

Report on 7th CryoBioEngineering Symposium
Royan Institute, ACECR, Tehran, I.R. Iran
 Wednesday, February 21, 2024



The **7th Cryobiology Symposium** was held by **Royan Institute**, under the scientific secretary of **Dr. Rouhollah Fathi** (Associate Professor of Royan Research Institute) and Executive Secretary **Mrs. Pegah Shayegh** (PhD student of Developmental Biology) on Wednesday, February 21, 2024. In this period, due to interdisciplinary cooperation, especially the entry of engineering sciences and basic technical sciences in the subject of Cryobiology, this symposium was named "**CBE: CryoBioEngineering Symposium**".



7th Joint Symposium on (Cell and Tissue)
CryoBioEngineering
 21 February, 2024, Tehran, Iran
 Royan Institute

A competition to select the top score student in CryoBioEngineering

Assisted Cryobiology Techniques (ACT)

Engineering based devices Microfluidics Microsensors Carriers Nanodevices	Media supplement Antifreeze molecules Antioxidants Cryoprotectants (CPAs)	techniques Slow freezing Vitrification Magnetic field Electrical field	CryoSchool on Nanotechnology Nanoparticles Nanocomposites Synthesis methods Nanoparticle-drug interactions
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ROYAN INSTITUTE **ACECR**

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This symposium included a series of scientific programs for school students, students and experts, which are mentioned below:

1- First, on Tuesday, January 19, 2024, a webinar entitled "Cryobiology: Approaches, Trends and Applications" was held with the participation of the Union of Biology. In this webinar, **Dr. Rouhollah Fathi**, Associate Professor of the Department of Embryology of Royan Institute and Scientific Secretary of the 7th Symposium on CryoBioEngineering, and **Dr. Fatemeh Hasani**, Assistant Professor of the Department of Embryology of Royan Institute and expert in embryology, gave a speech to more than 220 students and researchers. The speech of two members of the scientific faculty of Royan Institute in this webinar included the following topics:

- Effects of freezing on cell and tissue function and methods of improvement
- The principles and methods of freezing and its applications in the treatment of infertility
- A look at the 7th CryoBioEngineering Symposium

معرفی شاخه‌ای از علم زیست‌شناسی

گرایوبایولوژی

رویکرد، گرایش‌ها و کاربردها

عناوین ویدئو:

- اثرات انجماد در عملکرد سلول و یافت و روش‌های بهبود آن
- اصول و روش‌های انجماد و کاربردهای آن در درمان ناباروری
- نگاهی به هفتمین سمپوزیوم مهندسی زیست انجماد CryoBioEngineering

فاطمه حسینی | سرکار خانم دکتر
استادیار پژوهشگاه رویان
متخصص جنین‌شناسی

روح الله فتحی | جناب آقای دکتر
دانشیار پژوهشگاه رویان
دبیر علمی هفتمین سمپوزیوم مهندسی زیست انجماد CryoBioEngineering

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IBBIOTECH | Biocan | I.A.G. | پژوهشگاه رویان

2- Royan Institute, based on its scientific and social mission, has entered the field of school student education for many years and has launched the "Stem Cells for All" educational center. This center tries to acquaint school students with current knowledge in the field of biological sciences. For several years, Royan Institute has been organizing specialized scientific programs such as symposia on cancer, regenerative medicine, cryobiology and summer school, similar to these programs in a simpler language for school students.

This year, with the cooperation of Avicenna research center (South of Tehran, Iran), the scientific conference "Cryobiology" was held with the participation of more than 450 school students and the program was also broadcast live on the "Shad" system. In this scientific conference, Mrs. Zahra Morshed, Dr. Zeynab Ghezelayagh, Mrs. Farideh Eivazkhani, and Dr. Rouhollah Fathi presented a lecture on the introduction of the science of "Cryobiology", its damages, solutions to compensate for them, and the applications of Cryobiology in human life. This program was organized by the efforts of Mrs. Naeimeh Al-Sadat Abtahi (Executive Secretary) and Mrs. Dr. Niazi (research director of Avicenna research center).

Also, Mr. Mohammad Sadegh Lotfi and Yasin Shakeri (researchers in the field of Cryobiology, Department of Embryology, Royan Institute) performed a scientific show about "the use of liquid nitrogen and the creation of a temperature of $-196\text{ }^{\circ}\text{C}$ ", which attracted the attention of the students and the audiences.





3- In the main program, which was held under the title of the 7th Symposium "CroBioEngineering" on Wednesday, February 21, 2024, in the conference hall of Royan Institute, professors in the field of engineering and Cryobiology from different universities and research centers all over Iran gave speeches.

