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### Адрес

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### Контакты

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### Работа в ИБХ

2015–наст.вр.

Ведущий научный сотрудник

### Награды

2016	Премия Правительства Москвы молодым ученым	За цикл работ по созданию системы широкомасштабного анализа геномной экспрессии «OncoFinder»
2003	Медали РАН для молодых ученых и студентов с премией	За работу «Полногеномная идентификация мобильных элементов, специфичных для ДНК человека»

### Членство в сообществах

с 2002 — Член Европейского биохимического сообщества (FEBS).

с 2006 — Член Американского общества микробиологов (American Society for Microbiology).

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### Степени и звания

Доктор наук (Биологические науки, 03.00.03 — Молекулярная биология)

### Гранты и проекты

2018–2022 — [Выявление факторов, препятствующих успешной HER-таргетной терапии при раке молочной железы и разработка противоопухолевого препарата, связывающего HER-лиганды](#)

### Публикации

- Li X, Wang Y, Yang J, **Buzdin A** (2024). Editorial: Application of multi-omics technologies to explore novel biological process and molecular function in immunology and oncology. *Front Genet* 15, 1403796, [10.3389/fgene.2024.1403796](https://doi.org/10.3389/fgene.2024.1403796)
- Khilal NR, Suntsova MV, Knyazev DI, Guryanova AA, Kovaleva TF, Sorokin MI, **Buzdin AA**, Katkova NY (2024). Adaptation and Experimental Validation of Clinical RNA Sequencing Protocol Oncobox for MGI DNBSEQ-G50 Platform. *Biochemistry (Moscow) Supplement Series B: Biomedical Chemistry* 17 (4), 172–182, [10.1134/S1990750823600589](https://doi.org/10.1134/S1990750823600589)
- Shaban N, Raevskiy M, Zakharova G, Shipunova V, Deyev S, Suntsova M, Sorokin M, **Buzdin A**, Kamashev D (2024). Human Blood Serum Counteracts EGFR/HER2-Targeted Drug Lapatinib Impact on Squamous Carcinoma SK-BR-3 Cell Growth and Gene Expression. *Biochemistry (Mosc)* 89 (3), 487–506, [10.1134/S000629792403009X](https://doi.org/10.1134/S000629792403009X)
- Shaban N, Kamashev D, Emelianova A, **Buzdin A** (2023). Targeted Inhibitors of EGFR: Structure, Biology, Biomarkers, and Clinical Applications. *Cells* 13 (1), [10.3390/cells13010047](https://doi.org/10.3390/cells13010047)
- Salvati A, Ferravante C, Lamberti J, Rocco T, Alexandrova E, D'Agostino Y, Sorokin M, Efimov V, **Buzdin A**, Strianese O, Nassa G, Tarallo R, Weisz A, Rizzo F, Giurato G (2023). Erratum: Author Correction: Host nasopharyngeal transcriptome dataset of a SARS-CoV-2 positive Italian cohort (Scientific data (2023) 10 1

- (379)). *Sci Data* 10 (1), 588, [10.1038/s41597-023-02504-5](https://doi.org/10.1038/s41597-023-02504-5)
6. Borisov N, Tkachev V, Simonov A, Sorokin M, Kim E, Kuzmin D, Karademir-Yilmaz B, **Buzdin A** (2023). Uniformly shaped harmonization combines human transcriptomic data from different platforms while retaining their biological properties and differential gene expression patterns. *Front Mol Biosci* 10, 1237129, [10.3389/fmolb.2023.1237129](https://doi.org/10.3389/fmolb.2023.1237129)
  7. Zolotovskaia M, Kovalenko M, Pugacheva P, Tkachev V, Simonov A, Sorokin M, Seryakov A, Garazha A, Gaifullin N, Sekacheva M, Zakharova G, **Buzdin AA** (2023). Algorithmically Reconstructed Molecular Pathways as the New Generation of Prognostic Molecular Biomarkers in Human Solid Cancers. *Proteomes* 11 (3), , [10.3390/proteomes11030026](https://doi.org/10.3390/proteomes11030026)
  8. Kamashev D, Shaban N, Lebedev T, Prassolov V, Suntsova M, Raevskiy M, Gaifullin N, Sekacheva M, Garazha A, Poddubskaya E, Sorokin M, **Buzdin A** (2023). Human Blood Serum Can Diminish EGFR-Targeted Inhibition of Squamous Carcinoma Cell Growth through Reactivation of MAPK and EGFR Pathways. *Cells* 12 (16), , [10.3390/cells12162022](https://doi.org/10.3390/cells12162022)
  9. Sorokin MI, **Buzdin AA**, Guryanova A, Efimov V, Suntsova MV, Zolotovskaia MA, Koroleva EV, Sekacheva MI, Tkachev VS, Garazha A, Kremenchutckaya K, Drobyshev A, Seryakov A, Gudkov A, Alekseenko IV, Rakitina OA, Kostina MB, Vladimirova U, Moiseev A, Bulgin D, Radomskaya E, Shestakov V, Baklaushev VP, Prassolov V, Shegay PV, Li X, Poddubskaya EV, Gaifullin N (2023). Large-scale assessment of pros and cons of autopsy-derived or tumor-matched tissues as the norms for gene expression analysis in cancers. *Comput Struct Biotechnol J* 21, 3964–3986, [10.1016/j.csbj.2023.07.040](https://doi.org/10.1016/j.csbj.2023.07.040)
  10. Wang Y, Liu B, Zhao G, Lee Y, **Buzdin A**, Mu X, Zhao J, Chen H, Li X (2023). Spatial transcriptomics: Technologies, applications and experimental considerations. *Genomics* 115 (5), 110671, [10.1016/j.ygeno.2023.110671](https://doi.org/10.1016/j.ygeno.2023.110671)
  11. Salvati A, Ferravante C, Lamberti J, Rocco T, Alexandrova E, D'Agostino Y, Sorokin M, Efimov V, **Buzdin A**, Strianese O, Nassa G, Tarallo R, Weisz A, Rizzo F, Giurato G (2023). Host nasopharyngeal transcriptome dataset of a SARS-CoV-2 positive Italian cohort. *Sci Data* 10 (1), 379, [10.1038/s41597-023-02289-7](https://doi.org/10.1038/s41597-023-02289-7)
  12. Zakharova G, Modestov A, Pugacheva P, Mekic R, Savina E, Guryanova A, Rachkova A, Yakushov S, Alimov A, Kulaeva E, Fedoseeva E, Kleyman A, Vasin K, Tkachev V, Garazha A, Sekacheva M, Suntsova M, Sorokin M, **Buzdin A**, Zolotovskaia MA (2023). Distinct Traits of Structural and Regulatory Evolutionary Conservation of Human Genes with Specific Focus on Major Cancer Molecular Pathways. *Cells* 12 (9), , [10.3390/cells12091299](https://doi.org/10.3390/cells12091299)
  13. Rozenberg JM, **Buzdin AA**, Mohammad T, Rakitina OA, Didych DA, Pleshkan VV, Alekseenko IV (2023). Molecules promoting circulating clusters of cancer cells suggest novel therapeutic targets for treatment of metastatic cancers. *Front Immunol* 14, 1099921, [10.3389/fimmu.2023.1099921](https://doi.org/10.3389/fimmu.2023.1099921)
  14. Zolotovskaia MA, Modestov AA, Suntsova MV, Rachkova AA, Koroleva EV, Poddubskaya EV, Sekacheva MI, Tkachev VS, Garazha AV, Glusker AA, Seryakov AP, Vladimirova US, Rumiantsev PO, Moiseev AA, Zharkov DO, Kuzmin DV, Zhao X, Prassolov VS, Shegay PV, Li X, Steinbichler TB, Kim E, Sorokin MI, Wang Y, **Buzdin AA** (2023). Pan-cancer antagonistic inhibition pattern of ATM-driven G2/M checkpoint pathway vs other DNA repair pathways. *DNA Repair (Amst)* 123, 103448, [10.1016/j.dnarep.2023.103448](https://doi.org/10.1016/j.dnarep.2023.103448)
  15. Pustovalova M, Malakhov P, Guryanova A, Sorokin M, Suntsova M, **Buzdin A**, Osipov AN, Leonov S (2023). Transcriptome-Based Traits of Radioresistant Sublines of Non-Small Cell Lung Cancer Cells. *Int J Mol Sci* 24 (3), 3042, [10.3390/ijms24033042](https://doi.org/10.3390/ijms24033042)
  16. Zakharova G, Efimov V, Raevskiy M, Rumiantsev P, Gudkov A, Belogurova-Ovchinnikova O, Sorokin M, **Buzdin A** (2023). Reclassification of TCGA Diffuse Glioma Profiles Linked to Transcriptomic, Epigenetic, Genomic and Clinical Data, According to the 2021 WHO CNS Tumor Classification. *Int J Mol Sci* 24 (1), 157, [10.3390/ijms24010157](https://doi.org/10.3390/ijms24010157)
  17. Kalmykova A, **Buzdin A** (2023). Evolution of Epigenetic Mechanisms and Signatures. *Cells* 12 (1), , [10.3390/cells12010109](https://doi.org/10.3390/cells12010109)
  18. Sorokin M, Rabushko E, Rozenberg JM, Mohammad T, Seryakov A, Sekacheva M, **Buzdin A** (2022). Clinically relevant fusion oncogenes: detection and practical implications. *Ther Adv Med Oncol* 14, 17588359221144108, [10.1177/17588359221144108](https://doi.org/10.1177/17588359221144108)
  19. Sorokin M, Zolotovskaia M, Nikitin D, Suntsova M, Poddubskaya E, Glusker A, Garazha A, Moiseev A, Li X, Sekacheva M, Naskhletashvili D, Seryakov A, Wang Y, **Buzdin A** (2022). Personalized targeted therapy

