November 4, 2024

CURRICULUM VITAE
MARIA M. BAYLIAK

Professor, Ph.D., D.Sc., Head of Department of Biochemistry and Biotechnology, Vasyl Stefanyk Precarpathian National University (PNU)

Research profiles

SCOPUS https://www.scopus.com/authid/detail.uri?authorId=23494636700, h-13

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Linkedin https://www.linkedin.com/in/maria-bayliak-005b6630/

Goggle Scholar https://scholar.google.com/citations?user=ErcNDtkAAAAJ&hl=uk&oi=ao

I. PERSONL/CONTACT DETAILS

Ukrainian, 1981
Work address: Department of Biochemistry and Biotechnology, Vasyl Stefanyk Precarpathian National University, 57 Shevchenko Str., Ivano-Frankivsk, 76018, Ukraine.
Phone: +38(0342)596171
E-mail: bayliak@ukr.net, maria.bayliak@pnu.edu.ua
Languages: Ukrainian, English (professional working proficiency)
Hobbies: embroidering, travelling, reading adventure and detective stories

II. EDUCATION

2014-2017 Doctorate student, Department of Biochemistry and Biotechnology, PNU. **Thesis title:** "Enhancement of the adaptive capacity of the yeast *Saccharomyces cerevisiae* and the fruit fly *Drosophila melanogaster* by using plant extracts, keto acids, and arginine", Thesis for a scientific degree of **doctor of biological sciences** by specialty "Biochemistry", defended at Yurij Fed'kovych Chernivtsi National University, Ukraine (December, 2019). Supervisor: Prof. Volodymyr Lushchak, Head of Department of Biochemistry and Biotechnology, PNU.

2003-2006 Postgraduate student, Department of Biochemistry, PNU. **PhD thesis in Biochemistry:** "Peculiarities of antioxidant defense of the yeast *Saccharomyces cerevisiae* at the different growth phases", defended at Yurij Fed'kovych Chernivtsi National University, Ukraine (October, 2007). Supervisor: Prof. Volodymyr Lushchak, Head of Department of Biochemistry, PNU.

1998-2003 Student, Department of Biology, PNU. **M.Sc. Thesis (in Biology)**: "Biomorphological peculiarities of *Convallaria majalis* in Precarpathian region", May 2002 – May 2003. Supervisor: Dr. Nadija V. Shums'ka, Department of Biology, PNU.

III. TEACHING EXPERIENCE

2022-present Head of Biochemistry and Biotechnology Dept., PNU. **Theoretical and practical courses:** "Microbiology", "Virology", "Molecular Biology", "Basics of neuropathology", "Bioethics and Biosafety", "Neurobiology", "Pathophysiology of obesity", "Neuroscience in education", "Human and animal physiology".

2020-2022 Professor, Biochemistry and Biotechnology Dept., PNU. **Theoretical and practical courses:** "Biologically active natural compounds", "Practicum on Biochemistry", "Microbiology", "Virology", "Molecular Biology".

2008-2020 Associate Professor, Biochemistry and Biotechnology Dept., PNU. **Theoretical and practical courses:** "Biologically active natural compounds", "Practicum on Biochemistry", "Microbiology", "Virology", "Molecular Biology".

2006-2008 Assistant of Professor, Biochemistry Dept., PNU. **Theoretical and practical courses:** "Biochemistry" (practice), "Microbiology" (practice), "Virology" ((seminars), "Molecular Biology" (practice), "Hydrobiology" (lectures & practice), "Ichthyology" (lectures & practice).

IV. PROFESSIONAL EXPERIENCE / TRAINING / SCHOLARSHIPS / GRANTS:

Trainings

21-25 10/2024 Participant of Una Europa Staff week "Embracing AI for Professional Development", 17 hours, Jagiellonian University in Krakow (Poland)

June 2024 Training course "University of the Future: Secrets of successful management in education", 15 hours (0.5 ECTS credits), Vasyl Stefanyk Precarpathian National University

02/2023-05/2023 Participant of the courses "Molecular and Cellular Neurophysiology" - 30 hours (1 ECTS credit), "Mastering online teaching of life science" - 30 hours (1 ECTS credit). in the project "Modular online course „Integrative Life Sciences" for Ukrainian biology students", funded by the German Academic Exchange Service (DAAD) within the framework of the program "Ukraine digital: Ensuring academic success in times of crisis 2023".

September 2022 Online courses "Google Digital Tools for Education". Basic level - 30 hours (1 ECTS credit). Intermediate level – 15 h (0.5 ECTS credit)

June 6-30, 2019 Attendance at DAAD Summer School "Perspectives in Biomedicine with a Focus on Cancer Immunotherapy", PNU, Ivano-Frankivsk, Ukraine.

February 11-15, 2019 Training at PolLASA courses on breeding, maintenance, welfare and use of laboratory animals (Polish Laboratory Animals Science Association, Warsaw, Poland)

May 25 – June 4, 2011 Attendance at IV Summer School "Molecular microbiology and biotechnology", Odesa I.I. Mechnykov National University, Odesa, Ukraine.

Scholarships and Grants

09/2024-12/2024 Participation in the project "Advanced inter-university life science block for Ukrainian biology students", funded by the German Academic Exchange Service (DAAD) within the framework of the program "Ukraine digital: Ensuring academic success in times of crisis 2024". The role in the project is a co-lecturer of the courses "Microbes, Viruses and Infections" and "Bioethics and Biosafety: practical aspects".

03/2023 – 12/2025 Implementation of the project funded by Ministry of Education and Science of Ukraine: Searching for markers of post-traumatic stress disorder based on oxidative stress and inflammation (#0123U101790, 2023-2024) (project leader).

02/2023-12/2023 Participation in the project "Modular online course „Integrative Life Sciences" for Ukrainian biology students", funded by the German Academic Exchange Service (DAAD) within the framework of the program "Ukraine digital: Ensuring academic success in times of crisis 2023". The role in the project is a lecturer of the course "Microbes, Viruses and Infections".

09/2022-12/2022 Participation in the project "Blended course "integrative life sciences" for Ukrainian biology students", funded by the German Academic Exchange Service (DAAD) within the framework of the program "Ukraine digital: Ensuring academic success in times of crisis". The role of the project is a lecturer of the Molecular Biology course.

