

# Redox regulation: Historical background and future developments

Faculté des sciences, Amphitheater 8, Vandoeuvre-lès-Nancy, Université de Lorraine

Redox regulation referred to as post-translational modifications affecting protein cysteine residues is of great importance for many biological processes. A milestone was the discovery in the 70s that photosynthesis is regulated at several entry points by such modifications. However, over the last decade, it has become obvious in all organisms that additional cellular functions and signaling pathways are controlled by redox changes, some of these being relevant for human health or microbial development and virulence. This redox biology symposium is the third of a series initiated in 2013 in Kaiserslautern followed by a second edition in 2015 already in Nancy. This edition will deal with redox regulation in eukaryote and bacterial systems with emphasis on plants as it is organized in the honor of Pr Jean Pierre Jacquot, who has made pioneering discoveries in this field and will officially retire in 2017.

## Day 1, March 29

13:00 - 13:45 Coffee – Welcome

13:45 - 14:00 Introduction

### Session 1

#### Redox regulation in chloroplasts and mitochondria (Chair: Stéphane Lemaire)

14:00 - 14:30 [Bob Buchanan](#) (Univ. Berkeley, USA)

*Jean-Pierre Jacquot, a Berkeley perspective*

14:30 - 15:00 [Renate Scheibe](#) (Univ. Osnabrück, Germany)

*Integration of thiol-modifications and metabolic fluxes for maintenance of cellular homeostasis*

15:00 - 15:20 [Stefanie Müller](#) (Univ. Bonn, Germany)

*Probing the glutathione-linked redox regulation in chloroplasts: Glutathione reductase mutants in Arabidopsis and Physcomitrella*

15:20 - 15:40 [José Gualberto](#) (Univ. Strasbourg, France)

*RECG1 and RADA are branch migration proteins that affect the stoichiometric segregation of the Arabidopsis mtDNA*

15:40 - 16:00 [Antonio Serrato](#) (CSIC Granada, Spain)

*Depicting the boundaries between the chloroplast thioredoxins f and m*

16:00 - 16:30 **Coffee break**

16:30 - 17:00 [Karl-Josef Dietz](#) (Univ. Bielefeld, Germany)

*Taming and exploiting redox- and ROS information in the chloroplast: The function of peroxiredoxins*

17:00 - 17:30 [Bernhard Grimm](#) (Univ. Berlin, Germany)

*Redox Control of the Tetrapyrrole Metabolism*

17:30 - 18:00 [Pascal Rey](#) (CEA Cadarache, France)

*Involvement of the Arabidopsis plastidial CGFS glutaredoxin, GRXS14, in the maintenance of chlorophyll content as a function of environmental conditions*

18:00 - 18:30 [Toshiharu Hase](#) (Univ. Osaka, Japan)

*Molecular basis for protein-protein interactions of Fd with Fd-dependent enzymes*

19:30 **Dinner together**

## Day 2, March 30

### Session 2

#### Redox regulation and development (Chair Yves Meyer)

8:30 - 9:00

[Ralf Reski](#) (Univ. Freiburg, Germany)  
*A moss (*Physcomitrella patens*) as an evo-devo model*

9:00 - 9:30

[Andreas Meyer](#) (Univ. Bonn, Germany)  
*Oxidative protein folding and disulfide-dependent plant hormone signalling in the plant endoplasmic reticulum of *Arabidopsis**

9:30 - 10:00

[Carsten Berndt](#) (Univ. Düsseldorf, Germany)  
*Redoxins affect embryonic development in the model organism zebrafish*

10:00 - 10:30

**Coffee break**

10:30 - 11:00

[Pierre Frendo](#) (Univ. Sophia Antipolis, Nice, France)  
*Regulation of Differentiation of Nitrogen-Fixing Bacteria by Microsymbiont-Targeting of Plant Thioredoxin *s1**

11:00 - 11:20

[Olivier Keech](#) (Umeå University, Sweden)  
*The regulation of primary metabolism and its control during leaf senescence*

11:20 - 11:40

[Johannes Knüsting](#) (Univ. Osnabrück, Germany)  
**Arabidopsis* Glutaredoxin *S17* (*GrxS17*) as a Central Redox-Switch in Development*

