

## Резюме: Зарайский Андрей Георгиевич

### Адрес

Федеральное государственное бюджетное учреждение науки Институт биоорганической химии им. академиков М.М. Шемякина и Ю.А. Овчинникова Российской академии наук, Москва, Россия

### Контакты

<https://www.ibch.ru/users/27>

### Образование

2011	Россия		Диплом профессора по специальности "молекулярная биология"
2000	Россия, Москва	Московский государственный университет имени М.В. Ломоносова (МГУ), биологический факультет	Присуждена учёная степень доктора биологических наук
1990	Россия, Москва	Московский государственный университет имени М.В. Ломоносова (МГУ), биологический факультет	Присуждена учёная степень кандидата биологических наук

### Работа в ИБХ

2018–наст.вр.	Главный научный сотрудник
2026–наст.вр.	Профессор

### Членство в советах и комиссиях ИБХ

Диссертационный совет
Ученый совет

### Награды

2006	Премия РАН имени А.О. Ковалевского	За работу «Гомеобоксные гены класса ANF регуляторы раннего развития головного мозга позвоночных»
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### Научные интересы

Основные работы А.Г. Зарайского посвящены структурно-функциональному изучению генов и белков, регулирующих эмбриональное развитие мозга.

### Членство в сообществах

А. Г. Зарайский является членом Ученого и Диссертационного советов ИБХ РАН, редколлегий журналов «Молекулярная биология» и «Онтогенез».

### Степени и звания

Профессор
Доктор наук (Биологические науки, 03.00.03 — Молекулярная биология)

### Ссылки и контакты

## Гранты и проекты

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2014– 2018	<a href="#">Изменение скорости диффузии морфогенов как механизм регуляции морфогенетического поля.</a>
2023– наст.вр.	<a href="#">Геномные механизмы эмбрионального развития и регенерации как фундаментальная основа для разработки медицинских технологий</a>
2019– 2021	<a href="#">Поиск и изучение функций генов эмбрионального скейлинга</a>
2018– 2021	<a href="#">Изучение роли нового трансмембранного белка-регулятора регенерации, исчезнувшего в эволюции позвоночных, с-Answer, с применением системы генного нокаута CRISPR/Cas9</a>

