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Life Sciences in the 21st Century: Looking into the Future

23–24 января 2024 г.
Москва, МГУ



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23–24 января 2024 г. в МГУ состоялась VII Межфакультетская студенческая научно-практическая конференция “Life Sciences in the 21st Century: Looking into the Future” (на английском языке), организованная кафедрой английского языка для естественных факультетов факультета иностранных языков и регионоведения МГУ имени М.В. Ломоносова совместно с биологическим факультетом и при активном участии еще четырех естественнонаучных факультетов университета – почвоведения, фундаментальной физико-химической инженерии, биотехнологического и фундаментальной медицины, а также биологического факультета совместного российско-китайского университета МГУ-ППИ в г. Шэньчжэне. На конференции были сделаны научные доклады, охватывающие широкий спектр направлений исследований в биологии и смежных науках, начиная от классических зоологических и ботанических наблюдений до использующих самые современные методические подходы экспериментов.

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Foreword

On 23–24 January 2024, the 7th annual student conference Life Sciences in the 21st Century: Looking into the Future was held at the Faculty of Biology of Lomonosov Moscow State University. The conference was organized and conducted by the Department of English for Sciences of the Faculty of Foreign Languages and Area Studies in collaboration with the Faculty of Biology and with an active participation of the faculties of Soil Science, Fundamental Medicine and Fundamental Physical and Chemical Engineering.

As usual, the overwhelming majority of conference presenters were Master's degree and PhD students who welcome this opportunity to discuss the results of their work with the peers and seniors in an interdepartmental and interfaculty context. With English being the only working language of the event, another objective of the conference consists in closely imitating the authentic format of professional international scientific forums of this kind, thus testing the adequacy of the students' operational knowledge of English as the global language of science and building their self-confidence.

This time, the conference organizing committee received about 250 submissions and a record number of presentations (212) were made by students from the MSU faculties of Biology, Soil Science, Fundamental Physical and Chemical Engineering, Fundamental Medicine and the Faculty of biology of the joint Shenzhen MSU-BIT University (China).

How wide the scope of research of MSU students of life sciences is can be understood by merely looking through the topics of the 6 plenary presentations – from soil respiration in urban lawns to novel compounds for medical use, from neuroscience to CRISPR-Cas activity evaluation, from supersoft adaptive materials to novel broad-spectrum recombinant vaccines. No wonder, the number of special thematic sessions of the conference has grown from the original six, in 2018, to the present nine:

- General Biology
- Biochemistry and Molecular Biology
- Biophysics and Bioengineering
- Physiology and Neurobiology
- Genetics, Histology, Embryology
- Ecology
- Fundamental Soil Science
- Applied Soil Science
- Biomedical Research

Students presenting at the conference proved to be creative and well-educated young professionals with up-to-date skills and interests, capable of doing high-quality research and making serious contributions at the forefront of life sciences. From the plethora of the wide-ranging conference papers the present volume only contains abstracts of the plenary and best sectional papers whose authors scored the most points for their English (from 96 to 100).

The conference made it abundantly clear that academic events of this kind, however hard to organize and conduct, are well worth it. They motivate students, promote a sense of belonging, give

a feeling of achievement and satisfaction, consolidate collective identity, and, in the long run, are, no doubt, mutually beneficial to both students and their teachers alike.

Professor Lydia Polubichenko
Dr. habil. in Philology
Head of the Department of English for Natural Sciences
Faculty of Foreign Languages and Area Studies

This year, for the first time, I had the honor of attending a session of the conference “Life Sciences in the 21st Century: Looking into the Future”. What I saw and heard made a huge and extremely pleasant impression on me. Many young people, yesterday’s unskilled students, who are now on the threshold of obtaining a master’s degree, enthusiastically shared their observations and discoveries. Each report caused a heated discussion, there were many interesting questions and clarifying comments. It was a real celebration of science, a valuable experience of scientific communication, for which I would like to thank the Department of English and personally Professor L. Polubichenko.

Non-standard creative approach on the part of teachers, which gives students flexibility of thinking, is extremely important for quality education. A university graduate cannot limit himself to solving standard tasks, he must be ready to act rationally beyond ready-made schemes and algorithms – this is his main value as a professional. Our students have passed dozens of ordinary exams during their lives, the results of their scientific works have been reported many times at the departments. Here they were challenged, and they accepted the challenge with readiness and inspiration. Unusual format of both the exam and scientific report, unusual audience and unexpected questions from students of other faculties with a different worldview allowed to look at their own scientific research from a different angle. I am sure that it will help many of them both at the forthcoming defense of their graduation papers and in the implementation of future projects, whatever they may become.

I congratulate the authors of the selected papers, as well as all the participants of the conference. You are all winners, you overcame yourselves, went beyond the boundaries of the usual educational process. And valuable experience has become your reward.

Associated Professor Lev Pozdnyakov
PHD in Biology
Deputy Dean of the Faculty of Soil Science

2024 STUDENT CONFERENCE LIFE SCIENCES IN THE 21ST CENTURY: LOOKING INTO THE FUTURE

Programme

January 23

<p>Plenary session 10.00–13.30</p> <p>Conference opening address and welcome speech Lydia Polubichenko, Head of the Department of English for Sciences, Professor of the Faculty of Foreign Languages and Area Studies</p>	<p>Afternoon session 14.30–19.00</p> <p>Session 1. General biology Session 2. Biochemistry and molecular biology Session 3. Biophysics, bioengineering, biotechnology Session 4. Physiology and neurobiology Session 5. Genetics, histology, embryology Session 6. Ecology Session 9. Biomedical Research</p>						
<p>Plenary presentations</p> <p>1. Деревенец Елизавета/ Elizaveta Derevenets Faculty of Soil Science, Department of Soil Geography Regulation of soil respiration in urban lawns using mineral fertilizers (Регулирование дыхания почв городских газонов с применением минеральных удобрений)</p> <p>2. Козин Ярослав Сергеевич/ Yaroslav S. Kozin Faculty of Fundamental Medicine Screening for novel compounds with anticomulsive activity (Поиск новых средств с антикомпульсивной активностью)</p> <p>3. Пономарев Тимофей Дмитриевич/ Timofei D. Ponomarev Faculty of Biology, Department of Human and Animal Physiology P300 subcomponents vary depending on the form of visual spatial attention (Суб-компоненты P300 различаются в зависимости от формы пространственного зрительного внимания)</p> <p>4. Сунь Жуйцзя/ Sun Ruijia Shenzhenn MSU-BIT University, Faculty of Biology, Department of Nanobiotechnology The Genome Detective: Universal biosensor for CRISPR-Cas activity evaluation (The Genome Detective. Универсальный биосенсор оценки активности CRISPR-Cas: проект биологического факультета МГУ-ППИ на iGEM 2023)</p> <p>5. Умаров Акмаль Зокиржонович/ Akmal Z. Umarov Faculty of Fundamental Physical and Chemical Engineering New class of supersoft adaptive materials based on copolymers: structural studies with synchrotron radiation (Структурные исследования нового класса сверхмягких адаптивных материалов на основе сополимеров с помощью синхротронного излучения)</p> <p>6. Худайназарова Нелли/ Nelli Khudainazarova Faculty of Biology, Department of Virology Novel broad-spectrum recombinant vaccine candidate for Rotavirus A prevention (Новая рекомбинантная вакцина-кандидат широкого спектра действия против Ротавируса А)</p>	<p>Subsession 1.1 General biology</p> <p>L. Polubichenko, D. Kozlov</p>	<p>Subsession 2.1 Biochemistry and molecular biology</p> <p>N. Glinskaya E. Kozharskaya</p>	<p>Session 3 Biophysics, bioengineering, biotechnology</p> <p>A. Foursova T. Surganova</p>	<p>Session 4 Physiology and neurobiology</p> <p>N. Morgoun, S. Kazantseva</p>	<p>Subsession 5.1 Genetics, histology, embryology, cell biology</p> <p>I. Alikhanova, Z. Alkhashtova</p>	<p>Subsession 6.1 Ecology</p> <p>O. Kozlova, S. Agadganyan</p>	<p>Session 9 Biomedical Research</p> <p>E. Mikheeva A. Volkova</p>
<p>Room M1</p>	<p>Room 389</p>	<p>Room 252</p>	<p>Room 226</p>	<p>Room 254</p>	<p>Room 221</p>	<p>Room M1</p>	<p>Room 288</p>

January 24

Morning session 10.00–13.00					
Session 1. General biology Session 2. Biochemistry and molecular biology Session 5. Genetics, histology, embryology Session 6. Ecology Session 7. Fundamental Soil Science Session 8. Applied Soil Science					
Subsession 1.2 General biology L. Polubichenko, S. Kazantseva	Subsession 2.2 Biochemistry and molecular biology N. Glinskaya E. Kozharskay	Subsession 5.2 Genetics, histology, embryology, cell biology O. Kozlova, I. Alikhanova	Subsession 6.2 Ecology A. Foursova D. Kozlov	Session 7 Fundamental Soil Science O. Egorova N. Morgoun Z. Alkhastova	Session 8 Applied Soil Science E. Mikheeva A. Volkova
Room 389	Room 252	Room 254	Room 226	Room 221	Room 288

January 24

Afternoon session 14.00–18.00					
Session 1. General biology Session 2. Biochemistry and molecular biology Session 6. Ecology					
Subsession 1.3 General biology L. Polubichenko, S. Kazantseva	Subsession 1.4 General biology N. Glinskaya E. Kozharskay	Subsession 2.3 Biochemistry and molecular biology O. Kozlova, I. Alikhanova	Subsession 6.3 Ecology A. Foursova D. Kozlov	Subsession 6.4 Ecology O. Egorova N. Morgoun Z. Alkhastova	Subsession 6.5 Ecology E. Mikheeva A. Volkova
Room 389	Room 252	Room 254	Room 226	Room 221	Room 288

January 23
Afternoon session 14.30–19.00
Subsession 1.1 General biology
Moderators: L. Polubichenko, D. Kozlov
Room 389

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Абу Дийак Ксения Тайсировна	Kseniia Abu Diiak	Faculty of Biology, Department of Entomology	Structure of sensilla on maxillary and labial palps in caddisflies of the genus <i>Rhyacophila</i> (Trichoptera: Rhyacophilidae)	Структура сенсилл на максиллярных и лабиальных щупиках у ручейников из рода <i>Rhyacophila</i> (Trichoptera: Rhyacophilidae)
2.	Архипов Дмитрий Владимирович	Dmitrii Arkhipov	Faculty of Biology, Department of Vertebrate Zoology	Systematics, phylogeny and biogeography of helmeted toads of the genus <i>Ingerophrynus</i> (Anura: Bufonidae)	Систематика, филогения и биогеография шлемоносных жаб рода <i>Ingerophrynus</i> (Anura: Bufonidae)
3.	Громова Валентина Сергеевна	Valentina Gromova	Faculty of Biology, Department of Vertebrate Zoology	Use of visual cues for learning the location of the goal in a maze by male and female common toads, <i>Bufo bufo</i>	Использование зрительных ориентиров для запоминания местоположения цели в лабиринте самцами и самками обыкновенных жаб, <i>Bufo bufo</i>
4.	Дукат Алексей Михайлович	Alexey M. Dukat	Faculty of Biology, Department of Microbiology	Decomposition of plastic by thermophilic microorganisms	Разложение пластика термофильными микроорганизмами
5.	Еньшина Ирина	Irina Enshina	Faculty of Biology, Department of Invertebrate Zoology	Morphological peculiarities of highly specialised parasitic crustaceans exemplified by the copepods <i>Nucellicola</i> sp.	Особенности морфологии сильно специализированных паразитических ракообразных на примере копепод <i>Nucellicola</i> sp.
6.	Жиров Иван	Ivan Zhirov	Faculty of Biology, Department of Ecology and Plant Geography	Spatial phylogenetic patterns in the Russian moss flora	Пространственные филогенетические закономерности флоры мхов России
7.	Зенин Иван Викторович	Ivan V. Zenin	Faculty of Biology, Department of Biological Evolution	Growing ant families from fertilized females in the laboratory	Выращивание муравьиных семей из оплодотворенных самок в лаборатории
8.	Индриксон Яна Владимировна	Jana Indriksone	Faculty of Biology, Department of Invertebrate Zoology	Morphology, systematics and phylogeny of the family Phyllidiidae (Gastropoda: Nudibranchia) from Vietnam waters	Морфология, систематика и филогения семейства Phyllidiidae (Gastropoda: Nudibranchia) вод Вьетнама
9.	Клюкин Никита	Nikita Kliukin	Faculty of Biology, Department of Vertebrate Zoology	Systematics, diversity and biogeography of blind skinks of the family <i>Dibamidae</i> (Reptilia: Squamata)	Систематика, разнообразие и биогеография червеобразных ящериц семейства <i>Dibamidae</i> (Reptilia: Squamata)
10.	Королева Анна Сергеевна	Anna S. Koroleva	Faculty of Biology, Department of Invertebrate Zoology	Unknown interstitial species of annelids of the Dorvilleidae family (Eunicida, Annelida) from the White Sea	Неизвестный интерстициальный вид аннелид сем. Dorvilleidae (Eunicida, Annelida) из Белого Моря
11.	Лапина Надежда	Nadezhda Lapina	Faculty of Biology, Department of Entomology	Flight kinematics and computational fluid dynamics of one of the smallest flying insects	Кинематика полета и реконструкция аэродинамики одного из мельчайших насекомых, способных к полету
12.	Перевозчикова Алла Александровна	Alla Perevozchikova	Faculty of Biology, Department of Anthropology	Physiological stress markers in medieval populations living at different altitudes	Маркёры физиологического стресса на примере средневекового населения, проживающего в условиях различной высотной зональности

January 23

Afternoon session 14.30–19.00

Subsession 2.1 Biochemistry and molecular biology

Moderators: N. Glinskaya, E. Kozharskaya

Room 252

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Ахтямов Артур	Artur Akhtyamov	Faculty of Biology, Department of Biochemistry	Orange Carotenoid Protein Domain Homologues	Гомологи доменов оранжевого каротиноидного белка
2.	Девяткина Маргарита Сергеевна	Margarita Devyatkina	Faculty of Biology, Department of Microbiology	Obtaining penicillopepsin from filamentous fungus <i>T. verruculosus</i>	Получение пенициллопепсина из мицелиального гриба <i>T. verruculosus</i>
3.	Дя Герман	German Dya	Faculty of Biology, Department of Biochemistry	Investigation of PAPP-A-dependent IGFBP-4 Proteolysis in Neurons and Astrocytes in Normal State and Parkinson's Disease	Изучение PAPP-A-зависимого протеолиза IGFBP-4 в ней- ронах и астроцитах в норме и при болезни Паркинсона
4.	Исмаилова Диана Хусейновна	Diana Ismailova	Faculty of Fundamental Medicine, Department of Pharmacy	Possible connection between monoamine-induced heterologous sensitization of multipotent mesenchymal stromal cells and cellular circadian rhythms	Возможная связь моноамин-индуцированной гетероло- гической сенситизации мультипотентных мезенхимных стромальных клеток с клеточными циркадными ритмами
5.	Клягин Сергей	Sergey Klyagin	Faculty of Biology, Department of Microbiology	Fibrino(geno)lytic effect and properties of extracellular proteases of <i>Aspergillus caespitosus</i> , <i>A. candidus</i> and <i>A.</i> <i>jensenii</i> micromycetes	Фибрино(гено)литическое действие и свойства внекле- точных протеаз микромицетов <i>Aspergillus caespitosus</i> , <i>A. candidus</i> и <i>A. jensenii</i>
6.	Мазалов Вадим Викторович	Vadim Mazalov	Faculty of Fundamental Medicine, Department of Pharmacy	The influence of regulatory stress factors on the sensitivity of adipose tissue multipotent mesenchymal stromal cells to norepinephrine	Влияние регуляторных факторов стресса на чувстви- тельность мультипотентных мезенхимных стромальных клеток жировой ткани к норадреналину
7.	Малабуйок Диана Максиминовна	Diana Malabuiok	Faculty of Biology, Department of Bioorganic Chemistry	Identification of tumor-specific antibodies using reconstructed B-lymphocyte repertoires	Поиск опухоль-специфичных антител с использованием реконструированных репертуаров В-лимфоцитов
8.	Орехова Анастасия	Anastasia Orekhova	Faculty of Biology, Department of Biochemistry	Functions of serum and glucocorticoid-regulated protein kinase 1 (SGK1) in adipocytes: regulation of glucose and fatty acid transport	Функции сывороточно- и глюкокортикоид-регулируемой протеинкиназы SGK1 в адипоцитах: регуляция транс- порта глюкозы и жирных кислот
9.	Спиридонова Ксения Сергеевна	Kseniia S. Spiridonova	Faculty of Fundamental Medicine	Quantification of immune checkpoint protein PD-L1 expression in urothelial bladder cancer tissue	Количественные показатели экспрессии белка контроль- ной точки иммунитета PD-L1 в ткани уротелиального рака мочевого пузыря
10.	Щипова Анна Алексеевна	Anna Shchipova	Faculty of Fundamental Medicine, Department of Pharmacy	Mechanisms of participation of the urokinase receptor in reprogramming of tumor stroma cells	Механизмы участия урокиназного рецептора в репро- граммировании клеток опухолевой стромы

January 23
Afternoon session 14.30–19.00
Session 3 Biophysics, bioengineering, biotechnology
Moderators: A. Foursova, T. Surganova
Room 226

