Somatic Anatomy

The Building Blocks of Life
Cells, Molecules, Atoms, and Energy

By Mary Ann Foster

Photo courtesy of iStockphoto.com/Jerry McEneaney
Many of us know first-hand the transformational power of massage education. It tends to catapult us into personal growth so deep that it often takes root in our bodies long before we recognize it. We may begin school to study massage, but soon realize that we ourselves are the study. Our bodies become our walking, talking laboratories. And the more we experience personally, the more capable we are of guiding our clients through their internal processes. A massage practice may not line the pockets with riches, but it can certainly enrich the heart and soul.

Somatic Anatomy is not intended to be an anatomy lesson so much as an invitation to explore an embodied understanding of anatomy and physiology, to integrate thinking with feeling, and to spin the wheels of motion so that you, too, can more fully embody the riches of somatic process in therapeutic massage.

A traditional study of anatomy begins with directional terms that locate the body in space. Then it drops, as we will here, to a microscopic level, examining the building blocks of the body—the cells, molecules, and atoms. Before delving into this microworld, we will look briefly into the infinite cosmos of subatomic reality with the intent of illuminating topics that have implications in both energy work and cellular processes.

**Quantum Properties**

It is mind-boggling to consider what we are actually made of. Each body is a universe unto itself, composed of millions upon millions of cells. Each cell is made up of trillions of molecules that house an immeasurable number of atoms. Although an atom contains subatomic particles (protons and neutrons in the nucleus, electrons orbiting the periphery), it is primarily empty space. To conceptualize the space between particles, imagine this: if the nucleus of an atom were the size of a marble, the atom's diameter would be about the circumference of a baseball stadium. The nucleus is about 10,000 times smaller than the outer orbit of electrons. When considering the vast distances between subatomic particles, comparable to the enormous expanses between planets, we realize that our bodies actually consist of far, far more space than substance.

Is this spacious “quantum body” what people experience during transcendental experiences in which physical boundaries seemingly dissolve into light and energy? And if the quantum body is primarily space, then what are we putting our hands on during massage?

We all feel density and volume in tissues, recognize the separateness of bodies, and instinctively learn to live by the laws of gravity. (Even if you fight this law, it always wins.) In fact, the very foundation of medicine and science is built on the 300-year-old laws of Newtonian physics. History recounts many a tale of centuries passing before scientific findings take a place in textbooks and popular culture.

Early in the last century came quantum physics, unveiling a revolutionary, invisible cosmos that operates under a set of laws totally different from the laws of gravity. In the magical universe of quantum reality, matter behaves not according to gravitational forces but as energetic waves. Subatomic particles (called *quanta*) exhibit properties that defy the time-space continuum. A quanta exists in two realities at once, being both a particle and a wave. Quanta can travel faster than the speed of light and exist simultaneously in more than one place.

This quantum universe is best described as a shimmering, vibrating sea of virtual energy packets, appearing one minute and disappearing the next, morphing into waves so quickly and simultaneously as to create the illusion of dense matter (see Figure 1, page 60). The most mind-bending of all quantum properties, one that may have the greatest relevance to massage, is that by the very act of observing the quanta, the observer influences their flux state. They may appear as matter, or as an energy wave, or not at all.

This discussion begs many questions. By the very act of observing our massage clients, are we changing their reality? And if our tissues function under both the laws of gravity and of quantum physics, do we affect both levels simultaneously, or do we address them separately with polarities such as deep-tissue massage and energy work?
Figure 1. An atom's dynamic wave and particle activity. Photo courtesy of iStockphoto.com/Olga Kolpakov.

Cells

Quantum reality meets the physical plane in the cells—the smallest unit of life. Each human body has about 60 trillion cells. Our cellular collective evolved a cooperative strategy for survival in a single body, differentiating according to function then grouping according to divisions of labor.

It is miraculous that our vast array of cells can function together so smoothly. Physiologists generally attribute this incredibly efficient coordination to one master controller—the brain. Yet, current research findings about the properties of neuropeptides and cellular functions chip away at this top-down paradigm, revealing a bottom-up bioenergetic cellular synchronicity that some biologists deem our collective cellular intelligence. Cells are homogenous in nature, each endowed with the same three parts: a membrane, a nucleus, and cytoplasm (cell fluid). The jellylike membrane is speckled with protein molecules that function as revolving transport channels for particles moving in and out. The nucleus houses the genes. The cytoplasm provides a fluid environment in which a group of organelles carry out system functions that parallel those of the body’s organs.