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## Публикации

1. Timoshina PS, **Zaraisky AG** (2026). Embryonic scaling: morphogen gradients, size sensing, and scaler genes. *Front Cell Dev Biol* 14, 1858676, [10.3389/fcell.2026.1858676](https://doi.org/10.3389/fcell.2026.1858676)
2. Bayramov AV, Mednikov DN, **Zaraisky AG** (2026). Evolutionary pathway and genetic mechanisms of fin-to-limb transition in vertebrates. *Front Cell Dev Biol* 14, 1784849, [10.3389/fcell.2026.1784849](https://doi.org/10.3389/fcell.2026.1784849)
3. Kosykh AV, Zhigmitova EB, Evtushenko NA, Gurskaia TH, Martynova AA, Silaeva YY, Ivanova AS, Martynova NY, Tereshina MB, Rudyak SG, Panteleyev AA, Makarenkova HP, Gurskaya NG, Lukyanov SA, **Zaraisky AG** (2026). Restoring , an ancient regeneration gene lost in amniotes, accelerates skin healing in mice. *Front Cell Dev Biol* 14, 1706902, [10.3389/fcell.2026.1706902](https://doi.org/10.3389/fcell.2026.1706902)
4. Parshina EA, Ziganshin RH, **Zaraisky AG**, Martynova NY (2026). Co-Immunoprecipitation-Coupled Mass Spectrometry Analysis of Zyxin's Interactome and Phosphosites in Early *Xenopus laevis* Development. *Int J Mol Sci* 27 (2), 738, [10.3390/ijms27020738](https://doi.org/10.3390/ijms27020738)
5. Ermakova GV, **Zaraisky AG**, Bayramov AV (2025). Hidden Paralogy of Chordin-Like Genes in Cartilaginous and Teleost Fishes as a Potential Factor in the Emergence and Evolution of Fins. *RUSS J DEV BIOL* 56, 176–188, [10.1134/S1062360425700274](https://doi.org/10.1134/S1062360425700274)
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7. Mednikov DN, **Zaraysky AG**, Bayramov AV (2025). Exploring the Pathways and Mechanisms of Evolutionary Transformation of Paired Appendages in Gnathostomes. *PALEONTOL J* 59 (9), 1210–1254, [10.1134/S0031030125600866](https://doi.org/10.1134/S0031030125600866)
8. Orlov EE, Timoshina PS, Parshina EA, Eroshkin FM, Bannikova MA, **Zaraisky AG** (2025). Optimized protocols for generating half-sized embryos from separated first two blastomeres in green sea urchin and *Xenopus laevis*. *Front Cell Dev Biol* 13, 1730288, [10.3389/fcell.2025.1730288](https://doi.org/10.3389/fcell.2025.1730288)
9. Parshina EA, Orlov EE, Voronezhskaya EE, Martynova NY, **Zaraisky AG** (2025). Cytoskeletal Regulator Zyxin Stimulates Nuclear Translocation of YAP in *Xenopus laevis* Embryonic Cells. *Russ. J. Bioorganic Chem.* 51 (5), 1945–1953, [10.1134/S1068162025601727](https://doi.org/10.1134/S1068162025601727)
10. Ermakova GV, Meyntser IV, Lyubetsky VA, **Zaraisky AG**, Bayramov AV (2025). The subfunctionalization of shox and shox2 paralogs in shark highlights both shared and distinct developmental mechanisms of branchial arches and fins. *Front Cell Dev Biol* 13, 1667637, [10.3389/fcell.2025.1667637](https://doi.org/10.3389/fcell.2025.1667637)
11. Parshina EA, **Zaraisky AG**, Martynova NY (2025). Transcriptome Analysis of Zyxin Cytoskeletal Protein Levels: Influence on Metabolism and Signaling Pathways in a Model of *Xenopus laevis* Embryos. *Russ. J. Bioorganic Chem.* 51 (5), 1990–1999, [10.1134/S1068162025601983](https://doi.org/10.1134/S1068162025601983)
12. Ermakova GV, Meyntser IV, Mugue NS, Lyubetsky VA, **Zaraisky AG**, Bayramov AV (2025). The emergence of chordin-like1 in gnathostomes may have contributed to the evolution of paired appendages. *Front Cell Dev Biol* 13, 1649996, [10.3389/fcell.2025.1649996](https://doi.org/10.3389/fcell.2025.1649996)
13. Parshina EA, **Zaraisky AG**, Martynova NY (2025). Regulation of pou5f3 Family Pluripotency Gene

