Curriculum vitae: Elena Vodovozova



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Education

2008	Russia, Moscow	M.M. Shemyakin and Yu.A. Ovchinnikov Institute of Bioorganic Chemistry RAS	DSc in chemistry, biochemistry
1985	Russia, Moscow	M.M. Shemyakin and Institute of Bioorganic Chemistry AS USSR	PhD in biochemistry
1975–1981	Russia, Moscow	M.V. Lomonosov Moscow State University (chemical faculty)	Ms in chemistry (Cum laude)

Teaching

IBCh positions

2008–to date	Head of Laboratory	
2019–to date	Principal research fellow	
2026–2026	Professor	

IBCh memberships

	Scientific council

Scientific interests

Dr. Vodovozova has specialized in the design of targeted drug delivery systems (nanocarriers) on the basis of liposomes, lipid derivatives of anticancers (lipophilic prodrugs) and lipophilic glycoconjugates (vectors) from the middle of 1990 years. Another field of the research, which she has developed, relates to the synthesis of photoaffinity probes bearing new high-performance photophore — diazocyclopentadien-2-ylcarbonyl group.

Titles

2007	Doctor of Science (Chemistry)
1985	Doctor of Philosophy (Chemistry)

Grants and projects

2026–to date	Designing reagent delivery systems for boron-neutron capture therapy based on liposomes and lipid nanoparticles
2021–2024	-Белковая корона липосом и ее влияние на взаимодействия с клетками кровеносного русла
2021–2023	Development of means of prevention and treatment of COVID-19 and concomitant infectious diseases using genetic technologies
2021–2024	Protein corona of liposomes and its effect on interactions with cells of the bloodstream
2020–2022	Development of a prototype vaccine design for the treatment and prevention of a new coronavirus infection COVID-19 based on liposomes with a set of T-cell epitopes
2019–2021	Interactions of antitumor liposomes carrying lipophilic prodrugs in the bilayer with endothelial cells and blood plasma proteins under dynamic conditions: biomodelling in a microchannel of a microfluidic device

Publications

1. Fonareva IP, Alekseeva AS, Svirshchevskaya EV, **Vodovozova EL**, Safonov VE, Fedorov AY, Shchegravina ES (2026). Design, Synthesis, and Biological Evaluation of a Novel Gedatolisib−Phospholipid Conjugate and Liposomal Formulations Based Thereon. *Bioconjug Chem* 37 (10), 1999–2010, 10.1021/acs.bioconjchem.6c00278
