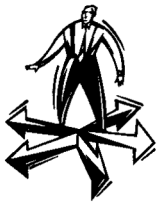

The Translucent Human

by
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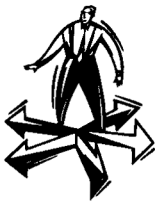
Certified Advanced Rolfer

(Author's note: I am not a scientist and this is not a scientific paper. The information contained within does, however, come from a multitude of published scientific articles. Please see the bibliography if you would like to investigate the source materials that I have used. Any mistakes in this article are solely my responsibility.)

Let's begin with a very simple question, one that I have asked a lot of people including a number of medical professionals. If you took all the cells out of a human body what would you have left? I mean this literally. If you removed every muscle cell, organ cell, glandular cell, nervous system cell, red blood cell, white blood cell, epithelial cell, etc., what would be left?

The answer I almost always get, especially from medical and scientifically trained people goes something like: "Why, you'd have nothing left," or "Almost nothing," or "You'd just have some bones," or "There'd just be some water and minerals," (the latter presumably in a puddle on the ground where the person used to be). More New Age types usually answer with something like: "Well there'd be spirit left." I don't feel qualified to answer this last speculation except to ask some further questions: And where would this spirit be? Would it have a shape? The same shape as the body? Would it walk or fly? And so on.

None of these answers are correct. The scientifically valid answer to this question is: You would have almost everything left! Remove all the cells from a human body and almost everything would still be there. This is because all our muscles, organs, glands, arteries and veins, nerves, sensory apparatus, etc. are mostly made up of connective tissue. This is a noncellular, strong, stringy material with tough fibers in a Jell-o-like colloidal ground substance. This composite material makes up what is known as the extracellular matrix (ECM). This material is composed primarily of long helical collagen molecules in different kinds of ground substance depending on what kind of connective tissue it is (i.e. tendons, cartilage, bone, fat, fascia, etc.). Each muscle, organ, gland, or other structure is like a sponge made up of this material with a layer around the outside and ever finer layers within layers on the inside until down to a tiny layer that enwraps each individual cell. The oxygen, nutrients, etc. that



the blood supplies to the cells must migrate from the capillaries through this matrix to the cells, and the waste products from cellular activity must migrate back out again into the blood or lymph.

Upon hearing this most medical/scientific types say something like: "Oh but of course." And I say: "What do you mean, 'Oh but of course' when just a moment ago you said there was nothing!" The vast majority of both the lay public and medical professionals don't consider the most basic material of our physical reality. If you doubt that this is true, try it out for yourself, put this question to your friends, your doctor, etc.

I am not suggesting that the cells aren't absolutely vital for most of our life functions; they are incredible miracles. But they don't compose most of our bodies, and there are some other vitally important functions that are carried on by the ECM and not by the cells. These mostly involve whole system communications and cellular regulatory functions. But before we discuss these, let's take a deeper look into the physical reality of what we are.

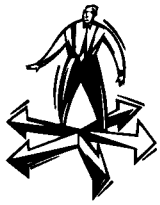
Imagine a human being with all of the cells removed. You would have a person with their overall shape, as well as the shape of all their internal structures, intact. For instance, the brain and the rest of the central nervous system, with its nerves and nerve plexi, would be there in the form of the perineural tissues. This whole structural complex is what I call the "translucent human."

Now it gets much more complicated. Imagine the smallest sheaths of the ECM, those enwrapping the individual cells. There are several types of fibrils that extend from these through the membranes of the cells and are continuous with a system of tiny fibers within the cells themselves. These form a cellular microskeleton and micro-nervous system called the cytoskeleton that orders and regulates the intracellular structure and functioning. It is composed of rigid struts and elastic bands forming a tensegrity structure like one of Bucky Fuller's models only much more complicated. The old model of the cell that most of us learned, with the organelles and various chemicals floating around in the cytoplasm is no longer scientifically valid. The cytoskeleton is unbelievably intricate; within a single invisibly small neuron it may be several meters long. It gets even finer, as some of the cytoskeleton's fibrils extend down through the membrane around the nucleus of the cell and form a similar structure, the karyoskeleton, that interacts with the genetic material, water, and ions there.

