

## Curriculum vitae: Sergei Lukyanov



### Address

Shemyakin–Ovchinnikov Institute of  
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Russia

### Contacts

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## IBCh positions

2016–to date	Head of department
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## IBCh memberships

Dissertation council

Scientific council

Certifying committee

## Awards

2015	Государственная премия в области науки и техники
2006	Премии РАН имени Ю.А. Овчинникова и именная золотая медаль
2012	Международная премия в области нанотехнологий RUSNANOPRISE

## Scientific interests

Sergei Lukyanov's basic scientific interests lie in the area of analysis of structure and functioning of eukaryotic genomes.

## Titles

Academician

Doctor of Science (Biological sciences)

## Publications

1. Britanova OV, Lupyr KR, Staroverov DB, Shagina IA, Aleksandrov AA, Ustyugov YY, Somov DV, Klimenko A, Shostak NA, Zvyagin IV, Stepanov AV, Merzlyak EM, Davydov AN, Izraelson M, Egorov ES, Bogdanova EA, Vladimirova AK, Iakovlev PA, Fedorenko DA, Ivanov RA, Skvortsova VI, **Lukyanov S**, Chudakov DM (2023). Targeted depletion of TRBV9+ T cells as immunotherapy in a patient with ankylosing spondylitis. *Nat Med* , , [10.1038/s41591-023-02613-z](https://doi.org/10.1038/s41591-023-02613-z)
2. Komech EA, Koltakova AD, Barinova AA, Minervina AA, Salnikova MA, Shmidt EI, Korotaeva TV, Loginova EY, Erdes SF, Bogdanova EA, Shugay M, **Lukyanov S**, Lebedev YB, Zvyagin IV (2022). TCR repertoire profiling revealed antigen-driven CD8+ T cell clonal groups shared in synovial fluid of patients with spondyloarthritis. *Front Immunol* 13, 973243, [10.3389/fimmu.2022.973243](https://doi.org/10.3389/fimmu.2022.973243)
3. Bryushkova EA, Skatova VD, Mutovina ZY, Zagrebneva AI, Fomina DS, Kruglova TS, Akopyan AA, Strazhesko ID, **Lukyanov SA**, Tkacheva ON, Lysenko MA, Chudakov DM (2022). Tocilizumab, netakimab, and baricitinib in patients with mild-to-moderate COVID-19: An observational study. *PLoS One* 17 (8), e0273340, [10.1371/journal.pone.0273340](https://doi.org/10.1371/journal.pone.0273340)

