

## 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

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### 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
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### 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

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## Гранты и проекты

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>

## Публикации

1. 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](#)
2. Bayramov AV, Ermakova GV, Kucheryavyy AV, Eroshkin FM, **Zaraisky AG** (2024). Genetic Basis of Morphological Transformations: Genes of the Noggin and Foxg1 Families as a Legacy of Whole Genome Duplications in Early Vertebrate Evolution. *PALEONTOL J* 58 (12), 1367–1388, [10.1134/S0031030124601208](#)
3. 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](#)
4. 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*, 203972, [10.1016/j.cdev.2024.203972](#)
5. Ermakova GV, Mugue NS, Mischenko AV, **Zaraisky AG**, Bayramov AV (2024). Foxg1 Genes of Acipenseriformes Support a Model of Ancestral Genomic Duplication Followed by Asynchronous Rediploidization. *RUSS J DEV BIOL* 55, 72–84, [10.1134/S1062360424700073](#)
6. 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](#)
7. 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](#)
8. 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](#)
9. 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](#)
10. **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](#)
11. 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](#)
12. 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](#)
13. 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)
14. 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)
  15. 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)
  16. Ermakova GV, Kucheryavyy AV, Mugue NS, Mischenko AV, **Zaraisky AG**, Bayramov AV (2024). Three *foxcg1* paralogues in lampreys and gnathostomes—brothers or cousins? *Front Cell Dev Biol* 11, 1321317, [10.3389/fcell.2023.1321317](https://doi.org/10.3389/fcell.2023.1321317)
  17. Lyubetsky VA, Rubanov LI, Tereshina MB, Ivanova AS, Araslanova KR, Uroshlev LA, Goremykina GI, Yang JR, Kanovei VG, Zverkov OA, Shitikov AD, Korotkova DD, **Zaraisky AG** (2023). Wide-scale identification of novel/eliminated genes responsible for evolutionary transformations. *Biol Direct* 18 (1), 45, [10.1186/s13062-023-00405-6](https://doi.org/10.1186/s13062-023-00405-6)
  18. 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)
  19. 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)
  20. 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)
  21. 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)
  22. 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)
  23. 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. *PALEONTOL J* 55 (7), 752–765, [10.1134/S0031030121070030](https://doi.org/10.1134/S0031030121070030)
  24. 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)
  25. 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)
  26. 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)
  27. 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)
  28. 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)
  29. 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)
  30. 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)

31. 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)
32. 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)
33. Паршина ЕА, **Зарайский АГ**, Мартынова НЮ (2020). Роль материнского гена pou5f3.3/oct60 в регуляции начальных этапов дифференцировки тканей в эмбриогенезе шпорцевой лягушки *Xenopus laevis*. *Bioorg Khim* 46 (6), 719–728, [10.31857/S013234232006024X](https://doi.org/10.31857/S013234232006024X)
34. Parshina EA, Eroshkin FM, Orlov EE, Gyoeva FK, Shokhina AG, Staroverov DB, Belousov VV, Zhigalova NA, Prokhortchouk EB, **Zaraisky AG**, Martynova NY (2020). Cytoskeletal Protein Zyxin Inhibits the Activity of Genes Responsible for Embryonic Stem Cell Status. *Cell Rep* 33 (7), 108396, [10.1016/j.celrep.2020.108396](https://doi.org/10.1016/j.celrep.2020.108396)
35. 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)
36. Ermakova GV, Kucheryavyy AV, **Zaraisky AG**, Bayramov AV (2020). Publisher Correction: Discovery of four Noggin genes in lampreys suggests two rounds of ancient genome duplication. *Commun Biol* 3 (1), 532, [10.1038/s42003-020-01272-x](https://doi.org/10.1038/s42003-020-01272-x)
