



2012 -2015



**Institute of Animal
Biochemistry and Genetics
Slovak Academy of
Sciences**

1. General information

2. Changes and development in 2012-2015

- Organization
- Personal management
- Funding
- Research outputs

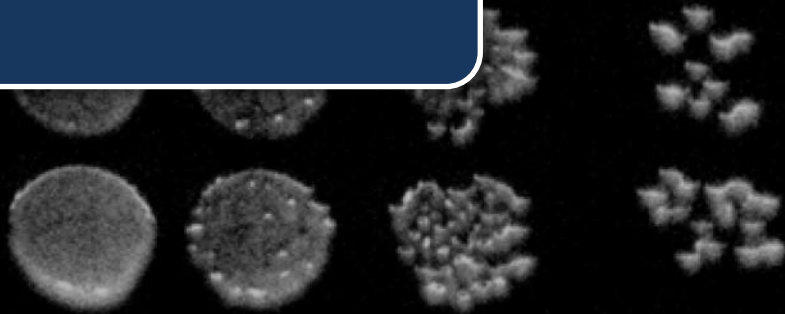
3. Social impact

4. SWOT analysis

General information

- medium-sized institute
- established in 1990 from a branch of the Institute of Farm Animal Physiology SASci in Košice
- belongs to the group of the Agricultural and Veterinary Sciences institutes within the Section 2 – Life, Chemical, Medical, and Environmental Sciences of the SASci
- basic research with potential applications in agriculture, biotechnology and medicine

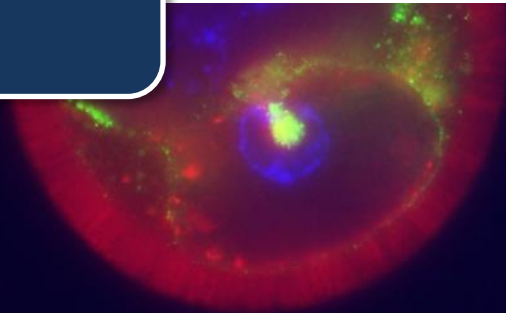
Department of Membrane Biochemistry



Department of Physiology and Ethology



Department of Immunogenetics



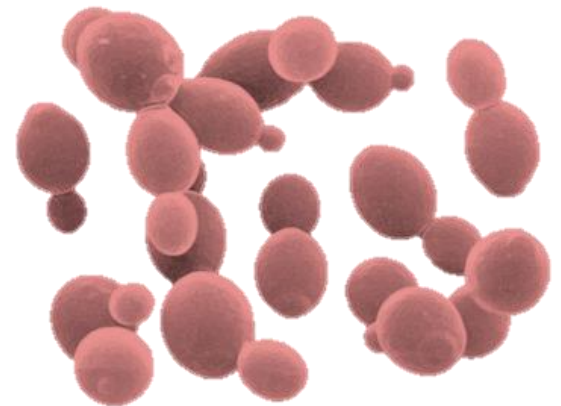
Department of Membrane Biochemistry

- **Laboratory of Membrane Biogenesis**

- role of lipid particles in eukaryotic cells
- biotechnological production of valuable lipids in yeast
- membrane lipids: biosynthesis, transport and turnover
- chromosome segregation in meiosis

