

What Is the Forgotten Side of Water?

Analysis by [A Midwestern Doctor](#)

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STORY AT-A-GLANCE

- › Throughout history, scientists have discovered water has a variety of largely unrecognized properties (e.g., vortex motion) that are necessary for life to function
- › Many of these result from water having a 4th phase in between a solid and liquid, where it behaves like a liquid crystal and is essential for biology
- › Liquid crystalline water provides strength and stability to the body, alongside creating barriers that protect the blood vessels and joints from wear. It also continually expands, creating the energy source that drives the muscles and nerves
- › It also spontaneously generates flows within the body and is responsible for many minute circulations within the body that otherwise cannot be explained (as they lack pumps)
- › The formation of liquid crystalline water goes hand in hand with zeta potential, the electrical charge that allows substances within fluids (e.g., blood cells) to remain separated, and which when disrupted, triggers a wide range of diseases (e.g., vaccines frequently cause microstrokes)

To maintain the illusion of knowing everything, science will often choose to simply ignore phenomena which are too complex for its existing models to explain. So, despite water having a myriad of remarkable properties necessary for life, few are recognized by science and [the many scientists who've recognized the hidden side of water](#) are largely forgotten.

For example, German naturalist Viktor Schauberger (1885 to 1958)¹ discovered that much of what water accomplishes in nature arises from its travel not in a linear manner,² but rather in constant spirals and vortices, and created many revolutionary devices.

In parallel, a team of Russian physiologists discovered [the heart causes blood to travel in spiraling vortices](#), which drastically increases blood's momentum and allows the heart to precisely direct where each type of blood goes within the body.

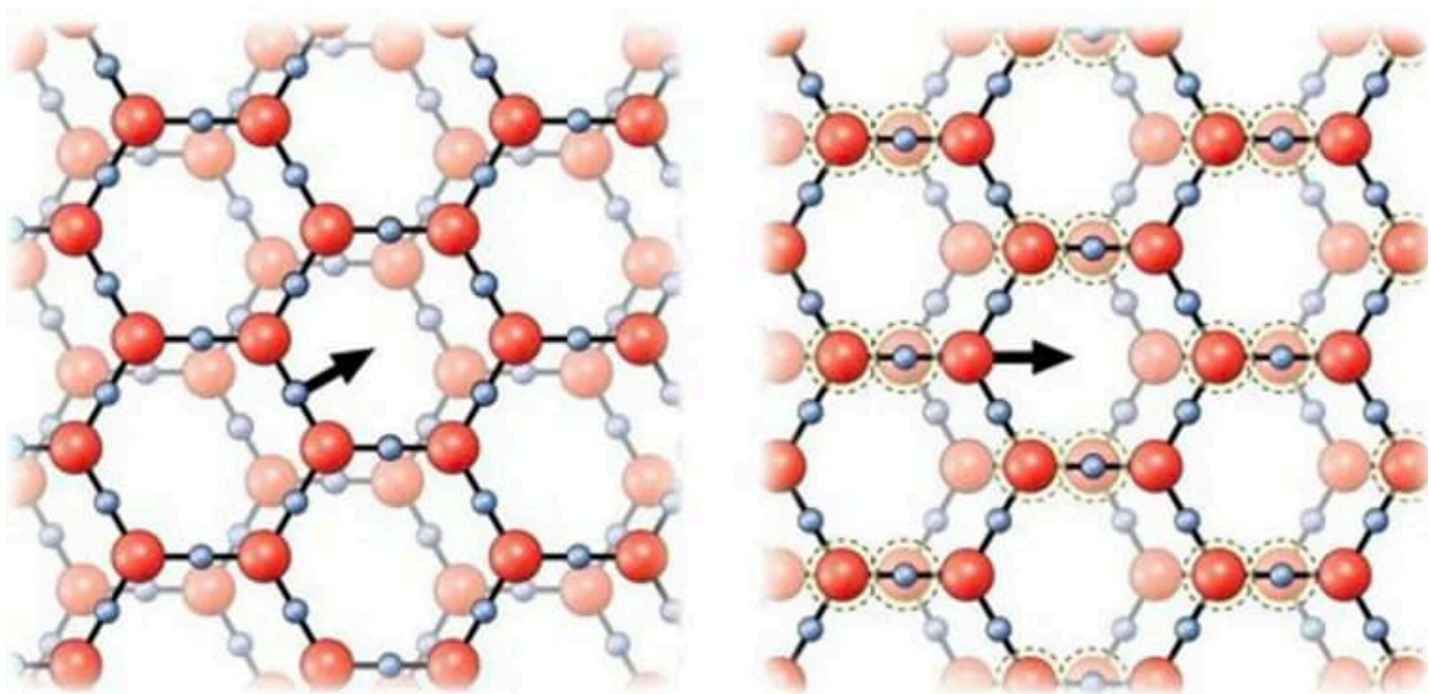
In short, water is thought of as a uniform, evenly mixed (homogenous) substance that exists to facilitate random mixing of biochemical reactants needed for life, despite abundant data (e.g., [the Russian research](#)) showing it often is highly structured.