Exercise 1. Cellular Touch

• Have a partner get comfortable. Ask where she wants touch, then gently place your hands there. Use full-hand contact, shaping your touch around the contours of your partner’s body (see Exercise 1, left).
• Sense the boundary where your skin meets her skin.
• Shift your focus below the boundary, sensing the fluids and cells in both you and your partner. Imagine cradling millions of fluid-filled cellular sacs with your hands. Notice any subtle rhythms, as though your hands were floating on a quiet sea of cellular activity.
• Explore cellular touch for at least ten minutes. Then, share feedback.

Primitive Intelligence

Physiologists often depict the cell nucleus as a CEO, the man behind the curtain, so to speak, pulling levers on a huge genome switchboard. Yet the fact that genes cannot turn themselves on and off dates this paradigm of genetic determinism. Epigenetics, the study of how the environment affects gene activity, may better explain the process.

The basis of epigenetics is that a cell functions like a miniature ecosystem, continually evolving in a whirl of complex metabolic processes, adapting to environmental factors in ways that can change gene expression in new cells. A single cell relates to its environment through the million or so receptor sites located on its membrane. At any given moment, a flurry of charged particles lands on these many sites. The membrane exhibits a primordial intelligence to selectively choose what passes through it, seeming to read its surrounding energy field by extending receptor sites out like liquid tendrils that engulf select particles for the cell’s metabolic needs.

System-Wide Coherence

Not only does a single cell display a primal intelligence, but our multitude of cells, tissues, and organs function with a system-wide coherence. All parts instantly and dynamically coordinate and resonate with all other parts. This synchrony can be compared to a good jazz band in which all the players listen and respond to the group with immediate yet spontaneous improvisations.

What coordinates system-wide coherence? Given the complexity and constancy of chemical processes occurring within our sea of cells, nerve conduction (moving at top speeds of twenty meters per second) would be too slow. In comparison, electromagnetic frequencies (moving the speed of light at 186,000 miles per second)
Molecules and Metabolism

The role molecules play in metabolism may shed light on cellular coherence. Molecules, the building blocks of cells, bond in diverse combinations. These bonds are continually broken down and rebuilt in an ongoing chain of chemical reactions that constitute metabolism. It is staggering to realize that a single cell can undergo up to 50,000 chemical reactions per second.

All chemical reactions are triggered by a constant exchange of electrically charged molecules circulating within the body and across cell membranes. It is hard to imagine that this magnitude of chemical reactions and whirl of molecular activity could be coordinated by the nervous system alone. Surely, electromagnetic fields generated by tissues and organs have a far greater biological purpose than being mere by-products of cellular activities. These fields may prove to be the very mechanism by which the body communicates with itself.

Atoms

Molecules are made of atoms. Early models of an atom depict it as a mini-solar system, with a central nucleus of clumped protons and neutrons in the middle surrounded by elliptical orbits of electrons in the periphery (see Figure 3, below). A more realistic picture depicts the charged particles within atoms swirling in a vortex of energy, with particles popping in and out of view like twinkling lights (see Figure 1, page 60).

Each atom has a unique spin rate, or energy signature, that generates a specific vibration and frequency pattern. In a quantum sea of energy, atoms’ waves overlap.
and crash, much like the concentric circles from pebbles dropped in water do (see Figure 4, above). When frequency patterns overlap, atoms reach harmonic resonance; when they crash, atoms fall into dissonance, a chaos of being out of sync. When they reach synchrony and quantum resonance, atoms behave like a multitude of tuning forks resonating together in one giant energy wave.

In a discussion of vibrational patterns, researcher Valerie Hunt describes chaos as the disorganization of an open system that reaches a level of complexity, then attempts to jiggle itself to a higher level. "In the same way that small disturbances can rapidly shift chaotic systems, so too can minute adjustments stabilize an energy field." Does the vibratory signature we share when we touch another person trigger energetic healing by reordering chaos and bringing somatic resonance to the cellular processes?

