

2024

# ISOBC NEWSLETTER

Volume 19, Number 2



**ISOBC Newsletter**

August 2024

Volume 19, Number 2

**Iran Society of Biophysical Chemistry**

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Iran Society Of Biophysical  
Chemistry (ISOBC)

University of  
Hormozgan



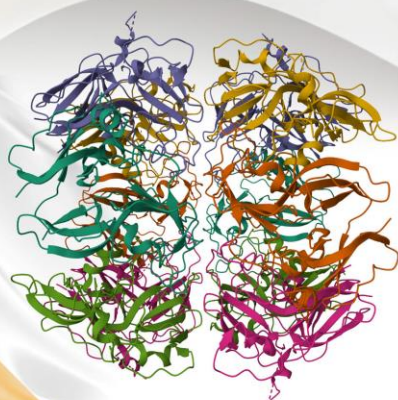
**18<sup>th</sup> National and 3<sup>rd</sup> International Conference of**

## Iran Biophysical Chemistry

University of Hormozgan, Bandar Abbas

December 25-26, 2024, Iran

Registration and Abstract Submission Deadline: 31 July to 21 October



### Conference themes:

Structure, function and stability of proteins  
Protein-ligand binding and drug targeting  
Computational Biophysical Chemistry and Structural Bioinformatics  
Structural Biochemistry and Proteomics  
Thermodynamic and Kinetics Properties of Biomolecules  
Quantum Biophysics \ Nanobiophysics \ Enzyme Technology  
Biosensors \ Artificial Intelligence and Biophysics  
Advanced High-Resolution Techniques for Bimolecular Recognition  
Marine Biophysics, Biochemistry and Bioinformatics



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## University of Tehran Hosted 5th Iran's Conference on Protein and Peptide Science

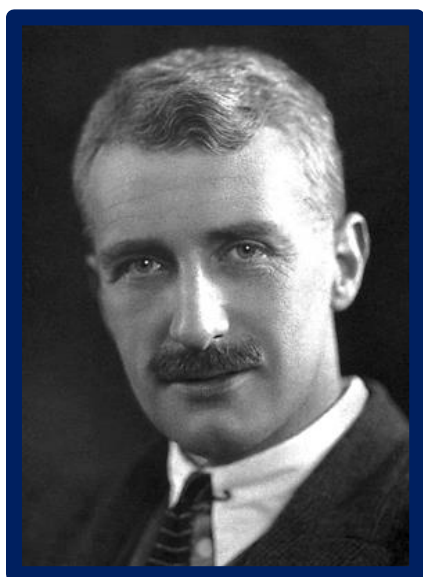
The 5th Iran's Conference on Protein and Peptide Science (PPS5) took place at the University of Tehran with the support of the Iranian Peptide Society (IPS) and Iran Society of Biophysical Chemistry (ISOBC). The event was organized by the Institute of Biochemistry and Biophysics (IBB) in partnership with the school of Biology of University of Tehran held on May 8 and 9, 2024. Prof. Reza Yousefi, the scientific secretary of the conference, reported that the conference secretariat received 300 research abstracts from scientists and researchers nationwide. Following the scientific committee's assessment, 230 works were chosen for presentation. Throughout the two-day conference, 43 distinguished scientists and key researchers delivered speeches. The opening ceremony included welcoming speeches of Prof. Ali Akbar Moosavi-Movahedi, the head of ISOBC, and Prof. Mohammad Reza Mokhber Dezfouli, the head of the Academy of Sciences of the Islamic Republic of Iran. Thereafter, Prof. Hedayatullah Ghourchian, faculty member of IBB, served his welcoming speech as an executive secretary of the conference. For further details about the conference, you can visit the conference website (<https://pps5.ut.ac.ir>).



