MEDICAL QUIZ – 2025, DEPARTMENT OF NORMAL PHYSIOLOGY

When? December, the 12th, 2025

Time - 4.30 p.m.

Venue – Sanitary building, Lecture Hall

Language? – English

Format? – 3 rounds:

"Myth or Reality?"

•Within 1 minute, teams suggest one possible answer with justification for the proposed questions. The jury awards a point if the answer is correct.

"Project"

•Teams present with pre-prepared projects from a suggested list of topics (both scientific or innovative). The task for members of other teams is to prepare one opposition and one review during the presentation. Presenters, upon successful presentation, receive 1 point, and the team also receives 1 point. If no questions are asked by the teams, questions are posed by the jury. All projects are thus discussed. The presentation time is 3 minutes. Summaries for opposition and review are 1 minute each.

"Historical Quiz"

Individual answers to jury questions about prominent Russian scientists—physiologists—and their discoveries. The contest takes place after several teams with the highest scores are selected. Each participant is initially assigned the number of points they earned during the team game. As a result of this contest, they receive an individual score. Winners are determined, and nominees are awarded titles such as "Best Presenter," "Best Opponent," and "Best Reviewer."

To participate in the quiz, teams (3-5 people) must send an application to elena.s.baeva@mail.ru by December 5, 2025. The jury will select the best projects and inform the teams. The list of project titles and all the guidelines are attached

SCIENTIFIC MODULE

1. Behavior freedom

Matthew T. Rich and colleagues identified synaptic connections responsible for the recurrence of drug use relapse. Based on the results of this study, propose a new effective approach to the prevention of relapses. https://doi.org/10.1016/j.celrep.2018.12.105

2. Breakthrough Technologies

In April 2018, James A. Briggs and colleagues published in *Science* the results of a study in which a detailed catalog of cell transcriptomes during frog development from zygote to early organogenesis was created, as well as a map of cell differentiation across all lineages over time. Propose a way to utilize such datasets for developing therapeutic methods to stimulate regeneration and outline an experimental plan to test their effectiveness. doi:10.1126/science.aar5780 https://tinyurl.com/scXen2018

3. Phoenix

Ryan S. Noyce artificially synthesized the considered extinct horsepox virus and proposed its use for vaccine development as a better alternative to the current cowpox-based vaccine. Propose a vaccine against an infection that is relevant and feasible to develop using synthetic biology methods and outline an experimental plan to evaluate its effectiveness. doi:10.1371/journal.pone.0188453

https://pubmed.ncbi.nlm.nih.gov/29351298/

4. Perfect Models

Polish scientists from the Foundation for Research and Science Development printed the world's first bionic pancreas with blood vessels. Propose applications of this work for further research on diabetes mellitus. https://doi.org/10.5114/ms.2018.74827

5. Dangerous Storms

Ji Li and colleagues from Genentech published the results of their study in the journal *Science Translational Medicine*, addressing the issue of preventing cytokine storms during cancer treatment. Propose a therapy for a particular pathology or group of diseases based on this research. DOI: 10.1126/scitranslmed.aax8861

6. Sensitive Sleep

An article was published in *Frontiers in Behavioral Neuroscience* about the discovery of a new class of hypnotics that affect orexin receptors. Propose the most relevant clinical application of these findings. https://doi.org/10.3389/fnbeh.2018.00327

7. Hidden Contribution

Scientists from the Massachusetts Institute of Technology developed a robot that penetrates the human brain and can treat strokes. In the treatment of which diseases could the use of such robots significantly improve clinical outcomes? DOI: 10.1126/scirobotics.aax7329

8. Sudden Metamorphoses

In January 2019, scientists from Austria, Canada, and the United Kingdom transplanted a nerve from the hand muscle into the biceps, resulting in changes in the structure and function of the recipient muscle. Propose a clinical application of the findings of this study. DOI: 10.1126/sciadv.aau2956

INNOVATIVE MODULE

1. Future is right

According to the "Atlas of New Professions" project, the demand in the labor market is rapidly changing, including in medicine. What new professions will emerge and be in demand in 3-7 years?
Propose a commercial project for training any new, highly specialized medical profession (choose from the atlas or create your own). The training duration should be as short as possible.
https://atlas100.ru

2. Peer-to-peer

The p2p model of the Uber startup has found applications not only in the transportation industry but also in other sectors. Successful services like Airbnb, profi.ru, and others use this model.
Develop a concept for an IT platform that would enable peer-to-peer transactions between doctors and patients within the framework of private medical practice.

3. Cheat or cheap

Mike May, in his article published in *Nature Medicine*, writes about how much clinical trials have changed over the last 25 years. How can pharmaceutical companies and contract research organizations be helped to cope with these new challenges? Propose a commercial model.
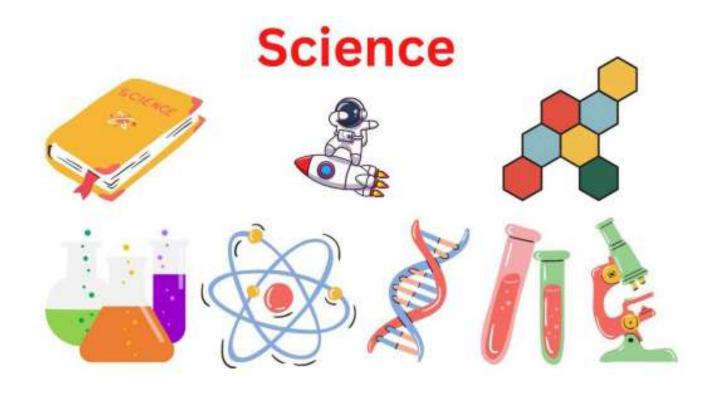https://doi.org/10.1038/s41591-018-0314-1

4. From public good

Projects like Folding@home and Rosetta@home are examples of engaging the public in solving scientific problems. Propose a business model for a high-tech enterprise that uses a similar approach as one of its main resources for production.

http://folding.stanford.edu
http://boinc.bakerlab.org

Science is a systematic and logical approach to understanding the natural world and the universe. Rooted in observation, experimentation, and analysis, science aims to generate reliable knowledge through evidence-based methods. It encompasses a wide range of disciplines, each contributing to our understanding of phenomena by asking questions, formulating hypotheses, and testing them rigorously.

Fortis imaginatio generat casum