

Curriculum vitae: Ilia Yampolsky



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bioorganic chemistry RAS, Moscow,
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IBCh positions

	Head of department
2018–to date	Principal research fellow
2021–to date	Deputy sci-director

IBCh memberships

Educational-methodical commission
Certifying committee
Dissertation council
Scientific council

Scientific interests

Research interests: medicinal chemistry, total synthesis of natural products, bioluminescence, fluorescent and fluorogenic dyes, evaluation of biosynthetic mechanisms. He dedicates plenty of time to teaching chemistry to high-school and university students specialized in biology and authors about a dozen original lecture courses.

Titles

Doctor of Science (Chemistry)

Grants and projects

2022–to date	-Оптимизация биолюминесцентной системы грибов для прикладных биоаналитических и биоимиджинговых технологий
2020–2022	-
2016–2021	-Создание первой в мире генетически кодируемой системы автономной биолюминесценции эукариот
2018–2021	-
2018–2020	-

Publications

1. Petushkov VN, Vavilov MV, Khokhlova AN, Zagitova RI, Belozero OA, Shcheglov AS, Kovalchuk SI, Tsarkova AS, Rodionova NS, **Yampolsky IV**, Dubinnyi MA (2024). Henlea earthworm bioluminescence comprises violet-blue BRET from tryptophan 2-carboxylate to deazaflavin cofactor. *Biochem Biophys Res Commun* 708, 149787, [10.1016/j.bbrc.2024.149787](https://doi.org/10.1016/j.bbrc.2024.149787)
2. Palkina KA, Karataeva TA, Perfilov MM, Fakhranurova LI, Markina NM, Somermeyer LG, Garcia-Perez E, Vazquez-Vilar M, Rodriguez-Rodriguez M, Vazquez-Vilrales V, Shakhova ES, Mitouchkina T, Belozero OA, Kovalchuk SI, Alekberova A, Malyshevskaya AK, Bugaeva EN, Guglya EB, Balakireva A, Sytov N, Bezlikhotnova A, Boldyreva DI, Babenko VV, Kondrashov FA, Choob VV, Orzaez D, **Yampolsky IV**, Mishin AS, Sarkisyan KS (2024). A hybrid pathway for self-sustained luminescence. *Sci Adv* 10 (10), eadk1992, [10.1126/sciadv.adk1992](https://doi.org/10.1126/sciadv.adk1992)
3. Mujawar A, Dimri S, Palkina KA, Markina NM, Sarkisyan KS, Balakireva AV, **Yampolsky IV**, De A (2024). Novel BRET combination for detection of rapamycin-induced protein dimerization using luciferase from fungus *Neonothopanus nambi*. *Heliyon* 10 (4), e25553, [10.1016/j.heliyon.2024.e25553](https://doi.org/10.1016/j.heliyon.2024.e25553)
4. Stevani CV, Zamuner CK, Bastos EL, Nóbrega BB, Soares DM, Oliveira AG, Bechara EJ, Shakhova ES, Sarkisyan KS, **Yampolsky IV**, Kaskova ZM (2024). The living light from fungi. *Journal of Photochemistry and Photobiology C: Photochemistry Reviews* 58, , [10.1016/j.jphotochemrev.2024.100654](https://doi.org/10.1016/j.jphotochemrev.2024.100654)
5. Shakhova ES, Karataeva TA, Markina NM, Mitouchkina T, Palkina KA, Perfilov MM, Wood MG, Hoang TT, Hall MP, Fakhranurova LI, Alekberova AE, Malyshevskaya AK, Gorbachev DA, Bugaeva EN, Pletneva LK, Babenko VV, Boldyreva DI, Gorokhovatsky AY, Balakireva AV, Gao F, Choob VV, Encell LP, Wood KV, **Yampolsky IV**, Sarkisyan KS, Mishin AS (2024). An improved pathway for autonomous bioluminescence imaging in eukaryotes. *Nat Methods* , , [10.1038/s41592-023-02152-y](https://doi.org/10.1038/s41592-023-02152-y)