### Session 3

#### Reductases, transferases and proteomics (Chair Peter Schürmann)

11:40 - 12:10

[Arne Holmgren](#) (Karolinska Institute, Stockholm, Sweden)  
*Selenocysteine in mammalian thioredoxin reductase and application of ebselen and related selenazols as therapeutics*

12:10 – 12:30

[Jean-Christophe Lec](#) (Univ. Lorraine, France)  
Mechanism and substrate specificities of bacterial and human thiosulfate sulfurtransferases: Human TSTD1 displays dual physiological roles in hydrogen sulfide production and elimination

12:30 – 14h00

**Lunch**

14:00 - 14:30

[Eric Gelhaye](#) (Univ. Lorraine, France)  
*Glutathione transferases in degradation of lignocellulosic materials*

14:30 - 15:00

[Monica Balsera](#) (IRNASA-CSIC, Salamanca, Spain)  
*Diversity and evolution of thioredoxin reductases*

15:00 - 15:20

[Mathieu Schwartz](#) (Univ. Lorraine, France)  
*Glutathione Transferase *Xi*: Structural insights into a class of enzymes conserved in fungi*

15:20 - 15:40

[Alain Lescure](#) (Univ. Strasbourg, France)  
*Is the selenium containing protein SelenoN a hemoprotein?*

15:40 - 16:00

[Sergio Esposito](#) (Univ. Napoli, Italy)  
*Effects of heavy metals cations on the activity of recombinant glucose 6P dehydrogenase from poplar*

16:00 - 16:30

**Coffee break**

- 16:30 - 17:00 [Christophe Marchand](#) (Univ. Pierre et Marie Curie, France)  
The deep thioredoxome in *Chlamydomonas reinhardtii* : new insights into redox regulation
- 17:00 - 17:30 [Markus Schwarzländer](#) (Univ. Bonn, Germany)  
Thiol-Switching during Kick-Start of Mitochondrial Energy Metabolism drives Efficient Seed Germination
- 17:30 - 18:00 [Stéphane Lemaire](#) (Univ. Pierre et Marie Curie) and [Nicolas Rouhier](#) (Univ. Lorraine, France)  
*Jean-Pierre Jacquot, a French perspective*
- 18:00 - 18:30 [Jean-Pierre Jacquot](#) : *a personal perspective*
- 19h30 ***Dinner together***

### Day 3, March 31

#### Session 4

#### Structural and biochemical insights into redox enzymes (Chair: Nicolas Rouhier)

- 8:30 - 9:00 [Jérémy Couturier](#) (Univ. Lorraine, France)  
*Arabidopsis thaliana* GRXS16, a multifaceted glutaredoxin in chloroplasts
- 9:00 - 9:30 [Mirko Zaffagnini](#) (Univ. Bologna, Italy)  
*ROS-mediated glutathionylation triggers amyloid-like aggregation of plant glycolytic GAPDH*
- 9:30 : 9:50 [Jonathan Przybyla-Toscano](#) (Univ. Lorraine, France)  
*Who are the partners of the mitochondrial Arabidopsis thaliana GRXS15 in the trafficking of iron-sulfur clusters?*
- 9:50 : 10:10 [Philippe Minard](#) (Univ. Paris-Sud, France)  
*Creation of artificial specific proteins by directed evolution*
- 10:10 - 10:30 [Thomas Roret](#) (Univ. Lorraine, France)  
*Structural characterization of BOLA-metal complexes: the case of Sinorhizobium meliloti YrbA*
- 10:30 - 11:00 ***Coffee break***
- 11:00 - 11:30 [Christopher Lillig](#) (Univ. Medicine Greifswald, Germany)  
*PAPS reductase as probe to understand the substrate-specificity of thioredoxins and glutaredoxins*
- 11:30 - 12:00 [Jean-Marc Lancelin](#) (Univ. Lyon, France)  
*Statistical mechanics to predict and analyze Inhibition of peroxiredoxins by catechol series*
- 12:00 - 12:30 [Bin Xia](#) (Univ. Beijing, China)  
*Solution NMR Studies of Plant Glutaredoxins*
- 12:30 ***Concluding remarks, end of the meeting***  
***Snacks and drinks before departure or as a take away***