- **Laboratory of Biosensors**

- development of novel biosensors for medicine and agriculture



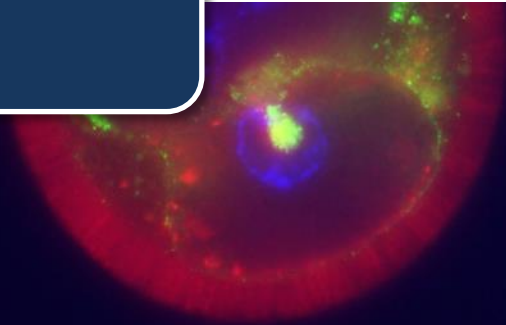
Department of Physiology and Ethology



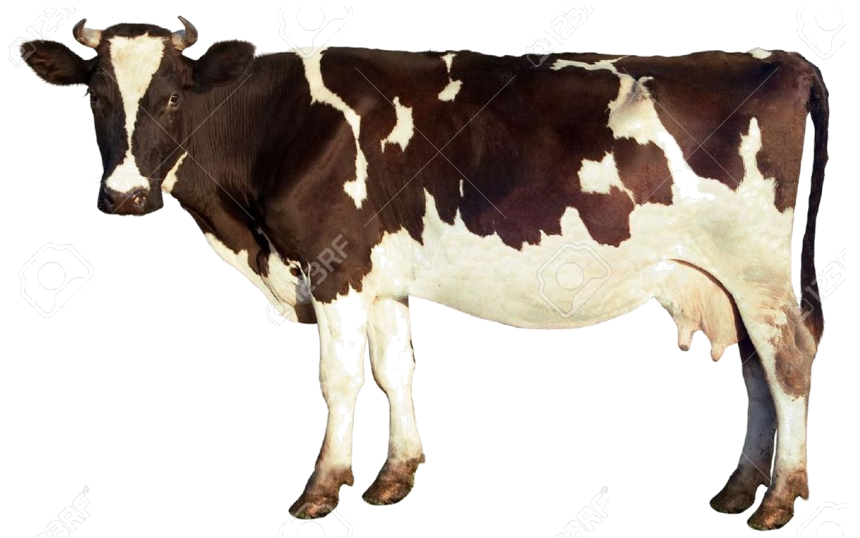
- poultry behaviour and welfare; epigenetic effects of maternal hormones; cognition and emotions
- neurobiology of birdsong; adult neurogenesis and singing behaviour; the use of MRI
- quail chorioallantoic membrane as *in vivo* angiogenesis and cancer diagnosis model

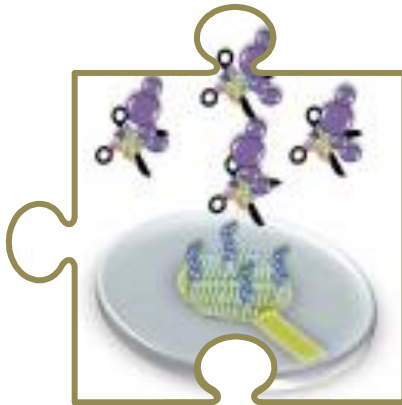


Department of Immunogenetics

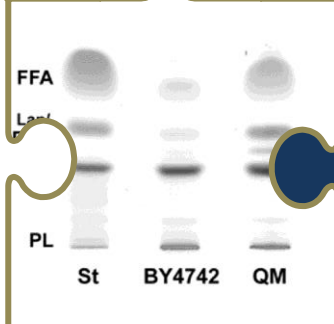


- CD molecules in reproductive processes of cattle
- analysis of tetraspanine web on bovine oocytes and sperm and its role in fertilization

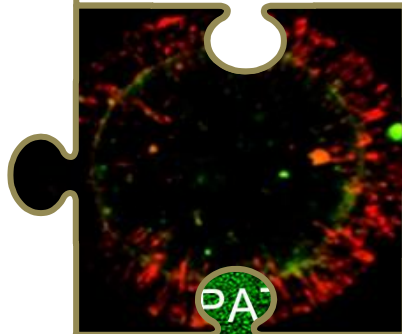




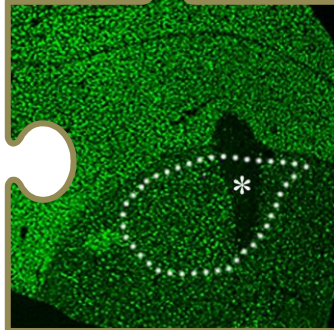
**interactions at membrane-like
interfaces**



**formation and maintenance of
membranes in eukaryotic cells**



**roles of membrane proteins in
cell-cell interactions**



**membrane receptors in neural
signalling and control of behaviour**

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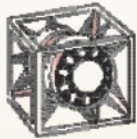
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The end of some laboratories...

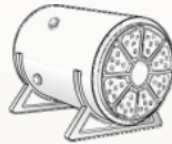
Cosmic Biology

26 Feb 1979: Commander Lyakhov and Flight Engineer Ryumin bring quail eggs aboard Soyuz-32 for incubation on Salyut 6. These are the first avian embryos in space.



25 Sept 1979: Quail eggs are launched on Kosmos 1129 (biosatellite) in Inkubator-1.

6 Dec 1989: Kvant-2 docks onto Mir with Inkubator-2 (1M) among other experimental equipment.



13 Mar 1989: NASA launches chicken embryos on Discovery STS-29. The "Chix in Space" hardware was designed by a student and sponsored by Kentucky Fried Chicken.



22 Mar 1990: The first quails hatch on Mir, making Commander Solovyov and Flight Engineer Balandin the first ever cosmo-aviculturists.

3 Aug 1990: Adult quails arrived on Mir via Soyuz TM-9. One had laid an egg on the shuttle ride.



7 Jul 1995: Quail embryos fixed by Dr. Thagard are returned to NASA laboratories via Atlantis STS-71 for post-flight study. This is the first participation of Americans in the quails in space effort.

