
Molecular Embryology, The Rockefeller
University, USA



Prof. Marius Ader
Professor for Cell Replacement in the
Mammalian Retina, CRTD, Dresden,
Germany



Prof. Guoliang Xu
Institute of Biochemistry and Cell
Biology, Shanghai Institutes for Bio-
logical Sciences, Chinese Academy of
Sciences, China-



Prof. Matteo Bellone
Head, Unit of Cellular Immunology Division
of Immunology, Transplantation and
Infectious Diseases San Raffaele Scientific
Institute, Milan, Italy



Prof. Jürgen Hescheler
Institute of Neurophysiology, University
of Cologne, Germany



Prof. Kevin Docherty
MacLeod Smith Professor of Bio-
chemistry, University of Aberdeen,
School of Medical Sciences, „Fores-
terhill, Aberdeen, UK



Prof. PV. Mohanan
Sree Chitra Tirunal Institute for Medical
Sciences and Technology (Govt. of India),
Biomedical Technology Wing, Kerala, India



Prof. Jorge Ferrer
Chair in Genetics and Medicine,
Section Head, Genomics and Genetics
Theme Leader, Imperial College
London, UK



Prof. Jonathan R. T. Lakey
Director of Research, Surgery
School of Medicine, University of
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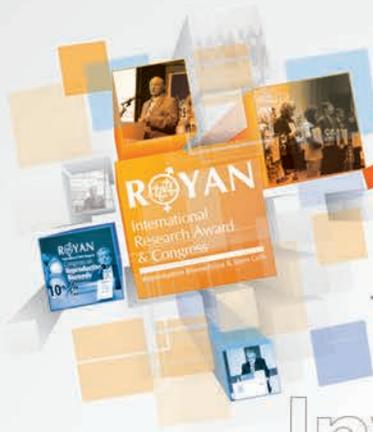
Prof. Andreas Keller
Chair for Clinical Bioinformatics
Saarland University, University Hospital,
Saarbrücken, Germany



Prof. Graham Parker
Assistant Professor (Research), Dept. of Pedi-
atrics, WSU School of Medicine, USA



Prof. Shahragim Tajbakhsh
Head of the Department of Develop-
mental & Stem Cell Biology, Vice-Direc-
tor of the CNRS Unit URA2578 and Di-
rector of a «Laboratory of Excellence»
Consortium, REVIVE, Pasteur Institute,
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Invited Speakers



Prof. Jorge Chavarro
Assistant Professor of Medicine, Harvard Medical School, Massachusetts, USA



Prof. Teruko Taketo
Professor of Department of Surgery, McGill University, Urology Research Laboratory, Royal Victoria Hospital, West Montreal, Canada



Prof. Paul Mozdziaik
Professor of Cornell University College of Agriculture and Life Sciences, Ithaca, USA



Prof. Serg Nef
Associate professor of Department of Genetics, Medicine and Development, University of Geneva, Medical School, Switzerland



Dr. Kenneth McEleavey
Director of Human Developmental Genetics, Director, Of Reproduction of Fertility, and Populations Department of Developmental Biology Pasetur institute, France



Prof. Richard Andersen
Elsie Inglis Professor of Clinical Reproductive Science
Head of Section, Obstetrics and Gynecology, University of Edinburgh, UK



Kazem Nouri
Director of IVF-Unit, Co-director of Fertility preservation program and fertility surgery unit, Austria



Prof. Stuart S. Howards
University of Virginia Charlottesville VA, USA
Wake Forest Medical Center Winston Salem NC, USA



Prof. Hooman Sadri Ardekani
Director of Male Fertility Research Program, Wake Forrest Institute for Regenerative Medicine (WFIRM) and Department of Orology Wake Forest School of Medicine, Winston-Salem, USA



Don Leigh
Principal Scientist, Department of Molecular Genetics, Genea, Sydney, Australia



Marcos Meseguer
Clinical Embryology Laboratory ivi Valencia, Spain



Hakan Yarali
professor at Hacettepe University, of Medicine, Department of Obstetrics and Gynecology, the Clinical Director of Anatolia IVF Center, Ankara, Turkey.