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## The Biography of Archibald Vivian Hill



Prepared by **Mahzad Motallebi**

M. S. student in Biophysics

Institute of Biochemistry and Biophysics (IBB)

University of Tehran

Archibald Vivian (A.V.) Hill was a British physiologist and biophysicist who was born in Bristol, on September, 26 1886. His father was Jonathan Hill. His mother, Ada Priscilla, was the person who taught A. V. elementary training at home, until the age of 7. At 11, he was doing very well in algebra and geometry and gradually he found that he would like to continue studying mathematics at college. A. V. took the Scholarship examination for Trinity College, Cambridge at 18. He was fortunate enough to receive the scholarship and entered Trinity in 1905.

After studying mathematics for two years, he decided to change his major as he became bored with it and he thought he was ‘better fitted to “engineering”’.

It was the time when his tutor, Dr Walter Fletcher opened the golden door for him into physiology, the study of living engines and in particular, the mechanism of muscle. He encouraged A. V. to enter the department of physiology. Hence, A. V. Hill started his research in the field of muscle physiology in 1909. His research was focused on the nature of muscle contraction, the heat production during a physical activity like running, plus the problem of lactic acid in muscles and the effects of oxygen uptake upon its removal in recovery. He received his fellowship in Trinity in 1910, the year in which he introduced his well-known formula ‘Hill Equation’ and the “Hill plot chart” to represent the sigmoidal co-operative binding of  $O_2$  molecules to hemoglobin.

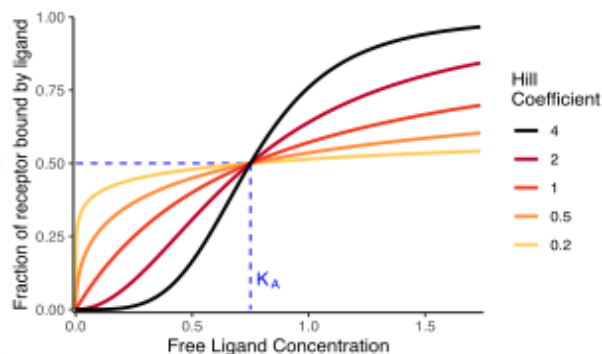
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## Hill's equation

$$S_{\text{HbO}_2} = \frac{[\text{HbO}_2]}{[\text{Hb}]}$$

$$= \frac{K_{\text{HbO}_2} [\text{O}_2]^n}{1 + K_{\text{HbO}_2} [\text{O}_2]^n}$$



During the years 1911-1914, Hill worked on several pieces of research on muscle contraction physiology and hemoglobin. With the start of World War I, he joined the Cambridgeshire regiment and stayed there till 1919. This period of wartime service may have saved him for muscle physiology, for he reports that:

‘In 1914, I was tending to drift away from physiology and had actually been appointed as University Lecturer in physical chemistry at Cambridge . . . but after 4-5 years absence I returned in 1919 to my first love’.

Archibald Hill had been appointed as a professor of physiology at several universities and scientific societies including Manchester University, University College London, and the Royal Society during his lifetime. In addition, he has done a lot for the refugees and people who had lost their jobs or could not be educated during and after the war.

After World War I, A.V. Hill continued his research on the heat production in the muscles as a result of exercise and he even would run every day for about 3 hours to calculate this inter-muscular heat generation and the role of the amount of oxygen uptake on this process. Meanwhile, he went to Germany to collaborate with other physiologists in this field and learn to use their measurement tools. Finally, in collaboration with Dr. Meyerhof, they found that the inter-muscular temperature rises during the physical activity is only 0.003 °C and the nervous impulses are responsible for this phenomenon which they have considered as mechanical work.

In 1922, Hill and Meyerhof received the Nobel Prize in Physiology and Medicine. Hill never stopped working as a scientist. He discovered a lot about the visco-elasticity of muscle fibers and his whole life's physiological findings have had significant effects on the promotion of biophysics, as well.



