



INTERNATIONAL CONFERENCE SMART BIO

# **2<sup>ND</sup> International Conference**

## **„Smart Bio“**

### **03-05 May 2018**

**KAUNAS**

**LITHUANIA**

## **ABSTRACT BOOK**

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### **3-May-2018 VMU Small hall (S. Daukanto g. 28, Kaunas) and VMU Tadas Ivanauskas hall (Ž. E. Žilibero 2)**

**08:30-12:00** Registration

**09:30-09:45** Opening Ceremony. Welcome word from Vice Rector for Research Prof. Dr. Julija Kiršienė.

**09:45-10:00** Opening Ceremony. Dean of Nature science faculty of Vytautas Magnus university speech.

**10:00-12:30 Session 1** (VMU Small hall (S. Daukanto g. 28, Kaunas). **Chairperson:** Algimantas Paulauskas, Alexander Sirotkin.

**10.00 – 10.20 Dmitry Spivak, A. Urazova, A. Zakharchuk, I. Spivak.** Dynamics of telomere length and telomerase activity under the influence of music of various types

**10.20 – 10.40 Natallia Shtemenko, Alexander Shtemenko.** Redox-Activated Nanobased Combinational Therapy with the Use of the Quadruple-Bonding Rhenium Compound.

**10.40 – 11.00 Pavel Shlizov, T.I. Dolinina, N.M.Pleskach, S.V. Zherebtsov, M.L. Bulatnikova, V.M. Mikhelson, I.M. Spivak.** General and individual differences of aging markers in the cells of patients with cocaine syndrome.

**11.00 – 11.20 Eduardas Cicinskas, Mariya Begun, Valeriia Vikhareva.** Immunotropic activity of Sea of Japan algae carrageenans.

**11.20 - 11.40 Aleksandra Kalitnik, Eduardas Cicinskas, Maria Begun, Vladlena Tiasto, Valeriia Mikhaylova, Valeriia Vikhareva.** Biological effects of sulfated polysaccharides isolated from red marine algae

**11.40 – 12.00 Algimantas Paulauskas.** Climate change impact to expansion of ticks and tick-borne diseases.

**12.00 – 12.30 Alexander Sirotkin.** Novel hormonal, intracellular and pharmacological regulators of female reproduction

**12:45-13:15 Lunch**

**13:15 1<sup>st</sup> Bus which will drive to Tadas Ivanauskas hall** (participations should wait at 13:10 near S. Daukanto g. 28 central entrance)

**13:45 2<sup>nd</sup> Bus which will drive to Tadas Ivanauskas hall** (participations should wait at 13:40 near S. Daukanto g. 28 central entrance)

**13:15-14:30 Poster session 1**

**14:30-17:00 Session 2 (Young researchers section)** (VMU Small hall (S. Daukanto g. 28, Kaunas). **Chairperson:** Saulius Mickevičius, Yuliia Ovchynnykova.

**14:30-14:45** Tadas Didvalis, Paulius Ruzgys, Saulius Šatkauskas, Diana Adlienė, Saulius Mickevičius. Assessment of ROS production using DCFH-DA dye in CHO cells after application of ionizing radiation.

**14:45-15:00** Viktorija Malouškina, Milda Jakutavičiūtė, Saulius Šatkauskas. Dependence of CHO cell electroporation and electrotransfection efficiency on the cell density and elapsed time since last passage.

**15:00-15:15** Maxim Vasilenko, Alena Gajdosova, Mykola Kuchuk, Olha Yaroshko. Transformation of varieties of *Amaranthus caudatus* L. and varieties of hybrids *A. caudatus* x *A. paniculatus* L. by “floral-dip” method.

**15:15-15:30** Anatoly Ivankov, A. Velygodska. Ways of Increasing the Carotenoids Synthesis of the Basidiomycetes Strains *Laetiporus sulphureus* (Bull.) Murrill.

**15:30-15:45** Arūnas Struckas, Piotr Vasiljev, Regimantas Bareikis, Sergejus Borodinas. The Overview of Ultrasonic Systems for Oil Extraction from Micro Algae.

**15:45-16:00** Izabela Smok, A. Polit. Confocal microscope analysis of human G protein subunits interactions.

**16:00-16:15** Julija Fediajevaitė, Sigitas Juzėnas. *L. clavatum* and *L. annotinum* clones: the establishment in Scots Pine dominated forest in relation to disturbances.

