

BIOHACKERS

ISSUE 17

MAGAZINE

BIOHACKING WITH HYDROGEN

EXCLUSIVE INTERVIEW
TYLER W. LEBARON, PH.D

FOUNDER, EXECUTIVE DIRECTOR OF
MOLECULAR HYDROGEN INSTITUTE
A SCIENCE-BASED, NONPROFIT
PROMOTING HYDROGEN RESEARCH
AND EFFECTS

THE MIRACULOUS ELEMENT:
MOLECULAR HYDROGEN

THERAPEUTIC HYDROGEN GAS :
WHAT THE STUDIES SHOW

REDUCING OXIDATIVE STRESS
AND ACHIEVING HOMEOSTASIS -
HYDROGEN DOES IT ALL, AND SAFELY!

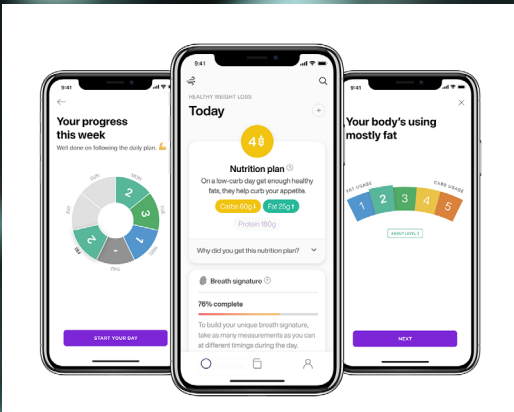
Also In Our SEPTEMBER Edition:

- Homeomorphism the First Language of Neural Reality
- The Liquid Crystal behavior of the Human Body
- Maximize Brain Function through Food & Lifestyle
- AND MUCH MORE!