6. Mujawar A, Phadte P, Palkina KA, Markina NM, Mohammad A, Thakur BL, Sarkisyan KS, Balakireva AV, Ray P, **Yampolsky I**, De A (2023). Triple Reporter Assay: A Non-Overlapping Luciferase Assay for the Measurement of Complex Macromolecular Regulation in Cancer Cells Using a New Mushroom Luciferase–Luciferin Pair. *Sensors (Basel)* 23 (17), , [10.3390/s23177313](https://doi.org/10.3390/s23177313)
7. Kotlobay AA, Dubinnyi MA, Kovalchuk SI, Makhin AP, Miturich VS, Lyakhovich MS, Fontaine DM, Southworth TL, Shmygarev VI, Yatskin ON, Branchini BR, **Yampolsky IV**, Kaskova ZM (2023). Structure elucidation of *Keroplatus* (Diptera:Keroplastidae) fungus gnat oxyluciferin. *Biochem Biophys Res Commun* 676, 1–5, [10.1016/j.bbrc.2023.07.035](https://doi.org/10.1016/j.bbrc.2023.07.035)
8. Bolt YV, Dubinnyi MA, Litvinenko VV, Kotlobay AA, Belozero OA, Zagitova RI, Shmygarev VI, Yatskin ON, Guglya EB, Kublitski VS, Baranov MS, **Yampolsky IV**, Kaskova ZM, Tsarkova AS (2023). Total Synthesis of Racemic Thieno[3,2-f]thiochromene Tricarboxylate, a Luciferin from Marine Polychaeta *Odontosyllis undecimdonata*. *Org Lett* 25 (26), 4892–4897, [10.1021/acs.orglett.3c01696](https://doi.org/10.1021/acs.orglett.3c01696)
9. Zagitova RI, Purtov KV, Shcheglov AS, Mineev KS, Dubinnyi MA, Myasnyanko IN, Belozero OA, Pakhomova VG, Petushkov VN, Rodionova NS, Lushpa VA, Guglya EB, Kovalchuk S, Kozhemyako VB, Mirza JD, Oliveira AG, **Yampolsky IV**, Kaskova ZM, Tsarkova AS (2023). Conjugated Dienoic Acid Peroxides as Substrates in Chaetopterus Bioluminescence System. *Int J Mol Sci* 24 (11), 9466, [10.3390/ijms24119466](https://doi.org/10.3390/ijms24119466)
10. Palkina KA, Balakireva AV, Belozero OA, Chepurnykh TV, Markina NM, Kovalchuk SI, Tsarkova AS, Mishin AS, **Yampolsky IV**, Sarkisyan KS (2023). Domain Truncation in Hispidin Synthase Orthologs from Non-Bioluminescent Fungi Does Not Lead to Hispidin Biosynthesis. *Int J Mol Sci* 24 (2), 1317, [10.3390/ijms24021317](https://doi.org/10.3390/ijms24021317)
11. Terekhov SS, Shmygarev VI, Purtov KV, Smirnov IV, **Yampolsky IV**, Tsarkova AS (2022). Drug design strategies for the treatment of coronavirus infection. *Bulletin of Russian State Medical University* 6 (6), 126–128, [10.24075/brsmu.2022.067](https://doi.org/10.24075/brsmu.2022.067)
12. Shmygarev VI, Prokopenko YA, Terekhov SS, Zakharova MY, Dubinnyi MA, Smirnov IV, **Yampolsky IV**, Tsarkova AS (2022). Amicoumacin-based prodrug development approach. *Bulletin of Russian State Medical University* 6 (2022), 99–105, [10.24075/brsmu.2022.073](https://doi.org/10.24075/brsmu.2022.073)
13. Petushkov VN, Vavilov MV, Ivanov IA, Ziganshin RH, Rodionova NS, **Yampolsky IV**, Tsarkova AS, Dubinnyi MA (2022). Deazaflavin cofactor boosts earthworms *Henlea* bioluminescence. *Org Biomol Chem* 21 (2), 415–427, [10.1039/D2OB01946A](https://doi.org/10.1039/D2OB01946A)
14. Shakhova ES, Markina NM, Mitouchkina TY, Bugaeva EN, Karataeva TA, Palkina KA, Fakhranurova LI,