- prescription in colorectal cancer using algorithmic analysis of RNA sequencing data. *BMC Cancer* 22 (1), 1113, [10.1186/s12885-022-10177-3](https://doi.org/10.1186/s12885-022-10177-3)
20. Borisov N, **Buzdin A** (2022). Transcriptomic Harmonization as the Way for Suppressing Cross-Platform Bias and Batch Effect. *Biomedicines* 10 (9), , [10.3390/biomedicines10092318](https://doi.org/10.3390/biomedicines10092318)
  21. Kamashev D, Shaban N, Suntsova M, Raevskiy M, Efimov V, Moiseev A, Sorokin M, **Buzdin A** (2022). Human Blood Serum Inhibits Ductal Carcinoma Cells BT474 Growth and Modulates Effect of HER2 Inhibition. *Biomedicines* 10 (8), , [10.3390/biomedicines10081914](https://doi.org/10.3390/biomedicines10081914)
  22. Rabushko E, Sorokin M, Suntsova M, Seryakov AP, Kuzmin DV, Poddubskaya E, **Buzdin AA** (2022). Experimentally Deduced Criteria for Detection of Clinically Relevant Fusion 3' Oncogenes from FFPE Bulk RNA Sequencing Data. *Biomedicines* 10 (8), , [10.3390/biomedicines10081866](https://doi.org/10.3390/biomedicines10081866)
  23. Lebedev T, **Buzdin A**, Khabusheva E, Spirin P, Suntsova M, Sorokin M, Popenko V, Rubtsov P, Prassolov V (2022). Subtype of Neuroblastoma Cells with High KIT Expression Are Dependent on KIT and Its Knockdown Induces Compensatory Activation of Pro-Survival Signaling. *Int J Mol Sci* 23 (14), , [10.3390/ijms23147724](https://doi.org/10.3390/ijms23147724)
  24. Lebedev TD, Khabusheva ER, Mareeva SR, Ivanenko KA, Morozov AV, Spirin PV, Rubtsov PM, Snezhkina AV, Kudryavtseva AV, Sorokin MI, **Buzdin AA**, Prassolov VS (2022). Identification of cell type-specific correlations between ERK activity and cell viability upon treatment with ERK1/2 inhibitors. *J Biol Chem* 298 (8), 102226, [10.1016/j.jbc.2022.102226](https://doi.org/10.1016/j.jbc.2022.102226)
  25. Zolotovskaia MA, Kovalenko MA, Tkachev VS, Simonov AM, Sorokin MI, Kim E, Kuzmin DV, Karademir-Yilmaz B, **Buzdin AA** (2022). Next-Generation Grade and Survival Expression Biomarkers of Human Gliomas Based on Algorithmically Reconstructed Molecular Pathways. *Int J Mol Sci* 23 (13), , [10.3390/ijms23137330](https://doi.org/10.3390/ijms23137330)
  26. Zolotovskaia MA, Tkachev VS, Guryanova AA, Simonov AM, Raevskiy MM, Efimov VV, Wang Y, Sekacheva MI, Garazha AV, Borisov NM, Kuzmin DV, Sorokin MI, **Buzdin AA** (2022). OncoboxPD: human 51 672 molecular pathways database with tools for activity calculating and visualization. *Comput Struct Biotechnol J* 20, 2280–2291, [10.1016/j.csbj.2022.05.006](https://doi.org/10.1016/j.csbj.2022.05.006)
  27. Rozenberg JM, Kamynina M, Sorokin M, Zolotovskaia M, Koroleva E, Kremenchutckaya K, Gudkov A, **Buzdin A**, Borisov N (2022). The Role of the Metabolism of Zinc and Manganese Ions in Human Cancerogenesis. *Biomedicines* 10 (5), , [10.3390/biomedicines10051072](https://doi.org/10.3390/biomedicines10051072)
  28. Borisov N, Sorokin M, Zolotovskaya M, Borisov C, **Buzdin A** (2022). Shambhala-2: A Protocol for Uniformly Shaped Harmonization of Gene Expression Profiles of Various Formats. *Curr. prot.* 2 (5), e444, [10.1002/cpz1.444](https://doi.org/10.1002/cpz1.444)
  29. Konovalov N, Timonin S, Asyutin D, Raevskiy M, Sorokin M, **Buzdin A**, Kaprovoy S (2022). Transcriptomic Portraits and Molecular Pathway Activation Features of Adult Spinal Intramedullary Astrocytomas. *Front Oncol* 12, 837570, [10.3389/fonc.2022.837570](https://doi.org/10.3389/fonc.2022.837570)
  30. Gudkov A, Shirokorad V, Kashintsev K, Sokov D, Nikitin D, Anisenko A, Borisov N, Sekacheva M, Gaifullin N, Garazha A, Suntsova M, Koroleva E, **Buzdin A**, Sorokin M (2022). Gene Expression-Based Signature Can Predict Sorafenib Response in Kidney Cancer. *Front Mol Biosci* 9, 753318, [10.3389/fmolb.2022.753318](https://doi.org/10.3389/fmolb.2022.753318)
  31. Raevskiy M, Sorokin M, Zakharova G, Tkachev V, Borisov N, Kuzmin D, Kremenchutckaya K, Gudkov A, Kamashev D, **Buzdin A** (2022). Better Agreement of Human Transcriptomic and Proteomic Cancer Expression Data at the Molecular Pathway Activation Level. *Int J Mol Sci* 23 (5), , [10.3390/ijms23052611](https://doi.org/10.3390/ijms23052611)
  32. Moiseev AA, Guriyanova AA, Suntsova MV, **Buzdin AA**, Sorokin MI (2022). A case of whole-exome and transcriptome sequencing of tumor for personalized experimental treatment for metastatic mesothelioma. *Herzen Oncology* 11 (2), 62–67, [10.17116/onkolog20221102162](https://doi.org/10.17116/onkolog20221102162)
  33. Sorokin M, Rabushko E, Efimov V, Poddubskaya E, Sekacheva M, Simonov A, Nikitin D, Drobyshev A, Suntsova M, **Buzdin A** (2021). Experimental and Meta-Analytic Validation of RNA Sequencing Signatures for Predicting Status of Microsatellite Instability. *Front Mol Biosci* 8, 737821, [10.3389/fmolb.2021.737821](https://doi.org/10.3389/fmolb.2021.737821)
  34. Schneider MA, **Buzdin AA**, Weber A, Clavien PA, Borger P (2021). Combination of antiretroviral drugs zidovudine and efavirenz impairs tumor growths in a mouse model of cancer. *Viruses* 13 (12), , [10.3390/v13122396](https://doi.org/10.3390/v13122396)
  35. Raevskiy M, Sorokin M, Vladimirova U, Suntsova M, Efimov V, Garazha A, Drobyshev A, Moiseev A, Rumiantsev P, Li X, **Buzdin A** (2021). EGFR Pathway-Based Gene Signatures of Druggable Gene Mutations in Melanoma, Breast, Lung, and Thyroid Cancers. *Biochemistry (Mosc)* 86 (11), 1477–1488, [10.1134/S0006297921110110](https://doi.org/10.1134/S0006297921110110)