Liquid Crystalline Water

Classically, we are taught water exists in three states: solid, liquid, and gas. However, throughout history, many researchers have observed that water (e.g., the “protoplasm” surrounding cells) assumes a gel-like state, behaving like a liquid crystal.

In 2009,³ after noticing that microspheres placed in water would be repelled by seemingly “empty” surfaces within the water Gerald Pollack was eventually able to explain how this seemingly impossible state of water was emerging.⁴ Once a few critical factors were present, water would assemble into a lattice on that surface, which prevented anything from passing through it, thereby creating an “exclusion zone” of water.

For exclusion zone water to form, it requires a hydrophilic surface, usually negatively charged.⁵ Once this condition is met, and electromagnetic energy is present⁶ (particularly infrared light, which exists everywhere),⁷ water will store that ambient energy by assembling into many layers of offset hexagonal sheets with the formula H_3O_2 often reaching 0.1mm in depth (which molecularly, is massive).⁸



As Pollack describes:

"This model yields a stable structure that sticks together naturally. This model yields predictable mechanical behavior: semisolid when left alone, yet able to flow in response to an imposed shear force. Its behavior should resemble gelatinous egg white."

Due to this lattice shape, each plane can easily slide past adjacent layers, allowing electrons to travel through the lattice with ease (resulting in conductivity approximately 100,000 times that of surrounding unstructured water).⁹

Since this structure is "missing" protons (it's $H_{1.5}O$ rather than H_2O), those protons go immediately outside the exclusion zone (EZ). Therefore, a negatively charged region exists within the EZ, while a positively charged region (which is acidic due to protons present) exists outside it. This, in turn, has been corroborated by numerous researchers who have both demonstrated a persistent pH change there and successfully harnessed its charge separation to power small electronics.¹⁰

Since the negatively charged region exists in the crystalline structure, it prevents most substances and ions from existing within it. This separating quality has many uses including economical water purification and allowing cells to create the sodium

potassium gradient which is necessary for life but far beyond what membrane pumps alone could accomplish (i.e., **cells will continue to concentrate potassium after their membrane pumps are disabled**).

Likewise, the EZ has increased viscosity, slowing substance diffusion, and can be directly observed by resonance imaging technologies detecting molecular restrictions (e.g., NMR¹¹ and MRI¹²).

Note: Liquid crystalline water absorbs ultraviolet light (270 nm wavelength), radiates less infrared radiation than surrounding water, and has approximately 10% greater refractive index than bulk water. By each metric, EZ water has a higher density than normal water. It comprises the greatest water percentage at 4 degrees Celsius – the same temperature Viktor Schauberger identified as providing water's greatest density.

This form of water is all around us in nature. For example, it forms the surface layer of water we typically associate with “surface tension” which is strong enough for water striders¹³ and certain lizards¹⁴ to stand upon. That layer, in turn, often behaves like a large connected sheet (best seen by observing large bodies of water from above) and when carefully examined, is actually a complex lattice that weaves through the body of water.