- Yampolsky IV**, Sarkisyan KS, Mishin AS (2022). Systematic Comparison of Plant Promoters in Nicotiana spp. Expression Systems. *Int J Mol Sci* 23 (23), 15441, [10.3390/ijms232315441](https://doi.org/10.3390/ijms232315441)
15. Makarieva TN, Romanenko LA, Mineev KS, Shubina LK, Guglya EB, Kalinovskaya NI, Ivanchina NV, Guzii AG, Belozero OA, Kovalchuk SI, Popov RS, Denisenko VA, Mikhailov VV, Babenko VV, Ilina EN, Malakhova MV, Terekhov SS, Kudzhaev AM, Dmitrenok PS, **Yampolsky IV**, Stonik VA (2022). Streptocinnamides A and B, Depsipeptides from Streptomyces sp. KMM 9044. *Org Lett* 24 (27), 4892–4895, [10.1021/acs.orglett.2c01714](https://doi.org/10.1021/acs.orglett.2c01714)
 16. Gerasimov AS, Rogozhkin SO, Shakhova ES, Chepurnykh TV, Gorokhovatsky AY, Myshkina NM, Balakireva AV, **Yampolsky IV** (2021). Recombinant Production of Hispidin-3-Hydroxylase: the Key Enzyme in Fungal Luciferin Biosynthesis. *Russ. J. Bioorganic Chem.* 47 (5), 1066–1076, [10.1134/S1068162021040099](https://doi.org/10.1134/S1068162021040099)
 17. Burakova LP, Lyakhovich MS, Mineev KS, Petushkov VN, Zagitova RI, Tsarkova AS, Kovalchuk SI, **Yampolsky IV**, Vysotski ES, Kaskova ZM (2021). Unexpected Coelenterazine Degradation Products of Photoprotein Photoinactivation. *Org Lett* 23 (17), 6846–6849, [10.1021/acs.orglett.1c02410](https://doi.org/10.1021/acs.orglett.1c02410)
 18. Gorokhovatsky AY, Chepurnykh TV, Shcheglov AS, Mokrushina YA, Baranova MN, Goncharuk SA, Purtov KV, Petushkov VN, Rodionova NS, **Yampolsky IV** (2021). The Recombinant Luciferase of the Fungus Neonothopanus nambi: Obtaining and Properties. *Dokl Biochem Biophys* 496 (1), 52–55, [10.1134/S1607672921010051](https://doi.org/10.1134/S1607672921010051)
 19. Beregovaya KA, Myshkina NM, Chepurnykh TV, Kotlobay AA, Purtov KV, Petushkov VN, Rodionova NS, **Yampolsky IV** (2021). Rational Design and Mutagenesis of Fungal Luciferase from Neonothopanus nambi. *Dokl Biochem Biophys* 496 (1), 14–17, [10.1134/S1607672921010026](https://doi.org/10.1134/S1607672921010026)
 20. Mitiouchkina T, Mishin AS, Somermeyer LG, Markina NM, Chepurnykh TV, Guglya EB, Karataeva TA, Palkina KA, Shakhova ES, Fakhranurova LI, Chekova SV, Tsarkova AS, Golubev YV, Negrebetsky VV, Dolgushin SA, Shalaev PV, Shlykov D, Melnik OA, Shipunova VO, Deyev SM, Bubyrev AI, Pushin AS, Choob VV, Dolgov SV, Kondrashov FA, **Yampolsky IV**, Sarkisyan KS (2020). Author Correction: Plants with genetically encoded autoluminescence. *Nat Biotechnol* 38 (8), 1001, [10.1038/s41587-020-0578-0](https://doi.org/10.1038/s41587-020-0578-0)