4. Goncharov MM, Bryushkova EA, Sharayev NI, Skatova VD, Baryshnikova AM, Sharonov GV, Karnaukhov V, Vakhitova MT, Samoylenko IV, Demidov LV, **Lukyanov S**, Chudakov DM, Serebrovskaya EO (2022). Pinpointing the tumor-specific T-cells via TCR clusters. *Elife* 11, , [10.7554/eLife.77274](https://doi.org/10.7554/eLife.77274)
5. Shelyakin PV, Lupyr KR, Egorov ES, Kofiadi IA, Staroverov DB, Kasatskaya SA, Kriukova VV, Shagina IA, Merzlyak EM, Nakonechnaya TO, Latysheva EA, Manto IA, Khaitov MR, **Lukyanov SA**, Chudakov DM, Britanova OV (2021). Naïve Regulatory T Cell Subset Is Altered in X-Linked Agammaglobulinemia. *Front Immunol* 12, 697307, [10.3389/fimmu.2021.697307](https://doi.org/10.3389/fimmu.2021.697307)
6. Izraelson M, Metsger M, Davydov AN, Shagina IA, Dronina MA, Obratsova AS, Miskevich DA, Mamedov IZ, Volchkova LN, Nakonechnaya TO, Shugay M, Bolotin DA, Staroverov DB, Sharonov GV, Kondratyuk EY, Zagaynova EV, **Lukyanov S**, Shams I, Britanova OV, Chudakov DM (2021). Distinct organization of adaptive immunity in the long-lived rodent *Spalax galili*. *Nat Aging* 1 (2), 179–189, [10.1038/s43587-021-00029-3](https://doi.org/10.1038/s43587-021-00029-3)
7. **(book)** Markvicheva KN, Bogdanova EA, Staroverov DB, **Lukyanov S**, Belousov VV (2019). Imaging of Intracellular Hydrogen Peroxide Production with HyPer upon Stimulation of HeLa Cells with EGF. *Methods Mol Biol* 1990, 85–91, [10.1007/978-1-4939-9463-2\\_7](https://doi.org/10.1007/978-1-4939-9463-2_7)
8. 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, Mitiouchkina 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)
9. Israelson MA, Stepanov AV, Staroverov DB, Shagina IA, Misorin AK, Schemeleva MA, Evstratieva AV, Merzlyak EM, Bogdanova EA, Britanova OV, **Lukyanov SA** (2018). Testing of monoclonal antibodies against the T-cell receptor associated with ankylosing spondylitis. *Bulletin of Russian State Medical University* 7 (5), 71–79, [10.24075/brsmu.2018.064](https://doi.org/10.24075/brsmu.2018.064)
10. Komech EA, Pogorelyy MV, Egorov ES, Britanova OV, Rebrikov DV, Bochkova AG, Shmidt EI, Shostak NA, Shugay M, **Lukyanov S**, Mamedov IZ, Lebedev YB, Chudakov DM, Zvyagin IV (2018). CD8+T cells with characteristic T cell receptor beta motif are detected in blood and expanded in synovial fluid of ankylosing spondylitis patients. *Rheumatology (Oxford)* 57 (6), 1097–1104, [10.1093/rheumatology/kex517](https://doi.org/10.1093/rheumatology/kex517)
11. Komech EA, Lebedev YB, Koshenkova AV, Syrko DS, Musatkina EA, **Lukyanov SA**, Chudakov DM, Zvyagin IV (2018). A study of the repertoire of activated T-cell clones obtained from a patient with ankylosing spondylitis. *Bulletin of Russian State Medical University* 7 (1), 65–73, [10.24075/brsmu.2018.001](https://doi.org/10.24075/brsmu.2018.001)
12. Shagin DA, Shagina IA, Zaretsky AR, Barsova EV, Kelmanson IV, **Lukyanov S**, Chudakov DM, Shugay M (2017). A high-throughput assay for quantitative measurement of PCR errors. *Sci Rep* 7 (1), 2718, [10.1038/s41598-017-02727-8](https://doi.org/10.1038/s41598-017-02727-8)
13. Bozhanova NG, Baranov MS, Klementieva NV, Sarkisyan KS, Gavrikov AS, Yampolsky IV, Zagaynova EV, **Lukyanov SA**, Lukyanov KA, Mishin AS (2017). Protein labeling for live cell fluorescence microscopy with a highly photostable renewable signal. *Chem Sci* 8 (10), 7138–7142, [10.1039/c7sc01628j](https://doi.org/10.1039/c7sc01628j)
14. Shagin DA, Turchaninova MA, Shagina IA, Shugay M, Zaretsky AR, Zueva OI, Bolotin DA, **Lukyanov S**, Chudakov DM (2017). Application of nonsense-mediated primer exclusion (NOPE) for preparation of unique molecular barcoded libraries. *BMC Genomics* 18 (1), 440, [10.1186/s12864-017-3815-2](https://doi.org/10.1186/s12864-017-3815-2)
15. Shugay M, Zaretsky AR, Shagin DA, Shagina IA, Volchenkov IA, Shelenkov AA, Lebedin MY, Bagaev DV, **Lukyanov S**, Chudakov DM (2017). MAGERI: Computational pipeline for molecular-barcoded targeted resequencing. *PLoS Comput Biol* 13 (5), e1005480, [10.1371/journal.pcbi.1005480](https://doi.org/10.1371/journal.pcbi.1005480)
16. Kaskova ZM, Dörr FA, Petushkov VN, Purtov KV, Tsarkova AS, Rodionova NS, Mineev KS, Guglya EB, Kotlobay A, Baleeva NS, Baranov MS, Arseniev AS, Gitelson JI, **Lukyanov S**, Suzuki Y, Kanie S, Pinto E, Mascio PD, Waldenmaier HE, Pereira TA, Carvalho RP, Oliveira AG, Oba Y, Bastos EL, Stevani CV, Yampolsky IV (2017). Mechanism and color modulation of fungal bioluminescence. *Sci Adv* 3 (4), e1602847, [10.1126/sciadv.1602847](https://doi.org/10.1126/sciadv.1602847)
17. Klementieva NV, Pavlikov AI, Moiseev AA, Bozhanova NG, Mishina NM, **Lukyanov SA**, Zagaynova EV, Lukyanov KA, Mishin AS (2017). Intrinsic blinking of red fluorescent proteins for super-resolution microscopy. *Chem Commun (Camb)* 53 (5), 949–951, [10.1039/c6cc09200d](https://doi.org/10.1039/c6cc09200d)