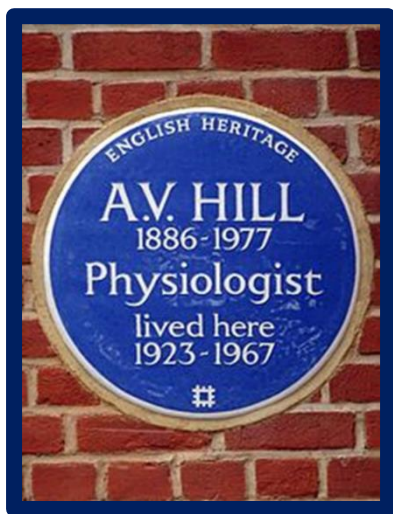
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Archibald Vivian Hill has written and published a lot of outstanding articles and books, some best-known are:

- Muscular Activity (1926)
- Muscular Movement in Man (1927)
- Living Machinery (1927)

Archibald Vivian Hill passed away on 3 June 1977 in Cambridge after years of working honestly and passionately for science and humanity. He has always been loved by his students, colleagues, and people who have had the chance to meet him in their lives.



In 2015, the English Heritage put a Blue plaque at Hill's former home, 16 Bishopswood Road, Highgate, where he had lived from 1923 to 1967.

### References:

- <https://royalsocietypublishing.org/doi/10.1098/rsbm.1978.0005>
- [https://en.wikipedia.org/wiki/Hill\\_equation\\_\(biochemistry\)](https://en.wikipedia.org/wiki/Hill_equation_(biochemistry))
- <https://www.nobelprize.org/prizes/medicine/1922/hill/biographical/>
- <https://www.pdn.cam.ac.uk/about-us/history/centenary/archibald-hill>

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## Advanced Atomic Force Microscope Installation at Institute of Biochemistry and Biophysics

The Atomic Force Microscope (AFM) BRISK model was installed at the Institute of Biochemistry and Biophysics (IBB) of the University of Tehran on April 15, 2023 (1402 A.H). The AFM is utilized to investigate the surface structural properties of materials at nanometer dimensions across three operating modes: contact, non-contact, and intermittent (tapping). It finds applications in various research fields such as medicine, biology, physics, chemistry, environment, food science, polymer and coating engineering, and mining engineering. Some capabilities of this instrument include generating topography images of solid surfaces, producing nanoparticle images, examining the structural characteristics of samples (particularly changes in size and shape), assessing surface roughness and thickness variations, as well as measuring sample height. The AFM instrument, located in IBB, is ready to provide services to researchers from different university departments and foreign visitors.



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## Lights, Camera, Action: Biophysics in the City of Angels

[View the Scientific Sessions](#)



### 69th Annual Meeting

📅 Saturday, Feb 15, 2025 - Wednesday, Feb 19, 2025

📍 Los Angeles Convention Center, 1201 S Figueroa St, Los Angeles, CA 90015, USA

<https://www.biophysics.org/2025meeting>



49<sup>th</sup> ISTANBUL  
5-9 July 2025  
FEBS  
CONGRESS



Bridging Continents to Advance Life Science

<https://2025.febscongress.org>



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## Biophysicist in Profile Mohammad Ali Khayamian



Institute of Biochemistry and Biophysics,  
University of Tehran, Tehran, Iran.  
Email: [m.a.khayamian@ut.ac.ir](mailto:m.a.khayamian@ut.ac.ir)

### 1- What is your view about your membership in Iran Society of Biophysical Chemistry (ISOBC)?

I am deeply honored and thrilled to have my membership approved by the Iran Society of Biophysical Chemistry (ISOBC). This membership signifies a significant recognition of my contributions to the field of biophysics and biochemistry. It provides an excellent platform for scientific collaboration, exchange of ideas, and participation in a community dedicated to advancing science. I am confident that this membership will facilitate fruitful interactions and foster progress in our collective scientific endeavors.

### 2- Would you please explain your biography sketch, University and your CV, including prizes?

Mohammad Ali Khayamian, born in Kerman, Iran in 1988, an Assistant Professor of Biophysics and the Director of the Integrated Biophysics and Bioengineering Lab (iBL) at Institute of Biochemistry and Biophysics, University of Tehran. I earned my PhD in Mechanical Engineering (Nanomechanics) from the University of Tehran, where my research focused on advanced bioelectronics and nanotechnology. My research primarily revolves around harnessing bioelectrical and biomechanical stimulations to enhance the diagnosis and treatment of cancer, endocrine system disorders, and infertility.

