

Reflections on the Heart

By Don St. John, Ph.D.

“The best and most beautiful things in the world cannot be seen or even touched...They must be felt with the heart” Helen Keller

What do you think of when you think of your heart? For most it is an elegant, mechanical pump whose sole job is to move blood through the vascular system. Perhaps if you have a family history of heart disease, high blood pressure or high cholesterol, your heart is a source of anxiety. Your wish is that it just keep beating, doing its thing, because you know if it stops, even for a little while, the game is over.

Heart disease is the number one killer of Americans, and more than 300,000 open heart surgeries are performed every year. As a culture we have become “sick of heart.” Approximately 500,000 people die each year from coronary heart disease, and approximately 1.5 million people suffer a heart attack each year in this country. If we include related diseases such as hypertension, we now reach some 60.8 million people who suffer some form of cardiovascular disease (see the CDC/ American Heart Association reports). These numbers are staggering, and even though a great deal can be done to prevent cardiovascular disease, the forecasts are not greatly optimistic. According to Dr. Gabriel Aldea¹, the chief of adult cardiac surgery at the University of Washington’s School of Medicine, “There’s an expectation that the number of cardiac patients could increase as much as 30 percent over the next 10 years. The baby boomers are reaching a critical mass.”ⁱ

The metaphors of the human heart as a pump has guided medical science to some of the most breathe taking medical advancements ever. And as one who has received its benefits and owes his life to them, I am deeply appreciative. Yet at the same time, having a mechanical pump be the guiding metaphor for our

¹ Dr Aldea was also my heart surgeon. He’s a very lovely and skilled man.

understanding of the human heart is a travesty. It is a distortion of reality such that it has been a major contributor to our lopsided cultural split between atheistic scientism and materialism on one hand, and religious fundamentalism on the other. Imagine what our world would be like if we prized our muscles above all else and considered our brains as mere electricity generators for our muscles. What would our education be like? Might we be spending six hours a day in PE and one hour a week for mathematics, science, philosophy and literature? What a loss it would be, and what a loss it is to have our hearts considered a mere pump.

Our poets and our spiritual traditions recognize and embrace its sacred nature, but our science and general understanding is only just now beginning to recognize what an amazing organ the heart really is. It does not matter if one is directing one's life, the head of a family, of a company or a country, attempting to guide, orient or navigate its growth without the full engagement of our heart's intelligence is functioning without our central resources. **Returning our hearts to their rightful place, in the center of our intelligence, and in full, equal partnership with our brain, is a key to health, wholeness and happiness.**

There is a field of medical science called Neurocardiology; it is the study of the nervous system of the heart and its relationship to the brain and autonomic nervous system. Drs. Armour and Ardellⁱⁱ wrote a text by the same name and among their conclusions was that the complexity of the nervous system of the heart qualified for consideration as a "heart brain." It has more links to the brain than any other organ, and has over 40,000 sensory neurons.ⁱⁱⁱ These neurons sense pressure changes and heart rate; they detect circulating hormones and neurochemicals. They then send this information to the brain. These afferent (meaning toward the brain) pathways enter the brain at the medulla in the brain stem. This is part of what has been called the reptilian brain, and it controls basic functions such as breathing. These incoming signals have a regulatory role over many of the autonomic nervous system signals that flow from the brain to the organs of the body including the heart. Again the heart processes information independently of the brain and nervous system and then interacts with them as well as with other processing

centers throughout the body. If the heart were a simple mechanical pump would it require such a complex nervous system?

In his book, *The Heart's Code*, Paul Pearsall tells a poignant, heart-wrenching story to illustrate the heart's capacity to "think and remember." He was speaking to at conference to a group of psychologists and psychiatrists, when a psychiatrist rose and shared the following story. An eight year old patient of hers received the heart of another little girl who had been murdered. She was brought to the psychiatrist by her mother when she began screaming at night about dreams in which she saw the killer of her transplant donor. After a few sessions, the psychiatrist felt she could not deny the reality of this little girl's experience, and with her mother's consent, called in the police. Using the descriptions given by the little girl, the donor's murderer was captured and convicted. A group of psychologists and psychiatrists can match any group in healthy skepticism, but in that room, Pearsall says there were few dry eyes.

The human brain has accomplished so much in science and technology that we have become brain centrists. For many decades there has been a growing appreciation of all things cerebral, and an unfortunate neglect of the organ that is in the center, at the core of our being. There are all too many examples of intellect without heart, of brain power without the wisdom and compassion of the heart. We can see it in national leaders who are willing to destroy hundreds of thousands of lives without any sense of empathy or remorse for the untold suffering their actions cause. We can see in attitudes dominated by competitiveness, victimization, workaholism, and the need to dominate. We can see it in our relationship to nature and the way we have polluted our air, our water and our food. We can see it in our divorce statistics, our attitudes toward "casual sex," our health statistics; all reflect an absence or lack of appreciation of the role the human heart is designed to play throughout our lives. There are serious individual and collective consequences to our belief that brain is king and heart is a mere pump.

