University	Peter the Great St. Petersburg Polytechnic University
Level of English proficiency	Fluent
Educational program and field of the educational program for which the applicant will be accepted	PHYSYCAL SCIENCES & TECHNOLOGY 1.5.2. Biophysics BIOLOGY & BIOTECHNOLOGY 1.5.3. Molecular biology 1.5.6. Biotechnology 1) Russian Science Foundation grant No. 22-14-00278
potential supervisor	 (Project Supervisor: A.L. Konevega, 2017-2019) "Translating ribosome - conformational foundations of functioning and inhibition". 2) Agreement No. 075-15-2021-1360 of the Federal Scientific and Technical Program for the Development of Synchrotron and Neutron Research "Development of a domestic innovative theranostic medicine based on terbium isotopes for radioimmune therapy of malignant neoplasms of various histological types" (Project Supervisor: A.L. Konevega, 2021-2023) 3) RFBR 20-04-60491 COVID (Project Supervisor: A.L. Konevega, 2020-2022) "Fundamental principles for the development of new medicine with specific activity against SARS-CoV-2 coronavirus." 4) RSF №17-14-01416 (Supervisor: A.L. Konevega, 2017-2019) "Conformational dynamics of the translational ribosome". 5) RFBR komfi No. 17-00-00368 (Supervisor: A.L. Konevega, 2017-2019) "Study of the kinetics and mechanism of inhibition of specific mRNA sequences translation". 6) RFBR 13-04-40212N (komfi) "Study of molecular mechanisms of elongation cycle reactions and development of methods for searching for new classes of antibacterial agents having impact on protein biosynthesis". (Supervisor: A.L. Konevega 2013-2015).
List of the topics offered for the prospective scientific research	Study of the molecular mechanism of functioning of antibiotics that inhibit protein biosynthesis
	Natural sciences 1.06. Biological sciences, Biophysics
	Supervisor's research interests
	Radiopharmaceuticals, medical radiology, proton therapy, Antibiotics that inhibit protein biosynthesis, cryoelectron microscopy

	Research highlights Radiopharmaceuticals development, Molecular mechanism of protein biosynthesis, cryoelectron microscopy
	Supervisor's specific requirements: Basic education in the field of physics, biology or medicine.
	Supervisor's main publications 1. Rumicidins are a family of mammalian host-defense peptides plugging the 70S ribosome exit tunnel. Panteleev PV, Pichkur EB, Kruglikov RN, Paleskava A, Shulenina OV, Bolosov IA, Bogdanov IV, Safronova VN, Balandin SV, Marina VI, Kombarova TI, Korobova OV, Shamova OV, Myasnikov AG, Borzilov AI, Osterman IA, Sergiev PV, Bogdanov AA, Dontsova OA, Konevega AL, Ovchinnikova TV. Nat Commun. 2024 Oct 16;15(1):8925. doi: 10.1038/s41467-024- 53309-y.
	 PMID: 39414793 Free PMC article. 2. The archaeal highly thermostable GH35 family β-galactosidase DaβGal has a unique seven domain protein fold. Kil Y, Pichkur EB, Sergeev VR, Zabrodskaya Y, Myasnikov A, Konevega AL, Shtam T, Samygina VR, Rychkov GN. FEBS J. 2024 Aug;291(16):3686-3705. doi: 10.1111/febs.17166. Epub 2024 Jun 2. PMID: 38825733
	3. An easy tool to monitor the elemental steps of in vitro translation via gel electrophoresis of fluorescently labeled small peptides. Marina VI, Bidzhieva M, Tereshchenkov AG, Orekhov D, Sagitawa ME, Sumhatwan NW, Tashlitalw MN, Farhara AS
	Sagitova VE, Sumbatyan NV, Tashlitsky VN, Ferberg AS, Maviza TP, Kasatsky P, Tolicheva O, Paleskava A, Polshakov VI, Osterman IA, Dontsova OA, Konevega AL, Sergiev PV. RNA. 2024 Feb 16;30(3):298-307. doi: 10.1261/rna.079766.123. PMID: 38164606
	4.Hybrid Molecules of Azithromycin with Chloramphenicol and Metronidazole: Synthesis and Study of Antibacterial Properties. Volynkina IA, Bychkova EN, Karakchieva AO, Tikhomirov AS, Zatonsky GV, Solovieva SE, Martynov MM, Grammatikova NE, Tereshchenkov AG, Paleskava A, Konevega AL, Sergiev PV, Dontsova OA, Osterman IA, Shchekotikhin AE, Tevyashova AN. Pharmaceuticals (Basel). 2024 Jan 31;17(2):187. doi: 10.3390/ph17020187.
Research supervisor: Andrei Konevega,	 PMID: 38399402 Free PMC article. 5.OCT4 Expression in Gliomas Is Dependent on Cell Metabolism. Volnitskiy A, Shabalin K, Pantina R, Varfolomeeva E, Kovalev R, Burdakov V, Emelianova S, Garaeva L, Yakimov A, Sogoyan
PhD in Physics and Mathematics (Peter the Great St. Petersburg Polytechnic University, 2005)	M, Filatov M, Konevega AL, Shtam T. Curr Issues Mol Biol. 2024 Jan 25;46(2):1107-1120. doi: 10.3390/cimb46020070. PMID: 38392188 Free PMC article.

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7.Radiosensitizing Effect of Dextran-Coated Iron Oxide
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10.Insights into the molecular mechanism of translation inhibition by the ribosome targeting antibiotic thermorybin
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Results of intellectual activity By means of methods of prestationary kinetics, biochemical and biophysical methods the mechanisms of action of antibiotics - inhibitors of protein synthesis have been characterized. Cryoelectron microscopy and X-ray diffraction analysis have been used to obtain spatial structures of ribosomal functional complexes with inhibitors. Structural and functional correspondence has been established and the molecular mechanism of action of antibiotics has been investigated in detail. For the first time, a new mechanism of regulation of translation initiation in case of a strict response has been discovered. Cryoelectron microscopy was used to study the ribosome complex in the process of re-coding the AUG stop codon to the amino acid selenocysteine (Sec). The mechanism of GTPase activation has been demonstrated. The kinetic parameters of re- coding, GTP hydrolysis, and peptide bond synthesis were studied making use of prestationary kinetics methods. The enzyme that provides the formation of a tRNA posttranscriptional modification – dihydrouridine. It has a unique mechanism for recognizing the corresponding substrate nucleotide at different positions of tRNA: 16 and 20. For correct
positioning of the substrate in the active center, the tRNA body turns at 160 degrees.
The functional ribosome complex in the process of decoding the correct codon (UUC for tRNAPhe), stabilized by the antibiotic kyrromycin, was studied by means of cryoelectron microscopymethods. The use of an aberration corrector in combination with a high-class technique for obtaining homogeneous samples made it possible to obtain a structure with a record high resolution (< 3 Å).