



Hello all,

Welcome to *Swan & Stone, Volume 1, Issue 6, Circulatory Physiology 101—What You Don't Know Can Hurt You.*

Here my objective is to argue for a *more enlightened view of breathing*, one that aspires to comprehend the whole vs. one that embraces the reductionist view of Western medicine. My arguments are:

- 1) Breathing is a circulatory function. Not only is it involved in gas exchange, it modulates pressures and compels the blood to move, especially venous blood.
- 2) Cells are the living units of the body and rely on circulation to function and to thrive. This includes the blood itself. Depending on the quality of the blood and its circulation, cells may be healthy and vital or diseased and dying.
- 3) Almost without saying, poor circulation is the root cause of many diseases.

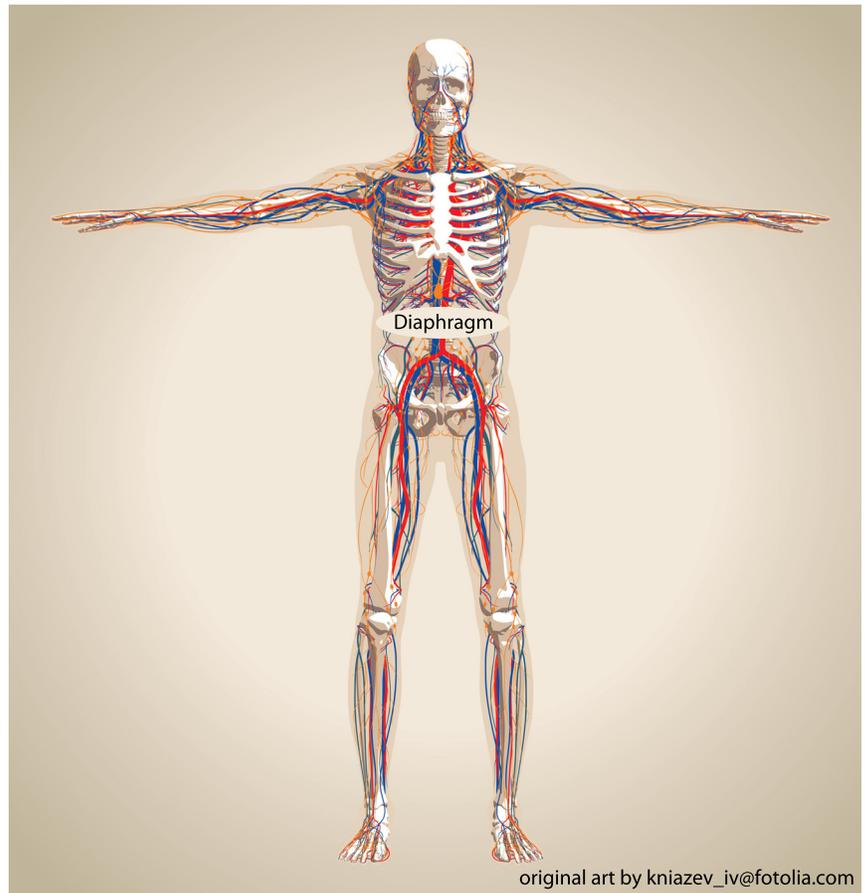


Figure 1 - Human Circulatory System

There are an estimated 100 trillion cells that make up the human body. For purposes of anatomical understanding we group these cells into organs. For clarity, we parse the tissues into 2 functional classes: 1) the “parenchyma” or functional cells of the organ, and 2) the “stroma” or connective tissue that holds the organ’s shape. All organs have function and shape. Both parenchyma and stroma consist of cells that depend on circulation. Externally, we see skin and shape. Internally, 60% of the body is fluid, about 2/3 of which is inside cells and about 1/3 is outside cells in what is referred to as “extracellular fluid”.

The job of the extracellular fluid is that of creating an environment that sustains cellular life, not unlike the ocean relative to sea life. This includes the delivery of everything that cells need to function plus the removal and transportation of cellular waste. Extracellular fluid surrounds and penetrates all tissues, and moves rapidly in the circulating blood – so as to remain fresh and clean. Recognizing that the universal role of this extracellular fluid is to create and maintain a consistent environment that sustains life, more than a hundred years ago French physiologist Claude Bernard gave it the name *milieu interieur*.