36. Sorokin M, Gorelyshev A, Efimov V, Zotova E, Zolotovskaia M, Rabushko E, Kuzmin D, Seryakov A, Kamashev D, Li X, Poddubskaya E, Suntsova M, **Buzdin A** (2021). RNA Sequencing Data for FFPE Tumor Blocks Can Be Used for Robust Estimation of Tumor Mutation Burden in Individual Biosamples. *Front Oncol* 11, 732644, [10.3389/fonc.2021.732644](https://doi.org/10.3389/fonc.2021.732644)
37. Lebedev T, Vagapova E, Spirin P, Rubtsov P, Astashkova O, Mikheeva A, Sorokin M, Vladimirova U, Suntsova M, Konovalov D, Roumiantsev A, Stocking C, **Buzdin A**, Prassolov V (2021). Growth factor signaling predicts therapy resistance mechanisms and defines neuroblastoma subtypes. *Oncogene* 40 (44), 6258–6272, [10.1038/s41388-021-02018-7](https://doi.org/10.1038/s41388-021-02018-7)
38. Seryakov A, Magomedova Z, Suntsova M, Prokofieva A, Rabushko E, Glusker A, Makovskaia L, Zolotovskaia M, **Buzdin A**, Sorokin M (2021). RNA Sequencing for Personalized Treatment of Metastatic Leiomyosarcoma: Case Report. *Front Oncol* 11, 666001, [10.3389/fonc.2021.666001](https://doi.org/10.3389/fonc.2021.666001)
39. Zolotovskaia M, Tkachev V, Sorokin M, Garazha A, Kim E, Kantelhardt SR, Bikar SE, Zottel A, Šamec N, Kuzmin D, Sprang B, Moisseev A, Giese A, Efimov V, Jovčevska I, **Buzdin A** (2021). Algorithmically deduced FREM2 molecular pathway is a potent grade and survival biomarker of human gliomas. *Cancers (Basel)* 13 (16), , [10.3390/cancers13164117](https://doi.org/10.3390/cancers13164117)
40. Samii A, Sorokin M, Kar S, Makovskaia L, Garazha A, Hartmann C, Moisseev A, Kim E, Giese A, **Buzdin A** (2021). Case of multifocal glioblastoma with four fusion transcripts of ALK, FGFR2, NTRK2, and NTRK3 genes stresses the need for tumor tissue multisampling for transcriptomic analysis. *Cold Spring Harb Mol Case Stud* 7 (4), , [10.1101/mcs.a006100](https://doi.org/10.1101/mcs.a006100)
41. **Buzdin AV**, Patrushev MV, Sverdlov ED (2021). Will plant genome editing play a decisive role in “quantum-leap” improvements in crop yield to feed an increasing global human population? *Plants (Basel)* 10 (8), , [10.3390/plants10081667](https://doi.org/10.3390/plants10081667)
42. Sorokin M, Raevskiy M, Zottel A, Šamec N, Skoblar Vidmar M, Matjašič A, Zupan A, Mlakar J, Suntsova M, Kuzmin DV, **Buzdin A**, Jovčevska I (2021). Large-Scale Transcriptomics-Driven Approach Revealed Overexpression of CRNDE as a Poor Survival Prognosis Biomarker in Glioblastoma. *Cancers (Basel)* 13 (14), , [10.3390/cancers13143419](https://doi.org/10.3390/cancers13143419)
43. Wang Y, Tong Z, Zhang W, Zhang W, **Buzdin A**, Mu X, Yan Q, Zhao X, Chang HH, Duhon M, Zhou X, Zhao G, Chen H, Li X (2021). FDA-Approved and Emerging Next Generation Predictive Biomarkers for Immune Checkpoint Inhibitors in Cancer Patients. *Front Oncol* 11, 683419, [10.3389/fonc.2021.683419](https://doi.org/10.3389/fonc.2021.683419)
44. Aschenbrenner B, Negro G, Savic D, Sorokin M, **Buzdin A**, Ganswindt U, Cemazar M, Sersa G, Skvortsov S, Skvortsova I (2021). Simvastatin is effective in killing the radioresistant breast carcinoma cells. *Radiol Oncol* 55 (3), 305–316, [10.2478/raon-2021-0020](https://doi.org/10.2478/raon-2021-0020)
45. Borisov N, Sergeeva A, Suntsova M, Raevskiy M, Gaifullin N, Mendeleeva L, Gudkov A, Nareiko M, Garazha A, Tkachev V, Li X, Sorokin M, Surin V, **Buzdin A** (2021). Machine Learning Applicability for Classification of PAD/VCD Chemotherapy Response Using 53 Multiple Myeloma RNA Sequencing Profiles. *Front Oncol* 11, 652063, [10.3389/fonc.2021.652063](https://doi.org/10.3389/fonc.2021.652063)
46. **Buzdin A**, Tkachev V, Zolotovskaia M, Garazha A, Moshkovskii S, Borisov N, Gaifullin N, Sorokin M, Suntsova M (2021). Chapter One - Using proteomic and transcriptomic data to assess activation of intracellular molecular pathways. *Adv Protein Chem Struct Biol* 127, 1–53, [10.1016/bs.apcsb.2021.02.005](https://doi.org/10.1016/bs.apcsb.2021.02.005)
47. Vladimirova U, Rumiantsev P, Zolotovskaia M, Albert E, Abrosimov A, Slashchuk K, Nikiforovich P, Chukhacheva O, Gaifullin N, Suntsova M, Zakharova G, Glusker A, Nikitin D, Garazha A, Li X, Kamashev D, Drobyshev A, Kochergina-Nikitskaya I, Sorokin M, **Buzdin A** (2021). DNA repair pathway activation features in follicular and papillary thyroid tumors, interrogated using 95 experimental RNA sequencing profiles. *Heliyon* 7 (3), e06408, [10.1016/j.heliyon.2021.e06408](https://doi.org/10.1016/j.heliyon.2021.e06408)
48. Kamashev D, Sorokin M, Kochergina I, Drobyshev A, Vladimirova U, Zolotovskaia M, Vorotnikov I, Shaban N, Raevskiy M, Kuzmin D, **Buzdin A** (2021). Human blood serum can donor-specifically antagonize effects of EGFR-targeted drugs on squamous carcinoma cell growth. *Heliyon* 7 (3), e06394, [10.1016/j.heliyon.2021.e06394](https://doi.org/10.1016/j.heliyon.2021.e06394)
49. Sorokin M, Borisov N, Kuzmin D, Gudkov A, Zolotovskaia M, Garazha A, **Buzdin A** (2021). Algorithmic Annotation of Functional Roles for Components of 3,044 Human Molecular Pathways. *Front Genet* 12, 617059, [10.3389/fgene.2021.617059](https://doi.org/10.3389/fgene.2021.617059)
50. **Buzdin A**, Skvortsova II, Li X, Wang Y (2021). Editorial: Next Generation Sequencing Based Diagnostic



Approaches in Clinical Oncology. *Front Oncol* 10, 635555, [10.3389/fonc.2020.635555](https://doi.org/10.3389/fonc.2020.635555)

51. Blinova E, **Buzdin A**, Enikeev D, Roshchin D, Suntsova M, Samyshina E, Drobyshev A, Deryabina O, Demura T, Blinov D, Shich E, Barakat H, Borger P, Merinov D, Kachmazov A, Serebrianyi S, Tumutolova O, Potoldykova N, Zhdanov P, Grigoryan V, Perepechin D (2020). Prognostic Role of FGFR3 Expression Status and Tumor-Related MicroRNAs Level in Association with PD-L1 Expression in Primary Luminal Non-Muscular Invasive Bladder Carcinoma. *Life (Basel)* 10 (11), 1–14, [10.3390/life10110305](https://doi.org/10.3390/life10110305)
52. Zottel A, Šamec N, Kump A, Raspor Dall'Olio LR, Pužar Dominkuš P, Romih R, Hudoklin S, Mlakar J, Nikitin D, Sorokin M, **Buzdin A**, Jovčevska I, Komel R (2020). Analysis of miR-9-5p, miR-124-3p, miR-21-5p, miR-138-5p, and miR-1-3p in Glioblastoma Cell Lines and Extracellular Vesicles. *Int J Mol Sci* 21 (22), 1–22, [10.3390/ijms21228491](https://doi.org/10.3390/ijms21228491)
53. Borisov N, Sorokin M, Tkachev V, Garazha A, **Buzdin A** (2020). Cancer gene expression profiles associated with clinical outcomes to chemotherapy treatments. *BMC Med Genomics* 13 (Suppl 8), 111, [10.1186/s12920-020-00759-0](https://doi.org/10.1186/s12920-020-00759-0)
54. Suntsova MV, **Buzdin AA** (2020). Differences between human and chimpanzee genomes and their implications in gene expression, protein functions and biochemical properties of the two species. *BMC Genomics* 21 (Suppl 7), 535, [10.1186/s12864-020-06962-8](https://doi.org/10.1186/s12864-020-06962-8)
55. Knyazeva M, Korobkina E, Karizky A, Sorokin M, **Buzdin A**, Vorobyev S, Malek A (2020). Reciprocal Dysregulation of MiR-146b and MiR-451 Contributes in Malignant Phenotype of Follicular Thyroid Tumor. *Int J Mol Sci* 21 (17), 1–17, [10.3390/ijms21175950](https://doi.org/10.3390/ijms21175950)
56. Sorokin M, Ignatev K, Barbara V, Vladimirova U, Muraveva A, Suntsova M, Gaifullin N, Vorotnikov I, Kamashev D, Bondarenko A, Baranova M, Poddubskaya E, **Buzdin A** (2020). Molecular Pathway Activation Markers Are Associated with Efficacy of Trastuzumab Therapy in Metastatic HER2-Positive Breast Cancer Better than Individual Gene Expression Levels. *Biochemistry (Mosc)* 85 (7), 758–772, [10.1134/S0006297920070044](https://doi.org/10.1134/S0006297920070044)
57. Sorokin M, Kholodenko I, Kalinovskiy D, Shamanskaya T, Doronin I, Konovalov D, Mironov A, Kuzmin D, Nikitin D, Deyev S, **Buzdin A**, Kholodenko R (2020). RNA Sequencing-Based Identification of Ganglioside GD2-Positive Cancer Phenotype. *Biomedicines* 8 (6), , [10.3390/biomedicines8060142](https://doi.org/10.3390/biomedicines8060142)
58. Sorokin M, Ignatev K, Poddubskaya E, Vladimirova U, Gaifullin N, Lantsov D, Garazha A, Allina D, Suntsova M, Barbara V, **Buzdin A** (2020). RNA Sequencing in Comparison to Immunohistochemistry for Measuring Cancer Biomarkers in Breast Cancer and Lung Cancer Specimens. *Biomedicines* 8 (5), , [10.3390/biomedicines8050114](https://doi.org/10.3390/biomedicines8050114)
59. Borger P, **Buzdin A**, Sorokin M, Kachaylo E, Humar B, Graf R, Clavien PA (2020). Large-Scale Profiling of Signaling Pathways Reveals a Distinct Demarcation between Normal and Extended Liver Resection. *Cells* 9 (5), , [10.3390/cells9051149](https://doi.org/10.3390/cells9051149)
60. Kalasauskas D, Sorokin M, Sprang B, Elmasri A, Viehweg S, Salinas G, Opitz L, Rave-Fraenk M, Schulz-Schaeffer W, Kantelhardt SR, Giese A, **Buzdin A**, Kim EL (2020). Diversity of Clinically Relevant Outcomes Resulting from Hypofractionated Radiation in Human Glioma Stem Cells Mirrors Distinct Patterns of Transcriptomic Changes. *Cancers (Basel)* 12 (3), , [10.3390/cancers12030570](https://doi.org/10.3390/cancers12030570)
61. Zolotovskaia MA, Sorokin MI, Petrov IV, Poddubskaya EV, Moiseev AA, Sekacheva MI, Borisov NM, Tkachev VS, Garazha AV, Kaprin AD, Shegay PV, Giese A, Kim E, Roumiantsev SA, **Buzdin AA** (2020). Disparity between Inter-Patient Molecular Heterogeneity and Repertoires of Target Drugs Used for Different Types of Cancer in Clinical Oncology. *Int J Mol Sci* 21 (5), 1–18, [10.3390/ijms21051580](https://doi.org/10.3390/ijms21051580)
62. Kim EL, Sorokin M, Kantelhardt SR, Kalasauskas D, Sprang B, Fauss J, Ringel F, Garazha A, Albert E, Gaifullin N, Hartmann C, Naumann N, Bikar SE, Giese A, **Buzdin A** (2020). Intratumoral Heterogeneity and Longitudinal Changes in Gene Expression Predict Differential Drug Sensitivity in Newly Diagnosed and Recurrent Glioblastoma. *Cancers (Basel)* 12 (2), , [10.3390/cancers12020520](https://doi.org/10.3390/cancers12020520)
63. Negro G, Aschenbrenner B, Brezar SK, Cemazar M, Coer A, Gasljevic G, Savic D, Sorokin M, **Buzdin A**, Callari M, Kvitsaridze I, Jewett A, Vasileva-Slaveva M, Ganswindt U, Skvortsova I, Skvortsov S (2020). Molecular heterogeneity in breast carcinoma cells with increased invasive capacities. *Radiol Oncol* 54 (1), 103–118, [10.2478/raon-2020-0007](https://doi.org/10.2478/raon-2020-0007)
64. Sorokin M, Poddubskaya E, Baranova M, Glusker A, Kogoniya L, Markarova E, Allina D, Suntsova M, Tkachev V, Garazha A, Sekacheva M, **Buzdin A** (2020). RNA sequencing profiles and diagnostic signatures