All of this, the ECM and the smaller intracellular and intranuclear systems, form what James Oschman Ph.D. has named the living matrix. This is what we are mostly made of, and it is barely recognized as even existing by most people, including doctors and scientists. However a number of diverse fields in the biological sciences have been studying the properties of the ECM under the general heading of biophysics. High powered electron microscopes have allowed us to look into a pretty fine level of these structures for some time, and newer research tools have been developed (like the extremely sensitive magnetometer known as a SQUID for superconducting quantum interference device) that allow us to peek into their electrical activity as well. What we are discovering is an extremely complex microscopic world of electrical currents and associated electromagnetic fields.

Think of the living matrix. This material that surrounds and interpenetrates our entire body is highly ordered. Each collagen molecule overlaps its neighbors by a precise amount in what is called a quarter stagger array. If bundles of collagen molecules are looked at in cross-section they are seen to be made up of helices in hexagonal spirals. It turns out that these molecules are also semiconductors. They conduct electric current throughout our entire bodies, as one system. So at a quantum level there is no distinct barrier between the extracellular matrix and the intracellular realms. Because of the highly ordered nature of these collagen molecules they have all the electrical properties of crystals, including being piezoelectric. Piezoelectric means that any kind of mechanical pressure is converted into electrical current and associated electromagnetic fields. This is how phonographs work. The needle transmits vibrations from the grooves in the record to a piezoelectric crystal inside the cartridge. The sounds on a record are transmitted to the sound system's amplifier as various currents depending on these vibrations. This is a very simple example compared to the multitude of activities going on in living bodies.

Piezoelectric currents in



our bodies are created regardless of whether the pressures are very slight as from the most gentle movement of our blood or breath, or the stronger forces generated by normal daily movements, or the really strong forces from a serious blow. As recently as the 1960's, most scientists thought that electrical phenomenon had no significance in life functions, but were an insignificant artifact of chemical and metabolic processes. Many scientists still give little credence to this area. Back in the 1940's Noble Prize-winning scientist Dr. Albert Szent-Gyorgyi became the honorary father of biophysics by predicting the semiconducting nature of these complex proteins. His ideas were mostly scoffed at by fellow scientists, until later studies proved him to be right.

The spacing and charges between the amino acids making up the collagen are just right for holding the hydrogen atoms of water molecules. Where these long, helical collagen molecules occur there is a surrounding layer of regular, helically-ordered water molecules. When current flows through the collagen the water molecules line up in an ordered manner, forming an insulating sheath around the collagen to protect those signals from interference. These water molecules also have currents passing through them, although the currents through the water are made up of protons (i.e. proticity), rather than being made up of electrons (i.e. electricity). This proticity appears to be a ubiquitous property of life that we barely understand at this point.

It has been discovered that light is also significant in biophysics. Cells emit measurable quantities of light, especially just before dividing. There are also phenomena called soliton waves that consist of energy with laser-like qualities that move through this matrix without becoming disorganized or losing energy. It is estimated that soliton waves could circle the earth through fiber optic cables some 4,500 times before showing any significant degrading. The mystery and complexity of what we are and how we function at this level of existence is evident. Biophysics is in its very early stages where the questions are multiplying much faster than the answers.

One pioneer in the field, orthopedic surgeon Dr. Robert Becker, studied salamanders because they are the only vertebrates that can truly regenerate severed body parts. He learned that while a salamander is regenerating a limb it produces a 9 cycle per second (9Hz) DC current in that limb, and when the limb is completely regrown that current stops. This discovery had a very profound practical application. Dr. Becker had a patient with a broken femur that would not heal. The poor man had been in a hospital bed for a year and the next step would have been to amputate the leg. But when Dr. Becker placed some silver mesh across the break and applied an artificially generated 9 Hz current through the fracture the bone quickly grew back together. This procedure has become commonplace and improvement in bone knitting has been dramatic. These are very weak currents, in this case something like + to 1 billionth of an ampere. The specific strength of these signals is important. Dr. Becker reasoned that stronger currents might be even more efficacious but increasing their amplitude out of their naturally occurring range made them ineffective.