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Бобылева Анна Витальевна	Anna V. Bobyleva	Faculty of Biology, Department of Biophysics	Structural networks of human brain: spectral analysis	Спектральный анализ структурных сетей головного мозга человека
2.	Галицкая Алёна Владимировна	Alena V. Galitskaya	Faculty of Biology, Department of Biophysics	Comparative study of the redox state of mitochondrial cytochromes in neuronal mitochondria and astrocytes under hypoxia in vivo conditions	Сравнительное исследование редокс-состояния цитохромов митохондрий нейронов и астроцитов при гипоксии в условиях in vivo
3.	Иноземцева Анастасия	Anastasia Inozemtseva	Faculty of Fundamental Physical and Chemical Engineering	Luminescence modification of CdSe/CdS/ZnS semiconductor nanocrystals in the vicinity of AgNPs	Изменение люминесценции полупроводниковых нанокристаллов с излучающим ядром CdSe вблизи серебряных наночастиц
4.	Кристовский Николай Всеволодович	Nikolay Kristovskiy	Faculty of Biology, Department of Bioengineering	Methods for modeling the efficiency of Forster resonant energy transfer	Методы моделирования эффективности Ферстеровского резонансного переноса энергии
5.	Мамаева Наида	Naida Mamaeva	Faculty of Biology, Department of Bioengineering	Modulation of dCas9-protein-DNA interactions by variation of solvent ionic composition and guide RNA functionalization	Модуляция взаимодействий dCas9-белков с ДНК за счет вариации ионного состава растворителя и функционализации гидовой РНК
6.	Матвеева Наталия Викторовна	Nataliia V. Matveeva	Faculty of Biology, Department of Biophysics	Investigation of local blood oxygenation in blood vessels, as well as the redox state of mitochondria of neurons and astrocytes in the cerebral cortex of mice with Alzheimer's disease	Исследование локальной оксигенации крови в сосудах, а также редокс-состояния митохондрий нейронов и астроцитов в коре мозга мышей при болезни Альцгеймера
7.	Мионов Павел Андреевич	Pavel A. Mironov	Faculty of Biology, Department of Bioengineering	The structure and dynamics of spider neurotoxin Ph α 1 β , gating modifier TRPA1 channel	Структура и динамика паучьего нейротоксина Ph α 1 β , модулятора канала TRPA1
8.	Осина Елизавета	Elizaveta Osina	Faculty of Biology, Department of Bioengineering	Preparation of Transcription Complexes for Analysis by Electron Microscopy	Подготовка транскрипционных комплексов для исследования методом электронной микроскопии
9.	Петрова Полина Александровна	Polina A. Petrova	Faculty of Biology, Department of Biophysics	Optimization of immunoassays based on nitrocellulose membranes	Иммуноанализ на нитроцеллюлозных мембранах и его оптимизация
10.	Сметанин Руслан Васильевич	Ruslan V. Smetanin	Faculty of Biology, Department of Bioengineering	Molecular mechanism of SLURP-1/EGFR interaction	Молекулярный механизм взаимодействия SLURP-1/EGFR
11.	Стинская Ксения	Ksenia Stinskaya	Faculty of Fundamental Physical and Chemical Engineering	Application of ZnO nanowires in solar cells	Применение ZnO нанопроволок в солнечных элементах
12.	Червицов Роман Николаевич	Roman N. Chervitsov	Faculty of Biology, Department of Biophysics	Analysis of the state of photosynthetic apparatus of <i>Chlorella vulgaris</i> algae cells in response to the alterations in light intensity and the action of heavy metals	Анализ состояния фотосинтетического аппарата клеток водоросли <i>Chlorella vulgaris</i> в ответ на изменение интенсивности освещения и действие тяжелых металлов
13.	Черников Андрей	Andrey Chernikov	Faculty of Biology, Department of Bioengineering	Study of the structure, functions and pharmacology of Lystar5 protein from the <i>Asterias rubens</i> starfish	Исследование структуры, функций и фармакологии белка Lystar5 из морской звезды <i>Asterias rubens</i>

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
14.	Чистякова Юлия Алексеевна	Iuliia Chistyakova	Faculty of Biology, Department of Biophysics	Mathematical modeling of carbohydrate-lipid metabolism of the adipocyte	Математическое моделирование углеводно-липидного обмена адипоцита
15.	Яшин Григорий	Grigoriy Yashin	Faculty of Fundamental Physical and Chemical Engineering	Mathematical Modeling of Two-Phase Flows with Chemical Interaction in Solid Rocket Engines	Математическое моделирование двухфазных потоков с химическим взаимодействием в ракетном двигателе твердого топлива

January 23

Afternoon session 14.30–19.00

Session 4 Physiology and neurobiology

Moderators: N. Morgoun, S. Kazantseva

Room 254

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Галдобина Дарья Александровна	Darja Galdobina	Faculty of Biology, Department of Neurobiology	Synchronization of hippocampal and prefrontal electric activity with regard to different conditioned stimulus in safe and dangerous context	Синхронизация электрической активности гиппокампа и префронтальной коры в зависимости от предъявления условного стимула в опасном и безопасном контексте
2.	Гуринова Софья Артёмовна	Sofia Gurinova	Faculty of Fundamental Medicine, Department of Pharmacy	The study of lipid plasma alteration in schizophrenia	Изучение липидного состава плазмы крови людей, страдающих шизофренией
3.	Джуманиязова Ирина Хамрабековна	Irina Dzhumaniiazova	Faculty of Biology, Department of Human and Animal Physiology	3-methylphenanthrene inhibits human I_{kr} and alters its kinetic	3-метилфенантрен блокирует человеческий I_{kr} и изменяет его кинетику
4.	Илиева Танзила Магомедовна	Tanzila M. Ilieva	Faculty of Biology, Department of Human and Animal Physiology	Prolactin as a probable regulator of liver and pancreatic fibrosis in a female rat model of biliary pancreatitis	Пролактин как возможный регулятор фиброза печени и поджелудочной железы в модели билиарного панкреатита самок крыс
5.	Кабильский Илья Алексеевич	Ilya Kabiolskiy	Faculty of Biology, Department of Human and Animal Physiology	Effects of argon inhalations on behavior of rats in model of prenatal alcohol intoxication	Влияние ингаляций аргоном на поведение крыс в модели пренатальной алкогольной интоксикации
6.	Симоненко Софья Дмитриевна	Sofia Simonenko	Faculty of Biology, Department of Human and Animal Physiology	Effects of repeated normobaric hypoxia in white rats of different age	Эффекты многократной нормобарической гипоксии у белых крыс разного возраста
7.	Хлыстова Маргарита	Margarita Khlystova	Faculty of Biology, Department of Human and Animal Physiology	Comparative analysis of the vasomotor effect of reactive oxygen species in the arteries of locomotor and respiratory muscles in rats	Сравнительный анализ вазомоторного влияния активных форм кислорода в артериях локомоторной и дыхательной мускулатуры у крыс
8.	Шатеева Валентина	Valentina Shateeva	Faculty of Biology, Department of Human and Animal Physiology	Mechanisms of reactive oxygen species influence on arterial tone in rats in early postnatal ontogenesis	Механизмы влияния активных форм кислорода на тонус артерий крыс в раннем постнатальном онтогенезе
9.	Шейн Вячеслав Евгеньевич	Viacheslav Shein	Faculty of Biology, Department of Human and Animal Physiology	Difference in response of water-salt appetite to hindlimb unloading: role of sex steroids in female and male mice	Роль половых стероидов в формировании различий реакции водно-солевого аппетита самок и самцов мышей на антиортостатическое вывешивание

January 23

Afternoon session 14.30–19.00

Subsession 5.1 Genetics, histology, embryology, cell biology

Moderators: I. Alikhanova, Z. Alkhastova

Room 221

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Богомолов Антон	Anton Bogomolov	Faculty of Biology, Department of Embryology	Early Embryogenesis of <i>Lymnaea stagnalis</i> (Mollusca, Heterobranchia): Developmental Features of the Basal Representative of Freshwater Gastropods	Ранний эмбриогенез <i>Lymnaea stagnalis</i> (Mollusca, Heterobranchia): Особенности развития базального представителя пресноводных гастропод
2.	Будагова Татьяна Юрьевна	Tatyana Y. Budagova	Faculty of Biology, Department of Cell Biology and Histology	Characteristic of a new transferable cell line of pig spleen as a model for further study of the African swine fever virus	Характеристика новой перевиваемой клеточной линии селезенки свиньи как модели для изучения вируса Африканской чумы свиней
3.	Дьяченко Анна Игоревна	Anna Diachenko	Faculty of Biology, Department of Genetics	Vitamin K and its antagonist warfarin effects on gene activity in <i>Drosophila melanogaster</i>	Анализ влияния витамина К и его антагониста варфарина на активность генов у <i>Drosophila melanogaster</i>
4.	Маяк Маргарита	Margarita Maiak	Faculty of Biology, Department of Cell Biology and Histology	Morphological and molecular-biological characteristics of lung carcinoma progression in animals with different hypoxia tolerance	Морфологические и молекулярно-биологические особенности прогрессии карциномы легкого у животных с разной устойчивостью к гипоксии
5.	Муратаев Рамиль	Ramil Murataev	Faculty of Biology, Department of Genetics	Genetic Diversity of Species, Hybrids and Cultivars of Black and Balsam Poplars in Moscow and Moscow Region	Генетическое разнообразие видов, гибридов и культиваров черных и бальзамических тополей Москвы и Московской области
6.	Никитина Мария	Maria Nikitina	Faculty of Biology, Department of Genetics	Molecular genetic mechanisms of the stress response in <i>Drosophila melanogaster</i> with the <i>Gagr</i> gene knockdown	Молекулярно-генетические механизмы стрессового ответа у <i>Drosophila melanogaster</i> с нокадаунм гена <i>Gagr</i>
7.	Николаева Нина	Nina Nikolaeva	Faculty of Biology, Department of Embryology	<i>Acomys cahirinus</i> as a model organism for studying the mechanisms of endometrial renewal during the menstrual cycle	<i>Acomys sahirinus</i> как модельный организм для исследования механизмов обновления эндометрия в ходе менструального цикла
8.	Пикина Арина	Arina Pikina	Faculty of Biology, Department of Embryology	Model system of the blood-brain barrier based on induced pluripotent stem cells	Модельная система гематоэнцефалического барьера на основе индуцированных плюрипотентных стволовых клеток
9.	Потапов Николай Сергеевич	Nikolay Potapov	Faculty of Biology	Involvement of vimentin intermediate filaments in regulation of membrane blebbing	Исследование роли виментиновых промежуточных филаментов в регуляции мембранного блеббинга
10.	Селезнева Алена Дмитриевна	Alena Selezneva	Faculty of Biology, Department of Genetics	Methylation of long non-coding RNA genes <i>MEG3</i> , <i>ZNF667-AS1</i> , <i>GAS5</i> , <i>SEMA3B-AS1</i> , <i>HAND2-AS1</i> , <i>SNHG6</i> , <i>SSTR5-AS1</i> and <i>KCNK15-AS1</i> : role in breast cancer pathogenesis	Роль метилирования генов длинных некодирующих РНК <i>MEG3</i> , <i>ZNF667-AS1</i> , <i>GAS5</i> , <i>SEMA3B-AS1</i> , <i>HAND2-AS1</i> , <i>SNHG6</i> , <i>SSTR5-AS1</i> , <i>KCNK15-AS1</i> в патогенезе рака молочной железы
11.	Селезнева Анна Дмитриевна	Anna Selezneva	Faculty of Biology, Department of Genetics	Methylation of microRNA genes <i>MIR124-1/2/3</i> , <i>125B-1</i> , <i>127</i> , <i>137</i> , <i>375</i> , <i>1258</i> : role in breast cancer pathogenesis	Роль метилирования генов микроРНК <i>MIR124-1/2/3</i> , <i>125B-1</i> , <i>127</i> , <i>137</i> , <i>375</i> , <i>1258</i> в патогенезе рака молочной железы
12.	Снежана Шепталиня	Snezhana Sheptalina	Faculty of Biology, Department of Genetics	The role of polymorphic variants of genes encoding proteins of the dopaminergic and cholecystokinergic systems in the pathogenesis of human panic disorders	Роль полиморфных вариантов генов, кодирующих белки дофаминергической и холецистокининергической систем в патогенезе панических расстройств человека

January 23
Afternoon session 14.30–19.00
Subsession 6.1 Ecology
Moderators: O. Kozlova, S. Agadganyan
Room M1

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Кремнёва Мария	Mariia Kremneva	Faculty of Biology, Department of Microbiology	Analysis of microbial communities of traditional fermented dairy products of the Russian Federation	Анализ микробных сообществ традиционных кисло-молочных продуктов Российской Федерации
2.	Мельник Арсений Дмитриевич	Arsenii Melnik	Faculty of Biology, Department of Microbiology	Structure of microbial communities in bottom sediments of the Barents and Kara seas and their relation to methane discharge zones	Микробные сообщества донных отложений Баренцево-Карского шельфа и их связь с зонами фокусированной разгрузки углеводородных газов
3.	Мольдон Иван Александрович	Ivan Moldon	Faculty of Biology, Department of Microbiology	Terpene Removal in the Presence of Readily Degradable Compounds by Biofiltration of Gaseous Emissions During Municipal Solid Waste Composting	Удаление терпенов в присутствии легкоразлагаемых соединений методом биофильтрации газового выброса при компостировании твердых коммунальных отходов
4.	Морозова Дарья	Daria Morozova	Faculty of Soil Science, Department of Soil Geography	Geographical aspects of sustainable land management practices in Russia	Географические аспекты практик устойчивого землепользования в России
5.	Петрова Ника Фёдоровна	Nika Petrova	Faculty of Biology, Department of Microbiology	Novel plasmid pPPUT-Tik-1-1 from a permafrost <i>Pseudomonas putida</i> strain and its present-day environmental and clinical analogues	Новая конъюгативная плаزمида pPPUT-Tik-1-1 из древнего штамма <i>Pseudomonas putida</i> и ее современные природные и клинические аналоги
6.	Пихтерева Валерия	Valeria Pikhtereva	Faculty of Biology, Department of Microbiology	Microbial reduction and oxidation of iron minerals in the Yessentuki mineral water deposit	Процессы микробного восстановления и окисления минералов железа в Ессентукском месторождении минеральных вод
7.	Сандалова Елизавета Владимировна	Elizaveta Sandalova	Faculty of Biology, Department of Ecology and Plant Geography	Colonization by seed plants: the key patterns of primary succession on lava flows of the Gorely volcano in the Kamchatka Peninsula	Заселение семенными растениями: основные закономерности первичной сукцессии на лавовых потоках вулкана Горелый (Камчатка)
8.	Тосхопоран Анастасия	Anastasia Toskhoporan	Faculty of Soil Science, Department of Soil Physics	Ciprofloxacin migration in upper soil horizons and quartz sand: model filtration experiments	Миграция ципрофлоксацина в верхних горизонтах почв и кварцевом песке: модельные фильтрационные эксперименты
9.	Федорищева Александра Станиславовна	Aleksandra Fedorishcheva	Faculty of Biology, Department of Vertebrate Zoology	Oscillating magnetic field does not disrupt orientation in the presence of stellar cues in an avian migrant	Осциллирующее магнитное поле не нарушает миграционную ориентацию птиц при доступе к звездному небу
10.	Чулей Артемий	Artemii Chulei	Faculty of Biology, Department of General Ecology and Hydrobiology	Succession of Soil-dwelling Testate Amoebae Communities Along the Age Gradient Formed by the Tsey Glacier Retreat	Сукцессия сообществ почвообитающих раковинных амёб вдоль возрастного градиента, образованного отступанием Цейского ледника

Afternoon session 14.30-19.00
Session 9 Biomedical Research
Moderators: E. Mikheeva, A. Volkova
Room 288

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Гоу Минсюань	Gou Mingxuan	Faculty of Biology, Department of Microbiology	Hemostatically Active Protease Produced by <i>Aspergillus tenessensis</i>	Гемостатически активная протеаза, образуемая микромицетом <i>Aspergillus tenesseensis</i>
2.	Кустова Дарья Дмитриевна	Daria Kustova	Faculty of Biology, Department of Virology	Efficacy of Antivirals and Monoclonal Antibodies against SARS-CoV-2 Omicron Lineages	Эффективность противовирусных препаратов и моноклональных антител против вариантов Омикрон SARS-CoV-2
3.	Лещев Иван	Ivan Leshchev	Faculty of Biology, Department of Virology	Evolutionary history of hantaviruses	Эволюционная история хантавирусов
4.	Никифоров Никита Геннадьевич	Nikita G. Nikiforov	Faculty of Biology	Macrophages derived from LPS-stimulated monocytes from patients with asymptomatic atherosclerosis were characterized by prolonged and increased pro-inflammatory activity	Макрофаги, полученные из стимулированных липополисахаридом моноцитов пациентов с бессимптомным атеросклерозом, обладали длительной и повышенной провоспалительной активностью
5.	Овсенева Мария Игоревна	Maria I. Ovseneva	Faculty of Fundamental Medicine	Analysis of population pharmacokinetics models of antiretroviral drugs and simulation	Анализ и воспроизведение популяционных моделей фармакокинетики антиретровирусных препаратов
6.	Озерова Дарья Дмитриевна	Daria Ozerova	Faculty of Biology, Department of Virology	Prevalence analysis of the rs61754966 allele of the NBN gene among patients with malignant liver tumors	Анализ распространенности аллеля rs61754966 гена NBN среди пациентов со злокачественными опухолями печени
7.	Садовская Александра Вячеславовна	Aleksandra Sadovskaya	Faculty of Biology, Department of Immunology	Blood serum from patients with acute leukemia inhibits the growth of multipotent mesenchymal stromal cells from healthy donors	Сыворотки крови больных острыми лейкозами угнетают рост мультипотентных мезенхимных стромальных клеток здоровых доноров
8.	Серикова Анастасия Андреевна	Anastasia Serikova	Faculty of Biology, Department of Virology	Research of genetic polymorphisms in the human cytomegalovirus phosphotransferase gene in adult patients after allogeneic hematopoietic stem cell transplantation	Исследование генетических полиморфизмов в гене фосфотрансферазы цитомегаловируса человека у взрослых пациентов после трансплантации аллогенных гемопоэтических стволовых клеток
9.	Строкач Александра Андреевна	Aleksandra Strokach	Faculty of Biology, Department of Immunology	Distribution of cytidine deaminase AID sites in the genome of humans and other model organisms	Распределение сайтов цитидиндеаминазы AID в геноме человека и других модельных организмов
10.	Сухова Мария Михайловна	Maria M. Sukhova	Faculty of Biology, Department of Immunology	Comparison of humoral response against SARS-CoV-2 in patients infected with Wuhan and Delta variants	Сравнение гуморального ответа против SARS-CoV-2 у пациентов, переболевших вариантами D614G и Delta
11.	Торопов Степан	Stepan Toropov	Faculty of Biology, Department of Virology	Recombinant antigen of Newcastle disease virus: preparation and characterization for development of veterinary vaccine candidate	Получение и характеристика рекомбинантного антигена вируса болезни Ньюкасла для создания прототипа кандидатной ветеринарной вакцины
12.	Файзуллина Дарья	Daria Fayzullina	Faculty of Biology, Department of Virology	The Meaning of Cytomegalovirus Persistence for Ewing Sarcoma Treatment	Значение персистенции цитомегаловируса в терапии саркомы Юинга

January 24
Morning session 10.00–13.00
Subsession 1.2 General biology
Moderators: L. Polubichenko, S. Kazantseva
Room 389

