

GRS Thiol-Based Redox Regulation and Signaling (GRS)

– Understanding Redox Processes and Cellular Consequences in Biomolecules and Whole Cells –

Final Report

1. Conference Background

The **Gordon Research Seminar (GRS) on Thiol-Based Redox Regulation and Signaling** is a two-day conference organized every two years by early career scientists from the Thiol-Redox field. The seminar specifically addresses international researchers who are in the **early stages of their scientific careers**. The GRS is coupled with the Gordon Research Conference on **Thiol-Based Redox Regulation and Signaling**, which usually all attendees of the GRS also join.

The aim of the GRS is to bring young researchers from the Thiol-Redox field together to share expertise, latest research findings, to improve their communication skills and to create an interactive international scientific network. Previous conferences were held in 2014, 2016, 2018, 2022 with great success and about 30 to 50 participants participating each time. The 2024 GRS on Thiol-Based Redox Regulation and Signaling took place on **July 13th and 14th 2024** at the Rey Don Jaime Grand Hotel in Castelldefels (Spain) **with 50 registered international participants**.

2. Conference Summary

A detailed program with the invited speakers is attached at the end.

The GRS is designed to provide a **venue for postdoctoral trainees and graduate students** to openly present their research to their peers, to learn how to productively communicate research ideas, and to promote a dynamic and interactive scientific community. At our conference, subtitled “**Understanding Redox Processes and Cellular Consequences in Biomolecules and Whole Cells**” we aimed to address a broad audience from the redox biology field that are interested in molecular factors involved in thiol-redox biology and whose alterations have profound consequences on several physiological and pathophysiological scenarios.

We divided the conference in three different scientific sessions: **(1) Lipids in redox biology, (2) Cellular redox signaling and regulation, (3) Tools to monitor redox modifications**. Due to the high interest of participants in giving oral presentations, we decided to go for 10 min talks and 5 min discussion, to provide opportunity to a large number of attendees to give a presentation. We selected the talks from the submitted abstracts based on scientific excellence and tried to balance gender, nationality and career stage:

Gender	Countries	Career Stage
Female: 11 Male: 7	Uruguay (1), USA (6), India (3), UK (1), China (1), Israel (1) and Europe (5)	PhD students (13), PostDoc (4) and Trainees (1)

For each session, we invited one discussion leader from the submitted abstracts and one from our invited speakers from the mentorship panel (faculty scientists) to ensure open and interesting discussions. **One of the selected talks was awarded by people's choice to be held at the associated GRC.**

In addition, **two poster sessions** were included in the program, after sessions 1 and 3. The poster sessions are a very important part of the GRS, as they allow for the discussion and exchange of ideas while promoting a networking environment. Out of the 50 participants, 46 people brought a poster and we ensured that each topic was present in each poster session. In order to encourage attendees to attend the poster sessions, we, for the first time for this GRS, included poster prizes using an online tool and democratic people's choice. Since we used all sponsorship to support attendance (see chapter on budget), we did not give monetary prizes, but a symbolic certificate and a piece of sulfur.



Poster Award session at the pool after the GRS.

We included one mentorship panel **(4) Navigating your career path in our program as our last session.** In this 1-hour mentorship panel with **three established researchers** (Maria Fedorova, Tobias Dick and Jan Ulrik Dahl) we had an open discussion in which the three speakers answered questions from the attendees. Questions such as why did you choose to stay in academia? What were obstacles you had to overcome for this? How do you think good mentorship looks like? And many others were asked mostly by very early career scientists from the audience.

3. Budget Summary

At this point we want to thank all contributors for their financial support! We decided not to use the money for refreshments/alcoholic drinks, but, since many research groups have limited budgets, to ensure that we have a diverse audience. For that we teamed up with the chairs of the associated GRC to acquire funding resulting in over 60,000 \$ in total.

For the GRS we were able to spend 10,070 \$ for registration and travel of our attendees and were able to support all the people that requested funding in coordination with the GRC funds (some GRS attendees that requested funding got reimbursements through the GRC, if they did not get money from GRS). We supported **10 scientists from the US (NSF), one from China (NEB), one from Israel (SfrrE) and three from Europe (SfrrE) with around 300 \$ registration award** each. Additionally, we were able to support **one PhD student from Uruguay and one from India with ca. 940\$ each** (Company of Biologists). We were also able to cover the registration and travel from our invited speakers partially through funds from the

GRC. We tried to balance the funding by gender, nationality (where applicable) and career stage (see table).