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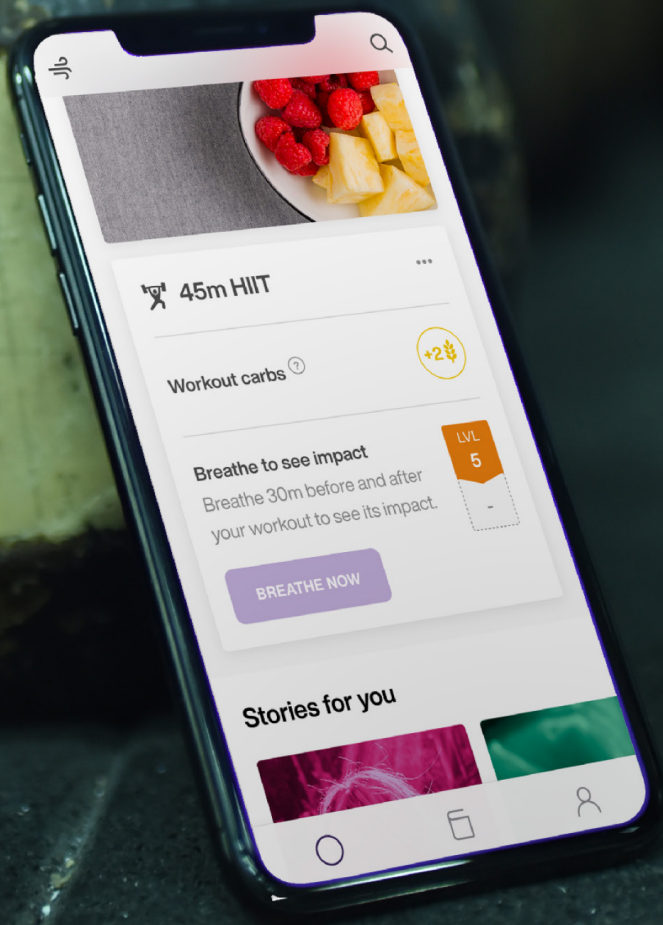
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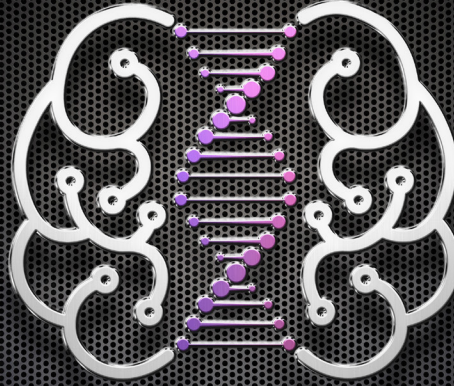
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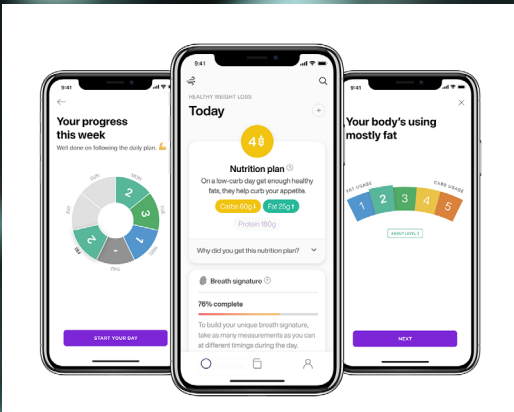
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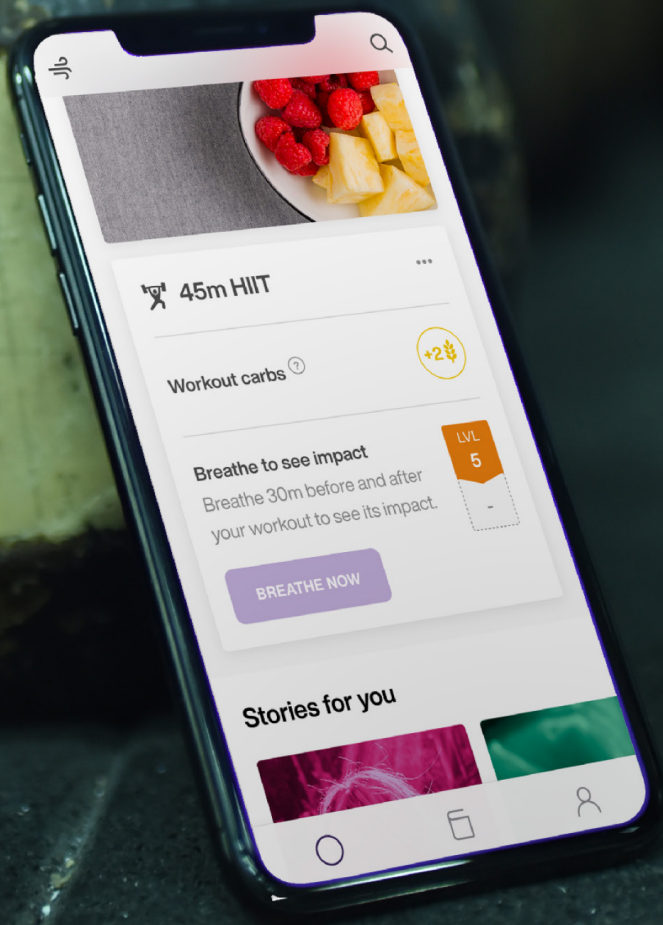
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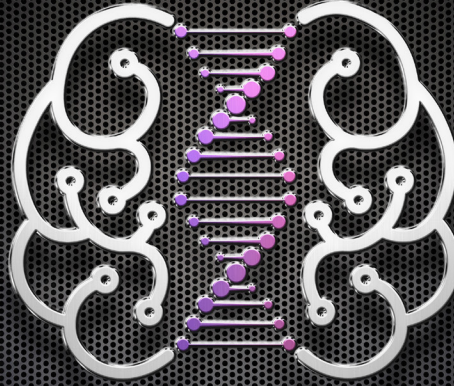
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MESSAGES FROM OUR BIOHACKING TEAM



A LETTER FROM THE EDITOR

When one experiences a new product, a new treatment, or a new idea, there's little that compares to the feelings of excitement and hope that rush in, fueling one's faith in the upright direction of humanity. I just recently attended the 8th Annual Biohacking Conference hosted by Dave Asprey in LA and like each biohacking event, I left feeling inspired to say the least. Just about everything I saw, every person I met, every biohack I experienced, further fed my appetite to share these great ideas and practices with the world, a world hungry for the opposite approach of industrialized medicine.

