EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

EU ROS

www.cost.eu/bmbs

## COST Action no. BM1203

# EU-ROS

## European Network on the Reactive Oxygen Species: Sources, targets and Applications (2012 – 2016)

**Biomedicine and Molecular Biosciences (BMBS)**

**Participating countries**

**AT, BA, BE, BG, CH, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IL, IT, LU, MK, MT, NL, NO, PL, PT, RO, RS, SI, SK, SE, TR, UK**

### Background

Life requires oxygen and oxygen is vital to the respiration of almost all cells. When partially reduced, like in hydrogen peroxide ($H_2O_2$) or superoxide radical ($O_2^{\bullet-}$), reactive oxygen species (ROS) are formed. ROS have several faces: ROS can be very aggressive and do serious harm to the cell's building blocks, but in tightly regulated amounts they act as essential signaling molecules. Unraveling the fine balance and the regulation mechanisms between ROS acting as a friend or a foe is fundamental to understand aerobic life.

### Mission/Objectives

To advance this important area of biology and medicine, EU-ROS will bring together multi-disciplinary experts to cross-fertilize ideas and to enhance the competitiveness of European research. By applying new approaches, sharing tools and discussing latest discoveries we aim at generating an advanced knowledge at the molecular mechanistic and cellular level, which will translate into novel applications for medicine or crop science. With EU-ROS, we overcome the fragmentation of European research on ROS, and the translated outcome will contribute to the benefit of European societies' economic growth and wellbeing.

### Main Achievements since budgetary start in April 2013

- EU-ROS kicked off in December 2012; the grant agreement started on 1 April 2013
- 33 participating countries, 1 IPC, 1 NNC (another pending); > 150 MC and WG members
- 10 Core Group meetings held (skype conference)
- 1st MC/WG meeting in Budapest (May 2013), 2nd MC/WG meeting in Istanbul (March 2014), 3rd MC/WG meeting planned in Munich (November 2014), 4th MC/WG meeting planned in Padua (March 2015)
- 1st WG meeting in Athens (September 2013), 2nd WG meeting in Madrid (December 2013), up to 10 small size WG meetings (5-6 participants from consortia for H2020 applications) planned for the next budget year at various places
- 6 completed STSMs, 3 approved STSMs and 2 pending STSMs until now, up to 16 STSMs planned for the next budget year
- 1st TS in Zurich in March 2013 (joint with Neurinox EU Network), 2nd TS in Birmingham in July 2013 (joint with Action CM1001)
- 1 dedicated Journal issue confirmed (Antioxid. Redox Signal. Forum issue), 1 edited book on ROS pre-approved (Springer Handbook of Experimental Pharmacology), 3 confirmed joint publications from EU-ROS members with acknowledgement of COST support, more have been announced for the next budget year
- Currently a consortium of 11 EU countries with 9 members of EU-ROS (McBean, Cuadrado, Lopez, Schmidt, Jaquet, Zarkovic, Frapart, Wallner, Ferdinandy) apply for a H2020 Marie Sklowdowska Curie Innovative Training Network (H2020-MSCA-ITN-2014).
- EC RTD Framework Programme proposal is currently prepared by another consortium with EU-ROS members (Schmidt, Krause, Jaquet and others)
- EU-ROS consortium (Krause, Jaquet and others) has successfully applied for 2 Swiss National UNIGE Grants. This was only possible by COST support and collaboration with other EU-ROS members

### Networking Needs & Other Objectives

- Chemistry: Analytics, synthesis
- Physics: Radical detection, imaging
- Systems biology: Pathway construction, Network analysis
- Medicine: Possible diagnostic & therapeutic applications
- Biology: Common pathways, Possible diagnostic & commercial applications
- Patient groups
- Public awareness: To alert consumers about false promises and risks of antioxidants and vitamins
- Horizon 2020 initiatives: To apply for interdisciplinary networks