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Афонин Данил Сергеевич	Danil Afonin	Faculty of Biology, Department of Plant Physiology	Development of methods for semisynthetic preparation of malonyl derivatives of plant glycosides	Разработка методов полусинтетического получения малонильных производных растительных гликозидов
2.	Горчханов Джабраил Магометович	Dzhabrail M. Gorchkhanov	Faculty of Biology, Department of Vertebrate Zoology	Genetic and taxonomic diversity gymnures of Vietnam (<i>Erinaceidae, Hylomiinae</i>)	Генетическое и таксономическое рахнообразии гимнур Вьетнама (<i>Erinaceidae, Hylomiinae</i>)
3.	Иванова Елена Александровна	Elena Ivanova	Faculty of Biology, Department of Anthropology	Growth completion in 16–19-year-old men and women in early 21st century	Особенности завершения ростовых процессов у юношей и девушек 16–19 лет в начале XXI века
4.	Качкина Василиса	Vasilisa Kachkina	Faculty of Biology, Department of Higher Plants	Angiosperm Leaf Compressions from the Late Eocene of the Maoming Basin, South China.	Покрытосеменные с сохранившимися фитолеймами из позднего эоцена бассейна Маомин, Южный Китай
5.	Коваленко Данил	Danil Kovalenko	Faculty of Biology, Department of Microbiology	Isolation and characterization of microorganisms potentially decomposing plastics in the coastal area of Barents and White Seas	Выделение и описание микроорганизмов – потенциальных пластикдеструкторов в прибрежной зоне Баренцева и Белого морей
6.	Ковзунова Полина	Polina Kovzunova	Faculty of Biology, Department of Anthropology	The Odontological Characteristics of the Tagar Culture Population	Одонтологическая характеристика населения тагарской культуры
7.	Кроленко Варвара	Varvara Krolenko	Faculty of Biology, Department of Invertebrate Zoology	The blood vascular system of <i>Caobangia billeti</i> (Annelida, Sabellida)	Кровеносная система <i>Caobangia billeti</i> (Annelida, Sabellida)
8.	Митюшина Анастасия	Anastasiia Mitiushina	Faculty of Biology, Department of Vertebrate Zoology	Factors affecting innate immunity of rodents	Факторы, влияющие на состояние врожденного иммунитета у грызунов
9.	Моцарь Елена	Elena Motsar	Faculty of Biology, Department of Virology	Molecular Characteristics of Natural Isolates of Fruit and Ornamental Crops Viruses	Молекулярная характеристика природных изолятов вирусов плодовых и декоративных культур
10.	Печенева Анастасия Алексеевна	Anastasiia Pecheneva	Faculty of Biology, Department of Vertebrate Zoology	Structure and dynamics of contact zones of closely related taxa: a case study of common chiffchaff <i>Phylloscopus collybita sensu lato</i>	Структура и динамика зон контакта близких таксонов на примере пеночки-теньковки (<i>Phylloscopus collybita sensu lato</i>)
11.	Погостина Дарья Денисовна	Daria Pogostina	Faculty of Biology, Department of Mycology and Algology	Micromorphological characters and chemical reactions of apothecial ascomycetes and their diagnostic value for species identification	Микроморфологические признаки и химические реакции апотециальных аскомицетов и их диагностическая роль в видовой идентификации

January 24

Morning session 10.00–13.00

Subsession 2.2 Biochemistry and molecular biology

Moderators: N. Glinskaya, E. Kozharskay

Room 252

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Балтин Святослав	Sviatoslav Baltin	Faculty of Biology, Department of Molecular Biology	Functions of the small open reading frame in the human mRNA of the <i>MCRS1</i> gene	Функции малой открытой рамки считывания в мРНК гена <i>MCRS1</i> человека
2.	Бескровная Маргарита	Margarita Beskrovnaia	Faculty of Biology, Department of Molecular Biology	Effect of DNA Modifications on pAgo Proteins Nuclease Activity: A New Tool in Molecular Biology?	Влияние ДНК модификаций на нуклеазную активность pAgo: новый инструмент в молекулярной биологии?
3.	Ваапов Бейт Рустемович	Beit Vaapov	Faculty of Biology, Department of Bioorganic Chemistry	Generation of CAR T cells resistant to the tumor microenvironment	Создание CAR T-клеток, устойчивых к опухолевому микроокружению
4.	Дроздов Никита Андреевич	Nikita A. Drozdov	Faculty of Biology, Department of Virology	The Role of The MIG21 Gene of <i>Nicotiana benthamiana</i> in The Interaction between The Plant and The Tobacco Mosaic Virus	Роль гена MIG21 <i>Nicotiana benthamiana</i> во взаимодействии между растением и вирусом табачной мозаики
5.	Комбаров Илья Алексеевич	Iliia Kombarov	Faculty of Biology, Department of Biochemistry	The piRNA pathway in the maintenance of early germ cells in <i>Drosophila melanogaster</i>	piRNA путь в поддержании ранних герминальных клеток у <i>Drosophila melanogaster</i>
6.	Немиц Егор Андреевич	Egor Nemits	Faculty of Biology, Department of Molecular Biology	The role of ubiquitin-ligase module MSL2 in the assembly of dosage compensation complex in <i>Drosophila melanogaster</i>	Изучение роли убиквитинлигазного модуля MSL2 в сборке комплекса дозовой компенсации <i>Drosophila melanogaster</i>
7.	Пушкина Наталия	Nataliia Pushkina	Faculty of Biology, Department of Virology	Ring-Like Patters in the Coliphage-Host System	Кольчатые паттерны в системе колифаг-хозяин
8.	Фомичева Елизавета	Elizaveta Fomicheva	Faculty of Biology, Department of Immunology	Molecular signatures of PKM2-mediated metabolic reprogramming in follicular cell-derived thyroid tumors	Молекулярные сигнатуры PKM2-опосредованного метаболического репрограммирования в фолликулярно-клеточных опухолях щитовидной железы
9.	Холдина Анна Мансуровна	Anna Kholdina	Faculty of Biology, Department of Microbiology	A new genetic modification system platformed on the thermophilic bacterium <i>Tepidiforma bonchosmolovskayae</i>	Новая система генетической модификации на основе термофильной бактерии <i>Tepidiforma bonchosmolovskayae</i>
10.	Чебаненко Виктория	Viktoriia Chebanenko	Faculty of Biology, Department of Biochemistry	Genetically encoded tools to study the subcellular dynamics of oxidative stress induced by reactive chlorine species	Генетически кодируемые инструменты для исследования субклеточной динамики окислительного стресса, индуцированного активными формами хлора

January 24

Morning session 10.00–13.00

Subsession 5.2 Genetics, histology, embryology, cell biology

Moderators: O. Kozlova, I. Alikhanova

Room 254

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Веселова Полина Андреевна	Polina Veselova	Faculty of Biology, Department of Cell Biology and Histology	Impact of Endoplasmic Reticulum Stress on Proliferation and Motility of Human Normal and Tumor Cells	Влияние стресса ЭПР на пролиферацию и подвижность нормальных и опухолевых клеток человека
2.	Гнедова Александра Александровна	Aleksandra Gnedova	Faculty of Biology, Department of Embryology	Aryl-hydrocarbon Receptor In the Perinatal Period of the Skin of Laboratory Mice	Арил-углеводородный рецептор в перинатальном периоде кожных покровов лабораторных мышей
3.	Егорочкин Михаил Геннадьевич	Michael Egorochkin	Faculty of Biology, Department of Cell Biology and Histology	Morphological characteristics of mouse organs consuming microplastics	Морфологическая характеристика органов мышей при потреблении микропластика
4.	Киселев Данила	Danila Kiselev	Faculty of Biology, Department of Cell Biology and Histology	Research of segregation sister chromatids by the replicative labeling method	Исследование сегрегации сестринских хроматид методом репликативного мечения
5.	Кургузова Надежда Сергеевна	Nadejda S. Kurguzova	Faculty of Biology, Department of Genetics	Search and Analysis of Genes for Resistance and Susceptibility of <i>Capsicum annuum</i> to Diseases Caused by Fungi of the Genus <i>Fusarium</i>	Поиск и анализ генов устойчивости и восприимчивости перца стручкового (<i>Capsicum annuum</i>) к заболеваниям, вызванным грибами рода <i>Fusarium</i>
6.	Леонова Мария	Maria Leonova	Faculty of Biology, Department of Genetics	Genetic structure of the population of the Bosporan Kingdom and the centre of ancient civilisation of the Northern Black Sea Coast – Phanagoria	Генетическая структура населения Боспорского царства и центра античной цивилизации Северного Причерноморья – Фанагории
7.	Мирзоян Даниил	Daniil Mirzoyan	Faculty of Biology, Department of Vertebrate Zoology	Genetic diversity and phylogeography of jebroas of the genus <i>Pygeretmus</i> (Glover, 1841)	Генетическое разнообразие и филогеографи тушканчиков рода <i>Pigeretmus</i> (Glover, 1841)
8.	Панкратова Мария	Mariia Pankratova	Faculty of Biology, Department of Embryology	YAP/TAZ signaling pathway in modeling human skin development using iPSCs	Сигнальный путь YAP/TAZ при моделировании развития кожи человека с использованием ИПСК
9.	Пигалов Антон Владимирович	Anton Pigalov	Faculty of Biology, Department of Genetics	The Use of Small RNAs as a Tool to Protect Wheat From Damage by Fungi of the Genus <i>Fusarium</i>	Использования малых РНК в качестве инструмента защиты пшеницы от поражения грибами рода <i>Fusarium</i>
10.	Романова Анна Дмитриевна	Anna Romanova	Faculty of Biology, Department of Genetics	<i>In vitro</i> system based on AAV-vectors for testing neuron-specific promoters	<i>In vitro</i> система на основе ААВ-векторов для тестирования нейроспецифичных промоторов
11.	Скорнякова Татьяна Сергеевна	Tatiana S. Skorniakova	Faculty of Biology, Department of Genetics	Application of Virus Induced Gene Silencing (VIGS) to study the functions of <i>Capsicum annuum</i> pepper genes	Применение метода VIGS (virus-induced gene silencing) для изучения функций генов перца <i>Capsicum annuum</i>
12.	Ткаченко Мария	Maria Tkachenko	Faculty of Biology, Department of Embryology	The Effects of Antidepressants of the Group of Selective Serotonin Reuptake Inhibitors on the Quality of Oocytes	Влияние антидепрессантов группы селективных ингибиторов обратного захвата серотонина на качество ооцитов

January 24
Morning session 10.00–13.00
Subsession 6.2 Ecology
Moderators: A. Foursova, D. Kozlov
Room 226

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Бахвалова Полина	Polina Bakhvalova	Faculty of Biology, Department of Vertebrate Zoology	Ecology of House Sparrow (<i>Passer domesticus</i>) and Field Sparrow (<i>Passer montanus</i>) in Moscow	Экология домового (<i>Passer domesticus</i>) и полевого (<i>Passer montanus</i>) воробьев в Москве
2.	Вакалюк Людмила Андреевна	Liudmila Vakaliuk	Faculty of Biology, Department of Higher Plants	The influence of external factors on the earlywood anatomical structure of pendunculate oak (<i>Quercus robur</i> L.)	Влияние внешних факторов на анатомическое строение ранней древесины дуба черешчатого (<i>Quercus robur</i> L.)
3.	Денисова Ольга	Olga Denisova	Faculty of Soil Science, Department of Radioecology and Ecotoxicology	Barrier function of leached chernozems during radial migration of cesium-137	Барьерная функция выщелоченных черноземов при радиальной миграции цезия-137
4.	Королева Ольга Эдуардовна	Olga Koroleva	Faculty of Biology, Department of General Ecology and Hydrobiology	Size structure of summer phytoplankton in Kandalaksha Bay, White Sea	Размерная структура летнего фитопланктона Кандалакшского залива белого моря
5.	Лупырѐв Андрей Андреевич	Andrei Lupyrev	Faculty of Biology, Department of Vertebrate Zoology	Seasonal and daily activity patterns of the yellow ground squirrel (<i>Spermophilus fulvus</i>) based on telemetry data	Сезонная и суточная динамика активности желтого суслика (<i>Spermophilus fulvus</i>) на основе данных телеметрии
6.	Парамонов Михаил Сергеевич	Mikhail Paramonov	Faculty of Biology, Department of General Ecology and Hydrobiology	The Influence Of Climate-Related Factors On The Species Composition Of Testate Amoebae In The Central Forest Reserve	Влияние связанных с климатом факторов на структуру видов раковинных амоб в Центрально-Лесном заповеднике
7.	Пронина Нина Алексеевна	Nina Pronina	Faculty of Biology, Department of Entomology	Functional diversity of the soil fauna of the forest ecosystems of the Tver region under the influence of anthropogenic disturbance	Функциональное разнообразие почвенной фауны лесных экосистем Тверской области под влиянием антропогенного нарушения
8.	Рак Анна Николаевна	Anna Rak	Faculty of Biology, Department of General Ecology and Hydrobiology	Transgenerational Effects of Short-term Exposure to Microplastics on the Vital Parameters and Copper Resistance of Freshwater Crustaceans <i>Daphnia magna</i>	Влияние кратковременного воздействия микропластика на жизненные параметры и устойчивость к меди пресноводных ракообразных <i>Daphnia magna</i> в ряду поколений
9.	Смирнова Анна	Anna Smirnova	Faculty of Biology, Department of General Ecology and Hydrobiology	Connecting the multiple dimensions of global soil fungal diversity	Факторы, обуславливающие глобальное разнообразие почвенных грибов
10.	Усова Валерия	Valeria Usova	Faculty of Biology, Department of Ecology	Modeling of in situ treatment of groundwater for removing nitrogen compounds using key processes of the oxidative and reductive branches of the nitrogen cycle	Моделирование ин ситу очистки пластовой воды от соединений азота с использованием ключевых процессов окислительного и восстановительного ветвей цикла азота
11.	Фаронова Евгения Александровна	Eugenia Faronova	Faculty of Biology	Value of human-modified forests for the conservation of canopy epiphytes (on the example of the Atlantic Forest, Brazil)	Ценность антропогенно-нарушенных лесов для охраны эпифитов, обитающих в кронах (на примере Бразильского Атлантического леса)

January 24

Morning session 10.00–13.00

Session 7 Fundamental Soil Science

Moderators: O. Egorova, N. Morgoun, Z. Alkhastova

Room 221

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Борисова Софья	Sofia Borisova	Faculty of Soil Science, Department of General Soil Science	Seasonal dynamics of soil solution composition	Сезонная динамика состава почвенного раствора
2.	Буланова Елизавета Александровна	Elizaveta A. Bulanova	Faculty of Soil Science, Department of Soil Geography	Paleogeographic regularities of the formation of the loess-soil series of the "Likhvin" section in the last interglacial and glacial periods	Палеогеографические закономерности формирования лессово-почвенной серии разреза «Лихвин» в последнее межледниковье и ледниковье
3.	Гарезина Анастасия Алексеевна	Anastasia Garezina	Faculty of Soil Science, Department of Soil Chemistry	Composition and content of aliphatic hydrocarbons in the upper horizons of sod-podzolic soils in the South taiga zone	Состав и содержание алифатических углеводородов в верхних горизонтах дерново-подзолистых почв в зоне Южной тайги
4.	Гуторова Виктория	Viktoriia Gutorova	Faculty of Soil Science, Department of Soil Chemistry	Adsorption of 2,4-dichlorophenoxyacetic acid on bentonite modified with hexadecyltrimetammonium bromide	Сорбция 2,4-дихлорфеноксисукусной кислоты на бентоните, модифицированном гексадецилтриметаммоний бромидом
5.	Комкова Дарья	Daria Komkova	Faculty of Soil Science, Department of General Soil Science	Changes in micromorphometric parameters of plowed Typical Chernozem affected by water erosion	Изменение микроморфометрических показателей пахотного чернозема типичного под влиянием водной эрозии
6.	Фролова Любовь	Lyubov Frolova	Faculty of Soil Science	Morphological diagnostics of Late Pleistocene pedogenesis relicts in the surface soils of the Suzdal Plateau	Морфологическая диагностика реликтов позднеплейстоценового педогенеза в поверхностных почвах Суздальского плато
7.	Шмельков Артём	Artem Shmelkov	Faculty of Soil Science, Department of Soil Geography	Long-term crop yield of "EkoNivaAgro-Levoberjnoe" regarding natural soil productivity	Многолетняя урожайность полей хозяйства «ЭкоНива-Агро-Левобережное» в связи с естественной продуктивностью почв

January 24
Morning session 10.00–13.00
Session 8 Applied Soil Science
Moderators: E. Mikheeva, A. Volkova
Room 288

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Богдан Евдокия	Evdokia Bogdan	Faculty of Soil Science, Department of Soil Physics and Reclamation	Influence of composite hydrogels on the physical properties and carbon gas exchange of soil constructions with tree seedlings: a case study of blue spruce (<i>Picea pungens</i> Engelm.)	Влияние композитных гидрогелей на физические свойства и углеродный газообмен почвенных конструкций с древесными саженцами (на примере ели голубой (<i>Picea pungens</i> Engelm.))
2.	Веденев Денис	Denis Vedenev	Faculty of Soil Science, Department of Soil Physics	Influence of perchlorates on water crystallization temperature and microbial communities in Mars regolith simulants	Влияние перхлоратов на температуру кристаллизации воды и микробные сообщества в аналогах реголита Марса
3.	Видакас Александра	Alexandra Vidakas	Faculty of Soil Science, Department of Agrochemistry and Plant Biochemistry	The impact of soil properties, mineral fertilizers and urban load on the development and ornamental qualities of prickly spruce (<i>Picea pungens</i> L.)	Влияние свойств почв, минеральных удобрений и городской нагрузки на развитие и декоративные характеристики ели колючей (<i>Picea pungens</i> L.)
4.	Государева Екатерина Алексеевна	Ekaterina A. Gosudareva	Faculty of Soil Science, Department of General Agriculture	Assessment of the Bryansk forest in terms of vegetation	Оценка состояния растительности Брянского леса
5.	Жиянова Мария	Mariya Zhiyanova	Faculty of Soil Science, Department of Agrochemistry and Plant Biochemistry	Study of the effectiveness of prolonged-acting fertilizers with biodegradable shells when growing lettuce (<i>Lactuca sativa</i> L.)	Изучение эффективности удобрений пролонгированного действия с биоразлагаемыми оболочками при выращивании салата (<i>Lactuca sativa</i> L.)
6.	Коваленко Мария Анатольевна	Maria Kovalenko	Faculty of Soil Science, Department of Soil Biology	Evaluation of the influence of temperatures on the microbiome of oil-contaminated soils of the European part of Russia and Antarctic soils	Оценка влияния температур на микробиом загрязненных нефтью почв европейской части России и антарктических грунтов
7.	Корсикова София	Sofiiia Korsikova	Faculty of Soil Science, Department of Soil Physics	Comparative characteristics of soil cadastral value in agricultural landscapes of the Altai territory	Сравнительная характеристика кадастровой стоимости земель агроландшафтов Алтайского края
8.	Огородняя Софья	Sofia Ogorodniaia	Faculty of Soil Science, Department of Soil Physics and Reclamation	Physical properties of the upper mineral horizons of the felling soils (middle taiga, Komi Republic)	Физические свойства верхних минеральных горизонтов почв вырубки (средняя тайга, Республика Коми)
9.	Руньков Руслан	Ruslan Runkov	Faculty of Soil Science, Department of Soil Physics	Spatial variability of methane emissions from soils of wet forests: a brief review	Пространственная изменчивость выбросов метана из почв влажных лесов: краткий обзор
10.	Хлевная Влада	Vlada Khlevnaya	Faculty of Soil Science, Department of Soil Biology	Research of growth parameters of microalgae <i>Chlorella vulgaris</i> in extracts from coniferous fractions of forest litter	Исследование параметров роста микроводоросли <i>Chlorella vulgaris</i> на вытяжках из хвойных фракций подстилок
11.	Шабалин Федор	Fedor Shabalin	Faculty of Soil Science, Department of Agrochemistry and Plant Biochemistry	Productivity and quality of common chicory (<i>Cichórium intybus</i> L.) using foliar feeding in the late stages of the growing season	Урожайность и качество цикория обыкновенного (<i>Cichórium intybus</i> L.) при фоллиарной подкормке в поздние сроки вегетации агрохимическими средствами

