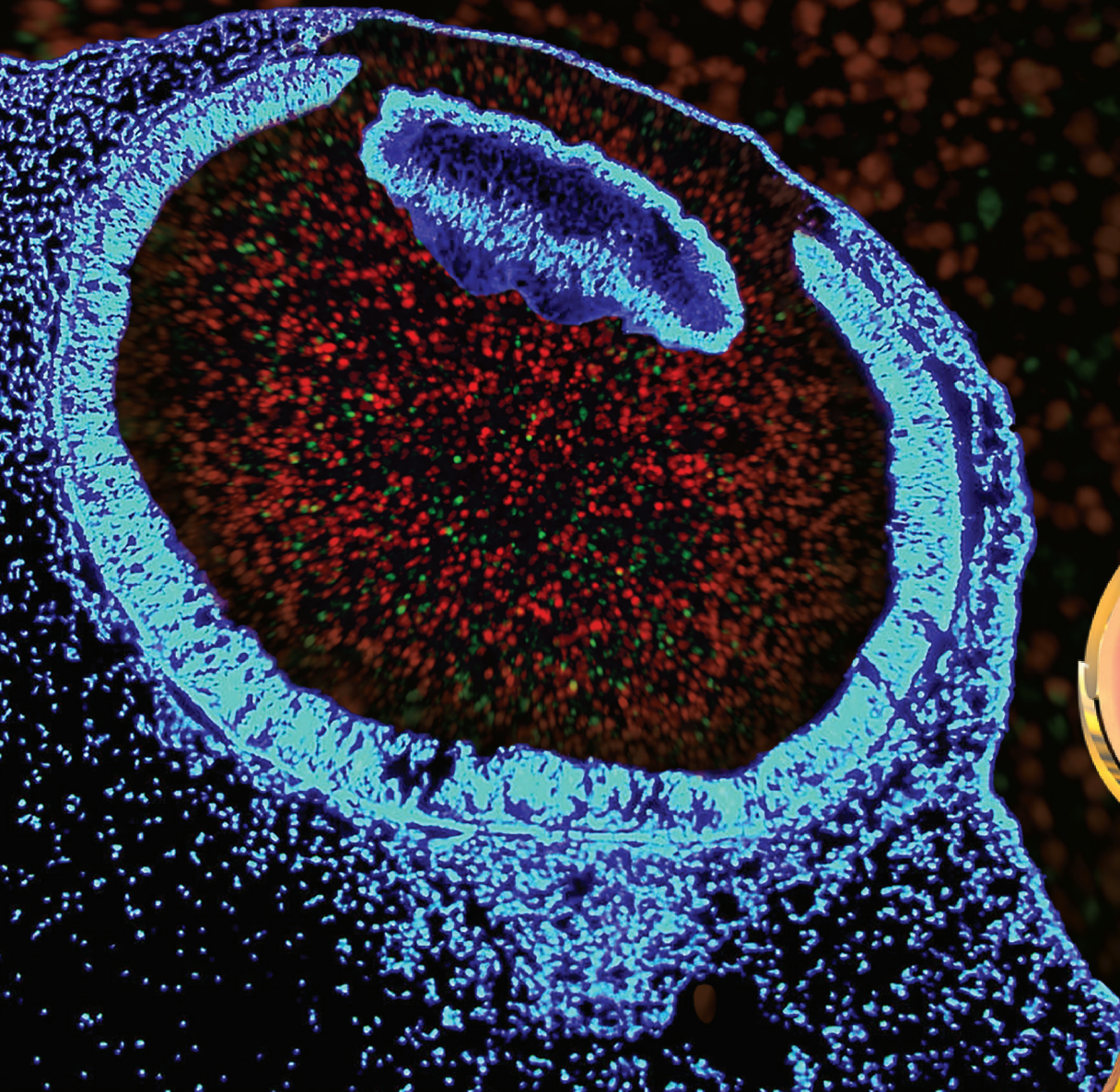


ROYAN INSTITUTE

THE TWENTY-FOURTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

Reproductive Biomedicine, Stem Cell Biology & Technology



SEPTEMBER 2025

TEHRAN - IRAN

2026

THE TWENTY-FIFTH
ROYAN
INTERNATIONAL
RESEARCH AWARD

The Seventh Kazemi Prize



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In the Name of
GOD

The Twenty-Fourth

ROYAN

INTERNATIONAL RESEARCH AWARD



Dr Saeid Kazemi Ashtiani
The Late Founder of ROYAN Institute





Six-day-old chick embryo
by: Fereshteh Karamali

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and Stem Cell Technologies



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FOREWORD

Dr Ali Montazeri

President of ACECR

The scientific progress of the Islamic Republic of Iran has drawn global attention in recent years. Since its establishment in 1980, the Academic Centre for Education, Culture and Research (ACECR) has prioritized scientific and technological development to ensure that all can benefit from these achievements. Over nearly four decades of activity, ACECR has focused on various fields, including medicine, engineering, agriculture, petrochemistry, culture, and art. Medical and biological activities of ACECR focus on targeted reproductive biomedicine, stem cell biology and technology, regenerative medicine, biotechnology, cancer biology, and herbal medicine, with the goal of translating the knowledge into health services.

Royan Institute, affiliated with ACECR, is one of the most successful centers, having achieved national and international recognition for its scientific accomplishments. Alongside its innovative and dedicated scientists, establishing effective scientific collaborations through the Royan International Award and Congress has been a key factor in Royan's success. Some scientists who have attended previous Royan awards and congresses have described these events in good words, while others have written articles about their collaborative projects with Iranian scientists. I hope the 24th Royan International Research Award will help define new directions in reproductive biomedicine, stem cell biology and technology, regenerative medicine, and biotechnology for the scientific community.

As the president of ACECR, I wish to honor the memory of Dr. Saeid Kazemi Ashtiani, the late founder of the Royan Institute and the visionary behind the Royan International Research Award. I also extend my sincere appreciation to the scientists from around the world who contributed to the award as a referee and projects evaluators, as well as to my colleagues at the Royan Institute—especially Dr. Abdolhossein Shahverdi, the current president of the Royan Institute—for their dedicated efforts in organizing this prestigious award. Finally, I express my sincere congratulations to the award winners and hope we can continue this scientific event in the years to come.





INTRODUCTION

Dr Abdolhossein Shahverdi

Award Chairman and Royan Institute President

Today, I thank Almighty God for helping my colleagues at the Royan Institute, affiliated with ACECR, successfully hold the 24th Royan International Research Award (RIRA) ceremony on September 3, 2025. Let us remember that RIRA was founded by the late president of Royan Institute, Dr. Saeid Kazemi Ashtiani, with the aim of encouraging researchers, appreciating their efforts, and preparing a friendly scientific atmosphere to facilitate the exchange of knowledge and experiences.

Created through the participation of researchers and experts from around the world, this opportunity provides a prestigious scientific platform for exchanging views and thinking together on new scientific topics, and our country's researchers also find an opportunity to present their latest scientific activities and achievements. We are convinced like previous RIRAs, these interactions have led to the implementation of collaborative projects and publication of joint articles in influential international journals and forums. Such connections suggest that the knowledge and expertise of researchers from our country are also being recognized and contributing to international scientific advancements in a way that we witness their efforts and achievements within our borders have elevated our nation's scientific standing on the global stages.

By organizing RIRA, Royan Institute strives to boost the motivation of young minds in order to enhance their efforts to conduct scientific research and to establish and sustain a distinguished scientific position, especially in biomedicine, at the international level.

We are excited to host researchers worldwide at Royan International Congress annually alongside the RIRA every September. Indeed, we hope these scientific meetings will lead to solutions that reduce the pain and suffering experienced by society and ultimately enable us to contribute effectively to addressing the challenges.

At the 24th RIRA, research submissions from leading countries in Reproductive Biomedicine, Stem Cell Biology, and Technology were sent to the secretariat. The bedrock of national and international winner selection was the evaluations of highly respected and influential reviewers within the scientific community. Finally, the winners were chosen by the scientific board of the Royan Institute, with assistance from some of reviewers and were introduced to the scientific community.

I would like to take this opportunity to thank all the scientific and executive committee members of RIRA who worked tirelessly to support it, but with little visibility. Finally, while I dedicate my heartfelt congratulations to the winners whose talent and perseverance have shone nationally and internationally today, I am specifically grateful for Dr. Afsharian's dedication to this matter. I hope like other scientific movements, this one will contribute to the development of new interactions, the successful exchange of ideas, and stronger connections and collaborations within the scientific community.





ROYAN AWARD ROYAN AWARD

Royan International Research Award (RIRA) was established by the late director of Royan Institute, Dr. Saeid Kazemi Ashtiani, with the aim of encouraging researchers, recognizing their efforts, and preparing a collaborative scientific environment for the exchange of knowledge and experiences. Dr. Kazemi had wonderful ideas to unite researchers and motivate them to enhance their efforts and conduct high-level research through this award. The staff lost their beloved director in January 2006 due to a heart attack. May he rest in peace.

This annual award continues to grow in prestige each year, enhancing both the scientific quality and the number of submitted papers. The research papers are evaluated by the award's national and international jury board, to whom we extend our sincere thanks. Each year, prominent researchers who have made outstanding contributions to solving problems in the fields of reproduction and stem cells are recognized, honored, and rewarded.

Comparing research across different fields is challenging, and identifying the best studies—given the variations in methods, implementations, and results—is almost impossible. Therefore, starting from the eighth RIRA, the same prizes have been awarded to winners in various fields of reproductive biomedicine and stem cell research, including female infertility, ethics, andrology, embryology, reproductive imaging, reproductive genetics, stem cell biology and technology, regenerative medicine, and biotechnology. Since the 20th RIRA, the procedure for announcing the awardees has been revised. Under this new format, each year one or two laureates are selected in the field of stem cell research, and one or two laureates are recognized in the field of reproductive biomedicine. This change was introduced to place greater emphasis on Royan's core areas of research and to highlight outstanding scientific achievements in these two fundamental disciplines.

Nomination and Selection Procedures for the Award

The submitted research articles are categorized into two scientific groups: reproductive biomedicine and stem cell biology and technology. Each article is ranked based on its relevance, impact factor, and innovation score. After sorting, each scientific group selects its nominees and sends them to national and international referees for evaluation.

Each referee qualitatively evaluates research articles related to their field of interest using a Likert scale based on the following criteria:

- Relevance to the award categories
- Creativity and innovation
- Methodology and research design
- Problem solving
- Applicability to humans

The evaluation of nominees by the juries is reviewed by the institute's scientific board. Ultimately, international and national winners are selected and invited to present their research at the Royan Twin Congress on Reproductive Biomedicine and Stem Cell Biology and Technology, held annually in August or September. Winners receive their prizes during the award ceremony.

Note: Winners are required to attend the ceremony and present their research articles at the congress.





Previous Awards

The First

ROYAN

International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



1



September 2000

Received Papers: 72

The **Twenty-Fourth** ROYAN
International Research Award

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:** **Wei-hau Wang**, USA
Spindle Observation in Living Human Eggs with Polarized 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



**ROYAN
Institute**

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The Second

ROYAN



International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



2



September 2001

Received Papers: 78



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
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2002

Received Papers: 212



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

Special Winner:

- **V. I. Sodestrom- Anttila, Finland**
Embryo Donation-Outcome & Attitude Among Embryo Donors & Recipient



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The Fourth

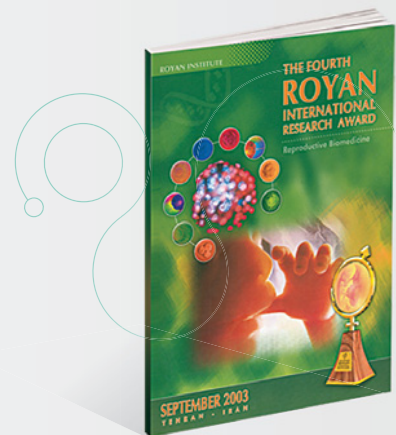
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International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2003

Received Papers: 222



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
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2004

Received Papers: 199



International Winners:

- **Second Place:** **Alfonso Guiterrez-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



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The Sixth

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International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2005

Received Papers: 198



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 Zolghadri**
Pregnancy Outcome Following Laparoscopic Tubal Ligation of Hydrosalpinx Tube in Patients with Early Recurrent Abortion





The Seventh

ROYAN

International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2006

Received Papers: 221



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
Apoptosis of Ejaculated Human Sperm Is Induced by Co-Incubation with Chlamydia Trachomatis Lipopolysaccharide
- **Fourth Place:** **Lone Schmidt**, Denmark
Does Infertility Cause Marital Benefit? An Epidemiological Study of 2250 Women and Men in Fertility Treatment
- **Fifth Place:** **Louis Chukwuemeka Ajonuma**, Hong Kong
Molecular and Cellular Mechanisms Underlying Abnormal Fluid Formation in the Female Reproductive Tract: The Critical Role of Cystic Fibrosis Transmembrane Conductance Regulators

Iranian Winners:

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



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The Eighth

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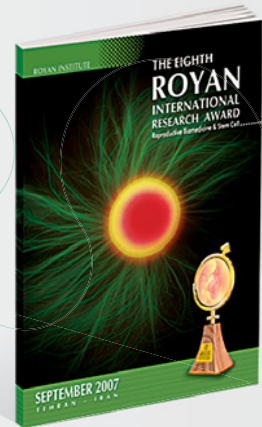
International Research Award

Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2007



Received Papers: 248

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 genetic 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