Contributor	Amount	Recipients	Reason
NSF	10x300 \$	10 trainees in the US (8 PhD students (f), 1 PostDoc (m) and one undergraduate student (m)	Registration
Sfrre	1219 \$ (3x310 \$, 1x319 \$)	2 PhD students in Europe (Sweden (f) and Belgium (f)) 1 Postdoc from Germany (f) and 1 PhD student from Israel (m)	Registration
Company of Biologists	Around 940 \$	1 PhD student from India (f) and Uruguay (f)	Travel
NEB	500 \$	Registration for one PhD student from China (m) and one postdoc from Japan (m)	Registration

4. Summarizing Remarks

This Gordon Research Seminar (GRS) on Thiol-Based Redox Regulation and Signaling was organized by the early career scientists Lisa R. Knoke (PostDoc at Ruhr University Bochum, Germany) and Uladzimir Barayeu (PostDoc at Tohoku University, Japan).

Overall, we think this was a great meeting – and we look forward to the next round in two years with two amazing Co-Chairs elected during our business meeting – congratulations. We thank all attendees, invited speakers, our contributors, our conference manager from GRC and on-site staff for a great conference with excellent science, fruitful discussions and a lot of networking and fun. We also want to warmly thank Carolyn Sevier and Elizabeth Veal (the GRC chairs) for the great team work.



(Lisa Knoke)



(Uladzimir Barayeu)

Detailed Conference Program

Saturday

1:00 - 5:00 pm	Arrival and Check-in
3:00 - 3:15 pm	Introductory Comments by GRC Staff / Welcome and Introduction from the Chairs
3:15 - 4:00 pm	Lipids in Redox Biology Discussion Leaders: Maria Fedorova (Technical University Dresden, Germany) and Paraskevi Kritsiligkou (German Cancer Research Center (DKFZ), Germany)
3:15 - 3:25 pm	Martina Steglich (Universidad de la República, Uruguay) "Human Glutathione Transferases Catalyze the Inactivation of Nitrooleic Acid"
3:25 - 3:30 pm	Discussion
3:30 - 3:40 pm	Meg Shieh (Brown University, United States) "2H-Thiopyran-2-Thione Sulfine and its Analogues: Unique Compounds For Converting H ₂ S to HSOH/H ₂ S ₂ "
3:40 - 3:45 pm	Discussion
3:45 - 3:55 pm	Neha (Indian Institute of Science Education and Research Kolkata, India) "Effect of p-Benzoquinone, a Cigarette Smoke-Derived Component, on the Architecture of Red Blood Cell Membrane"
3:55 - 4:00 pm	Discussion
4:00 - 5:30 pm	Poster Session I
5:30 - 7:30 pm	Cellular Redox Signaling and Regulation Discussion Leaders: Jan-Ulrik Dahl (Illinois State University, United States) and Simran Gupta (Indian Institute of Science Education and Research, Pune, India)
5:30 - 5:40 pm	Ragini Agrawal (Indian Institute of Science, Bengaluru, India) "Precision Persulfide Generation Provides Insight into the Mitochondrial Sulfane Sulfur Pool"
5:40 - 5:45 pm	Discussion
5:45 - 5:55 pm	Hussain Beig (Indian Institute of Science, India) "Thiol Based Defense Mechanisms of Mycobacterium Tuberculosis Against Hypochlorous Acid"
5:55 - 6:00 pm	Discussion
6:00 - 6:10 pm	Jonathan Petrocelli (Dana-Farber Cancer Institute/Harvard Medical School, United States) "Exploring Skeletal Muscle Cysteine Oxidation Shifts Immediately Post and in Recovery from Acute Exercise"
6:10 - 6:15 pm	Discussion
6:15 - 6:25 pm	Marta Bogacz (Friedrich Schiller University, Jena, Germany, Germany) "Active Site Cysteine Positioning in a <i>Trypanosoma Brucei</i> Dual-Function Peroxiredoxin Enables Adaptation to a Parasitic Life Style"
6:25 - 6:30 pm	Discussion
6:30 - 6:40 pm	Thomas Foy (Newcastle University, United Kingdom)

