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

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

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

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–	Development of a prototype vaccine design for the treatment and prevention of a new coronavirus

2022	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. 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
2. 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
3. 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
4. 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
5. **Vodovozova EL** (2024). Editorial for Special Issue: Liposomal and Lipid-Based Drug Delivery Systems and Vaccines. *Pharmaceutics* 16 (2), , 10.3390/pharmaceutics16020238
6. 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
7. 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
8. 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
9. 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
10. 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
11. 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
12. Gretskaya N, Akimov M, Andreev D, Zalygin A, Belitskaya E, Zinchenko G, Fomina-Ageeva E, Mikhalyov I, **Vodovozova E**, Bezuglov V (2023). Multicomponent Lipid Nanoparticles for RNA Transfection. *Pharmaceutics* 15 (4), , 10.3390/pharmaceutics15041289
13. 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

14. Semyachkina-Glushkovskaya O, Bragin D, Bragina O, Socolovski S, Shirokov A, Fedosov I, Ageev V, Blokhina I, Dubrovsky A, Telnova V, Terskov A, Khorovodov A, Elovenko D, Evsukova A, Zhoy M, Agranovich I, **Vodovozova E**, Alekseeva A, Kurths J, Rafailov E (2023). Low-Level Laser Treatment Induces the Blood-Brain Barrier Opening and the Brain Drainage System Activation: Delivery of Liposomes into Mouse Glioblastoma. *Pharmaceutics* 15 (2), 567, 10.3390/pharmaceutics15020567
15. 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
16. Tretiakova DS, **Vodovozova EL** (2022). Liposomes as Vaccine Delivery Systems and Adjuvants. *BIOL MEMBRANY* 39 (2), 85–106, 10.31857/S0233475522020074
17. 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
18. 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
19. 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
20. 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
21. 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
22. 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
23. **(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
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25. 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
26. 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
27. 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
28. 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
29. 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
30. 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
31. 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
32. 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
33. Zhang C, Feng WEI, **Vodovozova E**, Tretiakova D, Boldyrevd I, Li Y, Kürths J, Yu T, Semyachkina-Glushkovskaya O, Zhu DAN (2018). Photodynamic opening of the blood-brain barrier to high weight molecules and liposomes through an optical clearing skull window. *Biomed Opt Express* 9 (10), 4850, 10.1364/BOE.9.004850
34. 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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37. Alekseeva AA, Moiseeva EV, Onishchenko NR, Boldyrev IA, Singin AS, Budko AP, Shprakh ZS, Molotkovsky JG, **Vodovozova EL** (2017). Liposomal formulation of a methotrexate lipophilic prodrug: Assessment in tumor cells and mouse T-cell leukemic lymphoma. *Int J Nanomedicine* 12, 3735–3749, 10.2147/IJN.S133034
38. 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
39. German SV, Navolokin NA, Kuznetsova NR, Zuev VV, Inozemtseva OA, Aniskov AA, Volkova EK, Bucharskaya AB, Maslyakova GN, Fakhrullin RF, Terentyuk GS, **Vodovozova EL**, Gorin DA (2015). Liposomes loaded with hydrophilic magnetite nanoparticles: Preparation and application as contrast agents for magnetic resonance imaging. *Colloids Surf B Biointerfaces* 135, 109–115, 10.1016/j.colsurfb.2015.07.042
40. Privalova AM, Uglanova SV, Kuznetsova NR, Klyachko NL, Golovin YI, Korenkov VV, **Vodovozova EL**, Markvicheva EA (2015). Microencapsulated multicellular tumor spheroids as a tool to test novel anticancer nanosized drug delivery systems in vitro. *J Nanosci Nanotechnol* 15 (7), 4806–4814, 10.1166/jnn.2015.10508
41. 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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44. Kuznetsova NR, **Vodovozova EL** (2014). Differential binding of plasma proteins by liposomes loaded with lipophilic prodrugs of methotrexate and melphalan in the bilayer. *Biochemistry (Mosc)* 79 (8), 797–804,

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48. Kuznetsova NR, Svirshchevskaya EV, Sitnikov NS, Abodo L, Sutorius H, Zapke J, Velder J, Thomopoulou P, Oschkinat H, Prokop A, Schmalz HG, Fedorov AY, **Vodovozova EL** (2013). Lipophilic prodrugs of a triazole-containing colchicine analogue in liposomes: Biological effects on human tumor cells. *Russ. J. Bioorganic Chem.* 39 (5), 543–552, 10.1134/S1068162013050105
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