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14. Ivanova ED, Ziganshin RH, Parshina EA, **Zaraisky AG**, Martynova NY (2025). Mass Spectrometric Analysis of Post-Translational Modifications of *Xenopus laevis* Cytoskeletal Protein Zyxin. *Russ. J. Bioorganic Chem.* 51 (3), 1083–1091, [10.1134/S1068162024606530](https://doi.org/10.1134/S1068162024606530)
  15. Parshina EA, Ivanova ED, **Zaraisky AG**, Martynova NY (2025). The Impact of Zyxin Modifications on Its Intracellular Distribution in the *Xenopus laevis* Embryo Model. *Russ. J. Bioorganic Chem.* 51 (2), 772–783, [10.1134/S1068162024605755](https://doi.org/10.1134/S1068162024605755)
  16. Bayramov AV, Yastrebov SA, Mednikov DN, Ermakova GV, **Zaraisky AG** (2024). The Origin and Mechanisms of Development of Paired Fins in Vertebrates. *RUSS J DEV BIOL* 55 (3), 99–118, [10.1134/S1062360424700097](https://doi.org/10.1134/S1062360424700097)
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  18. Shitikov A, Parshina E, **Zaraisky A**, Tereshina MB (2024). An improved method for whole-mount in situ hybridization in regenerating tails of *Xenopus laevis* tadpoles. *Front Cell Dev Biol* 12, 1487644, [10.3389/fcell.2024.1487644](https://doi.org/10.3389/fcell.2024.1487644)
  19. Timoshina PS, Nesterenko AM, Parshina EA, Orlov EE, Eroshkin FM, **Zaraisky AG** (2024). Dissecting the mystery of embryonic scaling: The Scalers Hypothesis and its confirmation in sea urchin embryos. *Cells and Development* 184, 203972, [10.1016/j.cdev.2024.203972](https://doi.org/10.1016/j.cdev.2024.203972)
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  21. Ermakova GV, Kucheryavyy AV, **Zaraisky AG**, Bayramov AV (2024). Three Foxg1 Genes in Lampreys: The Heritage of Whole-Genome Duplications at the Early Stages of Vertebrate Evolution. *RUSS J DEV BIOL* 55, 15–25, [10.1134/S1062360424700024](https://doi.org/10.1134/S1062360424700024)
  22. Ivanova ED, Parshina EA, **Zaraisky AG**, Martynova NY (2024). Isoforms of the Cytoskeletal LIM-Domain Protein Zyxin in the Early Embryogenesis of *Xenopus laevis*. *Russ. J. Bioorganic Chem.* 50 (3), 723–732, [10.1134/S1068162024030026](https://doi.org/10.1134/S1068162024030026)
  23. Parshina EA, **Zaraisky AG**, Martynova NY (2024). Ribonucleoprotein Complex Factor Ybx1 Stabilizes the Maternal mRNA of the *ssx2ip* Gene Encoding the Centrosome Maturation Protein in *Xenopus laevis* Embryogenesis. *Russ. J. Bioorganic Chem.* 50 (3), 715–722, [10.1134/S1068162024030051](https://doi.org/10.1134/S1068162024030051)
  24. Паршина ЕА, **Зарайский АГ**, Мартынова НЮ (2024). Фактор рибонуклеопротеиновых комплексов Ybx1 стабилизирует материнскую мРНК гена *ssx2ip*, кодирующего белок созревания centrosом, в эмбриональном развитии лягушки *Xenopus laevis*. *Биоорганическая химия* 50 (3), 338–344, [10.31857/S0132342324030133](https://doi.org/10.31857/S0132342324030133)
  25. **Zaraisky AG**, Araslanova KR, Shitikov AD, Tereshina MB (2024). Loss of the ability to regenerate body appendages in vertebrates: from side effects of evolutionary innovations to gene loss. *Biol Rev Camb Philos Soc* 99 (5), 1868–1888, [10.1111/brv.13102](https://doi.org/10.1111/brv.13102)
  26. Bayramov AV, Yastrebov SA, Mednikov DN, Araslanova KR, Ermakova GV, **Zaraisky AG** (2024). Paired fins in vertebrate evolution and ontogeny. *Evol Dev* 26 (3), e12478, [10.1111/ede.12478](https://doi.org/10.1111/ede.12478)
  27. Bayramov AV, Ermakova GV, **Zaraisky AG** (2024). Reconstruction of Ancestral Genomes as a Key to Understanding the Early Evolution of Vertebrate Genotype. *RUSS J DEV BIOL* 54, S1–S9, [10.1134/S1062360423070020](https://doi.org/10.1134/S1062360423070020)
  28. Ermakova GV, Kucheryavyy AV, **Zaraisky AG**, Bayramov AV (2024). The Molecular Mechanism of Body Axis Induction in Lampreys May Differ from That in Amphibians. *Int J Mol Sci* 25 (4), , [10.3390/ijms25042412](https://doi.org/10.3390/ijms25042412)
  29. Ermakova GV, Meyntser IV, **Zaraisky AG**, Bayramov AV (2024). Loss of *noggin1*, a classic embryonic inducer gene, in elasmobranchs. *Sci Rep* 14 (1), 3805, [10.1038/s41598-024-54435-9](https://doi.org/10.1038/s41598-024-54435-9)
  30. Eroshkin FM, Fefelova EA, Bredov DV, Orlov EE, Kolyupanova NM, Mazur AM, Sokolov AS, Zhigalova NA, Prokhortchouk EB, Nesterenko AM, **Zaraisky AG** (2024). Mechanical Tensions Regulate Gene Expression in the *Xenopus laevis* Axial Tissues. *Int J Mol Sci* 25 (2), , [10.3390/ijms25020870](https://doi.org/10.3390/ijms25020870)

