

- 2017; 12 (6): e0179258. <https://doi.org/10.1371/journal.pone.0179258>.
61. Cao Z., Bhella D., Lindsay J.G. Reconstitution of the mitochondrial PrxIII antioxidant defence pathway: general properties and factors affecting PrxIII activity and oligomeric state. *J Mol Biol.* 2007; 372 (4): 1022–33. <https://doi.org/10.1016/j.jmb.2007.07.018>.
62. Zhen W.Q., Xie Z.Z., Wang X., et al. Influences of PON1 on airway inflammation and remodeling in bronchial asthma. *J Cell Biochem.* 2018; 119 (1): 793–805. <https://doi.org/10.1002/jcb.26242>.
63. Amatullah H., Maron-Gutierrez T., Shan Y., et al. Protective function of DJ-1/PARK7 in lipopolysaccharide and ventilator-induced acute lung injury. *Redox Biol.* 2021; 38: 101796. <https://doi.org/10.1016/j.redox.2020.101796>.
64. Richarme G., Liu C., Mihoub M., et al. Guanine glycation repair by DJ-1/Park7 and its bacterial homologs. *Science.* 2017; 357 (6347): 208–11. <https://doi.org/10.1126/science.aag1095>.
65. Jang B.C., Sung S.H., Park J.G., et al. Glucosamine hydrochloride specifically inhibits COX-2 by preventing COX-2 N-glycosylation and by increasing COX-2 protein turnover in a proteasome-dependent manner. *J Biol Chem.* 2007; 282 (38): 27622–32. <https://doi.org/10.1074/jbc.M610778200>.
66. Gromova O.A., Torshin I.Yu., Lila A.M., et al. Differential chemoreactom analysis of glucosamine sulfate and nonsteroidal anti-inflammatory drugs: promising synergistic drug combinations. *Modern Rheumatology Journal.* 2018; 12 (2): 36–43 (in Russ.). <https://doi.org/10.14412/1996-7012-2018-2-36-43>.
67. Song P., Xie Z., Wu Y., et al. Protein kinase ζ -dependent LKB1 serine 428 phosphorylation increases LKB1 nucleus export and apoptosis in endothelial cells. *J Biol Chem.* 2008; 283 (18): 12446–55. <https://doi.org/10.1074/jbc.M708208200>.
68. Cheng X., Ma Y., Moore M., et al. Phosphorylation and activation of cAMP-dependent protein kinase by phosphoinositide-dependent protein kinase. *Proc Natl Acad Sci USA.* 1998; 95 (17): 9849–54. <https://doi.org/10.1073/pnas.95.17.9849>.
69. Reimold A.M., Iwakoshi N.N., Manis J., et al. Plasma cell differentiation requires the transcription factor XBP-1. *Nature.* 2007; 447 (7142): 710–4. <https://doi.org/10.1038/447710a>.
70. Ronkina N., Menon M.B., Schwermann J., et al. MAPKAP kinases MK2 and MK3 in inflammation: complex regulation of TNF biosynthesis via expression and phosphorylation of tristetraprolin. *Biochem Pharmacol.* 2010; 80 (12): 1915–20. <https://doi.org/10.1016/j.bcp.2010.06.021>.
71. Fan C., Rajasekaran D., Syed M.A., et al. MIF intersubunit disulfide mutant antagonist supports activation of CD74 by endogenous MIF trimer at physiologic concentrations. *Proc Natl Acad Sci USA.* 2013; 110 (27): 10994–9. <https://doi.org/10.1073/pnas.1221817110>.
72. Aung G., Niyonsaba F., Ushio H., et al. Catestatin, a neuroendocrine antimicrobial peptide, induces human mast cell migration, degranulation and production of cytokines and chemokines. *Immunology.* 2011; 132 (4): 527–39. <https://doi.org/10.1111/j.1365-2567.2010.03395.x>.
73. Keegan A.D., Nelms K., White M., et al. An IL-4 receptor region containing an insulin receptor motif is important for IL-4-mediated IRS-1 phosphorylation and cell growth. *Cell.* 1994; 76 (5): 811–20. [https://doi.org/10.1016/0092-8674\(94\)90333-3](https://doi.org/10.1016/0092-8674(94)90333-3).
74. Harashima S., Horiuchi T., Wang Y., et al. Sorting nexin 19 regulates the number of dense core vesicles in pancreatic β -cells. *J Diabetes Investig.* 2012; 3 (1): 52–61. <https://doi.org/10.1111/j.2040-1124.2011.00138.x>.
75. Torshin I.Yu., Lila A.M., Gromov A.V., et al. Meta-analysis of clinical trials of the effectiveness of treatment of osteoarthritis with Chondrogard. *FARMAKOEKONOMIKA. Sovremennaya farmakoeconomika i farmakoepidemiologiya / PHARMACOECONOMICS. Modern Pharmacoeconomics and Pharmacoepidemiology.* 2020; 13 (4): 18–24 (in Russ.). <https://doi.org/10.17749/2070-4909/farmakoeconomika.2020.066>.
76. Gromova O.A., Torshin I.Yu., Zaichik B.Ts., et al. Differences in the standardization of medicinal products based on extracts of chondroitin sulfate. *FARMAKOEKONOMIKA. Sovremennaya farmakoeconomika i farmakoepidemiologiya / PHARMACOECONOMICS. Modern Pharmacoeconomics and Pharmacoepidemiology.* 2021; 14 (1): 40–52 (in Russ.). <https://doi.org/10.17749/2070-4909/farmakoeconomika.2021.083>.