 21. Kotlobay AA, Kaskova ZM, **Yampolsky IV** (2020). Palette of Luciferases: Natural Biotools for New Applications in Biomedicine. *Acta Naturae* 12 (2), 15–27, [10.32607/actanaturae.10967](https://doi.org/10.32607/actanaturae.10967)
 22. Mitiouchkina T, Mishin AS, Somermeyer LG, Markina NM, Chepurnykh TV, Guglya EB, Karataeva TA, Palkina KA, Shakhova ES, Fakhranurova LI, Chekova SV, Tsarkova AS, Golubev YV, Negrebetsky VV, Dolgushin SA, Shalaev PV, Shlykov D, Melnik OA, Shipunova VO, Deyev SM, Bubyrev AI, Pushin AS, Choob VV, Dolgov SV, Kondrashov FA, **Yampolsky IV**, Sarkisyan KS (2020). Plants with genetically encoded autoluminescence. *Nat Biotechnol* 38 (8), 944–946, [10.1038/s41587-020-0500-9](https://doi.org/10.1038/s41587-020-0500-9)
 23. Mirza JD, Migotto AE, **Yampolsky IV**, Moraes GV, Tsarkova AS, Oliveira AG (2020). Chaetopterus variopedatus bioluminescence: A review of light emission within a species complex. *Photochem Photobiol* 96 (4), 768–778, [10.1111/php.13221](https://doi.org/10.1111/php.13221)
 24. Kotlobay AA, Kaskova ZM, **Yampolsky IV** (2020). Palette of luciferases: Natural biotools for new applications in biomedicine. *Acta Naturae* 12 (2), 15–27, [10.32607/ACTANATURAE.11152](https://doi.org/10.32607/ACTANATURAE.11152)
 25. Kotlobay AA, Dubinnyi MA, Purtov KV, Guglya EB, Rodionova NS, Petushkov VN, Bolt YV, Kublitski VS, Kaskova ZM, Ziganshin RH, Nelyubina YV, Dorovatovskii PV, Eliseev IE, Branchini BR, Bourenkov G, Ivanov IA, Oba Y, **Yampolsky IV**, Tsarkova AS (2019). Bioluminescence chemistry of fireworm Odontosyllis. *Proc Natl Acad Sci U S A* 116 (38), 18911–18916, [10.1073/pnas.1902095116](https://doi.org/10.1073/pnas.1902095116)
 26. (book) Shimomura O, Stevani CV, Kaskova ZM, Tsarkova AS, **Yampolsky IV** (2019). Luminous fungi. , 301–348.
 27. (book) Shimomura O, **Yampolsky IV** (2019). Bioluminescence: Chemical principles and methods (3rd Edition). , 1–496, [10.1142/8239](https://doi.org/10.1142/8239)
 28. Osipova ZM, Shcheglov AS, **Yampolsky IV** (2019). Autonomous bioluminescent systems: Prospects for use in the imaging of living organisms. *Bulletin of Russian State Medical University* 9 (6), 62–65, [10.24075/brsmu.2019.083](https://doi.org/10.24075/brsmu.2019.083)
 29. Chen C, Zhu L, Baranov MS, Tang L, Baleeva NS, Smirnov AY, **Yampolsky IV**, Solntsev KM, Fang C (2019). Photoinduced Proton Transfer of GFP-Inspired Fluorescent Superphotoacids: Principles and Design. *J Phys Chem B* 123 (17), 3804–3821, [10.1021/acs.jpcc.9b03201](https://doi.org/10.1021/acs.jpcc.9b03201)
 30. Chen C, Baranov MS, Zhu L, Baleeva NS, Smirnov AY, Zaitseva SO, **Yampolsky IV**, Solntsev KM, Fang C