- linked with response to ramucirumab in gastric cancer. *Cold Spring Harb Mol Case Stud* 6 (2), , [10.1101/mcs.a004945](https://doi.org/10.1101/mcs.a004945)
65. Zolotovskaia MA, Tkachev VS, Seryakov AP, Kuzmin DV, Kamashev DE, Sorokin MI, Roumiantsev SA, **Buzdin AA** (2020). Mutation Enrichment and Transcriptomic Activation Signatures of 419 Molecular Pathways in Cancer. *Cancers (Basel)* 12 (2), , [10.3390/cancers12020271](https://doi.org/10.3390/cancers12020271)
  66. Tkachev V, Sorokin M, Borisov C, Garazha A, **Buzdin A**, Borisov N (2020). Flexible Data Trimming Improves Performance of Global Machine Learning Methods in Omics-Based Personalized Oncology. *Int J Mol Sci* 21 (3), , [10.3390/ijms21030713](https://doi.org/10.3390/ijms21030713)
  67. **(книга)** Tkachev V, Sorokin M, Garazha A, Borisov N, **Buzdin A** (2020). Oncobox Method for Scoring Efficiencies of Anticancer Drugs Based on Gene Expression Data. *Methods Mol Biol* 2063, 235–255, [10.1007/978-1-0716-0138-9\\_17](https://doi.org/10.1007/978-1-0716-0138-9_17)
  68. **(книга)** Zolotovskaia M, Sorokin M, Garazha A, Borisov N, **Buzdin A** (2020). Molecular Pathway Analysis of Mutation Data for Biomarkers Discovery and Scoring of Target Cancer Drugs. *Methods Mol Biol* 2063, 207–234, [10.1007/978-1-0716-0138-9\\_16](https://doi.org/10.1007/978-1-0716-0138-9_16)
  69. **(книга)** Borisov N, Sorokin M, Garazha A, **Buzdin A** (2020). Quantitation of Molecular Pathway Activation Using RNA Sequencing Data. *Methods Mol Biol* 2063, 189–206, [10.1007/978-1-0716-0138-9\\_15](https://doi.org/10.1007/978-1-0716-0138-9_15)
  70. Borger P, Schneider M, Frick L, Langiewicz M, Sorokin M, **Buzdin A**, Kachaylo E, Graf R, Humar B, Clavien RA (2019). Exploration of the Transcriptional Landscape of ALPPS Reveals the Pathways of Accelerated Liver Regeneration. *Front Oncol* 9, 1206, [10.3389/fonc.2019.01206](https://doi.org/10.3389/fonc.2019.01206)
  71. Nikitin D, Kolosov N, Murzina A, Pats K, Zamyatin A, Tkachev V, Sorokin M, Kopylov P, **Buzdin A** (2019). Retroelement-Linked H3K4me1 Histone Tags Uncover Regulatory Evolution Trends of Gene Enhancers and Feature Quickly Evolving Molecular Processes in Human Physiology. *Cells* 8 (10), , [10.3390/cells8101219](https://doi.org/10.3390/cells8101219)
  72. **(книга)** Nikitin D, Sorokin M, Tkachev V, Garazha A, Markov A, **Buzdin A** (2019). RetroSpect, a new method of measuring gene regulatory evolution rates using co-mapping of genomic functional features with transposable elements. *Evolution, Origin of Life, Concepts and Methods* 42 (1), 85–111, [10.1007/978-3-030-30363-1\\_5](https://doi.org/10.1007/978-3-030-30363-1_5)
  73. Igolkina AA, Zinkevich A, Karandasheva KO, Popov AA, Selifanova MV, Nikolaeva D, Tkachev V, Penzar D, Nikitin DM, **Buzdin A** (2019). H3K4me3, H3K9ac, H3K27ac, H3K27me3 and H3K9me3 Histone Tags Suggest Distinct Regulatory Evolution of Open and Condensed Chromatin Landmarks. *Cells* 8 (9), , [10.3390/cells8091034](https://doi.org/10.3390/cells8091034)
  74. **Buzdin A**, Sorokin M, Garazha A, Glusker A, Aleshin A, Poddubskaya E, Sekacheva M, Kim E, Gaifullin N, Giese A, Seryakov A, Rumiantsev P, Moshkovskii S, Moiseev A (2019). RNA sequencing for research and diagnostics in clinical oncology. *Semin Cancer Biol* 60, 311–323, [10.1016/j.semcancer.2019.07.010](https://doi.org/10.1016/j.semcancer.2019.07.010)
  75. Nikitin D, Garazha A, Sorokin M, Penzar D, Tkachev V, Markov A, Gaifullin N, Borger P, Poltorak A, **Buzdin A** (2019). Correction: Nikitin, D., et al. Retroelement-Linked Transcription Factor Binding Patterns Point to Quickly Developing Molecular Pathways in Human Evolution. 2019, , 130. *Cells* 8 (8), , [10.3390/cells8080832](https://doi.org/10.3390/cells8080832)
  76. Jovčevska I, Zottel A, Šamec N, Mlakar J, Sorokin M, Nikitin D, **Buzdin AA**, Komel R (2019). High FREM2 Gene and Protein Expression Are Associated with Favorable Prognosis of IDH-WT Glioblastomas. *Cancers (Basel)* 11 (8), , [10.3390/cancers11081060](https://doi.org/10.3390/cancers11081060)
  77. Borisov N, **Buzdin A** (2019). New Paradigm of Machine Learning (ML) in Personalized Oncology: Data Trimming for Squeezing More Biomarkers From Clinical Datasets. *Front Oncol* 9, 658, [10.3389/fonc.2019.00658](https://doi.org/10.3389/fonc.2019.00658)
  78. **(конференция)** Доронин ИИ, **Буддин АА**, Сорокин МИ, Холоденко ИВ, Деев СМ, Холоденко ПВ (2019). The approach for selection optimal combinations of chemotherapy drugs with GD2-specific antibodies for the effective elimination of GD2-positive tumor cells. *FEBS Open Bio* 9 (S1), 339, <https://doi.org/10.1002/2211-5463.12675>
  79. Suntsova M, Gaifullin N, Allina D, Reshetun A, Li X, Mendeleeva L, Surin V, Sergeeva A, Spirin P, Prassolov V, Morgan A, Garazha A, Sorokin M, **Buzdin A** (2019). Atlas of RNA sequencing profiles for normal human tissues. *Sci Data* 6 (1), 36, [10.1038/s41597-019-0043-4](https://doi.org/10.1038/s41597-019-0043-4)
  80. **Buzdin A**, Sorokin M, Poddubskaya E, Borisov N (2019). High-Throughput Mutation Data Now Complement Transcriptomic Profiling: Advances in Molecular Pathway Activation Analysis Approach in Cancer Biology. *Cancer Inform* 18, 1176935119838844, [10.1177/1176935119838844](https://doi.org/10.1177/1176935119838844)