18. Ryumina AP, Serebrovskaya EO, Staroverov DB, Zlobovskaya OA, Shcheglov AS, **Lukyanov SA**, Lukyanov KA (2016). Lysosome-associated minisog as a photosensitizer for Mammalian cells. *Biotechniques* 61 (2), 92–94, [10.2144/000114445](https://doi.org/10.2144/000114445)
19. Serebrovskaya EO, Yuzhakova DV, Ryumina AP, Druzhkova IN, Sharonov GV, Kotlobay AA, Zagaynova EV, **Lukyanov SA**, Shirmanova MV (2016). Soluble OX40L favors tumor rejection in CT26 colon carcinoma model. *Cytokine* 84, 10–16, [10.1016/j.cyto.2016.05.005](https://doi.org/10.1016/j.cyto.2016.05.005)
20. Britanova OV, Shugay M, Merzlyak EM, Staroverov DB, Putintseva EV, Turchaninova MA, Mamedov IZ, Pogorelyy MV, Bolotin DA, Izraelson M, Davydov AN, Egorov ES, Kasatskaya SA, Rebrikov DV, **Lukyanov S**, Chudakov DM (2016). Dynamics of individual T Cell repertoires: From cord blood to centenarians. *J Immunol* 196 (12), 5005–5013, [10.4049/jimmunol.1600005](https://doi.org/10.4049/jimmunol.1600005)
21. Yuzhakova DV, Shirmanova MV, Lapkina IV, Serebrovskaya EO, **Lukyanov SA**, Zagaynova EV (2016). The effect of housing temperature on the growth of CT26 tumor expressing fluorescent protein EGFP. *Progress in Biomedical Optics and Imaging - Proceedings of SPIE* 9917, , [10.1117/12.2228524](https://doi.org/10.1117/12.2228524)
22. Klementieva NV, Lukyanov KA, Markina NM, **Lukyanov SA**, Zagaynova EV, Mishin AS (2016). Green-to-red primed conversion of Dendra2 using blue and red lasers. *Chem Commun (Camb)* 52 (89), 13144–13146, [10.1039/c6cc05599k](https://doi.org/10.1039/c6cc05599k)
23. Shirmanova M, Yuzhakova D, Snopova L, Perelman G, Serebrovskaya E, Lukyanov K, Turchin I, Subochev P, **Lukyanov S**, Kamensky V, Zagaynova E (2015). Towards PDT with genetically encoded photosensitizer killerred: A comparison of continuous and pulsed laser regimens in an animal tumor model. *PLoS One* 10 (12), e0144617, [10.1371/journal.pone.0144617](https://doi.org/10.1371/journal.pone.0144617)
24. Matlashov ME, Bogdanova YA, Ermakova GV, Mishina NM, Ermakova YG, Nikitin ES, Balaban PM, Okabe S, **Lukyanov S**, Enikolopov G, Zarsky 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)
25. Yuzhakova DV, Shirmanova MV, Serebrovskaya EO, Lukyanov KA, Druzhkova IN, Shakhov BE, **Lukyanov SA**, Zagaynova EV (2015). CT26 murine colon carcinoma expressing the red fluorescent protein KillerRed as a highly immunogenic tumor model. *J Biomed Opt* 20 (8), 88002, [10.1117/1.JBO.20.8.088002](https://doi.org/10.1117/1.JBO.20.8.088002)
26. Bilan DS, Shokhina AG, **Lukyanov SA**, Belousov VV (2015). Main cellular redox couples. *Russ. J. Bioorganic Chem.* 41 (4), 341–356, [10.1134/S1068162015040044](https://doi.org/10.1134/S1068162015040044)
27. Purtov KV, Petushkov VN, Baranov MS, Mineev KS, Rodionova NS, Kaskova ZM, Tsarkova AS, Petunin AI, Bondar VS, Rodicheva EK, Medvedeva SE, Oba Y, Oba Y, Arseniev AS, **Lukyanov S**, Gitelson JI, Yampolsky IV (2015). The Chemical Basis of Fungal Bioluminescence. *Angew Chem Int Ed Engl* 54 (28), 8124–8128, [10.1002/anie.201501779](https://doi.org/10.1002/anie.201501779)
28. Shirmanova MV, Druzhkova IN, Lukina MM, Matlashov ME, Belousov VV, Snopova LB, Prodanetz NN, Dudenkova VV, **Lukyanov SA**, Zagaynova EV (2015). Intracellular pH imaging in cancer cells in vitro and tumors in vivo using the new genetically encoded sensor SypHer2. *BIOCHIM BIOPHYS ACTA* 1850 (9), 1905–1911, [10.1016/j.bbagen.2015.05.001](https://doi.org/10.1016/j.bbagen.2015.05.001)
29. Bilan DS, **Lukyanov SA**, Belousov VV (2015). Genetically encoded fluorescent sensors for redox processes. *Russ. J. Bioorganic Chem.* 41 (3), 231–244, [10.1134/S106816201502003X](https://doi.org/10.1134/S106816201502003X)
30. Mishina NM, Mishin AS, Belyaev Y, Bogdanova EA, **Lukyanov S**, Schultz C, Belousov VV (2015). Live-cell STED microscopy with genetically encoded biosensor. *Nano Lett* 15 (5), 2928–2932, [10.1021/nl504710z](https://doi.org/10.1021/nl504710z)
31. Kleshnin M, Shirmanova M, Fiks I, Orlova A, Plekhanov V, Zagaynova E, **Lukyanov S**, Turchin I (2015). Trans-illumination fluorescence imaging of deep-seated tumors in small animals. *Photonics Lasers Med* 4 (1), 85–92, [10.1515/plm-2014-0024](https://doi.org/10.1515/plm-2014-0024)
32. Билан ДС, Шохина АГ, **Лукьянов СА**, Белоусов ВВ (2015). Основные редокс-пары клетки. 41 (4), 385–402.
33. Pereverzev AP, Gurskaya NG, Ermakova GV, Kudryavtseva EI, Markina NM, Kotlobay AA, **Lukyanov SA**, Zarsky 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)
34. Druzhkova I, Shirmanova M, Lukina M, Dudenkova V, Sergeeva T, Belousov V, **Lukyanov S**, Zagaynova E (2015). Registration of intracellular pH in cancer cells with genetically encoded ratiometric sensor. *Progress in Biomedical Optics and Imaging - Proceedings of SPIE* 9537, , [10.1117/12.2184756](https://doi.org/10.1117/12.2184756)