January 24
Afternoon session 14.00–18.00
Subsession 1.3 General biology
Moderators: L. Polubichenko, S. Kazantseva
Room 389

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Гришина Дарья Юрьевна	Darya Y. Grishina	Faculty of Biology, Department of Invertebrate Zoology	Integrative taxonomy and phylogeography <i>Eubranchus rupium – exiguus</i> (Gastropoda: Nudibranchia) species complex	Интегративная таксономия и филогеография комплекса видов <i>Eubranchus rupium – exiguus</i> (Gastropoda: Nudibranchia)
2.	Дедыкин Иван	Ivan Dadykin	Faculty of Biology, Department of Invertebrate Zoology	Inland Water Microcrustaceans of the Karaginsky District (Kamchatka Krai)	Микроракообразные внутренних водоемов Карагинского района (Камчатский край)
3.	Дробкова Александра	Alexandra Drobkova	Faculty of Biology, Department of Mycology and Algology	Comparative Characteristics of Algologically Pure and Axenic Cultures of Microalgae	Сравнительные характеристики альгологически чистых и аксеничных культур микроводорослей
4.	Дукат Анна	Anna Dukat	Faculty of Biology, Department of Microbiology	Thermophilic Sulfur-Oxidizing Bacteria of the Uzon Caldera	Термофильные сероокисляющие бактерии кальдеры Узон
5.	Иванова Мария	Mariia Ivanova	Faculty of Biology, Department of Higher Plants	Taxonomic Composition and Morphology of <i>Elatine</i> Species of the Russian Far East	Таксономический состав и морфология видов <i>Elatine</i> российского Дальнего Востока
6.	Комарова Анна	Anna Komarova	Faculty of Biology, Department of Anthropology	Influence of degree of masculinity in people on perception of their emotions by others	Влияние степени маскулинности лица человека на восприятие его эмоций другими людьми
7.	Крупский Иван Александрович	Ivan Kroupsky	Faculty of Biology, Department of Higher Plants	Phylogeny and morphological evolution of <i>Peliosanthes</i> (Asparagaceae)	Филогения и морфологическая эволюция рода <i>Peliosanthes</i> (Asparagaceae)
8.	Львова Ася	Asia Lvova	Faculty of Biology, Department of Higher Plants	Changes in the allergenic potency of <i>Betula</i> pollen since its emission	Изменение аллергенных свойств пыльцы березы с момента ее эмиссии
9.	Мерзликін Даниил Сергеевич	Daniil Merzlikin	Faculty of Biology, Department of Evolutionary Biology	Study and comparison of Odonoptera ovipositions from the Carboniferous, Permian and Triassic periods	Изучение и сопоставление яйцекладок Odonoptera из каменноугольного, пермского и триасового периодов
10.	Парафенюк Екатерина	Ekaterina Parafenyuk	Faculty of Biology, Department of Vertebrate Zoology	Male reproductive strategies in isolated population of feral horse (<i>Equus ferus caballus</i> Linnaeus, 1758)	Репродуктивные стратегии самцов в изолированной популяции одичавших лошадей (<i>Equus ferus caballus</i> Linnaeus, 1758)
11.	Снытников Евгений Александрович	Evgenii Snytnikov	Faculty of Biology, Department of General Ecology and Hydrobiology	Phytogeography and systematics northern three-toed jerboa <i>Dipus sagitta</i>	Филогеография и систематика мохноногого тушканчика <i>Dipus sagitta</i>

January 24
Afternoon session 14.00–18.00
Subsession 1.4 General biology
Moderators: N. Glinskaya, E. Kozharskay
Room 252

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Безрукова Юлия Сергеевна	Iuliia Bezrukova	Faculty of Biology, Department of Vertebrate Zoology	Persistence and variability of songbird's dialects over long periods of time on the example of the thrush nightingale <i>Luscinia luscinia</i>	Постоянство и изменчивость диалектов певчих птиц на больших отрезках времени на примере восточного соловья <i>Luscinia luscinia</i>
2.	Гайсин Никита Олегович	Nikita O. Gaisin	Faculty of Biology, Department of Mycology and Algology	Fusarium Link species from protected forest areas in Vietnam	Грибы рода <i>Fusarium</i> Link охраняемых лесов Вьетнама
3.	Дорофеев Владимир Олегович	Vladimir Dorofeev	Faculty of Biology, Department of Entomology	On the systematic Position of the Genus <i>paraphaenogaster</i> dlusky, 1981 (hymenoptera, formicidae)	О систематическом Положении Рода <i>paraphaenogaster</i> dlusky, 1981 (hymenoptera, formicidae)
4.	Дубов Никита Владимирович	Nikita Dubov	Faculty of Biology, Department of Anthropology	Morphofunctional and Epidemiological Aspects of Acne	Морфофункциональные и эпидемиологические аспекты акне
5.	Касаткина Анастасия Николаевна	Anastasia N. Kasatkina	Faculty of Soil Science, Department of Soil Biology	Microbiological characteristics of thermotolerant bacterial complexes of frozen fumarole deposits	Микробиологическая характеристика термотолерантных бактериальных комплексов мерзлых фумарольных отложений
6.	Левещина Елена Владимировна	Elena Leveshchina	Faculty of Biology, Department of Vertebrate Zoology	Сравнительная филогеография и таксономическое разнообразие пустынно-степных ежей (<i>Hemiechinus auritus</i> , <i>Mesechinus dauuricus</i>)	Comparative Phylogeography and Taxonomic Diversity of the Steppe-desert Hedgehogs (<i>Hemiechinus auritus</i> , <i>Mesechinus dauuricus</i>)
7.	Мотченко Максим Васильевич	Maksim Motchenko	Faculty of Biology, Department of Anthropology	Variability of Craniological Features in the Asian Populations: Evolutionary Aspects	Изменчивость краниологических признаков населения Азии (эволюционные аспекты)
8.	Никандрова Елена	Helen Nikandrova	Faculty of Biology, Department of Higher Plants	Taxonomy of the genus <i>Maianthemum</i> s. s. (Asparagaceae): morpho-molecular aspects	Морфо-молекулярные аспекты систематики рода <i>Maianthemum</i> s. s. (Asparagaceae)
9.	Савченко Вероника	Veronika Savchenko	Faculty of Soil Science, Department of Soil Biology	Antagonism between yeasts isolated from crops and phytopathogenic fungi	Антагонизм дрожжей, выделенных из сельскохозяйственных культур, в отношении фитопатогенных грибов
10.	Сычева Ксения	Kseniia Sycheva	Faculty of Biology, Department of Entomology	Ecological Characteristics and Genetic Diversity of the Invasive Mosquito <i>Aedes (Hulecoeteomyia) koreicus</i> in Southern Russia	Особенности экологии и генетическое разнообразие инвазивного комара <i>Aedes (Hulecoeteomyia) koreicus</i> на юге России
11.	Уразаева Анастасия	Anastasia Urazaeva	Faculty of Biology, Department of Invertebrate Zoology	Anatomy and histology of the reproductive system of the deep-sea chaetognath <i>Eukrohnia hamata</i>	Анатомия и гистология половой системы глубоководной хетогнаты <i>Eukrohnia hamata</i>
12.	Чертопруд Елизавета Михайловна	Elizaveta M. Chertoprud	Faculty of Biology, Department of Invertebrate Zoology	Groundwater Hydrobiidae (Mollusca: Gastropoda) of the Caucasus	Hydrobiidae (Mollusca: Gastropoda) грунтовых вод Кавказа

January 24

Afternoon session 14.00–18.00

Subsession 2.3 Biochemistry and molecular biology

Moderators: O. Kozlova, I. Alikhanova

Room 254

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Зайцева Юлия	Yulia Zaitseva	Faculty of Biology, Department of Biochemistry	Study of RNA-guided DNA nucleases from a new group of bacterial Argonaute proteins in vitro and in vivo	Исследование РНК-гид зависимых ДНК-нуклеаз из новой группы белков-Аргонатов бактерий in vitro и in vivo
2.	Илясов Игорь Олегович	Igor O. Ilyasov	Faculty of Biology, Department of Biochemistry	Determination of the PLP-binding protein VAPA functions from the <i>Variovorax paradoxus</i> betaproteobacteria	Определение функций PLP-связывающего белка VAPA из бетапуротеобактерии <i>Variovorax paradoxus</i>
3.	Леденев Олег Владимирович	Oleg Ledenev	Faculty of Biology, Department of Bioorganic Chemistry	Biological Activity and Physical Chemical Properties of Aqueous Solutions of Regulatory Peptides	Биологическая активность и физико-химические свойства водных растворов регуляторных пептидов
4.	Лунегова Дарья	Daria Lunegova	Faculty of Biology, Department of Biochemistry	Localization of the ligand-binding site within AstaP protein	Локализация лиганд-связывающего участка белка AstaP
5.	Мазур Диана	Diana Mazur	Faculty of Biology, Department of Bioorganic Chemistry	The nicotinic acetylcholine receptor ligands effect on human primary glioblastoma cells	Влияние лигандов никотиновых ацетилхолиновых рецепторов на клетки первичных культур глиобластомы человека
6.	Малухина Алёна Дмитриевна	Alena Malukhina	Faculty of Biology, Department of Molecular Biology	The influence of Prion Domains' Context on the Prion Properties of Proteins in <i>S. cerevisiae</i>	Влияние контекстов принообразующих участков на прионные свойства белков <i>S. cerevisiae</i>
7.	Стародубова Варвара	Varvara Starodubova	Faculty of Biology, Department of Molecular Biology	D-amino acid oxidase of <i>Rhodotorula gracilis</i> as a chemogenetic tool for the generation of hydrogen peroxide in mice hepatocytes	Оксидаза D-аминокислот <i>Rhodotorula gracilis</i> как хемогенетический инструмент для генерации пероксида водорода в гепатоцитах мышей
8.	Таныгина Дарья	Daria Tanygina	Faculty of Biology, Department of Biochemistry	Development of a system of targeted delivery of protein therapeutics based on extracellular vesicles	Разработка системы направленной доставки белковых препаратов на основе внеклеточных везикул

January 24
Afternoon session 14.00–18.00
Subsession 6.3 Ecology
Moderators: A. Foursova, D. Kozlov
Room 226

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Борков Степан	Stepan Borkov	Faculty of Soil Science, Department of Radioecology and Ecotoxicology	Soil pollution and radiation situation in industrial zones of the Southeastern Administrative District of Moscow	Загрязнение почв и радиационная обстановка в промышленных зонах Юго-Восточного административного округа Москвы
2.	Водолага Виктория Игоревна	Victoria I. Vodolaga	Faculty of Biology	Effects of water hardness on toxicity of lead salts to crustaceans <i>Daphnia magna</i>	Формирование токсического эффекта солей свинца в зависимости от жесткости воды (на примере ракообразных <i>Daphnia magna</i>)
3.	Гончарова Анна Владиславовна	Anna Goncharova	Faculty of Soil Science, Department of Soil Biology	Assessment of the impact of the Salaryevo Solid Waste Landfill on soil microbial communities	Оценка влияния полигона твердых коммунальных отходов «Саларьево» на микробные сообщества почв
4.	Жандаров Максим Вячеславович	Maksim Zhandarov	Faculty of Soil Science, Department of Radioecology and Ecotoxicology	Assessment of ecosystem services of the lands of the Belgorod region	Оценка экосистемных услуг земель Белгородской области
5.	Иванова Дарья Андреевна	Daria Ivanova	Faculty of Biology, Department of General Ecology and Hydrobiology	Phytoplankton of Stratified Lakes at Different Stages of Isolation from the White Sea	Фитопланктон стратифицированных озер, находящихся на разных стадиях изоляции от Белого моря
6.	Кузнецов Андрей	Andrey Kuznetsov	Faculty of Soil Science, Department of Radioecology and Ecotoxicology	Assessment of the linkage between soil degradation and food security: a case study of Belgorod region	Оценка взаимосвязи деградации почв и продовольственной безопасности на примере Белгородской области
7.	Пожидаева Анастасия	Anastasiia Pozhidaeva	Faculty of Soil Science, Department of Soil Geography	Transformation of natural-territorial complexes as a result of recreational load on the route of the ecological trail (Valdai National Park)	Трансформация природно-территориальных комплексов в результате рекреационной нагрузки на маршруте экологической тропы (национальный парк «Валдайский»)
8.	Тимофеева Алина Александровна	Alina Timofeeva	Faculty of Biology, Department of General Ecology and Hydrobiology	Macrozoobenthos of Small Reservoirs of The Forest-Steppe Zone Under Conditions of Zoogenic Impact	Макрозообентос малых водоемов лесостепной зоны в условиях зоогенного воздействия
9.	Филиппов Даниил	Daniil Filippov	Faculty of Soil Science, Department of Soil Biology	Evaluation of the biological activity of constructozems of various structures under conditions of the cities of Syktyvkar, Moscow and Krasnodar	Оценка биологической активности конструкторземов различного строения в условиях городов Сыктывкара, Москвы и Краснодара
10.	Чиженко Мария	Mariya Chizhenko	Faculty of Biology, Department of Ecology and Environmental Management	Influence of urban noise on the frequency parameters of thrush nightingale (<i>Luscinia luscinia</i>) song in Moscow and Moscow region	Влияние городского шума на частотные параметры песни восточного соловья (<i>Luscinia luscinia</i>) в Москве и Московской области
11.	Чичекина Екатерина	Ekaterina Chichekina	Faculty of Soil Science, Department of Soil Geography	Spatial model for the redistribution of nutrient flows from wastewater of New Moscow (Greater Moscow) treatment plants within the territory of New Moscow (Greater Moscow)	Пространственная модель для перераспределения потоков биогенных элементов с очистных сооружений внутри территории ТиНАО (Новой Москвы)

January 24

Afternoon session 14.00–18.00

Subsession 6.4 Ecology

Moderators: O. Egorova, N. Morgoun, Z. Alkhastova

Room 221

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Гришковец Диана	Diana Grishkovets	Faculty of Soil Science, Department of Soil Biology	Soil myxomycetes and their bacterial attendants	Почвенные слизевики и их бактериальные спутники
2.	Киселев Александр Дмитриевич	Alexander Kiselev	Faculty of Biology, Department of Invertebrate Zoology	Trophic Niche of Non-Indigenous Crab <i>Chionoecetes opilio</i> (Fabricius, 1788) in Blagopoluchiya Bay of the Kara Sea	Трофическая ниша краба-вселенца <i>Chionoecetes opilio</i> (Fabricius, 1788) в заливе Благополучия Карского моря
3.	Корнеев Павел	Pavel Korneev	Faculty of Biology, Department of Mycology and Algology	Mycobiota of Kuryanov treatment facilities of Mosvodokanal JSC	Микобиота Курьяновских очистных сооружений АО «Мосводоканал»
4.	Коршунова Наталья Олеговна	Natalia Korshunova	Faculty of Soil Science, Department of Soil Chemistry	The effect of de-icing fluid on the chemical composition of eluate in a column experiment with soddy-podzolic soil	Влияние противообледенительных жидкостей на химический состав элюата в колонном эксперименте с дерново-подзолистой почвой
5.	Косякова Анастасия	Anastasia Kosyakova	Faculty of Soil Science, Department of Soil Biology	Effect of sulfide on nitrogen fixation by haloalkalophilic non-heterocystous cyanobacterium <i>Sodalinema</i> sp. P-1104	Влияние сульфида на фиксацию азота галоалкалофильной негетероцистной цианобактерией <i>Sodalinema</i> sp. P-1104
6.	Логвиненко Андрей Денисович	Andrey D. Logvinenko	Faculty of Biology, Department of Invertebrate Zoology	Metazoan Parasites of Few Marine Fish Species Near Pertsov White Sea Biological Station (Lomonosov MSU)	Зараженность многоклеточными паразитами некоторых видов морских рыб в районе ББС МГУ им. Н.А. Перцова
7.	Логвинова Екатерина	Ekaterina Logvinova	Faculty of Soil Science, Department of Soil Biology	Microbial Diversity of Hydrocarbon-Contaminated Soils of the Murmansk region	Микробное разнообразие почв Мурманской области, загрязненных нефтепродуктами
8.	Манахов Павел Дмитриевич	Pavel Manakhov	Faculty of Biology, Department of Ecology and Environmental Management	Adaptations to the High-Altitude Environments in the Cranial Morphology Among the Native Populations of Qinghai and Pamir and Tian Shan Mountains	Проявление адаптации к высокогорным условиям в строении черепа коренных жителей Цинхая, Памира и Тянь-Шаня
9.	Пименов Валерий Евгеньевич	Valerii Pimenov	Faculty of Biology	Local vegetation of the Kamchatka River valley during the Holocene and Late Pleistocene: reconstruction based on palynological and tephrochronological data	Реконструкция локальной растительности в долине реки Камчатка в позднем плейстоцене и голоцене на основе данных палинологии и тейфрохронологии
10.	Погорелова Ольга	Olga Pogorelova	Faculty of Soil Science, Department of Soil Geography	Ecological assessment of the land use system in the Tver region	Экологическая оценка системы землепользования тверской области
11.	Полошевец Таисия	Taisiia Poloshevets	Faculty of Biology, Department of Ecology and Plant Geography	Leaf functional traits and strategies of plants in subalpine <i>Calamagrostis</i> meadows of the North-Western Caucasus	Функциональные признаки листьев и стратегии растений субальпийских вейниковых лугов Северо-Западного Кавказа
12.	Резник Евгения Владиславовна	Evgenia V. Reznik	Faculty of Biology, Department of Mycology and Algology	White sea phytoplankton community structure and species composition	Видовой состав и структура сообщества фитопланктона Белого моря

January 24
Afternoon session 14.00–18.00
Subsession 6.5 Ecology
Moderators: E. Mikheeva, A. Volkova
Room 288