“The heart of creatures is the foundation of life, the Prince of all, the Sun of their microcosm, on which all vegetation does depend, from whence all vigor and strength does flow.”

William Harvey, M.D. 1628

The heart is a sensing, feeling, communicating organ. It a self-organizing, highly complex information center continually sending messages to the brain. There are four channels of communication between the heart and the brain. Three of the four are well established in medical science and there is a growing body of literature establishing the fourth. The first three are neurologically, biochemically by way of hormonal exchanges and biomechanically by way of pressure waves. The fourth is electromagnetically. These four channels of communication and the complexity of the heart’s nervous system attest to the intimate relationship between heart and brain. What does it mean that the heart is so linked to the brain and so many sensory neurons? Or that neurocardiologists refer to it as a heart-brain? Or that the heart has more neural pathways to the brain than any other organ?

What does it mean that the recipient of a heart transplant begins to dream and see the man who murdered her donor? From all of this, can we conclude that **the heart is an organ of intelligence, an intelligence that has been deprecated, ignored and not recognized in our culture?** This is not about “emotional intelligence” which leans heavily toward getting the emotions out of the way so we can act rationally. Or knowing what we feel so we can not be swayed by our emotions. The intelligence of the heart is a way of knowing. It really is a spiritual intelligence bringing the capacity to understand the sacred and profound truths that simply defy rational understanding. It brings a knowing of what is important and what is not. Again, ask yourself, is it not intuitively obvious that our hearts would be such a key player in the arena of human intelligence?

Neuroscientist Antonio Damasio, in a fascinating series of experiments^{iv} demonstrated how when the centers of the brain that integrate feeling are not functioning as a result of injury, the individual's capacity to make self enhancing, or self supporting decisions is diminishes significantly. The individual's capacity to act in his own behalf markedly decreases. Feeling, integrated with reason, the heart integrated with the brain, is the hallmark of a full human being. The heart, on board, present, full and listened to, in conjunction with the full faculties of the brain, describe a human being with wisdom, an individual with relational intelligence, a human whose life is an unfolding of productivity, generativity, creativity and integrity. Think of how we use those phrases—clear hearted; whole hearted; strong hearted!

Most of us don't know that the heart is also an endocrine gland. In 1983 the first hormone produced by the heart was isolated and called atrial natriuretic factor (ANF). This hormone influences the walls of the vessels, the kidneys and the adrenal glands. The heart also releases norepinephrine and dopamine, neurotransmitters which had previously been thought to be only in the brain. More recently, oxytocin, the hormone sometimes called the "love" or "bonding" hormone was found in the heart. No the heart is not just a mechanical pump.

The human heart is the most responsive organ in the human body. The quality of its beat changes in response to each moment to moment interaction with our environment. It is like a cellular conductor broadcasting its message to every cell in our bodies, and that broadcast effects perception, feeling, cognition and health. Beating approximately one hundred thousand times per day and forty million times per year, it changes it rate and quality of beat in response to ever changing environmental circumstances. Within one conversation the heart shifts countless times to reflect the affect and quality of the conversation. Not only does it change how it is beating, it broadcast that change to every cell in the body, especially to the brain. How our hearts respond to what is occurring in our moment to moment exchange with the world is signaled to every organ and every cell. If this

were not exciting enough, consider that this broadcast also reaches those in close proximity. Our own “vibes” affect us and each other. How is this possible?

The heart is the most powerful generator of electromagnetic energy in the human body, producing the largest rhythmic electromagnetic field of any of the body's organs. The heart's electrical field is about 60 times greater in amplitude than the electrical activity generated in the brain. This field measured by an electrocardiogram can be detected anywhere on the surface of the body. The magnetic field produced by the heart is more than 5000 times greater in strength than the field generated by the brain and can be detected a number of feet away from the body.

Signals generated by the heart have the capacity to affect those around us. One person's heart signal, as measured by an electrocardiogram, can affect another's brain waves, as measured by an electroencephalogram. When people touch or are in proximity, one person's heart signal is registered in another's brain waves. Thus, the heart is both a perceptual, feeling organ and an organ of transmission. So much communication between human beings is generated heart to heart. The quality of being, the quality of feeling that we experience in the presence of another is being driven by the heart to heart, electromagnetic communication. If the heart is surrounded by stone, walled off from our awareness as a result of maltreatment or trauma, we lose the capacity to feel each others' presence.