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33. Bayramov AV, Ermakova GV, Kucheryavyy AV, Meintser IV, **Zaraisky AG** (2022). Lamprey as Laboratory Model for Study of Molecular Bases of Ontogenesis and Evolutionary History of Vertebrata. *J Ichthyol* 62 (7), 1213–1229, [10.1134/S0032945222060029](https://doi.org/10.1134/S0032945222060029)
34. Korotkova DD, Gantsova EA, Goryashchenko AS, Eroshkin FM, Serova OV, Sokolov AS, Sharko F, Zhenilo SV, Martynova NY, Petrenko AG, **Zaraisky AG**, Deyev IE (2022). Insulin Receptor-Related Receptor Regulates the Rate of Early Development in *Xenopus laevis*. *Int J Mol Sci* 23 (16), , [10.3390/ijms23169250](https://doi.org/10.3390/ijms23169250)
35. Parshina EA, Orlov EE, **Zaraisky AG**, Martynova NY (2022). The Cytoskeletal Protein Zyxin Inhibits Retinoic Acid Signaling by Destabilizing the Maternal mRNA of the RXR $\gamma$  Nuclear Receptor. *Int J Mol Sci* 23 (10), , [10.3390/ijms23105627](https://doi.org/10.3390/ijms23105627)
36. Orlov EE, Nesterenko AM, Korotkova DD, Parshina EA, Martynova NY, **Zaraisky AG** (2022). Targeted search for scaling genes reveals matrix metalloproteinase 3 as a scaler of the dorsal-ventral pattern in *Xenopus laevis* embryos. *Dev Cell* 57 (1), 95–111.e12, [10.1016/j.devcel.2021.11.021](https://doi.org/10.1016/j.devcel.2021.11.021)
37. Filenko PA, Chechenina AA, **Zaraisky AG**, Eroshkin FM (2022). The Effect of Myosin Inhibitors on the Expression of Mechano-Dependent Genes in the Early Development of the Clawed Frog. *Russ. J. Bioorganic Chem.* 48 (4), 854–857, [10.1134/S1068162022040094](https://doi.org/10.1134/S1068162022040094)
38. Ermakova GV, Kucheryavyy AV, Eroshkin FM, Martynova NY, **Zaraisky AG**, Bayramov AV (2021). Study of the Early Telencephalon Genes of Cyclostomes as a Way to Restoring the Evolutionary History of This Unique Part of the Central Nervous System of Vertebrates. *PALEONTOLOGICAL JOURNAL* 55 (7), 752–765, [10.1134/S0031030121070030](https://doi.org/10.1134/S0031030121070030)
39. Martynova NY, Parshina EA, **Zaraisky AG** (2021). Cytoskeletal protein Zyxin in embryonic development: from controlling cell movements and pluripotency to regulating embryonic patterning. *FEBS J* 290 (1), 66–72, [10.1111/febs.16308](https://doi.org/10.1111/febs.16308)
40. Ivanova AS, Tereshina MB, Araslanova KR, Martynova NY, **Zaraisky AG** (2021). The Secreted Protein Disulfide Isomerase Ag1 Lost by Ancestors of Poorly Regenerating Vertebrates Is Required for *Xenopus laevis* Tail Regeneration. *Front Cell Dev Biol* 9, 738940, [10.3389/fcell.2021.738940](https://doi.org/10.3389/fcell.2021.738940)