28 Feb 1999: The surviving 10 quail chicks hatched on Mir descend to Earth aboard Soyuz TM-28 with Lt. Col. Bella and Commander Padalka. They land just south of Kiyma, Kazakhstan with 3 chicks who survive descent.

1979 1981 1983 1985 1987 1989 1991 1993 1995 1997 1999

The Slovak Socialist Republic (SSR) is part of what is officially the Czechoslovak Socialist Republic (ČSSR) and has been since 1960. ČSSR has been an Eastern Bloc satellite of Soviet Union since the Warsaw Pact invasion following Prague Spring in 1968.

17 Nov 1989: The Velvet Revolution begins.

29 Mar 1990: Czechoslovakia becomes the Czechoslovak Federal Republic, and the SSR is no longer socialist. Days later, after a brief "Dash War," the Czechoslovak Federal Republic becomes the Czech and Slovak Federal Republic (ČSFR)

19-21 Aug 1991: The August Coup attempt takes place whilst President Gorbachev is on holiday on the Black Sea.

31 Dec 1992: In what became known as the Velvet Divorce, Czechoslovakia agrees to dissolution into separate Czech and Slovak republics.

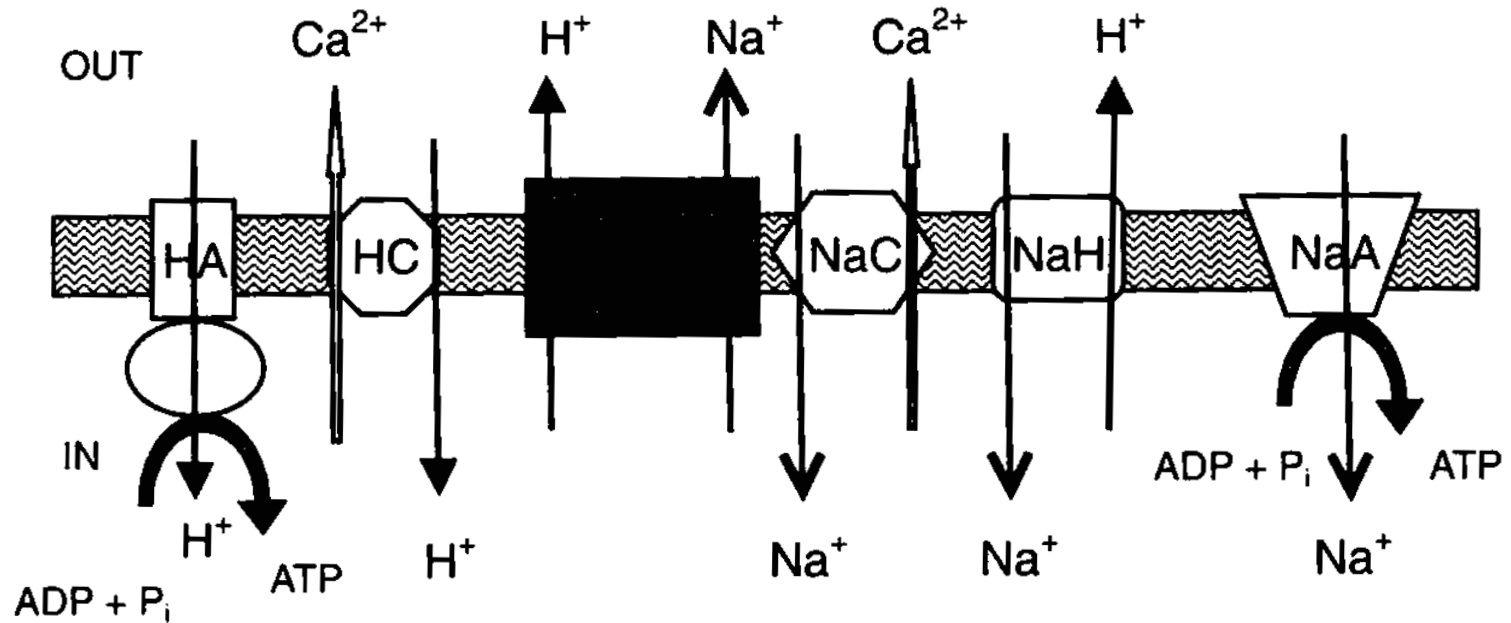
16 Dec 1991: Kazakhstan, the location of the launch site of all quail flights, Baikonur Cosmodrome, declares independence from U.S.S.R.