01/2022 – 04/2023 Researcher in the project funded by Ministry of Education and Science of Ukraine: "Correction of metabolic syndrome by sulforaphane-enriched preparations of broccoli sprouts" (#0122U000894). Project leader – Prof. Volodymyr Lushchak.

11/020 – 11/2023 Implementation of the project funded by National Research Fund of Ukraine "Intermediates of phenylpropanoid pathway as substances to prolong lifespan and healthspan» (#2020.02/0118, 2020-2023) (project leader).

May, 2021 Winner of the Small Research Grant Application (2021) program from the US-Ukraine Foundation Biotech Initiative

01/2018-12/2020 Researcher in the project funded by Ministry of Education and Science of Ukraine: "Development of new non-medicinal methods for correction of metabolic syndrome: normalization of physiological and biochemical indices in animals" (#0118U003477). Project leader – Prof. V. Lushchak.

04/2018-02/2020 Post-doc in the project "Cellular mechanisms of healthy brain ageing under caloric restriction" (#90233) in the framework "Trilateral Partnerships – Cooperation Projects between Scholars and Scientists from Ukraine, Russia and Germany" funded by Volkswagenstiftung, German. (Project leader of Ukrainian team– Prof. V. Lushchak).

June 1-30, 2009 Scholarship from Queen Jadwiga Fund was received for the realization of research project "Budding yeast *Saccharomyces cerevisiae* as a model to study role of oxidative stress in ageing". The experimental work was done at the Faculty of Biochemistry, Biophysics and Biotechnology of Jagiellonian University (Krakow, Poland).

01/2009-12/2011 Researcher in the project funded by Ministry of Education and Science of Ukraine: "Regulation of free radical processes under response of living organisms to harmful environmental factors" (#0109U001412). Project leader – Prof. V. Lushchak.

05/2008-12/2008 Researcher in the project funded by the State Fund for Fundamental Research of Ukraine (SFSF): "Adaptation of the yeast *Saccharomyces cerevisiae* to free radicals" (05.2008-06.2009, #0108U006932). Project leader – Prof. V. Lushchak.

10/2006-12/2006, 6/2007-12/2007 Researcher in projects funded by the SFSF: "Yeast *Saccharomyces cerevisiae* as a model to study the effects of carbonate radical on eukaryotic cells", "Adaptive response of the yeast *Saccharomyces cerevisiae* to carbonic radical effect" (#0107U009804); "Toxicity of iron and copper ions in the presence of carbonates" (#0107U009805). Project leader – Prof. V. Lushchak.

V. LABORATORY METHODS (PROFICIENCY):

Microbiological methods: light microscopy, cultivation of microorganisms, isolation of pure microbial cultures, study of physiological and biochemical properties of microorganisms (yeast), determination of life span of yeast cells.

Physiological methods: fruit fly *D. melanogaster* maintaining and lifespan assay; fruit fly age-related functional declines (fecundity, mobility, sensitivity to stresses, etc.), mouse housing, behavior reactions in mice.

Biochemical and molecular biology methods: preparation of tissue and cell extracts, enzyme activities assays, measurement of contents of major metabolites; protein and DNA electrophoresis; western blot; classical PCR and RT-PCR; classical histology; blood chemistry and blood enzyme tests; urine analysis; ELISA assay; spectrophotometric determination of antioxidant properties of plant compounds and major markers of oxidative stress, and fluorometrical assays of metabolites and reactive oxygen species.

VI. SCIENTIFIC INTERESTS AND CURRENT RESEARCH WORK

- Biochemical and molecular aspects of adaptation of living organisms (yeast, *Drosophila*, mice) to environmental conditions, in particular to oxidative stress
- Aging and anti-aging approaches
- Free radicals, oxidative stress and antioxidants

- Antioxidant, adaptogenic, antiglycemic, stress-protective, neuroprotective, and geroprotective effects and detoxifying properties of natural products (alpha-ketoglutarate, arginine, quercetin, plant extracts, etc.) on fruit fly *Drosophila melanogaster* and mice
- Metabolic syndrome and obesity prevention and treatment (on fruit flies and mice)
- Brain aging
- Functions of Nrf2 та Keap1 proteins
- Post-traumatic stress disorder in the mouse model

Supervision of undergraduate and post-graduate students

I supervise students who do research on two model objects: mice and fruit flies, as well as on kombucha. Under my guidance, students have won several times the All-Ukrainian competition of student research papers in the field of "Biological Sciences": Nadiia Burdyliuk and Khrystyna Hryshuk in 2013 (III place), Maria Lilyk in 2015 (III place), Oleh Demianchuk and Nataliia Butenko in 2018 (II place), Oleh Demianchuk and Mariana Sitko in 2019 (I place). Students also regularly participate in scientific conferences, which is confirmed by published abstracts and co-authorship of articles in professional journals in Ukraine and abroad.
Student Anna Okhovych received academic scholarship of the President of Ukraine in 2023, scholarship of the Institute of East European Studies Foundation in 2023.

Post-graduate students

2024 - present Andrii Divnych, Oles Luhovyi, Stanislav Tymochkin

2023 - present Vitalii Derkachov

2014-2017 Maria Lylyk, PhD thesis "Protective effect of alpha-ketoglutarate in the fruit fly *Drosophila melanogaster* under the influence of xenobiotics", 03.00.04 - Biochemistry, defended in 2022.