81. Borisov N, Shabalina I, Tkachev V, Sorokin M, Garazha A, Pulin A, Eremin II, **Buzdin A** (2019). Shambhala: a platform-agnostic data harmonizer for gene expression data. *BMC Bioinformatics* 20 (1), 66, [10.1186/s12859-019-2641-8](https://doi.org/10.1186/s12859-019-2641-8)
82. Nikitin D, Garazha A, Sorokin M, Penzar D, Tkachev V, Markov A, Gaifullin N, Borger P, Poltorak A, **Buzdin A** (2019). Retroelement-Linked Transcription Factor Binding Patterns Point to Quickly Developing Molecular Pathways in Human Evolution. *Cells* 8 (2), 130, [10.3390/cells8020130](https://doi.org/10.3390/cells8020130)
83. Zolotovskaia MA, Sorokin MI, Emelianova AA, Borisov NM, Kuzmin DV, Borger P, Garazha AV, **Buzdin AA** (2019). Pathway Based Analysis of Mutation Data Is Efficient for Scoring Target Cancer Drugs. *Front Pharmacol* 10 (JAN), 1, [10.3389/fphar.2019.00001](https://doi.org/10.3389/fphar.2019.00001)
84. Tkachev V, Sorokin M, Mescheryakov A, Simonov A, Garazha A, **Buzdin A**, Muchnik I, Borisov N (2019). FLOating-Window Projective Separator (FloWPS): A Data Trimming Tool for Support Vector Machines (SVM) to Improve Robustness of the Classifier. *Front Genet* 9 (JAN), 717, [10.3389/fgene.2018.00717](https://doi.org/10.3389/fgene.2018.00717)
85. Rummyantsev PO, Nikiforovich PA, Poloznikov AA, Abrosimov U, Saenko VA, Rogunovich TI, **Budzin AA**, Polyakov AP, Kaprin AD, Dedov II (2019). YSRAEV600E mutation in papillary thyroid carcinoma. Clinical and methodological aspects. *Vopr Onkol* 65 (1), 16–26.
86. Sergeeva AM, Abramova TV, Surin VL, Obukhova TN, Dovydenko MV, Suntsova MV, **Buzdin AA**, Mendeleeva LP (2019). Molecular genetic structure of multiple myeloma tumour cells prior to treatment and at the time of relapse: Short review and case report. *Probl Gematol Pereliv Krovi* 64 (3), 362–374, [10.35754/0234-5730-2019-64-3-362-374](https://doi.org/10.35754/0234-5730-2019-64-3-362-374)
87. (книга) **Buzdin AA**, Borisov NM (2019). MiRImpact as a methodological tool for the analysis of MicroRNA at the level of molecular pathways. *Handbook of Nutrition, Diet, and Epigenetics* 3 (5), 2289–2308, [10.1007/978-3-319-55530-0\\_91](https://doi.org/10.1007/978-3-319-55530-0_91)
88. Zolotovskaia MA, Sorokin MI, Roumiantsev SA, Borisov NM, **Buzdin AA** (2019). Pathway Instability Is an Effective New Mutation-Based Type of Cancer Biomarkers. *Front Oncol* 8 (JAN), 658, [10.3389/fonc.2018.00658](https://doi.org/10.3389/fonc.2018.00658)
89. Emelianova AA, Kuzmin DV, Panteleev PV, Sorokin MI, **Buzdin AA**, Ovchinnikova TV (2018). Anticancer Activity of the Goat Antimicrobial Peptide ChMAP-28. *Front Pharmacol* 9, 1501, [10.3389/fphar.2018.01501](https://doi.org/10.3389/fphar.2018.01501)
90. Shtam T, Naryzhny S, Samsonov R, Karasik D, Mizgirev I, Kopylov A, Petrenko E, Zabrodskaya Y, Kamysinsky R, Nikitin D, Sorokin M, **Buzdin A**, Gil-Henn H, Malek A (2018). Plasma exosomes stimulate breast cancer metastasis through surface interactions and activation of FAK signaling. *Breast Cancer Res Treat* 174 (1), 129–141, [10.1007/s10549-018-5043-0](https://doi.org/10.1007/s10549-018-5043-0)
91. Marggraf MB, Panteleev PV, Emelianova AA, Sorokin MI, Bolosov IA, **Buzdin AA**, Kuzmin DV, Ovchinnikova TV (2018). Cytotoxic Potential of the Novel Horseshoe Crab Peptide Polyphemusin III. *Mar Drugs* 16 (12), , [10.3390/md16120466](https://doi.org/10.3390/md16120466)
92. Shtam T, Naryzhny S, Kopylov A, Petrenko E, Samsonov R, Kamysinsky R, Zabrodskaya Y, Nikitin D, Sorokin M, **Buzdin A**, Malek A (2018). Functional Properties of Circulating Exosomes Mediated by Surface-Attached Plasma Proteins. *J Hematol (Brossard)* 7 (4), 149–153, [10.14740/jh412w](https://doi.org/10.14740/jh412w)
93. Sorokin M, Kholodenko R, Suntsova M, Malakhova G, Garazha A, Kholodenko I, Poddubskaya E, Lantsov D, Stilidi I, Arhiri P, Osipov A, **Buzdin A** (2018). Oncobox bioinformatical platform for selecting potentially effective combinations of target cancer drugs using high-throughput gene expression data. *Cancers (Basel)* 10 (10), , [10.3390/cancers10100365](https://doi.org/10.3390/cancers10100365)
94. **Buzdin A**, Sorokin M, Garazha A, Sekacheva M, Kim E, Zhukov N, Wang Y, Li X, Kar S, Hartmann C, Samii A, Giese A, Borisov N (2018). Molecular pathway activation – New type of biomarkers for tumor morphology and personalized selection of target drugs. *Semin Cancer Biol* 53, 110–124, [10.1016/j.semcancer.2018.06.003](https://doi.org/10.1016/j.semcancer.2018.06.003)
95. Borisov N, Tkachev V, Suntsova M, Kovalchuk O, Zhavoronkov A, Muchnik I, **Buzdin A** (2018). A method of gene expression data transfer from cell lines to cancer patients for machine-learning prediction of drug efficiency. *Cell Cycle* 17 (4), 486–491, [10.1080/15384101.2017.1417706](https://doi.org/10.1080/15384101.2017.1417706)
96. Nikitin D, Penzar D, Garazha A, Sorokin M, Tkachev V, Borisov N, Poltorak A, Prassolov V, **Buzdin AA** (2018). Profiling of human molecular pathways affected by retrotransposons at the level of regulation by transcription factor proteins. *Front Immunol* 9 (JAN), 30, [10.3389/fimmu.2018.00030](https://doi.org/10.3389/fimmu.2018.00030)
97. Sorokin M, Kholodenko R, Grekhova A, Suntsova M, Pustovalova M, Vorobyeva N, Kholodenko I, Malakhova