At the beginning of the program, after the recitation of the Quran and the national anthem of the Islamic Republic, Mr. Professor Abdul Hossein Shahverdi, the head of the Royan Institute, who is one of the well-known researchers in the field of sperm biology and its freezing, gave a speech and explained the importance of the subject of science. Cryobiology, especially in the field of infertility treatment. Then the scientific secretary of the program, while welcoming the participants, presented a short report on how to plan and implement the 7th Symposium "CryoBioEngineering". About 180 students, researchers and professors participated in this program in person and virtually.

Collaborating scientific centers in this program were:

- University of Technology Sydney, Australia
- Shahid Beheshti University
- Shahid Beheshti University of Medical Sciences
- Tarbiat Modares University
- Medical University Tehran
- University of Knowledge and Culture
- Academic Jihad Medicinal Plants Research Institute
- The National Center for Academic Jihad Genetic Resources
- Animal Science Research Institute (ASRI)
- National Research Institute of Genetics Engineering and Biotechnology
- The Khajeh Nasir Toosi University
- Reproductive Sciences Research Institute, Royan Institute (Tehran)
- Biotechnology Research Institute of Royan Institute (Isfahan)

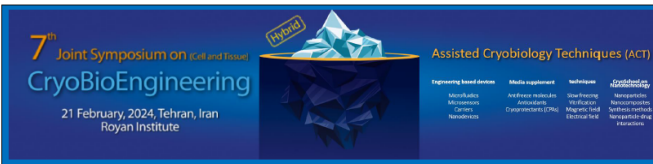
The scientific themes of the 7th Symposium "CBE: CryoBioEngineering" and its speakers are as follows:

- 1- The first part: Cryoschool in nanotechnology
- 2- The second part: different methods of Cryobiology
- 3- The third part: Supplements
- 4- The fourth part: engineered-based devices

Also, **Professor Majid Ebrahimi Warkiani**, a professor at the University of Technology Sydney, spoke virtually to the audiences as a **keynote speaker**.
Lecture title: **Advancing cell biology and cryoresearch through microfluidic systems**

At the closing ceremony, while acknowledging and thanking the professors and participants, the award "Chosen student in the field of Cryobiology" was given to Dr. Ghazaleh Zandi from the National Center for Genetic Engineering and Biotechnology. Also, appreciation and thanks were given to the financial sponsor of the program, Royan Stem Cell Technology Company with its CEO **Dr. Morteza Zarrabi**.

Finally, it can be said that a total of 900 students, researchers and experts benefited from the scientific programs of the "**CryoBioEngineering**" or **CBE** symposium.



7th Joint Symposium on CryoBioEngineering
21 February 2024, Tehran, Iran
Royan Institute

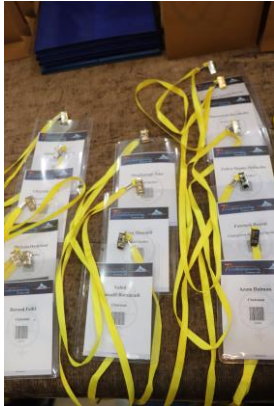
Assisted Cryobiology Techniques (ACT)

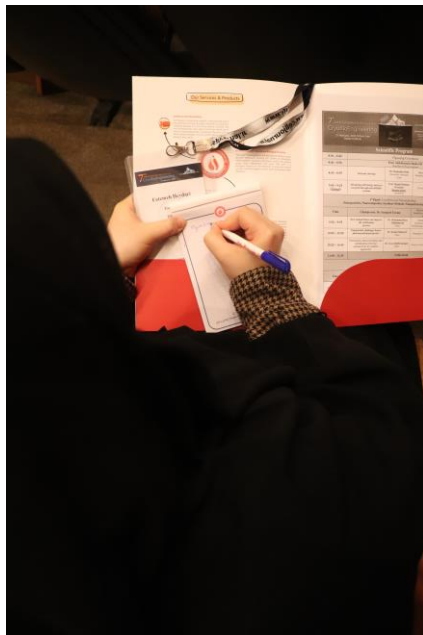
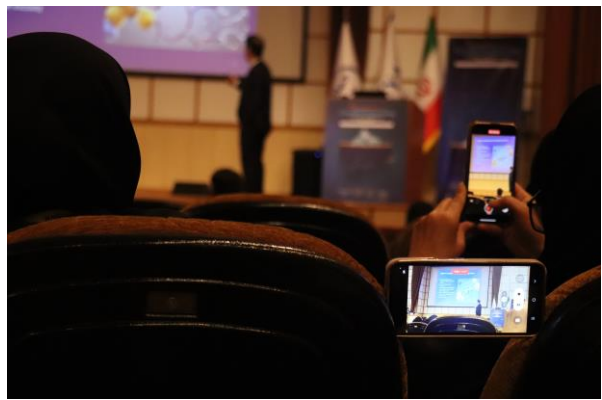
Improving Insemination Methods, Assisted Reproductive Techniques, Microbiome, Assisted Fertilization, Assisted Embryo Transfer, Assisted Fertilization, Assisted Embryo Transfer, Assisted Fertilization, Assisted Embryo Transfer