	Name in Russian	Name in English	Faculty, department	Title of paper in English	Title of paper in Russian
1.	Аверкиева Ульяна	Uliana Averkieva	Faculty of Soil Science, Department of Radioecology and Ecotoxicology	Comparative characteristics of soil radioactivity in the zones of emergency chernobyl contamination and routine emissions from a radiation-hazardous object	Сравнительная характеристика радиоактивности почв в зонах аварийного чернобыльского загрязнения и штатных выбросов радиационно-опасного объекта
2.	Волкова Вероника	Veronika Volkova	Faculty of Soil Science, Department of Land Resources and Soil Evaluation	Sorption activity of <i>Alternaria alternata</i> and <i>Fusarium oxysporum</i> against Cu	Сорбционная активность микромицетов <i>Alternaria alternata</i> и <i>Fusarium oxysporum</i> по отношению к Cu
3.	Волкова Елизавета	Elizaveta Volkova	Faculty of Soil Science, Department of General Soil Science	Effects of pharmaceuticals on the rhizosphere properties	Влияние фармацевтических препаратов на свойства ризосферы
4.	Горбань Артемий Александрович	Artemy Gorban	Faculty of Biology, Department of Vertebrate Zoology	Distribution and genetic diversity structure of steppe whiskered bat <i>Myotis davidii</i> (Peters, 1869)	Распространение и структура генетического разнообразия степной ночницы <i>Myotis davidii</i> (Peters, 1869)
5.	Гусева Полина	Polina Guseva	Faculty of Soil Science, Department of Soil Geography	Distribution of enchytraeid functional groups in soils of the Cis-Urals transect	Распределение экологических групп энхитриид почв модельной трансекты Предуралья
6.	Зуев Кирилл Юрьевич	Kirill Y. Zuev	Faculty of Biology	Deadwood dynamics in deciduous forests of the Kaluzhskie Zaseki Nature Reserve	Динамика валежа в широколиственных лесах заповедника «Калужские засеки»
7.	Лунегова Лада	Lada Lunegova	Faculty of Soil Science, Department of Land Resources and Soil Evaluation	Assessment of the toxicity of soils with the addition of ash and slag waste	Оценка токсичности почвогрунтов с добавлением золошлаковых отходов
8.	Салова Варвара Дмитриевна	Varvara Salova	Faculty of Biology, Department of Microbiology	Novel representative of the phylum <i>Verrucomicrobiota</i> isolated from a bioreactor with methane-oxidising microorganisms	Новый представитель филума <i>Verrucomicrobiota</i> , выделенный из биореактора с метаноокисляющими микроорганизмами
9.	Самбурский Алексей	Alexei Samburskii	Faculty of Soil Science, Department of Soil Chemistry	Absorption of Cs (I) and Sr (II) by bentonites modified with model formation water	Абсорбция Cs (I) и Sr (II) бентонитами, обработанными модельной пластовой водой
10.	Смородникова Юлия	Iuliia Smorodnikova	Faculty of Soil Science, Department of Land Resources and Soil Evaluation	Assessment of soils formed under the impact of wastes (tailings) from the enrichment of tin ores according to biological indicators	Оценка состояния почв, формирующихся под воздействием отходов (хвостов) обогащения оловянных руд по биологическим показателям
11.	Спасская Екатерина	Ekaterina Spasskaya	Faculty of Soil Science, Department of Soil Biology	Bacteria in the solid atmospheric precipitation of some Russian cities	Бактерии в твердых атмосферных выпадениях некоторых городов России

PLENARY PRESENTATIONS

REGULATION OF SOIL RESPIRATION IN URBAN LAWNS USING MINERAL FERTILIZERS

РЕГУЛИРОВАНИЕ ДЫХАНИЯ ПОЧВ ГОРОДСКИХ ГАЗОНОВ С ПРИМЕНЕНИЕМ МИНЕРАЛЬНЫХ УДОБРЕНИЙ

Elizaveta Derevenets

Faculty of Soil Science, Department of Soil Geography

Keywords: soil respiration, greenhouse gases, mineral fertilizers, urban lawn soils

The increase in carbon dioxide content in the atmosphere of our planet remains urgent problem due to its influence on climate change. Soils act as both a source and a sink for greenhouse gases such as CO₂, CH₄, N₂O. It is not widely known that about a third of atmospheric CO₂ is of soil origin. Despite this, the contribution of soils to the adaptation and mitigation of climate change is still insufficiently assessed, but it can be significant, as demonstrated for urban lawns.

One of the factors regulating the emission of carbon dioxide from urban lawn soils is the mineral fertilizers used to maintain an aesthetically attractive and sustainable grass cover. However, researchers' opinions on this effect and soil microbial communities reaction are ambiguous, therefore studying the influence of mineral fertilizers on soil respiration is relevant. The purpose of this investigation was to analyze the effect of various types and doses of mineral fertilizers on soil respiration of urban lawns in Moscow megalopolis. The studies were performed in the Botanical Garden of Moscow State University on Leninskie Hills in a small-plot experiment with the fractional application of four types of complex fertilizers (NPKS 27:6:6:2, NPKS 21:10:10:2, NPK 15:15:15 and NPK 18:18:18 + 3 MgO + trace elements) at the doses of 60 and 120 kg N/ha during the growing season. To conduct the experiment the basal respiration of soils was studied, carbon content of microbial biomass was estimated by substrate-induced respiration, and the CO₂ emission from soils was investigated by the method of closed static chambers.

The hypothesis that different types of fertilizers may exert various impacts on CO₂ formation and emission from soils due to their effect on the soil microbial communities functioning is confirmed. Various impacts of mineral fertilizers on short-term and seasonal dynamics of CO₂ emission from soils of urban lawn are shown.

The analysis of the CO₂ emissions in short-term dynamics after repeated fertilizers application shows that the use of NPKS 21:10:10:2 leads to the lowest intensity of soil respiration and basal respiration along with the smaller increase in microbial biomass.

To conclude, diagnosing the functioning of urban lawn soils and vegetation using different mineral fertilizers should allow to select the most effective way to maintain a healthy lawn and minimize CO₂ production in urban ecosystems.

SCREENING FOR NOVEL COMPOUNDS WITH ANTICOMPULSIVE ACTIVITY

ПОИСК НОВЫХ СРЕДСТВ С АНТИКОМПУЛЬСИВНОЙ АКТИВНОСТЬЮ

Козин Ярослав

Faculty of Fundamental Medicine

Keywords: Obsessive-compulsive disorder, 8-OH-DPAT, marble burying, Rotarod, compound screening, neurotrophic factor

Relevance. Obsessive-compulsive disorder (OCD) is a prevalent psychiatric disorder often accompanied by many comorbidities. WHO rates it among the top 10 diseases by decrease in the quality of life and loss of income. OCD is characterized by the presence of obsessions, unwanted intrusive thoughts or images causing marked distress, and/or compulsions, ritualistic repetitive behaviors or mental acts used to alleviate the distress. Relatively low therapy efficacy, long latency period, and intensity of adverse effects dictate the relevance of the search for new, effective, and safe means of pharmacological correction of OCD. In this work, we looked to screen a band of newly synthesized compounds and an already used drug in the most popular animal models of OCD. **Goal.** To study the effects of a dipeptide BDNF mimetic GSB-106 in doses of 1, 5 and 10 mg/kg, a 4-phenylpiperolidone derivative GIZH-290 in doses of 0.01, 0.1 and 1 mg/kg, a dipeptide neurotensin mimetic dilept in doses of 0.8, 3.2 and 6.4 mg/kg, all synthesized at Research Zakusov Institute of Pharmacology, and a GABAB-receptor agonist baclofen in doses of 0.1, 1 and 5 mg/kg after single dose administration in animal models of OCD. **Methods.** In this work, GSB-106, GIZH-290, dilept, and baclofen are studied using the 8-OH-DPAT-induced decrease in spontaneous alternation model and in the marble burying test. The Rotarod test was used as well to assess the motor activity. **Results.** GSB-106 (1, 5 and 10 mg/kg), GIZh-290 (0.01, 0.1 and 1 mg/kg), dilept (3.2 and 6.4 mg/kg), and baclofen (0.1, 1 and 5 mg/kg) were shown to possess an anticomplusive-like effect as they reduced the marble burying behavior, although baclofen's effect was accompanied by the motor disturbances in the 5 mg/kg dose. GSB-106 (10 mg/kg) and dilept (0.8 mg/kg) also showed anticomplusive-like effect in the 8-OH-DPAT-induced decrease in spontaneous alternation. However, neither baclofen, nor GIZH-290 did not decrease the perseverative-like behavior in the 8-OH-DPAT-induced decrease in spontaneous alternation. On the contrary, baclofen (1 mg/kg) exacerbated the effect of 8-OH-DPAT in the 8-OH-DPAT-induced decrease in spontaneous alternation model. **Conclusion.** GSB-106 and dilept show anticomplusive activity in the marble burying test and the 8-OH-DPAT-induced decrease in spontaneous alternation model, however GIZH-290 and baclofen only possess anticomplusive activity in the marble burying test and not in the 8-OH-DPAT-induced decrease in spontaneous alternation model with baclofen affecting motor function at the 5 mg/kg dose.

THE GENOME DETECTIVE: UNIVERSAL BIOSENSOR FOR CRISPR-CAS ACTIVITY EVALUATION

Sun Ruijia

Shenzhen MSU-BIT University, Faculty of Biology, Department of Nanobiotechnology

Synthetic biology is a rapidly growing field that applies engineering principles to biological systems, enabling the development of biotechnologies to design, construct, and manipulate biological entities. Through the construction of new biological systems synthetic biologists can help to open up new treatment possibilities for different diseases and tackle global challenges. At the forefront of advancing synbio stands iGEM, which runs the premier student competition in this field, attracting over a thousand of participants each year. Among the groundbreaking projects showcased in iGEM competitions are notable contributions like the portable biosensor device developed by the Moscow team in 2019 to detect tick-borne diseases, and “HaploSense”, a fast and specific portable device for Hepatitis C genotype detection created by the 2020 Moscow team during the Covid-19 pandemic. Inspired by the achievements of the Moscow team, the 2023 Shenzhen MSU-BIT University (SMBU) iGEM team developed a universal cellular biosensor to detect real-time activity of CRISPR-Cas system in somatic cells aiming to enhance the precision and efficacy of genome editing.

The project of SMBU iGEM team utilized biobricks and CRISPR-Cas systems, integrating a reporter protein to facilitate real-time detection in somatic cells. The Golden Gate assembly technique, renowned for its efficiency in cloning and seamless assembly of multiple DNA fragments, was utilized to construct the biosensor system. Fluorescence polarization was employed to measure protein-DNA interactions, providing a real-time, non-invasive method to monitor CRISPR-Cas activity, thus overcoming the limitations of traditional methods such as the electrophoretic mobility shift assay (EMSA), which is notably time-consuming and less efficient. The biosensor system incorporated a genetic construct comprising sgRNA and reporter proteins, such as RFP and GFP, enabling continuous monitoring in various tissues. Additionally, mathematical modeling software was employed to simulate and optimize the interactions within the CRISPR-Cas systems, while custom hardware, designed and created through 3D printing, facilitated the experimental procedures. This integrative approach allows for real-time measurement of CRISPR-Cas activity, significantly enhancing the accuracy and reliability of the system.

With the support of the faculty of biology of Shenzhen MSU-BIT university and help from Dean Dr. Andrey Kitashov, the team project successfully developed a universal cellular biosensor model alongside a mathematical modeling tool to optimize CRISPR-Cas systems. These advancements enhance the selection process for effective CRISPR-Cas systems tailored to specific genetic modifications. Furthermore, the human practice efforts engaged over 500 individuals from diverse educational backgrounds, effectively promoting awareness and cultivating interest in the general public towards the field of synthetic biology.

NEW CLASS OF SUPERSOFT ADAPTIVE MATERIALS BASED ON COPOLYMERS: STRUCTURAL STUDIES WITH SYNCHROTRON RADIATION

СТРУКТУРНЫЕ ИССЛЕДОВАНИЯ НОВОГО КЛАССА СВЕРХМЯГКИХ АДАПТИВНЫХ МАТЕРИАЛОВ НА ОСНОВЕ СОПОЛИМЕРОВ С ПОМОЩЬЮ СИНХРОТРОННОГО ИЗЛУЧЕНИЯ

Умаров Акмаль

Faculty of Fundamental Physical and Chemical Engineering

Keywords: Bottlebrush triblock copolymers, Gels, biomimetic materials, Small Angle X-ray Scattering, Synchrotron radiation, Swelling

Bottlebrush triblock copolymers are biomimetic materials considered to be promising for biomedicine. They imitate biological tissues, which exhibit a unique combination of two opposite properties – softness and elasticity under relatively small stress values, but intense strain-stiffening with increase in deformation. These features of mechanical behavior allow to apply them as bioimplants. Another useful property of bottlebrush networks is their ability to change volume manyfold when exposed to an appropriate solvent. Injectable bottlebrush hydrogels based on approach of combining linear and bottlebrush architecture are desired in biomedical applications such as drug delivery, reconstructive surgery, and tissue engineering. Investigation of swelling and gelation processes and mechanisms in such systems is an important task of gel physics

Small Angle X-Ray Scattering studies were conducted to investigate changes in supramolecular structure during swelling and gelation processes for a series of samples with the same chemical compound, but different structure parameters: side chain length (nsc), grafting density (ng), the degree of polymerization of brush block (nbb) and the degree of polymerization of linear blocks (nL). To study the structure as the function of the swelling ratio a unique for such system approach was developed. Dynamic SAXS data were obtained at European Synchrotron Radiation Facility (ESRF, Grenoble).

For systems based on bottlebrush triblock copolymers the scattering peaks appear in the SAXS curves. One of them (in bigger scattering angle area) corresponds to the average distance d_1 between the neighboring bottlebrush backbones and the other one to distance d_3 between the spheres related to crosslinks in network. During the swelling processes, the peak's location moves to the area of smaller angles, i. e. the distance increases. To analyze this dynamic process, a Python algorithm, which automates the process of choosing an interval and initial data for approximating the experimental data, was built. Thus, we obtained the dependencies between the swelling ratio (in term of d_3) and the distance d_1 between the neighboring bottlebrush backbones. Collected data were compared with models of two-dimensional and three-dimensional swelling.

NOVEL BROAD-SPECTRUM RECOMBINANT VACCINE CANDIDATE FOR ROTAVIRUS A PREVENTION

НОВАЯ РЕКОМБИНАНТНАЯ ВАКЦИНА-КАНДИДАТ ШИРОКОГО СПЕКТРА ДЕЙСТВИЯ ПРОТИВ РОТАВИРУСА А

Худайназарова Нелли

Faculty of Biology, Department of Virology

Keywords: Rotavirus vaccine; recombinant vaccine; plant virus adjuvant

Rotavirus infection is a leading cause of severe gastroenteritis in children under five years of age. The best way to prevent rotavirus infection is vaccination. Since 2006, four attenuated rotavirus vaccines have been licensed in more than 100 countries. Despite the worldwide introduction of rotavirus vaccination, the global burden of rotavirus-associated gastroenteritis remains high. Rotavirus infection still causes more than 128,500 deaths annually [1]. Current vaccines have a number of disadvantages, including low effectiveness in developing countries; serious side effects, such as intestinal intussusception; a wide range of contraindications; the risks of chronic infection and reversion of the vaccine strain to a virulent phenotype. The shortcomings of the existing vaccines emphasize the need for newer approaches to rotavirus vaccine design. The goal of the present work is to develop the novel broad-spectrum highly immunogenic and safe vaccine candidate against Rotavirus A (RVA). As the basis for the vaccine candidate, a recombinant Rotavirus A antigen (abbreviated as RAA) was obtained. This antigen includes sequences of VP8* subunit of rotavirus protein VP4 – spike protein of RVA virion capsid. For antigen design, two methods were combined – the application of the peptide that corresponds to the pathogen’s neutralising epitope, highly conserved among RVA strains; and the use of the extended VP8* subunit fragment. The RAA was expressed in *Escherichia coli* culture, isolated, purified and characterised.

When developing a new vaccine, it is essential to take into consideration currently relevant virus strains. For this reason, antigenic specificity of the RAA was examined using antisera to patient-derived rotavirus isolates circulating in the Russian Federation. The correspondence of the antigen to currently circulating RVA variants was analysed by Western blot and ELISA analyses.

The proposed vaccine candidate also contains an innovative, effective, safe and biodegradable adjuvant, spherical particles (SPs), obtained from plant virus (tobacco mosaic virus, TMV) through thermally-induced rearrangement [2, 3]. The immunogenicity of the RRA + SPs vaccine composition was evaluated in a murine model.

The data obtained indicate that the vaccine candidate based on the RRA and SPs composition is a prospective subject for further research and may one day become a good alternative to existing vaccines.

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SECTIONAL PRESENTATIONS

SYSTEMATICS, PHYLOGENY AND BIOGEOGRAPHY OF HELMETED TOADS OF THE GENUS *INGEROPHRYNUS* (ANURA: BUFONIDAE) **СИСТЕМАТИКА, ФИЛОГЕНИЯ И БИОГЕОГРАФИЯ ШЛЕМОНОСНЫХ ЖАБ РОДА *INGEROPHRYNUS* (ANURA: BUFONIDAE)**

Архипов Дмитрий

Faculty of Biology, Department of Vertebrate Zoology

Keywords: *Ingerophrynus*, phylogeny, biogeography, systematics, species boundaries

Helmeted toads *Ingerophrynus* is a genus of terrestrial tropical amphibians which includes 12 species endemic to the Southeast Asia [1]. However, the wide range of the genus makes it an attractive subject for studies and preliminary data suggest that the diversity of genus may be underestimated [2]. The purpose of this work is a comprehensive study of the diversity and phylogenetic relationships within the genus based on the analysis of DNA markers, morphometric analysis and GIS modeling of ranges.

The material for our work was the collection of the Zoological Museum of Moscow State University. The genetic analysis included tissue samples of all species of the genus. DNA extraction, PCR, and sequencing were performed using standard methods. Three fragments of mitochondrial DNA (16S rRNA, 12S rRNA and ND1) and three nuclear DNA genes (POMC, BDNF and RAG1) were studied. Phylogenetic analysis was carried out using MrBayes and IQtree programs. Historical biogeography and divergence time estimates were reconstructed using RASP and BEAST, respectively. Morphological analysis was carried out in the Statistica program based on standard morphological measurements [3]. The ecological niches of species were modeled in the Maxent program using 762 locations of three species from databases GBIF and iNaturalist.

The resulting phylogeny has confirmed the monophyly of the genus and suggested that its diversity is significantly underestimated. It has shown that the formation of *Ingerophrynus* probably occurred in Borneo about 16 million years ago. Within *Ingerophrynus* six groups of species have been identified, united in two main clades – Sunda and Indochinese. Within species from two to six significantly separate genetic lineages have been identified ($p = 4.5\sim 8.4\%$).

GIS models of ecological niches show a reliable distribution of three species. Models for *I. macrotis* and *I. galeatus* show a clear spatial separation of the identified genetic lineages, while models for the two lineages of *I. parvus* show their complete geographic separation and deep differentiation of the ecological niches of these lineages. The border between them coincides with the Kangar-Pattani line. Together with significant genetic and morphological differentiation, GIS modeling data confirm that the northern lineage is probably a new species.

Further studies of the systematics, phylogeny and biogeography of the *Ingerophrynus* require complex morphological and acoustic studies of lineages identified within the genus.