37. Ermakova GV, Kucheryavyy AV, **Zaraisky AG**, Bayramov AV (2020). Discovery of four Noggin genes in lampreys suggests two rounds of ancient genome duplication. *Commun Biol* 3 (1), 501, [10.1038/s42003-020-01234-3](https://doi.org/10.1038/s42003-020-01234-3)
38. Ermakova GV, Kucheryavyy AV, **Zaraisky AG**, Bayramov AV (2020). Heterochrony of the Expression of Lanf and Foxg1 in the Lamprey Confirms the Appearance of the Telencephalon as an Evolutionarily Young Superstructure in the Central Nervous System of Vertebrates. *RUSS J DEV BIOL* 51, 246–254, [10.1134/S1062360420040049](https://doi.org/10.1134/S1062360420040049)
39. Bayramov AV, Ermakova GV, **Zaraisky AG** (2020). Genetic Mechanisms of the Early Development of the Telencephalon, a Unique Segment of the Vertebrate Central Nervous System, as Reflecting Its Emergence and Evolution. *RUSS J DEV BIOL* 51, 162–175, [10.1134/S1062360420030054](https://doi.org/10.1134/S1062360420030054)
40. Rubanov LI, **Zaraisky AG**, Shilovsky GA, Seliverstov AV, Zverkov OA, Lyubetsky VA (2019). Screening for mouse genes lost in mammals with long lifespans. *BioData Min* 12 (1), 20, [10.1186/s13040-019-0208-x](https://doi.org/10.1186/s13040-019-0208-x)
41. Korotkova DD, Lyubetsky VA, Ivanova AS, Rubanov LI, Seliverstov AV, Zverkov OA, Martynova NY, Nesterenko AM, Tereshina MB, Peshkin L, **Zaraisky AG** (2019). Bioinformatics Screening of Genes Specific for Well-Regenerating Vertebrates Reveals c-answer, a Regulator of Brain Development and Regeneration. *Cell Rep* 29 (4), 1027–1040.e6, [10.1016/j.celrep.2019.09.038](https://doi.org/10.1016/j.celrep.2019.09.038)
42. Ermakova GV, Kucheryavyy AV, **Zaraisky AG**, Bayramov AV (2019). The expression of FoxG in the early development of the European river lamprey *Lampetra fluviatilis* demonstrates significant heterochrony with that in other vertebrates. *Gene Expr Patterns* 34, 119073, [10.1016/j.gep.2019.119073](https://doi.org/10.1016/j.gep.2019.119073)
43. Nesterenko AM, **Zaraisky AG** (2019). The Mechanisms of Embryonic Scaling. *RUSS J DEV BIOL* 50 (3), 95–101, [10.1134/S1062360419030044](https://doi.org/10.1134/S1062360419030044)
44. Tereshina MB, Ivanova AS, Eroshkin FM, Korotkova DD, Nesterenko AM, Bayramov AV, Solovieva EA, Parshina EA, Orlov EE, Martynova NY, **Zaraisky AG** (2019). Agr2-interacting Prod1-like protein Tfp4 from *Xenopus laevis* is necessary for early forebrain and eye development as well as for the tadpole appendage regeneration. *Genesis* 57 (5), e23293, [10.1002/dvg.23293](https://doi.org/10.1002/dvg.23293)
45. Ivanova AS, Korotkova DD, Ermakova GV, Martynova NY, **Zaraisky AG**, Tereshina MB (2018). Ras-dva small GTPases lost during evolution of amniotes regulate regeneration in anamniotes. *Sci Rep* 8 (1), 13035, [10.1038/s41598-018-30811-0](https://doi.org/10.1038/s41598-018-30811-0)
46. Байрамов АВ, Ермакова ГВ, Кучерявый АВ, **Зарайский АГ** (2018). Миноги – “живые ископаемые” в исследованиях раннего развития и регенерации позвоночных. *Ontogenez* 49 (5), S3–S14, [10.1134/S0475145018080013](https://doi.org/10.1134/S0475145018080013)
47. 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)
48. Eroshkin FM, Kremnev SV, Ermakova GV, **Zaraisky AG** (2018). Development of Methods and Techniques to Visualize Mechanical Tension in Embryos Using Genetically Encoded Fluorescent Mechanosensors. *RUSS J DEV BIOL* 49 (6), 362–369, [10.1134/S1062360418060024](https://doi.org/10.1134/S1062360418060024)
  49. Bayramov AV, Ermakova GV, Kucheryavyy AV, **Zaraisky AG** (2018). Lampreys, “Living Fossils,” in Research on Early Development and Regeneration in Vertebrates. *RUSS J DEV BIOL* 49 (6), 327–338, [10.1134/S1062360418080015](https://doi.org/10.1134/S1062360418080015)
  50. Ivanova AS, Martynova NY, Komarov PA, Orlov EE, Ermakova GV, **Zaraisky AG**, Tereshina MB (2018). Obtaining of Agr2 Specific Antibodies and Determination of the Agr2 Protein Distribution Pattern during Early Embryonic Development and Tadpole Regeneration in *Xenopus laevis*. *RUSS J DEV BIOL* 49 (6), 393–397, [10.1134/S1062360418060036](https://doi.org/10.1134/S1062360418060036)
  51. (конференция) Байрамов АВ, Ермакова ГВ, Ерошкин ФМ, Иванова АС, Мартынова НЮ, Терёшина МБ, **Зарайский АГ** (2018). Гены, исчезнувшие в эволюции, как регуляторы развития мозга и регенерации. *Современные проблемы физикохимической и клеточной биологии: от молекул к живым системам*, 36.