35. Shugay M, **Lukyanov S**, Chudakov DM (2015). Sequencing rare T-cell populations. *Oncotarget* 6 (37), 39393–39394, [10.18632/oncotarget.6349](https://doi.org/10.18632/oncotarget.6349)
36. Kuznetsova DS, Shirmanova MV, Dudenkova VV, Subochev PV, Turchin IV, Zagaynova EV, **Lukyanov SA**, Shakhov BE, Kamensky VA (2015). Photobleaching and phototoxicity of KillerRed in tumor spheroids induced by continuous wave and pulsed laser illumination. *J Biophotonics* 8 (1112), 952–960, [10.1002/jbio.201400130](https://doi.org/10.1002/jbio.201400130)
37. Baranov MS, Solntsev KM, Baleeva NS, Mishin AS, **Lukyanov SA**, Lukyanov KA, Yampolsky IV (2014). Red-Shifted Fluorescent Aminated Derivatives of a Conformationally Locked GFP Chromophore. *Chemistry* 20 (41), 13234–13241, [10.1002/chem.201403678](https://doi.org/10.1002/chem.201403678)
38. Serebrovskaya EO, Ryumina AP, Boulina ME, Shirmanova MV, Zagaynova EV, Bogdanova EA, **Lukyanov SA**, Lukyanov KA (2014). Phototoxic effects of lysosome-associated genetically encoded photosensitizer killer red. *J Biomed Opt* 19 (7), 071403, [10.1117/1.JBO.19.7.071403](https://doi.org/10.1117/1.JBO.19.7.071403)
39. Britanova OV, Putintseva EV, Shugay M, Merzlyak EM, Turchaninova MA, Staroverov DB, Bolotin DA, **Lukyanov S**, Bogdanova EA, Mamedov IZ, Lebedev YB, Chudakov DM (2014). Age-Related decrease in TCR repertoire diversity measured with deep and normalized sequence profiling. *J Immunol* 192 (6), 2689–2698, [10.4049/jimmunol.1302064](https://doi.org/10.4049/jimmunol.1302064)
40. Shugay M, Britanova OV, Merzlyak EM, Turchaninova MA, Mamedov IZ, Tuganbaev TR, Bolotin DA, Staroverov DB, Putintseva EV, Plevova K, Linnemann C, Shagin D, Pospisilova S, **Lukyanov S**, Schumacher TN, Chudakov DM (2014). Towards error-free profiling of immune repertoires. *Nat Methods* 11 (6), 653–655, [10.1038/nmeth.2960](https://doi.org/10.1038/nmeth.2960)
41. Mironova KE, Proshkina GM, Ryabova AV, Stremovskiy OA, **Lukyanov SA**, Petrov RV, Deyev SM (2013). Genetically encoded immunophotosensitizer 4D5scFv-miniSOG is a highly selective agent for targeted photokilling of tumor cells in vitro. *Theranostics* 3 (11), 831–840, [10.7150/thno.6715](https://doi.org/10.7150/thno.6715)
42. Klementyeva NV, Shirmanova MV, Serebrovskaya EO, Fradkov AF, Meleshina AV, Snopova LB, Prodanets NN, **Lukyanov SA**, Zagaynova EV (2013). In vivo bioluminescence imaging of tumor cells using optimized firefly luciferase luc2. *Sovrem Tekhnologii Med* 5 (3), 6–13.
43. Shirmanova MV, Serebrovskaya EO, Snopova LB, Kuznetsova MM, Ryumina AP, Turchin IV, Sergeeva EA, Ignatova NI, Klementyeva NV, Lukyanov KA, **Lukyanov SA**, Zagaynova EV (2013). KillerRed and miniSOG as genetically encoded photosensitizers for photodynamic therapy of cancer. *Progress in Biomedical Optics and Imaging - Proceedings of SPIE* 8803, , [10.1117/12.2032552](https://doi.org/10.1117/12.2032552)