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SEASONAL DYNAMICS OF SOIL SOLUTION COMPOSITION СЕЗОННАЯ ДИНАМИКА СОСТАВА ПОЧВЕННОГО РАСТВОРА

Sofia Borisova

Faculty of Soil Science, Department of General Soil Science

Keywords: Lysimeters, soil solution, macro- and microelements

Studying soil solution dynamics is a crucial task of fundamental soil science since it sheds light on the functioning of the soil body and the contribution of biological cycling to soil cover formation. Moreover, studying soil solution composition in a long-range prospect allows us to assess and predict the state of soils in urban conditions.

Since the 1960s, soil solutions have been monitored using large lysimeters at the MSU Soil station. There are two groups of lysimeters installed. Lysimeters of the first group differ in vegetation, while the second group is characterized by various types of ameliorative tillage. Monitoring comprises several annual cycles of observations involved in ongoing studies on the role of litter in soil formation and biogeochemical cycling of trace elements. However, this work includes the results obtained during the last year observations.

The aim of this work was to establish regularities in soil solution seasonal dynamics, affected by different phytocenoses and ameliorative tillage. We determined similarities and differences in the composition of solutions obtained from lysimeters of two groups and ascertained the regularities of macro- and microelements' water migration. Soil solutions were sampled from 2 groups of lysimeters. In the obtained solutions, the contents of macro- and microelements were measured with an AAS-3 atomic absorption spectrophotometer. For elements with low concentrations, the MS-ICP method was applied using an Agilent 7500a ICP-MS spectrometer. Anion composition was determined with a Dionex ICS-2000.

Soil solutions forming under various phytocenoses contained essential elements such as Ca, Na, K and Mg at higher concentrations than those occurring under different soil tillage types. Nonetheless, those leading elements showed similar water migration coefficients observed for soil solutions of both lysimeter groups. Ca, Na, K and Mg, along with C, N and Cl, represented the most intensively migrating components.

Similar water migration coefficients emphasize the invariance of elements' behavior under both high and low intensities of biological cycling. However, the higher velocity of biological cycling, the more elements are included in it. Due to the different intensities of biological cycling, two independent groups of soil solutions varying in composition are formed. Thus, biological cycling plays a regulating role in the migration flow of essential elements.

SOIL POLLUTION AND RADIATION SITUATION IN INDUSTRIAL ZONES OF THE SOUTHEASTERN ADMINISTRATIVE DISTRICT OF MOSCOW

ЗАГРЯЗНЕНИЕ ПОЧВ И РАДИАЦИОННАЯ ОБСТАНОВКА В ПРОМЫШЛЕННЫХ ЗОНАХ ЮГО-ВОСТОЧНОГО АДМИНИСТРАТИВНОГО ОКРУГА МОСКВЫ

Stepan Borkov

Soil Science Faculty, Department of Radioecology and Ecotoxicology

Keywords: Soil radioactivity, heavy metals, petroleum products

In industrial areas, pollution can cover the entire thickness of the soil and reach its deep horizons and groundwater. As a rule, various sources of pollution operate in industrial zones, forming a wide range of pollutants entering the natural environment. Therefore, the study of the distribution of toxicants and radionuclides in the soil profiles of industrial zones is an urgent task. In the city of Moscow, on the territory of many old industrial zones, it is planned to build new residential neighborhoods in the coming years. In this regard, the analysis of soil pollution in these areas is necessary to assess sanitary and hygienic indicators and ensure environmental safety of the population.

The purpose of this research is to study the levels of accumulation and distribution of radionuclides, petroleum products and heavy metals in the surface and deep horizons of soils of various urban ecosystems of some industrial zones of the Southeastern Administrative District of Moscow on the basis of literary materials and own research. In this work, the values of the equivalent dose of gamma radiation and the levels of specific activity and the distribution of natural radionuclides in urban soils were measured, the content and distribution of petroleum products in the soil profiles of industrial zones were estimated, the contents and distributions of mobile forms of heavy metals in the soil profiles of industrial zones were determined.

As a result, it can be said that in the Southern Port area, the content of petroleum products in the studied soils does not exceed the permissible norms, with the exception of one point dedicated to the site of man-made waste storage, in which the excess was 1.3 MPC. In the Kapotnya area, the excess of permissible norms was found in 5 out of 9 points, in some of them by 1.2–5 times, and in one of the points by 33–88 times. As a result of measurements of the content of mobile forms of heavy metals, exceedances of the maximum permissible concentrations for Cd, Cu, Ni, Pb, Zn were detected. The largest number of exceedances were found in the levels of Pb and Zn. Previously, it can be said that in both industrial zones, the levels of specific activity of natural radionuclides do not exceed control levels

of 370 Bq/kg, and the density of Cs – 137 pollution does not exceed the level of global precipitation of 3.5 kBq/m².

INFLUENCE OF PERCHLORATES ON WATER CRYSTALLIZATION TEMPERATURE AND MICROBIAL COMMUNITIES IN MARS REGOLITH SIMULANTS

ВЛИЯНИЕ ПЕРХЛОРАТОВ НА ТЕМПЕРАТУРУ КРИСТАЛЛИЗАЦИИ ВОДЫ И МИКРОБНЫЕ СООБЩЕСТВА В АНАЛОГАХ РЕГОЛИТА МАРСА

Denis Vedenev

Soil Science Faculty, Department of Soil Physics

Keywords: Astrobiology, microorganisms, perchlorate resistance, freezing point

During the studies of Mars regolith by various landing missions, it was found that its surface layer includes perchlorates (up to 1%) [1]. Perchlorates are characterized by high hygroscopicity and the ability to significantly reduce the water crystallization temperature. Due to these properties, in the conditions of Mars, perchlorates are able to form liquid brines, serving as a potential habitat for microorganisms. However, the capability of bacterial survival in such conditions in situ has not been determined.

To study the dependence of the crystallization temperature of aqueous perchlorate solutions on their concentration and mechanical composition of regolith analogues, experiments were conducted on the freezing-thawing of 3 regolith mechanical analogues (particle sizes: 500–1000 microns, 100–250 microns and <63 microns) in a freezer ($t = -80\text{ }^{\circ}\text{C}$). The samples were saturated with sodium perchlorate (NaClO_4) solutions of 10%, 25% and 50% – perchlorate concentrations. The temperature in the samples was recorded every 10 seconds, which made it possible to identify the phase transition.

The study of the microbiological activity of arid soils with the addition of perchlorates was carried out in an experiment with native mountain soil sampled in the foothill of the Teide volcano on Tenerife, since the microbial community from this sample has shown the greatest resistance when cultured on perchlorate-containing media.

The experimental results showed that bacterial communities in a heterogeneous environment were able to survive oxidative stress caused by the presence of perchlorates and could grow, multiply and metabolize under favorable conditions. The dependence of the water crystallization temperature on the granulometric composition of the soil was also established: the crystallization temperature decreased with increasing particle size.

At the moment, the number of studies on the perchlorate effects on microorganisms in situ is small. During these researches, the impact of perchlorates on prokaryotes in concentrations up to 5% has been determined [2]. In our study, it was found that microbial communities exposed to sodium perchlorate in concentrations up to 10% showed high tolerance and retained a large number of viable cells. This is a weighty argument in favor of the survival possibility of terrestrial-type microorganisms

in perchlorate solutions on Mars. Also, this indicates that this is not the maximum concentration at which microbial communities are able to survive in situ. Thus, further research is needed in the field of studying the effect of perchlorates in higher concentrations.

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THE IMPACT OF SOIL PROPERTIES, MINERAL FERTILIZERS AND URBAN LOAD ON THE DEVELOPMENT AND ORNAMENTAL QUALITIES OF PRICKLY SPRUCE (*PICEA PUNGENS* L.)

ВЛИЯНИЕ СВОЙСТВ ПОЧВ, МИНЕРАЛЬНЫХ УДОБРЕНИЙ И ГОРОДСКОЙ НАГРУЗКИ НА РАЗВИТИЕ И ДЕКОРАТИВНЫЕ ХАРАКТЕРИСТИКИ ЕЛИ КОЛЮЧЕЙ (*PICEA PUNGENS* L.)

Alexandra Vidakas

Soil Science Faculty, Department of Agrochemistry and Plant Biochemistry

Keywords: Conifers, mineral nutrition, pollution, decorative effect

Among all coniferous plants prickly spruce (*Picea pungens* L.) is the most resistant to various soil and climatic conditions of the environment [1]. Due to its hardiness and high ornamental qualities, this plant is often used in landscaping. Urban soils are characterized by poor physical and agrochemical parameters, which creates problems when growing plants. Also, it is necessary to consider the optimal nutrient consumption level of plants when developing agrochemical techniques to grow prickly spruces in cities. Furthermore, there is no information in literature about agricultural technology and the requirements of conifers to mineral nutrition, which makes it difficult to achieve a high decorative effect.

The purpose of the work was to identify patterns of influence of soil properties, doses and types of mineral fertilizers and urban load on increments, mineral nutrition and quality indicators of prickly spruce (*Picea pungens* L.). The objects of the study were 8–9 y. o. prickly spruces (*Picea pungens* L.) which were selected on the territory of MSU and in the plant nursery “Seasons” (Kaluga region). The tasks of the experiment included: studying the properties of nursery soils and urban soils; analysis of the supply of plants with macro- and microelements when using various types of fertilizers; determination of the influence of soil properties and mineral fertilizers on biometric indicators and ornamental qualities of prickly spruce (*Picea pungens* L.). Agrochemical parameters of soils and chemical composition of plants were analyzed using generally accepted methods [2].

The results of determining microelements in plants showed that the availability of zinc and copper in urban soils was 8–13 times higher than in nursery soils. The parameters of increments for nursery

plants indicated that the application of ammonium nitrate together with zinc, copper, boron and the complex of microelements didn't stimulate plant growth due to the low doses. The comparison of increments demonstrated that, despite the slightly acidic reaction of the environment, favorable for conifers, and the absence of pollution in the nursery, the parameters of urban plants at slightly alkaline pH values and in conditions of high concentrations of Pb and Cd were higher. Consequently, with a sufficient supply of mineral nutrition elements, a high concentration of heavy metals had little effect on plant growth.

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EFFECTS OF PHARMACEUTICALS ON THE RHIZOSPHERE PROPERTIES **ВЛИЯНИЕ ФАРМАЦЕВТИЧЕСКИХ ПРЕПАРАТОВ** **НА СВОЙСТВА РИЗОСФЕРЫ**

Elizaveta Volkova

Faculty of Soil Science, Department of General Soil Science

Keywords: Health and hygiene products (HHPs), pharmaceuticals, rhizosphere, dissolved organic matter (DOM), enzyme activity

The distribution of health and hygiene products (HHPs) in natural environments has increasingly attracted attention in recent decades. It has now been shown that HHPs, their derivatives and metabolites, being biologically active substances, can affect the activity of soil microorganisms and their diversity. The purpose of this study is to examine the influence of emerging pollutants on the properties of the rhizosphere through the products of the pharmaceutical industry and to identify the features of the interaction of these pollutants with the microorganism-plant system.

The study was performed on soil samples obtained from the surface horizon of leached medium-thick heavy loamy chernozem. Lettuce (*Lactuca sativa*) was used as a model plant. We selected four compounds from different therapeutic groups as contaminants: ketoprofen, ciprofloxacin, clotrimazole and atenolol. The drugs were added to the soil in the form of aqueous solutions in four concentration levels (X10, 100, 1000, 10000). When the lettuce reached technical ripeness, each plant was removed from the container and soil samples were taken to study their biological and chemical properties. Enzyme activity was determined colorimetrically and the structure of dissolved organic matter (DOM) was studied using ion cyclotron resonance mass spectrometry.

The data obtained showed that: peptide compounds, as well as substances from the lipid class, were most susceptible to changes in DOM fractions; according to the general set of indicators, even those samples that contained the lowest concentrations of drugs differed from the uncontaminated control samples; changes in the contribution of classes of substances to the composition of DOM

were variable. Lettuce phytomass significantly decreased in samples with the addition of ciprofloxacin at the maximum concentration and ketoprofen at concentrations of 1000 and 10,000 compared to control samples. A decrease in phytomass was also observed for concentrations of ciprofloxacin and clotrimazole at the level of 100. For atenolol, no decrease in plant productivity was observed. A significant decrease in enzymatic activity was noted in samples with the addition of atenolol at a concentration of 1000, ciprofloxacin at a concentration of 10 and 1000, clotrimazole and ketoprofen at a concentration of 100 and 10,000.

The present results demonstrated that the indicators of enzymatic activity, biomass of model plants and DOM composition differed significantly from uncontaminated samples. Differences from control samples were mainly expressed in the inhibitory effect in the form of a decrease in the average values of enzymatic activity and biomass of lettuce.

DISTRIBUTION AND GENETIC DIVERSITY STRUCTURE OF STEPPE WHISKERED BAT *MYOTIS DAVIDII* (PETERS, 1869)

РАСПРОСТРАНЕНИЕ И СТРУКТУРА ГЕНЕТИЧЕСКОГО РАЗНООБРАЗИЯ СТЕПНОЙ НОЧНИЦЫ *MYOTIS DAVIDII* (PETERS, 1869)

Artemy Gorban

Faculty of Biology, Department of Zoology of Vertebrates

Keywords: modelling of ecological niches, phylogeny, phylogeography, species distribution modelling

Steppe whiskered bat (*Myotis davidii*) is one of the few bat species with a truly Trans-Palaearctic distribution. Moreover, due to complexity of its identification, for more than 75 years the species status of *M. davidii* was unclear. High ecological plasticity together with complicated history of the species left a lot of blank spots in our understanding of distribution and genetic structure of *M. davidii*, thus making the revision of the species crucial for determining conservation priorities and understanding the ways of animal dispersal from possible centers of origin.

Two main objectives were set for our study: to clarify phylogeographic structure and to refine the understanding of geographical distribution of *M. davidii*. To accomplish these objectives, a set of tasks was made: firstly, we had to analyze genetic variability of the species using genetic markers of different inheritance systems, and, secondly, to model the distribution of *M. davidii* using a cadaster of animal records and bioclimatic data.

A total of 189 sequences were analyzed, 99 of which were taken from NCBI and BOLD databases, while the remaining were obtained from the bat samples, collected between 2010 and 2021. We used 4 microsatellite loci, as well as 3 mitochondrial genes. The ecological and distribution modelling was carried out using 176 points of *M. davidii* findings from various databases and previous studies; bioclimatic data was obtained from WorldClim and TEOW databases.

As a result of our studies the following data were obtained. The phylogenetic analysis of mitochondrial genes shows a divergence of *M. davidii* into two main clades: eastern and western, first

one having a complicated genetical structure itself. However, the analysis of nuclear DNA in eastern clade showed no signs of such structure. One may explain these facts via slow migration mobility of the species and/or by existence of some ecological barriers, that prevent the genetic flow. Our data suggests, that there could have been multiple expansion waves in eastern parts of *M. davidii* range. The ecological modelling proved high levels of plasticity of the species. Despite rather poor accuracy of the models for the whole range and its western parts, one could see a potential place of an ecological barrier in eastern part, comparing the outcome of the model with obtained genetical data. Considering high ecological plasticity and the split of the eastern and western clades, there might be a speciation occurring in *M. davidii*.

STUDY OF RNA-GUIDED DNA NUCLEASES FROM A NEW GROUP OF BACTERIAL ARGONAUTE PROTEINS IN VITRO AND IN VIVO

ИССЛЕДОВАНИЕ РНК-ГИД ЗАВИСИМЫХ ДНК-НУКЛЕАЗ ИЗ НОВОЙ ГРУППЫ БЕЛКОВ-АРГОНАВТОВ БАКТЕРИЙ IN VITRO И IN VIVO

Yulia Zaitseva

Faculty of Biology, Department of Biochemistry

Keywords: Argonaut proteins; programmable nuclease; guide RNA

Proteins of the Argonaute family play a central role in RNA interference processes in eukaryotes in complex with small non-coding RNAs. Argonaute proteins (pAgo) have also been found in some prokaryotes (Makarova et al., 2009). It is believed that pAgo proteins are one of the main components of the prokaryotic immune system which utilize short DNA or RNA fragments to recognize and destroy viral and exogenous plasmid DNA or RNA (Makarova et al., 2009; Olovnikov et al., 2013; Swarts et al., 2014; Kuzmenko et al., 2020). Some properties of Argonautes such as guide nucleic acid binding and endonuclease activity are reminiscent of the activity of the guide RNA binding proteins of the CRISPR-Cas immune system. This work is devoted to the *in vitro* and *in vivo* study of the nuclease activity of the Argonaute proteins DekAgo, DreAgo and 541Ago from the mesophilic bacteria *Deinococcus cavernae*, *Deinococcus reticulitermitis* and *Solitalea agri*, respectively. It was determined that the proteins belong to a novel group of Argonautes, which cleave target DNA in complex with guide RNA. *In vitro* experiments were carried out with purified proteins and single-stranded oligonucleotides. All three proteins were shown to exhibit nuclease activity in the temperature range from 30 to 45 °C in the presence of magnesium or manganese ions. For all proteins, the single-turnover rate constants for target cleavage were measured in the presence of phosphorylated and non-phosphorylated guide molecules. It was found that none of the proteins has a preference for the presence or absence of phosphate or at the 5'-end of guides, but the set of resulting products of nuclease activity in this Argonaute group depends on phosphorylation and the 5'-end nucleotide of guides; all three proteins can use guide molecules of varying lengths (from 14 to 30 nucleotides). The target is cleaved at multiple positions in the presence of a single guide, suggesting that the guide-target duplex can move within the effector complex. This feature is also characteristic of other proteins in this group. To study the binding of

target DNA without its cleavage, mutant variants DekAgo, DreAgo and 541Ago with substitutions in the active center were obtained. The functioning of Agronautes as programmable nucleases, as well as the studied properties of those proteins, make them promising tools for genetic engineering and genomic manipulation in bacterial and eukaryotic cells.

PHYTOPLANKTON OF STRATIFIED LAKES AT DIFFERENT STAGES OF ISOLATION FROM THE WHITE SEA

ФИТОПЛАНКТОН СТРАТИФИЦИРОВАННЫХ ОЗЕР, НАХОДЯЩИХСЯ НА РАЗНЫХ СТАДИЯХ ИЗОЛЯЦИИ ОТ БЕЛОГО МОРЯ

Daria Ivanova

Faculty of Biology, Department of General Ecology and Hydrobiology

Keywords: phytoplankton; stratified lakes; the White Sea

On the Karelian coastline, as a result of post-glacial land uplift, bays are being gradually separated from the White Sea and turning into freshwater basins, passing a meromictic phase. Lake Kislo-Sladkoe and lake Elovoe under the investigation are at different stages of isolation. While stratified, they possess a five-layered hydrological structure where the desalinated surface layer, halocline, aerobic saline zone, chemocline, and hydrogen sulfide zone can be distinguished. Such conditions lead to the thriving of unique microalgal biota. The purpose of this paper is to compare the dynamics of phytoplankton structure in both lakes in order to reveal any trends.