2. Soboleva NZ, Pipiya SO, Kalganova AI, Doroshenko VA, Starikova VV, Koroev DO, Gorodnichev RB, **Vodovozova EL**, Smirnov IV, Terekhov SS (2026). Synergistic Activity of Antimicrobial Peptides with Orthogonal Mechanisms of Action. *Russ. J. Bioorganic Chem.* 52 (5), 124, 10.1134/S1068162026603575
3. Fedorova OV, Ovchinnikova IG, Rusinov GL, Avdeeva VV, Zhdanov AP, Zhizhin KY, Kuznetsov NT, Zakharova LY, Kuznetsova DA, Razuvaeva YS, Zhiltsova EP, Sinyashin OG, Alekseeva AS, **Vodovozova EL**, Abdrakhmanova II, Ibrahim A, Solovyeva VV, Maltsev AV, Fisenko VP, Bachurin SO, Mikhailov YM, Aleksandrova YI, Shurpik DN, Stoikov II, Ziganshina AY, Solovieva SE, Antipin IS, Agafonov MA, Terekhova IV, Ilicheva PM, Pidenko PS, Burmistrova NA, Moustafine RI, Timergalieva VR, Zabolotnaya YN, Khutoryanskiy VV, Demin AM, Levit GL, Charushin VN, Krasnov VP, Goryacheva OA, Mayorova OA, Mesheryakova SM, Goryacheva IY, Ayupova AI, Fattakhova AA, Rizvanov AA, Inozemtseva OA, Gusliakova OI, Gorin DA, Gerasimov AV, Zubaidullina LS, Ziganshin MA, Valiulin SV, Onischuk AA, Bezrukov AN, Galyametdinov YG, Padnya PL, Nazarova AA, Sultanova ED, Burilov VA (2025). Modern Strategies of Drug Therapy: Multi-Target Drug Delivery, Bioimaging, Diagnostics.*RUSS J GEN CHEM* 95 (Suppl 1), S1–S448, 10.1134/S1070363225606726
4. Svirshchevskaya EV, Shchegravina ES, Gracheva IA, Konovalova MV, Akopov SB, Tretiakova DS, Rysina YD, Zapevalova MV, Schmalz HG, Koroev DO, Gavryushin AE, **Vodovozova EL**, Fedorov AY (2025). Hydrophilic and lipophilic colchicinoid formulations for therapy of liver fibrosis in murine model. *Bioorg Chem* 169, 109397, 10.1016/j.bioorg.2025.109397
5. Gaisin KS, Ryabukhina EV, Koroev DO, Mikhalyov II, Zhuravlev ES, Stepanov GA, Boldyrev IA, **Vodovozova EL** (2025). An Ionizable Cationic Lipid for Intracellular RNA Delivery. *Russ. J. Bioorganic Chem.* 51 (5), 1982–1989, 10.1134/S1068162025602149
6. Rubtsova M, Mokrushina Y, Andreev D, Poteshnova M, Shepelev N, Koryagina M, Moiseeva E, Malabuiok D, Prokopenko Y, Terekhov S, Chernov A, **Vodovozova E**, Smirnov I, Dontsova O, Gabibov A, Rubtsov Y (2025). A Luciferase-Based Approach for Functional Screening of 5′ and 3′ Untranslated