**16:15-16:30** Mantas Adomaitis, Grita Skujienė. Taxonomic clarification: the invasive pest slug occurring in Lithuania is *Arion vulgaris* Moquin-Tandon, 1855.

**16:30-16:45** Elena Tyumina, G. Bazhutina, I. Ivshina, E. Vikhareva. Structural and functional features of rhodococci exposed to NSAID-based pharma pollutants.

**16:45-17:00** Dykyy, I.V., Milinevsky, G.P., Savitsky, O.L., Lutsenko, D.G., Khoetsky, P.B., Veselsky, M.F., Smagol, V.M., Dzhulay, A.O., Tsaryk, J.V., Nazaruk, K.M., Zatushevsky, A.T., Simon A.O., Telipska, M.A., Beznoshchenko B.O. New Smart Technology For Antarctic Biology Research.

**15:00-17:00** Session 3 (Dedicated to 95th anniversary of Vytautas Magnus University Botanical Garden) (VMU Tadas Ivanauskas hall, Ž. E. Žilibero 2, Kaunas). **Chairperson:** Remigijus Daubaras, Tetiana Andrianova.

**15.00 -15.15** Tetiana Andrianova. Mycospherella and its related conidial fungi as pathogens on medicinal plants in Ukraine

**15:15-15:30** Tetiana Kyrpa-Nesmiian, Volodumir Rudas, Olga Ovcharenko, Victoria Osipenko, Maxim Kharhota, Mykola Kuchuk. Studies On The Adaptation Of Solanum Tuberosum Plants Expressing The Desa Gene To Osmotic Stress

**15:30-15:50** Vida Mildžienė. On the Molecular Mechanisms of Plant Response to Pre-sowing Seed Treatment with Cold Plasma and Electromagnetic Field.

**15:50-16:05** Volodumer Radchenko, Svitlana Bilous, Artur Likhanov, Raisa Matashuk. Micropropagation and Secondary Metabolite Activity of *Lysimachia Nummularia* L.

**16:05-16:20** Edvina Krokaitė, Jolanta Nemaniute-Guziene, Dinara Shakeneva, Lina Jociene, Laisvūnė Duchovskienė, Donatas Zvingila, Jolanta Patamsyte, Violeta Kleizaitė, Regina

**Vysniauskiene, Vida Ranceliene, Eugenija Kupcinskiene.** Is nitrogen in excess among plant species of Nemunas and other Lithuanian river basins?

**16:20-16:40 Ona Ragažinskienė, Audrius Sigitas Maruška.** Development Research of Medicinal (Aromatic) Plants (MAP's) in Vytautas Magnus University in 1924-2018.

**16:40-17:00 Remigijus Daubaras, Laima Česonienė.** Integrated investigation of prospective Vaccinium species and selection of new cultivars at Kaunas Botanical Garden of VMU.

**17:30 Excursion to Vytautas Magnus University Botanical Garden** (Bus which will drive to excursion are leaving at 17:05)

**4-May-2018** VMU Small hall and 402 aud. (S. Daukanto g. 28, Kaunas)

**08:30-12:00** Registration

**09:00-10:00** Poster session 2

**10:00-12:30 Session 4.** The session was dedicated to the project “Integrated impact of climate and environmental changes to the productivity, biodiversity and sustainability of agro-ecosystems” (KLIMAGRO, No. SIT-8/2015) of the National Research Program “Sustainability of Agro-, Forest and Water Ecosystem”.

VMU Small hall (S. Daukanto g. 28, Kaunas).

**Chairperson:** Viktor Glebov and Jūratė Žaltauskaitė.

**10.00-10.15 Romualdas Juknys, Arvydas Kanapickas, Jūratė Žaltauskaitė, Gintarė Sujetovienė, Irena Januškaitienė, Giedrė Kacienė, Aušra Dikšaitytė, Rimantas Velička, Aušra Marcinkevičienė, Zita Kriaučiūnienė, Jūratė Aleinikovienė, Ilona Vagusevičienė, Robertas Kosteckas.** Integrated Impact Of Climate And Environmental Changes To The Productivity, Biodiversity And Sustainability Of Agro-Ecosystems.

**10:15-10:30 Arvydas Kanapickas, Romualdas Juknys, Gintarė Sujetovienė.** Thermal Time Models For Estimating Plant Phenological Development Under Climate Based Relationships.

