

THE REDOX LANGUAGE OF PEROXISOME-DERIVED HYDROGEN PEROXIDE

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In recent decades, our understanding of peroxisome biology has grown significantly. However, we still know little about how redox-active metabolites, including H_2O_2 , are transported across the peroxisomal membrane and how changes in peroxisomal H_2O_2 (po- H_2O_2) metabolism impact redox-driven biological processes. To bridge this knowledge gap, we have developed cell lines with modulatable po- H_2O_2 production and optimized approaches for identifying po- H_2O_2 targets in different subcellular locations. Here, I will first briefly elaborate on what is known about po- H_2O_2 metabolism and signaling, with a focus on human health and disease. Next, I will delve into our work, highlight some interesting targets of po- H_2O_2 , and discuss how excessive levels of po- H_2O_2 may rewire cellular metabolism, modulate autophagy, and impact inter-organelle communication. Gaining more insight into these phenomena is key to our understanding of how peroxisomes are integrated into cellular signaling networks implicated in aging and diseases such as cancer, diabetes, and neurodegenerative disorders.