

Insulin resistance: Reading

Prof.Dr.Nuray ARI,2018

- [Oxid Med Cell Longev.](#) 2017;2017:8765972. doi: 10.1155/2017/8765972. Epub 2017 Sep 7.

- **The Contribution of Singlet Oxygen to Insulin Resistance.**

- [Onyango AN.](#)

- **Abstract**

- **Insulin resistance contributes to the development of diabetes and cardiovascular dysfunctions. Recent studies showed that elevated singlet oxygen-mediated lipid peroxidation precedes and predicts diet-induced insulin resistance (IR), and neutrophils were suggested to be responsible for such singlet oxygen production. This review highlights literature suggesting that insulin-responsive cells such as endothelial cells, hepatocytes, adipocytes, and myocytes also produce singlet oxygen, which contributes to insulin resistance, for example, by generating bioactive aldehydes, inducing endoplasmic reticulum (ER) stress, and modifying mitochondrial DNA. In these cells, nutrient overload leads to the activation of Toll-like receptor 4 and other receptors, leading to the production of both peroxy-nitrite and hydrogen peroxide, which react to produce singlet oxygen. Cytochrome P450 2E1 and cytochrome c also contribute to singlet oxygen formation in the ER and mitochondria, respectively. Endothelial cell-derived singlet oxygen is suggested to mediate the formation of oxidized low-density lipoprotein which perpetuates IR, partly through neutrophil recruitment to adipose tissue. New singlet oxygen-involving pathways for the formation of IR-inducing bioactive aldehydes such as 4-hydroperoxy-(or hydroxy or oxo)-2-nonenal, malondialdehyde, and cholesterol secosterol A are proposed. Strategies against IR should target the singlet oxygen-producing pathways, singlet oxygen quenching, and singlet oxygen-induced cellular responses.**