- G, Garazha A, Nedoluzhko A, Vasilov R, Poddubskaya E, Kovalchuk O, Adamyan L, Prassolov V, Allina D, Kuzmin D, Ignatev K, Osipov A, **Buzdin A** (2017). Acquired resistance to tyrosine kinase inhibitors may be linked with the decreased sensitivity to X-ray irradiation. *Oncotarget* 9 (4), 5111–5124, [10.18632/oncotarget.23700](https://doi.org/10.18632/oncotarget.23700)
98. Borisov N, Suntsova M, Sorokin M, Garazha A, Kovalchuk O, Aliper A, Ilitskaya E, Lezhnina K, Korzinkin M, Tkachev V, Saenko V, Saenko Y, Sokov DG, Gaifullin NM, Kashintsev K, Shirokorad V, Shabalina I, Zhavoronkov A, Mishra B, Cantor CR, **Buzdin A** (2017). Data aggregation at the level of molecular pathways improves stability of experimental transcriptomic and proteomic data. *Cell Cycle* 16 (19), 1810–1823, [10.1080/15384101.2017.1361068](https://doi.org/10.1080/15384101.2017.1361068)
  99. Larkin B, Ilyukha V, Sorokin M, **Buzdin A**, Vannier E, Poltorak A (2017). Cutting edge: Activation of sting in t cells induces type i IFN responses and cell death. *J Immunol* 199 (2), 397–402, [10.4049/jimmunol.1601999](https://doi.org/10.4049/jimmunol.1601999)
  100. Wirsching A, Melloul E, Lezhnina K, **Buzdin AA**, Ogunshola OO, Borger P, Clavien PA, Lesurtel M (2017). Temporary portal vein embolization is as efficient as permanent portal vein embolization in mice. *Surgery* 162 (1), 68–81, [10.1016/j.surg.2017.01.032](https://doi.org/10.1016/j.surg.2017.01.032)
  101. **Buzdin AA**, Prassolov V, Garazha AV (2017). Friends-Enemies: Endogenous retroviruses are major transcriptional regulators of human DNA. *Front Chem* 5 (JUN), 35, [10.3389/fchem.2017.00035](https://doi.org/10.3389/fchem.2017.00035)
  102. (книга) Aliper AM, Korzinkin MB, Kuzmina NB, Zenin AA, Venkova LS, Smirnov PY, Zhavoronkov AA, **Buzdin AA**, Borisov NM (2017). Mathematical justification of expression-based pathway activation scoring (PAS). *Methods Mol Biol* 1613, 31–51, [10.1007/978-1-4939-7027-83](https://doi.org/10.1007/978-1-4939-7027-83)
  103. (книга) Garazha A, Suntsova M, **Buzdin A** (2017). Structural and functional coevolution of human endogenous retroviruses with our genome. , 479–485, [10.1007/978-3-319-48838-738](https://doi.org/10.1007/978-3-319-48838-738)
  104. (книга) **Buzdin AA**, Prassolov V, Zhavoronkov AA, Borisov NM (2017). Bioinformatics meets biomedicine: Oncofinder, a quantitative approach for interrogating molecular pathways using gene expression data. *Methods Mol Biol* 1613, 53–83, [10.1007/978-1-4939-7027-84](https://doi.org/10.1007/978-1-4939-7027-84)
  105. Petrov I, Suntsova M, Ilitskaya E, Roumiantsev S, Sorokin M, Garazha A, Spirin P, Lebedev T, Gaifullin N, Larin S, Kovalchuk O, Konovalov D, Prassolov V, Roumiantsev A, **Buzdin A** (2017). Gene expression and molecular pathway activation signatures of MYCN-amplified neuroblastomas. *Oncotarget* 8 (48), 83768–83780, [10.18632/oncotarget.19662](https://doi.org/10.18632/oncotarget.19662)
  106. **Buzdin AA**, Artibasova AV, Fedorova NF, Suntsova MV, Garazha AV, Sorokin MI, Allina D, Shalatonin M, Borisov NM, Zhavoronkov AA, Kovalchuk I, Kovalchuk O, Kushch AA (2016). Early stage of cytomegalovirus infection suppresses host microRNA expression regulation in human fibroblasts. *Cell Cycle* 15 (24), 3378–3389, [10.1080/15384101.2016.1241928](https://doi.org/10.1080/15384101.2016.1241928)
  107. Aliper A, Belikov AV, Garazha A, Jellen L, Artemov A, Suntsova M, Ivanova A, Venkova L, Borisov N, **Buzdin A**, Mamoshina P, Putin E, Swick AG, Moskalev A, Zhavoronkov A (2016). In search for geroprotectors: In silico screening and in vitro validation of signalome-level mimetics of young healthy state. *Aging (Albany NY)* 8 (9), 2127–2152, [10.18632/aging.101047](https://doi.org/10.18632/aging.101047)
  108. Alexandrova E, Nassa G, Corleone G, **Buzdin A**, Aliper AM, Terekhanova N, Shepelin D, Zhavoronkov A, Tamm M, Milanesi L, Miglino N, Weisz A, Borger P (2016). Large-scale profiling of signalling pathways reveals an asthma specific signature in bronchial smooth muscle cells. *Oncotarget* 7 (18), 25150–25161, [10.18632/oncotarget.7209](https://doi.org/10.18632/oncotarget.7209)
  109. Artibasova AV, Korzinkin MB, Sorokin MI, Shegay PV, Zhavoronkov AA, Gaifullin N, Alekseev BY, Vorobyev NV, Kuzmin DV, Kaprin AD, Borisov NM, **Buzdin AA** (2016). MiRImpact, a new bioinformatic method using complete microRNA expression profiles to assess their overall influence on the activity of intracellular molecular pathways. *Cell Cycle* 15 (5), 689–698, [10.1080/15384101.2016.1147633](https://doi.org/10.1080/15384101.2016.1147633)
  110. Petrov I, Suntsova M, Mutorova O, Sorokin M, Garazha A, Ilitskaya E, Spirin P, Larin S, Zhavoronkov A, Kovalchuk O, Prassolov V, Roumiantsev A, **Buzdin A** (2016). Molecular pathway activation features of pediatric acute myeloid leukemia (AML) and acute lymphoblast leukemia (ALL) cells. *Aging (Albany NY)* 8 (11), 2936–2947, [10.18632/aging.101102](https://doi.org/10.18632/aging.101102)
  111. Shepelin D, Korzinkin M, Vanyushina A, Aliper A, Borisov N, Vasilov R, Zhukov N, Sokov D, Prassolov V, Gaifullin N, Zhavoronkov A, Bhullar B, **Buzdin A** (2016). Molecular pathway activation features linked with transition from normal skin to primary and metastatic melanomas in human. *Oncotarget* 7 (1), 656–670, [10.18632/ONCOTARGET.6394](https://doi.org/10.18632/ONCOTARGET.6394)



112. Lebedev TD, Spirin PV, Suntsova MV, Ivanova AV, **Buzdin AA**, Prokofjeva MM, Rubtsov PM, Prassolov VS (2015). Receptor tyrosine kinase KIT can regulate the expression of genes involved in spontaneous regression of neuroblastoma. *Mol Biol* 49 (6), 943–945, [10.1134/S0026893315060151](https://doi.org/10.1134/S0026893315060151)
113. Lebedev TD, Spirin PV, Suntsova MV, Ivanova AV, **Buzdin AA**, Prokofjeva MM, Rubtsov PM, Prassolov VS (2015). Receptor tyrosine kinase KIT may regulate expression of genes involved in spontaneous regression of neuroblastoma. *Mol Biol (Mosk)* 49 (6), 1052–1055, [10.7868/S0026898415060154](https://doi.org/10.7868/S0026898415060154)
114. Suntsova M, Garazha A, Ivanova A, Kaminsky D, Zhavoronkov A, **Buzdin A** (2015). Molecular functions of human endogenous retroviruses in health and disease. *Cell Mol Life Sci* 72 (19), 3653–3675, [10.1007/s00018-015-1947-6](https://doi.org/10.1007/s00018-015-1947-6)
115. Zhu Q, Izumchenko E, Aliper AM, Makarev E, Paz K, **Buzdin AA**, Zhavoronkov AA, Sidransky D (2015). Pathway activation strength is a novel independent prognostic biomarker for cetuximab sensitivity in colorectal cancer patients. *Hum Genome Var* 2 (1), 15009, [10.1038/hgv.2015.9](https://doi.org/10.1038/hgv.2015.9)
116. Garazha A, Ivanova A, Suntsova M, Malakhova G, Roumiantsev S, Zhavoronkov A, **Buzdin A** (2015). New bioinformatic tool for quick identification of functionally relevant endogenous retroviral inserts in human genome. *Cell Cycle* 14 (9), 1476–1484, [10.1080/15384101.2015.1022696](https://doi.org/10.1080/15384101.2015.1022696)
117. Artemov A, Aliper A, Korzinkin M, Lezhnina K, Jellen L, Zhukov N, Roumiantsev S, Gaifullin N, Zhavoronkov A, Borisov N, **Buzdin A** (2015). A method for predicting target drug efficiency in cancer based on the analysis of signaling pathway activation. *Oncotarget* 6 (30), 29347–29356, [10.18632/oncotarget.5119](https://doi.org/10.18632/oncotarget.5119)
118. Venkova L, Aliper A, Suntsova M, Kholodenko R, Shepelin D, Borisov N, Malakhova G, Vasilov R, Roumiantsev S, Zhavoronkov A, **Buzdin A** (2015). Combinatorial high-throughput experimental and bioinformatic approach identifies molecular pathways linked with the sensitivity to anticancer target drugs. *Oncotarget* 6 (29), 27227–27238, [10.18632/oncotarget.4507](https://doi.org/10.18632/oncotarget.4507)
119. Spirin PV, Lebedev TD, Orlova NN, Gornostaeva AS, Prokofjeva MM, Nikitenko NA, Dmitriev SE, **Buzdin AA**, Borisov NM, Aliper AM, Garazha AV, Rubtsov PM, Stocking C, Prassolov VS (2014). Silencing AML1-ETO gene expression leads to simultaneous activation of both pro-apoptotic and proliferation signaling. *Leukemia* 28 (11), 2222–2228, [10.1038/leu.2014.130](https://doi.org/10.1038/leu.2014.130)
120. **Buzdin AA**, Zhavoronkov AA, Korzinkin MB, Roumiantsev SA, Aliper AM, Venkova LS, Smirnov PY, Borisov NM (2014). The OncoFinder algorithm for minimizing the errors introduced by the high-throughput methods of transcriptome analysis. *Front Mol Biosci* 1 (AUG), 8, [10.3389/fmolb.2014.00008](https://doi.org/10.3389/fmolb.2014.00008)
121. Moskalev AA, Aliper AM, Smit-McBride Z, **Buzdin A**, Zhavoronkov A (2014). Genetics and epigenetics of aging and longevity. *Cell Cycle* 13 (7), 1063–1077, [10.4161/cc.28433](https://doi.org/10.4161/cc.28433)
122. Borisov NM, Terekhanova NV, Aliper AM, Venkova LS, Smirnov PY, Roumiantsev S, Korzinkin MB, Zhavoronkov AA, **Buzdin AA** (2014). Signaling pathways activation profiles make better markers of cancer than expression of individual genes. *Oncotarget* 5 (20), 10198–10205, [10.18632/oncotarget.2548](https://doi.org/10.18632/oncotarget.2548)
123. **Buzdin AA**, Zhavoronkov AA, Korzinkin MB, Venkova LS, Zenin AA, Smirnov PY, Borisov NM (2014). Oncofinder, a new method for the analysis of intracellular signaling pathway activation using transcriptomic data. *Front Genet* 5 (MAR), 55, [10.3389/fgene.2014.00055](https://doi.org/10.3389/fgene.2014.00055)
124. Vishnyakova KS, Babizhayev MA, Aliper AM, **Buzdin AA**, Kudryavzeva AV, Yegorov YE (2014). Stimulation of cell proliferation by carnosine: Cell and transcriptome approaches. *Mol Biol* 48 (5), 718–726, [10.1134/S0026893314050161](https://doi.org/10.1134/S0026893314050161)
125. Aliper AM, Frieden-Korovkina VP, **Buzdin A**, Roumiantsev SA, Zhavoronkov A (2014). A role for G-CSF and GM-CSF in nonmyeloid cancers. *Cancer Med* 3 (4), 737–746, [10.1002/cam4.239](https://doi.org/10.1002/cam4.239)
126. Aliper AM, Frieden-Korovkina VP, **Buzdin A**, Roumiantsev SA, Zhavoronkov A (2014). Interactome analysis of myeloid-derived suppressor cells in murine models of colon and breast cancer. *Oncotarget* 5 (22), 11345–11353, [10.18632/oncotarget.2489](https://doi.org/10.18632/oncotarget.2489)
127. Zhavoronkov A, **Buzdin AA**, Garazha AV, Borisov NM, Moskalev AA (2014). Signaling pathway cloud regulation for in silico screening and ranking of the potential geroprotective drugs. *Front Genet* 5 (MAR), 49, [10.3389/fgene.2014.00049](https://doi.org/10.3389/fgene.2014.00049)
128. Lezhnina K, Kovalchuk O, Zhavoronkov AA, Korzinkin MB, Zabolotneva AA, Shegay PV, Sokov DG, Gaifullin NM, Rusakov IG, Aliper AM, Roumiantsev SA, Alekseev BY, Borisov NM, **Buzdin AA** (2014). Novel robust biomarkers for human bladder cancer based on activation of intracellular signaling pathways. *Oncotarget* 5 (19), 9022–9032, [10.18632/oncotarget.2493](https://doi.org/10.18632/oncotarget.2493)