Now of course, not every biohack is exactly 100% proven. Suffice to say, there are many that are still in the process of collecting data from studies and clinical trials. However, those that have stood up to the modern pill-popping regimes and have adamantly supported their ideas on the foundations of strong scientific data, are truly examples to be held in high regard. I was impressed with how many products and companies there were at the conference that held a mission of true service to fellow mankind.

Yes, like in any startup industry or even industry at that matter, there are those who are looking to push some falsehood to scheme people into buying their product or services. But as we know, the companies that rise to the top are those that stick to the cardinal virtues that make up all of us: Prudence, Justice, Fortitude and Temperance.

The Biohacking Industry is outgrowing its mold and soon a new layer of enthusiasts will be added. This is something that should enthrall us, but it should

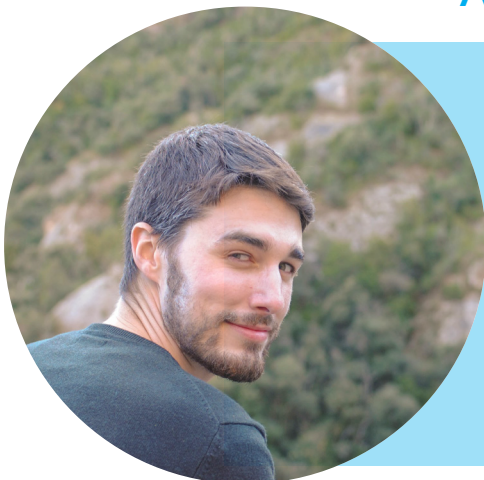
not permit us to lose site of the foundational attributes that make and will continue to make us biohackers for the rest of our lives. Essentially, we are all after freedom - freedom from disease, freedom from injury, freedom from hysteria, freedom from aging. Responsible Biohacking is perhaps the best way towards that freedom, and we must continually adjust our sails to catch the winds that stem from truth and service. That is what we at Biohackers Magazine strive towards - serving the community through the provision of information carefully discerned and attuned towards the values of sincerity and science.

"Through Discipline Comes Freedom" - Aristotle



Dallas and Dave Asprey - 8th Annual Biohacking Conference in LA, California

About Dallas McClain



Born in the USA, Dallas is a passionate reader of theological and personal development books. He holds a bachelor's degree in Biological Sciences. Teaching English abroad, Dallas has been immersed in various cultures and backgrounds while making friends all over the world. He is a Catholic Christian and enjoys time outdoors while being a tennis enthusiast. He is the Co-founder and Editor of Biohackers Update Magazine. He is currently living in Orlando, Florida with his wife & children, where he enjoys writing, sports, and nature hikes in his free time. Dallas can best be reached at his email: dallas.biohackersupdate.com@gmail.com

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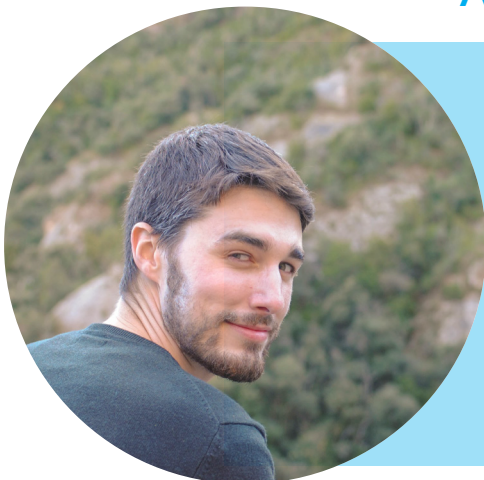
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A MESSAGE FROM COO JEAN FALLACARA

We Biohackers, maximize both our quality of life and our time alive; sometimes dreaming to live up to 150 years old.

Our Team recently came back from the Biohacking Conference by Dave Asprey, in Los Angeles, where we were on a mission for You, to investigate, experiment, and deep dive into new technologies, keeping science as the backbone of our research because Integrity without knowledge is weak and useless, and knowledge without integrity is dangerous and dreadful.

Science is busy investigating anti-aging, anti-inflammatory, muscle-building, Meta-learning, memory, neurostimulation, precision & individualized nutrition avenues.

There are multitudes of new devices claiming to alter your brainwaves for quiet relaxation, intense focus, or to enter a deep flow state...