Сведения об авторах

Торшин Иван Юрьевич – к.ф.-м.н., к.х.н., старший научный сотрудник ФИЦ «Информатика и управление» РАН (Москва, Россия). ORCID ID: <https://orcid.org/0000-0002-2659-7998>; WoS ResearcherID: C-7683-2018; Scopus Author ID: 7003300274; РИНЦ SPIN-код: 1375-1114.

Громова Ольга Алексеевна – д.м.н., профессор, научный руководитель ФИЦ «Информатика и управление» РАН (Москва, Россия). ORCID ID: <https://orcid.org/0000-0002-7663-710X>; WoS ResearcherID: J-4946-2017; Scopus Author ID: 7003589812; РИНЦ SPIN-код: 6317-9833. E-mail: unesco.gromova@gmail.com.

Чучалин Александр Григорьевич – д.м.н., профессор, академик РАН, пульмонолог, заведующий кафедрой госпитальной терапии педиатрического факультета ФГАОУ ВО «Российский национальный исследовательский медицинский университет им. Н.И. Пирогова» Минздрава России (Москва, Россия). ORCID ID: <https://orcid.org/0000-0002-5070-5450>; РИНЦ SPIN-код: 7742-2054.

About the authors

Ivan Yu. Torshin – PhD (Phys. Math.), PhD (Chem.), Senior Researcher, Federal Research Center “Informatics and Management”, RAS (Moscow, Russia). ORCID ID: <https://orcid.org/0000-0002-2659-7998>; WoS ResearcherID: C-7683-2018; Scopus Author ID: 7003300274; RSCI SPIN-code: 1375-1114.

Olya A. Gromova – Dr. Med. Sc., Professor, Research Supervisor, Federal Research Center “Informatics and Management”, RAS (Moscow, Russia). ORCID ID: <https://orcid.org/0000-0002-7663-710X>; WoS ResearcherID: J-4946-2017; Scopus Author ID: 7003589812; RSCI SPIN-code: 6317-9833. E-mail: unesco.gromova@gmail.com.

Aleksandr G. Chuchalin – Dr. Med. Sc., Professor, Academician of RAS, Pulmonologist, Chief of Chair of Hospital Therapy, Faculty of Pediatrics, Pirogov Russian National Research Medical University (Moscow, Russia). ORCID ID: <https://orcid.org/0000-0002-5070-5450>; RSCI SPIN-code: 7742-2054.