## Contact details


**Chair of the Action**
Prof. Andreas Daiber,
University Medical Center Mainz, Germany
daiber@uni-mainz.de

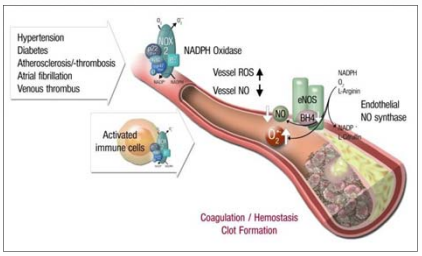
**Vice Chair of the Action**
Prof. Fabio di Lisa
Università di Padova, Italy
dilisa@bio.unipd.it

**DC Rapporteur**
Dr. Johanna Lanner
Karolinska Institutet, Sweden
johanna.lanner@ki.se

**Science Officer**
Dr. Inga Dadeshidze
inga.dadeshidze@cost.eu

**Administrative Officer**
Dr. Jeannette Nchung Oru
jeannette.nchungoru@cost.eu


**Website**
www.eu-ros.eu




Contribution of immune cells to vascular complications. Interplay of reactive oxygen species sources in vascular and immune cells in the progression of vascular dysfunction and thrombus formation. Karbach et al. *Curr. Pharma. Des.* **2014**. © Bentham Science Publishers. Similar interactions of ROS and immune cells have been reported in our themed WG sessions on fibrosis and neuro-degeneration.


COST is supported by the EU RTD Framework Programme

ESF provides the COST Office through a European Commission contract

EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

www.cost.eu/bmbs

## Working Group activities

### Working Group 1: Sources of ROS

- WG leader: Prof. Ulla Knaus
- Physiological/disease-relevant, specific inhibition/validation (for WG3)
- Organization of 3 themed disease-specific WG sessions at meetings

### Working Group 2: Molecular Mechanisms & Targets

- WG leader: Prof. Agnes Görlach
- Identify relevant damage (for WG4), define mechanism, provide basis for molecular detection (for WG4)

### Working Group 3: Drugs

- WG leader: Dr. Tamara Seredenina
- Inhibit disease-relevant ROS sources (from WG1) without eliminating physiological, molecularly or functionally revert damage
- Establishment of a Drugs and Tools database for oxidative stress & redox research such as knockout mice, antibodies

### Working Group 4: Diagnostics & Biomarkers

- WG leader: Prof. Pietro Ghezzi
- Validation of animal models, early identification and localisation of risk, apply to tailor and monitor therapy (from WG3)
- Establishment of a biomarker database for oxidative stress markers that could be used in biological samples

### Working Group 5: Imaging

- WG leader: Dr. Yves Frappart
- Localisation of risk, define sources (for WG1) and biomarkers (for WG4)

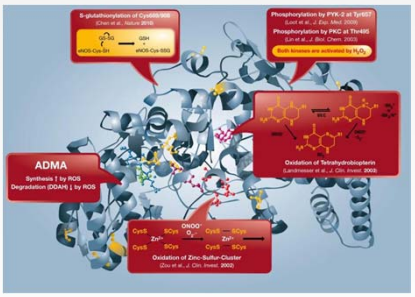
### Working Group 6: Technology Transfer & Funding

- WG leader: Dr. Vincent Jaquet
- Facilitate collaboration, exchange of and assist with SOPs, technologies, methods, samples, tools and models

**Industry participation**

**Redoxis**
Fredrik Wallner
Projectleader Sweden
Fredrik.wallner@redoxis.com
www.redoxis.se

**Glucox Biotech**
Per Wikström
Management Team Sweden
Per.wikstrom@glucoxbiotech.com
www.glucoxbiotech.com




Redox regulation of endothelial nitric oxide synthase by different "redox switches". S-glutathionylation, phosphorylation by redox-sensitive kinases, oxidative depletion of tetrahydrobiopterin ($BH_4$), oxidative disruption of the zinc-sulfur binding site, redox regulation of the endogenous eNOS inhibitor asymmetric dimethylarginine (ADMA). Kröller-Schön et al. *Antioxid. Redox Signal.* **2014**. © MARY ANN LIEBERT INC.

EU-ROS

COST is supported by the EU RTD Framework Programme

EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE
ESF provides the COST Office through a European Commission contract