Fig. 15.6 *Mosaic pattern seen using low-angle visible light.*

Note: Pollack has also made a strong case that liquid crystalline water facilitates different phase changes (e.g., freezing, water boiling, or water vapor becoming clouds).¹⁵

Cellular Structural Integrity

Typically, cells are thought to be liquid bags whose contents are dictated by membrane lipids and proteins and held together by a cytoskeleton. However, liquid crystalline water (which forms along the cell membrane and the structures within cells) plays an equally pivotal structural role as it:

- Creates the gel-like stability of cells and tissue (which prevents them from suddenly leaking and spilling out once a puncture occurs).
- Creates a (continually regenerating) protective barrier which prevents things from entering the cells (and likewise protects the lining of blood vessels from being damaged by what flows past them or the load-bearing pivot point within joints from wearing down).
- Lubricates many surfaces, allowing them to slide past each other (e.g., the tendons and fascia **are covered with a layer of this water**). Conversely, as it disappears, tissues start to stick together (creating problematic adhesions), arthritis onsets, and the blood vessels become vulnerable to injury **and atherosclerosis begins**.

Note: *This lubrication can also be observed outside the body (e.g., ice skating is possible because a layer of liquid crystalline water forms between the water and ice).*

- Creates non-compressible pockets throughout the body, which are essential for biomechanics (e.g., joints have a layer of liquid crystalline water in the center which bears the force and weight of movement without becoming damaged or resisting the motion).
- These non-compressible structures allow the body to utilize a tensegrity based structure where elastic lines of tissue tension throughout the body can allow any force to be equally distributed throughout the body, both protecting any single area from buckling if exposed to excessive force and allowing free motion throughout the structure (rather than being like a typical building with a largely static one which relies on a single static core).

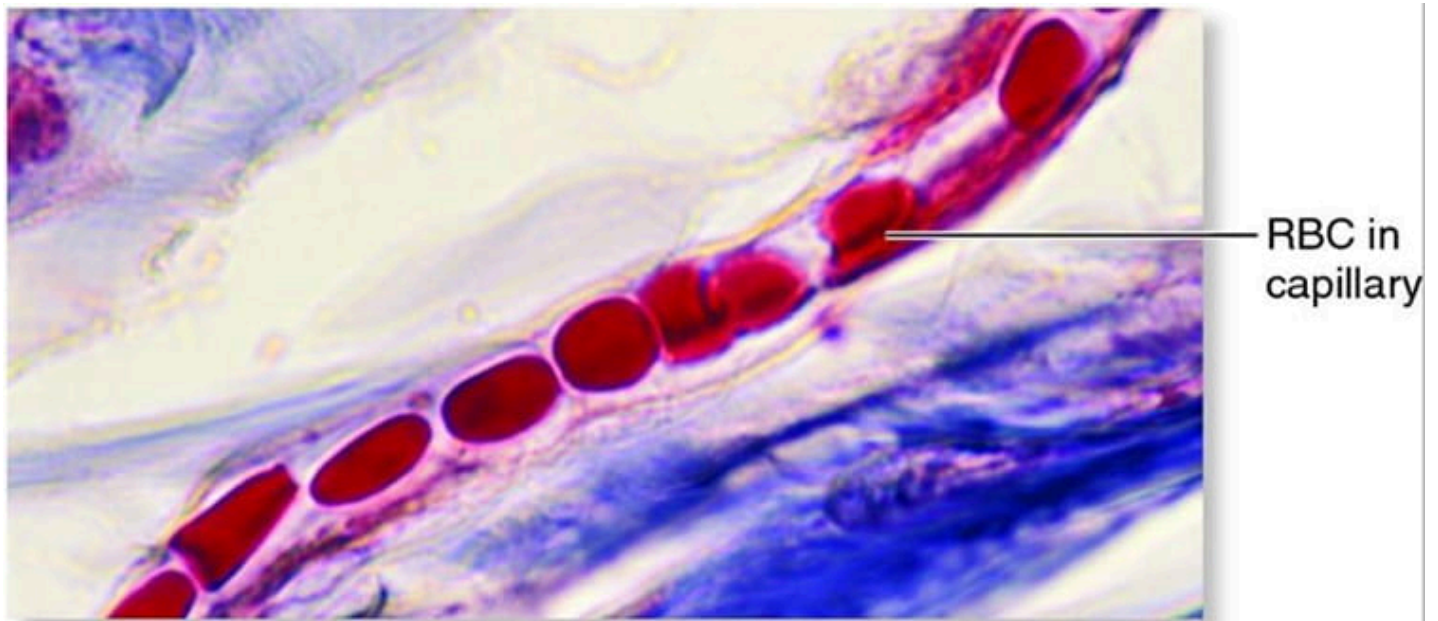
While many of these concepts initially appear quite abstract, one French hand surgeon found a way to visualize them through magnifying images obtained during surgery:

Note: *The liquid crystalline water model has been embraced by bodyworkers as it puts into words what they observe within the body.*

Mysteries of Microcirculation

All of the above raises many questions, one of which is how the 4th phase of water functions inside the body? I will present some of the findings below.

A consistent pattern emerges when examining each circulatory pathway in the body. Tiny spaces with no extrinsic force driving their flow simultaneously require regular movement through them, and without that flow, life cannot function.



Note: *In many cases, the blood vessels through which red blood cells travel are smaller than the red blood cell, requiring the blood cell to deform to fit – something which could not occur without substantial force pushing the blood cell forward.*

As the hydrostatic pumping force of the heart is largely absent at the capillary bed, many have wondered if an alternate driver of circulation exists. For example, spontaneous circulation can be observed in a developing embryo before heart

development,¹⁶ while flow and pressures observed throughout the body are frequently inconsistent with heart-generated pressure being the driving force behind blood circulation.¹⁷

When I've thought this question over at length, it does not seem realistic that the heart could provide enough force to move the red blood cells through every capillary in the body. What then could be causing the fluids inside the body to move?

Proton Induced Motion

Pollack and his team happened upon a chance discovery in their laboratory,¹⁸ which provided an answer to the mysteries of circulation:

“Fluid commonly flows in response to an external pressure gradient. However, when a tunnel-containing hydrogel [which contains liquid crystalline water] is immersed in water, spontaneous flow occurs through the tunnel without any pressure gradient. We confirmed this flow in a wide range of plant- and animal-derived hydrogels.”

As stated above, liquid crystalline water requires ambient infrared energy and a polar surface to form. A curious phenomenon occurs when that surface lines the inside of a tube — the liquid crystalline water lining the tube causes water to flow spontaneously through it.

“EZs [regions of liquid crystalline water] were studied previously by immersing sections of tubes made of strongly hydrophilic material, Nafion, in aqueous microsphere suspensions. A microsphere-free EZ developed adjacent to the tube surface.

In the central core of the tube, movement of microspheres demonstrated a flow, continuously sustaining itself at a velocity of $\sim 10 \mu\text{m/s}$ in the axial direction ... On the other hand, flow was not observed in tubes built of hydrophobic materials such as Teflon, which do not generate EZs.”

Since liquid crystalline water's formation requires ambient radiant energy, its presence influences observed flow:

"We found that increased infrared energy substantially increased the flow velocity ... application of ultraviolet-containing white light could boost flow velocity by up to 500%. Thus, the self-driven flow mechanism can convert radiant energy into kinetic energy."

Pollack theorized this flow was generated by mutual repulsion between positively charged protons expelled as water (H_2O) transitions to liquid crystalline (H_3O_2) water. Several observations support this hypothesis. First, protons are continually added to water passing through:

"We found that the exiting water had a lower pH value than the entering water; the pH difference exceeded one unit and never diminished — even after 30 minutes of continuous flow."

Second, flow was greatest in narrow tubes:

"Another prediction of the proton-gradient hypothesis is that the flow should be faster in narrower tunnels ... a narrower tunnel should lead to a higher proton concentration in the core ... which should lead to faster flow in the narrower tunnels."

Note: *Narrow blood vessels are the most vulnerable to their blood flow being disrupted by an impaired zeta potential, and hence where the initial subtle signs of illness often appear.*

Third, flow direction was always from the narrower end to the wider end:

"A common feature shared among the various flows was the direction — always toward the region with a larger cross-section or volume."