Regions of the mRNA Component for mRNA Vaccines. *Vaccines (Basel)* 13 (5), 530, 10.3390/vaccines13050530
7. Ryabukhina E, Kobanenko M, Tretiakova D, Shchegravina E, Khaidukov S, Alekseeva A, Boldyrev I, Zgoda V, Tikhonova O, Fedorov AY, Onishchenko N, **Vodovozova E** (2025). Plasma protein corona of liposomes loaded with a phospholipid–allocolchicinoid conjugate enhances their anti-inflammatory potential. *Colloids Surf B Biointerfaces* 253, 114746, 10.1016/j.colsurfb.2025.114746
8. Shirokov A, Zlatogosrkaya D, Adushkina V, **Vodovozova E**, Kardashevskaya K, Sultanov R, Kasyanov S, Blokhina I, Terskov A, Tzoy M, Evsyukova A, Dubrovsky A, Tuzhilkin M, Elezarova I, Dmitrenko A, Manzhaeva M, Krupnova V, Semiachkina-Glushkovskaia A, Ilyukov E, Myagkov D, Tuktarov D, Popov S, Inozemzev T, Navolokin N, Fedosov I, Semyachkina-Glushkovskaya O (2024). Plasmalogens Improve Lymphatic Clearance of Amyloid Beta from Mouse Brain and Cognitive Functions. *Int J Mol Sci* 25 (23), , 10.3390/ijms252312552
9. Tretiakova DS, Volynsky PE, Kobanenko MK, Alekseeva AS, Le-Deygen IM, **Vodovozova EL**, Boldyrev IA (2024). Phosphatidylglycerol in lipid bilayer. Molecular recognition, conformational transitions, hydrogen bonding and microviscosity. *J Mol Liq* 411, , 10.1016/j.molliq.2024.125688
10. Navolokin N, Adushkina V, Zlatogorskaya D, Telnova V, Evsiukova A, **Vodovozova E**, Eroshova A, Dosadina E, Diduk S, Semyachkina-Glushkovskaya O (2024). Promising Strategies to Reduce the SARS-CoV-2 Amyloid Deposition in the Brain and Prevent COVID-19-Exacerbated Dementia and Alzheimer's Disease. *Pharmaceuticals (Basel)* 17 (6), 788, 10.3390/ph17060788
11. **Vodovozova EL** (2024). Editorial for Special Issue: Liposomal and Lipid-Based Drug Delivery Systems and Vaccines. *Pharmaceutics* 16 (2), , 10.3390/pharmaceutics16020238
12. Kobanenko M, Samofalov P, Kapitonova I, Alekseeva A, Kapkaeva M, Scheglovitova O, Tuzikov A, Tretiakova D, **Vodovozova E** (2024). Plasma Protein Adsorption on Melphalan Prodrug Bearing Liposomes - Bare, Stealth, and Targeted. *Drug Deliv Lett* 14 (4), 320–328, 10.2174/0122103031297263240612110749
13. Shchegravina ES, Tretiakova DS, Sitdikova AR, Usova SD, Boldyrev IA, Alekseeva AS, Svirshchevskaya EV, **Vodovozova EL**, Fedorov AY (2023). Design and preparation of pH-sensitive cytotoxic liposomal formulations containing antitumor colchicine analogues for target release. *J Liposome Res* 34 (3), 1–17, 10.1080/08982104.2023.2274428
14. Tretiakova DS, Azhikina TL, Boldyrev IA, Svirshchevskaya EV, **Vodovozova EL** (2023). Synthesis of Liposomes Conjugated with CpG-Oligonucleotide and Loaded with a Set of T-Cell Epitopes of the SARS-CoV-2 Virus. *Russ. J. Bioorganic Chem.* 49 (4), 905–911, 10.1134/S1068162023040210
15. Tretiakova D, Kobanenko M, Alekseeva A, Boldyrev I, Khaidukov S, Zgoda V, Tikhonova O, **Vodovozova E**, Onishchenko N (2023). Protein Corona of Anionic Fluid-Phase Liposomes Compromises Their Integrity Rather than Uptake by Cells. *Membranes (Basel)* 13 (7), 681, 10.3390/membranes13070681
16. Onishchenko NR, Moskovtsev AA, Kobanenko MK, Tretiakova DS, Alekseeva AS, Kolesov DV, Mikryukova AA, Boldyrev IA, Kapkaeva MR, Shcheglovitova ON, Bovin NV, Kubatiev AA, Tikhonova OV, **Vodovozova EL** (2023). Protein Corona Attenuates the Targeting of Antitumor Sialyl Lewis X-Decorated Liposomes to Vascular Endothelial Cells under Flow Conditions. *Pharmaceutics* 15 (6), 1754, 10.3390/pharmaceutics15061754
17. Boldyrev IA, Shendrikov VP, Vostrova AG, **Vodovozova EL** (2023). A Route to Synthesize Ionizable Lipid ALC-0315, a Key Component of the mRNA Vaccine Lipid Matrix. *Russ. J. Bioorganic Chem.* 49 (2), 412–415, 10.1134/S1068162023020061
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19. Tretiakova DS, Alekseeva AS, Onishchenko NR, Boldyrev IA, Egorova NS, Vasina DV, Gushchin VA, Chernov AS, Telegin GB, Kazakov VA, Plokhikh KS, Konovalova MV, Svirshchevskaya EV, **Vodovozova EL** (2023). Proof-of-Concept Study of Liposomes with a Set of SARS-CoV-2 Viral Peptidic T-Cell