To examine phytoplankton, water samples were taken from several horizons up to the hydrogen sulphide zone using a submersible pump, and fixed with formalin. Samples were concentrated by the reverse filtration method. Algal cells were identified, measured, and counted in a Najotte chamber under a light microscope at x200 and x400 magnification. To calculate carbon biomass, biovolumes were determined by mathematical equations based on the geometric shapes of cells, and converted to carbon content. Similarity analysis of phytoplankton structure was performed via statistical nMDS, one-way ANOSIM, and SIMPER procedures.

As a part of the study, 64 phytoplankton species were registered in Kislo-Sladkoe, while 70 species were catalogued in Elovoe, all belonging to Bacillariophyta, Myzozoa, Cyanobacteria, Ochrophyta, Chlorophyta, Charophyta, Cercozoa, Cryptophyta, and Euglenozoa. The phytoplankton structure in the two lakes varied both in species composition and seasonal dynamics. The maximum biomass value for the growing season in Kislo-Sladkoe was significantly higher than that in Elovoe (149.8 mg C/m² and 57.4 mg C/m², respectively). Statistical analysis showed that most samples reliably clustered into four groups that were dissimilar by 91% or more. Group I includes samples of under-ice phytoplankton from Kislo-Sladkoe with *Microcystis ichthyoblabe*, *Amphora* sp. and cryptomonades as characteristic species. Group II consists of samples mainly from the upper horizons of Kislo-Sladkoe in May-August where the determinative species are *Cyclotella choctawhatcheeana* and *Microcystis ichthyoblabe*. Group III comprises most samples from Elovoe where *Gyrosigma obscurum*, *Melosira nummuloides* and *Desmodesmus armatus* define similarity

within the community. Group IV includes samples from chemocline of both lakes with *Oxyrrhis marina* acting as a characteristic species.

Thus, at the beginning of the season the lakes differed in phytoplankton communities. However, later, due to the more intensive growth of organisms associated with chemocline as the most productive layer, *Oxyrrhis marina* formed a community typical of both lakes.

TROPHIC NICHE OF NON-INDIGENOUS CRAB *CHIONOECETES OPILIO* (FABRICIUS, 1788) IN BLAGOPOLUCHIYA BAY OF THE KARA SEA

ТРОФИЧЕСКАЯ НИША КРАБА-ВСЕЛЕНЦА *CHIONOECETES OPILIO* (FABRICIUS, 1788) В ЗАЛИВЕ БЛАГОПОЛУЧИЯ КАРСКОГО МОРЯ

Alexander Kiselev

Faculty of Biology, Department of Invertebrate Zoology

Keywords: Snow crab *Chionoecetes opilio*; diet; trophic niche; the Kara Sea

The snow crab *Chionoecetes opilio* is an important example of an invasive species in the Arctic. It was discovered in the Kara Sea in 2012 (Zimina, 2014), spreading from the non-indigenous Barents Sea population. The invasion of snow crabs has already affected the trophic structure of benthic communities (Udalov et al., 2016, Rudneva et al., 2022). However, the diet of *C. opilio* in the Kara Sea is poorly understood (Burukovsky et al., 2021). Our study aims to complete the data on the diet of *C. opilio* and its role in the Kara Sea food web. Material was collected from two stations in Blagopoluchiya Bay in 2018, 2020 and 2022. Stomach contents were described using the method of Burukovsky (2022). Stable isotope analysis of carbon and nitrogen in tissues was performed to determine the role of snow crab in the food web. A Thermo Delta V Plus mass spectrometer and a Thermo Flash 1112 elemental analyser were used for the analysis. The stomach contents of 153 snow crabs were analysed and the stable isotope compositions of 63 benthic species were examined. The dominant components found in the snow crab stomachs were detritus, plant debris, sand, brittle stars and molluscs. In 2020, the average food lump showed a higher proportion of detritus and chitin in the snow crab diet and a lower proportion of brittle stars compared to 2018. Stable isotope composition indicates that snow crabs occupy the same trophic level in the middle of the food web in different years. The trophic level of snow crabs is lower than top predators (*Urasterias lincki*, *Leptagonus decagonus*, *Triglops* sp.), higher than filter-feeding molluscs (*Ennucula tenuis*, *Thyasiridae* gen. sp.) and at the same level as scavengers (*Eualis gaimardii*, *Scoletoma fragilis*) or small predators (*Micronephthys minuta*). However, stable isotope analysis did not reveal any changes in the diet of the snow crab in 2020 as observed from stomach contents. Thus, stomach contents and stable isotope analysis demonstrate the important role of detritus and plant debris in the diet of *C. opilio*, which lowers its trophic level compared to the main predators. According to literature data, snow crabs in other regions feed mainly on animal prey (Chuchakalo et al., 2011, Kolts et al., 2013, Sokolov et al., 2016). In the Kara Sea, however, snow crabs are likely to use all available food sources in the disturbed benthic communities.

SYSTEMATICS, DIVERSITY AND BIOGEOGRAPHY OF BLIND SKINKS OF THE FAMILY DIBAMIDAE (REPTILIA: SQUAMATA)

СИСТЕМАТИКА, РАЗНООБРАЗИЕ И БИОГЕОГРАФИЯ ЧЕРВЕОБРАЗНЫХ ЯЩЕРИЦ СЕМЕЙСТВА DIBAMIDAE (REPTILIA: SQUAMATA)

Nikita Kliukin

Faculty of Biology, Department of Vertebrate Zoology

Keywords: Dibamidae, systematics, diversity, osteology

The family Dibamidae, or blind skinks, belongs to a complex and poorly studied group of essentially limbless squamates characterized by a fossorial lifestyle. Previous studies demonstrated that Dibamidae is divided into the two genera *Anelytropsis* Cope 1885 and *Dibamus* Duméril & Bibron 1839, with the former genus being placed among the latter in recent molecular phylogenetic studies, thus rendering the genus *Dibamus* paraphyletic. Little is known about the life history of this peculiar group of lizards, the scarcity of material deposited in herpetological collections across the world hinders taxonomic and biogeographic assessment of these lizards. Due to their secretive life-style, most species of the genus *Dibamus* are known from very few specimens, the molecular and osteological data for most species of this group are not available. For further progress on *Dibamus* systematics and biogeography, molecular phylogenetic assessments of the genus combined with analysis of osteology are necessary.

We sequenced 25 specimens (14 species) for the three fragments of mitochondrial gene, (ND2, 16S rRNA, COI) and six nuclear protein-coding genes (BDNF, CMOS, DNAH3, NKTR, RAG1 and R35) with a total length up to 7100 base pairs (bp). For obtaining information on the diversity of skeletal morphology, 16 specimens (16 species) were X-rayed in 3D using a micro-CT scanner (Bruker Skyscan).

Our analysis revealed the monophyly of Dibamidae, represented by three main clades: northern *Dibamus* from China and northern Vietnam, southern *Dibamus* from Indochina and Sundaland, and *Anelytropsis* from Mexico. Taxonomic diversity of Dibamidae still remains largely underestimated; our analyses revealed from 4 to 6 candidate new species of *Dibamus* from Vietnam and Cambodia. Based on the results of the analysis of phylogeny and diversity of the genus *Dibamus* patterns of geographical distribution of the family were clarified. The family Dibamidae likely originated in Indochina, where the three lineages of *Dibamus* occur now. From Indochina dibamids colonized Sundaland and East Asia and further dispersed to North America via the Beringian land bridge.

Due to the analysis of osteology, diagnostic features of the *Dibamus* clades were identified. The northern clade of *Dibamus* can be distinguished from other congeners by the shape of the prefrontal bone, the size of the retroarticular process and the presence of the metatarsal bones.

Summarizing, this study provides a better understanding of diversity, highlights the systematics of Dibamidae. Moreover, it demonstrates the importance of tropical Southeast Asia regarding biodiversity conservation and dispersal of species.

INFLUENCE OF PRION DOMAINS' CONTEXT ON PRION PROPERTIES OF PROTEINS IN *S. CEREVISIAE**

ВЛИЯНИЕ КОНТЕКСТОВ ПРИОНООБРАЗУЮЩИХ УЧАСТКОВ НА ПРИОННЫЕ СВОЙСТВА БЕЛКОВ *S. CEREVISIAE*

Alena Malukhina

Faculty of Biology, Department of Molecular Biology

Keywords: prion proteins, Rnq1, *S. cerevisiae*

Amyloids have been long known as protein aggregates enriched with regular cross- β structures. Inheritable amyloids are called prions. Prion proteins contain regions called “prion domains”; (PrD) that are required for formation and propagation of prion state. It has been shown that PrDs tend to be located at the end of polypeptides which appears to be important for their prion properties. For example, previous studies have provided the evidence that the PrD of Rnq1 protein is located precisely at the C-terminus.[1] Here we aim to study the influence of modifications of C-terminal domain of Rnq1 protein on its prion properties.

To test the importance of the C-terminal region of Rnq1 for prion formation the chromosomal RNQ1 gene in strain 74-D694 [RNQ+] cells were modified to encode Rnq1-GFP or the first 355, 277, 381 or 392 amino acid residues of Rnq1. Proteins of the resulting strains were analyzed by SDS-PAGE, with and without boiling. In this method boiling disrupts prion aggregates and allows them to enter the gel and to be visualized, whereas without boiling they are unable to enter the lane. During the analysis the [RNQ+] prion was lost in all cases as evidenced by the absence of boiling effect. According to this result modified proteins are unable to form prion on the template of wild type Rnq1. This indicates the importance of C-terminal region for prion formation. However, SDS-PAGE analysis showed a significant decrease in expression in truncated proteins which could potentially affect the results. To observe patterns of aggregation in the modified proteins and obtain their proteinase K resistance maps [RNQ+] strain cells were transformed with plasmids carrying a truncated GFP- RNQ1, RNQ1-GFP or GFP-RNQ1. The described plasmids were overproduced and aggregation patterns were observed and photographed after 3 and 24 hours of induction. The obtained patterns were similar in GFP-RNQ1 and 355, 381 and 392 truncations and differed in GFP-RNQ1 and RNQ1–277-GFP suggesting amyloid formation de novo in both cases. Finally, after induction the overproduced proteins were collected and analyzed by MALDI-TOF to identify their proteinase K resistant regions though these results have not yet been released.

Based on the results, it was established that the C-terminal domain is important for the manifestation of prion properties of Rnq1 as its modification prevents the protein from forming prion aggregates on the wild type protein template. However, observed aggregation patterns suggest that 355, 381 and 392 truncations are potentially able to reproduce the original prion fold when overproduced though it could be either preserved or rearranged.

* *The research is conducted under scientific supervision of Dr. Vitaly Kushnirov*

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MOLECULAR GENETIC MECHANISMS OF THE STRESS RESPONSE IN DROSOPHILA MELANOGASTER WITH THE GAGR GENE KNOCKDOWN

МОЛЕКУЛЯРНО-ГЕНЕТИЧЕСКИЕ МЕХАНИЗМЫ СТРЕССОВОГО ОТВЕТА У DROSOPHILA MELANOGASTER С ПОКДАУНОМ ГЕНА GAGR

Maria Nikitina

Department of Genetics, Faculty of Biology

Keywords: Gagr gene, domesticated gene, *Drosophila melanogaster*, immunity, physiological tests, ammonium persulfate

During molecular domestication the mobile element sequences are transformed for host needs. However, despite the importance of genes obtained from this process, most of them have unknown functions that need to be studied. Therefore, the aim of this research is to investigate it in the domesticated Gagr gene in *Drosophila melanogaster* which is a convenient model object.

In the work, the Gagr was inactivated in different tissues using knockdown, obtaining hybrids from crossing females of the Gagr^{KK109908} line with male driver lines. In addition, the hybridization with w1118 females was a control. Physiological characteristics such as the period of imago development, their mobility, heat shock survival and life expectancy were measured. Moreover, a relative gene expression study was carried out using OT-PCR in 7-day-old adults under standard conditions and after their exposure to ammonium persulfate, causing oxidative stress. Presently both physiological tests and relative expression of 14 immune response genes and the Gagr under standard conditions were completed on the received flies with Gagr inactivation in all tissues.

Firstly, the Gagr knockdown was shown not to affect the mortality, lead to more rapid growth as well as enhance resistance to heat stress and reduce lifespan after exposure to ammonium persulfate. Nevertheless, it did not decrease the life expectancy under standard conditions, did not change the imago motor activity and contributed to formation of melanized masses in the fat body in females.

Secondly, the system for Gagr inactivation is proven to work well. Additionally, the Gagr knockdown influences transcription of immune response genes. For instance, antimicrobial peptide genes TotA, TotC, in contrast to AttB, Ceca2, expressed low in mutant males which had high expression of serpin and serine endopeptidase genes such as Spn88Eb, Spn28Dc, CG10051, CG10232, GG1304, Ser6. The Ppo1 and its inhibitor Spn28Dc expressed more in males than in the other sex. The Nazo and the Soc16D, as opposed to the CG33346, had the highest level in control females.

Thus, the Gagr may be involved in the stress response and maintaining cellular homeostasis. Moreover, its inactivation results in global changes in gene expression. Now the study is continuing on flies with Gagr knockdown in different tissues.

LOCAL VEGETATION OF THE KAMCHATKA RIVER VALLEY DURING THE HOLOCENE AND LATE PLEISTOCENE: RECONSTRUCTION BASED ON PALYNOLOGICAL AND TEPHROCHRONOLOGICAL DATA

РЕКОНСТРУКЦИЯ ЛОКАЛЬНОЙ РАСТИТЕЛЬНОСТИ В ДОЛИНЕ РЕКИ КАМЧАТКА В ПОЗДНЕМ ПЛЕЙСТОЦЕНЕ И ГОЛОЦЕНЕ НА ОСНОВЕ ДАННЫХ ПАЛИНОЛОГИИ И ТЕФРОХРОНОЛОГИИ

Valerii Pimenov

Faculty of Biology, Department of Molecular Biology

Keywords: Kamchatka, palynology, local vegetation

The Kamchatka Peninsula stands as one of the most dynamically active volcanic regions within the expansive Pacific Ring of Fire. Exceptional climatic characteristics, remarkable terrain dissection, and minimal human impact have collectively contributed to the development of unparalleled ecosystems across the peninsula's vast territory. The area provides the potential for conducting wide-ranging and interdisciplinary research endeavors. Despite a considerable number of studies focusing on regional paleoreconstruction, there has been a deficiency in a comprehensive study of the ecological history of local plant communities in the area. The aim of study is to reconstruct the local vegetation in the middle and lower reaches of the Kamchatka River during the Holocene and the Late Pleistocene, as well as relate our findings to tephrochronological studies.

In order to achieve this, we carried out pollen analysis on 68 soil samples collected from four archaeological sites located in the Kamchatka River valley. The Ushki-suite is the earliest archaeological site discovered in Kamchatka, dating back to 12700 BP. The Naksha-site is a Late Holocene archaeological site. Additionally, the Ust-Kamchatsk-site, comprised of two soil sections, is located along the eastern coast, near the river mouth. We conducted archaeological excavations, identifying tephra layers, and gathering samples in the fields. Laboratory methods included pollen analysis and AMS-14C dating (A.E. Lalonde AMS Laboratory, University of Ottawa). We used statistical methods such as PCA and CA in C2 software, as well as Tilia and OxCal software.

Our outcomes contradict the prevalent belief that grass tundra-steppe communities propagated in the late Pleistocene (12730–11940 BP) and rather indicate the presence of arboreal taxa (AP). The presence of woody vegetation is confirmed by the analysis of macrocharcoal in the samples. Wood charcoals with signs of repeated burning, including birch and spruce, were found. Apparently, the tundra-steppe communities known for the late Pleistocene of eastern Siberia were distributed in this area much earlier. The principal component analysis of pollen spectra from soil samples identified volcanic activity and hydrological conditions as the primary factors influencing the formation of the local vegetation during the Holocene.

Our study supplements previous research and provides a more distinct understanding of the relationship between past plant communities and environmental factors in Kamchatka. Thus, there is a need for further research into the relationship between climate and vegetation dynamics in Kamchatka to obtain a more comprehensive understanding of the ecological history of the peninsula.

ECOLOGICAL ASSESSMENT OF THE LAND USE SYSTEM IN THE TVER REGION

ЭКОЛОГИЧЕСКАЯ ОЦЕНКА СИСТЕМЫ ЗЕМЛЕПОЛЬЗОВАНИЯ ТВЕРСКОЙ ОБЛАСТИ

Olga Pogorelova

Faculty of soil science; Department of soil geography

Keywords: Environmental management, agriculture, soil cover, geoinformation systems

Food security is an important aspect of the country's national development strategy. Providing the population with high-quality food in sufficient quantities is a key factor for maintaining the health and well-being of society. According to a report by the Russian Ministry of Agriculture, 63% of unused arable land was in the Tver Region in 2021. The return of unused arable land to agricultural circulation is an urgent task of the Tver Region development program.

Currently, in the Tver region, the volume of mineral fertilizers is lower than scientifically justified. The removal of nutrients from the soil along with the harvest significantly exceeds their intake. The crop yield is formed mainly due to natural soil fertility. This leads to soil degradation [1]. The shortage of fertilizers will also be relevant for the lands put into circulation, since this problem is relevant not only for the Tver region, but also for other subjects of the Russian Federation. Approximately 60% of the cultivated areas in the Russian Federation remain completely untreated [2].

Therefore, natural soil fertility plays an important role for agriculture in the Tver region. In order to put new lands into circulation efficiently and safely, it is necessary to study the land use structure features, as well as the composition and quality of soil and land resources. Information on the area of crops and crop yields was obtained from the Federal State Statistics Service. The collected information was uploaded to GIS and visualized as a cartograms series. The obtained cartographic materials were analyzed and compared with the results of calculating the soil cover composition and the agro-climatic zoning map[3, 4].

According to the results of the cartographic materials analysis, there is no connection between the area of crops and the soil cover composition. The existing land use structure and the set of cultivated crops do not take into account the fertilizers shortage. Insufficient supply of fertilizers not only exacerbates the shortage of nutrients in the soil, but also does not make up for current losses. The introduction of new lands into circulation, without increasing the volume of fertilizers, will lead to soils dehumidification with further deterioration of their physical, chemical and biological properties.

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QUANTIFICATION OF IMMUNE CHECKPOINT PROTEIN PD-L1 EXPRESSION IN UROTHELIAL BLADDER CANCER TISSUE

КОЛИЧЕСТВЕННЫЕ ПОКАЗАТЕЛИ ЭКСПРЕССИИ БЕЛКА КОНТРОЛЬНОЙ ТОЧКИ ИММУНИТЕТА PD-L1 В ТКАНИ УРОТЕЛИАЛЬНОГО РАКА МОЧЕВОГО ПУЗЫРЯ

Kseniia S. Spiridonova

Faculty of Fundamental Medicine

Keywords: muscle-invasive and non-muscle-invasive bladder cancer, PD-L1, immunofluorescence analysis, flow cytometry

Introduction. Immunotherapy is a modern trend in the drug therapy of tumors of various localizations including muscle–invasive urothelial bladder cancer (BC). The question of the rationality of immunotherapy in the initial stages of the disease has not been resolved, despite the fact that non-muscle-invasive BC is highly immunogenic. At the same time, many studies have noted a high level of PD-L1 expression, which is the most important factor for the prescription of immune checkpoint inhibitors. This study has been conducted to obtain a molecular justification for the rationality of using immune checkpoint inhibitors in the group of favorable prognosis without muscle invasion, based on the results of a comparative quantitative assessment of PD-L1 in the tissue of non-muscle-invasive and muscle-invasive BC.

