

CHRONICLES

Chronicle of the VIII Conference of Young Scientists on Molecular Biology and Genetic Technologies at the Institute of Cytology of the Russian Academy of Sciences (October 11–14, 2022, St. Petersburg): section “Molecular microbiology and protistology”

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| Submitted November 7, 2022 | Accepted November 28, 2022 |

VIII Conference of Young Scientists on Molecular Biology and Genetic Technologies was organized by the Young Scientists and Specialists Council of the Institute of Cytology of the Russian Academy of Sciences (INC RAS), St. Petersburg, and was held at INC RAS on October 11–14, 2022 (Fig. 1, A). The main goal of this meeting was to provide young researchers with a platform for a comprehensive discussion of their findings, aimed at determination of further research directions and development of cooperation between research teams.

The conference included six sections held on October 11–13, covering a wide range of topical issues of molecular and cell biology: “Genetic and omics technologies in biology and medicine”, “Stem cells and regenerative medicine”, “Cellular and molecular basis of tumor progression”, “Molecular and genetic basis of neurodegenerative pathologies”, “Molecular microbiology and protistology”, and “Physical foundations of the functioning of biological systems”. Nearly 220 participants – undergraduate and postgraduate students, young scientists – from different cities of Russia participated in the meeting both in person and remotely (online). To introduce young participants to recent advances in the abovementioned research areas, the leading experts gave a series of invited lectures. Besides, on the final day of the event – October 14 – a research training for young scientists was organized with the involvement of leading specialists and supplier

companies. Such a one-day research training in the format of seminars and workshops is becoming a tradition for the Conference of Young Scientists at INC RAS. This year, it was focused on single-cell RNA sequencing technologies and bioinformatics data analysis (Fig. 1, B).

The section dedicated to protistological and microbiological studies was held as a part of the Conference of Young Scientists of the Institute of Cytology RAS for the second time, and it is likely to become traditional the future Institute’s scientific events. Last time, in 2020, the section “Cellular and molecular biology of unicellular organisms” gathered about 35 students and young scientists. The reports were focused on the physiology of single-celled eukaryotes, their morphological and ultrastructural features, and molecular phylogenetic studies of various groups of protists. The young microbiologists presented results of their research on the cellular and molecular responses of prokaryotes to various stressors, the role of volatile organic compounds in their interspecies interaction, and the bacterial impact on the structural organization and functional activity of animal, plant, and protist cells.

In 2022, the focus of the conference has slightly shifted to molecular, genetic, and omics research; so, the section entitled “Molecular microbiology and protistology” was included in the program on October 13, 2022. Despite all the difficulties, the registered participants presented 21 reports in person and online. Within the section, two sessions with



Fig. 1. A – The conference logo in the Institute of Cytology RAS; B – school for young scientists, workshop on single-cell RNA sequencing technologies; C – concluding remarks at closing of the conference. Photos by J. Khorolskaya and O. Paliy.

oral presentations on various topics were organized; in addition, there were several sessions for poster presentations.

The young protistologists presented their findings in various fields of this scientific area, and each of the reports was of special interest. The talks focused on studies of parasitic organisms included both data on phylogeny of different groups of microsporidians and development of molecular technologies for their control. The young scientists gave oral and poster presentations on the problems of molecular phylogeny of amoebozoans, along with its combination with morphological descriptions, and also paid attention to studies of fine structure, in particular, of amoebae nuclear apparatus. Several reports covered studying of marine bloom-forming dinoflagellates – from investigation of their life cycles to bioinformatic and experimental analysis of protein machinery. Finally, there were participants who presented results of their works with ciliates: specifically, the characteristics of cytoplasmic and macronuclear bacterial endosymbionts and results of studying of tubulin cytoskeleton in the ciliate cells were discussed.

The microbiological part of the section program included thorough talks on bacterial molecular machinery, in particular, proteins presumably involved in cell division and mechanisms providing resistance to antibiotics. Besides, students presented results of studying anti-restriction mechanisms in bacteriophages and bacterial immunity, as well as Quorum Sensing regulatory system and the impact of volatile organic compounds thereon in the gram-negative bacteria. The effects of bacterial invasion on the structural organization of mammalian cells

were discussed. Attention was also paid to the biodiversity – young scientists spoke about bacterial taxonomic composition of biofilms from acidic and hot springs in Kunashir Island; microbiome researches were represented by a talk on changes of mammalian microbial community in the bile during opisthorchiasis.

During the conference, the young scientists were able not only to share their findings, but also to be acquainted with researches of world-known specialists. For example, Professor Julius Lukês (Head of Laboratory of Molecular Biology of Protists, Institute of Parasitology, Biology Centre of the Czech Academy of Sciences) introduced participants to an enigmatic group – diplomemids, heterotrophic flagellates belonging to the phylum Euglenozoa that demonstrate extraordinary abundance and diversity in the ocean. Diplonemids possess unique morphological, metabolic, and genetic features, including large mitochondrial genomes.

Dr. Vasily Zlatogursky (Department of Invertebrate Zoology, Faculty of Biology, St. Petersburg State University) spoke about free-living heterotrophic heliozoan protists, centrohelids. As it turned out, they have a complex life cycle and demonstrate high abundance not only in marine ecosystems, but also in soils. Dr. Zlatogursky gave bright insight into diversity of centrohelids, which is only now being fully revealed thanks to the use of new molecular approaches in combination with classical morphological methods.

The third invited talk in the section was delivered by Dr. Alexander Kudryavtsev (Head of Laboratory of Cellular and Molecular Protistology, Zoological Institute of the Russian Academy of Sciences). He

highlighted a number of important points regarding the modern systematics in the phylum Amoebozoa. Besides, some problematic issues of species identification were noted, in particular, discrepancy between the results of molecular biological analysis and morphological descriptions (an example was presented concerning the placing of species with tubulinean morphology among discoseans in the phylogenetic tree).

After the end of the section, the conference part of the event was concluded with final remarks of the Chairman of the Program Committee, di-

rector of the Institute of Cytology RAS Dr. Alexey Tomilin and the Vice-chairperson of the Organizing committee Dr. Mariia Berdieva (Fig. 1, C). They emphasized the importance and topicality of such meetings, thanked all the participants and wished them success in scientific career. The organizers also expressed their strong expectation that the Conference of Young Scientists of the Institute of Cytology RAS will develop further to become a solid platform for knowledge exchange and promoting cooperation between young research teams.