**10:30-10:45 Aušra Marcinkevičienė, Rimantas Velička, Zita Kriaučiūnienė, Marina Keidan, Lina Marija Butkevičienė, Rita Pupalienė, Robertas Kosteckas, Sigitas Čekanauskas.** The Efficiency Of Non-Chemical Weed Control In Winter Rapeseed.

**10:45-11.00 Giedrė Kacienė, Aušra Dikšaitytė, Irena Januškaitienė, Diana Miškelytė, Jūratė Žaltauskaitė, Gintarė Sujetovienė, Sandra Sakalauskienė, Jurga Miliauskienė, Romualdas Juknys.** Ozone And Future Climate Effect On Interspecific Competition Between Summer Rapes And Wild Mustard.

**11.00-11.15 Monika Toleikienė, Žydrė Kadžiulienė, Aušra Arlauskienė.** Environmental Aspects Of Legume Manure Management In Organic Agroecosystem.

**11:15-11:30 Oleksandr Mudrak, Yuliia Ovchynnykova, Galyna Mudrak, Oksana Nagorniuk.** Eastern Podilia As Structural-Functional System Of European Environmental Network

**11:30-11:45 P. Lakyda, Andrii Bilous, V. Myroniuk, R. Vasylyshyn, I. Lakyda, M. Matsal.** Remote Sensing-Based Assessment Of Biomass Carbon Stock: A Case Study For Ukrainian Polissya

**11:45-12:00 A. Kravchenko, E. Sarina, E. Solov'eva, V. Gleboy.** Accumulation of Toxicans in Soils of the Lipetsk Region Close to Roads.

**12:45-13:15 Lunch**

**13:15-14:30 Poster session 3**

**14:30-17:00 Session 5** (VMU Small hall (S. Daukanto g. 28, Kaunas). **Chairperson:** Oleksandr Tashyrev, Andrius Kaselis.

**14:30-14:50 Oleksandr Tashyrev, Vira Hovorukha, Nadiezhda Matvieieva, H.O. Tashyreva, V.M. Shevel, O.S. Iungin.** Development of novel universal biotechnologies for obtaining valuable products from a wide range of wastes.

**14:50-15:10 Nadiezhda Matvieieva, H. Shutava, S. Shysh, K. Drobot, Ya. Ratushnyak, A. Shakhovsky, V. Duplij.** Biofortification Of Wormwood Using Agrobacterium Rhizogenes-Mediated Transformation

**15:10-15:25 V.M. Hovorukha, O.B. Tashyrev, N.A. Matvieieva, H.O. Tashyreva, O.A. Havryliuk, O.IU. Bielikova, I.B. Sioma.** Integrated approach for development of environmental biotechnologies for treatment of solid organic waste and obtaining of biohydrogen and lignocellulosic substrate

**15:25-15:45 Ilya Velegzhaninov, Anna Rybak, Elena Belykh, Yana Pylina, Dmitry Shadrin.** Increasing of cell resistance to genotoxic stress by multiplex CRISPR/dCas9-mediated overexpression of genes of DNA damage recognition and repair.

**15:45-16:00 Lilit Ovsepyan, I. Kurganova, V. O. Lopez De Gerenyu.** Dynamics of microbial and enzymatic activity in post-agrogenic soils of Central Russia.

**16:00 – 16:15 Sergey Dromashko, Oleg V. Kvitko, I.I. Koneva, Ya I. Sheiko, Nina A. Balashenko, Svetlana N. Shevtsova, Anastasia S. Sapun.** Time-laps microscopy of living cells with video complex “tsitomir”: scientific, medical, and ecological possibilities.

**16:15-16:30 Nina Voronova, Raman Shulinski, S.S. Levykina, Y.V. Bandarenka, D.G. Zhoro.** New mitochondrial genomes of three aphid species: aphid fabae subsp. Mordvilko, theroaphis tenera, appendiseta robiniae.

**16:30-16:45 Daria Kozlova, Alexander Popov.** Interleukin-6, 14-3-3-η, calprotectin and butyrylcholinesterase as the most promising biomarkers for the rheumatoid arthritis diagnosis complex test system development.