Scientific Program

8:30 – 8:40	Opening Ceremony		
8:40 – 8:50	Prof. Abdolhossein Shahverdi (President of Royan Institute)		
8:50 – 8:55	Welcome message	Dr. Rouhollah Fathi (Scientific chairman) (Iran)	Department of embryology, reproductive biomedicine research center, Royan Institute for reproductive biomedicine
9:00 – 9:25 (Virtual)	Advancing cell biology and cryo research through microfluidic systems	Prof. Majid Ebrahimi Warkiani (Keynote lecture) (Australia)	University of Technology Sydney, school of biomedical engineering
1st Panel: CryoSchool on Nanotechnology (Nanoparticles, Nanocomposites, Synthesis Methods, Nanoparticle-drug Interactions)			
Time	Chairperson: Dr. Somayeh Tavana		Department of embryology, reproductive biomedicine research center, Royan Institute for reproductive biomedicine
9:30 – 9:55	How nanoparticles can improve the vitrification process	Dr. Mohammad Reza Ghalamboran (Iran)	Member of faculty, plant sciences & biotechnology department, life sciences and biotechnology faculty, Shahid Beheshti University
10:00 – 10:20	Nanoparticle challenges from a pharmaceutical perspective	Dr. Zeynab Siahnouri (Iran)	Pharmacist of infertility clinic, Royan Institute
10:25 – 10:45	Fabrication, characterization and optimization of herbal nanoparticles for medical application	Dr. Reza Ghaffarzadegan (Iran)	Director of Institute of medicinal plants, ACECR
11:00 – 11:20	Coffee break		
2nd Panel: Techniques (Slow Freezing, Vitrification, Magnetic Field, Electrical Field)			
Time	Chairpersons: Dr. Azam Dalman, Dr. Fatemeh Hassani		Department of embryology, reproductive biomedicine research center, Royan Institute for reproductive biomedicine
11:30 – 11:50	Nanowarming technology in ovarian tissue cryopreservation	Dr. Zahra Shams Mofarabe (Iran)	Department of biology and anatomical sciences, school of medicine, Shahid Beheshti University of medical sciences

11:55 – 12:15	Cryopreservation of sperm and testicular tissue: progresses and challenges	Prof. Mansoureh Movahedin (Iran)	Professor of anatomical sciences dept, medical sciences faculty, Tarbiat Modares University
12:20 – 12:40	Oocyte cryopreservation	Dr. Mahshad Khodarahman (Iran)	Tehran University of Medical Sciences
13:00 – 14:00	Pray & lunch		
3rd Panel: Media Supplement (Antifreeze Molecules, Antioxidant, Cryoprotectants (CPAs))			
Time	Chairpersons: Dr. Vahid Esmaeili Borzabadi, Dr. Fatemeh Hassani		Department of embryology, reproductive biomedicine research center, Royan Institute for reproductive biomedicine, Royan Institute
14:00 – 14:20	Using the novel mitochondria-targeted antioxidants (mito-tempo and mitoq) in semen cryopreservation of avian and small ruminants	Dr. Reza Masoudi (Iran)	Animal science research Institute of Iran (ASRI)
14:25 – 14:45	A recent overview of microbes and microbiome preservation	Dr. Shaghayegh Nasr (Iran)	Microorganisms bank, Iranian biological resource center (IBRC), ACECR, Tehran, Iran Department of microbial biotechnology, faculty of basic sciences and advanced technologies in biology, University of Science and Culture, Tehran, Iran
14:50 – 15:10	The impact of nanoparticles on cryopreservation and in vitro fertilization in sperm of farm animal	Dr. Mehdi Hajian (Iran)	Department of animal biotechnology, reproductive biomedicine research center, Royan Institute for biotechnology, ACECR, Isfahan, Iran
15:20 – 15:45	Coffee break		
4th Panel: Engineering-based Devices (Microfluidics, Microsensors, Carriers, Nanodevices)			
Time	Chairperson: Dr. Davood Fathi		Associate professor of photonics and optoelectronics, Tarbiat Modares University, Tehran, Iran
15:50 – 16:10	Toward embryo cryopreservation-on-a-chip	Dr. Mojtaba Dashtizad (Iran)	National Institute of genetic engineering and biotechnology, department of medical biotechnology
16:15 – 16:35	Design and fabrication of gradient microfluidic chip for embryo vitrification	Dr. Ghazaleh Zandi (Iran)	National Institute of genetic engineering and biotechnology, department of medical biotechnology
16:40 – 17:00	Fabrication process of microdevices for biological purposes	Dr. Farhad Akbari Boroumand (Iran)	Khajeh Nasir Toosi University of technology, department of electronic engineering
17:05 – 17:30	Closing Ceremony Dr. Rouhollah Fathi (Scientific Chairman) Awards for a Competition to Select the Top Score Student in CryoBioEngineering		







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