44. Ryumina AP, Serebrovskaya EO, Shirmanova MV, Snopova LB, Kuznetsova MM, Turchin IV, Ignatova NI, Klementyeva NV, Fradkov AF, Shakhov BE, Zagaynova EV, Lukyanov KA, **Lukyanov SA** (2013). Flavoprotein miniSOG as a genetically encoded photosensitizer for cancer cells. *BIOCHIM BIOPHYS ACTA* 1830 (11), 5059–5067, [10.1016/j.bbagen.2013.07.015](https://doi.org/10.1016/j.bbagen.2013.07.015)
45. Mishina NM, Markvicheva KN, Fradkov AF, Zagaynova EV, Schultz C, **Lukyanov S**, Belousov VV (2013). Imaging H2O2 microdomains in receptor tyrosine kinases signaling. *Methods Enzymol* 526, 175–187, [10.1016/B978-0-12-405883-5.00011-9](https://doi.org/10.1016/B978-0-12-405883-5.00011-9)
46. Mishina NM, Markvicheva KN, Bilan DS, Matlashov ME, Shirmanova MV, Liebl D, Schultz C, **Lukyanov S**, Belousov VV (2013). Visualization of intracellular hydrogen peroxide with HyPer, a genetically encoded fluorescent probe. *Methods Enzymol* 526, 45–59, [10.1016/B978-0-12-405883-5.00003-X](https://doi.org/10.1016/B978-0-12-405883-5.00003-X)
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49. Bilan DS, Pase L, Joosen L, Gorokhovatsky AY, Ermakova YG, Gadella TWJ, Grabher C, Schultz C, **Lukyanov S**, Belousov VV (2013). HyPer-3: A genetically encoded H2O2 probe with improved performance for ratiometric and fluorescence lifetime imaging. *ACS Chem Biol* 8 (3), 535–542, [10.1021/cb300625g](https://doi.org/10.1021/cb300625g)
50. Shirmanova MV, Serebrovskaya EO, Lukyanov KA, Snopova LB, Sirotkina MA, Prodanetz NN, Bugrova ML, Minakova EA, Turchin IV, Kamensky VA, **Lukyanov SA**, Zagaynova EV (2013). Phototoxic effects of



- fluorescent protein KillerRed on tumor cells in mice. *J Biophotonics* 6 (3), 283–290, [10.1002/jbio.201200056](https://doi.org/10.1002/jbio.201200056)
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  52. Belova AS, Mishina NM, Orlova AG, Sergeeva YA, Maslennikova AV, Brilkina AA, Shakhova NM, Belousov VV, **Lukyanov SA** (2013). The study of cisplatin effect on hydrogen peroxide and pH level in HeLa Kyoto cell line using genetically-encoded sensors. *Sovrem Tekhnologii Med* 5 (4), 19–22.
  53. 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**, Zarausky 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)
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  55. Bolotin DA, Mamedov IZ, Britanova OV, Zvyagin IV, Shagin D, Ustyugova SV, Turchaninova MA, **Lukyanov S**, Lebedev YB, Chudakov DM (2012). Next generation sequencing for TCR repertoire profiling: Platform-specific features and correction algorithms. *Eur J Immunol* 42 (11), 3073–3083, [10.1002/eji.201242517](https://doi.org/10.1002/eji.201242517)
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