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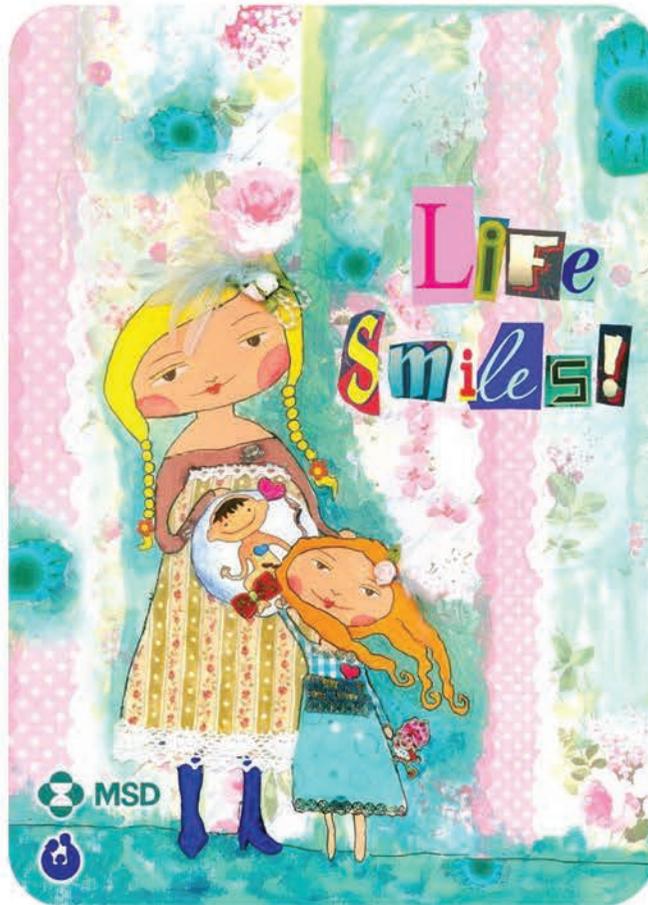
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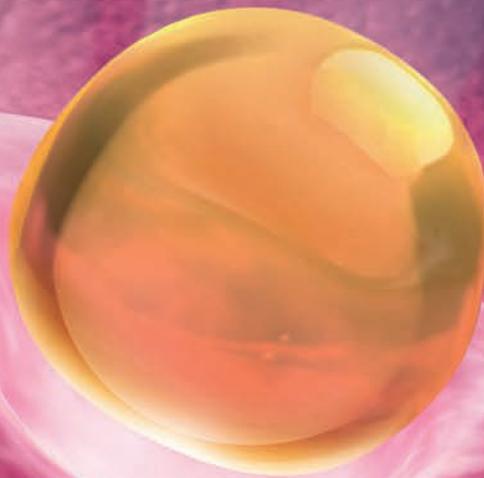