VII. AWARDS

2022 – Diploma of mayor of Ivano-Frankivsk on the occasion of the 20th anniversary of the department of Biochemistry and Biotechnology
2021 – Order of Princess Olga of the third grade
2020 – Diploma of PNU for high professionalism, conscientious work and on the occasion of celebrating the 80th anniversary of the university
2018 – Laureate of Ukrainian L'Oréal-UNESCO program "For women in science 2018"
2017 – Diploma of Ivano-Frankivsk state administration and head of district council, Ivano-Frankivsk, Ukraine
2016 – Diploma of PNU for significant achievements in research work

VIII. VOLUNTEER AND OTHER ACTIVITIES

Academic Editor in the Journal "Biomed Research International" (since 2020)
Editor of Journal of Vasyl Stefanyk Precarpathian University ("Series of Biology") (2015 - present)

Jury member of National Biological and Ecological Olympiads (since 2011)
Jury member of Contest of research works of members of Junior Academy of Sciences (2015)
Jury member of National Tournament for Young Biologists (2012-2020)
Member of Organizing Committee and Lecturer at Carpathian Summer School in Biochemistry held annually at Department of Biochemistry and Biotechnology, PNU (2013-2019)
Member of Organizing Committee and Lecturer at Autumn School for Young Biochemists held annually at Department of Biochemistry and Biotechnology, PNU (since 2013)
Member of the jury of the competition "Implementing Sustainable Development Goals at the School Level", which lasted from December 2023 to April 2014 and was organized by Epson

Membership in Ukrainian Biochemical Society (since 2015)

Reviewer in the Journals (periodically):

Annals of Microbiology, Biocatalysis and Agricultural Biotechnology, Biology open, Brazilian Journal of Pharmaceutical Sciences, Drug and Chemical Toxicology, FASEB Journal, Industrial Crops and Products, Journal of Experimental Biology, Journal of Food Biochemistry, Neurotoxicity Research, Oxidative Medicine And Cell Longevity, PLOS ONE, Preparative Biochemistry and Biotechnology, The Journal of Basic and Applied Zoology, Journal of Pure and Applied Microbiology, Ageing and Disease, Antonie van Leeuwenhoek, Applied Microbiology and Biotechnology, Biochemistry and Biophysics Reports, BMC Complementary and Alternative Medicine, Molecular & Cellular Toxicology, Pharmaceutical Biology, National Academy Science Letters, Journal of Insect Physiology, Environmental Toxicology and Pharmacology, Critical Reviews in Biotechnology, Experimental Biology and Medicine, Journal of Microbiology, Biotechnology and Food Sciences, BBA - General Subjects, Ecotoxicology, Scientific Reports, Heliyon, Mutation Research, Natural Product Research, Molecular and Cellular Biochemistry, Lipids, Medical Oncology, Frontiers in Pharmacology, Aging Cell, Biofactors, Neuroprotection, Journal of Applied Toxicology, Plant Foods for Human Nutrition, ACS Omega, British Journal of Pharmacology, Journal of Applied Microbiology, International Journal of Biological Macromolecules, Journal of Food Quality, Food Bioscience, International Journal of Endocrinology, Letters in Applied Microbiology, Photochemistry and Photobiology, Journal of Applied Entomology, SAGE Open Medicine, LWT, Insect Biochemistry and Physiology, Journal of Nutrition and Metabolism, Food Research International, Brain X.

Review of research project

SPS Research Open call 2020 (France)

IX. Publications

Papers: monograph – 1, monograph chapters – 5, articles in Scopus – 49 (68 articles in total). Abstracts – 60. h-index in the SCOPUS database – 17.

List of publications

Monograph and monograph chapters

1. Strilbytska O., **Bayliak M**., Lushchak O., Lushchak V. Laboratory mouse in the study of post-traumatic stress disorder. Practical recommendations: study guide for students and postgraduate students of specialty 091 Biology and Biochemistry, PNU. 1st ed. Ivano-Frankivsk, PE Goliney O., 2024. 124 pp. [in Ukrainian]
2. Lushchak O., Gospodaryov D., Strilbytska O., **Bayliak M**. Changing ROS, NAD and AMP: A path to longevity via mitochondrial therapeutics. In: Advances in protein chemistry and structural biology, 2023. Vol. 136. P. 157–196. https://doi.org/10.1016/bs.apcsb.2023.03.005 (SCOPUS) Q1
3. Husak V., **Bayliak M**. Molecular Mechanisms of Chromium Tolerance in Plants: A Key Role of Antioxidant Defense. In: Kumar, N., Walther, C., Gupta, D.K. (eds) Chromium in Plants and Environment. Environmental Science and Engineering. Springer, Cham, 2023. https://doi.org/10.1007/978-3-031-44029-8_16
4. **Bayliak M.M.**, Abrat O.B. Role of Nrf2 in Oxidative and Inflammatory Processes in Obesity and Metabolic Diseases. In: Deng H. (eds) Nrf2 and its Modulation in Inflammation. Progress in Inflammation Research, vol 85. Springer, Cham, 2020. P. 153-187. https://doi.org/10.1007/978-3-030-44599-7_7 (SCOPUS)
5. Stambulska U.Y., **Bayliak M.M**. Legume-Rhizobium Symbiosis: Secondary Metabolites, Free Radical Processes, and Effects of Heavy Metals. In: Merillon JM., Ramawat K. (eds) Co-Evolution of Secondary Metabolites. Reference Series in Phytochemistry. Springer, Cham, 2020. P. 291-322. https://doi.org/10.1007/978-3-319-96397-6_43 (SCOPUS)
6. Semchyshyn H.M., **Bayliak M.M.**, Lushshak V.I. Starvation in yeast: biochemical aspects. In: Biology of starvation in human and other organisms / Edited by T.C. Merkin. Nova Science Publishers, Inc., 2011. Chapter 2. P. 103-150) (SCOPUS)

Review and experimental articles

2024

1. Demianchuk O., Vatashchuk M., Gospodaryov D., Hurza V., Ivanochko M., Derkachov V., Berezovskyi V., Lushchak O., Storey K. B., **Bayliak M**., Lushchak, V. I. High-fat high-fructose diet and alpha-ketoglutarate affect mouse behavior that is accompanied by changes in oxidative stress response and energy metabolism in the cerebral cortex. *Biochimica et biophysica acta. General subjects*. 2024. Vol. 1868(1), 130521. https://doi.org/10.1016/j.bbagen.2023.130521 Q1

2. Vatashchuk M. V., Hurza V. V., Stefanyshyn N., **Bayliak M. M**., Gospodaryov D. V., Garaschuk O., Lushchak V. I. (2024). Impact of caloric restriction on oxidative stress and key glycolytic enzymes in the cerebral cortex, liver and kidney of old and middle-aged mice. *Neuropharmacology*. 2024. Vol. 247, 109859. https://doi.org/10.1016/j.neuropharm.2024.109859 Q1

3. Demianchuk O., Lylyk M., Balatskiy V., Gospodaryov D., **Bayliak M**. Alpha-ketoglutarate supplementation in long-lived Drosophila melanogaster: Impact on lifespan and metabolic responses. *Archives of Insect Biochemistry and Physiology*. 2024. Vol. 116(1), e22116. https://doi.org/10.1002/arch.22116 O2

4. Derkachov V.P., **Bayliak M. M**. The effect of cafeteria diet and social isolation on some biochemical, physiological and behavior parameters in mice. *Biotechnologia Acta*. 2024. Vol. 17, N2. P. 29-32.