Each fluid conduit in the body is lined with a material recognized to create liquid crystalline water. For example, all blood vessels are lined with a protective glycocalyx, **which remarkably well-suited for creating liquid crystalline water on its surface.**

Likewise, liquid crystalline water generating biomolecules divide cells into compartments and simultaneously, by lining the gaps with liquid crystalline water, create a primitive circulatory system, facilitating the exchange of metabolites necessary to sustain life. The biological flow of fluids independent of a central pump has also been explored in animals:

“Blood can apparently flow without a beating heart. After the heart had been arrested, postmortem blood flow was confirmed in mice, rats, dogs, and chick embryos. The flow persisted from 15 minutes to several hours. Furthermore, some amphibian larvae could live up to 15 days following surgical removal of the heart, implying an alternative means for propelling blood.”

In short, the human vascular system is structured so that expelled protons can drive circulation, something that hydrostatic pumping alone is not sufficient to do.

Note: Other organisms also utilize this mechanism. Plants require significant internal water transportation, but they have no pumping organs. In the lab, Pollack demonstrated that the xylem creates liquid crystalline water¹⁹ and that this flow allows water to overcome gravity's resistance and climb up tubes.²⁰

Colloidal Stability

When a substance is mixed into water, it can fail to mix, dissolve, or form a colloidal suspension. When repelling forces overcome attractive forces, particles become suspended and a colloid forms. The behavior of chia seeds in water illustrates this concept:



In the above image, a hydrophilic gel (composed of a large amount of liquid crystalline water) forms around each seed, creating a barrier that prevents seeds from coming together and separating by gravity. However, when this gel doesn't form sufficiently, gravity separates the seeds from the water.



Chia seeds hence, provide one of the best ways to observe liquid crystalline water directly and to conceptually understand colloidal stability (as something similar to this also occurs with particles much smaller than chia seeds).

Most biological systems, in turn, are colloidal suspensions that depend on mutual negative charges (or various types of minute barriers) to remain dispersed. In health, the disperse forces outweigh the attractive ones, but once this reverses (e.g., due to a

vaccine or severe infection), fluids will begin to clump together, impairing the microcirculation, eliminating metabolic waste products, and once severe enough, give rise to small or large strokes.

Note: *The heart also struggles to pump thickened blood, and many have observed restoring the physiologic zeta potential treats arrhythmias (e.g., [atrial fibrillation](#)).*

In turn, a major problem with vaccinations (due to their aluminum content) and COVID-19, along with its vaccines (due to their spike proteins) is that both of these carry a very high positive charge density which overpowers the negatively charged dispersive forces within the body. As such, many childhood vaccine injuries can be traced to aluminum induced microstrokes and likewise, one of the primary issues with the COVID vaccines is the clots they create throughout the body.

Note: *Once you know how to look for them, you can often find [signs of a microstroke in COVID-19 vaccine recipients](#).*

Liquid Crystalline Water and Zeta Potential

[Zeta potential](#) quantifies the negative charge maintaining colloidal stability, and since unobstructed microcirculation is so vital to health, a key part of my medical practice revolves around ways to restore the physiologic zeta potential (discussed further [here](#)). Because of this, I am always looking at how the factors in a patient's life influence their zeta potential, and due to their many overlaps, have extensively explored [the relationship between liquid crystalline water and zeta potential](#).

For example, virtually all colloidal systems in nature rely upon mutual negative charges for dispersion, rather than mutual positive charges, which could also create the same effect. I now believe this is due to liquid crystalline water creating a negatively charged (H_3O_2^-) coating around polar particles in water, hence necessitating another negative charge to create repulsion.

Likewise, many of the same factors that increase one (e.g., alkalinity) also increase the other. As such, I believe many factors attributed to enhancing one may, in fact, enhance the other (e.g., something that increases the amount of negatively charged liquid crystalline water around a particle will also increase its negative charge and colloidal dispersion, hence also increasing the zeta potential).

Similarly, a disruption in one can often affect the other (e.g., in the smallest vessels, a loss of zeta potential which causes blood cells to clump together can obstruct the vessel and negate the blood flow generated from liquid crystalline water).