129. Zabolotneva AA, Zhavoronkov AA, Shegay PV, Gaifullin NM, Alekseev BY, Roumiantsev SA, Garazha AV, Kovalchuk O, Aravin A, **Buzdin AA** (2013). A systematic experimental evaluation of microRNA markers of human bladder cancer. *Front Genet* 4 (NOV), 247, [10.3389/fgene.2013.00247](https://doi.org/10.3389/fgene.2013.00247)
130. Jones RB, Song H, Xu Y, Garrison KE, **Buzdin AA**, Anwar N, Hunter DV, Mujib S, Mihajlovic V, Martin E, Lee E, Kuciak M, Raposo RAS, Bozorgzad A, Meiklejohn DA, Ndhlovu LC, Nixon DF, Ostrowski MA (2013). LINE-1 retrotransposable element DNA accumulates in HIV-1- infected cells. *J Virol* 87 (24), 13307–13320, [10.1128/JVI.02257-13](https://doi.org/10.1128/JVI.02257-13)
131. Suntsova M, Gogvadze EV, Salozhin S, Gaifullin N, Eroshkin F, Dmitriev SE, Martynova N, Kulikov K, Malakhova G, Tukhbatova G, Bolshakov AP, Ghilarov D, Garazha A, Aliper A, Cantor CR, Solokhin Y, Roumiantsev S, Balaban P, Zhavoronkov A, **Buzdin A** (2013). Human-specific endogenous retroviral insert serves as an enhancer for the schizophrenia-linked gene PRODH. *Proc Natl Acad Sci U S A* 110 (48), 19472–19477, [10.1073/pnas.1318172110](https://doi.org/10.1073/pnas.1318172110)
132. Zabolotneva AA, Zhavoronkov A, Garazha AV, Roumiantsev SA, **Buzdin AA** (2013). Characteristic patterns of microrna expression in human bladder cancer. *Front Genet* 3 (JAN), 310, [10.3389/fgene.2012.00310](https://doi.org/10.3389/fgene.2012.00310)
133. Baskaev KK, Kholodenko RV, Malakhova GV, Gaifullin NM, Korzeneva EA, Suntsova MV, **Buzdin AA** (2013). Experimental analysis of human-specific protein-coding open reading frame c11orf72. *Russ. J. Bioorganic Chem.* 39 (2), 131–137, [10.1134/S1068162013020039](https://doi.org/10.1134/S1068162013020039)
134. Alexandrova EA, Olovnikov IA, Malakhova GV, Zabolotneva AA, Suntsova MV, Dmitriev SE, **Buzdin AA** (2012). Sense transcripts originated from an internal part of the human retrotransposon LINE-1 5' UTR. *Gene* 511 (1), 46–53, [10.1016/j.gene.2012.09.026](https://doi.org/10.1016/j.gene.2012.09.026)
135. Zabolotneva AA, Bantysh O, Suntsova MV, Efimova N, Malakhova GV, Schumann GG, Gayfullin NM, **Buzdin AA** (2012). Transcriptional regulation of human-specific SVAF1retrotransposons by cis-regulatory MAST2 sequences. *Gene* 505 (1), 128–136, [10.1016/j.gene.2012.05.016](https://doi.org/10.1016/j.gene.2012.05.016)
136. Baskaev K, Garazha A, Gaifullin N, Suntsova MV, Zabolotneva AA, **Buzdin AA** (2012). NMETR: Technique for facile recovery of hypomethylation genomic tags. *Gene* 498 (1), 75–80, [10.1016/j.gene.2012.01.097](https://doi.org/10.1016/j.gene.2012.01.097)
137. Baskaev KK, **Buzdin AA** (2011). Evolutionarily recent groups of transposable elements in the human genome. *Russian Journal of Genetics: Applied Research* 1 (6), 524–531, [10.1134/S2079059711060049](https://doi.org/10.1134/S2079059711060049)
138. Zabolotneva A, Tkachev V, Filatov F, **Buzdin A** (2010). How many antiviral small interfering RNAs may be encoded by the mammalian genomes? *Biol Direct* 5, 62, [10.1186/1745-6150-5-62](https://doi.org/10.1186/1745-6150-5-62)
139. Kuzmin D, Gogvadze E, Kholodenko R, Grzela DP, Mityaev M, Vinogradova T, Kopantzev E, Malakhova G, Suntsova M, Sokov D, Ivics Z, **Buzdin A** (2010). Novel strong tissue specific promoter for gene expression in human germ cells. *BMC Biotechnol* 10, 58, [10.1186/1472-6750-10-58](https://doi.org/10.1186/1472-6750-10-58)
140. Mityaev MV, Kopantzev EP, **Buzdin AA**, Vinogradova TV, Sverdlov ED (2010). Enhancer element potentially involved in human survivin gene promoter regulation in lung cancer cell lines. *Biochemistry (Mosc)* 75 (2), 182–191, [10.1134/S0006297910020082](https://doi.org/10.1134/S0006297910020082)
141. **Buzdin AA** (2010). Functional analysis of retroviral endogenous inserts in the human genome evolution. *Bioorg Khim* 36 (1), 38–46.
142. **Buzdin AA** (2010). A functional analysis of retroviral endogenous inserts in view of human genome evolution. *Russ. J. Bioorganic Chem.* 36 (1), 32–39, [10.1134/S1068162010010048](https://doi.org/10.1134/S1068162010010048)
143. Schumann GG, Gogvadze EV, Osanai-Futahashi M, Kuroki A, Münk C, Fujiwara H, Ivics Z, **Buzdin AA** (2010). Unique functions of repetitive transcriptomes. *Int Rev Cell Mol Biol* 285 (C), 115–188, [10.1016/B978-0-12-381047-2.00003-7](https://doi.org/10.1016/B978-0-12-381047-2.00003-7)
144. Bantysh OB, **Buzdin AA** (2009). Novel family of human transposable elements formed due to fusion of the first exon of gene MAST2 with retrotransposon SVA. *Biochemistry (Mosc)* 74 (12), 1393–1399, [10.1134/S0006297909120153](https://doi.org/10.1134/S0006297909120153)
145. Gogvadze E, Stukacheva E, **Buzdin A**, Sverdlov E (2009). Human-specific modulation of transcriptional activity provided by endogenous retroviral insertions. *J Virol* 83 (12), 6098–6105, [10.1128/JVI.00123-09](https://doi.org/10.1128/JVI.00123-09)
146. Ghilarov DA, **Buzdin AA** (2009). Endogenous retroviral sequences control the transcription of many host genes in eukaryotes. , 35–63.
147. Gogvadze E, **Buzdin A** (2009). Retroelements and their impact on genome evolution and functioning. *Cell Mol Life Sci* 66 (23), 3727–3742, [10.1007/s00018-009-0107-2](https://doi.org/10.1007/s00018-009-0107-2)
148. Giliarov DA, Sakharova TA, **Buzdin AA** (2009). [Molecular receptors of taste agents]. *Bioorg Khim* 35 (1), 5–

