Alternativz™

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Hello all,

Welcome to ***The Mesenteric Circulation***, *Alternativz* Volume 2, Issue 2. This is an article that I've had in mind for a long time. Before we start, March 2014 marks the 10 year anniversary of COHERENCE. We're celebrating with a 20% off sale on books and CDs that will extend through March 31st. Click here for details and thank you for your interest.

Where the common concept of "breathing" is that it is a function of the lungs, my readers know that the "new science of breathing" concerns itself with the much-larger picture of what happens when we move the diaphragm, the large sheath of muscle that separates abdominal cavity below and thoracic cavity above. The reality is that the diaphragm is the motive force behind multiple pumps, these pumps moving air, blood, and digestive matter in the body, a fact that modern Western medicine sadly fails to recognize. Both "life" and "health" depend on diaphragm movement.

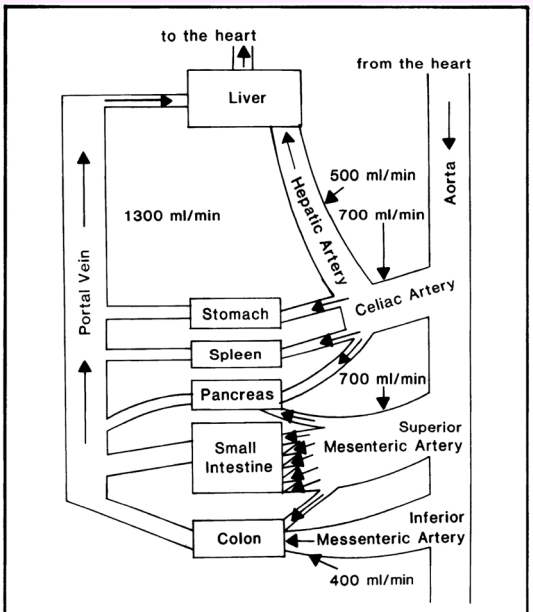

Figure 1
Diagram of splanchnic organs and their blood supply.

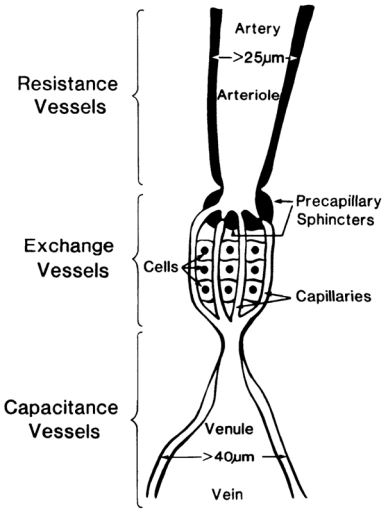

Figure 2
Mesenteric microcirculation. Dimensions represent vessel width below which vessel is termed an arteriole (25μm), as opposed to a microscopic artery, or venule (40μm), as opposed to a microscopic vein.

From The Physiologist, Vol 25, #5, 1982, with permission.

For context, much of our work has concerned itself with breathing and the autonomic nervous system, specifically, the elegant synchrony of sympathetic and parasympathetic functions with the motion of the diaphragm, the phenomenon of heart rate variability (HRV) being a foremost indicator of this synchrony. A fundamental Coherent Breathing training method is to monitor one's HRV and consciously synchronize one's breathing with it. This method was asserted in US Patent #7713212 in 2003. A bit later, we put forward a wholistic theory of breathing and circulation including the detection of the Valsalva Wave, a blood wave that rises in the arterial tree during exhalation and rises in the venous tree during inhalation. See US Patent #7922664. Click here to see the Valsalva Wave.

Part of the synchrony that compels blood to move and sustains the wave is the contraction and relaxation of the smooth muscle of the arterial tree, alternating with inhalation and exhalation respectively. ***To the mesenteric circulation***, the blood network of the intestines and the largest user of blood on the descending aorta, it is the only circulatory construct where veins also possess muscular control. Together, mesenteric arteries and veins facilitate flow of ~12% of total cardiac output, almost equal to that of the brain, ~15% of cardiac output, brain and gut brain requiring almost equal flow.

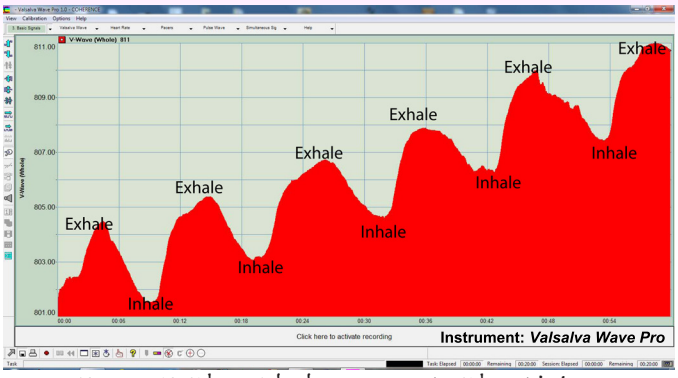

Figure 3: The Valsalva Wave At The Abdomen

Mesenteric veins, also known as "capacitance vessels" (see Figure 2) serve as an important reservoir for blood. A central reason that mesenteric veins possess muscular control is that their contraction is required to propel blood, via the vena cava, back to the chest. Action is under control of sympathetic nerves which can effect mild to extreme muscular contraction, extreme enough to empty the mesenteric circulation of several hundred milliliters of blood all at once. This can occur during times of extreme exertion, when blood is needed elsewhere, or during blood loss elsewhere in the body.

A mild form of sympathetic stimulation occurs every time we inhale, i.e. every time the diaphragm moves downward. From the larger circulatory perspective, this makes perfect sense...when the diaphragm moves down, pressurizing the abdominal cavity in which the intestines and mesenteric circulation reside, capacitance vessels contract, sending blood back to the chest where pressure is reduced. When we exhale and the diaphragm moves up, pressure in the thoracic cavity increases and pressure in the abdominal cavity decreases. Blood issues from the chest through the left heart into the descending aorta as a wave, making its way back to the mesenteric arteries.

If this is so, we would expect to be able to observe blood flowing into and out of the abdomen with each cycle of exhalation and inhalation, respectively - looking into the abdomen with Valsalva Wave Pro, it is exactly what we do see. Referring to Figure 3, (Valsalva Wave Pro sensor positioned 1 inch below navel) note that the wave rises with exhalation and falls with inhalation. It is absent the heartbeat, which we presently interpret as the heartbeat being integrated by the resistance/capacitance arrangement of the mesenteric blood vessels as described in Figure 2. Note that this is very different from what we see at the earlobe or at the fingers where we see both a prominent respiratory wave and a prominent heartbeat.

I postulate that the diaphragm plays a vital role in mediating internal processes, where I presently consider it fact that diaphragm movement mediates circulation and digestion. I anticipate that varying gas and fluid pressures as a function of diaphragm movement will also eventually be found to facilitate other organ functions, for example those of the liver, pancreas, and kidneys.

Thank you for your interest and consideration,

Stephen Elliott, President, COHERENCE

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