  52. Ivanova AS, Ermakova GV, **Zaraisky AG**, Tereshina MB (2018). Patterns of Mitosis and Activation of the Map-Kinase Cascade during Tadpole Tail Regeneration in the Refractory Period of *Xenopus laevis* Development. *RUSS J DEV BIOL* 49 (5), 260–263, [10.1134/S1062360418050028](https://doi.org/10.1134/S1062360418050028)
  53. Martynova NY, Parshina EA, Ermolina LV, **Zaraisky AG** (2018). The cytoskeletal protein Zyxin interacts with the zinc-finger transcription factor Zic1 and plays the role of a scaffold for Gli1 and Zic1 interactions during early development of *Xenopus laevis*. *Biochem Biophys Res Commun* 504 (1), 251–256, [10.1016/j.bbrc.2018.08.164](https://doi.org/10.1016/j.bbrc.2018.08.164)
  54. (конференция) Иванова АС, Мартынова НЮ, Ермакова ГВ, Короткова ДД, **Зарайский АГ** (2018). GENES MISSING IN AMNIOTES REGULATE REGENERATION IN ANAMNIOTES. *EMBO Conference*, 124.
  55. Eroshkin FM, Bayramov AV, Ermakova GV, **Zaraisky AG**, Martynova NY (2018). Molecular Mechanisms of the Xanf1 Homeobox Gene Expression Regulation during the Early Development of the Forebrain Rudiment in the Clawed Frog. *Russ. J. Bioorganic Chem.* 44 (3), 310–321, [10.1134/S1068162018030032](https://doi.org/10.1134/S1068162018030032)
  56. Ivanova AS, Korotkova DD, Martynova NY, Averyanova OV, **Zaraisky AG**, Tereshina MB (2018). Methods of In Vivo Gene-Specific Knockdown Using Morpholino and Vivo-Morpholino Oligonucleotides. *Russ. J. Bioorganic Chem.* 44 (3), 358–361, [10.1134/S106816201803007X](https://doi.org/10.1134/S106816201803007X)
  57. Martynova NY, Eroshkin FM, **Zaraisky AG** (2018). Effect of a Heterodimeric Complex of the Transcription Factors Sox15 and Xanf1 on the Formation of the Xanf1 Gene Expression Zone during the Early Development of the Forebrain in the Spur-Toed Frog. *Russ. J. Bioorganic Chem.* 44 (3), 362–365, [10.1134/S106816201803010X](https://doi.org/10.1134/S106816201803010X)
  58. (конференция) Иванова АС, **Зарайский АГ** (2018). The secreted factor Ag1 and small GTPases Ras-dva missing in amniotes regulate fins regeneration in *Danio rerio*. *2nd International FishMed Conference on Zebrafish Research*, 104.
  59. Martynova NY, Eroshkin FM, Orlov EE, **Zaraisky AG** (2018). HMG-box factor Sox15 and homeodomain-containing factor Xanf1/Hesx1 directly interact and regulate the expression of Xanf1/Hesx1 during early forebrain development in *Xenopus laevis*. *Gene* 638, 52–59, [10.1016/j.gene.2017.09.024](https://doi.org/10.1016/j.gene.2017.09.024)
  60. Bayramov AV, Ermakova GV, Eroshkin FM, Kucheryavyy AV, Martynova NY, **Zaraisky AG** (2017). Presence of homeobox gene of Anf class in Pacific lamprey *Lethenteron camtschaticum* confirms the hypothesis about the importance of emergence of Anf genes for the origin of telencephalon in vertebrate evolution. *RUSS J DEV BIOL* 48 (4), 241–251, [10.1134/S1062360417040026](https://doi.org/10.1134/S1062360417040026)
  61. (конференция) Korotkova D, Ivanova A, Lyubetsky V, Seliverstov A, Martynova N, Nesterenko A, Tereshina M, **Zaraisky A** (2017). Novel FGF-signaling modulator c-Answer revealed by bioinformatics screening for genes present only in well-regenerative animals. *Mech Dev* (145), S49–PS1.82, [10.1016/j.mod.2017.04.089](https://doi.org/10.1016/j.mod.2017.04.089)



62. Eroshkin FM, Martynova NY, Bayramov AV, Ermakova GV, Ivanova AS, Korotkova DD, **Zaraisky AG** (2017). Interaction of secreted factor Agr2 with its potential receptors from the family of three-finger proteins. *Russ. J. Bioorganic Chem.* 43 (3), 344–346, [10.1134/S1068162017030049](https://doi.org/10.1134/S1068162017030049)