26 Dec 1991: The U.S.S.R. dissolves.

17 Aug 1998: The "Ruble Crisis" strikes. Russia defaults on debt and devalues the ruble.

The end of some laboratories...

Bioenergetics of Strict Anaerobes



- methanogenesis in *Methanothermobacter thermoautotrophicus*
- Na^+/H^+ translocating ATP-ase
- mutational analysis of the Na^+-H^+ antiport in this organism

The new topics...

Avian CAM as a model of angiogenesis



New topics...

Chromosome Segregation in Meiosis



Slovak Academy of Sciences Programme



Dr. Silvia Bágeľová Poláková, PhD.

Characterisation of new genes necessary for the
meiotic segregation of chromosomes

SASPRO 0070/01/02

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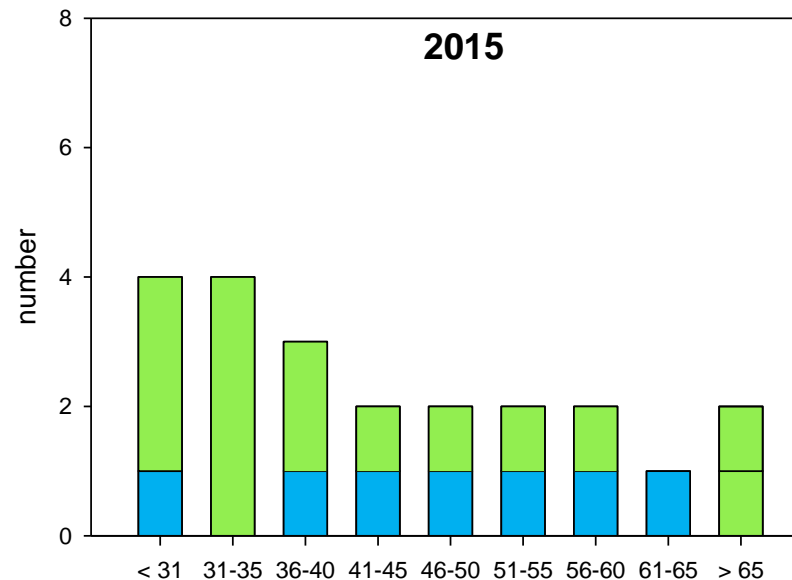
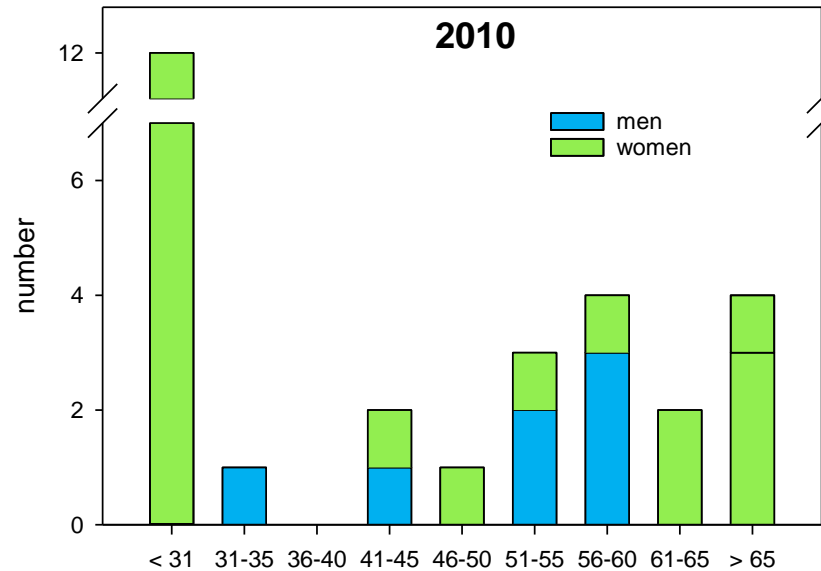
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Personal management

Researchers according to age and gender



Personal management

- balanced age structure
- limited instruments to motivate researchers
- using existing resources for stimulating to publish in high quality journals
- encouraging and helping young colleagues to obtain international experience

