

Promoting metabolic health and lifespan by increasing oxidative stress



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Michael Ristow studied medicine, and subsequently became board-certified for Internal Medicine. He then became a research associate at Harvard Medical School, and served as a professor for Human Nutrition at the University of Jena 2005 to 2012. Since 2013 he is a professor for Energy Metabolism at the Swiss Federal Institute of Technology (ETH) Zurich. His research is focused on the biochemical and molecular basis of longevity – in particular the role played by mitochondria in lifespan regulation and prevention of metabolic diseases. Contrary to the widely re-iterated Free Radical Theory of Aging, Ristow was the first to show that the health-promoting effects associated with low caloric intake, physical exercise and other lifespan-extending interventions like sirtuin signaling are caused by increased formation of Reactive Oxygen Species (ROS) within the mitochondria, causing a vaccination-like adaptive response that culminates in increased stress resistance and extended longevity, a process called mitohormesis. He works with the roundworm *C. elegans* and mammalian model organisms, as well as humans.

Selected Publications:

Ristow M: Unraveling the truth about antioxidants: Mitohormesis explains ROS-induced health benefits. **Nat Med**, 20, 709-711 (2014)

Weimer S, Priebes J, Kuhlow D, Groth M, Priebe S, Mansfeld J, Merry TL, Dubuis S, Laube B, Pfeiffer AF, Schulz TJ, Guthke R, Platzer M, Zamboni N, Zarse K, **Ristow M:** D-Glucosamine supplementation extends lifespan of nematodes and of ageing mice. **Nat Com**, 5, e3563 (2014)

Schmeisser K, Mansfeld J, Kuhlow D, Weimer S, Priebe S, Heiland I, Birringer M, Groth M, Segref A, Kanfi Y, Price NL, Schmeisser S, Schuster S, Pfeiffer AF, Guthke R, Platzer M, Hoppe T, Cohen HY, Zarse K, Sinclair DA, **Ristow M:** Role of sirtuins in lifespan regulation is linked to methylation of nicotinamide. **Nat Chem Biol**, 9, 693-700 (2013)

Zarse K, Schmeisser S, Groth M, Priebe S, Beuster G, Kuhlow D, Guthke R, Platzer M, Kahn CR, **Ristow M:** Impaired insulin-/IGF1-signaling extends life span by promoting mitochondrial L-proline catabolism to induce a transient ROS signal. **Cell Metab**, 15, 451-465 (2012)

Ristow M; Zarse K, Oberbach A, Kiehntopf M, Birringer M, Stumvoll M, Kahn CR, Blüher M: Antioxidants prevent anti-diabetic and health-promoting effects of physical exercise in humans, **Proc Natl Acad Sci USA**, 106: 8665-70 (2009)

Schulz TJ, Voigt A, Zarse K, Birringer M, **Ristow M:** Glucose restriction extends *Caenorhabditis elegans* life span by inducing mitochondrial metabolism and increasing oxidative stress, **Cell Metab**, 6: 280-293 (2007)

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