63. Orlov EE, Nesterenko AM, Martynova NY, **Zaraisky AG** (2017). Visualizing the morphogen adsorption gradient in the *Xenopus laevis* embryo using fluorescently labeled heparin-binding motif of BMP4 morphogen. *Russ. J. Bioorganic Chem.* 43 (3), 347–349, [10.1134/S1068162017030128](https://doi.org/10.1134/S1068162017030128)
64. Eroshkin FM, **Zaraisky AG** (2017). Mechano-sensitive regulation of gene expression during the embryonic development. *Genesis* 55 (4), , [10.1002/dvg.23026](https://doi.org/10.1002/dvg.23026)
65. Nesterenko AM, Kuznetsov MB, Korotkova DD, **Zaraisky AG** (2017). Morphogene adsorption as a Turing instability regulator: Theoretical analysis and possible applications in multicellular embryonic systems. *PLoS One* 12 (2), e0171212, [10.1371/journal.pone.0171212](https://doi.org/10.1371/journal.pone.0171212)
66. Bayramov AV, Eroshkin FM, Martynova NY, Orlov EE, Borodulin AV, **Zaraisky AG** (2017). The secreted protein Noggin4 is an activator of the Wnt/PCP-signaling pathway. *Russ. J. Bioorganic Chem.* 43 (2), 216–219, [10.1134/S1068162017020029](https://doi.org/10.1134/S1068162017020029)
67. Bayramov AV, Ermakova GV, Eroshkin FM, Kucheryavyy AV, Martynova NY, **Zaraisky AG** (2016). The presence of *Anf/Hesx1* homeobox gene in lampreys suggests that it could play an important role in emergence of telencephalon. *Sci Rep* 6, 39849, [10.1038/srep39849](https://doi.org/10.1038/srep39849)
68. Bayramov AV, Eroshkin FM, Borodulin AV, Martynova NY, Ermakova GV, **Zaraisky AG** (2016). Secreted protein Noggin4 participates in the formation of forebrain structures in *Xenopus laevis* by inhibiting the Wnt/beta-catenin signaling pathway. *RUSS J DEV BIOL* 47 (4), 202–206, [10.1134/S1062360416040020](https://doi.org/10.1134/S1062360416040020)
69. Martynova NY, Nesterenko AM, Orlov EE, Eroshkin FM, Borodulin AV, Bayramov AV, **Zaraisky AG** (2016). The interaction of secreted proteins Noggin4 and Wnt8 from *Xenopus laevis* embryos. *Russ. J. Bioorganic Chem.* 42 (3), 340–342, [10.1134/S1068162016030110](https://doi.org/10.1134/S1068162016030110)
70. Eroshkin FM, Nesterenko AM, Borodulin AV, Martynova NY, Ermakova GV, Gyoeva FK, Orlov EE, Belogurov AA, Lukyanov KA, Bayramov AV, **Zaraisky AG** (2016). Noggin4 is a long-range inhibitor of Wnt8 signalling that regulates head development in *Xenopus laevis*. *Sci Rep* 6, 23049, [10.1038/srep23049](https://doi.org/10.1038/srep23049)
71. Nesterenko AM, Orlov EE, Ermakova GV, Ivanov IA, Semenyuk PI, Orlov VN, Martynova NY, **Zaraisky AG** (2015). Affinity of the heparin binding motif of Noggin1 to heparan sulfate and its visualization in the embryonic tissues. *Biochem Biophys Res Commun* 468 (12), 331–336, [10.1016/j.bbrc.2015.10.100](https://doi.org/10.1016/j.bbrc.2015.10.100)
72. Matlashov ME, Bogdanova YA, Ermakova GV, Mishina NM, Ermakova YG, Nikitin ES, Balaban PM, Okabe S, Lukyanov S, Enikolopov G, **Zaraisky AG**, Belousov VV (2015). Fluorescent ratiometric pH indicator SypHer2: Applications in neuroscience and regenerative biology. *BIOCHIM BIOPHYS ACTA* 1850 (11), 2318–2328, [10.1016/j.bbagen.2015.08.002](https://doi.org/10.1016/j.bbagen.2015.08.002)
73. Eroshkin FM, Fedina NV, Martynova NY, Bayramov AV, **Zaraisky AG** (2015). The Point Mutation in NOGGIN2 Protein That Enhances Its Ability to Bind Activin. *Bioorg Khim* 41 (6), 749–751, [10.7868/s0132342315060056](https://doi.org/10.7868/s0132342315060056)
74. Eroshkin FM, Fedina NV, Martynova NY, Bayramov AV, **Zaraisky AG** (2015). A point mutation of the Noggin2 protein increasing its binding capacity to activin. *Russ. J. Bioorganic Chem.* 41 (6), 675–677, [10.1134/S1068162015060059](https://doi.org/10.1134/S1068162015060059)