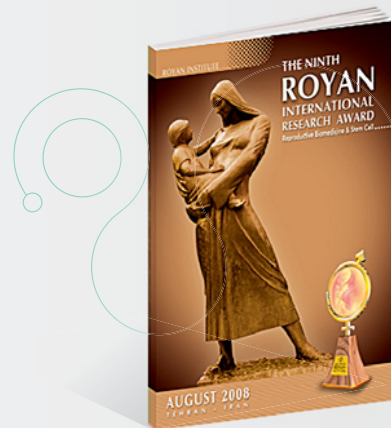
The Ninth

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International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2008

Received Papers: 202



International Winners:

Best research project in stem cell field

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

Best research project in reproductive genetic 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



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The Tenth

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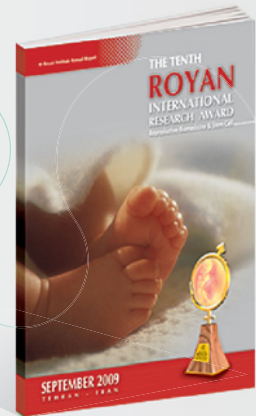


International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2009



Received Papers: 253



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 genetic 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

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International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2010



Received Papers: 358



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 genetic field

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

Best research project in embryology field

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

Iranian Winners:

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





The Twelfth

ROYAN



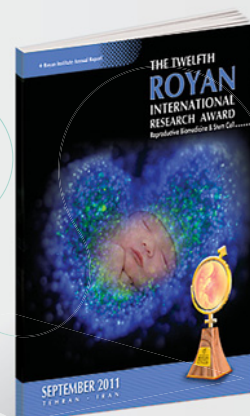
International Research Award

Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2011



Received Papers: 280



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 genetic 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
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2012



Received Papers: 169



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 infertility 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 genetic 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



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The Fourteenth

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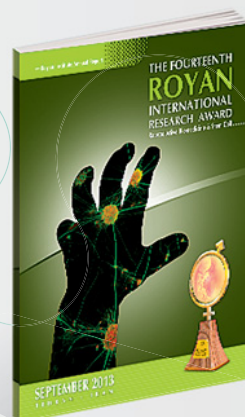
International Research Award

Reproductive Biomedicine, Stem Cell
Biology & Technology



14

September 2013



Received Papers: 206



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 genetic & 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
- **Malek Hossein Asadi**
OCT4B1, A Novel Spliced Variant of OCT4, Is Highly Expressed in Gastric Cancer and Acts as an Antiapoptotic Factor
- **Hossein Mozdarani**
Genome Instability and DNA Damage in Male Somatic and Germ Cells Expressed as Chromosomal Microdeletion and Aneuploidy Is a Major Cause of Male Infertility
- **Armin Towhidi**
Omega-3 Fatty Acids Accompanied with A-Tocopherol Improved Fresh and Post-thaw Sperm Quality in Ruminants





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International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2014



Received Papers: 222



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 genetic 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**
The Augmented BMP Pluripotency Pathway via TGF- β Suppression Maintains the Ground State of Embryonic Stem Cells Self-Renewal
- **Rouhollah Fathi**
Optimal Strategy Toward Fertility Preservation: *in vivo* and *in vitro* Post-thaw Options in Gamete, Embryo and Ovarian Tissue Cryostorage



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The Sixteenth

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International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2015



Received Papers: 204



International Winners:

Best research project in female infertility field

- **Geetanjali Sachdeva**, India
Endometrial Secretome and Its Role in Uterine Functions

Best research project in embryology field

- **Priyanka Parte**, India
Tubulin Reversible Acetylation – Driving the Moves and the Moves Behind the Drive

Best research project in biotechnology field

- **Zhang**, USA
Identifying and Overcoming an Epigenetic Barrier for SCNT Reprogramming

Best research project in reproductive genetic field

- **Masoud Zamani Esteki**, Belgium
Concurrent Whole-Genome Haplotyping and Copy Number Profiling of Single Cells

Best research project in stem cell biology and technology field

- **Guoliang Xu**, China
DNA Oxidation Towards Totipotency in Mammalian Development

Iranian Winners:

- **Maryam Shahhoseini**
Expression Profile of Macrophage Migration Inhibitory Factor (MIF) Signaling Pathway as a Potential Biomarker in Pathophysiology of Endometriosis
- **Morteza Mahmoudi**
Bioinspired Substrates Direct the Fate of Stem Cells





The Seventeenth

ROYAN

International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2016



Received Papers: 175



International Winners:

Best research project in biotechnology field

- **Jianguo Zhao**, China
High Efficient Genome Editing in Pigs for Making Human Disease Models

Best research project in embryology field

- **Peter Koopman**, Australia
Validation of Retinoic Acid as the Master Inducer of Meiosis in Fetal Germ Cells

Best research project in regenerative medicine field

- **Mohammad Sharif Tabebordbar**, USA
In vivo DMD Gene Editing in Muscles and Muscle Stem Cells of Dystrophic Mice

Best research project in reproductive genetic field

- **Miguel Ramalho-Santos**, USA
Hira-Mediated H3.3 Incorporation Is Required for DNA Replication and Ribosomal RNA Transcription in the Mouse Zygote

Best research project in stem cell biology and technology field

- **Xiaohua Shen**, China
Cis-regulatory Roles of lncRNAs in Transcription Regulation and Stem Cell Differentiation

Iranian Winners:

- **Mohsen Sharafi**
Optimization of Domestic Animal Sperm Freezing Using Novel Plant-Origin Cryopreservation Media
- **Anahita Mohseni Meybodi**
Beneficial Application of Molecular Cytogenetics in Delineation of Chromosomal Abnormalities Involved in Male Infertility: From Rare to Care
- **Kamran Ghaedi**
Utilization of Pioglitazone as a Novel Approach to Increase the Colony Formation Efficiency of Individualized Human Pluripotent Stem Cells





The Eighteenth

ROYAN



International Research Award

Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2017



Received Papers: 239



International Winners:

Best research project in stem cell biology and technology field

- **Thomas Braun**, Germany
Compaction of Chromatin Seals Quiescence of Muscle Stem Cells

Best research project in embryology field

- **David Greening**, Australia
Exosomes: A New Paradigm in Embryo-Maternal Cross-Talk for Successful Implantation

Best research project in regenerative medicine field

- **Riccardo Fodde**, Neatherlands
Diet, Inflammation, and Stem Cells: Trading off Regenerative Response with Cancer Risk

Best research project in reproductive genetic field

- **Kaei Nasu**, Japan
Roles of Aberrantly Expressed microRNAs in Endometriosis

Best research project in female infertility field

- **Khaleque Khan**, Japan
Molecular Detection of Intrauterine Microbial Colonization in women with Endometriosis

Iranian Winners:

- **Mahnaz Ashrafi**
Assisted Reproductive Outcomes in Women with Different Polycystic Ovary Syndrome Phenotypes: The Predictive Value of Anti-Müllerian Hormone
- **Fereshteh Esfandiari**
in vitro Generation of Meiosis-Competent Germ Cells from Embryonic Stem Cells by Engineering the Delivery of BMP4
- **Mahdi Sheikh**
Granulocyte Colony Stimulating Factor in Repeated IVF Failure: A Randomized Trial
- **Hossein Ghanbarian**
RNA-Directed Programming of Embryonic Stem Cell
- **Kambiz Gilani**
Untargeted Metabolomic Profiling of Seminal Plasma in Non-obstructive Azoospermia Men: A Non-invasive Detection of Spermatogenesis





The Nineteenth

ROYAN

International Research Award

Reproductive Biomedicine, Stem Cell
Biology & Technology



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August 2018



Received Papers: 191



International Winners:

Best research project in stem cell biology and technology field

- **Saverio Bellusci**, Germany
Two-Way Conversion Between Lipogenic and Myogenic Fibroblastic Phenotypes Marks the Progression and Resolution of Lung Fibrosis

Best research project in embryology & andrology fields

- **Reza Nosrati**, Australia
Microfluidics for Male Fertility

Best research projects in reproductive genetic field

- **Pradeep Kumar**, India (share Winner)
Epigenetic Regulation of Coding and Non-coding RNA Expression During the 1st Wave of Spermatogenesis
- **Amir Amiri-Yekta**, Iran (Share Winner)
Genetics and Molecular Characterization of the Multiple Morphological Abnormalities of the Sperm Flagella (MMAF) Syndrome

Best research project in female infertility field

- **Teresa Kaye Woodruff**, USA
A Bioprosthetic Ovary Created Using 3D Printed Microporous Scaffolds Restores Ovarian Function in Sterilized Mice

Best research project in biotechnology field

- **Ali Fouladi Nashta**, UK
Impact of Sperm Hyaluronidase and VLMWHA on Sheep Blastocyst Formation *in vitro*, Viability After Cryopreservation and Pregnancy Rate After Embryo Transfer

Iranian Winners:

- **Sarah Rajabi**
Bioengineering of a Humanized Heart by Seeding of hiPSC-Derived Cardiovascular Progenitor Cells into Growth Factor-Tethered Rat Heart Matrix
- **Mazdak Razi**
Antioxidant, Anti-inflammatory and Testosterone Therapy Reinforces Spermatogonial Stem Cells Self-Renewal in Experimentally-Induced Varicocele; Possible Mechanisms



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The Twentieth

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International Research Award
Reproductive Biomedicine, Stem Cell
Biology & Technology



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August 2019



Received Papers: 67



International Winner:

Best research project in Reproductive Biomedicine field

- **Jemma Evans**, Australia
The Negative Impact of Obesity Associated Advanced Glycation End Products on Female Fertility

Iranian Winner:

- **Mehdi Totonchi**
Application of Genomic Studies in Uncovering Sperm Defects Mechanisms



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The Twenty-Frist

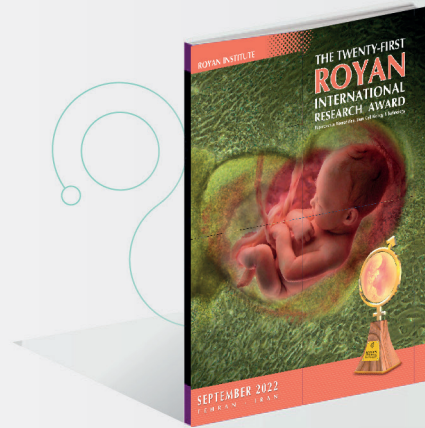
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International Research Award
Reproductive Biomedicine, Stem Cell
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September 2022



National Winners:

Stem Cell Biology and Technology

- **Mehdi Jaymand**
Electrically Conductive Scaffolds for Tissue Engineering: Advantages, Challenges, and Perspectives
- **Iman Shabani**
Development of Bioactive Dopants to Design PANI-Based Conductive Scaffolds for Tissue Engineering Applications

Reproductive Biomedicine

- **Marziyeh Tavalaei**
Could Artificial Oocyte Activation Following ICSI Improve Fertilization and Pregnancy in Couples with Male Factor Infertility

Selected Iranian Scientist

Stem Cell Biology and Technology

- **Omid Mashinchian**, Switzerland
An Engineered Multicellular Stem Cell Niche for Studying Disease, Aging and Regeneration

Reproductive Biomedicine

- **Ali Honaramooz**, Canada
The Application of Animal Models in Preservation of Male Fertility





The Twenty-Second

ROYAN



International Research Award

Reproductive Biomedicine, Stem Cell
Biology & Technology



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September 2023



National Prominent Senior Scientists

Stem Cell Biology and Technology

- **Seyed Ali Malek-Hosseini**

Biotechnology

- **Fereidoun Mahboudi**

Reproductive Biomedicine

- **Abbas Aflatoonian**

National Prominent Junior Scientists

Stem Cell Biology and Technology

- **Seyed Ehsan Enderami**

Reproductive Biomedicine

- **Amir Fattahi**

Biotechnology

- **Esmaeil Mirzaie**





The Twenty-Third

ROYAN

International Research Award
The Sixth Kazemi Prize



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September 2024



Kazemi Prize Winners

- **Thomas Braun**, Germany
Requirements of Stem Cell-Mediated Skeletal Muscle Regeneration
- **Nikolas Rivron**, Austria
Blastoids: Modeling Blastocyst Genesis and Implantation with Stem Cells



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THE TWENTY-FOURTH

ROYAN

INTERNATIONAL
RESEARCH AWARD





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2.	Ajdary, Marziyeh	Iran	Investigation of HSD3B, StAR, CYP11A1 Proteins in Plasma Levels of Endometriosis Patients Treated with Dienogest
3.	Arjmand, Fateme	Iran	Evaluation of the Effects of Extracellular Vesicles Derived from Adipose Tissue Mesenchymal Stem Cells on a Mouse Model of Primary Ovarian Insufficiency (POI): Histology, and the Expression of Key Genes in the Folliculogenesis Process
4.	Attar, Armin	Iran	Prevention of Acute Myocardial Infarction-Induced Heart Failure by Intracoronary Infusion of Mesenchymal Stem Cells: A Phase III Randomized Clinical Trial (PREVENT-TAHA8)
5.	Boiani, Michele	Germany	New Facets of Zona Pellucida(ZP) Proteins: Called Oocyte-Specific, Yet Produced by the Preimplantation Embryo and Needed for Blastocyst Formation
6.	Daemi, Hamed	Iran	Sulfated Alginate-Based Scaffolds for Engineering of Soft Tissues
7.	Dahan, Michael	Canada	The Role of PCOS on Pregnancy Complications
8.	Deneke, Victoria	Austria	A Conserved Fertilization Complex Bridges Sperm and Egg in Vertebrates
9.	Ebrahimi Warkiani, Majid	Australia	AI-Powered Solutions for Male Infertility
10.	Esmailivand, Masoumeh	Iran	MicroRNAs in the Blastocoel Fluid as Accessible Indicators of Chromosomal Normality
11.	Fathi, Helia	Iran	Investigating the Effect of sumatriptan on Spermatogenesis, Testosterone Levels and Oxidative Stress Factors in NMRI Male Rats
12.	Fesahat, Farzaneh	Iran	Modulation of NRF2 and CYP24A1 Pathways by Hookah Smoke: Implications for Male Reproductive Health
13.	Firouzabadi, Amir Masoud	Iran	Possible Impact of Human β -defensin 1 on Sperm Motility in Infertile Men with Abnormal Sperm Parameters
14.	Fodde, Riccardo	Netherlands	Western Lifestyles, Metaflammation, and the Cell-of-Origin of Colon Cancer
15.	FRUNGERI, MONICA	Argentina	Testicular Aging: Impact of Melatonin on the Inflammatory-Oxidative Status
16.	FRUNGERI, MONICA	Argentina	Impact of COVID-19 on Sperm and the Seminal Fluid
17.	Ghanian, Mohammad Hossein	Iran	Earlier Detection of Alzheimer's Disease Based on a Novel Biomarker cis P-tau by a Label-Free Electrochemical Immunosensor