I am committed to exploring the emerging field of "Cancer Electromics," aiming to unravel the electrical aspects of cells and their implications for managing various health challenges. My work integrates biophysical principles with engineering technologies to address complex biomedical problems.

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### Honors & Awards:

- **2023:** Honorary diploma, 7th Young Scientists Festival (Start-up business)
- **2022:** MOOSAVI-MOVAHEDI Award, Iranian Biochemistry and Biophysics Association
- **2021:** Honorary diploma, KANS scientific competition (Health and MedTech)
- **2021:** Shahid Shahriari Award, Iran's National Elites Foundation (INEF)
- **2021:** Best Ph.D. dissertation award, University of Tehran
- **2016:** Biotechnology Development Council of Iran scholarship (Best Ph.D. proposal)
- **2015:** Ph.D. scholarship, Iran Nanotechnology Initiative Council (INIC)
- **2012:** Distinguished Student Award, Iran University of Science and Technology
- **2008:** Ranked 2nd, Second International Sufi Observing Competition
- **2004:** Ranked 3rd (1st Provincial), Khwarizmi Young Award contest

**3- Please let us know about the establishment of your lab that you have made. What are the advantages of this lab and their instruments relative to others?**

The Integrated Biophysics and Bioengineering Lab (iBL) at the University of Tehran was established to bridge the gap between various scientific disciplines and promote interdisciplinary research.

The lab is equipped with cutting-edge technology and facilities, including:

- ❖ **Cell Culture Facilities:** CO<sub>2</sub> incubator, laminar hood, centrifuge, and microfuge
- ❖ **Imaging Systems:** Inverted biology microscope and time-lapse live imaging system
- ❖ **Bioelectronics and Biomechanics Equipment:** Microfluidic systems, FDM and SLA 3D printers
- ❖ **Electroporation Devices:** Square and exponential pulse electroporation device
- ❖ **Power Sources:** Various types of DC and AC power sources

The lab promotes interdisciplinary collaboration by bringing together students and researchers from diverse fields, including biophysics, physics, biology, electronic engineering, mechanical engineering, and veterinary medicine. It is equipped with advanced equipment, featuring state-of-the-art instruments that enable high-precision and complex research. Additionally, the lab serves as an innovation hub, facilitating the development of groundbreaking technologies and solutions.

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### 4- What are the bio and medical applications of the mentioned facilities and equipment in biophysical research?

The facilities and equipment at iBL have significant bio and medical applications, including:

- **Cell Culture Research:** Studying cellular behaviors and responses, which is crucial for understanding diseases and developing new treatments.
- **Biomechanics:** Investigating the mechanical properties and behaviors of cells, which is crucial for understanding cell function, tissue development, and disease progression. This includes studying how cells respond to mechanical stimuli, which can impact cancer research, tissue engineering, and regenerative medicine.
- **Bioelectronics:** Developing biosensors and electronic devices for medical diagnostics, monitoring and treatment.
- **Microfluidics:** Creating lab-on-a-chip devices for rapid and precise biochemical analyses, which can be used in diagnostics and drug development.
- **Electroporation:** Facilitating gene editing and drug delivery at the cellular level.

### 5- What is your suggestion for promotion of relation among ISOBC members?

To enhance relations among ISOBC members, I suggest the following:

- **Organize Workshops and Conferences:** Facilitate regular events where members can present their research, share knowledge, and discuss emerging trends.
- **Encourage Collaborative Projects:** Promote joint research initiatives and cross-institutional collaborations.
- **Create Networking Opportunities:** Develop online platforms and forums for members to connect and collaborate.
- **Establish Mentorship Programs:** Pair experienced researchers with newer members to provide guidance and support.
- **Promote Research Visibility:** Highlight member achievements and research in newsletters, journals, and conferences to foster a sense of community and recognition.

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**Dedicated to Scientists,  
Beautiful IRAN**

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