75. Shandarin IN, Ivanova AS, Minin AA, Tereshina MB, **Zaraisky AG** (2015). The *ag1* gene is required for the fin regeneration in *Danio rerio*. *Russ. J. Bioorganic Chem.* 41 (4), 379–382, [10.1134/S1068162015040123](https://doi.org/10.1134/S1068162015040123)
76. Pereverzev AP, Gurskaya NG, Ermakova GV, Kudryavtseva EI, Markina NM, Kotlobay AA, Lukyanov SA, **Zaraisky AG**, Lukyanov KA (2015). Method for quantitative analysis of nonsense-mediated mRNA decay at the single cell level. *Sci Rep* 5, 7729, [10.1038/srep07729](https://doi.org/10.1038/srep07729)
77. Ivanova AS, Shandarin IN, Ermakova GV, Minin AA, Tereshina MB, **Zaraisky AG** (2015). The secreted factor Ag1 missing in higher vertebrates regulates fins regeneration in *Danio rerio*. *Sci Rep* 5, 8123, [10.1038/srep08123](https://doi.org/10.1038/srep08123)
78. Tereshina MB, Ermakova GV, Ivanova AS, **Zaraisky AG** (2014). Ras-dva1 small GTPase regulates telencephalon development in *Xenopus laevis* embryos by controlling Fgf8 and Agr signaling at the anterior border of the neural plate. *Biol Open* 3 (3), 192–200, [10.1242/bio.20147401](https://doi.org/10.1242/bio.20147401)
79. Martynova NY, Ermolina LV, Ermakova GV, Eroshkin FM, Gyoeva FK, Baturina NS, **Zaraisky AG** (2013). The cytoskeletal protein Zyxin inhibits Shh signaling during the CNS patterning in *Xenopus laevis* through

- interaction with the transcription factor Gli1. *Dev Biol* 380 (1), 37–48, [10.1016/j.ydbio.2013.05.005](https://doi.org/10.1016/j.ydbio.2013.05.005)
80. Ivanova AS, Tereshina MB, Ermakova GV, Belousov VV, **Zaraisky AG** (2013). Agr genes, missing in amniotes, are involved in the body appendages regeneration in frog tadpoles. *Sci Rep* 3, 1279, [10.1038/srep01279](https://doi.org/10.1038/srep01279)
  81. Shemiakina II, Ermakova GV, Cranfill PJ, Baird MA, Evans RA, Souslova EA, Staroverov DB, Gorokhovatsky AY, Putintseva EV, Gorodnicheva TV, Chepurnykh TV, Strukova L, Lukyanov S, **Zaraisky AG**, Davidson MW, Chudakov DM, Shcherbo D (2012). A monomeric red fluorescent protein with low cytotoxicity. *Nat Commun* 3, 1204, [10.1038/ncomms2208](https://doi.org/10.1038/ncomms2208)
  82. Borodulin AV, Eroshkin FM, Bayramov AV, **Zaraisky AG** (2012). Noggin4 expression during chick embryonic development. *Int J Dev Biol* 56 (5), 403–406, [10.1387/ijdb.120020az](https://doi.org/10.1387/ijdb.120020az)
  83. Eroshkin FM, Bayramov AV, Martynova NY, **Zaraisky AG** (2012). Use of the luciferase reporter constructs for investigation of the capacity of noggin2 protein to inhibit cell signaling pathways in xenopus laevis embryos. *Russ. J. Bioorganic Chem.* 38 (3), 338–340, [10.1134/S106816201203003X](https://doi.org/10.1134/S106816201203003X)
  84. Bayramov AV, Eroshkin FM, Martynova NY, Ermakova GV, Solovieva EA, **Zaraisky AG** (2011). Novel functions of Noggin proteins: Inhibition of Activin/Nodal and Wnt signaling. *Development* 138 (24), 5345–5356, [10.1242/dev.068908](https://doi.org/10.1242/dev.068908)
  85. Serebrovskaya EO, Gorodnicheva TV, Ermakova GV, Solovieva EA, Sharonov GV, Zagaynova EV, Chudakov DM, Lukyanov S, **Zaraisky AG**, Lukyanov KA (2011). Light-induced blockage of cell division with a chromatin-targeted phototoxic fluorescent protein. *Biochem J* 435 (1), 65–71, [10.1042/BJ20101217](https://doi.org/10.1042/BJ20101217)
  86. Tereshina MB, Bayramov AV, **Zaraisky AG** (2011). Expression patterns of genes encoding small GTPases Ras-dva-1 and Ras-dva-2 in the Xenopus laevis tadpoles. *Gene Expr Patterns* 11 (12), 156–161, [10.1016/j.gep.2010.10.009](https://doi.org/10.1016/j.gep.2010.10.009)
  87. Shcherbo D, Shemiakina II, Ryabova AV, Luker KE, Schmidt BT, Souslova EA, Gorodnicheva TV, Strukova L, Shidlovskiy KM, Britanova OV, **Zaraisky AG**, Lukyanov KA, Loschenov VB, Luker GD, Chudakov DM (2010). Near-infrared fluorescent proteins. *Nat Methods* 7 (10), 827–829, [10.1038/nmeth.1501](https://doi.org/10.1038/nmeth.1501)