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18.	govahi, azam	Iran	Changes in the Transcriptomic Profile of Cumulus Cells Under the Influence of Cumulus-Oocytes Complex Pre-Incubation
19.	govahi, azam	Iran	Study of CGRP and ENA-78 Gene Expression and Related MiRNAs in Patients with Endometriosis
20.	Haddadi, Parinaz	Iran	Induction of Experimentally Induced Mouse AD Model
21.	Haddadi, Parinaz	Iran	Evaluated of the Effect of Astrocytes-Derived Exosome on Neurogenesis by Experimentally Induced Mouse AD Model
22.	Haddadi, Parinaz	Iran	Induction of Experimentally Induced Mouse AD Model
23.	Hadinedoushan, Hossein	Iran	The Role of Inflammasome Dysregulation in Obstructive and Non-obstructive Azoospermia: A Comparative Molecular Analysis of Blood, Tissue, and Seminal Plasma
24.	Hallak, Jorge	Brasil	A Novel Role for the Sperm Cell in Immunity: Discovery of Sperm DNA-Extracellular Trap-Like Structures (SETs-L) Beyond Reproduction
25.	Hallak, Jorge	Brasil	Transmission Electron Microscopy Reveals the Presence of SARS-CoV-2 in Human Spermatozoa Associated with an ETosis-Like Response
26.	Halvaei, Iman	Iran	Evaluation of the Effect of Lecithin and Nanolecithin in repairing membrane Damage, Maintaining Membrane Integrity, and Improving Human Sperm Function in the Freezing–Thawing Process
27.	harimi, samaneh	Iran	Hsa-miR-15b-5p/miR-195-5p Controls Osteogenic Differentiation of Human Adipose-Derived Mesenchymal Stem Cells Through Regulating Indian Hedgehog Expression
28.	Heidari Khoei, Heidar	Austria	Stem Cell-Based Human Embryo Model (Human Blastoid) as a Tool for Understanding Early Embryogenesis
29.	Heidari Khoei, Heidar	Austria	The Role of mTOR Signaling in Human Blastocyst development and Implantation
30.	Horta Nunez, Fabrizio	Australia	Creating A Transformative Strategy for Infertility Treatments By Assessing Gamete And Embryo Metabolism Via Novel Non-Invasive Metabolic Imaging, Lab On-A-Chip & Artificial Intelligence Technologies
31.	Hosseini, Seyed Amir	United Kingdom	Perturbing LSD1 and WNT rewires transcription to synergistically induce AML differentiation
32.	Hosseini, Kobra	Iran	Dynamic Ovarian Markers for Predicting ART Success: A Systematic Review and Meta-Analysis
33.	Ibrahim, Abubakar	Malaysia	Design Placentation: Elaborating the Mechanism of Peri-Implantation Sexual Intercourse and Oxidative Stress: A Randomised Controlled Trial



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34.	Karimi, Mahdi	Iran	Mechanism and Antibacterial Synergies of Poly(Dabco-BBAC) Nanoparticles Against Multi-Drug Resistant Pseudomonas Aeruginosa Isolates from Human Burns
35.	Kashir, Junaid	United Arab Emirates	The Mammalian Sperm Factor Phospholipase C Zeta Is Critical for Early Embryo Division and Pregnancy in Humans and Mice
36.	Mansouri, Kamran	Iran	Human Placental Mesenchymal Stromal Cell-Derived Small Extracellular Vesicles as a Treatment for Severe COVID-19: A Double-Blind Randomized Controlled Clinical Trial
37.	Mansouri, Kamran	Iran	Improvement in the Clinical Manifestations of Interstitial Lung Disease Following Treatment with Placental Mesenchymal Stromal Cell Extracellular Vesicles in a Patient with Systemic Sclerosis: A Case Report
38.	Mansouri, Kamran	Iran	Treatment of Persistent Chemotherapy-Induced Hair Loss (Alopecia) with Human Mesenchymal Stromal Cells Exosome Enriched Extracellular Vesicles: A Case Report
39.	Mirsanei, Jamileh sadat	Iran	Mesenchymal Stem Cell-Derived Extracellular Vesicles Restore Spermatogenesis in Busulfan-Induced Azoospermia
40.	MirzaKarimi, Zahra	Iran	The Effect of Aframomum Malagueta Extract on the Health of Sperm Genetic Material in Asthenospermic Patients
41.	Moghadassali, Reza	Iran	Enhancing Maturity in 3D Kidney Micro-Tissues Through Clonogenic Cell Combinations and Endothelial Integration
42.	Moghadassali, Reza	Iran	Enriched Human Embryonic Stem Cells-Derived CD133 ⁺ , CD24 ⁺ Renal Progenitors Engraft and Restore Function in a Gentamicin-Induced Kidney Injury in Mice
43.	Moghassemi, Saeid	Belgium	ex vivo purging of cancer cells from Ovarian Tissue Using Photodynamic Therapy: A Novel Strategy to Restore Fertility in Leukemia Patients
44.	momen, razieh	Iran	Magnetic Melamine Cross-Linked Polystyrene-alt-Malic Anhydride Copolymer: Synthesis, Characterization, Paclitaxel delivery, Cytotoxic Effects on Human Ovarian and Breast Cancer Cells
45.	Pluchino, Stefano	United Kingdom	Early-Stage Brain Stem Cell Therapy for Treating Progressive Multiple Sclerosis
46.	Pluchino, Stefano	United Kingdom	Patient Stem Cell Models of Multiple Sclerosis
47.	Rasouli-Saravani, Ashkan	Iran	Effects of miR-29-Enriched Amniotic Fluid EVs on Fibrosis, Intrauterine adhesions, and the rate of embryo Implantation in Asherman Syndrome





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49.	Sadeghi Abandansari, Hamid	Iran	Topical Administration of Mucoadhesive Liposomes-Epoetin- β for Targeting the Ocular Posterior Segment
50.	Sadeghi Abandansari, Hamid	Iran	Switchable PAMAM Megamers for Deep Tumor Penetration and Enhanced Cell Uptake
51.	Sahab Negah, Sajad	Iran	Nano-scaffold Containing Functional Motif of Stromal Cell-Derived Factor 1 Enhances Neural Stem Cell Behavior and Synaptogenesis in Traumatic Brain Injury
52.	Seyed Hosseini, Parsa	Iran	Reporting Binding Process of Atropine to Human Serum Albumin
53.	Sheibak, Nadia	Iran	Evaluation of Microfluidic Chip Efficiency for Human Sperm Sorting and Comparison of the Resulting Sperm Quality with Density Gradient Centrifugation and Swim-Up Methods in Men with Normal and Abnormal Sperm Parameters
54.	Tehrani, Fahimeh	Iran	Association Between Anti-Mullerian Hormone Levels and Age in Women with Endometriosis: Insights from a Population-Based Study
55.	Tehrani, Fahimeh	Iran	Elucidating the Genetic Architecture of Early Menopause in Tehran Cardiometabolic Genetic Study
56.	Towhidi, Armin	Iran	Application of Nanotechnology in Sperm Cryopreservation: Lecithin Ultrastructures
57.	Vahidi, Bahman	Iran	In Silico Analysis of a Parallel Plate Bioreactor to Reveal Effects of Oscillatory Flow on Stem Cells for Bone Tissue Engineering Applications
58.	Vosough, Massoud	Iran	MiR-29a-Laden Extracellular Vesicles Efficiently Induced Apoptosis Through Autophagy Blockage in HCC Cells
59.	Winuthayanon, Wipawee	United States	Progesterone Signaling in Oviductal Epithelial Cells Modulates the Immune Response to Support Preimplantation Embryonic Development
60.	Yadav, Savita	India	Deciphering the Male Contribution to Idiopathic Recurrent Pregnancy Loss: Proteomic and microRNA Signatures in Human Spermatozoa
61.	Zamani Esteki, Masoud	Netherlands	Intelligent and Non-invasive Embryo Selection: A New Paradigm in Assisted Reproduction to Enhance Embryo Selection
62.	赵, 涵	China	Genetic Aspects of Infertility and Its Treatment





2025 International Winner

Stem Cell Biology and Technology

Heidar Heidari Khoei, DVM, PhD

heidarheidari@yahoo.com

 Austria



Dr. Heidari Khoei is a reproductive biologist and embryologist whose research focuses on early human development, particularly self-organization, lineage specification, and embryo–endometrium interactions. Using advanced stem cell-based models such as human blastoids, he has uncovered human-specific developmental mechanisms previously inaccessible, with first-author publications in leading journals including *Nature*, *Cell*, and *Nature Protocols*. He received his Ph.D. in Reproductive Biology with highest distinction from Shahid Beheshti University of Medical Sciences and Royan Institute, and is currently a postdoctoral fellow in Nicolas Rivron's lab at the Institute of Molecular Biotechnology (IMBA), Vienna. His work has been recognized with prestigious fellowships such as the Marie Skłodowska-Curie and Lise Meitner awards, and he is a co-inventor on a European patent for generating blastocyst-like structures. His long-term aim is to bridge developmental biology and translational science to advance reproductive health.

Stem Cell-Based Human Embryo Model (Human Blastoid) as a Tool for Understanding Early Embryogenesis

Objective/Background :

Human early embryonic development remains difficult to study due to ethical and technical limitations. To address this, we developed a stem cell-based model of the human blastocyst, termed blastoids, which closely mimic preimplantation embryos in morphology, lineage specification, and implantation capacity. These models provide an ethical and scalable platform for studying fundamental developmental processes. In this study, we leveraged human blastoids to investigate the role of the mechanistic target of rapamycin (mTOR) pathway in regulating blastocyst dormancy and implantation potential. Understanding how mTOR signaling modulates early embryonic states could lead to improved fertility treatments and embryo preservation strategies.

Materials & Methods :

We generated human blastoids from naïve pluripotent stem cells (hPSCs) using a chemically defined protocol that promotes self-organization into trophectoderm (TE), epiblast (EPI), and primitive endoderm (PrE) analogs. These structures were then subjected to pharmacological mTOR inhibition to induce a putative dormant state. We characterized the effects of mTOR suppression on blastoid growth, transcriptional dynamics, metabolic activity, and implantation capacity using single-cell RNA sequencing, immunofluorescence, and an in vitro implantation assay with hormonally primed endometrial organoids.

RESULTS:

Blastoids efficiently recapitulated early blastocyst development, displaying characteristic cystic structures, inner cell mass (ICM)-like clusters, and TE monolayers. Immunostaining and transcriptomic profiling confirmed that blastoids followed a developmental trajectory comparable to natural blastocysts, with sequential emergence of TE and EPI, followed by PrE differentiation. Functionally, blastoids exhibited the ability to attach to and interact with hormonally primed endometrial cells, modeling early implantation dynamics.

Upon mTOR inhibition, blastoids exhibited a reversible dormancy-like state, characterized by arrested growth, reduced metabolic activity, and delayed lineage progression. While dormant blastoids retained lineage-specific identities, they displayed impaired polar trophectoderm (pTE) maturation, which is crucial for implantation. Notably, when mTOR inhibition was lifted, blastoids reactivated their developmental program, resuming growth, metabolic activity, and restoring their implantation potential. Transcriptomic analysis revealed that mTOR-inhibited blastoids shared molecular signatures with naturally occurring diapause embryos in other mammals, supporting the hypothesis that early human embryos may possess an intrinsic capacity for dormancy.

CONCLUSION:

This study demonstrates that stem cell-derived blastoids provide a powerful model to investigate key regulatory pathways in early human development. By modulating mTOR signaling, we reveal an intrinsic ability of human blastoids to enter and exit a dormancy-like state, offering new insights into blastocyst survival mechanisms. These findings have significant implications for enhancing embryo culture conditions in IVF, optimizing embryo preservation, and improving implantation outcomes in ARTs.

