

ACUPUNCTURE & ACUPRESSURE

Breath: The Movement of Oxygen and Energy

Shai White-Gilbertson, PhD, MSCR, Dipl Ac, CTR

I remember with surprising clarity the first time a patient started crying during an acupuncture treatment I was giving. This is now quite a long time ago, back in 1999, when I was a student. I had just needled Lung 7 on her right wrist and looked up to see that her eyes were full of tears and, it seemed to me, a question: why is this happening? I thought for a moment and then said, "The needle I just placed is in the lung meridian. That particular meridian has the special job of processing grief. Is there any chance it might be especially sensitive or might need extra support today?" No acupuncturist will be surprised to learn that there had been significant sadness in my patient's life recently, a troubling family matter that weighed on her. She would, indeed, be appreciative of any directed support I could work into her treatment.

I no longer remember the rest of the appointment, and the countless number of times I've had a variation on that conversation have blended together to such a degree that I don't think I could recount any others with such specificity. That first, right wrist, though? It has stayed with me. My guess is that, as was my habit in those days, I probably offered this patient an image to consider during needling and that image probably involved breathing in a color or temperature that would support her overall treatment, intending to gently blow some of the lung's resonant energy into her rough and hurting places. Lung, air, grief, breath: these are deeply connected concepts in acupuncture practice.

Molecules and Meridians

Since I left practice to become a molecular biologist, I've learned many strange and wonderful things about cells. When I am navigating my own times of grief, of held breath, the imagery that rises is now informed by both my acupuncture background and the knowledge acquired over many years of biomedical classes and research. The journey of air through the lungs, into the bloodstream, and finally into every cell is an especially rich story.

A little background is in order, but anyone who has built a sandcastle or saved for a vacation will quickly understand the principle at work: small, low energy efforts can build something quite amazing if those small efforts are allowed to accumulate. In the case of the cell, a series of proteins embedded in the inner membrane of mitochondria patiently and cleverly execute a single difficult task. The proteins each use a tiny amount of energy to move protons to a designated holding area. Energy has to be invested in order to continuously pump protons to an area that is already teeming with them. As the protons accumulate, the natural tendency is for the protons to flow away from this area of overpopulation and the cell provides one doorway in order to create a river of protons, not unlike the flow you would see if the Hoover Dam sprouted a single culvert in its vertical surface. This flow is the sandcastle, the savings account that the cell has meticulously created with relatively small efforts: move one proton, move two protons, don't stop. The result is a mechanical force that can run a tiny molecular turbine. It's worth taking a moment to let that settle: the proton "river" does not metaphorically turn an axle; rather, it quite literally does this in every cell, every minute. This mechanical power source is critical for making the chemical energy that allows us life, and oxygen plays a key role in maintaining the power source.

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 byproducts. 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 whir 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.

JUNE 2015