	"A 2-Cys Peroxiredoxin Confers Redox Sensitivity on a p38-Related MAPK by Dual Independent Mechanisms"
6:40 - 6:45 pm	Discussion
6:45 - 6:55 pm	Haruna Takeda (Dana-Farber Cancer Institute, United States) "Mediator Complex Subunit 16 (MED16): Its Physiological Role and Redox-dependent Regulations"
6:55 - 7:00 pm	Discussion
7:00 - 7:10 pm	Lindsey Farris (Wake Forest University School of Medicine, United States) "Novel Modification of Peroxiredoxin 3 After Mitochondrial Oxidative Stress"
7:10 - 7:15 pm	Discussion
7:15 - 7:25 pm	Anna Thompson (Georgia Institute of Technology, United States) "A New Role for Cu/Zn Superoxide Dismutase in Fe/S Biogenesis"
7:25 - 7:30 pm	Discussion
Sunday	
9:00 - 11:00 am	Tools to Monitor Thiol-Redox Modifications Discussion Leaders: Tobias Dick (German Cancer Research Center (DKFZ), Germany) and Teresa Marker (German Cancer Research Center (DKFZ), Germany)
9:00 - 9:10 am	Danny Schilling (German Cancer Research Center (DKFZ), Heidelberg, Germany, Germany) "Exploring Endogenous Modulators of Protein Persulfidation Using a Novel Quantitative Assay"
9:10 - 9:15 am	Discussion
9:15 - 9:25 am	Ghulam Abbas (Institute of Synthetic Biology, Shenzhen Institute of Advanced Technology, CAS, China) "Deciphering Subcellular Redox Dynamics in AML: Insights from Genetically Encoded Sensors and Live-Cell Imaging"
9:25 - 9:30 am	Discussion
9:30 - 9:40 am	Vanessa Cepas López (University of Turin / Candiolo Cancer Institute IRCCS, Italy) "An Approach to the Study of Single Cell Redox Dynamics by Using Cancer Patient-Derived Organoids (PDOs) and Compartment-Specific Genetically-Encoded Redox Biosensors"
9:40 - 9:45 am	Discussion
9:45 - 9:55 am	Daniel Kaufman (Ben-Gurion University in the Negev, Israel) "An Electrochemical Method to Switch, Monitor, and Control Mucus Thiol-Disulfide in a Gut Model System"
9:55 - 10:00 am	Discussion
10:00 - 10:10 am	Julia Malo Pueyo (Redox Signaling Lab, VIB-VUB Center for Structural Biology, Belgium) "Understanding the Architecture of Human Redox-Relay Complexes"
10:10 - 10:15 am	Discussion
10:15 - 10:25 am	Radosveta Gencheva (Karolinska Institutet, Sweden)

	"The Anticancer Compounds Auranofin, TRi-1 and TRi-2 have Distinct Cytotoxicity Profiles with Regards to Thioredoxin Reductase Inhibition"
10:25 - 10:30 am	Discussion
10:30 - 10:40 am	Patrick Tawiah (Illinois State University, United States) "Exploring the Implications of a Novel Silver-Ruthenium-Based Surface Coating on the Bacterial Redox Homeostasis"
10:40 - 10:45 am	Discussion
10:45 - 10:55 am	Laura de Cubas Landaluce (Universitat Pompeu Fabra, Spain) "Inter-Compartmental H ₂ O ₂ Fluxes and their Regulation by Scavengers, Transporters and Signaling Cascades Affect Cell Fitness"
10:55 - 11:00 am	Discussion
11:00 - 12:30 pm	Poster Session II <i>Coffee will be served in the poster area from 11:00 am - 11:30 am</i>
12:30 pm	Lunch
1:30 - 2:30 pm	Mentorship Component: Navigating Your Career Path - How to Make Science More Inclusive Discussion Leaders: Lisa Knoke (Ruhr University Bochum, Germany) and Utsav Dey Sarkar (Indian Institute of Science Education and Research, Pune, India)
1:30 - 2:30 pm	Panel Discussion <i>Navigating Your Scientific Career Path</i> Jan-Ulrik Dahl (Illinois State University, United States) Maria Fedorova (Technical University Dresden, Germany) Tobias Dick (German Cancer Research Center (DKFZ), Germany)
2:30 - 3:00 pm	Evaluation Period <i>Complete the GRS Evaluation Forms; Election of Future Chair(s)</i>
3:00 pm	Seminar Concludes