Phase Changes

Colloidal solutions can exist either as a thickened “gel” (with significant amounts of liquid crystalline water) or a fully fluid colloidal solution (a “sol”). A key innovation Gerald Pollack made is that, through releasing specific ions, [the body can rapidly cycle between having its colloids in a “sol” or “gel” state](#), creating another way the body can harvest the energy accumulated by liquid crystalline water.

For example, in Pollack’s model, muscles produce liquid crystalline water that stretches their proteins. To contract, calcium (a zeta potential collapsing ion), is released and rapidly breaks apart the liquid crystalline water within the muscle protein, causing the stretched muscle fiber to rapidly shorten (as nothing remains to push it open). Conversely, ATP (which [restores zeta potential](#)) is used to rebuild that liquid crystalline water and “relax” the muscle by stretching it back to its resting state.

Likewise, many other cellular processes also depend upon this phase shift such as nerve cells firing (supported by the fact that local anesthetics eliminate the liquid crystalline water in their vicinity) and the rapid expulsion and expansion of vesicles by cells (all of which is discussed further [here](#)).

Note: *We frequently find local anesthetics are very useful for dispersing pockets of “clumped fluid” within the body, and, due to the trauma release that often follows, we now suspect those fluid agglomerations (e.g., within the fascia) are a way the body stores*

trauma.

Conclusion

America's scientific apparatus has the capacity to produce extraordinary innovations for humanity, but as independent scientists like Pollack have shown, that pioneering spirit has been replaced with a drive to secure future funding and maintain the status quo:

"Until the modern era, scientists focused on seeking foundational mechanisms. They tried to understand how the world works ... The pursuit of simplicity seems to have largely evaporated from the scientific scene. In four decades of doing science, I have seen this noble culture yield to one less audacious and more pragmatic.

The chutzpah has vanished. Scientists content themselves with short-term gains in narrowly focused areas rather than seeking fundamental truths that may explain broad areas of nature.

Water occupies a place central to so many natural processes that few people can conceive that the basics could remain open to question ... A third reason for the slow emergence of such fundamental principles plagues all of science: intellectual timidity.

Relying on received wisdom feels safer than dealing with the uncertainties of revolutionary disruption ... A fourth reason is outright fear. Challenging received wisdom means stepping on the toes of scientists who have built careers on that wisdom."

Making America Healthy Again, thus is much more than just a question of eliminating a few harmful toxins from our environment. Rather, it is a question of revisiting how the science our decisions revolve around is conducted to begin with.

For that reason, a major push from the MAHA leadership has been to reform how research is conducted so that discoveries that can transform science are incentivized and longstanding dogmas (e.g., the necessity of fluoride or vaccines) can be challenged rather than censored from every platform.

As such, RFK Jr. and NIH director Jay Bhattacharya have begun enacting a series of vital and long overdue policies to facilitate it. I believe it is critical that we support this endeavor, particularly since it is only through a new form of science that our society can begin to give a serious look at The Forgotten Sides of Medicine, which can allow us to realize the health each of us has been searching for.

Of these, I believe the forgotten side of water to be particularly important, as beyond it explaining many mysteries within physiology, the loss of the body's liquid crystalline water and zeta potential (and the accompanying tissue dehydration) is one of the key degenerative processes that underlie aging.

Author's Note: *This is an abridged version of [a longer article](#) which goes into greater detail on how to increase liquid crystalline water and zeta potential within the body (which can be read [here](#)), an article on how the zeta potential concept underlies a wide range of diseases (which can be read [here](#)) and a five part series on liquid crystalline water (which can be read [here](#), [here](#), [here](#), [here](#) and [here](#)).*

A Note from Dr. Mercola About the Author

A Midwestern Doctor (AMD) is a board-certified physician from the Midwest and a longtime reader of Mercola.com. I appreciate AMD's exceptional insight on a wide range of topics and am grateful to share it. I also respect AMD's desire to remain anonymous since AMD is still on the front lines treating patients. To find more of AMD's work, be sure to check out [The Forgotten Side of Medicine](#) on Substack.

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