

Reduction oxidation (REDOX) reactions are central to life and when altered, they can promote disease progression. It is now clear that some ROS, such as hydrogen peroxide (H_2O_2), can act as messengers both in the extracellular environment and within cells. Mitochondria, the main cell power source, seems to be an important redox signaling node, central to metabolism, oxidative phosphorylation, the citric acid cycle, fatty acid oxidation, the urea cycle and the biosynthesis of iron-sulfur centers. Furthermore, mitochondria have key roles in cell death, calcium homeostasis, and oxygen sensing, proliferation, and angiogenesis - the growth of new blood vessels. Consequently, mitochondria are at the core of many biological processes, and redox signals to and from this organelle help to integrate mitochondrial function with the health of the cell and the organism.

Redox imbalance is expressed in one of two ways: a predominance of oxidative stress-related symptoms and signs (similar to rusting but in a biological sense), or a predominance of inflammatory (reactive) signs and symptoms. Health can be achieved by addressing imbalances in these areas and then moving the REDOX needle back to the balance point.

Our genetic blueprints have created a tendency to lean one direction or the other. We can choose to provide health support by addressing our REDOX potential. This is done primarily through lifestyle adjustments and also by supplementing with REDOX signaling molecules. An effective response to health challenges moves the balance back to the middle. For example, the management of cancer would involve reducing inflammation, the reactive response, rather than oxidative stress.