This points up a number of problems that have to do with understanding how healing processes work, both those of regenerating injured tissue and those of recognizing and destroying invading organisms. A number of mysteries remain because much of this healing work takes place out of contact with the central nervous system (CNS) and can't be explained by hormonal responses either. These two are the only communication systems recognized by most scientists. But, for instance, if a child has a severed spine and no CNS function lower in their body, their vital functions still work and their body still grows; their arms and legs get longer, even though the musculature doesn't develop normally because of the lack of exercise. Wounds continue to heal, though perhaps not as well because of the reduced blood flow due to poor circulation. All of this demonstrates that there is a need for another communication system, one that is evolutionarily very old, because it is at work in life forms with less complex nervous systems or other modern adaptations. Earthworms and amoebas heal wounds also. The bioenergetic flow through the living matrix appears to be a perfect candidate for just such a system. Research summarized by Dr. Oschman (see bibliography) is verifying this hypothesis.

Biophysics can now explain much about how acupuncture works. (Oschman, A Biophysical Basis for Acupuncture) Most doctors and scientists accept that it works because many of its effects are verifiable and repeatable. Yet there has been relatively little effort to investigate what this system actually is. It has now been shown that this living matrix is the medium for the acupuncture meridians. Polarized collagen molecules line up along pre-existing energy pathways in the embryo and fetus, and that while invisible to even microscopic investigation these can be measured by sensitive scientific equipment.

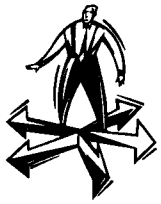
Biophysics has aided research on a variety of other subjects. These include processes as fundamental to life as photosynthesis, as lascivious as moths' sexual attraction, and as esoteric as measuring the energy coming off the hands of healers from all over the world while they're in their healing mode. Because the currents generated by these life processes are so small it has been hard for most doctors and scientists to believe that they could have any significant effects. (In the 1940's a similar skepticism led some European chemists and behavioral scientists to ingest relatively potent doses of LSD to prove that a few hundred millionths of a gram of some chemical couldn't possibly have any obvious effect. They found out otherwise.) However our cellular structures are extremely sensitive receptors to electromagnetic fields. One scientist (W. Ross Adey and colleagues, Loma Linda, as quoted in Oschman, Biophysics of Energy Medicine) described the membranes of cells as being like "a field of waving corn, responding to an infinite variety of faint electrochemical breezes that blow along the membrane surface." There is also an amazing interchangeability between chemical signaling processes and electromagnetic fields. These same scientists demonstrated the production of hormonal responses in cells from the application of electromagnetic fields without the presence of the hormones. This occurs because the receptors for various hormones in the body are also resonant antennas that respond to specific electromagnetic frequencies. This equivalency has profound implications waiting to be explored. Many of these findings are presented in the book Biological Coherence and Response to External Stimuli, edited by Dr. Herbert Frolich, and in Dr. Oschman's review of that book.

Is there any practical significance to all of this? Biophysics shows us an emerging, intricate body of knowledge that is dramatically changing what we understand humans to be, how they function, and how they are affected by each other and their environment. Connective tissue can be said to truly connect us, not just physically, internally, but electromagnetically both throughout our body and out into our environment. The implications for improving humans' capacity to heal or even regenerate damaged tissues are truly astounding. See the works cited in the bibliography, especially Dr. Becker's books, for further information on this topic. Currently, given that the living matrix's very existence not even recognized by most doctors, scientists, and complimentary healers, it is not surprising that there are no medical tests or measurements of its vitality and well-being.

Research in biophysics may someday even lead to verifying some aspects of things usually considered far-out such as astrology; consider that Jupiter's magnetic field is 19,000 times stronger than the Earth's. (Please note that I am not saying this will happen, only that it might.)