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Funding

Evaluation Period	VEGA	APVV	Internat. Funding incl. ERA-Net and SASPRO
2003-2006	38.4	77.8	12.9
2007-2011	51.6	128.4	35.1
2012-2015	245.7	527.5	328.8

in thousands of EUR

ERA-Net
IntelliTip

AWARE
ANIMAL WELFARE RESEARCH IN AN ENLARGED EUROPE

S A S **P R O**

EUWelNet
Coordinated European Animal Welfare Network

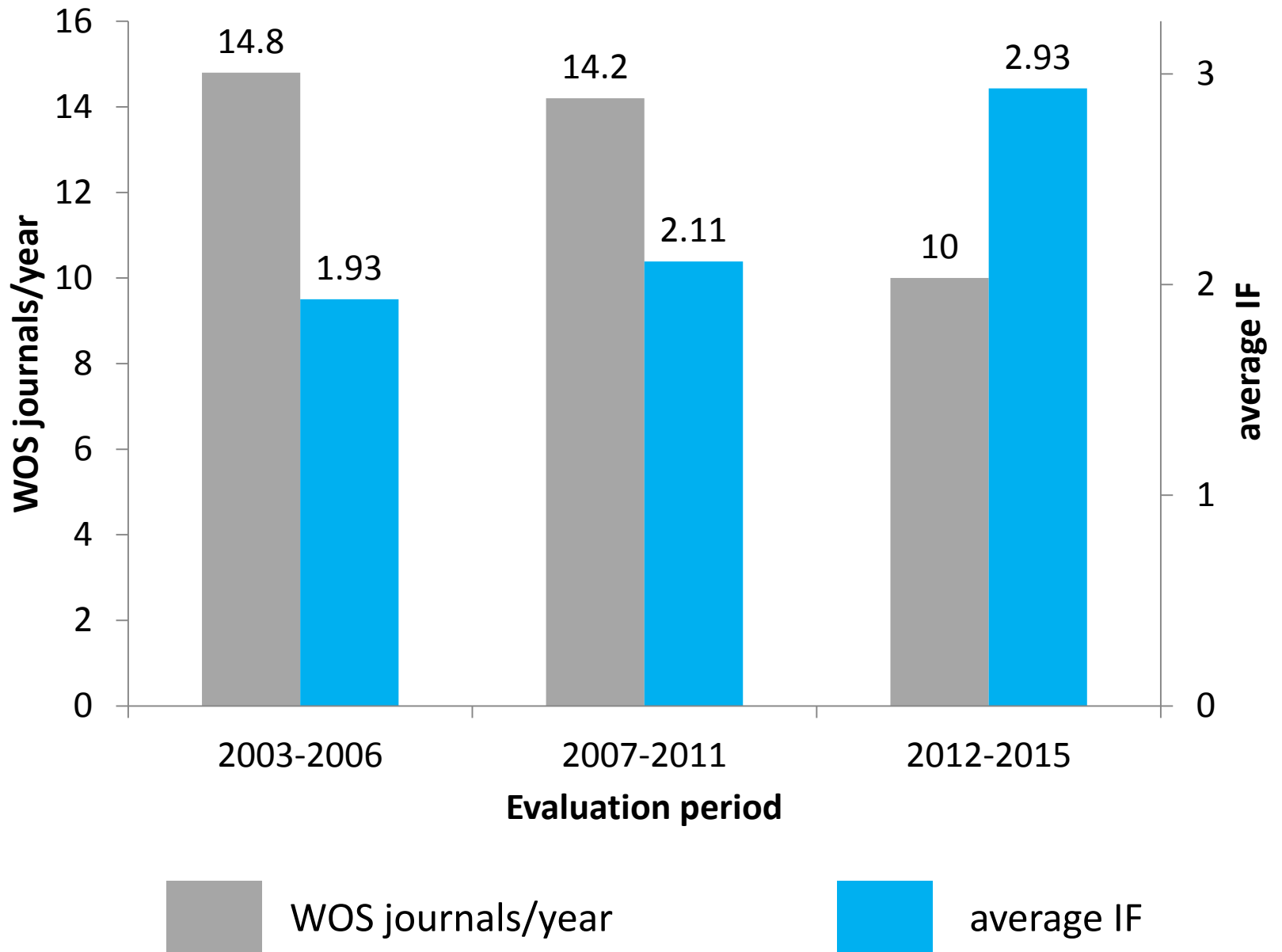
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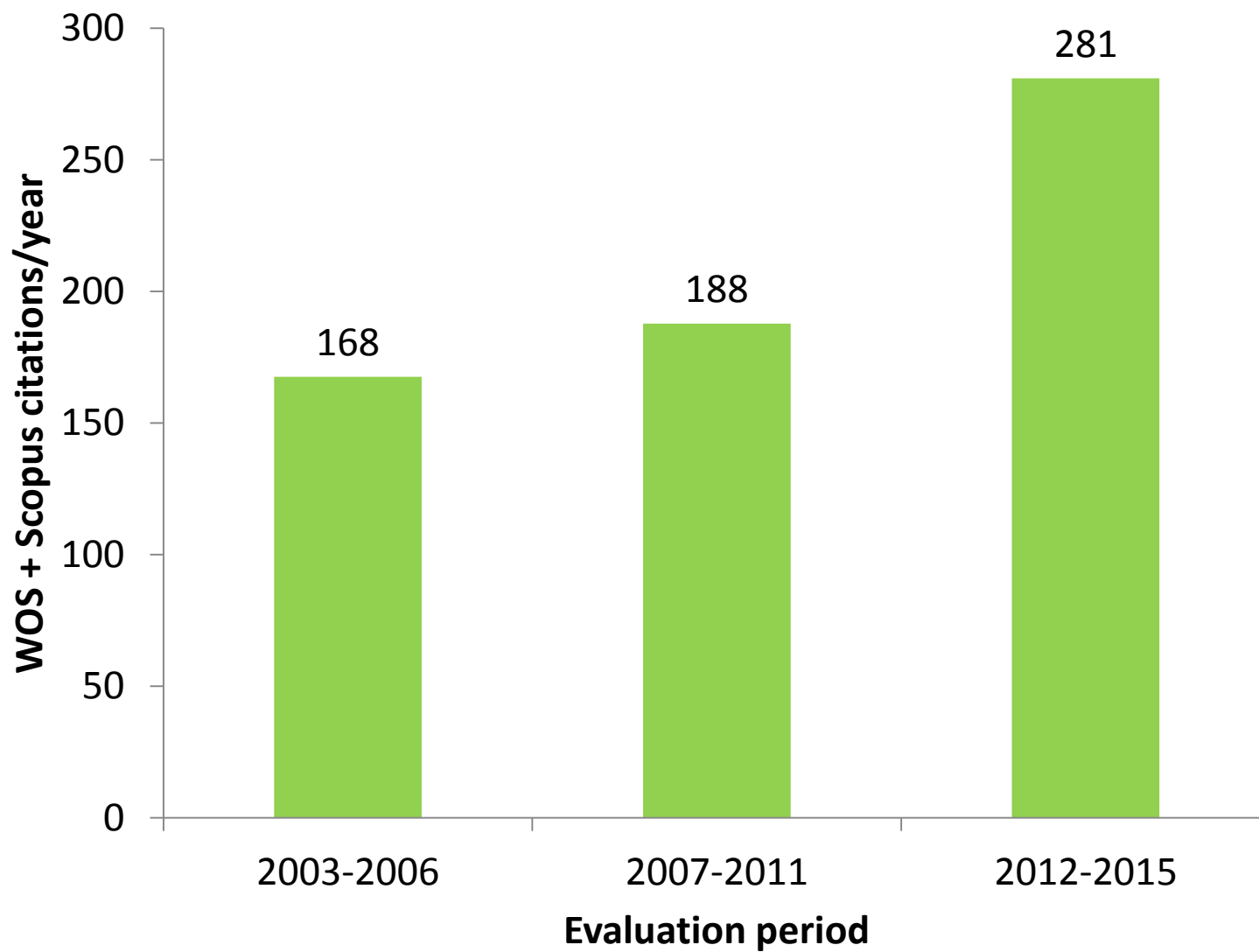
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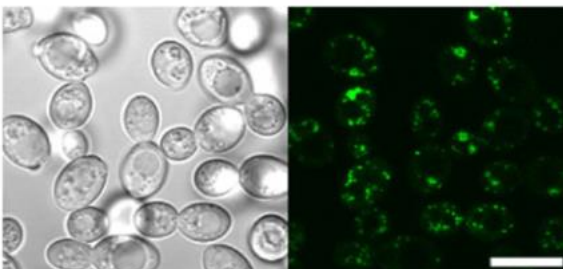
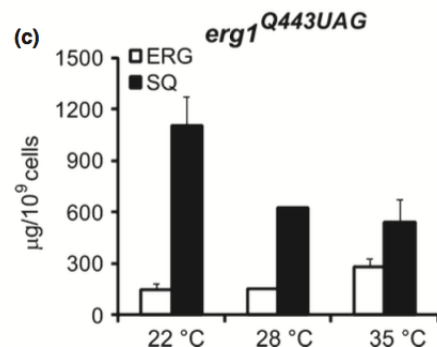
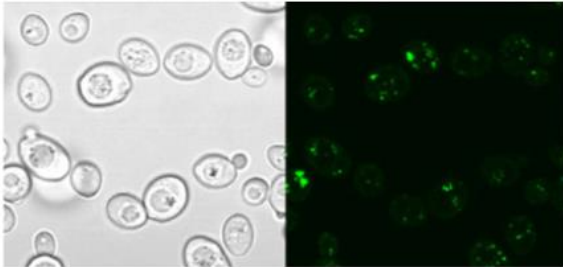
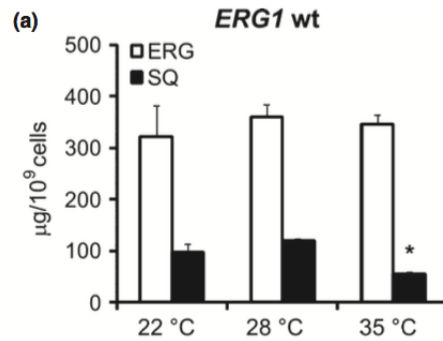


