

Research Project

ErgOX - Enzymology of oxidative sulfur transfers

Third-party funded project

Project title ErgOX - Enzymology of oxidative sulfur transfers

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Organisation / Research unit

Departement Chemie / Molecular Bionics (Seebeck)

Department

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Status Completed

Oxidative stress causes cancer, cardiovascular, neurodegenerative and infective disease. Much of cellular oxidative stress is mediated, communicated, mitigated or amplified by a complex system of sulfur containing small metabolites or protein-based cysteines. Characterization of key players and reactions in this network is crucial for preventive and therapeutic interventions.

I propose a new perspective on sulfur biochemistry. The reactivity of sulfur with the oxidative stressors superoxide, peroxides or hydroxyl radicals is well established, but far less is known about reactions between sulfur and molecular oxygen. I shall demonstrate that this reaction is fundamental to cellular life, and how advances in this field provide new options in medicine, biotechnology and the food industry.

Assisted by a team of three PhD students and a postdoctoral researcher I intend to establish this new research field by identification, characterization and engineering of enzymatic activities which catalyse oxidative carbon-sulfur bond formation and cleavage. Specific systems in this study include the biosynthetic enzymes for ergothioneine which is a sulfur containing secondary metabolite with potent activities on cellular functions.

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