**16:45-17:00 Andrius Kaselis.** Role of extracellular cues on PNS regeneration *in vitro*.

**15:00-17:00 Session 6** (402 room, S. Daukanto g. 28, Kaunas, Kaunas). **Chairperson:** Vera Shekh, Eugenija Kupčinskienė

**15.00 -15.20 Dmitrii Bogoliubov.** Karyosphere: a many-faced structure of the oocyte nucleus.

**15:20-15:40 Elena Michailova, Larisa Barabanova.** The implementation of genetic assays for investigating the Gulf of Finland biological systems.

**15:40-16:00 Olena Danchenko, O.V. Yakoviichuk, A.S. Fedorko, Nikolaeva , T.I. Halko.** Ontogenetic features of redox reactions In The Myocardium Geese

**16:00-16:20 Tugce Yurtluk, Fikriye Alev Akcay, Ayşe Avci.** Effects of process conditions on the biosynthesis of silver nanoparticles by Bacillus sp. SBT8.

**16:20-16:40 Vera Shekh, Emeka Ofoegbu, Ebunoluwa Adenuga, Anna Dubina, Larisa Shchyrova.** High responsiveness of cardiovagal outflow and sympathoinhibition to cold pressor test in young overweight normotensive subjects.

**16:20-16:40 Eugenia Perminova, Yulia Vinogradova, Elena Lapteva, Vera Kovaleva.** The Specificity Of Microbiological Complex Formation In Post-Agrogenic Soils.

**16:40-16:55 Roman Mamadzhanyov, Aleksandr Khaustov, Margarita Redina, Yulia Nigmatzyanova.** Environmental Monitoring of the University Campus: the Case Study of RUDN University Campus in Moscow, Russia.

**16.55 – 17.10 Yulia Vinogradova, Alla Kuklina, Olga Shelepova, Olena Vergun, Olga Grygorieva, Ján Brindza.** Differences between Aronia Medik. taxa on the micromorphological and biochemical characters.

**17:10-17:25 Mark Schlueter.** Using wild beese for increasing crop production.

**5-May-2018 Post conference tour to Trakai castle** (participations are meeting at 9:50 near the central entrance of S. Daukanto g. 28, Kaunas central entrance)

**The organisers are not responsible for the contents of the abstracts published in this book**

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# TUMOR CELL METABOLISM DURING INACTIVATION OF S-ADENOSYLMETHIONINE DECARBOXYLASE. INVESTIGATION IN SILICO

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## Abstract

The study of the metabolism of tumor cells has broadened the understanding of the mechanisms and effects of tumor associated metabolic disorders at various stages of tumor formation due to the emergence of new biochemical, molecular biology methods and mathematical methods that enhanced predictive capabilities of computer simulation. However, existing data remains very dispersed and not systemically integrated. The purpose of the work was to investigate the redistribution of metabolic flows in the cell by inactivating S-adenosylmethionine decarboxylase (SAMdc, EC: 4.1.1.50), the key enzyme of the polyamide cycle and the common target of antitumor therapy.

To address these goals, a stoichiometric metabolic model was developed that included five metabolic cycles: polyamines, methionine, methionine regeneration cycle, folic acid cycle, and the synthesis of glutathione and taurine. The model is based on 51 reactions involving 59 metabolites (31 of them are internal metabolites). All calculations were performed using the method of analysis of stationary flows (FluxBalanceAnalysis, FBA). Within this method, the number of elementary modalities (EFM) and flow control (CEF) were calculated. This work proposes to extend the capabilities of the analysis of interactions using the flow control coefficients (CEF) by simulating both overexpression and suppression of the synthesis of SAMdc. The model was developed in the CellNetAnalyzer 2017.

According to the simulation results, inactivation of SAMdc will reduce the flow through the enzymes for the synthesis and acetylation of spermine and spermidine. At the same time, significant reduction of flows is predicted only when SAMdc is inactivated by more than 50%. We determined that SAMdc controls the methionine cycle more significantly than the polyamines cycle. The obtained results indicate that the inactivation of SAMdc will result in a significant increase in flows through the methionine cycle and the taurine synthesis cycle for glutathione, a folate cycle. Therefore, when using therapeutic agents aimed to inactivate SAMdc, it is necessary to consider the possibility of the reprogramming of cellular tumor metabolism, the role of S-adenosylmethionine (SAM) in the methylation and catabolism of serine, the amount of which in these conditions will increase. In addition, the decrease in the activity of SAMdc creates the possibility of increased synthesis of glutathione metabolite, protecting tumor cells from oxidative stress.