Keywords :

Human Blastoids, mTOR Signaling, Blastocyst Dormancy, Early Embryo Development, Assisted Reproduction





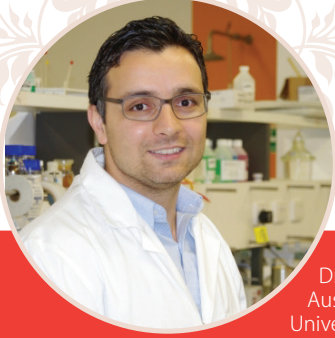
International Winner 2025

Reproductive Biomedicine

Majid Ebrahimi Warkiani, PhD

m.ebrahimi.w@gmail.com

Australia 



Dr. Majid E. Warkiani is a Professor in the School of Biomedical Engineering at UTS, Sydney, Australia. He earned his PhD in Mechanical Engineering from Nanyang Technological University (NTU, Singapore) under the prestigious SINGA scholarship from A*STAR and completed his postdoctoral training at Massachusetts Institute of Technology (MIT, USA). Throughout his career, he has held fellowships from NRF (2014-2012), NHMRC (2022-2018) and Cancer Institute NSW (2025–2022). Currently, his research focuses on microfluidics, organ-on-a-chip technologies, and 3D micro-printing. His outstanding research contributions have earned him several awards, including the Young Tall Poppy Science Award (2019), MIT Technology Review-Innovators under 35 Award (2016), and the Nanyang Young Alumni Award (2017). Since 2010, he has published 200 peer-reviewed scientific articles and book chapters in premier journals such as Nature Protocols, Nature Communications, Nature Reviews Urology, Advanced Materials, Trends in Biotechnology, ACS Nano, and Lab on a Chip. Dr. Warkiani is not only a prominent researcher but also a valued member of various biotech companies' advisory boards. Additionally, he actively contributes to the academic community by serving as a guest editor and reviewer for esteemed journals such as Scientific Reports, Nature Biomedical Engineering, Lab on a Chip, and Micromachines.

AI-Powered Solutions for Male Infertility

Objective/Background :

Male infertility is a rising global health issue, with sperm counts declining by over %50 in the last 50 years. Today, male factors contribute to infertility in over half of all cases, with non-obstructive azoospermia (NOA)—the complete absence of sperm in the ejaculate due to testicular failure—being the most severe form. NOA affects up to %20 of infertile men and poses a significant clinical challenge. The current gold-standard treatment, microdissection testicular sperm extraction (mTESE), requires embryologists to manually search testicular tissue under a microscope for hours to locate rare sperm cells. This process is inefficient, error-prone, and mentally taxing, often leading to missed sperm and inaccurate diagnoses.

To address this critical bottleneck in male infertility care, this study investigates the use of an assistive AI tool based on a neural network (CNN) to automate and enhance sperm detection in real time. The system integrates with standard ICSI microscopes to support embryologists by identifying spermatozoa in complex tissue suspensions instantly. By improving speed, accuracy, and throughput, this AI-assisted approach aims to transform the clinical workflow for NOA patients and offer a scalable solution to a growing global reproductive health burden.

To address this critical bottleneck in male infertility care, this study investigates the use of an assistive AI tool based on a neural network (CNN) to automate and enhance sperm detection in real time. The system integrates with standard ICSI microscopes to support embryologists by identifying spermatozoa in complex tissue suspensions instantly. By improving speed, accuracy, and throughput, this AI-assisted approach aims to transform the clinical workflow for NOA patients and offer a scalable solution to a growing global reproductive health burden.

Materials & Methods :

This two-phase proof-of-concept study began with a training phase using eight azoospermic patients (>10,000 sperm images) to provide a variety of surgically collected samples for sperm morphology and debris variation to train a convolutional neural network to identify spermatozoa. Second, side-by-side testing was undertaken on two cohorts of non-obstructive azoospermia patient samples: an embryologist versus the AI identifying all the spermatozoa in the still images (cohort 1, n=4), and a side-by-side test with a simulated clinical deployment of the AI model with an intracytoplasmic sperm injection microscope and the embryologist performing a search with and without the aid of the AI (cohort 2, n=4).

RESULTS:

In cohort 1, the AI model showed an improvement in the time taken to identify all the spermatozoa per field of view ($\times 0.30 \pm 0.02$ 5–10s versus 1.18 ± 36.10 s, $P < 0.0001$) and improved recall (0.81 ± 91.95 versus 1.34 ± 86.52 , $P < 0.001$) compared with an embryologist. From a total of 2660 spermatozoa to find in all the samples combined, 1937 were found by an embryologist and 1997 were found by the AI in less than 1000th of the time. In cohort 2, the AI-aided embryologist took significantly less time per droplet (3.19 ± 98.90 s versus 7.84 ± 168.7 s, $P < 0.0001$) and found 1396 spermatozoa, while 1274 were found without AI, although no significant difference was observed.

CONCLUSION:

AI-powered image analysis has the potential for seamless integration into laboratory workflows, to reduce the time to identify and isolate spermatozoa from surgical sperm samples from hours to minutes, thus increasing success rates from these treatments.

Keywords :

Azoospermia, Male infertility, Microdissection testicular sperm extraction, Spermatozoa, Surgical sperm collection



2025 National Winner

Reproductive Biomedicine

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Iran



Dr. Masoumeh Esmailivand holds a Ph.D. in Reproductive Biology with a research focus on molecular embryology and the diagnostic and therapeutic applications of microRNAs in infertility. She is currently a faculty member in the Department of Obstetrics and Gynecology at Kermanshah University of Medical Sciences and serves as a clinical embryologist at the Infertility Center of Mo'tazedi Hospital. Her main research interests include the role of miRNA biomarkers in embryo selection, the development of non-invasive ART methods, and the molecular regulation of gametes and early embryonic development.

microRNAs in the Blastocoel Fluid as Accessible Indicators of Chromosomal Normality

Objective/Background :

MicroRNAs (miRNAs) derived from the pre-implantation blastocoel fluid (BF) have attracted interest as accessible biomarkers indicative of embryonic health in ongoing IVF cycles. Therefore, we investigated expression levels of some aneuploidy-associated miRNAs and implantation-related mRNAs as predictive markers for embryo chromosomal normality.

Materials & Methods :

In this study, the BF of 25 blastocysts that had been checked for aneuploidy (aneuploid=17 and euploid=8) was aspirated and the expression of 10 miRNAs (miR-20a, miR-30c, miR-661, miR-372, miR-142, miR-191, miR-345, miR-339, miR-141, and miR-27b) and four genes (ERBB4, SELL, ITGB3, ITGAV) were evaluated using real time-PCR.

RESULTS:

Results showed that the levels of miR-661 and miR-20a were significantly higher in the BF of the aneuploid embryos compared to the euploid group ($p = 0.0017$ and 0.004 , respectively). A comparison of the mRNA levels between the aneuploid and euploid groups also demonstrated a significant difference in ITGAV ($p = 0.013$) and SELL ($p = 0.0317$) levels. In the euploid group, a negative correlation was found between ITGB3 and miR-30c ($r = -0.71$, $p = 0.08$), and in the aneuploid group, a positive correlation was found between ERBB4 and miR-345 ($r = 0.71$, $p = 0.02$).

CONCLUSION:

It can be suggested that miR-20a, miR-661, and ITGAV levels of BF could be used as less-invasive biomarkers to evaluate embryonic health. Moreover, aneuploidy-related miRNA levels were associated with levels of genes involved in embryo implantation.

Keywords :

blastocoel fluid, miRNAs, in vitro fertilization, implantation, biomarker





National Winner 2025

Stem Cell Biology and Technology

Hamed Daemi, PhD

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Iran



Dr. Hamed Daemi is an Assistant Professor of Polymer Engineering and head of the Tissue Engineering Group at the Royan Institute, Tehran. He earned his Ph.D. in Polymer Engineering from the Iran Polymer and Petrochemical Institute with highest distinction, focusing on polyurethane and alginate nanostructures for catalytic and biomedical applications.

His research expertise spans polymer chemistry, functional materials, nanocomposites, smart hydrogels, and tissue engineering, with particular emphasis on engineering skin, cartilage, and cardiovascular tissues, as well as developing advanced polymers for drug delivery and wound healing. He has supervised numerous graduate students and has been actively involved in the commercialization of smart polymeric wound dressings and skin substitutes.

Dr. Daemi has published extensively in high-impact journals such as Biomaterials, Materials Today, Carbohydrate Polymers, and RSC Advances. He is the recipient of multiple national and international awards, including the Khwarizmi Young Award and recognition from the Iran Polymer Society and the Royan Institute as a top researcher. His work has also resulted in several patents on alginate-based polyurethanes, green catalysts, and polymeric biomaterials. In addition to his scientific achievements, he has contributed to more than 40 conference presentations and plays an active role in scientific societies, including the Iran Polymer Society and the National Foundation of Exceptional Talents.

Sulfated Alginate-Based Scaffolds for Engineering of Soft Tissues

Objective/Background :

Design and synthesis of sulfated alginate-based engineered constructs including hydrogels, films, and nanofibrous mats are of interest as available, renewable and low-cost biomaterials for engineering of different soft tissues. These constructs could trigger main activities of the cells including cell proliferation, migration, differentiation and also tissue repair. In this regard, our primary focus centers on unraveling the pivotal role of the sulfated alginate as a constituent of scaffolds on cell and tissue behaviors.

Materials & Methods :

The sulfated alginate solely or in combination with other materials has been employed to be evaluated in point of its role on cell activities of different cells including fibroblasts, endothelial cells, macrophages, mesenchymal stem cells, islets and etc. For this aim, sulfated alginate was physically or chemically modified by calcium cations, isocyanate-based or/and vinyl-functionalized polyurethane, methacrylated chitosan, and carbodiimide chemistry. All of the sulfated alginate-based constructs including hydrogels, nanofibrous mats, and microparticles were first both physically and chemically characterized by FTIR, NMR, CHNS elemental analysis, EDX mapping, and etc. After that, different in vitro analyses including cell viability, scratch assay, cell adhesion, hemocompatibility, protein adsorption and ... were performed on resulting engineered constructs. Finally, different in vivo experiments were performed in accordance with the guidelines established by the acquired centers, and histological and immunohistological aspects of the healed tissues were studied.

RESULTS:

Appearance of carboxylate, sulfate and methacrylate functional groups at 1680-1650 cm⁻¹, 1270-1260 cm⁻¹, and 1730-1700 cm⁻¹ confirmed chemical structure of sulfated alginate and its derivatives. Further characterization by NMR spectroscopy and elemental analysis confirmed the successful sulfation, methacrylation, and urea formation in chemical structure of sulfated alginate and final engineered constructs by appearance of the characteristic peaks at 6.2-5.8 ppm and 4.7-4.5 ppm. The results of both indirect and direct MTT assays showed appropriate cytocompatibility for all constructs. In addition, the results of histopathological analyses of engineered constructs as wound dressing, cell carrier and tough hydrogel well showed proper biocompatibility against control samples.

CONCLUSION:

The appearance of deterministic bands, peaks, and required elements and functional groups in chemical structure of these constructs confirmed the chemical structure of proposed biomolecules by abovementioned techniques. The microstructure of the engineered constructs was studied by microscopic instruments like SEM analysis, and the nanofibrous or microporous structure of each construct was approved. Based on the in vitro cytotoxicity experiments, the scaffolds not only showed no cytotoxicity, but the cell growth and migration also dramatically increased by increasing the sulfated alginate content. The ability of prepared constructs as hydrogel to promote wound healing process in diabetic animals, as nanofibrous mats to be used as functional tissue-engineered small-diameter vascular grafts, as double network hydrogel to mitigate fibrosis for long-term glycemic control in diabetic mice, and finally, as microparticle to promote articular cartilage tissue regeneration in rabbits revealed significant role of sulfated alginate as a bioactive semi-synthetic polysaccharide for regeneration of soft tissues.

Keywords :

Sulfated alginate - Tissue Engineering - Soft tissues



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Royan Institute

Royan Institute is a renowned center committed to multidisciplinary, campus-wide integration and collaboration among academic and medical professionals to advance understanding male and female infertility, embryo development, stem cell biology, and biotechnology. Royan Institute provides comprehensive services in infertility treatment, regenerative medicine/cell therapy, recombinant protein production, and the development of biological products.

Royan Institute was established in 1991 by the late Dr. Saeid Kazemi Ashtiani, along with a group of researchers and physicians from the Iran University of Medical Sciences of Academic Center for Education, Culture and Research (ACECR) as an outpatient surgery center providing medical services to infertile couples, as well as conducting research and training in reproductive sciences. In 2002, the institute expanded its research to include stem cell studies, which were subsequently translated into applications in regenerative medicine and cell therapy. After more than three decades, Royan Institute remains dedicated to improving the success rates of infertility treatments, enhancing embryo health, and advancing public health through clinical cell therapy services.

Looking ahead to 2025, the Institute aims to achieve international excellence in research, technology, education, and treatment. It also aspires to be a leading scientific authority in stem cell science, biotechnology, reproductive biomedicine, and regenerative medicine, while making significant contributions to public health.

Mission

The mission of Royan Institute, aligned with the country's comprehensive scientific roadmap and the ACECR development plan, can be categorized into the following aspects:

- Research and development in science and technology, focusing on reproductive biomedicine, stem cells, and biotechnology
- Education and promotion of scientific findings at both national and international levels
- Commercialization of research outcomes to provide services and biological products aimed at addressing the country's specialized needs
- Treatment of infertile patients and difficult-to-treat diseases through the effective application of research findings

Vision

Royan Institute is a center of excellence in research and technology at the international level. It is a pioneer in the development of science, technology, and innovation in biological sciences and is an internationally renowned authority in stem cell science, reproduction, biotechnology, and regenerative medicine. The institute also plays an effective role in improving public health.

