

INTRODUCTION

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Systems biology research at BGRS-2018



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From 11th International Multiconference "Bioinformatics of Genome Regulation and Structure\Systems Biology" - BGRS\SB-2018

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In this Special Issue of BMC Systems Biology we present four studies representing systems biology research at BGRS\SB (Bioinformatics of Genome Regulation and Structure\Systems Biology) – 2018 multi-conference (<http://conf.bionet.nsc.ru/bgrssb2018/en/>). This biannual meeting is conducted in Academgorodok, Novosibirsk since 1998. Other special issues of the BGRS conference series include manuscripts in the fields of plant biology, genomics, bioinformatics and genetics, and collated as BMC Genomics, BMC Evolutionary Biology, BMC Neuroscience, BMC Genetics, BMC Medical Genomics and BMC Plant Biology supplements in recent years [1–4]. We would also like to bring attention of the reader to the highlight of the genetics and bioinformatics research at Belyaev Readings-2017 (<http://conf.bionet.nsc.ru/belyaev100/en/>), which was held in 2017, in BioMed Central journals [5–8].

The papers below were presented in the frames of BGRS\SB–affiliated symposium "Systems Computational Biology" (<http://conf.bionet.nsc.ru/bgrssb2018/en/english-systems-computational-biology/>) and at 10th International Young Scientists School (SBB-2018) (<http://conf.bionet.nsc.ru/bgrssb2018/en/school/>).

Dmitry Sakharov and coauthors [9] performed comprehensive comparison of Caco-2 monolayers grown in traditional 2D culture and in a microfluidic chip. It turns out that cultivation conditions influence the spectrum of specific miRNA, secreted by Caco-2 cells substantially. Moreover, these two types of culture display differences in their cell adhesion molecules. This work is an addition to a recent series of papers [10, 11] which describe various steps toward the development of a multi-tissue organ-on-a-chip device.

Alexey Moskalev and co-authors [12] dissected a role of *unpaired 1* gene in ageing of *D. melanogaster* by over-expressing it various organs of the fly. In addition to its

pronounced and sex-specific effects on a lifespan, over-expressing of *upd1* led to an increase in mRNA levels of the JAK/STAT target genes, pointing that pharmacological modulation of this pathway may eventually help to counteract ageing.

Lyudmila Pastushkova and her colleagues [13] endeavor to perform the study of urine proteome to discover biomarkers of adaptation. Notably, they showed that urine proteome profiles correctly sort individuals into cohorts with one or another predominant type of autonomic regulation of the heart rate. Functional analysis of identified protein biomarkers highlighted many molecules contributing to vascular rigidity. Interested reader should also peruse the previous studies published by the same group, which also investigated the changes in urine proteome detected after spaceflight [14, 15].

Ulyana Zubairova and co-authors [16] developed an ImageJ-plugin for the processing of multi-frame multi-channel 3D images obtained from confocal laser scanning microscopy. This plug-in was extensively tested in high-throughput analysis of cereal leaf epidermis architecture, thus being instrumental for the development of the spatial model for this important plant tissue.

Many authors of the four manuscripts described above are young scientists working on their Master or PhD Dissertation in Biology, Biotechnology or related fields. BioMed Central previously had published special issues comprised of materials prepared by participants of International Young Scientists Schools "Systems Biology and Bioinformatics" (SBB) held in Novosibirsk, Russia (<http://conf.bionet.nsc.ru/sbb2018/en/>). We invite our readers worldwide to attend our next events - Systems Biology and Bioinformatics Young Scientists School SBB-2019 which will be held in Novosibirsk (<http://conf.bionet.nsc.ru/sbb2019/en/>), and Vavilov Society Congress - 2019 in St. Petersburg, Russia, in summer 2019. Systems biology field will be highlighted at VII Congress of Vavilov Society of Geneticists and Breeders organized

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by of Saint Petersburg State University 18–22 June 2019 (<https://events.spbu.ru/events/genetic-selection-2019>).

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AB and YO are guest editors of the special post-conference issues and Program Committee members of BGRS\SB-2018 conference. RH is Chairman of the conference. All the authors read, revised and approved the final manuscript.

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