

Diversity of Selenium Functions in Health and Disease (Oxidative Stress and Disease)

From CRC Press



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Named after Selene, Greek goddess of the moon, selenium (Se) has moved from being thought of as a toxicant to being considered an essential nutrient with the potential to reduce cancer risk in the span of seven decades.

Diversity of Selenium Functions in Health and Disease focuses on current knowledge of aspects of Se research relevant to its medical use, and particularly to chemoprevention of cancer. It covers how Se is integrated into selenoproteins, selenium compounds with individual functions and dual functions, and unexpected links to Se such as with diabetes. The text ends with a discussion of polymorphisms and mutations in genes of selenoproteins.

The chapters elucidate why studies undertaken to prevent diseases with selenium ended with disappointing outcomes and often with the opposite result, i.e. disease promotion. They show that benefit, failure, or side effects depend on:

- The chemical form and dose of selenium
- The selenium status of the individual ingesting selenium
- The capacity of selenium form to serve as a source for selenoprotein biosynthesis
- The function of selenoproteins reacting to a change in the selenium status
- The stage of the disease (mainly cancer) at the time point of intervention
- The genetic background of individuals to be treated

Bringing together the accumulated evidence regarding selenium biochemistry, the book covers aspects not found in available general monographs. The narrow focus on medical uses of Se helps resolve the present confusion about potential benefits and hazards of selenium in human health. The book gives you a solid scientific basis for optimum use of selenium in preventing or treating human diseases and answering the questions: Why is selenium essential? How much is required? What are the health consequences of low selenium and can selenium reduce cancer risk?

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Editorial Review

About the Author

Helmut Sies, M.D., Ph.D.(hon), studied medicine at the Universities of Tübingen, Paris and Munich, and did the habilitation for physiological chemistry and physical biochemistry at the University of Munich. He spent sabbaticals at the University of Buenos Aires, Argentina, University of California at Berkeley, USA, at the University of Siena, Italy, and the Heart Research Institute, Sydney, Australia. He was chair of the Department of Biochemistry and Molecular Biology I at Heinrich-Heine-University Düsseldorf, Germany, where he now is an emeritus professor. He also is senior scientist at the Leibniz Research Institute for Environmental Medicine at Düsseldorf, and adjunct professor at the University of Southern California, and a professor of biochemistry at King Saud University, Riyadh, Saudi-Arabia. He served as president of the Society for Free Radical Research International and of the Oxygen Club of California (OCC). He is a Fellow of the National Foundation for Cancer Research (NFCR), Bethesda, MD, USA, and of the Royal College of Physicians (FRCP), London, England. He is member of the German National Academy of Sciences Leopoldina. His research interests include hydrogen peroxide metabolism, oxidative stress, redox signaling and micronutrients, notably flavonoids, carotenoids and selenium.

Regina Brigelius-Flohé received her PhD in Biochemistry in Tübingen and Münster, Germany in 1978. During a post-doctoral fellowship in Munich and Düsseldorf together with Helmut Sies she investigated the cellular thiol-disulfide status in perfused organs under various conditions of oxidative stress. The detection and analysis of mixed disulfides of proteins and glutathione provided a basis for the regulation of enzyme activities by thiol modification, a field which is now expanding and known as redox regulation. In 1984 changed to pharmaceutical industry and was heading a Molecular Biology Lab and later the Department of Molecular Biology (Grünenthal Ltd., Aachen, Germany). In 1994 she became professor at the University of Potsdam combined with the heading of the Department Biochemistry of Micronutrients at the German Institute of Human Nutrition Potsdam-Rehbruecke (DIfE) where she now is an emeritus professor. Her favourite micronutrients were vitamin E and selenium. Her group was the first to elucidate the metabolism of tocopherols and tocotrienols. Research regarding selenium is related to redox-regulated processes in inflammation and cancer development influenced by selenium and specific selenoproteins, mainly glutathione peroxidase 2.

She was a member of the scientific advisory board of the German Society of Biochemistry and Molecular Biology for 6 years and president of *SFRR-Europe* 2005/2006. She now serves on the editorial boards of several journals in the field of nutrition, micronutrients, free radicals, and redox regulation.

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