2023

5. Vatashchuk M. V., **Bayliak M. M.**, Hurza V. V., Demianchuk O. I., Gospodaryov D. V., Lushchak, V. I. (2023). Alpha-ketoglutarate partially alleviates effects of high-fat high-fructose

diet in mouse muscle. *EXCLI Journal*. 2023. Vol. 22. P. 1264–1277. https://doi.org/10.17179/excli2023-6608 Q1

6. Lushchak O., Orru M., Strilbytska O., Berezovskyi V., Cherkas A., Storey K. B., **Bayliak M**. Metabolic and immune dysfunctions in post-traumatic stress disorder: what can we learn from animal models?. *EXCLI Journal*. 2023. Vol. 22. P. 928–945. https://doi.org/10.17179/excli2023-6391. Q1
7. **Bayliak M. M.**, Gospodaryov D. V., Lushchak V. I. Homeostasis of carbohydrates and reactive oxygen species is critically changed in the brain of middle-aged mice: Molecular mechanisms and functional reasons. *BBA advances*. 2023. Vol. 3, 100077. Q3. https://doi.org/10.1016/j.bbadva.2023.100077
8. **Bayliak M. M**., Demianchuk O. I., Gospodaryov D. V., Balatskyi V. A., Lushchak, V. I. Specific and combined effects of dietary ethanol and arginine on *Drosophila melanogaster*. *Drug and chemical toxicology*. 2023. Vol. 46, N 5. P. 895–905. Q2. https://doi.org/10.1080/01480545.2022.2105863
9. Demianchuk O. I., Ivanochko M. V., Gospodaryov D. V., **Bayliak M. M.** *Rhodiola rosea* and ferulic acid activate expression of genes related to autophagy and resistance to heat shock in mice of different age. *Biotechnologia Acta*. 2023. Vol. 16, N2. P. 26-29. https://doi.org/10.15407/biotech16.02.018
10. Derkachov V.P., Ivanochko M. V., **Bayliak M. M.** The effect of broccoli sprouts on oxidative stress markers in mice fed with cafeteria diet. *Biotechnologia Acta*. 2023. Vol. 16, N2. P. 18-20.
11. Ivanochko M. V., Demianchuk O. I., **Bayliak M. M.**, Lushchak V.I. consumption of broccoli sprouts increased the activity of glutathione-dependent antioxidant enzymes in murine liver. *Biotechnologia Acta*. 2023. Vol. 16, N2. P. 15-17.
12. **Bayliak M**., Abrat O., Shmihel H., Lushchak V., Shvadchak V. Interuniversity online courses as possible approach to improve teaching during crisis: A Ukrainian case study. *Journal of Vasyl Stefanyk Precarpathian National University*. 2023. Vol. 10, N 1 (Apr. 2023). P. 49-60. https://doi.org/10.15330/jpnu.10.1.49-60.
13. Demianchuk O., Butenko N., Gospodaryov D., **Bayliak M**. Effects of feeding with non-autoclaved and autoclaved fructose-arginine mixture on stress resistance of *Drosophila melanogaster*. *Journal of Vasyl Stefanyk Precarpathian National University*. 2023. Vol. 9, N 4 (Jan. 2023). P. 15-24. https://doi.org/10.15330/jpnu.9.4.15-24.
14. Vatashchuk M., Hurza V., **Bayliak M**. Adapting of spectrophotometric assay of paraoxonase activity with 4-nitrophenylacetate for murine plasma and liver. *Journal of Vasyl Stefanyk Precarpathian National University*. 2023. Vol. 9, N 4 (Jan. 2023). P. 6-14. https://doi.org/10.15330/jpnu.9.4.6-14.

2022

15. **Bayliak M. M.,** Vatashchuk M. V., Gospodaryov D. V., Hurza V. V., Demianchuk O. I., Ivanochko M. V., Burdyliuk N. I., Storey K. B., Lushchak O., Lushchak V. I. High fat high fructose diet induces mild oxidative stress and reorganizes intermediary metabolism in male mouse liver: Alpha-ketoglutarate effects. *Biochimica et biophysica acta. General subjects*. 2022. Vol. 1866(12), 130226. https://doi.org/10.1016/j.bbagen.2022.130226
16. Semaniuk U. V., Gospodaryov D. V., Strilbytska O. M., Kucharska A. Z., Sokół-Łętowska A., Burdyliuk N. I., Storey K. B., **Bayliak M. M**., Lushchak O. Chili pepper extends lifespan in a concentration-dependent manner and confers cold resistance on Drosophila melanogaster cohorts by influencing specific metabolic pathways. Food & function. Vol. 13(15). P. 8313–8328. https://doi.org/10.1039/d2fo00930g
17. **Bayliak M.M.,** Sorochynska O.M., Kuzniak O.V., Drohomyretska I.Z., Klonovskyi A.Y., Hrushchenko A.O., Vatashchuk M.V., Mosiichuk N.M., Storey K.B., Garaschuk O., Lushchak V.I. High stability of blood parameters during mouse lifespan: sex-specific effects of every-

other-day fasting. Biogerontology. 2022. Vol. 23(5). P. 559–570. https://doi.org/10.1007/s10522-022-09982-x