There are also tons of supplements and new ingredients to optimize your gut microbiome, and now your microbiome, the large community of viruses, genetic material, and exosomes living inside the human body. Yes, food

is more than calories.

Biosynergism and bioharmony are more about realigning with the roots of humanity and embracing natural practices; all while prioritizing recovery & embracing ancestral medicine.

Biohacking must restore science as the backbone of decision-making if we want biohackers to sit on the front lines.



About Jean Fallacara



Born in France, Jean is an athlete, entrepreneur, scientist, public speaker and an Art collector. He is the founder and CEO of Cyborggainz, the Managing Director at inTEST Corporation and the COO of Biohackers Update Magazine. He is also the author of "Neuroscience Calisthenics: Hijack your Body Clock." Jean holds a bachelor's degree in biochemistry, a master's degree in immunology and genetics, and an engineering degree in biotechnology. He has also studied neurosciences and brain functionalities, and law and finances. He is currently living in between Boston and Montreal after his biotech company was acquired by inTEST Corp (NYSE:INTT) in October 2021.

Website: jeanfallacara.com / Website: cyborggainz.com

ARJUN'S STATEMENT

What makes a company successful?

Is it the assets they have, or the inflow of money? There can be many parameters to judge the success of a company. Truth be told, when we started off, it was like we were in space - we had no point of reference, no nearby stars to guide us, and we weren't even sure if we were moving or not.

I hear business coaches and other motivational speakers say, just keep moving forward but when you don't have a point of reference, how do you even know where forward or backward is, what's up or what's down?

So how do you value something when you don't even know what to do with it? It is simple really. As babies, we didn't have any point of reference either, but we learned; no one taught us, we just observed our surroundings, and we developed our own point of reference and compared our progress from there.

However, as we grew up, we let society and peer pressure dictate the narrative and our reference points - what is good, what is bad, right or wrong - and we accepted it, so we are not outsiders.

It is time that we do what is right rather than what is popular. It is time to be who you really are rather than what society wants you to be. That is the essence of biohacking, be curious, ask questions and research.

Don't let anyone tell you what is good for you, learn it for yourself. You are unique and so should the measure of success be for you.



About Arjun Chauhan



Born in India, Arjun is the master of all trades, the Chief Marketing Officer of Biohackers Update Magazine and a soccer enthusiast. He holds a bachelor's in commerce and a Master's in Business administration, specializing in marketing and human resources. He has 6 years of experience in Content Marketing and is always looking forward to gaining more from life. With a passion towards nature, he is currently in the Foothills of Himalayas, in the northern part of India.



— OUTER —

“We are all connected; To each other, biologically. To the earth, chemically. To the rest of the universe atomically.”

— Neil DeGrasse Tyson

BRAIN FOOD

Maximize Brain Function
through Food & Lifestyle





Often when we learn about health optimization we understand that diet and food plays a vital role. “You are what you eat” isn’t just a cliché and the Father of Medicine, Hippocrates was spot on when he said, “let food be thy medicine”. But what does eating for optimization really mean? How can we properly and effectively use our diets to help define our quality of life, energy and cognitive abilities?

It’s no secret that more people, American’s especially, are developing chronic and deadly diseases at a faster rate than ever before. Cognitive decline has affected many, leaving us to question what some of the main contributors are to this decline in overall health and wellbeing. There can be many factors that play a role in this decline and I invite us to take a closer look at the ways food, diet and environmental factors have affected our generations.

A recent study has shown that frequent consumption of ul-

tra-processed foods can put you on the fast track for cognitive decline. Some of these ultra-processed foods include “easier” and “quicker” menu items like frozen foods, prepackaged soups and sauces, the obvious fast food chains, sodas, candies and so on. As it may come to no surprise that these foods can severely affect our health, it may not be as obvious as to what foods can actually support our cognitive abilities, function and brain health.

Studies and research prove that the best foods for your brain are not-so-ironically the same that can also protect your heart and blood vessels. The following is a list of real, whole foods that research suggests to be incorporated into your everyday diet to support and protect your cognitive health.

Berries

Berries are abundant in flavonoids. Flavonoids are a phytonutrient and have natural plant pigments that give berries their beautiful and bright color. Flavonoids help improve memory,

have anti-inflammatory effects, and protect cells from oxidative damage that can lead to disease. The antioxidants found in berries can help prevent cognitive diseases like Alzheimer’s and dementia. A study has found that consuming two or more servings of strawberries and blueberries each week delayed memory decline by up to two and a half years.