- (2019). Designing redder and brighter fluorophores by synergistic tuning of ground and excited states. *Chem Commun (Camb)* 55 (17), 2537–2540, [10.1039/c8cc10007a](https://doi.org/10.1039/c8cc10007a)
31. Kotlobay AA, Sarkisyan KS, Mokrushina YA, Marcet-Houben M, Serebrovskaya EO, Markina NM, Gonzalez Somermeyer L, Gorokhovatsky AY, Vvedensky A, Purtov KV, Petushkov VN, Rodionova NS, Chepurnyh TV, Fakhranurova LI, Guglya EB, Ziganshin R, Tsarkova AS, Kaskova ZM, Shender V, Abakumov M, Abakumova TO, Povolotskaya IS, Eroshkin FM, Zaraisky AG, Mishin AS, Dolgov SV, Mitouchkina TY, Kopantzev EP, Waldenmaier HE, Oliveira AG, Oba Y, Barsova E, Bogdanova EA, Gabaldón T, Stevani CV, Lukyanov S, Smirnov IV, Gitelson JI, Kondrashov FA, **Yampolsky IV** (2018). Genetically encodable bioluminescent system from fungi. *Proc Natl Acad Sci U S A* 115 (50), 12728–12732, [10.1073/pnas.1803615115](https://doi.org/10.1073/pnas.1803615115)
 32. Osipova ZM, Shcheglov AS, **Yampolsky IV** (2018). Bioluminescent imaging: new opportunities. *Bulletin of Russian State Medical University* 2018 (5), 87–90, [10.24075/brsmu.2018.063](https://doi.org/10.24075/brsmu.2018.063)
 33. Schultz DT, Kotlobay AA, Ziganshin R, Bannikov A, Markina NM, Chepurnyh TV, Shakhova ES, Palkina K, Haddock SHD, **Yampolsky IV**, Oba Y (2018). Corrigendum to “Luciferase of the Japanese syllid polychaete *Odontosyllis undecimdonata*” [Biochem. Biophys. Res. Commun. 2018 Jul 20;502(3):318–323]. *Biochem Biophys Res Commun* 503 (2), 1179, [10.1016/j.bbrc.2018.06.122](https://doi.org/10.1016/j.bbrc.2018.06.122)
 34. Schultz DT, Kotlobay AA, Ziganshin R, Bannikov A, Markina NM, Chepurnyh TV, Shakhova ES, Palkina K, Haddock SHD, **Yampolsky IV**, Oba Y (2018). Luciferase of the Japanese syllid polychaete *Odontosyllis undecimdonata*. *Biochem Biophys Res Commun* 502 (3), 318–323, [10.1016/j.bbrc.2018.05.135](https://doi.org/10.1016/j.bbrc.2018.05.135)
 35. (conference) **Yampolsky IV**, Purtov KV (2018). New bioluminescence systems: luciferins, luciferases and luciferin biosynthesis pathways. *FEBS Open Bio* 8 (1), 26: S.05–1.
 36. (conference) Palkina K, Markina N, Mokrushina Y, Chepurnykh T, Sarkisyan K, **Yampolsky I** (2018). Biosynthesis of hispidin by plant type III polyketide synthases in yeast and mammalian cell cultures. *FEBS Open Bio* 8 (1), 172–173.
 37. Purtov KV, Gorokhovatsky AY, Kotlobay AA, Osipova ZM, Petushkov VN, Rodionova NS, Tsarkova AS, Chepurnykh TV, **Yampolsky IV**, Gitelson JI (2018). Isolation and Purification of Fungal Luciferase from *Neonothopanus nimbi*. *Dokl Biochem Biophys* 480 (1), 177–180, [10.1134/S1607672918030134](https://doi.org/10.1134/S1607672918030134)
 38. Ermakova YG, Pak VV, Bogdanova YA, Kotlobay AA, **Yampolsky IV**, Shokhina AG, Panova AS, Marygin RA, Staroverov DB, Bilan DS, Sies H, Belousov VV (2018). SyHer3s: A genetically encoded fluorescent ratiometric probe with enhanced brightness and an improved dynamic range. *Chem Commun (Camb)* 54 (23), 2898–2901, [10.1039/c7cc08740c](https://doi.org/10.1039/c7cc08740c)
 39. Пуртов КВ, Гороховатский АЮ, Котлобай АА, Осипова ЗМ, Петушков ВН, Родионова НС, Царькова АС, Чепурных ТВ, **Ямпольский ИВ**, Gitelson JI (2018). Люцифераза гриба *Neonothopanus nambi*: Выделение и очистка. 480 (6), 747–750.
 40. Осипова ЗМ, Щеглов АС, **Ямпольский ИВ** (2018). Новая биолюминесцентная система грибов: перспективы использования в медицинских исследованиях. (1), 80–83, [10.24075/vrgmu.2018.004](https://doi.org/10.24075/vrgmu.2018.004)
 41. Osipova ZM, Shcheglov AS, **Yampolsky IV** (2018). A bioluminescent system of Fungi: Prospects for application in medical research. *Bulletin of Russian State Medical University* 7 (1), 80–83, [10.24075/brsmu.2018.004](https://doi.org/10.24075/brsmu.2018.004)
 42. Chen C, Liu W, Baranov MS, Baleeva NS, **Yampolsky IV**, Zhu L, Wang Y, Shamir A, Solntsev KM, Fang C (2017). Unveiling Structural Motions of a Highly Fluorescent Superphotoacid by Locking and Fluorinating the GFP Chromophore in Solution. *J Phys Chem Lett* 8 (23), 5921–5928, [10.1021/acs.jpclett.7b02661](https://doi.org/10.1021/acs.jpclett.7b02661)
 43. Yuan M, Ma X, Jiang T, Gao Y, Cui Y, Zhang C, Yang X, Huang Y, Du L, **Yampolsky I**, Li M (2017). Prolonged bioluminescence imaging in living cells and mice using novel pro-substrates for: *Renilla* luciferase. *Org Biomol Chem* 15 (48), 10238–10244, [10.1039/c7ob01656e](https://doi.org/10.1039/c7ob01656e)
 44. Purtov KV, Osipova ZM, Petushkov VN, Rodionova NS, Tsarkova AS, Kotlobay AA, Chepurnykh TV, Gorokhovatsky AY, **Yampolsky IV**, Gitelson JI (2017). Structure of fungal oxyluciferin, the product of the bioluminescence reaction. *Dokl Biochem Biophys* 477 (1), 360–363, [10.1134/S1607672917060059](https://doi.org/10.1134/S1607672917060059)
 45. Bozhanova NG, Baranov MS, Klementieva NV, Sarkisyan KS, Gavrikov AS, **Yampolsky IV**, Zagaynova EV, Lukyanov SA, Lukyanov KA, Mishin AS (2017). Protein labeling for live cell fluorescence microscopy with a highly photostable renewable signal. *Chem Sci* 8 (10), 7138–7142, [10.1039/c7sc01628j](https://doi.org/10.1039/c7sc01628j)
 46. Пуртов КВ, Осипова ЗМ, Петушков ВН, Родионова НС, Царькова АС, Котлобай АА, Чепурных ТВ, Гороховатский АЮ, **Ямпольский ИВ**, Гительсон ИИ (2017). Структура оксилуциферина грибов –

