

# GLOBAL PROFILING OF UBIQUITIN-PROTEASOME SYSTEM FUNCTIONING AND PROTEIN TURNOVER

Moscow Institute of Physics and Technology (National Research University)

Degree or qualification is awarded: **PhD (Candidate of Science)**

Language of study: **English**

Mode of study: **full-time**

Duration: **4 years**

Availability of free education: **yes**

Price: **375 000 RUB**

Programme webpage at the university website:

<https://eng.mipt.ru/programs/global-profiling-of-ubiquitin-proteasome-system-functioning-and-protein-turnover/>

Programme curator: **Denis Ustyuzhaninov**

Tel.: **+7 (498) 713 91 70**

E-mail: [interadmission@phystech.edu](mailto:interadmission@phystech.edu)

## Research supervisor:

[Alexey Belogurov](#)

PhD, DSc, Head of Laboratory of Hormonal Regulation Proteins (M.M. Shemyakin–Yu.A. Ovchinnikov Institute of Bioorganic Chemistry of the Russian Academy of Sciences), Head of the Molecular Biomedicine Laboratory (Center of the National Technology Initiative at the M.M. Shemyakin–Yu.A. Ovchinnikov Institute of Bioorganic Chemistry of the Russian Academy of Sciences)

## Supervisor's research interests:

Study of molecular mechanisms of proteasome machinery, including specific inhibitors of immunoproteasome for the treatment of autoimmune diseases, investigation of ubiquitin metabolism and global profiling of the cellular ubiquitinome, probing of the ubiquitin-proteasome system utilizing genome editing techniques.

## Research highlights:

We developed technique for the ubiquitin fluorescence tracking and now are using this methodology to provide comprehensive understanding of ubiquitinproteasome system dynamics on the previously unreachable state of the art.

## Supervisor's specific requirements:

- DNA cloning and protein expression.
- PAGE and WB techniques.
- Flow cytometry.
- Eukaryotic cells maintaining.
- Transfection/transduction procedures.

## Main publications:

- Kudriaeva A, Kuzina ES, Zubenko O, Smirnov IV, Belogurov A. Charge-mediated proteasome targeting. The FASEB Journal 2019;33:6852-66. <https://doi.org/10.1096/fj.201802237R>
- Stepanov AV, Markov OV, Chernikov IV, Gladkikh DV, Zhang H, Jones T, et al. Autocrine-based selection of ligands for personalized CAR-T therapy of lymphoma. Sci Adv 2018;4:eaau4580. <https://doi.org/10.1126/sciadv.aau4580>
- Lomakin Y, Kudriaeva A, Kostin N, Terekhov S, Kaminskaya A, Chernov A, et al. Diagnostics of autoimmune neurodegeneration using fluorescent probing. Scientific Reports 2018;8:12679. <https://doi.org/10.1038/s41598-018-30938-0>
- Ivanova VV, Khaiboullina SF, Gomzikova MO, Martynova EV, Ferreira AM, Garanina EE, et al. Divergent Immunomodulation Capacity of Individual Myelin Peptides—Components of Liposomal Therapeutic against

- Multiple Sclerosis. Front Immunol 2017;8. <https://doi.org/10.3389/fimmu.2017.01335>
- Lomakin Y, Arapidi GP, Chernov A, Ziganshin R, Tcyganov E, Lyadova I, et al. Exposure to the EpsteinBarr Viral Antigen Latent Membrane Protein 1 Induces Myelin-Reactive Antibodies In Vivo. Front Immunol 2017;8. <https://doi.org/10.3389/fimmu.2017.00777>
  - Belogurov A, Zakharov K, Lomakin Y, Surkov K, Avtushenko S, Kruglyakov P, et al. CD206-Targeted Liposomal Myelin Basic Protein Peptides in Patients with Multiple Sclerosis Resistant to First-Line DiseaseModifying Therapies: A First-in-Human, Proof-ofConcept Dose-Escalation Study. Neurotherapeutics 2016;13:895-904. <https://doi.org/10.1007/s13311-016-0448-0>
  - Belogurov A, Kuzina E, Kudriaeva A, Kononikhin A, Kovalchuk S, Surina Y, et al. Ubiquitin-independent proteosomal degradation of myelin basic protein contributes to development of neurodegenerative autoimmunity. FASEB J 2015;29:1901-13. <https://doi.org/10.1096/fj.14-259333>

## **Specializations within this programme**