

Much of the oxygen we breathe finds its way to this workstation of the mitochondria. There is a specially carved place for the oxygen molecule to land in a protein called cytochrome C oxidase. This protein is the anchor in the relay team that creates the proton storehouse. As the final player, it falls to cytochrome C oxidase to make sure that the important process leaves no harmful by-products. The cell offers an excellent example for us here, as it strives to ensure that no industrial waste is associated with generating its power supply. The possibility of such contamination is real; the energy that moves the protons involves a complicated dance of passing electrons from one pumping protein to another and these electrons can hardly be left to wander unsupervised after passing through the gauntlet. Instead, the electrons are combined with protons which are allocated to cleaning up rather than being pumped into the proton warehouse. In cytochrome C oxidase, the protons, electrons, and molecular oxygen are combined.

Elegantly, safely, and neatly, the final product released by cytochrome C oxidase is two molecules of water for every molecule of O₂. Should this reaction be stalled, the entire relay team of proton-pumping proteins will back up and eventually grind to a halt, and the river of protons will dry up. It is at this deep, cellular location that oxygen does its magic and it is to this level that breath is drawn.

Breath turning to water is already a respected concept in Chinese Medicine, particularly in the Five Phase school of thought where lung energy nourishes the kidney element of water. As the kidney meridian is charged with processing the emotion of fear, any activity that nourishes both lung and kidney has wonderful potential for our lives. The deep and steadying breath we have all taken in some difficult moment unlocks energy and buffers fear energetically, chemically, physiologically.

Oxygen allows the energy-making machinery of our cells to whirl along, and part of that process is actually making pure water appear from a protein that would otherwise be stuck. It is the exact opposite of rust, that combination of moisture and machinery that results in any bike left outside for too long fusing its chain and gearing. In the body, instead of water turning a mechanism stiff and brittle, water flows out, leaving behind a sparkling flexibility. This is a very different image than the one I might have considered in 1999, but one I appreciate carrying with me now.

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