  88. Ermolina LV, Martynova NY, **Zaraisky AG** (2010). The cytoskeletal protein zyxin-A universal regulator of cell adhesion and gene expression. *Russ. J. Bioorganic Chem.* 36 (1), 24–31, [10.1134/S1068162010010036](https://doi.org/10.1134/S1068162010010036)
  89. Shcherbo D, Murphy CS, Ermakova GV, Solovieva EA, Chepurnykh TV, Shcheglov AS, Verkhusha VV, Pletnev VZ, Hazelwood KL, Roche PM, Lukyanov S, **Zaraisky AG**, Davidson MW, Chudakov DM (2009). Far-red fluorescent tags for protein imaging in living tissues. *Biochem J* 418 (3), 567–574, [10.1042/BJ20081949](https://doi.org/10.1042/BJ20081949)
  90. Martynova NY, Ermolina LV, Eroshkin FM, Gioeva FK, **Zaraisky AG** (2008). Transcriptional factor Xanf1 interacts with the focal adhesion protein zyxin at early development stage of the Xenopus laevis brain. *Russ. J. Bioorganic Chem.* 34 (4), 513–516, [10.1134/S1068162008040183](https://doi.org/10.1134/S1068162008040183)
  91. Martynova NY, Eroshkin FM, Ermolina LV, Ermakova GV, Korotaeva AL, Smurova KM, Gyoeva FK, **Zaraisky AG** (2008). The LIM-domain protein zyxin binds the homeodomain factor Xanf1/Hesx1 and modulates its activity in the anterior neural plate of Xenopus laevis embryo. *Dev Dyn* 237 (3), 736–749, [10.1002/dvdy.21471](https://doi.org/10.1002/dvdy.21471)
  92. Shcherbo D, Merzlyak EM, Chepurnykh TV, Fradkov AF, Ermakova GV, Solovieva EA, Lukyanov KA, Bogdanova EA, **Zaraisky AG**, Lukyanov S, Chudakov DM (2007). Bright far-red fluorescent protein for whole-body imaging. *Nat Methods* 4 (9), 741–746, [10.1038/nmeth1083](https://doi.org/10.1038/nmeth1083)
  93. Tereshina MB, Belousov VV, **Zaraisky AG** (2007). Study of the mechanism of small GTPase Ras-dva intracellular localization. *Russ. J. Bioorganic Chem.* 33 (5), 534–536, [10.1134/S1068162007050123](https://doi.org/10.1134/S1068162007050123)
  94. Ermakova GV, Solovieva EA, Martynova NY, **Zaraisky AG** (2007). The homeodomain factor Xanf represses expression of genes in the presumptive rostral forebrain that specify more caudal brain regions. *Dev Biol* 307 (2), 483–497, [10.1016/j.ydbio.2007.03.524](https://doi.org/10.1016/j.ydbio.2007.03.524)
  95. **Zaraisky AG** (2007). Neural induction: New achievements and prospects. *Mol Biol* 41 (2), 173–186, [10.1134/S002689330702001X](https://doi.org/10.1134/S002689330702001X)
  96. Evdokimov AG, Pokross ME, Egorov NS, **Zaraisky AG**, Yampolsky IV, Merzlyak EM, Shkoporov AN, Sander I, Lukyanov KA, Chudakov DM (2006). Structural basis for the fast maturation of Arthropoda green fluorescent protein. *EMBO Rep* 7 (10), 1006–1012, [10.1038/sj.embor.7400787](https://doi.org/10.1038/sj.embor.7400787)
  97. Efimov VA, Birikh KR, Staroverov DB, Lukyanov SA, Tereshina MB, **Zaraisky AG**, Chakhmakhcheva OG (2006). Hydroxyproline-based DNA mimics provide an efficient gene silencing in vitro and in vivo. *Nucleic*

- Acids Res* 34 (8), 2247–2257, [10.1093/nar/gkl249](#)
98. Tereshina MB, **Zaraisky AG**, Novoselov VV (2006). Ras-dva, a member of novel family of small GTPases, is required for the anterior ectoderm patterning in the *Xenopus laevis* embryo. *Development* 133 (3), 485–494, [10.1242/dev.02207](#)
99. Eroshkin FM, Ermakova GV, Bayramov AV, **Zaraisky AG** (2006). Multiple noggins in vertebrate genome: Cloning and expression of noggin2 and noggin4 in *Xenopus laevis*. *Gene Expr Patterns* 6 (2), 180–186, [10.1016/j.modgep.2005.06.007](#)
100. **Zaraisky AG** (2004). *Xenopus* embryos as a model to study the genetic mechanisms of brain development. *Mol Biol (Mosk)* 38 (1), 40–47.
