



Alexander Gabibov short bio

PhD, Dr. Sci. (Chemistry) Director, Shemyakin & Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences Miklukho – Maklaya str. 16/10, 117997, Moscow B-437 Russia. HI 32

Alexander Gabibov was born in Moscow 31 August 1955. He graduated from the school of chemistry at Lomonosov Moscow state university. He fulfilled his graduation degree at the Department of Chemical kinetics headed by Nobel Laureate (chemistry), Professor Nikolay Semyonov and Department of Chemical Enzymology headed by Professor Ilya Berezin. His diploma work was devoted to investigations of mechanism of action of peroxidases. In 1977 he joins the laboratory of Alexander Braunstein, discoverer of Vitamin B6 catalysis, member of Soviet Academy of Sciences and National Academy of Sciences of USA. Under the supervision of Alexander Braunstein and Evgeny Severin he accomplished his PhD study devoted to the fast kinetics of protein phosphorylation. He isolated one of the first protein kinases and he estimated elementary constants of the process. This work was published in 1981-1983 in several issues of European J. of Biochemistry (FEBS J.) and was estimated by Edwin Krebs (Nobel Laureate). He received the prize for young scientists of Soviet Union for this work. Alexander Gabibov was awarded by Sber Prize for Science in 2023.

EDUCATION

Moscow State University, Chemical Faculty,	1972-1977
Department of Chemical Enzymology	
Graduate practice in the Moscow State University,	1975-1977
Chemical Faculty, Department of Chemical Enzymology.	
Postgraduate practice in the Institute of Molecular	1978-1981
Biology USSR Academy of Sciences, Laboratory	

of Enzyme regulation of Cell activity

Trainee in the Institute of Biochemistry and Organic Chemistry 1984

Czechoslovak Academy of Sciences, Prague

Present positions:

2016- Full Member of Russian Academy of Sciences

2003-2016 -Correspondent Member (associate) of Russian Academy of Sciences.

2000-Present Position-Professor, Moscow State University, Chemical Department (Cell Biology)

1997-Present Position- Professor, Head of the Laboratory of Biocatalysis, Shemyakin & Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences (Moscow, Russia)

2008-Present position President of Russian Biochemical and Molecular Biology Society, Head of the National Committee of Russian Biochemists, Russian Academy of Sciences

2009-Présent Correspondant a titre étranger de l'Académie National De Pharmacie de République Française

2012 Head of the Department of Industrial Pharmacology School of Fundamental Medicine, Lomonosov Moscow State University

2013 – 2015, Vice –president, President of FEBS (Federation of European Biochemical Societies)

2013-Deputy Director of Shemyakin & Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences (Moscow, Russia)

2014-Member of Academia Europaea

2017-Director of Shemyakin & Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences (Moscow, Russia)

Invited Speaker plenary and Symposia lecturer of selected meetings during last years:

2006 International Congress of Biochemistry and Molecular Biology, Kyoto. Japan

2009 International Congress of Biochemistry and Molecular Biology, Shanghai, China

2009 Gordon Conference, USA

2012 International Congress of Biochemistry and Molecular Biology, Seville, Spain

Lecturer on more than 50 international meetings during last five years

International grants for last 10 ears- HHMI, COPERNICUS, INTAS, NIH, ISGB, NATO-science for Peace.

Member of Scientific panels

1.Shemyakin&Ovchinnikov Institute of Bioorganic Chemistry, Russian Academy of Sciences

2.Moscow State University, Chemical Department

3.Russian Foundation of Basic Research,

4.Ministry of Industry and Trade Russian Federation

5. NIH-RFBR panel for joint grants in Cancer and AIDS

6. Vice-President, President of the Federation of European Biochemical Societies (FEBS) 2013-2015

Editor-in Chief

PubMed cited Journal "Acta Naturae", Associate Editor Quarterly Reviews of Biophysics, Discovery,

Member of Editorial Board:

Biorg.Chem. Biotechnology and Applied Biochemistry, Faculty 1000 "Chemical Biology", Frontiers in Immunology

Monograph "Topology in Molecular biology"

DNA and proteins

Springer, 2009

"Catalysis in Organic Synthesis"

Novoscience, 2012

Main achievements:

Alexander Gabibov firstly proposed that antibody catalysis may take place in nature. He showed that antiidiotypic antibodies toward enzymes might have catalytic function. He discovered DNA-hydrolyzing activity of antibodies and other "natural biocatalytic pathways" in humans and in mice in different pathologies. (Science, 1992, PNAS, 1995, J. Immunol. methods, 2000). He demonstrated several antibody-mediated reactions (PNAS 2000, 2006, J Immunology, 2008). He showed antibody, enzyme-mediated pathways to cleave organophosphorus nerve gases (PNAS 2011, 2013, 2020). He proposed for the first time to use QM/MM approaches to calculate antibody-mediated reactions (Science advances, 2016, PNAS 2020).

Alexander Gabibov proposed to quantitatively estimate DNA supercoiling using Flow linear Dichroism technique and applied it for DNA-topoisomerases (FEBS J. 2005). Alexander Gabibov demonstrated ubiquitin independent pathway to destroy naturally unfolded proteins such as myelin basic protein (MBP) by proteasome (JBC, 2014, FASEB J. 2015). He proposed a novel microfluidic system to study individual clones and more general to analyze biodiversity (PNAS, 2017, 2018, 2020). He showed that combinatorial autocrine-based selection allows rapidly identify specific ligands for these B cell receptors on the surface of FL tumor cells. The selected ligands are used in a chimeric antigen receptor T cell (CAR-T) format for redirection of human cytotoxic T lymphocytes (Science Adv. 2018, Leukemia, 2019). From the time of his PhD, and Postdoctoral fellowship Alexander Gabibov pay attention to mechanism of enzyme reactions under supervision of his mentor Alexander Braunstein he described the pre-steady state kinetics of B6 - dependent enzymes, topoisomerases, and protein kinases (FEBS J, 1981, 1982, 1983, 1995) and he recently discovered a new kinase responsible for drug resistance (Science adv. 2020). He is focused on antibiotic drug resistance (Antibiotics, 2020, 2020). He showed the genetic risk of the development of Multiple sclerosis (Frontiers Immunol, 2020) and he developed a potential drug to treat MS (Frontiers Immunol, 2017, 2019, FASB J. 2011, 2013, 2012). He developed Catalytic CARs Nature Biomedical Engineering 2023. Alexander Gabibov together with Roger Kornberg proposed the algorithm of prediction of specific virus-neutralizing

therapeutic antibodies. He proved that predicted with AI and Machine Learning approaches epitope-specific antibodies poses neutralizing activity toward SARS-CoV-2. The application of genetically modified mice models with human angiotensin-converting enzyme allowed to validate this approach (Nature Com, 2026). Alexander Gabibov proposed the AI algorithm to select optimal substrates for antibody catalysis (PNAS, 2026)

Alexander Gabibov was awarded by Soviet government in 1984 with the “Lenin Komsomol prize” for best achievement in chemical science. Alexander Gabibov got the order for nomination “Best Chemist” from the Ministry of Industry of Russian Federation in 2017 year.

Alexander Gabibov 1984 year Received the Governmental “Meritorious labor medal”

Alexander Gabibov was decorated by the Government of RF by the medal “850 year of the foundation of Moscow”

International recognition: Alexander Gabibov is a Member of European Academy of Sciences, Foreign member of French Academy of Pharmacy. SberBank National Prize for science 2023