The 60% of our body that is fluid represents a volume of ~42 liters, ~28L being inside cells. Of the remainder, ~5L is in the blood and 9L are distributed throughout the body supporting the milieu interieur, but mixing with and moving with the blood. This includes lymphatic fluid and specialized fluids such as cerebrospinal fluid, pericardial fluid, and synovial fluid. *The point I want to emphasize is that cellular health depends on extracellular fluid, which depends on the circulation of blood and the pressures generated by the organs of circulation.*



If cellular health depends on extracellular fluid, which depends on circulation and the pressures of circulation, then what happens when circulation and the pressures of circulation are extreme. One end of this spectrum might be characterized by the marathon, where circulation and extracellular fluid are servicing the extreme demands of the cells. In a marathon, the heart is beating and the diaphragm is moving, both facilitating blood flow. The other end might be characterized by the lethargic couch potato, breathing only enough to stay alive. In between, there is “optimal homeostasis”, a state of vitality with ease.

By and large, the subject of Issues 1-7 of Swan & Stone have been “resonance”, specifically, circulatory resonance, or in keeping with the big picture “cardio-plumonary-circulatory-diaphragmatic” resonance, admittedly pedantic but not without purpose. In the greater scheme of things and against the blinding light of reductionism, our health, wellness, performance, and longevity depend on our knowledge and understanding of how things work. The reality is that the way we breathe and the health of our blood determine the viability of our milieu interieur, our extracellular or interstitial environment, the environment on which the cells of our body – all of them – depend. We don’t have to let the mind wander far to be reminded of consequences of poor circulation and polluted blood. ([See my previous article on gene expression here.](#))

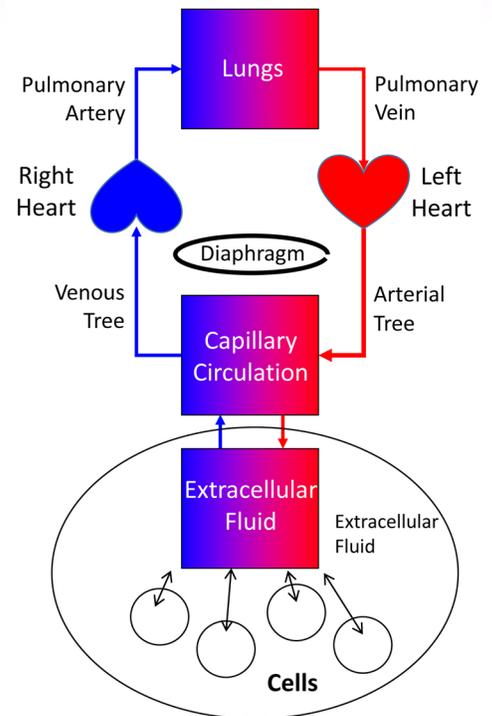


Figure 2 - The Big Picture

Hypertension is symptomatic of the larger circulatory problem that exists due to sub-optimal breathing, the number of cases of “primary” hypertension numbering 60-70 million in the US alone, affecting at least 1 out of 3 adults. “Primary” hypertension is the more recent term for “essential” hypertension, a name that was in vogue during the late 90s. Decoding either term, they mean “a condition of high blood pressure that exists for no known reason”. At the same time, the medical industrial complex nets close to \$100 billion/year on this condition alone, not to mention the much broader spectrum of diseases of the circulation, and of the tissues that accrue from poor circulation and bad blood, probably surpassing \$1 trillion worldwide. Reductionist theory continues to press for microscopic vs. macroscopic answers. The reductionist view of this is that it is a consequence of “heart disease”, “arterial disease”, “cancer”...

My “position” is that the average adult does not understand the importance of moving the diaphragm. Further, I have asserted, and I maintain that it is the job of the diaphragm to facilitate the flow of venous blood. Here I have argued the principle that “primary” hypertension is an outcome of a condition that is known in Chinese medicine as “blood stagnation”. Basically, it means that blood is not flowing as it should, anywhere in the body. The root cause of this stagnation is that the diaphragm fails to move downward sufficiently during inhalation, thereby resulting in the ~~the~~ venous tree failing to empty. When the venous tree fails to empty, capillary circulation has nowhere to go. As capillary circulation is full, arterial blood has nowhere to go and arterial pressure rises – the entire system pressurizes and the heart works harder to solve the problem of inadequate blood flow, a condition of which the autonomic nervous system is aware. Over time, as breathing continues to fail to move the blood, the condition becomes more grave.

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Major Reference: Medical Physiology, Guyton & Hall, 10th Edition.

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