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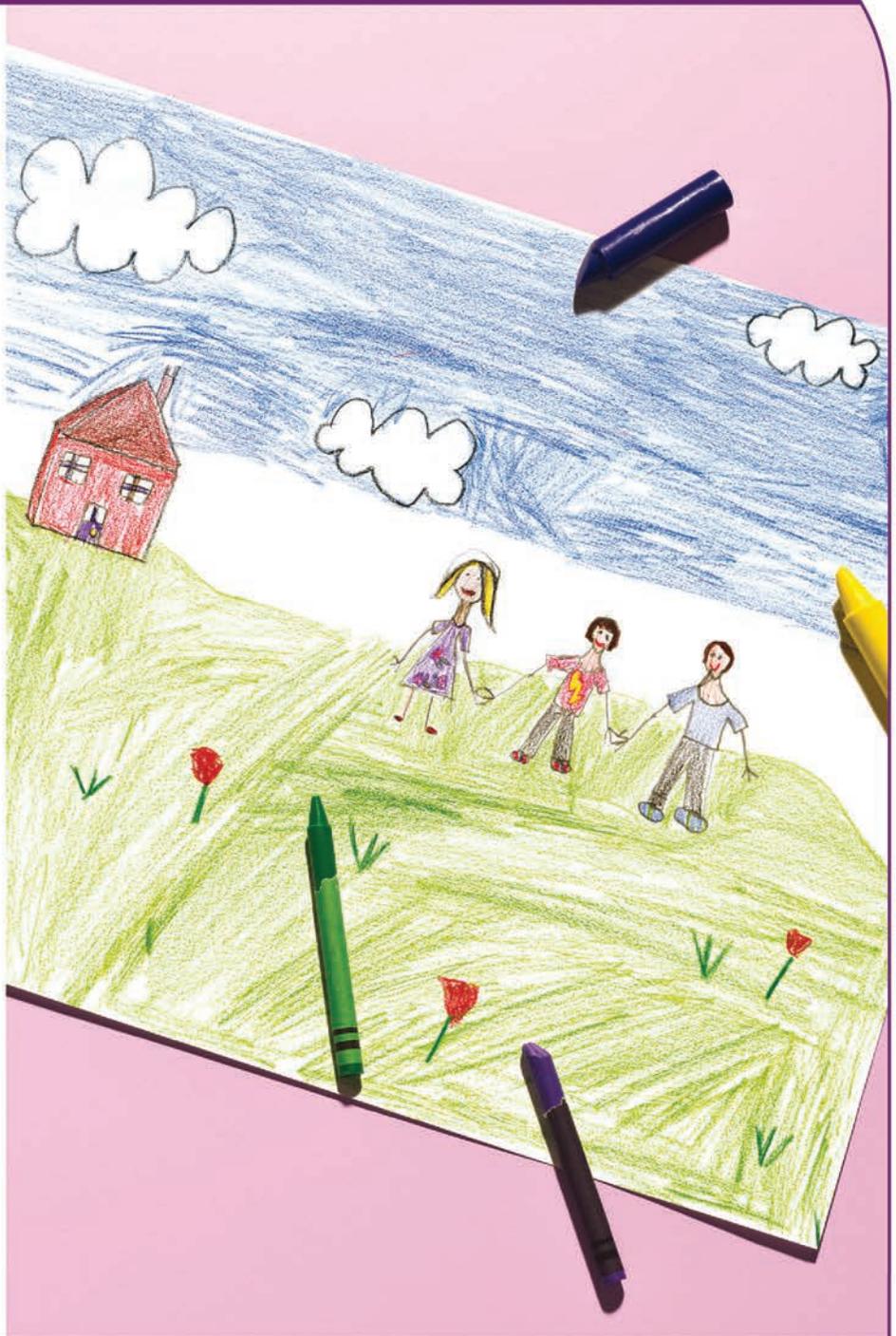
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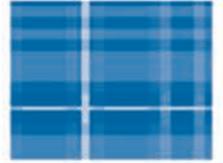


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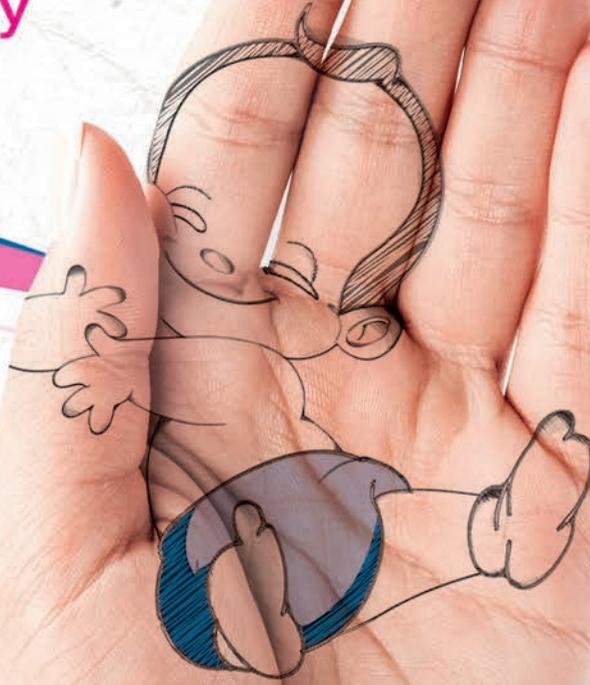


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