18. **Bayliak M.M.**, Demianchuk O.I., Gospodaryov D.V., Balatskyi V.A., Lushchak V.I. Specific and combined effects of dietary ethanol and arginine on Drosophila melanogaster. Drug Chem. Toxicol. 2022. Vol. 28. P. 1-11. https://doi.org/10.1080/01480545.2022.2105863
19. Vatashchuk M. V., **Bayliak M. M.**, Hurza V. V., Storey K. B., Lushchak, V. I. Metabolic syndrome: lessons from rodent and Drosophila Models. BioMed research international. 2022. Vol. 2022, 5850507. https://doi.org/10.1155/2022/5850507
20. Kuzniak, O. V., Sorochynska, O. M., **Bayliak, M. M**., Klonovskyi, A. Y., Vasylyk, Y. V., Semchyshyn, H. M., Storey, K. B., Garaschuk, O., & Lushchak, V. I. (2022). Feeding to satiation induces mild oxidative/carbonyl stress in the brain of young mice. EXCLI Journal, 21, 77-92. https://doi.org/10.17179/excli2021-4347
21. **Bayliak, M. M**., Gospodaryov, D. V., & Lushchak, V. I. (2022). Mimicking caloric restriction for anti-aging effects: the pro-oxidant role of alpha-ketoglutarate. Current Opinion in Toxicology, 30, 100339. https://doi.org/10.1016/j.cotox.2022.02.012
22. Hurza V., Vatashchuk M. Bayliak M. Pathogenesis and Biomarkers of Metabolic Syndrome. Journal of Vasyl Stefanyk Precarpathian National University. 2021. 8, 4 (Jan. 2022). P. 7-19. DOI: https://doi.org/10.15330/jpnu.8.4.7-19.

2021

23. Peteliuk V., Rybchuk L., **Bayliak M.**, Storey K.B., Lushchak O. (2021). Natural sweetener *Stevia rebaudiana*: Functionalities, health benefits and potential risks. EXCLI Journal, 20, 1412-1430. https://doi.org/10.17179/excli2021-4211
24. **Bayliak M.M.,** Lushchak, V.I. (2021) Pleiotropic effects of alpha-ketoglutarate as a potential anti-ageing agent. Ageing Res. Rev. 66, 101237. (SCOPUS) Q1 Aging/Biochemistry
25. **Bayliak M.M.**, Sorochynska O.M., Kuzniak O.V., Gospodaryov D.V., Demianchuk O.I., Vasylyk Y.V., Mosiichuk N.M., Storey K.B., Garaschuk O., Lushchak V.I. (2021) Middle age as a turning point in mouse cerebral cortex energy and redox metabolism: Modulation by every-other-day fasting. Exp. Gerontol. 145, 111182.
26. **Bayliak M.M**., Dmytriv T.R., Melnychuk A.V., Strilets N.V., Storey K.B., Lushchak V.I. (2021). Chamomile as a potential remedy for obesity and metabolic syndrome. EXCLI Journal. 20, 1261-1286.
27. **Bayliak M.M**., Mosiichuk N.M., Sorochynska O.M., Kuzniak O.V., Sishchuk L.O., Hrushchenko A.O., Semchuk A.O., Pryimak T.V., Vasylyk Y.V., Gospodaryov D.V., Storey K.B., Garaschuk O., Lushchak V.I. (2021) Middle aged turn point in parameters of oxidative stress and glucose catabolism in mouse cerebellum during lifespan: minor effects of every-other-day fasting. Biogerontology. 22, 315-328.
28. Sorochynska O.M., Kuzniak O.V., **Bayliak M.M**., Vasylyk Y.V., Storey K.B., Lushchak V.I. (2021). Every-other-day fasting reduces glycolytic capability in the skeletal muscle of young mice. *Biologia*, **76,** 1627–1634. https://doi.org/10.1007/s00424-021-02529-y
29. Hurza V., Vatashchuk M. **Bayliak M.** Pathogenesis and biomarkers of metabolic syndrome. *Journal of Vasyl Stefanyk Precarpathian National University*. 2021. 8, 4 (Jan. 2022). P. 7-19. https://doi.org/10.15330/jpnu.8.4.7-19.

2020

30. **Bayliak M.M.** Metabolic syndrome, obesity and *Drosophila //* Journal of Vasyl Stefanyk Precarpathian National University. 2020. Vol. 7, No. 4. P. 9-14. doi: 10.15330/jpnu.7.4.7-18
31. **Bayliak M.M.**, Demianchuk O.I., Gospodaryov D.V., Abrat O.B., Lylyk M.P., Storey K., Lushchak V.I. (2020) Mutations in genes *cnc* or *dKeap1* modulate stress resistance and metabolic processes in *Drosophila melanogaster*. Comp. Biochem. Physiol. A Mol. Integr. Physiol. 248, 110746.

2019

32. Sorochynska O.M., **Bayliak M.M.**, Gospodaryov D.V., Vasylyk Y.V., Kuzniak O.V., Pankiv T.M., Garaschuk O., Storey K.B. and Lushchak V.I. Every-other-day feeding decreases glycolytic and mitochondrial energy-producing potentials in the brain and liver of young mice. Front. Physiol. 2019. 10:1432. doi: 10.3389/fphys.2019.01432
33. Sorochynska O.M., **Bayliak M.M.**, Vasylyk Y.V., Kuzniak O.V., Drohomyretska I.Z., Klonovskyi A.Y., Storey J.M., Storey K.B., Lushchak V.I. Intermittent fasting causes metabolic stress and leucopenia in young mice. Ukr. Biochem. J. 2019. 91(1), 53-64.
34. **Bayliak M.M.**, Abrat O.B., Storey J.M., Storey K.B., Lushchak V.I. Interplay between diet induced obesity and oxidative stress: Comparison between *Drosophila* and mammals. Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology. 2019. 228, 18-12.
35. **Bayliak M.M.**, Lylyk M.P., Gospodaryov D.V., Kotsyubynsky V.O., Butenko N.V., Storey K.B., Lushchak V.I. Protective effects of alpha-ketoglutarate against aluminum toxicity in *Drosophila melanogaster*. Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology. 2019. 217, 41-53.