Overview of the Institute

- The first IVF childbirth in Tehran (1993)
- The first ICSI childbirth in Tehran (1995)
- Iran's second successful open testicular biopsy to treat severe male infertility (1996)
- The first frozen embryo childbirth in Iran (1996)

- The first ICSI birth using frozen sperm from a gonadectomized man in Iran (1999)
- The first human embryonic stem cell line established in Iran and the region (2003)
- The first PGD childbirth in Iran (2004)
- First use of adult stem cells in the treatment of myocardial infarction (MI) during coronary artery bypass grafting (CABG) in Iran (2004)
- Production of insulin-producing cells from human embryonic stem cells (2004)
- Culture of human limbal stem cells on the chorionic membrane (2004)
- Establishment of the first private cord blood bank in Iran (2005)
- The first IVM-IVF sheep birth in Iran (2006)
- The first cloned sheep birth in Iran (2006)
- Establishment of mouse and human induced pluripotent stem cells (iPS) (2008)
- The first cloned goat birth in Iran (2009)
- A new method for the treatment of Vitiligo by cell transplantation (2009)
- The first transgenic goats birth in Iran (2010)
- The first calves birth from vitrified *in vitro* developed embryos in Iran (2011)
- Establishment of pre-hospital cell therapy (2011)
- Establishment of the Stem Cell Bank (2011)
- The first healthy childbirth 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, an endangered species, in Iran (2015)
- The first auto-transplantation of cryopreserved human ovarian tissue in a cancer patient (2017)
- Establishment of the Faculty of Basic Sciences and Medical Technology at Royan Institute (2018)
- Obtaining the license of producing Kimia-cell in GMP conditions from Iran FDA (2019)
- Producing the transgenic Covidsa mouse for preclinical studies of COVID-19 vaccines (2020)
- Implementing the phase I clinical trial of natural killer cell therapy for pediatric glioblastoma (2021)
- Commercialization of the first cell therapy product in Iran's pharmaceutical market (2022)
- Publication of editorial book entitled "Cartilage from Biology to Biofabrication" by Nature Springer (2023)
- Introducing RoyinSheet and RoyinGraf as the first allogenic cell products in Iran into the country's pharmaceutical portfolio (2024)

Honors

- Honoring the Everlasting Personage Prize, 2004
- Receiving several Razi Research Awards in Medical Science, presented by the Iran Ministry of Health and Medical Education
- Being selected by Iran National Award for Book of the Year, 2009
- Receiving The Islamic Educational, Scientific, and Cultural Organization (ISESCO) Science and Technology Prize, 2010
- Earning the Hippocrates Scientific Prize, 2012
- Winning the UNESCO Prize, 2014
- Winning Allameh Tabatabaei Award, hosted by the Vice Presidency for Science and Technology, the Presidency, and the National Elite Foundation of Iran, 2014
- Earning The World Academy of Sciences (TWAS) Prize, 2019
- Gaining the 32nd Khwarizmi Award, 2019
- Receiving the Mustafa Prize, 2019



- Placing as one of the top research institutes worldwide during the last two decades according to the total number of publications in the field of male infertility and assisted reproductive techniques (ART), 2020
- Being selected as one of the 2020 highlighted research, a chapter book entitled 3D Printing in Dentistry in applications of biomedical engineering in dentistry (by Springer), 2020
- Receiving the health service medal from Tehran Municipality, Health Section, 2021
- Achieving second place among 52 Iranian research institutes, 2022
- Winning Dayong Gao Young Investigator Award, 2022
- Winning the CogX Award at the World Artificial Intelligence and Transformative Technology Festival in England for the Best Artificial Intelligence Product in the Healthcare Sector, 2023
- Introducing four scientists from Royan Institute in the list of the top 2% most cited scientists worldwide for Single Year Impacts, 2023
- Receiving the “Health and Medicine” Certificate at the BRICS Women’s Startups Contest, 2024



Royan Scientific Committee

This committee, as the highest scientific decision-making body of Royan Institute, consists of the institute's president, deputy directors, heads of research institutes, and several academic faculty members from both the research institutes and ACECR.



Goals

- Determining the general policy and developing annual, mid-term, and long-term plans to expand scientific activities at the national and international levels, based on the twenty-year vision of ACECR
- The supervising and evaluating of research and educational activities, as well as the approval of the regulations
- Approving the postgraduate course programs, scientific meetings, congresses, and awards. The Scientific Committee is responsible for making decisions regarding regulations and programs for all international-level events
- Reviewing and approving the institute's annual report on scientific activities
- Verifying the applicants' academic qualifications



Royan Ethics Committee

Ethical Committee of Royan was established in 2003 and consists of ethicists, researchers, medical doctors, religious scholars, epidemiologists, legal experts, and community representatives.

Goals

- Evaluation of research projects at Royan Institute from an Ethical Perspective
- Evaluation of the cases presented by the clinical wards and resolve the ethical and law issues

Main Activities

The activities of this committee focus on two main areas: the Organizational Ethics Committee and the Medical Ethics Committee, which include the following:

- Reviewing and approving projects from research institutes
- Reviewing and approving projects conducted outside the research institutes.
- Handling referrals from the therapeutic departments
- Approving the ethical guidelines for implementation in the therapeutic departments





RESEARCH

Royan Institute for Reproductive Biomedicine

Royan Institute for Reproductive Biomedicine (RI-RB) aims to increase fertility success rates and improve embryo health by conducting research on various aspects of infertility and its treatment, with the vision of enhancing population health. The primary research focus across the five departments of RI-RB includes: optimizing ovarian stimulation protocols; improving conditions for embryo implantation; etiological diagnosis of embryo implantation failures and spontaneous abortions; enhancing sperm quality, count, selection, and isolation methods; evaluating the side effects of cancer treatments on gametes; studying ovarian tissue cryopreservation and *in vitro* culture of ovarian follicles; early diagnosis of fetal anomalies; epigenetic studies of sperm, oocytes, and embryos; pre-implantation genetic diagnosis; assessing environmental and occupational factors affecting reproduction; and investigating the effect of quality-of-life parameters on infertility treatment.

The vision of this institute is to achieve accurate diagnosis and treatment of infertility based on modern reproductive science, leading to healthy newborns in a short period. The institute's mission is to conduct research aimed at improving fertility and increasing pregnancy rates, resulting in healthy live births.



RI-RB Departments

- Embryology
- Endocrinology and Female Infertility
- Male Infertility
- Reproductive Genetics
- Reproductive Imaging

To enhance communication between basic sciences and clinics, six initiatives have been introduced:

- Andrology
- Endometriosis
- Oncofertility
- Polycystic Ovary Syndrome (PCOS)
- Premature Ovarian Failure (POF)
- Recurrent Implantation Failure (RIF) and Recurrent Spontaneous Abortion (RSA)



Embryology Department

Introduction

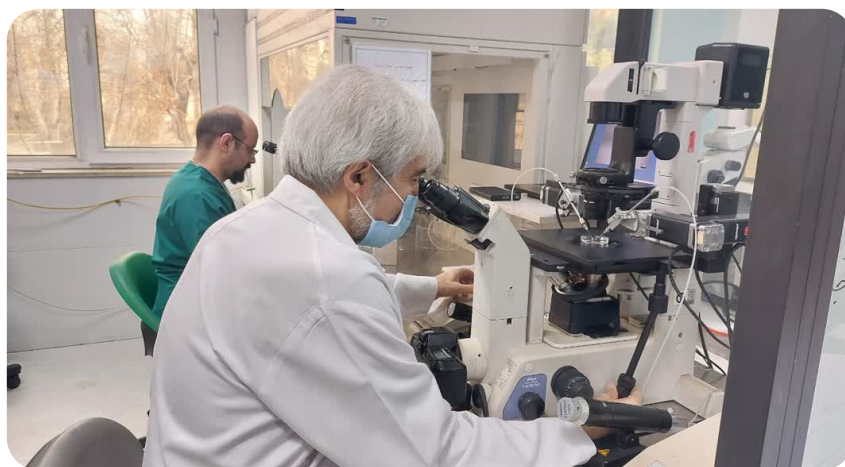
The Department of Embryology was established in 1997. Over the previous decade, foundational descriptions of animal and human experimental studies have emerged in the field of embryology.

Goals

- Increasing the quality of gametes and embryos
- Establishing *in vitro* human follicle culture following ovarian tissue cryopreservation

Main Activities

- Evaluation of the molecular aspects of gamete maturation and embryo development
- Performing embryo co-culture with various types of somatic cells
- *In vitro* maturation of animal and human gametes
- Evaluating the molecular and cellular events of embryo implantation
- Three-dimensional cell culture for designing an endometrial biomodel
- Three-dimensional culture of follicles to obtain high-quality oocytes
- Performing nuclear transfers
- Finding the most effective method for preserving gametes, ovarian and testicular tissues



Selected Articles (2025)

1. Karami N., Taei A., Hassani S.N., Alizadeh N., Eftekhari-Yazdi P., Hassani F. The effects of insulin–transferrin–selenium (ITS) and CHIR99021 on the development of pre-implantation human arrested embryos *in vitro*. Scientific Reports.2025;15(1)
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Endocrinology and Female Infertility Department

Introduction

This department was established in 1994 to study new strategies for the diagnosis and treatment of female infertility and recurrent abortion, with the goal of increasing embryo implantation rates.

Goals

- Improving *in vitro* fertilization (IVF) outcomes
- Providing appropriate clinical guidelines for the treatment of women suffering from endometriosis, recurrent implantation failure, and oncofertility
- Improving methods for oocyte retrieval and embryo implantation
- Increasing pregnancy and live birth rate

Main Activities

- Evaluation and treatment of infertile women
- Developing innovative strategies for diagnosing the causes of female infertility



- Prenatal evaluation
- Planning and conducting annual educational seminars for patients and adolescent girls to increase awareness and knowledge about endometriosis and polycystic ovary syndrome, focusing on prevention of complications and infertility issues
- Organizing training sessions for couples to enhance their quality of life and reduce their stress



Selected Articles (2025)

1. Hafezi M., Arabipoor A., Zareei M., Vesali S., Mostafaei P., Zamani N. The Effect of Dual Trigger on *In Vitro* Fertilization/Intracytoplasmic Sperm Injection Outcomes in Patients with Suboptimal Ovarian Response (POSEIDON Classification Group I): A Randomized Clinical Trial. *International Journal of Fertility and Sterility*. 2025;19(3):251-258.
2. Shamlou N., Zafarani F., Aflatoonian R., Aghajanpour S., Lotfi M., Zolfaghari Z., Chekini Z., Ghaffari F., Kazerouni F. Altered Expression of Interleukin-6, Glycodelin A and Heparin-Binding Epidermal Growth Factor, in The Endometrium of Women with Hydrosalpinx: A Case-Control Study. *International Journal of Fertility and Sterility*. 2025;19(2):157-163.
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8. Jafari K., Tajik N., Moini A., SeyedAlinaghi S., Abiri A. Metabolic mediators of the overweight's effect on infertility in women with polycystic ovary syndrom. *Scientific Reports*. 2025;15(1)

9. Pirooznia P., Meighani E.M., Ghaffari F. Exploring new frontiers in oncofertility preservation: a case of ovarian stimulation during pregnancy. *Journal of Ovarian Research*. 2025;18(1)

10. Irani S., Najafi A., Vesali S., Mashayekhi M., Niknejad F., Ahmadi F. A survey on the frequency of polycystic ovary morphology (PCOM) in infertile patients with septate and arcuate uterine anomalies: a cross-sectional study. *Scientific Reports*. 2025;15(1)

Male Infertility Department

Introduction

This department was established in 2006 and began studying male infertility. Therefore, it is essential to use appropriate diagnostic and therapeutic techniques to study the various aspects of male infertility.

Goals

- Developing new strategies and techniques for the diagnosis and treatment of male infertility
- Improving screening methods to prevent male infertility





Main Activities

- Evaluation and treatment of infertile men
- Determining the etiology of spermatogenesis failure, sperm dysfunction, and ejaculation disorders
- Studying the etiology of abnormal semen parameters

Selected Articles (2025)

1. Kalantari H., Sabbaghian M. Isolated teratospermia in fertile men: a call for reassessment. *F and S Reports*. 2025; 6(1):95
2. Haghpanah A., Ayareh N., Akbarzadeh A., Irani D., Hosseini F., Moghadam F.S., Gilani M.A.S., Shamohammadi I. Differentiating between obstructive and non-obstructive azoospermia: A machine learning-based approach. *BJUI Compass*. 2025; 6(2)
3. Jahangirian J., Jannatifar R., Hafezi M., Amozegar H., Hosseini R., Nasiri N., Mohammadi M., Eftekhari-Yazdi P. Is There an Association between Dyslipidemia and The Risk of Ovarian Hyperstimulation Syndrome in A Population of Non-Obese Polycystic Ovary Syndrome Patients? A Cross-Sectional Study. *International Journal of Fertility and Sterility*. 2025;19(2):193
4. Esmaili V., Alizadeh A., Zendejdel M., Habibi M., Pezeshki A., Dizavi A., Vesali S., Gilani M.A.S., Nahid M., Shahverdi A. Branched-chain and Aromatic Amino Acids in Blood and Seminal Plasma are Associated with Sperm Parameters, A Practice within a Fertility Clinic Considering the Metabolic Syndrome. *Reproductive Sciences*. 2025;32(3):757
5. Jamalirad H., Jajroudi M., Khajehpour B., Sadighi Gilani M.A., Eslami S., Sabbaghian M., Vakili Arki H. AI predictive models and advancements in microdissection testicular sperm extraction for non-obstructive azoospermia: A systematic scoping review. *Human Reproduction Open*. 2025; 2025(1)
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7. Zekri S., Bahiraei R., Ghezelayagh Z., Maghami P., Shahverdi A., Sabbaghian M., Ebrahimi B. Effects of 6-Gingerol Supplementation in Cryopreservation on Human Sperm Parameters, DNA Fragmentation, and Apoptosis Incidence. *Urology Journal*. 2025; 22
8. Dortaj S., Gilani M.A.S., Sabbaghian M. Genetic investigations of SEPTIN12 gene in infertile men with acephalic sperm syndrome. *Gene Reports*. 2025; 38



Reproductive Genetic Department

Introduction

Department of Reproductive Genetics was established in 2003. The primary research focuses of this department include genetic and epigenetic factors that influence fertility, embryo development, and implantation, with an emphasis on translating these findings into clinical applications. Research areas encompass genetic causes of azoospermia, mutations responsible for congenital agenesis of the vas deferens, preimplantation genetic testing (PGT), pharmacogenetics, as well as epigenetic and gene expression profiles during early embryogenesis.