Materials and methods. PD-L1 expression was identified in 56 surgical samples of BC tissue by the flow cytometry. The expression level of PD-L1 (%) was calculated by the Kolmogorov-Smirnov method in the FlowJo 10 program. Antibodies were used: primary – anti-PD-L1 (SQab1716), secondary – conjugated with DyLight650 (ab98729).

Results and discussion. PD-L1 expression was detected in 100% of the studied tumors with high heterogeneity of the marker. The level of marker expression ranged from 8 to 70% in the tumors of different patients. The median level of PD-L1 expression in non-muscle-invasive BC tissue was 1.5 times higher than in muscle-invasive BC (32% vs 22%, $p=0.001$). Statistically significant difference was also revealed when comparing the median level of PD-L1 expression in the MIBC with the general group (22.0% vs 28.5%, $p=0.006$). The optimal cut-off of division into groups with high and low expression was determined, which was 30%. In general group a high level of marker expression ($\geq 30\%$) was detected in 46% of cases, in the group of muscle-invasive BC – only in 20%, and among non-muscle-invasive tumors – in 68% of cases. The differences between the following comparison groups were statistically significant: muscle-invasive vs non-muscle-invasive BC; muscle-invasive and non-muscle-invasive BC vs. all examined tumors.

Conclusion. Quantitative immunofluorescence analysis associated with flow cytometry demonstrated that the frequency of a high level of PD-L1 expression $\geq 30\%$ in the tissue of non-muscle-

invasive BC is almost 3 times higher compared to the muscle-invasive BC ($p=0.0005$). The obtained result is a molecular justification for the rationality of starting therapy with immune checkpoint inhibitors at a high level of PD-L1 expression already at the onset of the disease, that is, with a non-muscle-invasive form of BC.

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THE EFFECTS OF ANTIDEPRESSANTS OF THE GROUP OF SELECTIVE SEROTONIN REUPTAKE INHIBITORS ON THE QUALITY OF OOCYTES

ВЛИЯНИЕ АНТИДЕПРЕССАНТОВ ГРУППЫ СЕЛЕКТИВНЫХ ИНГИБИТОРОВ ОБРАТНОГО ЗАХВАТА СЕРОТОНИНА НА КАЧЕСТВО ООЦИТОВ

Maria Tkachenko

Faculty of Biology, Department of Embryology

Keywords: oocyte maturation, serotonin, SERT, fluoxetine, SSRIs, oocyte quality

Serotonin (5-hydroxytryptamine, 5-HT) is known to be a regulator of oocyte maturation in a large number of animal species (Shmukler et al., 2022). In maturing mammalian oocytes, the accumulation of exogenous maternal serotonin occurs due to the activity of the membrane transporter SERT (Nikishin et al., 2019). The importance of this mechanism arises from the fact that SERT is a target molecule for the treatment of variable mood disorders by drugs called selective serotonin reuptake inhibitors (SSRIs), which are considered to be the most effective and safest antidepressants (Hyttel, 1994).

In this work, we investigated serotonin levels in oocytes after SERT inhibition and the effect of fluoxetine on oocyte quality. Functional analysis of oocytes at different stages of maturation showed that SERT expression and activity increases with oocyte maturation. In order to assess the possible effects of disruption of the described mechanism on development, we performed an *in vivo* experiment with the administration of the SSRI fluoxetine (20 mg/kg) for 7 days. It showed a significant decrease in the content of serotonin in both growing GV-oocytes and ovulated mature MII-oocytes. However, to evaluate the quality of postovulatory oocytes after exposure to fluoxetine *in vivo*, we conducted experiments to assess their morphology. The percentage of fragmented oocytes was higher in the experimental group than in the control group. However, when we analysed the shape and size of the meiotic spindle, which is one of the indicators of oocyte quality, there was no statistical difference between the two groups (Sanfins et al., 2004). To investigate the effect of fluoxetine on the molecular mechanisms involved in oocyte maturation, we performed Western blot analysis of the level of the active form of MAP kinase in the oocytes from the control and experimental groups. The MAP kinase

pathway is a conserved mechanism involved in oocyte maturation in a variety of animals (Heng-Yu et al., 2003). Our results showed that the amount of the analysed protein was reduced in oocytes exposed to fluoxetine, indicating a negative effect of SSRIs on the maturation and developmental potential of oocytes.

The obtained data clearly indicate that the mechanism of specific membrane transport of serotonin normally ensures the accumulation of serotonin in maturing oocytes and that the use of SSRIs probably has a negative effect on the quality of the oocytes.

RESEARCH OF GROWTH PARAMETERS OF MICROALGAE CHLORELLA VULGARIS IN EXTRACTS FROM CONIFEROUS FRACTIONS OF FOREST LITTER

ИССЛЕДОВАНИЕ ПАРАМЕТРОВ РОСТА МИКРОВОДОРОСЛИ CHLORELLA VULGARIS НА ВЫТЯЖКАХ ИЗ ХВОЙНЫХ ФРАКЦИЙ ПОДСТИЛОК

Vlada Khlevnaya

Faculty of Soil Science, Department of Soil Biology

Keywords: Microalgae, photobioreactor, reduction of CO₂ emission

Transformation of forest litter is responsible for 25–90% of CO₂ emission. The activity of the processes depends on temperature and the amount of moisture, which increases significantly in urban environments because of the presence of dark solid materials on the surface of the soil and street watering. Forest litter removal is legally regulated in the cities because of a range of reasons, including allergic reactions. Nevertheless, there is an alternative option for management that suggests collecting forest litter, producing extracts and using them for the cultivation of microalgae in order to reduce CO₂ emission. Another significant environmental problem is the existence of a great amount of municipal wastewater, which contains a lot of salts after the snowmelt. These water entering waterbodies cause blooming, which negatively affects the environment. For this reason, the use of municipal wastewater in the process of producing extracts from coniferous fractions of forest litter is actual.

The research of new media and cultivation methods of *Chlorella vulgaris* has the practical application because this kind of microalgae is widely used in a range of spheres like cosmetology, pharmacology, the production of food additives, biodegradable plastic and biofuels. Furthermore, *Chlorella vulgaris* may become one of the first species taking part in colonization of Mars due to the ability to consume CO₂ and produce O₂ much faster than higher plants. The object of the study was the microalgae culture *Chlorella vulgaris* GKV 1. Samples of coniferous fractions of forest litter were collected in the recreation zones of Vorobyovy Gory park and near the playground on the outskirts of Bitsevsky Park.

Media for cultivation were made by mixing coniferous fractions of forest litter and municipal wastewater in a ratio of 1:25. Standard BBM medium and BBM medium with the addition of glucose were used as a control samples. Cultivation was carried out under conditions of round-the-clock

lighting and bubbling. During cultivation, pH was measured once a day and growth curves were recorded at wavelengths of 680 and 750 nm.

The results revealed no significant differences in pH values. Nevertheless, the growth curves demonstrate a slightly more active growth of *Chlorella vulgaris* in the extract from the coniferous fraction of the Bitsevsky Park forest litter. In conclusion, this area of research is perspective, therefore in the future experiments can be tested other fractions of forest litter or industry important species of microalgae.

A NEW GENETIC MODIFICATION SYSTEM PLATFORMED ON THE THERMOPHILIC BACTERIUM *TEPIDIFORMA BONCHOSMOLOVSKAYAE* **НОВАЯ СИСТЕМА ГЕНЕТИЧЕСКОЙ МОДИФИКАЦИИ НА ОСНОВЕ ТЕРМОФИЛЬНОЙ БАКТЕРИИ *TEPIDIFORMA BONCHOSMOLOVSKAYAE***

Anna Kholdina

Faculty of Biology, Department of Microbiology

Keywords: genetic modification system, genetic tools, restriction barrier, transformation, replication origin

The development of genetic tools for a new model organism expands the range of organisms capable of heterologous expression of extremozymes. Additionally, it is important to study the cellular processes and metabolic features of extremophiles. For effective protein synthesis, plasmid vectors with constitutive or inducible promoters, strong ribosome binding sites, transcription terminators, markers of selection, and possibly with functional reporter genes must be replicated in host organisms (Riley, Guss, 2021). Overcoming the restriction barrier caused by the functioning of restriction-modification (RM) enzymes degrading foreign DNA methylated differently from the DNA of the host organism is an important step in the genetic tool development of genetic modification systems. The aim of this work is to develop genetic tools for the thermophilic bacterium *Tepidiforma bonchosmolovskayae* 3753O.

First of all, we analyzed the potential of the RM system of the *T. bonchosmolovskayae* 3753O. Restrictase and restrictase-methylase of the microorganism were isolated. We determined the optimal parameters of the strain's restriction activity, including the concentration corresponding to 1 unit of activity, optimal temperature and pH. The enzymes of the restriction system were highly active. In vivo pre-methylation is one of the approaches to overcome the restriction barrier and increase transformation efficiency. To achieve this, the methyltransferase gene was cloned into the expression vector pLATE11 and *E. coli* was transformed with this construction. Pre-methylation efficiency will be assessed by incubating the pre-methylated plasmid with endonuclease of restriction.

Protocols for preparing competent cells and transformation of *T. bonchosmolovskayae* 3753O were then developed. The experiment involved testing untreated cells for natural competence, as well as glycerol-treated cells and saccharose/glycine-treated cells. The optimal transformation protocol include cell-wall-weakening using glycine and sucrose osmoprotection with prolonged time of recovery.

To construct the functional shuttle-vector, it is necessary to locate the origin of replication in *T. bonchosmolovskayae* 3753O cells. Five hypothetical chromosome replication origins were predicted via in silico analysis. DNA fragments including origin sequences were cloned into the pAL2-T vector. These vector constructions were used to transform *T. bonchosmolovskayae* 3753O cells. Transformants bearing plasmid with the functional origin of replication were selected using plates with a solid medium containing 50 µg/ml of ampicillin. The localized chromosomal replication origin of *T. bonchosmolovskayae* 3753O will be used for the shuttle-vector design.

In summary, we have developed protocols for the preparation of competent cells and transformation of *T. bonchosmolovskayae* 3753O and the approach for overcoming the restriction barrier. The construction of the shuttle-vector is in progress.

GENETICALLY ENCODED TOOLS TO STUDY THE SUBCELLULAR DYNAMICS OF OXIDATIVE STRESS INDUCED BY REACTIVE CHLORINE SPECIES

ГЕНЕТИЧЕСКИ КОДИРУЕМЫЕ ИНСТРУМЕНТЫ ДЛЯ ИССЛЕДОВАНИЯ СУБКЛЕТОЧНОЙ ДИНАМИКИ ОКИСЛИТЕЛЬНОГО СТРЕССА, ИНДУЦИРОВАННОГО АКТИВНЫМИ ФОРМАМИ ХЛОРА

Viktoriiia Chebanenko

Faculty of Biology, Department of Biochemistry

Keywords: genetically encoded fluorescent biosensor; oxidative stress; reactive chlorine species; hypochlorous acid

Reactive oxygen species have garnered significant attention from researchers during the past decade owing to their demonstrated role in cellular signalling and the progression of diseases [1]. However, our understanding of the mechanisms underlying the production of other potent oxidants and their involvement in both physiological and pathological contexts remains severely limited. Reactive chlorine species (RCS) are among these oxidants. Neutrophils primarily produce hypochlorous acid (HOCl) via the myeloperoxidase reaction within the phagosome, which significantly contributes to the innate immune response [2]. Concurrently excessive generation of HOCl in regions afflicted by chronic inflammation can induce oxidative stress within nearby tissues. RCS accumulation has been observed in inflammation-related pathologies, particularly cardiovascular and neurodegenerative diseases [3]. Kostyuk and colleagues recently developed Hypocrates, a sensitive and selective biosensor for detection of HOCl, in order to investigate its role in pathogenesis [4].

The present study focuses on the development of tools based on the Hypocrates to study the subcellular dynamics of RCS stress. Our research aims to optimise the response amplitude of the biosensor to oxidants, improve its pH stability and design biosensor iterations suitable for expression in key eukaryotic cell compartments. Due to the complex nature of intramolecular interactions in fluorescent biosensors, the modelling of their critical properties can be a challenge. To address this, we used a non-directed mutagenesis approach to generate mutant libraries containing hundreds of

Hypocrates variants. After screening the libraries, we selected mutants with improved properties for further investigation. Two improved Hypocrates variants were obtained, exhibiting a twofold increase in response amplitude and stability across the physiological pH range. The resulting variants were fused to signal peptides that target proteins to the cytoplasm, nucleus, mitochondrial matrix or cell membrane. The precise localisation and functional efficacy of the new Hypocrates versions were verified using the mouse neuroblastoma cell culture Neuro2a.

The absence of suitable instruments poses a significant challenge in investigating HOCl dynamics in live cells and tissues. Traditional analytical techniques are inefficient for detecting reactive small molecules due to their highly transient lifespan. In contrast, genetically encoded biosensors based on fluorescent proteins can track their analytes in living systems of any complexity. It is anticipated that the development of a genetically encoded fluorescence toolkit will aid in addressing the current knowledge gap regarding the intricate dynamics of reactive chlorine species stress dynamics at the subcellular level.

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SUCCESSION OF SOIL-DWELLING TESTATE AMOEBAE COMMUNITIES ALONG THE AGE GRADIENT FORMED BY THE TSEY GLACIER RETREAT

СУКЦЕССИЯ СООБЩЕСТВ ПОЧВОБИТАЮЩИХ РАКОВИННЫХ АМЕБ ВДОЛЬ ВОЗРАСТНОГО ГРАДИЕНТА, ОБРАЗОВАННОГО ОТСТУПАНИЕМ ЦЕЙСКОГО ЛЕДНИКА

Artemii Chulei

Faculty of Biology, Department of General Ecology and Hydrobiology

Keywords: Testate amoebae communities; alpine ecosystems; species diversity; microbial assemblages; Greater Caucasus; soil succession; Tsey Glacier; substitution model

As a response to the ongoing atmospheric warming, glaciers retreat in most regions of the world (Marta et al., 2021). In the Caucasus, the total area taken up by glaciers is known to have reduced by 23% over the last 20 years (Tielidze et al., 2022). The deglaciated surfaces are quickly colonized

by living organisms, and the structure of these new communities is altered during succession. Microorganisms are a crucial part of alpine soil communities, while their succession patterns remain underexplored.

The aim of this work is to determine patterns of successional dynamics of species richness, diversity and structure of soil-dwelling testate amoebae assemblages in the periglacial zone of the Tsey Glacier. On the transect, ten sample plots were chosen with surface ages ranging from 1 to 170 years. The selected sites included the main stages of primary vegetation succession: from the bare ground with sand and pebbles to the pine forest.

The laboratory preparation of soil samples was carried out according to the conventional methodology, which is based on the concentration and filtration of specimens, followed by light microscoping (Mazei and Chernyshov, 2011). To distinguish living amoebae with cytoplasmic remains inside, the rose bengal dye (C₂₀H₄Cl₄I₄O₅) was added to the concentrated suspensions.

Forty seven species of testate amoebae from 21 genera were identified during our analysis. In accordance with the obtained data, species accumulation curves were constructed in the R program. As the duration of assemblage existence increases, we record a rise both in the number of species and in the evenness of their structure. The assessment of species diversity (Shannon, Cody) and evenness (Pielou) indices demonstrates that the formation of stable communities of soil protozoa in mountain tundra requires approximately 100 years.

The differences in species structure exhibit a clear division of testate amoebae into young, intermediate and old-growth communities. Moreover, when separating living species from dead ones, it was shown that testate amoebae, like most invertebrate animals, are characterized by a substitution model of succession, not an additive one, as previously assumed (Wanner and Xylander, 2005).

In conclusion, studying the mechanisms and rates of the formation of complex microbial communities in alpine areas is essential for both fundamental ecology and analyzing the restoration capacities of natural habitats (Donhauser and Frey, 2018). The research explains the key aspects of protozoan succession, which is significant for monitoring and forecasting changes in high mountain ecosystems due to global warming.

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MECHANISMS OF PARTICIPATION OF THE UROKINASE RECEPTOR IN REPROGRAMMING OF TUMOR STROMA CELLS

МЕХАНИЗМЫ УЧАСТИЯ УРОКИНАЗНОГО РЕЦЕПТОРА В РЕПРОГРАММИРОВАНИИ КЛЕТОК ОПУХОЛЕВОЙ СТРОМЫ

Anna Shchipova

Faculty of Fundamental Medicine

Keywords: Extracellular vesicles, tumor stroma, neuroblastoma, mesenchymal stromal cells, urokinase receptor

In a multicellular organism, cells interact with each other through various mechanisms such as pressure and tension, receptors and small signal molecules, peptides and extracellular vesicles.

Extracellular vesicles (EVs) are a heterogeneous family of membrane-bound structures stemmed from an endosome or plasma membrane. Initially, it was shown that the release of EVs is part of the mechanism of disposal of waste products from cells. However, studies have found that the release of EVs is also an important component of intercellular communication involved in both normal physiological and pathological processes. On their surface they carry receptors, adhesion molecules, integrins, tetraspanins and other transmembrane and surface proteins that help them to interact with recipient cells.

In recent years, research on the use of EVs in the diagnosis and treatment of various diseases has been popular. EVs are present in all bodily fluids, which facilitates the collection of analysis and allows tracking the progression of the disease. Much attention in the literature is paid to the role of extracellular vesicles of tumor cells in the tumor progression and metastasis. Tumor cells can alter their microenvironment by secreting EVs containing signal proteins, microRNAs and transcription factors that enhance the chemoresistance of the tumor and contribute to its metastasis.

The role of urokinase system in the tumor metastasis has been studied for several decades, and the data available nowadays confirm that the role of urokinase system in cancer is crucial: the high content of urokinase system proteins in tumor cell vesicles suggests their significant influence on the activation of the surrounding stroma and the induction of EV-mediated invasion and metastasis. Urokinase receptor is also known to initiate tumor progression and metastasis.

In this paper the role of urokinase receptor in reprogramming of tumor stroma cells with the participation of extracellular vesicles has been determined. Collected vesicles from wild type Neuro2A mice neuroblastoma cells and from Neuro2A cells with suppressed expression of uPAR (Neuro2A-Plaur^{-/-}) were cocultivated with mesenchymal stromal cells, and then the expression levels of mRNA of activated stroma markers have been evaluated by PCR-RT. As a result, the influence of tumor cells' vesicles on the transcriptional activity of MSC has been found. It has also been shown that in the absence of urokinase receptor vesicles are unable to activate the expression of stroma markers. Moreover, it has been found that the mechanism of vesicles' action is based on the miRNA.