2018

36. Lylyk M.P., **Bayliak M.M.,** Shmihel H.V., Storey J.M., Storey K.B., Lushchak V.I. Effects of alpha-ketoglutarate on lifespan and functional aging of *Drosophila melanogaster* flies. Ukr. Biochem. J. 2018. 90 (6), 49-61.
37. Stambulska U.Ya., **Bayliak M.M.**, Lushchak V.I. Chromium(VI) toxicity in legume plants: modulation effects of rhizobial symbiosis. BioMed Research International. 2018, 2018, Article ID 8031213, 13 pages. doi:10.1155/2018/8031213
38. **Bayliak** M.M., Lylyk M.P., Maniukh O.V., Storey J.M., Storey K.B., Lushchak V.I. Dietary L-arginine accelerates pupation and promotes high protein levels but induces oxidative stress and reduces fecundity and lifespan in *Drosophila melanogaster*. J. Comp. Physiol. B. 2018. 188(1), 37-55.
39. **Bayliak** MM, Hrynkiv OV, Knyhynytska RV, Lushchak VI. Alpha-ketoglutarate enhances freeze–thaw tolerance and prevents carbohydrate-induced cell death of the yeast *Saccharomyces cerevisiae*. Arch. Microbiol. 2018. 200(1), 33-46.

2017

40. **Bayliak** M.M., Burdyliuk N.I., Lushchak V.I. Growth on alpha-ketoglutarate increases oxidative stress resistance in the yeast *Saccharomyces cerevisiae.* Int. J. Microbiol. 2017. (2017), Article ID 5792192, 9 pages, doi: 10.1155/2017/5792192
41. **Bayliak** M.M., Lylyk M.P., Sorochynska O.M. Dietary alpha-ketoglutarate partially prevents age-related decline in locomotor activity and cold tolerance in *Drosophila melanogaster*. Biologia. 2017. 72(4), 458-467.
42. **Bayliak** M.M., Lylyk M.P., Shmihel H.V., Sorochynska O.M., Semchyshyn O.I., Storey J.M., Storey K.B., Lushchak V.I. Dietary alpha-ketoglutarate promotes higher protein and lower triacylglyceride levels and induces oxidative stress in larvae and young adults but not in middle-aged *Drosophila melanogaster*. Comp. Biochem. Physiol. Part A: Mol. Integr. Physiol. 2017. 204, 23-33.
43. Lylyk M., Sorochynska O., Maniuch O., **Bayliak M**. Age-related physiological and biochemical changes *Drosophila* grown on alpha-ketoglutarate [in Ukrainian]. Bulletin of Taras Shevchenko National University of Kyiv. Series: Problems of Physiological Functions Regulation. 2017. 22(1), 25-31
44. **Bayliak** M, Burdyliuk N. Effects of long-term cultivation on medium with alpha-ketoglutarate supplementation on metabolic processes of *Saccharomyces cerevisiae.* J Aging Res. 2017 (2017) Article ID 8754879, 12 pages, doi: 10.1155/2017/8754879
45. Lylyk M.P, Holovchak M.V., Shmihel H.V., **Bayliak** M.M. Influence of alpha-

ketoglutarate on *Drosophila melanogaster* resistance to different toxicants [in Ukrainian]. Ukrainian journal of medicine, biology and sport. 2017, 4 (6), 180-185.

2016

46. Lylyk M., Sorochynska O.M., Maniukh O.V., **Bayliak M.M**. Gender differences of amino acid metabolism in *Drosophila melanogaster* on alpha-ketoglutarate-supplemented food [in Ukrainian]. Bulletin of Taras Shevchenko National University of Kyiv. Series: Problems of Physiological Functions Regulation. 2016. 21(2), 31-36.
47. **Bayliak M.M.**, Burdyliuk N. I., Lushchak V.I., 2016. Effects of pH on antioxidant and prooxidant properties of common medicinal herbs. Open Life Sci. 11, 298–307.
48. **Bayliak M.M.**, 2016. Effects of bicarbonate and alpha-ketoglutarate on sensitivity of yeast *Saccharomyces cerevisiae* to hydrogen peroxide and iron ions. Studia biologica. 10(2), 53-62.
49. **Bayliak M.M.**, Shmihel H.V., Lylyk M.P., Storey K.B., Lushchak V.I., 2016. Alpha-ketoglutarate reduces ethanol toxicity in *Drosophila melanogaster* by enhancing alcohol dehydrogenase activity and antioxidant capacity. Alcohol. 55, 23-33.
50. **Bayliak M.M.**, Lylyk M.P., Shmihel H.V., Sorochynska O.M., Manyukh O.V., Pierzynowski S. G., Lushchak V.I., 2016. Dietary alpha-ketoglutarate increases cold tolerance in *Drosophila melanogaster* and enhances protein pool and antioxidant defense in sex-specific manner. J. Therm. Biol. 60, 1-11.
51. **Bayliak M.M.**, Burdylyuk N. I., Lushchak V.I., 2016. Quercetin increases stress resistance in the yeast *Saccharomyces cerevisiae* not only as an antioxidant. Ann. Microbiol. 66(2), 569-576. (
52. **Bayliak M.M.**, Lylyk M.P., Vytvytska O.M., Lushchak V.I., 2016. Assessment of antioxidant properties of alpha-keto acids *in vitro* and *in vivo*. Eur. Food Res. Technol. 242 (2), 179-188.

2015

53. Lylyk M.P., **Bayliak M.M.,** 2015. Possible protective mechanisms of alpha-ketoglutarate on fruit fly *Drosophila melanogaster* canton s under exposure to different stressors [in Ukrainian]. Journal "Scientific Herald of Chernivtsy University. Biology (Biological Systems)". 7(1), 119-124.
54. **Bayliak M.M.**, Shmihel H.V., Lylyk M.P., Vytvytska O.M., Storey J.M., Storey K.B., Lushchak V.I., 2015. Alpha-ketoglutarate attenuates toxic effects of sodium nitroprusside and hydrogen peroxide in *Drosophila melanogaster*. Environ. Toxicol. Pharmacol. 40(2), 650-659.
55. **Bayliak M.**, Burdylyuk N., 2015. 2,4-Dichlorphenoxicacetic acid at low concentrations enhances reproductive ability and oxidative stress resistance of yeast *Saccharomyces cerevisiae*. Journal of Vasyl Stefanyk Precarpathian National University, 2(1), 93-99.