Here's another interesting angle. What is the major source of electrical energy in the body? (IÆll give you a hint: It isn't the brain or large muscles.) It is the heart. The heart is a very complex muscle made up of crisscrossing, spirally wound layers that generate very complex toroidal (i.e. donut-like) fields in seven different axes of spin. Some researchers believe that these electromagnetic fields control much of what we normally think of as higher brain function. (Winter, Heart Intelligence and DNA Programming) Blood, among its other functions, is a wonderful conductor of electricity that moves to almost every nook and cranny of our body, carrying its charge. If these speculations are true then the heart really is the master gland as Chinese medicine has long claimed.

And how can we talk about the heart without talking about love. Electrocardiograph studies have shown that when a person is feeling love their heart rhythms are more coherent, and with a specific harmonious ratio between their peak and duration. It is thus very



possible that the act of feeling love is in itself good for our health. That isn't a hard idea for most of us to accept, but it is nice to have science come to the same place.

CONCLUSION

Human beings are not what most people think they are in their most simple physical reality. Our image of the translucent human illustrates this other view of reality, that of the living matrix. Many of the undeniable benefits attributed to many complementary healing techniques almost certainly have to do with their effects on this system. For instance I have already mentioned that the living matrix is the medium through which the acupuncture meridians travel. Homeopaths' explanation of the electromagnetic basis of their remedies' healing effects which get stronger as they become more diluted, less physical and more purely electromagnetic, are much more plausible given this worldview. We can now say that when someone touches someone else that they are literally touching from every part, every cell, every nucleus of every cell in them to the same in the other person. The widespread, richly rewarding, healing practice of laying on of hands is now beginning to be scientifically understood. Rolfers are the only therapists I know of who work exclusively and intentionally with this system throughout the body. We now have a mechanism for explaining the energetic changes we so often see in our clients.

Therefore, the recognition of this system, this living matrix, and its myriad functions is a necessary addition to the intellectual armamentarium of both, medical and biological scientists, and anyone else interested in understanding the human condition, if we are to better utilize the resources at our disposal for improving our overall well-being. This biophysical investigation is at a very early stage in its development and much more will be coming clear soon.

BIBLIOGRAPHY

Robert Becker, M.D. *Sing the Body Electric* and *Cross Currents*. These are two books written for the lay public. In addition he has published many articles in various scientific journals. Unfortunately his ground breaking research has mostly been ignored.

Herbert Frolich editor, *Biological Coherence and Response to External Stimuli*, Springer-Verlag, Berlin, 1988. Dr. Frolich is the reigning grand old man of biophysics. This is a compilation of highly technical articles. For the non-biophysicist I would recommend Dr. Oschman's review listed below.

James Oschman, Ph.D. and Nora Oschman have a number of articles and booklets available on biophysics and the living matrix. These have been my primary source of information. They include: *Structure and Properties of Ground Substances* (American Zoologist, Vol. 24, No. 1, 1984) and *A Biophysical Basis for Acupuncture*, published in the Proceedings of the First Symposium of the Committee for Acupuncture Research, held on January 23 and 24, 1993. Copies of the Proceedings are available from CAR, P.O. Box 33, New Town Branch, Boston, MA 02258, or from the author.

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Physiological and Emotional Effects of Acupuncture Needle Insertion, published in the Proceedings of the Second Symposium of the Society for Acupuncture Research held on Sept. 17-18, 1994 (see address above).

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The Rolf Institute also carries a number of Dr. Oschman's publications.

Daniel Winter, *Heart Intelligence and DNA Programming*. Daniel Winter is involved with the Institute for HeartMath. These people are doing very interesting research on the nature of the electrical activity of the heart and its practical significance. They have produced books and two ambient music recordings, Heart Zones and Speed of Balance by Doc Lew Childre, that are specifically designed to stimulate positive heart energy states. Contact: The Institute of HeartMath / 14700 West Park Ave. / Boulder Creek, CA 95006 / 408-338-6803.