Ancha Baranova, PhD

Professor, Systems Biology

Director, Chronic Metabolic and Rare Diseases Systems Biology Initiative (ChroMe RaDSBIn)

Education

PhD, Genetics, DSci in Genetics, Moscow State University, Moscow, Russia

Key Interests

Personalized Medicine | Human Genetics | Stress Response | Stress Biomarkers | Aging | Insulin Resistance | Systemic Inflammation | Computational Biology | Systems Biology

CONTACT

Phone: 703-993-4293 | Email: abaranov@gmu.edu

Website: https://scholar.google.com/citations?hl=en&user=nzc5N8sAAAAJ&view_op=list_

SELECT PUBLICATIONS

- Stepanova, M., *et al.* (2015). Age-independent rise of inflammatory scores may contribute to accelerated aging in multi-morbidity. *Oncotarget, 6*(3), 1414.
- Glebova, K., *et al.* (2015). Oxidized extracellular DNA as a stress signal that may modify response to anticancer therapy. *Cancer Letters, 356*(1), 22-33.
- Kural, K. C., *et al.* (2016). Pathways of aging: comparative analysis of gene signatures in replicative senescence and stress induced premature senescence. *BMC Genomics, 17,* 1030.
- Baranova, A., *et al.* (2019). Adipose may actively delay progression of NAFLD by releasing tumor-suppressing, anti-fibrotic miR-122 into circulation. *Obesity Reviews, 20(1)*, 108–118.

Research Focus

The strongest aspect of my research program lies in its transdisciplinary nature. In over more than twenty years of active time in academia, I have developed an expertise in a variety of research fields. In many collaborations, I analyze multidimensional datasets and make sense out of this data, putting together arrays of disparate data pieces and generating testable hypotheses ready for experimental validation. With that, we are constantly building the forest out of individual trees.

My lab has discovered many biomarkers for chronic liver diseases, cancer and other illnesses, a biosynthesis of the melanin in human adipose, two novel properties of cell-free DNA, and a variety of novel functions for known biomolecules. Recently, my lab has entered a field of anti-aging research. We dissect major pathophysiological components of aging, namely systemic inflammation, insulin resistance, and organ fibrosis. Our work in personalized medicine has a particular emphasis on longitudinal monitoring and management of health in pre-symptomatic individuals, and augmenting the body's homeostasis by non-pharmacological means.

Current Projects

- Adipose depot as a metabolic stress buffer: Inducible Melanin Biosynthesis and production of miR-122 in Human Adipose to Abate Systemic Inflammation.
- The development of wearable electrochemical sensor patch that will quantify oxiDNA in near real-time (every 30 minutes) to produce life-event awareness feedback for its wearers, thus, becoming a stepping-stone to permit a person to make fast, positive health regimen changes.
- Mapping and mining cfDNA fragment ends to aid in the development of novel biomarkers reflecting pathological changes in chromatin marks, including the detection of neoplasms. Of course, "fragmentomics"-based diagnostic assays which, essentially, map and quantify short nucleotide fragments could, if necessary, be implemented as qPCR assays rather than as expensive NGS runs.