RESEARCH ARTICLE

Squalene epoxidase as a target for manipulation of squalene levels in the yeast *Saccharomyces cerevisiae*

Martina Garaiová, Veronika Zambojová, Zuzana Šimová, Peter Griač & Ivan Hapala

Institute of Animal Biochemistry and Genetics, Slovak Academy of Sciences, Ivanka pri Dunaji, Slovakia



Letters in
Applied Microbiology



Letters in Applied Microbiology ISSN 0266-8254

ORIGINAL ARTICLE

Production of squalene by lactose-fermenting yeast *Kluyveromyces lactis* with reduced squalene epoxidase activity

E. Drozdíková^{1,†}, M. Garaiová^{2,†}, Z. Csáky², M. Obernauerová¹ and I. Hapala²¹ Department of Microbiology and Virology, Faculty of Sciences, Comenius University, Bratislava, Slovakia² Institute of Animal Biochemistry and Genetics, Slovak Academy of Sciences, Ivanka pri Dunaji, Slovakia

Christopher B. Fox (ed.), *Vaccine Adjuvants: Methods and Protocols*, Methods in Molecular Biology, vol. 1494, DOI 10.1007/978-1-4939-6445-1_7, © Springer Science+Business Media New York 2017

Biosynthetic Approaches to Squalene Production: The Case of Yeast

Martin Valachovič and Ivan Hapala

- engineered yeast accumulating high amounts of valuable lipid – squalene under biotechnologically relevant conditions
- established small-scale purification of squalene from yeast

Localization of CD9 Molecule on Bull Spermatozoa: Its Involvement in the Sperm–Egg Interaction

J Antalíková, J Jankovská, M Šimon, P Cupperová, K Michalková and E Horovská

Department of Immunogenetics, Institute of Animal Biochemistry and Genetics Slovak Academy of Sciences, Ivanka pri Dunaji, Slovakia

Original Paper

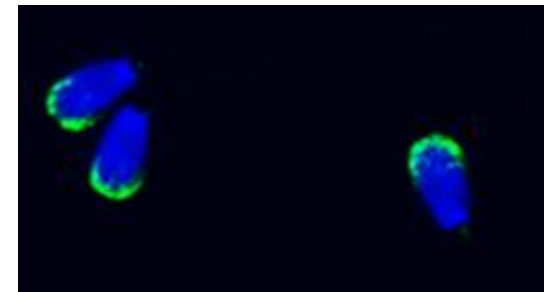
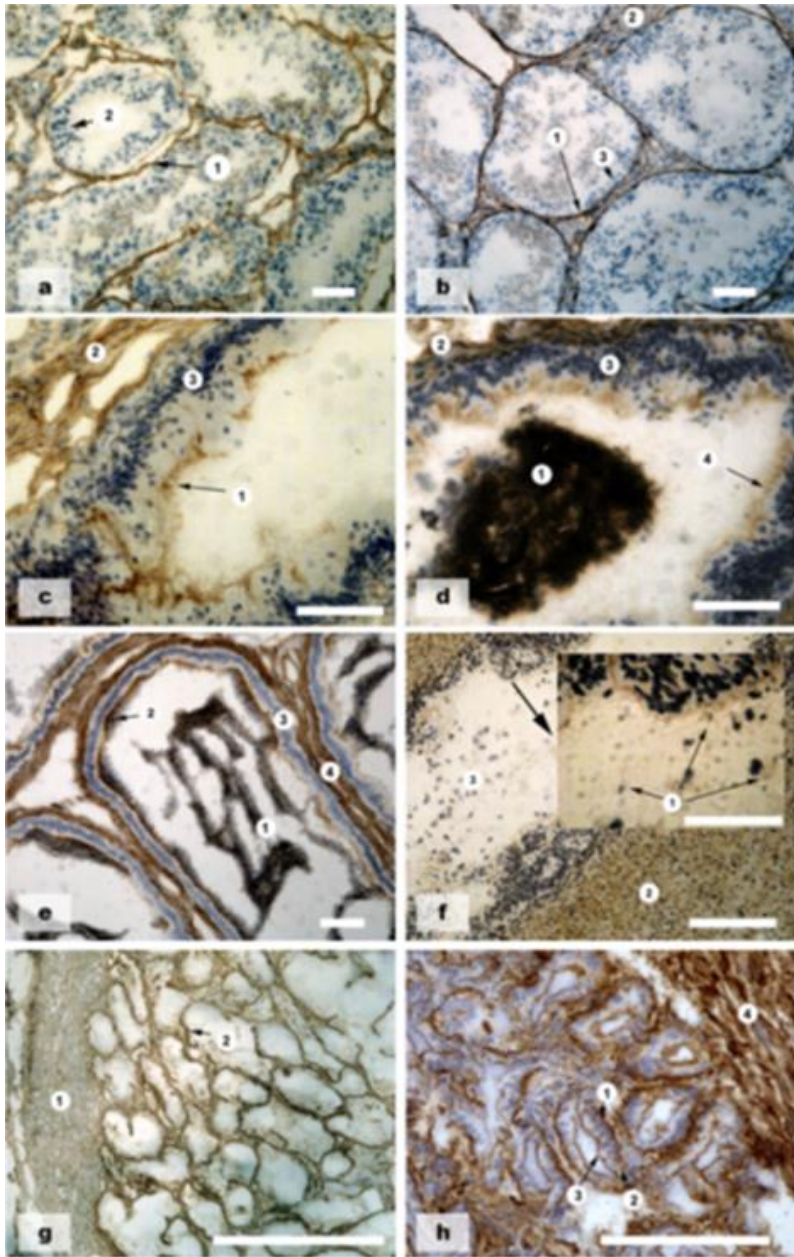
Czech J. Anim. Sci., 59, 2014 (3): 134–139