Goals

- Improving embryo implantation rates through preimplantation genetic testing (PGT)
- Assisting physicians in prescribing medication for controlled ovarian stimulation through pharmacogenetics
- Genetic follow-up of newborns conceived through assisted reproductive technology (ART)
- Evaluating candidate genes related to recurrent spontaneous abortion (RSA) in the Iranian population

Main Activities

- Genetic counseling
- Lymphocyte karyotyping
- Karyotyping the stem cell lines after various manipulations
- PGT
- Producing recombinant proteins in collaboration with the Royan Biotechnology Center
- Molecular diagnostic tests include Y-chromosomal microdeletions and specific mutations in candidate genes that may be associated with causes of miscarriage or failed ART





Selected Articles (2025)

1. Beder N., Mirbahari S.N., Belkhelfa M., Mahdizadeh H., Totonchi M. Unmasking the potential: mechanisms of neuroinflammatory modulation by oncolytic viruses in glioblastoma. *Exploration of Targeted Anti Tumor Therapy*. 2025;6
2. Fatemi N., Mirbahari S.N., Tierling S., Sanjabi F., Shahrivari S., AmeliMojarad M., Ameli-mojarad M., Mirzaei Rezaei M., Nobaveh P., Totonchi M., Nazemalhosseini Mojarad E. Emerging Frontiers in Colorectal Cancer Therapy: From Targeted Molecules to Immunomodulatory Breakthroughs and Cell-Based Approaches. *Digestive Diseases and Sciences*. 2025;70(3):919-942
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4. Ziyafati Kafi F., Eslami N., Shekari F., Bazrgar M. Theranostic potential of extracellular vesicles in reproductive tracts: implications for recurrent implantation failure. *Molecular Biology Reports*. 2025;52(1)
5. Sadati S.A., Chekini Z., Shekari F., Hafezi M., Ghaheri A., Shahhoseini M., Moini A., Aflatonian R., Totonchi M., Afsharian P. Expression analysis of plasma extracellular vesicle associated candidate MiRNAs in endometriosis using integrative bioinformatics and experiential data. *Scientific Reports*. 2025;15(1)
6. Rai A., Poh Q.H., Okae H., Arima T., Totonchi M., Greening D.W. Dynamic Proteome Landscape During Preimplantation Human Embryo Development and Trophectoderm Stem Cell-Differentiation. *Proteomics*. 2025;25(15):72-89
7. Zatalian N., Dalman A., Gourabi H. Preventing chemotherapy-induced ovarian damage through PI3K/AKT and Hippo pathway regulation. *Supportive Care in Cancer*. 2025;33(4)
8. Khajehoseini F., Noormohammadi Z., Eftekhari-Yazdi P., Gourabi H., Pazhoomand R., Hosseinishenatal S., Bazrgar M. Correlation among blastocoel fluid DNA level, apoptotic genes expression and preimplantation aneuploidy. *Reproduction and Fertility*. 2025;6(1)
9. Afkari M., Saboori-Darabi S., Shahzadeh Fazeli S.A., Amiri-Yekta A. Male infertility and its ties to next generation sequencing as a new forward path to definite diagnoses. *Gene*. 2025;965
10. Bazrgar M., Khajehoseini F., Eftekhari-Yazdi P., Bakhtiarizadeh M.R., Gourabi H., Saei P., Pazhoomand R., Hosseinishenatal S., Mohammadi R. Aneuploidy-driven gene expression profiling in human blastocysts: insights from RNA-Seq analysis. *Journal of Assisted Reproduction and Genetics*. 2025;42(3):885-896



Reproductive Imaging Department

Introduction

Reproductive Imaging Department was established in 2012 to focus on infertility assessment, obstetric care, and pregnancy evaluation. Imaging techniques performed in this department, such as hysterosalpingography and three-dimensional hysterosonography, have been significant breakthroughs in the diagnosis and management of infertility.

Goals

- Expanding clinical and fundamental research in reproductive imaging.
- Providing modern strategies and enhancing clinical services for infertile couples

Main Activities

- Conducting diagnostic accuracy investigations of imaging modalities, including hysterosalpingography, hysterosonography, and three-dimensional ultrasound
- Fetal screening
- Defining standards for ultrasound measurement charts appropriate for Iranian fetuses
- Providing educational courses in diagnostic ultrasound techniques for andrology and female infertility fellowships



Selected Articles (2025)

1. Pahlavan F., Irani S., Mashayekhi M., Vesali S., Niknejad F., Ahmadi F., Bagheri-Lankarani N. Comparison of *In Vitro* Fertilization Outcomes between Normal and T-Shaped Uteri, Diagnosed by Hysterosalpingography in Women with infertility: A Retrospective Cohort Study. *International Journal of Fertility and Sterility*. 2025; 19(1):24-28
2. Shamlou N., Zafarani F., Aflatoonian R., Aghajanzpour S., Lotfi M., Zolfaghari Z., Chekini Z., Ghaffari F., Kazerouni F. Altered Expression of Interleukin-6, Glycodelin A and Heparin-Binding Epidermal Growth Factor, in The Endometrium of Women with Hydrosalpinx: A Case-Control Study. *International Journal of Fertility and Sterility*. 2025; 19(2):157-163
3. Irani S., Najafi A., Vesali S., Mashayekhi M., Niknejad F., Ahmadi F. A survey on the frequency of polycystic ovary morphology (PCOM) in infertile patients with septate and arcuate uterine anomalies: a cross-sectional study. *Scientific Reports*. 2025; 15(1)



Royan Institute for Stem Cell Biology and Technology

Royan Institute for Stem Cell Biology and Technology (RI-SCBT), formerly known as the Department of Stem Cells, was established in 2002 to advance research in general stem cell biology in Iran. Subsequently, the Department of Stem Cells was promoted to the Institute for Stem Cell Biology and Technology, comprising three departments with multiple research groups. These groups conduct studies in stem cells and developmental biology, regenerative medicine, personalized medicine, cancer medicine, biomedical engineering, and brain and cognitive sciences. The institute is committed to fostering cross-disciplinary partnerships and collaborations among biologists, engineers, and medical professionals to improve health through a comprehensive and coordinated “bench to bedside” approach.

Currently, the institute’s departments are:

- Department of Stem Cells and Developmental Biology
- Department of Cell Engineering
- Department of Regenerative Medicine



Moreover, there are two initiatives in which principal investigators collaborate to conduct research in Cancer Medicine and Biodiscovery.

Both basic research and clinical departments provide significant opportunities for scientific advancement and translational research.

The vision of RI-SCBT is to efficiently translate stem cell research findings into practical treatments for disorders, with the goal of improving health. The mission of RI-SCBT is to generate insights into stem cell biology through basic research and to provide the foundation necessary for developing novel therapies using regenerative medicine.

In addition to conducting research to understand the fundamentals of stem cell biology using a “bench to bedside” approach, this institute also engages in translational research involving experimental models and clinical trials, in collaboration with other clinical research centers.

RI-SCBT is a member of two international initiatives: the Stem Cell Genomic Instability Initiative and the AOHUPO Human Embryonic Stem Cell Membrane Proteome Initiative.



Department of Stem Cells and Developmental Biology

Introduction

This department was established in 2002 to provide a platform for interactions among researchers interested in the biology of stem cells, differentiation, and regeneration.



Goals

Gain knowledge and explore the translation of science in the following disciplines:

- Stem cells
- Stem cell differentiation and transdifferentiation of somatic cells into one another
- Producing transgenic mice by manipulating embryonic stem cells

Main Activities

- Stem cells and developmental biology, including pluripotent stem cells (both embryonic and induced) and adult stem cells
- Stem cell studies in the fields of the nervous system, cardiovascular system, gastrointestinal tract, liver, kidney, pancreas, hair, and skin
- Hematopoietic stem cells and Cancer stem cells
- Reprogramming and gene targeting

Selected Articles (2025)

1. Gogajeh N.N., Yekta B.E., Javadpour J., Eslaminejad M.B. Structural characterization, *in vitro* bioactivity, and cytotoxicity evaluation of sol-gel derived SiO₂– CaO– Na₂O– P₂O₅ based glass- ceramics in the presence of manganese. *Materials Today Chemistry*. 2025; 45
2. Alizadeh S.D., Hassan Zadeh Tabatabaei M.S., Rezaei Zadeh Rukerd M., Tabrizi R., Masoomi R., Moradi S., Nouri M., Moradi M.-T., Khodarahmi R., Zarrabi M., Khazaie H. The mutual impacts of stem cells and sleep: opportunities for improved stem cell therapy. *Stem Cell Research and Therapy*. 2025; 16(1)
3. Yakhkeshi S., Isah M.B., Sadeghi-Abandansari H., Zhang X. Advances in IgY antibody dosage form design and delivery strategies: Current status and future perspective. *International Journal of Biological Macromolecules*. 2025; 300

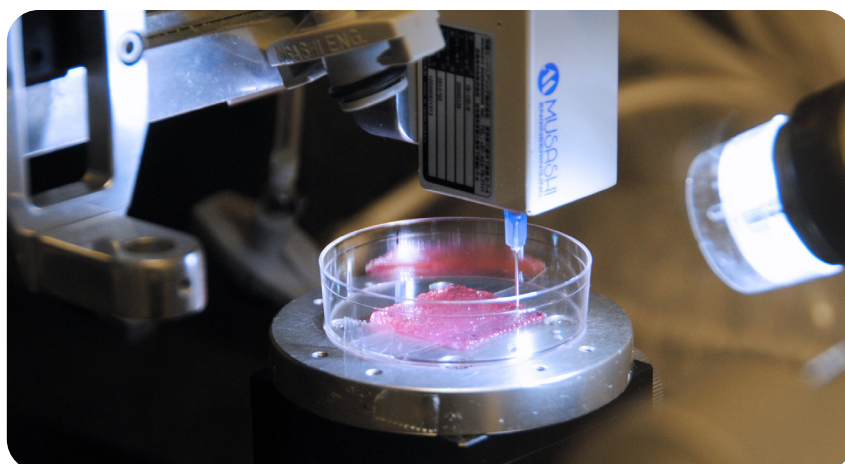


4. Pan Z., Yao Q., Kong W., Ma X., Tian L., Zhao Y., Zhu S., Chen S., Sun M., Liu J., Jiang S., Ma J., Liu Q., Peng X., Li X., Hong Z., Hong Y., Wang X., Liu J., Zhang J., Zhang W., Sun B., Pahlavan S., Xia Y., Shen W., Liu Y., Jiang W., Xie Z., Kong W., Wang X., Wang K. Generation of iPSC-derived human venous endothelial cells for the modeling of vascular malformations and drug discovery. *Cell Stem Cell*. 2025; 32(2):227-245
5. Naserkhaki R., Shokouhian B., Tahamtani Y., Khosravi A., Iravani S., Zarrabi A., Vosough M. Revisiting Treatment Strategies: Addressing Epithelial-to-Mesenchymal Transition-Induced Resistance in Hepatocellular Carcinoma. *BME Frontiers*. 2025; 6
6. Movasat H., Giacomino E., Shahdoost A., Dorri Nokoorani Y., Abrbekouh A.H., Tahamtani Y., Shakiba N. A systems view of cellular heterogeneity: Unlocking the “wheel of fate”. *Cell Systems*. 2025; 16(6)
7. Esmaeili A., Baghaban Eslaminejad M., Hosseini S. Biomolecular corona potential in extracellular vesicle engineering for therapeutic applications. *Biomedicine and Pharmacotherapy*. 2025; 188
8. Samsonchi Z., Amirian R., Tayebi L., Derakhshankhah H., Izadi Z., Hajizadeh-Saffar E. Reviving hope: unlocking pancreatic islet immortality by optimizing a trehalose-based cryopreservation media and cell-penetrating peptide. *Stem Cell Research and Therapy*. 2025; 16(1)
9. Hong Y., Liu J., Wang W., Li H., Kong W., Li X., Zhang W., Pahlavan S., Tang Y.-D., Wang X., Wang K. Pluripotent stem cell-derived cardiomyocyte transplantation: marching from bench to bedside. *Science China Life Sciences*. 2025
10. Leisi Mehrabani F., Alibeigian Y., Baghaban Eslaminejad M., Hosseini S. Mechanical harvesting of cell sheets: an efficient approach for bone and cartilage tissue engineering. *Stem Cell Research and Therapy*. 2025; 16(1)

Department of Cell Engineering

Introduction

This department was established in 2016 with the aim of providing a multidisciplinary environment for collaboration among biologists, engineers, chemists, and physicists.