101. Bayramov AV, Martynova NY, Eroshkin FM, Ermakova GV, **Zaraisky AG** (2004). The homeodomain-containing transcription factor X-nkx-5.1 inhibits expression of the homeobox gene Xanf-1 during the *Xenopus laevis* forebrain development. *Mech Dev* 121 (12), 1425–1441, [10.1016/j.mod.2004.08.002](#)
102. Martynova N, Eroshkin F, Ermakova G, Bayramov A, Gray J, Grainger R, **Zaraisky A** (2004). Patterning the forebrain: FoxA4a/Pintallavis and Xvent2 determine the posterior limit of Xanf1 expression in the neural plate. *Development* 131 (10), 2329–2338, [10.1242/dev.01133](#)
103. **Zaraisky AG** (2004). *Xenopus* embryos as a model to study the genetic mechanisms of brain development. *Mol Biol* 38 (1), 34–39, [10.1023/B:MBIL.0000015137.35243.31](#)
104. Verkhusha VV, Kuznetsova IM, Stepanenko OV, **Zaraisky AG**, Shavlovsky MM, Turoverov KK, Uversky VN (2003). High stability of Discosoma DsRed as compared to Aequorea EGFP. *Biochemistry* 42 (26), 7879–7884, [10.1021/bi034555t](#)
105. Novoselov VV, Alexandrova EM, Ermakova GV, **Zaraisky AG** (2003). Expression zones of three novel genes about the developing anterior neural plate of *Xenopus* embryo. *Gene Expr Patterns* 3 (2), 225–230, [10.1016/S1567-133X\(02\)00077-7](#)
106. Chudakov DM, Belousov VV, **Zaraisky AG**, Novoselov VV, Staroverov DB, Zorov DB, Lukyanov S, Lukyanov KA (2003). Kindling fluorescent proteins for precise in vivo photolabeling. *Nat Biotechnol* 21 (2), 191–194, [10.1038/nbt778](#)
107. Tersikh AV, Fradkov AF, **Zaraisky AG**, Kajava AV, Angres B (2002). Analysis of DsRed mutants: Space around the fluorophore accelerates fluorescence development. *J Biol Chem* 277 (10), 7633–7636, [10.1074/jbc.C100694200](#)
108. Eroshkin F, Kazanskaya O, Martynova N, **Zaraisky A** (2002). Characterization of cis-regulatory elements of the homeobox gene Xanf-1. *Gene* 285 (12), 279–286, [10.1016/S0378-1119\(02\)00393-1](#)
109. **Zaraisky AG** (2001). HOX genes in embryogenesis and phylogenesis. *Ontogenez* 32 (1), 3–13.
110. Brockmann B, Smith MW, **Zaraisky AG**, Harrison K, Okada K, Kamiya Y (2001). Subcellular localization and targeting of glucocorticoid receptor protein fusions expressed in transgenic *Arabidopsis thaliana*. *Plant Cell Physiol* 42 (9), 942–951, [10.1093/pcp/pce120](#)
111. Tersikh A, Fradkov A, Ermakova G, **Zaraisky A**, Tan P, Kajava AV, Zhao X, Lukyanov S, Matz M, Kim S, Weissman I, Siebert P (2000). 'Fluorescent timer': Protein that changes color with time. *Science* 290 (5496), 1585–1588, [10.1126/science.290.5496.1585](#)
112. Lukyanov KA, Fradkov AF, Gurskaya NG, Matz MV, Labas YA, Savitsky AP, Markelov ML, **Zaraisky AG**, Zhao X, Fang Y, Tan W, Lukyanov SA (2000). Natural animal coloration can be determined by a nonfluorescent green fluorescent protein homolog. *J Biol Chem* 275 (34), 25879–25882, [10.1074/jbc.C000338200](#)
113. Alexandrova EM, **Zaraisky AG** (2000). Molecular mechanisms of early neurogenesis in vertebrates. *Mol Biol* 34 (4), 496–507, [10.1007/BF02759559](#)
114. Matz MV, Fradkov AF, Labas YA, Savitsky AP, **Zaraisky AG**, Markelov ML, Lukyanov SA (1999). Fluorescent proteins from nonbioluminescent Anthozoa species. *Nat Biotechnol* 17 (10), 969–973, [10.1038/13657](#)
115. Ermakova GV, Alexandrova EM, Kazanskaya OV, Vasiliev OL, Smith MW, **Zaraisky AG** (1999). The homeobox gene, Xanf-1, can control both neural differentiation and patterning in the presumptive anterior neuroectoderm of the *Xenopus laevis* embryo. *Development* 126 (20), 4513–4523.