149. Gilyarov DA, Sakharova TA, **Buzdin AA** (2009). Molecular receptors of taste agents. *Russ. J. Bioorganic Chem.* 35 (1), 1–9, [10.1134/S1068162009010014](https://doi.org/10.1134/S1068162009010014)
150. Mityaev MV, Kopantzev EP, **Buzdin AA**, Vinogradova TV, Sverdlov ED (2008). Functional significance of a putative Sp1 transcription factor binding site in the survivin gene promoter. *Biochemistry (Mosc)* 73 (11), 1183–1191, [10.1134/S0006297908110035](https://doi.org/10.1134/S0006297908110035)
151. **Buzdin A** (2007). Human-specific endogenous retroviruses. *ScientificWorldJournal* 7, 1848–1868, [10.1100/tsw.2007.270](https://doi.org/10.1100/tsw.2007.270)
152. Gogvadze E, Barbisan C, Lebrun MH, **Buzdin A** (2007). Tripartite chimeric pseudogene from the genome of rice blast fungus *Magnaporthe grisea* suggests double template jumps during long interspersed nuclear element (LINE) reverse transcription. *BMC Genomics* 8, 360, [10.1186/1471-2164-8-360](https://doi.org/10.1186/1471-2164-8-360)
153. **Buzdin A**, Gogvadze E, Lebrun MH (2007). Chimeric retrogenes suggest a role for the nucleolus in LINE amplification. *FEBS Lett* 581 (16), 2877–2882, [10.1016/j.febslet.2007.05.034](https://doi.org/10.1016/j.febslet.2007.05.034)
154. Kholodenko R, Kholodenko I, Sorokin V, Tolmazova A, Sazonova O, **Buzdin A** (2007). Anti-apoptotic effect of retinoic acid on retinal progenitor cells mediated by a protein kinase A-dependent mechanism. *Cell Res* 17 (2), 151–162, [10.1038/sj.cr.7310147](https://doi.org/10.1038/sj.cr.7310147)
155. **Buzdin AA** (2007). DNA hybridization in solution for mutation detection. , 211–239, [10.1007/978-1-4020-6040-39](https://doi.org/10.1007/978-1-4020-6040-39)
156. **Buzdin AA** (2007). Nucleic acids hybridization: Potentials and limitations. , 1–28, [10.1007/978-1-4020-6040-31](https://doi.org/10.1007/978-1-4020-6040-31)
157. **Buzdin AA**, Lukyanov SA (2007). Stem-loop oligonucleotides as hybridization probes and their practical use in molecular biology and biomedicine. , 85–96, [10.1007/978-1-4020-6040-34](https://doi.org/10.1007/978-1-4020-6040-34)
158. Lukyanov SA, Lukyanov KA, Gurskaya NG, Bogdanova EA, **Buzdin AA** (2007). Selective suppression of polymerase chain reaction and its most popular applications. , 29–51, [10.1007/978-1-4020-6040-32](https://doi.org/10.1007/978-1-4020-6040-32)
159. **Buzdin AA** (2007). Current attempts to improve the specificity of nucleic acids hybridization. , 241–264, [10.1007/978-1-4020-6040-310](https://doi.org/10.1007/978-1-4020-6040-310)
160. **Buzdin AA** (2007). Coincidence cloning: Robust technique for isolation of common sequences. , 187–210, [10.1007/978-1-4020-6040-38](https://doi.org/10.1007/978-1-4020-6040-38)
161. Lukyanov SA, Rebrikov D, **Buzdin AA** (2007). Suppression subtractive hybridization. , 53–84, [10.1007/978-1-4020-6040-33](https://doi.org/10.1007/978-1-4020-6040-33)
162. **Buzdin A**, Kovalskaya-Alexandrova E, Gogvadze E, Sverdlov E (2006). At least 50% of human-specific HERV-K (HML-2) long terminal repeats serve in vivo as active promoters for host nonrepetitive DNA transcription. *J Virol* 80 (21), 10752–10762, [10.1128/JVI.00871-06](https://doi.org/10.1128/JVI.00871-06)
163. **Buzdin A**, Kovalskaya-Alexandrova E, Gogvadze E, Sverdlov E (2006). GREM, a technique for genome-wide isolation and quantitative analysis of promoter active repeats. *Nucleic Acids Res* 34 (9), e67, [10.1093/nar/gkl335](https://doi.org/10.1093/nar/gkl335)
164. Kholodenko IV, **Buzdin AA**, Kholodenko RV, Baibikova JA, Sorokin VF, Yarygin VN, Sverdlov ED (2006). Mouse retinal progenitor cell (RPC) cocultivation with retinal pigment epithelial cell culture affects features of RPC differentiation. *Biochemistry (Mosc)* 71 (7), 767–774, [10.1134/S0006297906070091](https://doi.org/10.1134/S0006297906070091)
165. Kovalskaya E, **Buzdin A**, Gogvadze E, Vinogradova T, Sverdlov E (2006). Functional human endogenous retroviral LTR transcription start sites are located between the R and U5 regions. *Virology* 346 (2), 373–378, [10.1016/j.virol.2005.11.007](https://doi.org/10.1016/j.virol.2005.11.007)
166. **Buzdin A** (2006). Transposable elements and their use for target site specific gene delivery. *Current Pharmacogenomics* 4 (1), 1–8, [10.2174/157016006776055437](https://doi.org/10.2174/157016006776055437)
167. Gogvadze EV, **Buzdin AA** (2005). New mechanism of retrogene formation in mammalian genomes: In vivo Recombination during RNA reverse transcription. *Mol Biol (Mosk)* 39 (3), 364–373.
168. **Buzdin A**, Vinogradova T, Lebedev Y, Sverdlov E (2005). Genome-wide experimental identification and functional analysis of human specific retroelements. *Cytogenet Genome Res* 110 (14), 468–474, [10.1159/000084980](https://doi.org/10.1159/000084980)
169. Gogvadze EV, **Buzdin AA** (2005). A new mechanism of retrogene formation in mammalian genomes: In vivo recombination during RNA reverse transcription. *Mol Biol* 39 (3), 321–330, [10.1007/s11008-005-0045-5](https://doi.org/10.1007/s11008-005-0045-5)
170. Gogvadze EV, **Buzdin AA**, Sverdlov ED (2005). Multiple template switches on LINE-directed reverse

transcription: the most probable formation mechanism for the double and triple chimeric retroelements in mammals. *Bioorg Khim* 31 (1), 82–89.

171. Gogvadze EV, **Buzdin AA**, Sverdlov ED (2005). Multiple template switches on LINE-directed reverse transcription: The most probable formation mechanism for the double and triple chimeric retroelements in mammals. *Russ. J. Bioorganic Chem.* 31 (1), 74–81, [10.1007/s11171-005-0010-z](https://doi.org/10.1007/s11171-005-0010-z)
172. **Buzdin AA** (2004). Retroelements and formation of chimeric retrogenes. *Cell Mol Life Sci* 61 (16), 2046–2059, [10.1007/s00018-004-4041-z](https://doi.org/10.1007/s00018-004-4041-z)
173. Chalaya T, Gogvadze E, **Buzdin A**, Kovalskaya E, Sverdlov ED (2004). Improving specificity of DNA hybridization-based methods. *Nucleic Acids Res* 32 (16), e130, [10.1093/nar/gnh125](https://doi.org/10.1093/nar/gnh125)
174. **Buzdin A**, Gogvadze E, Kovalskaya E, Volchkov P, Ustyugova S, Illarionova A, Fushan A, Vinogradova T, Sverdlov E (2003). The human genome contains many types of chimeric retrogenes generated through in vivo RNA recombination. *Nucleic Acids Res* 31 (15), 4385–4390, [10.1093/nar/gkg496](https://doi.org/10.1093/nar/gkg496)
175. **Buzdin A**, Ustyugova S, Gogvadze E, Lebedev Y, Hunsmann G, Sverdlov E (2003). Genome-wide targeted search for human specific and polymorphic L1 integrations. *Hum Genet* 112 (56), 527–533, [10.1007/s00439-002-0904-2](https://doi.org/10.1007/s00439-002-0904-2)
176. **Buzdin A**, Ustyugova S, Khodosevich K, Mamedov I, Lebedev Y, Hunsmann G, Sverdlov E (2003). Human-specific subfamilies of HERV-K (HML-2) long terminal repeats: Three master genes were active simultaneously during branching of hominoid lineages. *Genomics* 81 (2), 149–156, [10.1016/S0888-7543\(02\)00027-7](https://doi.org/10.1016/S0888-7543(02)00027-7)
177. **Buzdin AA**, Lebedev YB, Sverdlov ED (2003). Human-Specific HERV-K Intron LTRs Have Nonaccidental Opposite Orientation Relative to the Direction of Gene Transcription and Might Be Involved in the Antisense Regulation of Gene Expression. *Russ. J. Bioorganic Chem.* 29 (1), 91–93, [10.1023/A:1022294906202](https://doi.org/10.1023/A:1022294906202)
178. **Buzdin AA**, Lebedev IB, Sverdlov ED (2003). Human genome-specific HERV-K intron LTR genes have a random orientation relative to the direction of transcription, and, possibly, participated in antisense gene expression regulation. *Bioorg Khim* 29 (1), 103–106.
179. Mamedov I, Batrak A, **Buzdin A**, Arzumanyan E, Lebedev Y, Sverdlov ED (2002). Genome-wide comparison of differences in the integration sites of interspersed repeats between closely related genomes. *Nucleic Acids Res* 30 (14), e71, [10.1093/nar/gnf071](https://doi.org/10.1093/nar/gnf071)
180. **Buzdin A**, Ustyugova S, Gogvadze E, Vinogradova T, Lebedev Y, Sverdlov E (2002). A new family of chimeric retrotranscripts formed by a full copy of U6 small nuclear RNA fused to the 3' terminus of L1. *Genomics* 80 (4), 402–406, [10.1006/geno.2002.6843](https://doi.org/10.1006/geno.2002.6843)
181. **Buzdin A**, Khodosevich K, Mamedov I, Vinogradova T, Lebedev Y, Hunsmann G, Sverdlov E (2002). A technique for genome-wide identification of differences in the interspersed repeats integrations between closely related genomes and its application to detection of human-specific integrations of HERV-K LTRs. *Genomics* 79 (3), 413–422, [10.1006/geno.2002.6705](https://doi.org/10.1006/geno.2002.6705)
182. Krieger IV, Revina LP, Kostina LI, **Buzdin AA**, Zalunin IA, Chestukhina GG, Stepanov VM (1999). Membrane Proteins of *Aedes aegypti* Larvae Bind Toxins Cry4B and Cry11A of *Bacillus thuringiensis* ssp. *israelensis*. *Biochemistry (Mosc)* 64 (10), 1163–1168.