2014

56. Shmihel H., Lylyk M., **Bayliak M**., 2014. Effect of alpha-ketoglutarate on pupation, feeding intensity and levels of some metabolites in larvae *Drosophila melanogaster* [in Ukrainian]. Visnyk of the Lviv University. Series Biology. 66, 91-99.
57. Struminska O.O., **Baylyak M.M.**, Kurta S.A., 2014. Microbiological properties of natural film-forming materials [in Ukrainian]. Eastern-European journal of enterprise technologies. 2(681), 34-40.
58. **Bayliak M.M.**, Burdyliuk N.I., Izers'ka L.I., Lushchak V.I., 2014. Concentration-dependent effects of *Rhodiola rosea* on long-term survival and stress resistance of yeast *Saccharomyces cerevisiae:* the involvement of YAP 1 and MSN2/4 regulatory proteins. Dose-Response. 1, 93-109. (SCOPUS)
59. Semchyshyn H.M., Miedzobrodzki J., **Bayliak M.M.**, Lozinska L.M., Homza B.V., 2014. Fructose compared with glucose is more a potent glycoxidation agent *in vitro*, but not under carbohydrate-induced stress *in vivo*: potential role of antioxidant and antiglycation enzymes. Carbohydr. Res. 384, 61-69.

2013

60. Luchkiv N.U., Burdylyuk N.I., Izers'ka L.I., **Bayliak M.M**., 2013. Evaluation of antioxidant properties of *Rhodiola rosea* L. and *Centaurea carpatica* porc., collected in Ukrainian Carpathians [in Ukrainian]. Galician Medical Journal. 20(1), 55-57.

2011

61. **Bayliak M.M.**, Lushchak V.I., 2011. The golden root, *Rhodiola rosea*, prolongs lifespan but decreases oxidative stress resistance in yeast *Saccharomyces cerevisiae*. Phytomedicine. 18(14), 1262-1268.

2009

62. Lushchak O.V., **Bayliak M.M.**, Korobova O.V, Levine R.L., Lushchak V.I., 2009. Buffer modulation of menadione-induced oxidative stress in *Saccharomyces cerevisiae.* Redox rep. 14(5), 214-220.

2008

63. **Bayliak M.**, Gospodaryov D., Semchyshyn H., Lushchak V., 2008. Inhibition of catalase by aminotriazole *in vivo* results in reduction of glucose-6-phosphate dehydrogenase activity in *Saccharomyces cerevisiae* cells [in Russian and in English]. Biochemistry (Moscow). 73(4), 515-523.

2007

64. **Bayliak M.M.**, Semchyshyn H.M., Lushchak V.I., 2007. Possible accumulation of non-active molecules of catalase and superoxide dismutase in *S. cerevisiae* cells under hydrogen peroxide induced stress. Central European Journal of Biology. 2(3), 326-336. (SCOPUS) Q1 Agricultural and Biological Sciences (miscellaneous)

2006

65. **Bayliak M.**, Semchyshyn H., Lushchak V., 2006. Effect of hydrogen peroxide on antioxidant enzyme activities in *Saccharomyces cerevisiae* is strain-specific [in Russian and in English]. Biochemistry (Moscow). 71(9), 1013-1020.
66. **Baylyak M.M.**, Semchyshyn H.M., Lushchak V.I., 2006. Role of catalase and superoxide dismutase in yeast *Saccharomyces cerevisiae* response to hydrogen peroxide in exponential phase [in Ukrainian]. Ukr. Biochem. J. 78(2), 79-85.

2005

67. **Baylyak M.M.**, Abrat O.B., Semchyshyn H.M., Lushchak V.I., 2005. Survival and antioxidant defence of the yeast *Saccharomyces cerevisiae* under starvation and oxidative stress [in Ukrainian]. Ukr. Biochem. J. 77(4), 93-98.
68. Gospodaryov D.V., **Bailyak M.M.**, Lushchak V.I., 2005. Free radical inactivation of glucose-6-phosphate dehydrogenase in *Saccharomyces cerevisiae in vitro* [in Ukrainian]. Ukr. Biochem. J. 77(1), P. 58-64.

Main conference theses

1. Demianchuk O., **Bayliak M**., Gospodaryov D., Lushchak V. Molecular reasons for aging: increased disbalance in the system oxidative stress – energy provision. P-02-018. (2024), Posters. FEBS Open Bio, Volume 14: Supplement: Mining biochemistry for human health and well-being, 48th FEBS Congress, 29 June–3 July 2024, Milano, Italy. P. 97. https://doi.org/10.1002/2211-5463.13837
2. Hurza V., Vatashchuk M., **Bayliak M**., Lushchak V. Influence of margarine diet alone and on the background of feeding every other day on the antioxidant system of mouse liver and heart. P-

35-055. (2024), Posters. FEBS Open Bio. Volume 14: Supplement: Mining biochemistry for human health and well-being, 48th FEBS Congress, 29 June–3 July 2024, Milano, Italy. P. 443. https://doi.org/10.1002/2211-5463.13837

3. **Bayliak M.**, Hurza V., Abrat O., Vatashchuk M. Abstracts of the International Scientific and Practical Conference "Actual Problems of Modern Biology, Animal Husbandry and Veterinary Medicine" dedicated to the 100th anniversary of the birth of Doctor of Biological Sciences, Academician of the Ukrainian Academy of Sciences, Honored Worker of Science and Technology of Ukraine, Director of the Institute of Animal Biology of the National Academy of Sciences of Ukraine from 1972 to 1993. Petro Lahodiuk (08.06.1924 - 17.02.1994), October 3-4, 2024, Lviv, Ukraine. P. 42.