Epitopes as a Vaccine. *Russ. J. Bioorganic Chem.* 48 (S1), S23–S37, 10.1134/S1068162022060255
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21. Semyachkina-Glishkovskaya O, Shirokov A, Blokhina I, Telnova , **Vodovozova E**, Alekseeva A, Boldyrev I, Fedosov I, Dubrovsky A, Khorovodov A, Terskov A, Evsukova A, Elovenko D, Adushkina V, Tzoy M, Kurthz J, Rafilov E (2023). Intranasal Delivery of Liposomes to Glioblastoma by Photostimulation of the Lymphatic System. *Pharmaceutics* 15 (1), 36, 10.3390/pharmaceutics15010036
22. Tretiakova DS, **Vodovozova EL** (2022). Liposomes as Vaccine Delivery Systems and Adjuvants. *BIOL MEMBRANY* 39 (2), 85–106, 10.31857/S0233475522020074
23. Tretiakova D, Kobanenko M, Le-Deygen I, Boldyrev I, Kudryashova E, Onishchenko N, **Vodovozova E** (2022). Spectroscopy Study of Albumin Interaction with Negatively Charged Liposome Membranes: Mutual Structural Effects of the Protein and the Bilayers. *Membranes (Basel)* 12 (11), , 10.3390/membranes12111031
24. Tretiakova DS, **Vodovozova EL** (2022). Liposomes as Adjuvants and Vaccine Delivery Systems. *Biochemistry (Moscow), Supplement Series A: Membrane and Cell Biology* 16 (1), 1–20, 10.1134/S1990747822020076
25. Kobanenko MK, Tretiakova DS, Shchegravina ES, Antipova NV, Boldyrev IA, Fedorov AY, **Vodovozova EL**, Onishchenko NR (2022). Liposomal Formulation of a PLA2-Sensitive Phospholipid–Allocolchicinoid Conjugate: Stability and Activity Studies In Vitro. *Int J Mol Sci* 23 (3), 1034, 10.3390/ijms23031034
26. Semyachkina-Glushkovskaya O, Fedosov I, Shirokov A, **Vodovozova E**, Alekseeva A, Khorovodov A, Blokhina I, Terskov A, Mamedova A, Klimova M, Dubrovsky A, Ageev V, Agranovich I, Vinnik V, Tsven A, Sokolovski S, Rafailov E, Penzel T, Kurths J (2021). Photomodulation of lymphatic delivery of liposomes to the brain bypassing the blood-brain barrier: New perspectives for glioma therapy. *Nanophotonics* 10 (12), 3215–3227, 10.1515/nanoph-2021-0212
27. Gracheva IA, Tretiakova DS, Zamyshlyaeva OG, Kudriashova ES, **Vodovozova EL**, Fedorov AY, Boldyrev IA (2021). Cy5-Labeled Phosphatidylcholine. *Russ. J. Bioorganic Chem.* 47 (5), 1114–1117, 10.1134/S1068162021050265
28. Onishchenko N, Tretiakova D, **Vodovozova E** (2021). Spotlight on the Protein Corona of Liposomes. *Acta Biomater* 134, 57–78, 10.1016/j.actbio.2021.07.074
29. **(conference)** Tretiakova DS, Le-Deygen I, Kudryashova E, **Vodovozova EL** (2021). Serum albumin penetration in the fluid lipid bilayer of liposomes loaded with a melphalan lipophilic prodrug can be prevented by inclusion of phosphatidylinositol or ganglioside GM1. *FEBS Open Bio 11 (Suppl. 1) 2021, 256* 11, 256, 10.1002/2211-5463.13205
30. Tuzikov AB, Ryabukhina EV, Paramonov AS, Chizhov AO, Bovin NV, **Vodovozova EL** (2021). A convenient route to conjugates of 1,2-diglycerides with functionalized oligoethylene glycol spacer arms. *MENDELEEV COMMUN* 31 (4), 538–541, 10.1016/j.mencom.2021.07.034
31. Alekseeva AS, Volynsky PE, Krylov NA, Chernikov VP, **Vodovozova EL**, Boldyrev IA (2021). Phospholipase A2 way to hydrolysis: Dint formation, hydrophobic mismatch, and lipid exclusion. *BIOCHIM BIOPHYS ACTA* 1863 (1), 183481, 10.1016/j.bbamem.2020.183481
32. Tretiakova D, Le-Deigen I, Onishchenko N, Kuntsche J, Kudryashova E, **Vodovozova E** (2021). Phosphatidylinositol stabilizes fluid-phase liposomes loaded with a melphalan lipophilic prodrug. *Pharmaceutics* 13 (4), , 10.3390/pharmaceutics13040473
33. Tretiakova DS, Khaidukov SV, Babayants AA, Frolova IS, Shcheglovitova ON, Onishchenko NR, **Vodovozova EL** (2020). Lipophilic Prodrug of Methotrexate in the Membrane of Liposomes Promotes Their Uptake by Human Blood Phagocytes. *Acta Naturae* 12 (1), 99–109, 10.32607/actanaturae.10946
34. Tretiakova D, Svirshchevskaya E, Onishchenko N, Alekseeva A, Boldyrev I, Kamyshinsky R, Natykan A, Lokhmotov A, Arantseva D, Shobolov D, **Vodovozova E** (2020). Liposomal Formulation of a Melphalan