**Exercise 2. Somatic Resonance**

When we touch another person, the tissues under our hands usually respond in several ways: they open and move toward the touch; they retract away from the touch; or they stay the same, as though frozen in an unresponsive pattern.

- **Explore touching a partner**, noticing the response of the tissues under your hands. Use full-hand contact, cradling the tissues without pressure.
- **Next suggest, "Feel my hand touching you: can you touch me back with your awareness?"** Notice any energetic or vibrational changes under your hands as your partner responds to this suggestion.
- **Then share feedback about changes in tone and resonance of areas being touched**, noting from both of your perspectives how the tissues respond to contact.

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**Energy in Medicine**

The classic definition of energy is the capacity to do work. Energy can neither be created nor destroyed, only converted to another realm. The two main types of energy in the body are potential (stored) energy and kinetic (moving) energy, which includes electrical, radiant, chemical, and mechanical energy.

The medical community validates the importance of energy in medicine with the use of MRIs, CAT scans, X-rays, and other diagnostic tools that reveal the densities of tissues, which work because diseased cells emit different energy fields than healthy cells. Medical professionals also use treatment interventions such as radiation to destroy cancer cells, E-stimulation to reduce pain, and high frequency shock waves to shatter kidney stones.

**Exercise 3. Sensing Energy**

- **Stand behind a seated partner.** Use your hands to scan the area several inches off her shoulders and neck, noticing any radiant heat or other type of energy you feel. Take note of this.
- **Then rest your hands on both of her shoulders**, using a full-contact touch. Notice any type of energy under your hands. "Listen" with your touch for heat, electrical energy, density, and vibration. Can you feel nerve conduction, cellular activity, or muscles twitching?
• Massage her shoulders, kneading the muscles there. Imagine stirring up the molecules as you work, like wedging clay or mixing ingredients in dough.
• After a few minutes of massage, stop. Rest your hands on her shoulders again. Can you feel kinetic energy in the tissues? What does it feel like? Notice any other changes in energy you feel.
• Then take your hands off her body and scan once more. Is there any difference in radiant heat?

Healing Touch

A healthy body functions with a flowing and interactive bioelectric energy field, whereas disturbances in energy flow lead to ill health. Healing touch improves overall balance by providing a supportive, caring touch that increases clients' awareness of their energy patterns. Most of us seem sensitive to the subliminal communication that takes place on an energetic level, instinctively responding to the vibes we pick up from other people. In massage, we communicate our energy vibration directly to the client via a touch that holds a healing intention (see Figure 5, right).

A massage therapist enlivens an energy system through healing touch, affecting somatic resonance to improve cellular coherence and manipulating soft tissue to literally stir the molecules in the tissues. Somatic resonance involves the listening contact of cellular touch. In contrast, soft-tissue manipulation actively kneads and stretches denser tissues. The first is a largely sensory focus, the latter a motor focus.

From an encompassing cellular touch, a practitioner can be drawn into any tissue layer, tending to the tissues that need attention with manipulation, while still tending to underlying energetic processes by keeping a receptive quality in the background.

Figure 5. Healing touch has a listening quality. Photo courtesy of iStockphoto.com/Matthew Scherf.

In light of this discussion, I propose cellular touch as a ground for massage, a place where energy meets matter. This counterbalances a tendency among practitioners that is one I know only too well from my own experience: in an effort to give a good massage, we overwork, drowning out what we feel while plowing and motoring through the tissues. Cellular touch can counter this tendency, tuning our sensory receptors to the energetic shifts taking place under our hands within our clients. This process can be as simple as relaxing the hands between strokes, inviting the natural action and rest cycles inherent to fluid movements, and expanding the spaces in between. In the end, this energetic exchange can enliven our own bodies with the benefits of healing touch as much as it does our clients'.

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Notes
2. This exercise is adapted from one called cellular holding, which is the basis of touch and re patterning in Body-Mind Centering, a somatic therapy based on an experiential study of anatomy and developmental movement, created by Bonnie Bainbridge Cohen.
9. B. Lipton, The Biology of Belief.