41. Bayramov AV, Ermakova GV, Kucheryavyy AV, **Zaraisky AG** (2021). Genome Duplications as the Basis of Vertebrates' Evolutionary Success. *RUSS J DEV BIOL* 52, 141–163, [10.1134/S1062360421030024](https://doi.org/10.1134/S1062360421030024)
42. Martynova NY, Parshina EA, **Zaraisky AG** (2021). Protocol for separation of the nuclear and the cytoplasmic fractions of *Xenopus laevis* embryonic cells for studying protein shuttling. *STAR Protocols* 2 (2), 100449, [10.1016/j.xpro.2021.100449](https://doi.org/10.1016/j.xpro.2021.100449)
43. Martynova NY, Parshina EA, **Zaraisky AG** (2021). Using RNA-binding proteins for immunoprecipitation of mRNAs from *Xenopus laevis* embryos. *STAR Protocols* 2 (2), 100552, [10.1016/j.xpro.2021.100552](https://doi.org/10.1016/j.xpro.2021.100552)
44. Ермакова ГВ, Кучерявый АВ, **Зарайский АГ**, Байрамов АВ (2021). СРАВНИТЕЛЬНЫЙ АНАЛИЗ ПАТТЕРНОВ ЭКСПРЕССИИ ГЕНОВ СЕМЕЙСТВА NOGGIN НА РАННИХ СТАДИЯХ РАЗВИТИЯ ГОЛОВНЫХ СТРУКТУР ЕВРОПЕЙСКОЙ РЕЧНОЙ МИНОГИ LAMPETRA FLUVIATILIS. *Ontogenez* 52 (1), 46–55, [10.31857/S0475145021010031](https://doi.org/10.31857/S0475145021010031)
45. Байрамов АВ, Ермакова ГВ, Кучерявый АВ, **Зарайский АГ** (2021). ГЕНОМНЫЕ ДУПЛИКАЦИИ КАК ОСНОВА ЭВОЛЮЦИОННОГО УСПЕХА ПОЗВОНОЧНЫХ. *Ontogenez* 52 (3), 170–194, [10.31857/S0475145021030022](https://doi.org/10.31857/S0475145021030022)
46. Ermakova GV, Kucheryavyy AV, **Zaraisky AG**, Bayramov AV (2021). Comparative Analysis of Expression Patterns of the Noggin Gene Family Genes at the Early Development Stages of Head Structures in the European River Lamprey *Lampetra fluviatilis*. *RUSS J DEV BIOL* 52, 33–41, [10.1134/S1062360421010033](https://doi.org/10.1134/S1062360421010033)
47. Parshina E, **Zaraisky AG**, Martynova NY (2020). The Role of Maternal pou5f3.3/oct60 Gene in the Regulation of Initial Stages of Tissue Differentiation during *Xenopus laevis* Embryogenesis. *Russ. J. Bioorganic Chem.* 46 (6), 1172–1180, [10.1134/S1068162020060242](https://doi.org/10.1134/S1068162020060242)

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50. Martynova NY, Parshina EA, Eroshkin FM, **Zaraisky AG** (2020). The Cytoskeletal Protein Zyxin Modulates the Expression of the Target Genes of the Shh Signaling Cascade in the Cells of the Neural Plate of Embryos of the Spur-Toed Frog *Xenopus laevis*. *Russ. J. Bioorganic Chem.* 46 (4), 530–536, [10.1134/S1068162020040147](https://doi.org/10.1134/S1068162020040147)
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