- продукта реакции биолюминесценции. 477 (2), 245–248, [10.7868/S0869565217320226](https://doi.org/10.7868/S0869565217320226)
47. **(conference)** Markina N, Gorokhovatsky A, Kotlobay A, Sarkisyan K, Mokrushina Y, **Yampolsky I** (2017). Hispidin-3-hydroxylase: a luciferin biosynthesis enzyme of glowing fungi. *FEBS J* 284, 106.
48. Oba Y, Suzuki Y, Martins GNR, Carvalho RP, Pereira TA, Waldenmaier HE, Kanie S, Naito M, Oliveira AG, Dörr FA, Pinto E, **Yampolsky IV**, Stevani CV (2017). Identification of hispidin as a bioluminescent active compound and its recycling biosynthesis in the luminous fungal fruiting body. *Photochem Photobiol Sci* 16 (9), 1435–1440, [10.1039/c7pp00216e](https://doi.org/10.1039/c7pp00216e)
49. Jiang T, Yang X, Zhou Y, **Yampolsky I**, Du L, Li M (2017). New bioluminescent coelenterazine derivatives with various C-6 substitutions. *Org Biomol Chem* 15 (33), 7008–7018, [10.1039/c7ob01554b](https://doi.org/10.1039/c7ob01554b)
50. **(conference)** **Yampolsky IV** (2017). Fungal bioluminescence system: luciferin, luciferase and luciferin biosynthesis. *FEBS J* 284, 189.
51. Petrushkina M, Gusev E, Sorokin B, Zotko N, Mamaeva A, Filimonova A, Kulikovskiy M, Maltsev Y, **Yampolsky I**, Guglya E, Vinokurov V, Namsaraev Z, Kuzmin D (2017). Fucoxanthin production by heterokont microalgae. *Algal Res* 24, 387–393, [10.1016/j.algal.2017.03.016](https://doi.org/10.1016/j.algal.2017.03.016)
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