Lipophilic Prodrug: Studies of Acute Toxicity, Tolerability, and Antitumor Efficacy. *Curr Drug Deliv* 17 (4), 312–323, 10.2174/1567201817666200214105357

35. Shchegravina ES, Tretiakova DS, Alekseeva AS, Galimzyanov TR, Utkin YN, Ermakov YA, Svirshchevskaya EV, Negrebetsky VV, Karpechenko NY, Chernikov VP, Onishchenko NR, **Vodovozova EL**, Fedorov AY, Boldyrev IA (2019). Phospholipidic Colchicinoids as Promising Prodrugs Incorporated into Enzyme-Responsive Liposomes: Chemical, Biophysical, and Enzymological Aspects. *Bioconjug Chem* 30 (4), 1098–1113, 10.1021/acs.bioconjchem.9b00051
36. Arantseva DA, **Vodovozova EL** (2018). Platinum-Based Antitumor Drugs and Their Liposomal Formulations in Clinical Trials. *Russ. J. Bioorganic Chem.* 44 (6), 619–630, 10.1134/S1068162018060031
37. Alekseeva AS, Chugunov AO, Volynsky PE, Onishchenko NR, Molotkovsky JG, Efremov RG, Boldyrev IA, **Vodovozova EL** (2018). Behavior of Doxorubicin Lipophilic Conjugates in Liposomal Lipid Bilayers. *Russ. J. Bioorganic Chem.* 44 (6), 732–739, 10.1134/S1068162019010023
38. Tretiakova DS, Alekseeva AS, Galimzyanov TR, Boldyrev AM, Chernyadyev AY, Ermakov YA, Batishchev OV, **Vodovozova EL**, Boldyrev IA (2018). Lateral stress profile and fluorescent lipid probes. FRET pair of probes that introduces minimal distortions into lipid packing. *BIOCHIM BIOPHYS ACTA* 1860 (11), 2337–2347, 10.1016/j.bbamem.2018.05.020
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40. Tretiakova D, Onishchenko N, Boldyrev I, Mikhalyov I, Tuzikov A, Bovin N, Evtushenko E, **Vodovozova E** (2018). Influence of stabilizing components on the integrity of antitumor liposomes loaded with lipophilic prodrug in the bilayer. *Colloids Surf B Biointerfaces* 166, 45–53, 10.1016/j.colsurfb.2018.02.061
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44. Третьякова ДС, Онищенко НР, Вострова АГ, **Водовозова ЕЛ** (2017). Взаимодействия противоопухолевых липосом, несущих липофильные пролекарства в бислое, с белками плазмы крови. 43 (6), 661–673, 10.7868/S0132342317060100
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47. Alekseeva A, Kapkaeva M, Shcheglovitova O, Boldyrev I, Pazynina G, Bovin N, **Vodovozova E** (2015). Interactions of antitumour Sialyl Lewis X liposomes with vascular endothelial cells. *BIOCHIM BIOPHYS ACTA* 1848 (5), 1099–1110, 10.1016/j.bbamem.2015.01.016

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