1. Balatskyi V.A. Lushchak V.I., **Bayliak M.M**. Development of a mouse model for the study of post-traumatic stress disorder / Abstracts of the XXI All-Ukrainian scientific and practical conference of young scientists dedicated to the 100th anniversary of the birth of Doctor of Biological Sciences, Professor Shavkun Vasyl Yukhymovych (May 18-19, 2023, Lviv). *The Animal Biology*. 2023. Vol. 25, N. 2, P. 50.
2. Tsiumpala S., Vatashchuk M., Hurza V., Ivanochko M., Demianchuk O., Starchevska K., **Bayliak M.**, Lushchak V. Modulating effects of ferulic acid and alpha-ketoglutarate on cafeteria diet-induced oxidative stress in the blood plasma and liver of mice // Biology, Biotechnology, Biomedicine: Materials of Young Scientists International Conference 11–12 July 2022. Ed. board: M. B. Galkin, N. V. Limanska, V. O. Ivanytsia. Odesa: «Odesa I. I. Mechnikov National University», 2022. P. 99-104.
3. Vatashchuk M., Hurza V., **Bayliak M.,** Lushchak V. Effects of a diet high in fat and fructose and alpha-ketoglutarate on the content of metabolites in the liver and plasma of young mice // Abstracts of the VI International Scientific Conference ["Actual problems of modern biochemistry, cell biology and physiology"], (Dnipro, October 6-7, 2022) P. 143-144.
4. **Bayliak M.M**. Geroprotective properties of alpha-ketoglutarate in *Drosophila* fruit flies. In: Medical and clinical chemistry "Materials of the XII Ukrainian Biochemical Congress, Ternopil, September 30-October 4, 2019". 2019. 21 (suppl. 3), 60.
5. Demianchuk OI, Sitko MV, Abrat OB, Gospodaryov DV, **Bayliak MM**. The absence of Nrf2 and Keap1 proteins disrupts redox homeostasis and mitochondrial activity in fruit flies. In: Medical and Clinical Chemistry "Materials of the XII Ukrainian Biochemical Congress, Ternopil, September 30-October 4, 2019". 2019. 21 (suppl. 3), 86-87.
6. Lushchak V.I., **Bailiak M.M.**, Gospodaryov D.V., Garashchuk O., Vasylyk Yu.V., Sorochynska O.M., Kuzniak O.V. Intermittent fasting decreases activity of key glycolytic enzymes but partially protects operation of mitochondria in aging mouse brain. In: 14th International Conference on Alzheimer's and Parkinson's Diseases (March 26-31, 2019, Lisbon, Portugal). P. 239. Poster N 699
7. **Bailiak M.**, Mosiichuk N., Sorochynska O., Kuzniak O., Vasylyk Yu., Garaschuk O., Lushchak V. Cerebral cortex undergoes stronger oxidative stress during aging than cerebellum. In: Paris Redox 2019 - the 21st Intern. Conf. on Oxidative Stress Reduction, Redox Homeostasis and Antioxidants (June 21-22, 2019, Université Pierre et Marie Curie, Paris, France). Abstracts Book. P. 82
8. Lushchak V., **Bailiak M.**, Mosiichuk N., Gospodaryov D., Sorochynska O., Kuzniak O., Vasylyk Yu., Garaschuk O. Possible Mechanisms Counteracting Age-Related Intensification Of Oxidative Stress In The Mouse Brain. In: Paris Redox 2019 - the 21st International Conference on Oxidative Stress Reduction, Redox Homeostasis and Antioxidants (June 21-22, 2019, Université Pierre et Marie Curie, Paris, France). Abstracts Book. P. 37.
9. Gospodaryov D., Lylyk M., Demianchuk O., Sitko M., Yurchak T., **Bayliak M**. Deficiency in Nrf2 and Keap1 delays development and modulates metabolic processes in *Drosophila melanogaster*. In: 26th European *Drosophila* Research Conference (5th-8th September 2019, EPFL, Switzerland). Program & Abstract Book. P. 196-197.

10. Gospodaryov D., **Balatskiy** V., Bayliak M. Bioenergetic basis for the effects of arginine and alpha-ketoglutarate on lifespan. In: Biochimica et Biophysica Acta (BBA) – Bioenergetics. 2018 1859:e59 (Abstacts of 20-th European Bioenergetics Conference, August 25-30, 2018, Budapest, (Hungary).
11. Holovchak M., Shmihel H., **Bayliak M**. Dietary alpha-ketoglutarate alleviates toxic effects of aluminum on fruit fly *Drosophila melanogaster* development. In: V International Conference «*Drosophila* in the Experimental Genetics and Biology» (Kyiv, 2016, May 12-14). P. 13.
12. Lylyk M. Shmihel H., Kozachok O., Bayliak M. Alpha-ketoglutarate modifies toxic action of sodium nitroprusside and ethanol on *Drosophila melanogaster*. In: Ukr. Biochem. J. 86 (5, suppl. 2) "Materials of XI Ukrainian Biochemical congress (Kyiv, October 6-10, 2014)", 249-250.
13. **Bayliak M.**, Izers'ka L. Biochemical percularities of *Saccharomyces cerevisiae* grown with alpha-ketoglutarate. In: Abstracts of 13th congress of Society of Microbiologists of Ukraine (Jalta, October, 1-6, 2013). Jalta, 2013. P. 64.
14. Hryshuk Kh., Burdyliuk N., Izers'ka L., **Bayliak M**. Low concentrations of *Rhodiola rosea* aqueous extract demonstrate stress-protective and geroprotective effects on yeast *Saccharomyces cerevisiae*. In: Materials of International Young scientists' conference [«Biodiversity. Ecology. Adaptation. Evolution»], (Odesa, May 13-17, 2013), 250-251.
15. Pavlykivskyj I., Burdyliuk N., Izers'ka L., **Bayliak M**. Influence of *Rhodiola rosea* and quercetin on stress resistance of yeast *Saccharomyces cerevisiae*. In: Materials of V International Young Scientists conference [Biodiversity. Ecology. Adaptation. Evolution.], (Odesa, June 13-17, 2011), 227-228.
16. **Bayliak** M.M., Lushchak V.I. Lifespan and oxidative stress resistance of yeast *Saccharomyces cerevisiae* under treatment with *Rhodiola rosea* extract. In: Ukr. Biochem. J. 2010. 82 (4, special issue "Materials of the 10th Ukranian Biochemical Congress", 228-229.
17. **Bayliak M.,** Lushchak V. Extracts of *Rhodiola rosea* decrease oxidative stress resistance but prolong chronological lifespan of the yeast *Saccharomyces cerevisiae*. In: 3rd Ukrainian-Polish Weigl Conference ["Microbiology on Service for Human"], (Odesa, 14-17 September, 2009): Abstracts. Odessa: Odesa National I.I. Mechnykov University, 2009, 72-73.
18. **Bayliak M.** Influence of *R. rosea* extracts on lifespan of yeast *Saccharomyces cerevisiae*. In: XII Congress of Society of Microbiologists of Ukraine (Uzhorod, May 25-30, 2009): Abstracts. Uzhorod: Patent, 2009, 359.