Distribution of tetraspanin family protein CD9 in bull reproductive system

P. CUPPEROVÁ¹, M. ŠIMON¹, J. ANTALÍKOVÁ¹, K. MICHALKOVÁ¹, L. HOROVSKÁ¹, S. HLUCHÝ²

¹Institute of Animal Biochemistry and Genetics, Slovak Academy of Sciences, Ivanka pri Dunaji, Slovak Republic

²Faculty of Agrobiology and Food Resources, Slovak University of Agriculture in Nitra, Nitra, Slovak Republic



- detection of CD9 tetraspanin in bull reproductive system and sperm plasma membrane
- its probable role in gamete interaction

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Department of Membrane Biochemistry

- construction of biosensors for medicine and agriculture
- biotechnological production of valuable lipids in yeast
- resistance to antifungal substances

Department of Physiology and Ethology

- Coordinated European Animal Welfare Network
- problems of poultry industry - damaging behaviour in laying hens, keel bone damage
- learned vocal communication as a model of language disorders
- photodynamic diagnosis and therapy of cancer

Department of Immunogenetics

- cattle reproduction

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Strengths

- strong research program
- collaboration with universities
- bi- and multi-lateral collaborations
- balanced age structure
- positive working environment

S

Weaknesses

- size of the institute
- state/conditions of existing premises
- isolation from the main campus
- lack of modern infrastructure
- output quantity

W

Opportunities

- moving to new premises
- establishing the Centre of Biosciences
- structural funds
- international projects
- internationalization of the staff

O

Threats

- unstable grant system
- lack of public understanding of our research mission
- unable to compete with commercial sphere and foreign institutions for the most talented

T

Talented young colleagues

Competition of Young Research Workers of the SASci



2015, 3rd prize
Ing. Alexandra Poturnayová, PhD.

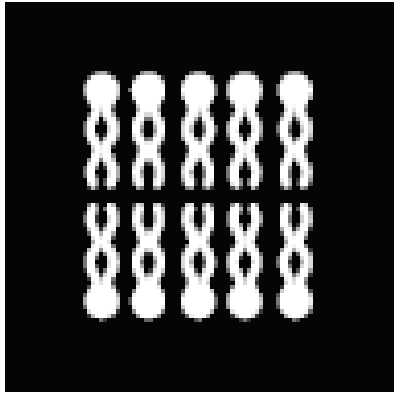


Section 2 of the SASci

2015, 2nd prize
Mgr. Eva Bosíková - Pavuková, PhD.



2016, 1st prize
Mgr. Mária Balážová, PhD.



**CENTRE OF
BIOSCIENCES
SLOVAK ACADEMY
OF SCIENCES**