Goals

- Material design for the culture and differentiation of stem cells
- Designing cell and drug delivery systems for regenerative medicine
- Bioprocess engineering in large scale cell production
- Establishment of bioengineering platforms for drug screening and disease diagnosis

Main Activities

- Surface modification
- Bioprocesses and bioreactors
- Microfluidics
- Biological and chemical Cell/Drug Delivery systems
- Bioprinting

Selected Articles (2025)

1. Sangsefidi F., Tamimi M., Baaji K., Rajabi S., Ghadimi T., Zandi M., Pezeshki-Modaress M. Multilayered electrospun chondroitin sulfate nanofiber impregnated with aortic extracellular matrix hydrogel for dermal regeneration: *In vitro* and *in vivo* study. *International Journal of Biological Macromolecules*. 2025; 320
2. Shahroudi S., Parvinnasab A., Salahinejad E., Abdi S., Rajabi S., Tayebi L. Efficacy of 3D-printed chitosan cerium oxide dressings coated with vancomycin-loaded alginate for chronic wounds management. *Carbohydrate Polymers*. 2025; 349
3. Sedaghat A., Shokrolahi F., Yeganeh H., Shokrollahi P., Hosseini S. Injectable gellan gum hydrogel with PLGA-LDH microspheres for controlled alendronate release and bone regeneration. *International Journal of Biological Macromolecules*. 2025; 321
4. Alizadeh S., Ezzatpour S., Zarkesh I., Vazquez H., Lopez G., Mirsalehi M., Kadkhoda-Mohammadi M., Bagher Z., Davachi S.M. Fabrication of injectable dexamethasone-loaded hydrogel microparticle via microfluidic technique for biomedical applications. *European Polymer Journal*. 2025; 225
5. Yakhkeshi S., Isah M.B., Sadeghi-Abandansari H., Zhang X. Advances in IgY antibody dosage form design and delivery strategies: Current status and future perspective. *International Journal of Biological Macromolecules*. 2025; 300
6. Karami M., Keshvari H., Hajari M.A., Shiri M., Movahedi F., Rezaeiani S., Pahlavan S., Montazeri L. Functional and Structural Improvement of Engineered Cardiac Microtissue Using Aligned Microfilaments Scaffold. *ACS Biomaterials Science and Engineering*. 2025; 11(1):531-542
7. Gachi M.Z., Solouk A., Shafieian M., Daemi H. Chemical structure of antibiotics determines their release rate from drug-loaded poly(vinyl alcohol)/sodium sulfated alginate nanofibrous wound dressings. *International Journal of Biological Macromolecules*. 2025; 307
8. Ghoytasi I., Ashtiani M.K., Ghasemzad M., Piryaee A., Iravani S., Zarrabi A., Vosough M. Mechanobiological reprogramming in liver cancer: Conjugated linoleic acid disrupts EMT



and cytoskeletal dynamics. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*. 2025; 716

9. Esmaeili A., Baghaban Eslaminejad M., Hosseini S. Biomolecular corona potential in extracellular vesicle engineering for therapeutic applications. *Biomedicine and Pharmacotherapy*. 2025; 188

10. Leisi Mehrabani F., Alibeigian Y., Baghaban Eslaminejad M., Hosseini S. Mechanical harvesting of cell sheets: an efficient approach for bone and cartilage tissue engineering. *Stem Cell Research and Therapy*. 2025; 16(1)

Department of Regenerative Medicine

Introduction

Regenerative Medicine Department was established in 2011. The medical researchers are dedicated to providing state-of-the-art clinical care and advancing stem cell research in regenerative medicine.

The most significant activities of this department are conducting clinical trials to evaluate the safety and efficacy of cell therapy for various conditions, including skin diseases, brain tumors, and osteoarthritis.



Goals

- Studying cell-based therapies
- Developing technologies to alleviate human suffering caused by chronic and degenerative disorders

Main Activities (Enrolling the different clinical trials in):

- Bone and cartilage diseases (e.g., osteoarthritis)
- Skin diseases (e.g., vitiligo)
- Cardiovascular diseases (e.g., myocardial infarction)
- CNS diseases (e.g., cerebral palsy)
- Eye diseases (e.g., Limbal Stem Cell Deficiency)



- Liver and gastrointestinal diseases (e.g., cirrhosis)
- Kidney diseases (e.g., chronic kidney disease)
- Diabetes mellitus
- Infertility (e.g., Premature Ovarian Failure)

Clinical trials are conducted in collaboration with numerous hospitals across various cities in Iran.

Selected Articles (2025)

1. Poorkazem H., Saber M., Moradmand A., Yakhkeshi S., Seydi H., Hajizadeh-Saffar E., Shekari F., Hassani S.-N. Comparative effects of various extracellular vesicle subpopulations derived from clonal mesenchymal stromal cells on cultured fibroblasts in wound healing-related process. *International Journal of Biochemistry and Cell Biology*. 2025; 180.
2. Sabbaghi M.M., Amini L., Nabavi S.M., Seyedfatemi N., Haghani H. Effect of expressive writing on the sexual self-concept in men with multiple sclerosis: a randomized clinical controlled trial. *BMC Neurology*. 2025; 25(1)
3. Mahdizadeh H., Izadpanah A., Nouri Y., Shams P., Daneshjou D., Ahari A.A., Tabibkhoei A., Haghighatkah H., Vosough M., Faranoush P., Azimi M., yousefi S., Barzegari A., Khosravani A., Asl N.S., Faranoush M., Ebrahimi M. The safety and feasibility of multiple intrathecal injections of allogenic NK cells in pediatrics with refractory/recurrent brain tumors. *BMC Cancer*. 2025; 25(1)
4. Naserkhaki R., Zarrabi A., Hashemi M., Crawford A.D., Bakhshandeh H., Chiani M., Fotouhi A., Piryaee A., Tahamtani Y., Vosough M. Turmerone-loaded nanocarriers effectively induced apoptosis and attenuated cancerous phenotype in *in vitro* and *in vivo* HCC models. *Colloids and Surfaces B: Biointerfaces*. 2025; 254
5. Naserkhaki R., Shokouhian B., Tahamtani Y., Khosravi A., Iravani S., Zarrabi A., Vosough M. Revisiting Treatment Strategies: Addressing Epithelial-to-Mesenchymal Transition-Induced Resistance in Hepatocellular Carcinoma. *BME Frontiers*. 2025; 6
6. Sarabi P.A., Rismani E., Shabanpouremam M., Talehahmad S., Vosough M. Developing a multi-epitope vaccine against *Helicobacter Pylori*. *Human Immunology*. 2025; 86(1)
7. Hashemian Z., Talehahmad S., Shokouhian B., Najimi M., Vosough M. Functional Liver Cell-Based Platforms in Biomedical Research. *Pharmacology Research and Perspectives*. 2025; 13(3)
8. Mohammad Rahimi H., Mahdavi F., Eslami N., Nemati S., Mirjalali H. The Effects of Extracellular Vesicles Derived from Hydatid Cyst Fluid on the Expression of microRNAs Involved in Liver Fibrosis. *Acta Parasitologica*. 2025; 70(2)
9. Nouri K., Piryaee A., Seydi H., Zarkesh I., Ghoytasi I., Shokouhian B., Najimi M., Vosough M. Fibrotic liver extracellular matrix induces cancerous phenotype in biomimetic micro-tissues of hepatocellular carcinoma model. *Hepatobiliary and Pancreatic Diseases International*. 2025; 24(1):92-103
10. Kakroodi F.A., Khodadoust E., Alizadeh M., Hayaei Tehrani R.S., Sarabi P.A., Rahmanian M., Vosough M. Current challenges and future directions of ATMPs in regenerative medicine. *Regenerative Therapy*. 2025; 30:358-370



Royan Institute for Developmental Biotechnology

Royan Institute for Developmental Biotechnology (RI-DB) was established in 2004 as a research sub-institute located in Isfahan Province. The efforts of RI-DB have positioned Royan Institute as a pioneer in animal cloning in Iran and the Middle East. Successfully producing the first cloned sheep in the Middle East in 2006 placed Iran among the few countries possessing this advanced technology. Utilizing this technology to produce transgenic animals led to the development of goats in Isfahan and Tehran (2009) capable of secreting human coagulation factor IX and human tissue plasminogen activator (hTPA) in their milk.

The vision of RI-DB is to achieve excellence in biotechnology research and to establish biotechnology as a premier precision tool for advancing future health development.

RI-DB includes the Animal Biotechnology Department, three research groups, and four laboratories.



Department of Animal Biotechnology

Introduction

This department consists of three groups and four laboratories: the Cellular Biotechnology, Molecular Biotechnology, and Reproductive Biotechnology groups, along with the Genetic, Stem Cell, Andrology, and Embryology laboratories.



Goals

- Cloning farm animals with high genetic potential
- Applying Assisted Reproductive Technologies (ART) in farm animals
- Improving sperm selection techniques for ART
- “Bench to production” approach in animal farming

Main Activities

- Somatic cell nuclear transfer (SCNT), interspecies SCNT, and transgenesis
- Establishment of novel sperm selection methods for ART
- Development of methods to enhance the efficiency of ART in animals

Selected Articles (2025)

1. Nourbakhsh N., Baniebrahimi G., Talebi S., Talebi A., Nasr Esfahani M.H., Movahedian B., Manshayi M., Naghdi N., Ejeian F., Masaali E., Mosaddad S.A. Subcutaneous implantation of tooth germ stem cells over the masseter muscle in mice: An *in vivo* pilot study. *Regenerative Therapy*. 2025;28:536-543
2. Erfanian S., Mostafaei F., Ajalloueian F., Baharvand H., Rajabi S., Ashtiani M.K. Controlled delivery of PRP from decellularized extracellular matrix enhances skeletal muscle regeneration. *Scientific Reports*. 2025;15(1)
3. Nazemoroaia M., Bagheri F., Mirahmadi-Zare S.Z., Eslami-kaliji F., Derakhshan A. Asymmetric natural wound dressing based on porous chitosan-alginate hydrogel/electrospun PCL-silk sericin loaded by 10-HDA for skin wound healing: *In vitro* and *in vivo* studies. *International Journal of Pharmaceutics*. 2025;668
4. Naderi N., Tavalaei M., Nasr-Esfahani M.H. The epigenetic approach of varicocele: A focus on sperm DNA and m6A-RNA methylation. *Human Reproduction Update*. 2025;31(2):81-101
5. Shayestefar M., Mirahmadi-Zare S.Z., Mashreghi A., Hasani S. Investigation of magnetic and structural properties of Dy-substituted Mn-Zn ferrite nanoparticles for hyperthermia applications. *Journal of Sol-Gel Science and Technology*. 2025
6. Safari H., Hajian M., Tanhaeivash N., Razi M., Drevet J.R., Nasr-Esfahani M.H. Consequences of vitamin D deficiency or overdosage on follicular development and steroidogenesis in Normo and hypo calcemic mouse models. *Scientific Reports*. 2025;15(1)
7. Golestanfar A., Naslaji A.N., Jafarpour F., Sadeghi Borujen N., Rouhollahi Varnosfaderani S., Menezo Y., Dattilo M., Nasr-Esfahani M.H. One carbon metabolism supplementation in maturation medium but not embryo culture medium improves the yield of blastocysts from bovine oocytes. *Scientific Reports*. 2025;15(1)
8. Hajian M., Pirali A., Moghaddam S.H.H., Moradi-Hajidavaloo R., Varnosfaderani S.R., Jozi M., Izadi T., Tanhaie-vash N., Kues W., Nasr-Esfahani M.-H., Jafarpour F., Eghbalsaied S. Efficient gene editing of BMP15, GDF9, and MSTN—but not the imprinted CLPG gene—in



goat embryos via electrotransfection and handmade cloning. *Functional and Integrative Genomics*. 2025;25(1)

9. Farmani M., Mirahmadi-Zare S.Z., Masaeli E., Tabatabaei F., Houreh A.B. Macroporous coating of silver-doped hydroxyapatite/silica nanocomposite on dental implants by EDTA intermediate to improve osteogenesis, antibacterial, and corrosion behavior. *Biomedical Materials (Bristol)*. 2025;20(2)

10. Ghobadi E., Yahay Z., Nouri N., Karamali F., Masaeli E. 3D printing of an anatomically shaped bone model inspired by vascularized tubular bone structure. *Biomaterials Advances*. 2025;176

Research Center for Basic and Population Based Studies in Non-Communicable Diseases

According to the latest report from the International Diabetes Federation, there are currently 463 million people with diabetes worldwide, half of whom remain undiagnosed. It is also estimated that within the next 15 years, the global prevalence will rise to 700 million people. Iran is considered the third country in the region, with an adult population (ages 20–79) exceeding 5 million people living with diabetes.

In 1980, the global prevalence of obesity was reported at 29%, which increased to 37% by 2013. In Iran, over 25 million people are overweight, accounting for 63% of the adult population. Moreover, 30% of the country's children are considered overweight. Currently, there are one million obese individuals in the country, and it is anticipated that obesity rates in Iran will escalate rapidly over the next few years.

Taken together, these health concerns pose a significant challenge and impose a considerable economic burden on the country's healthcare system. The increasing prevalence necessitates a systematic approach encompassing all aspects of research, prevention, and therapy.