We spoke about respiratory sinus arrhythmia and showed how it was the heart beat related to the breath. That there is variability in the time between heart beats, and that is because the influence of the sympathetic division of the autonomic nervous system is greater during inhalation and the influence of the parasympathetic nervous system is more during exhalation. There is another approach to measuring the variability between heart beats that was developed by the people at an organization called HeartMath^v. They refer to heart rate variability and use a mathematical transformation to determine the “coherence” of the

variability— in other words if the rhythm of the variability is smooth and harmonious versus chaotic or disorganized. Essentially, they are measuring the same thing, except that the HeartMath folks are more interested in the quality and pattern of the variability, and the respiratory sinus arrhythmia studies are concerned with the strength and adaptability of the changes between heart beats.

Let's clarify this. When we take our pulse and record, for example, 70 beats per minute, we naturally assume that the time interval between each beat is constant throughout that minute. But, this is not so! There is a natural variability in the time interval between beats. I am not speaking here of pathological arrhythmias, but of natural beat to beat fluctuations. Musicians listening to the beat of a drum hear the quality and pattern of the rhythm being expressed. So too with the rhythms of our heart beat; the patterns have qualities that can be analyzed and the degree of their coherence determined, and in terms of their strength and flexibility.

The coherence of our heart rhythms on an objective level refers to the quality of interplay between the two divisions of our autonomic nervous system, and our hearts, and between our hearts and brain. ^{vi} Coherence in this sense means a certain global order in the system, a certain connectedness among parts, a uniformed, synchronized pattern. What is really important here is that high levels of coherence are accompanied, subjectively, by good positive feelings in the heart. So often people will say everything is fine when in fact they are spending the great majority of their time feeling rushed, pressured, worried, anxious, cynical, resentful, constricted, unappreciated, disconnected, unhappy, unloved and tense— or any other of many negative states. And if these states are on the mild side, we assume normality. But these are states of distress; they are reflecting a certain degree of incoherence in the patterns of heart rate variability, in the dynamic play of our nervous system and hearts carrying profound physiological implications for our health and well being. Our life processes are struggling for balance.

On the other hand, when we experience sincere, genuine peace in our hearts or appreciation, warmth, care, compassion, love or any version of true positive

active that is reflecting a high degree of coherence with positive implications for our health and well being. There is flow, efficiency and ease. The obvious implication of this speaks to the importance of cultivating positive affect, positive feeling in our lives.

In the previous chapter, we spoke about how the brain, particularly the orbital frontal cortex, develops in the medium of interpersonal interactions. There is an abundant literature on how much communication is taking place non-verbally between mother and infant. According to the literature, this communication is mediated mostly via the right brain of mother to the right brain of infant. This right brain to right brain communication is providing the biochemical nourishment necessary for the synaptic growth of the brain, again particularly in the orbital frontal and prefrontal areas. Yet, when one understands the electromagnetic strength of the heart, and how connected to the brain it is, then it becomes very compelling to wonder if the heart is the primary organ of transmission and reception between mother and infant. Or at the very least, it is a key partner with the right brain in this essential, formative communication. Ask any mother!

Pearsall describes an experiment conducted by Russek and Schwartz^{vii} illustrating the energetic connection between hearts and between hearts and brains. They had two people sit opposite one another in the same room with their eyes closed and not communicating in any way. Using a complex measurement process that included attaching ECGs and EEGs to both people, they simultaneously recorded the results. The preliminary results indicated three possible energetic connections. It appeared that one person's heart energy transmits to one's brain. Second, it appeared that one person's heart seems to exchange energy with the other person's brain; third, it appeared that one person's heart transmitted to another person's heart. These results were also reported in studies by McCraty at the HeartMath Institute. We are connected heart to brain and heart to heart.

ⁱ Seattle Magazine, 2002

ⁱⁱ Armour, J.A. and Ardell, Eds. (1994), *Neurocardiology*. New York, NY, Oxford University Press

ⁱⁱⁱ Armour, etc

^{iv} Da Masio,

^v See McCraty, Rollin (2001) *Science of the Heart: Exploring the Role of the Heart in Human Performance*, The Heart Math Institute

^{vi} For a thorough exposition of coherency and heart rate variability see McCraty, et al (2006) *The Coherent Heart*, The Heart Math Institute.

^{vii} Russek and Schwartz, "Interpersonal Heart-Brain Registration and the Perception of Parental Love: A 42 Year Follow-up of the Harvard Mastery of Stress Study," *Subtle Energies* Vol. 5 (1994), pp. 195-208.