116. Kazanskaya OV, Ermakova GV, Pannese M, Lukyanov SA, Boncinelli E, **Zaraisky AG** (1998). cDNA cloning of three new homeobox-containing genes of the Anf class from human, chicken, and newt. *Russ. J. Bioorganic Chem.* 24 (3), 166–172.



117. Kazanskaya OV, Ermakova GV, Pannese M, Boncinelli E, **Zaraisky AG** (1998). cDNA Cloning of Three New Homeobox-Containing Genes of the Anf Class from Human, Chicken, and Newt. *Bioorg Khim* 24 (3), 192–193.
118. Bogdanova E, Matz M, Tarabykin V, Usman N, Shagin D, **Zaraisky A**, Lukyanov S (1998). Inductive interactions regulating body patterning in planarian, revealed by analysis of expression of novel gene scarf. *Dev Biol* 194 (2), 172–181, [10.1006/dbio.1997.8828](https://doi.org/10.1006/dbio.1997.8828)
119. Vasiliev OL, Lukyanov SA, Belyavsky AV, Kazanskaya OV, **Zaraisky AG** (1997). A novel marker of early epidermal differentiation: cDNA subtractive cloning starting on a single explant of *Xenopus laevis* gastrula epidermis. *Int J Dev Biol* 41 (6), 877–882.
120. Kazanskaya OV, Severtzova EA, Barth KA, Ermakova GV, Lukyanov SA, Benyumov AO, Pannese M, Boncinelli E, Wilson SW, **Zaraisky AG** (1997). Anf: A novel class of vertebrate homeobox genes expressed at the anterior end of the main embryonic axis. *Gene* 200 (12), 25–34, [10.1016/S0378-1119\(97\)00326-0](https://doi.org/10.1016/S0378-1119(97)00326-0)
121. Lukyanov KA, Launer GA, Tarabykin VS, **Zaraisky AG**, Lukyanov SA (1995). Inverted terminal repeats permit the average length of amplified dna fragments to be regulated during preparation of cdna libraries by polymerase chain reaction. *Anal Biochem* 229 (2), 198–202, [10.1006/abio.1995.1402](https://doi.org/10.1006/abio.1995.1402)
122. **Zaraisky AG**, Ecochard V, Kazanskaya OV, Lukyanov SA, Fesenko IV, Duprat AM (1995). The homeobox-containing gene XANF-1 may control development of the Spemann organizer. *Development* 121 (11), 3839–3847.
123. Ecochard V, Cayrol C, Foulquier F, **Zaraisky A**, Duprat AM (1995). A novel TGF- $\beta$ -like gene, fugacin, specifically expressed in the spemann organizer of *Xenopus*. *Dev Biol* 172 (2), 699–703, [10.1006/dbio.1995.8052](https://doi.org/10.1006/dbio.1995.8052)
124. **Zaraisky AG**, Lukyanov SA, Vasiliev OL, Smirnov YV, Belyavsky AV, Kazanskaya OV (1992). A novel homeobox gene expressed in the anterior neural plate of the *Xenopus* embryo. *Dev Biol* 152 (2), 373–382, [10.1016/0012-1606\(92\)90144-6](https://doi.org/10.1016/0012-1606(92)90144-6)
125. **Zaraisky AG**, Zatevakhina GV (1990). Studies of *Xenopus laevis* early embryogenesis using the monoclonal antibodies to the intermediate filaments proteins. *Ontogenez* 21 (3), 267–273.
126. Lukyanov SA, **Zaraisky AG** (1990). Methodological approaches to the detection of mRNA in histological sections. *Ontogenez* 21 (5), 455–465.
127. Belintsev BN, Belousov LV, **Zaraisky AG** (1987). Model of pattern formation in epithelial morphogenesis. *J Theor Biol* 129 (4), 369–394, [10.1016/S0022-5193\(87\)80019-X](https://doi.org/10.1016/S0022-5193(87)80019-X)
128. Savic D, Belintsev BN, Belousov LV, **Zaraisky AG** (1986). Morphogenetic activity prepattern in embryonic epithelia. *Prog Clin Biol Res* 217, 101–104.
129. Belintsev BN, Belousov LV, **Zaraisky AG** (1985). The model of epithelial morphogenesis basing on the elastic forces and contact polarization of cells. *Ontogenez* 16 (1), 5–14.