At the Center for Basic and Population-Based Studies in Non-Communicable Diseases (NCD), researchers study the following issues:



- Cell-based therapy research: development of stem cell and pancreatic islet transplantation technologies
- Biodiscovery and disease modeling: cell-based disease modeling, generation of transgenic animal models for diseases, natural compound discovery through high-throughput screening to test on cell and animal disease models
- Clinical and epidemiological studies involve designing epidemiological research to assess the prevalence of obesity, diabetes, and other endocrine diseases among juveniles and adults to identify effective disease prevention methods. This includes designing and conducting clinical trials for novel treatments targeting endocrine and metabolic disorders, as well as performing systematic reviews on topics where scientific consensus is lacking

Selected Articles (2025)

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Royan Applied Research Centers and Core Facilities

Advanced Therapy Medicinal Product Technology Development Center

The Advanced Therapy Medicinal Product Technology Development Center (ATMP), established in 2018, specializes in the design and development of regenerative medicine products prior to their introduction into the pharmaceutical market. The production unit sources reliable cellular materials and evaluates the safety and efficacy of cellular products. The quality control unit ensures that the production of safe and effective products complies with international standards. Meanwhile, the quality assurance unit rigorously oversees the documentation of all production stages, adhering to defined protocols in accordance with international standards.

The mission of the ATMP Center is to establish a reliable and efficient bridge between the laboratory and preclinical stages of regenerative medicine products, facilitating their transition to clinical treatment and large-scale industrial production.



Laboratory Animal Science Core Facility

The Laboratory Animal Science Core Facility at Royan Institute plays a national role in educating scholars conducting fundamental research on experimental animals by providing



advanced equipment across all categories within the field of animal research. Each center has three major activities:

- Maintenance and breeding of the animals
- Creating animal models through surgical manipulations or chemical interventions
- Research and development in animal modeling

Scientists at this service unit facility responsible for designing animal experiments must have a degree in Veterinary Medicine or a related biomedical science field. They are also required to have completed a course in laboratory animal science, focusing on the humane and gentle handling of animals. Additionally, they should be knowledgeable about alternative methods and the ethical considerations of animal experimentation.

Modern laboratory animal science is founded on the Three Rs established by Russell and Burch:

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

The primary aim of the Laboratory Animal Facility is to ensure the practical implementation of the Three Rs.

Goals

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





Royan Center for Innovative Technologies Acceleration and Commercialization

Royan Innovative Technologies Acceleration and Commercialization Center (RITAC) was established in 2019 to enhance the core values of Royan Institute by commercializing research findings and providing services and biological products aimed at addressing the country's specialized needs. RITAC conducts feasibility studies, develops business plans, and supports Research and Technology Laboratory (RTL) projects in securing higher levels of financing and investment. Additionally, it facilitates connections between innovators, idea owners, and investors.

RITAC is responsible for managing Venture Capital (VC) investments in Royan Institute, through which several functional, science-based companies and startup offices are supported. Three such companies are highlighted here:



Royan Stem Cell Technology Company

Royan Stem Cell Technology Company operates both private and public cord blood banks. The stem cell samples extracted from cord blood and stored in these banks have made our country self-sufficient in supplying the necessary cells for cell-based transplantation. More than tens of thousands of samples have already been stored in the private bank, with donors providing voluntary informed consent to donate them to patients in need.



Cell Tech Pharmed Company

Cell Tech Pharmed is a knowledge-based company affiliated with Royan Institute. It was established in 2018 with investment from the Execution of Imam Khomeini's Order. Cell Tech Pharmed is a subsidiary of Barekat Pharmaceutical Group, operating in the fields of developing and transferring technical knowledge, commercializing new technologies, and drug manufacturing.

Royan researchers have made enormous and continuous efforts to apply stem cells in pa-



tient treatment. After several years of dedication, Cell Tech Pharmed was launched to pave the way for improved treatment procedures and provide satisfactory services to patients.



Royan AtiTech Pharmed

Royan AtiTech Pharmed (ATP), established in 2019 and affiliated with Royan Institute, is a biotech company specializing in advanced therapy medicinal products. The company operates under GMP standards, features a Grade B cleanroom, advanced quality control laboratories, and a robust quality management system. ATP is dedicated to innovation and improving healthcare through cutting-edge therapies.



TREATMENT

Infertility Clinic

The infertility rate among Iranian couples is estimated to be 10–15%. Royan Infertility Clinic, established in Tehran in 1991, is the second infertility clinic founded in Iran and the first in the capital. With over 30 years of experience in this field, Royan Clinic remains a preferred choice for many patients despite the presence of more than 80 infertility clinics across Iran, due to its high success rates. Most of our patients are referred by other physicians and clinics. Each year, we handle approximately 200,000 clinic visits and 6,500 treatment cycles, including numerous international patients who travel to Iran for infertility treatment. Our services include diagnostic and operative laparoscopy, hysteroscopy, cystoscopy, intrauterine insemination (IUI), ovulation induction, *in vitro* fertilization (IVF), intracytoplasmic sperm injection (ICSI), preimplantation genetic testing (PGT), PESA/TESE, microscopic TESA, vasovasostomy, vasoepididymostomy, transurethral resection of the duct (TURD), gamete and embryo cryopreservation, assisted hatching, karyotyping, and molecular genetic tests such as Factor V Leiden, Factor II, and MTHFR gene analysis, among others routinely offered to patients. More than three thousand couples have achieved successful pregnancies at Royan Infertility Clinic.



Royan Infertility Clinic comprises various departments dedicated to assessing different aspects of infertility and developing optimal treatment methods:

- Endocrinology Section: Diagnosis and treatment of various endocrinological disorders, including PCOS, thyroid dysfunctions, and hyperprolactinemia. This section also includes a diet clinic to support the effective treatment of infertility
- Endoscopy Section: Consists of laparoscopy and hysteroscopy for the diagnosis and treatment of certain reproductive tract disorders, such as cysts and adhesions
- Endometriosis Clinic
- Recurrent Abortion Clinic: Provides evaluation and treatment for various types of recurrent miscarriages
- Prenatology Clinic: Provides monitoring of the mother's health during pregnancy, diagnosis and treatment of fetal abnormalities, and performs P.W.D. procedures
- IVF Failure Clinic: Increasing pregnancy rates and reducing failures
- Male Infertility Clinic
- Psycho-Social Support and Counseling Clinic
- Genetic Counseling Clinic
- Reproductive imaging modalities include rectal and vaginal ultrasonography



Cell Therapy Center

Royan Cell Therapy Center was established in 2008 to provide medical services and conduct clinical trials. The center offers services utilizing Good Manufacturing Practice (GMP)-grade cell products, including:

- Mesenchymal stromal cells for Osteoarthritis
- Melanocyte cells for vitiligo
- Fibroblast cells for Wrinkle and Acne Scar treatment
- Mononuclear cells for Heart Failure
- Limbal stem cells for chemical injury of the Cornea
- Muscle-derived stem cells for stress incontinence



Diabetes Clinic

Based on a decade of experience in basic and translational diabetes research, the Diabetes Clinic at Royan Institute was established in 2019 to achieve its goals through an interdisciplinary approach and the development of effective collaborations. The clinic has recruited expert personnel, including scientists, clinicians, and engineers, and provides specialized facilities to improve patient access to advanced standards of diabetes treatment.

Diabetes Clinic at Royan Institute helps prevent diabetes through local population screening and comprises several specialized clinics, including Endocrinology, Diabetes, Foot Ulcer, Nutrition, Physical Activity, Psychology, and Optometry. Each patient is expected to visit all relevant clinics, where specialized examinations and treatments—such as exercise guidance from specialist physicians—are provided to ensure effective management and prevention of the disease's long-term complications.



EDUCATION

Since 1994, alongside other specialized clinical and research activities, Royan Institute has been actively committed to advancing the scientific expertise of researchers. It facilitates the transfer of knowledge to both national and international researchers by offering long- and short-term specialized educational and training courses.

These educational activities are as follows:

- Master of Science in Developmental Biology, Cellular and Molecular Biology, Stem Cell Biology, Genetics, and Biochemistry in collaboration with Science and Culture University
- PhD by Research: Developmental Biology, Molecular Biology, Animal Physiology, Cellular and Molecular Sciences, Reproductive Biology
- Course-Based PhD: Developmental Biology in collaboration with Science and Culture University
- Female Infertility and Andrology Fellowships

The short-term courses at Royan International Specialized Training Center, including specialized workshops, seminars, symposiums, and congresses for national and international audiences, are conducted by the following departments of Royan Institute: Biotechnology, Reproductive Biomedicine (Embryology, Female and Male Infertility, Genetics, Imaging, Nursing & Midwifery), and Stem Cell Biology and Technology.

Royan Edu-Tourism

Since 1993, Royan Institute has placed special emphasis on education and the transfer of specialized knowledge to both national and international researchers. This aligns with its commitment to raising awareness among students, researchers, and the public about health through the provision of research programs and specialized clinical services. Identified as one of the Royan Institute's strategic plan, it is especially important for the Deputy of Education to develop this plan by leveraging the invaluable experience of directors as well as the institute's facilities and capabilities.

The various scientific laboratories at Royan Edu-Tourism Center include Cell Culture, Molecular Biology, General Laboratory, Embryology, Flow Cytometry, Clean Room, and Animal Surgery Room.



Royan International Twin Congress

Royan International Twin Congress on Reproductive Biomedicine and Stem Cell Biology & Technology is a unique event in its field in Iran and the Middle East. This congress combines two separate events with distinct themes and is held annually by the Royan Reproductive Biomedicine and Stem Cell Biology & Technology Research Institutes.

The primary objective of the congress is to bring together researchers and practitioners from around the world to stimulate and promote research in the fields of interest covered by the Royan Congress. Moreover, the Royan International Twin Congress presents an exceptional opportunity for international participants to experience the warm hospitality of the Iranian people. It also provides an exciting adventure to explore Iran's picturesque and stunning attractions, immerse oneself in its rich history, magnificent architecture, and art, and appreciate the vast diversity of its natural landscapes and resources.



West Asia and North Africa (WANA) network

To promote and develop scientific and educational programs, the Royan Research Institute has launched an international scientific network at the global level, focusing on the countries of West Asia and North Africa (WANA). This network primarily concentrates on the latest scientific advancements in infertility treatment, stem cells and biotechnology. The initiative aims to strengthen the scientific knowledge of countries in this strategic region, which boasts a rich cultural and historical heritage and is considered the cradle of the Islamic world, by organizing educational and research programs within WANA countries.





Given the strong commitment of the government of the Islamic Republic of Iran to enhance regional relations, particularly with neighboring countries bordering the Caspian Sea and the Persian Gulf, this scientific network can significantly contribute to achieving this objective. The establishment of the WANA countries' scientific network will be spearheaded by the Royan Institute, affiliated with ACECR and the Center of the Islamic Republic of Iran

Faculty of Basic Sciences and Medical Technology

By virtue of the establishment authorization issued by the Ministry of Medical Education, the Faculty of Basic Science and Advanced Technology was founded in 2017. The higher education courses were launched with the support and resources of scientific hubs affiliated with ACECR.

PhD courses offered by this faculty are as follows:

- Applied Cell Science in collaboration with Royan Institute
- Tissue Engineering in collaboration with Royan Institute
- Reproductive Biology in partnership with Avicenna Institute

Mission

- Cooperation in the development and improvement of health conditions in the country.
- Elevate the scientific standing at the international level by establishing the appropriate framework and necessary infrastructure to support research activities and expand the frontiers of knowledge.

Policy

- Promotion and advancement of applied research in state-of-the-art medical technologies
- Expansion of interactions between basic science and the clinical sphere
- Promotion of product-oriented education that facilitates the commercialization of research achievements to address the country's scientific needs
- Expansion of international collaborations in research and advanced medical technologies
- Promotion of existing capabilities to advance the frontiers of knowledge



Royan Institute Publisher

Royan Publication Department publishes scientific books at both national and international levels, covering various fields of interest within Royan Institute. The following titles are examples of books that have already been published:

- Diagnosis of Congenital Uterine Malformations by Imaging Techniques

Publisher: NAHL, England, 2019

- Stem Cell Nanoengineering

Publisher: John Wiley and Sons, USA, 2015

- Regenerative Medicine and Cell Therapy

Publisher: Humana Press, Springer, USA, 2012

- Advances in Stem Cell Research

Publisher: Humana Press, Springer, USA, 2012

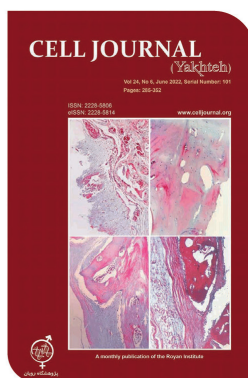
- Trends in Stem Cell Biology and Technology

Publisher: Humana Press, Springer, USA, 2009

Royan Publication Department publishes two scientific journals on a quarterly basis: Cell Journal and the International Journal of Fertility and Sterility.

Cell Journal (Yakhteh) is an international, open-access, peer-reviewed scientific journal dedicated to disseminating the latest research in cellular, molecular, and related fields. Established as a quarterly publication, it was certified by the Ministry of Culture and Islamic Guidance in 1999 and accredited as a scientific and research journal by the Health and Biomedical Information (HBI) Journal Accreditation Commission in 2000. The journal is also a member of the Committee on Publication Ethics (COPE).

International Journal of Fertility & Sterility (Int J Fertil Steril) is a quarterly international journal that publishes research papers across a broad range of disciplines within fertility and sterility. Areas covered include gynecology and female infertility, andrology, reproductive genetics, embryology, epidemiology, reproductive ethics, endocrinology and metabolism, pathology, psychology and psychiatry, radiology and imaging, and immunology. Int J Fertil Steril was certified by the Ministry of Culture and Islamic Guidance in 2007 and accredited as a scientific and research journal by the HBI Journal Accreditation Commission in 2008. The International Journal of Fertility & Sterility is an open access journal.



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