Leafy Greens

Vitamin K, lutein, folate and beta-carotene are all neuro-protective nutrients found in leafy greens such as kale, spinach, collards and broccoli. Adding one daily serving of a green leafy vegetable to one’s diet can improve and contribute to healthy cognitive function.

Nuts and Seeds

The addition of whole nuts and seeds can be incredibly beneficial to the brain. Not only are they an excellent source of protein, these foods also contain omega-3 fatty acids and powerful antioxidants. Diets rich in unprocessed nuts and seeds

have been shown to lower blood pressure and allow more positive brain function in older age.

Fatty Fish

Fatty fish is a great choice for brain health. Fatty fish like Salmon, Mackerel, Albacore, Anchovy and so on are another rich source of omega-3 fatty acids. At least two servings per week can reduce damaging build up of beta-amyloid. It's important to source fish well and choose varieties low in mercury and ideally Wild Caught.

Turmeric

This bright yellow spice often found in many curry dishes contains a powerful antioxidant called curcumin. Curcumin has been shown to directly support cells in the brain. It can help with memory, depression and is proven to help new brain cells grow. You can take turmeric in supplement form if you are not accustomed to its pungent flavor.

Alongside the importance of an intentional diet, a healthy environment also has a key role in cognitive health and performance. Research has shown that natural environments and being stimulated by nature itself is extremely beneficial to the mind, particularly for tasks that require much attention and demand. Cognitive function versus cognitive fatigue has a lot to do with the environment in which we live. Natural environments have rejuvenating powers as they consist of calming and fascinating stimuli like trees, flowers and water and lack alerting stimuli, allowing our minds and body's to be at a resting state.

A practice called grounding is proven to be very beneficial. Grounding oneself outdoors by walking barefoot in grass, the dirt and sand helps connect you with earth, improving cortisol rhythm and decreasing stress response, which supports cognitive function.

This ideal resting state triggers the parasympathetic nervous system. The parasympathetic nervous system controls the body's ability to relax. When our body is in this state of rest, many beneficial things are happening. To name a few – our cells are repairing, our body is able to digest well and properly and our heart rate slows. These positive affects for the parasympathetic nervous system are all associated with healthy cognitive aging.

Each morning we wake up we have a new opportunity to choose positivity and health for our lives. In order to decrease our odds of impairment to the brain we would do well to in-

corporate key aspects of optimal food choices and positive lifestyle changes into our daily regimen and set ourselves up for success. The benefits in our choices not only affect ourselves personally but those around us in our daily lives as well. Based on these choices we make for our own health and wellbeing, we are also making a positive impact on the world around us.



About Ally D'Alia



Ally D'Alia is a Private Chef, Recipe Developer and Health Coach with a background in health supportive culinary cuisine and integrative coaching.

When serving her clients, she focuses on developing plant forward, whole and clean meals and recipes that support a holistic lifestyle. While not in the kitchen, Ally enjoys time spent outdoors by the sea or beside a lake, traveling and tasting cuisine from different environments and cultures.

To learn more about Ally's approach, visit www.allydalia.com.

Instagram: [@allydal](https://www.instagram.com/allydal)



STILLNESS

**How Float Therapy
Impacted My Health
Journey**

Was there a healthier me somewhere within reach? I was unclear but certain I wanted to get there. Was it possible to reach the unthinkable? Of course both mental and physical health is possible to achieve. But putting in the effort to reach our full potential comes from us wanting change and taking steps forward while making discoveries that the world has to offer us.

In my previous article 'Chronically ill and Seeking Solutions', I gave a glimpse of many discoveries within my journey.. Living with a chronic illness, it is clear that I would face many challenges along the way. My body attacked itself and lacked a strong balanced immunity.

Uncomfortable circumstances became the new normal. But the New Normal became the Strength I needed to desire change in my life and not just see but experience it for myself. As a woman who is also a mother, wife, who faces many obstacles everyday, it became essential to find therapies that would help me cope with such symptoms - the main ones being, Sleep deprivation, Stress, Inflammation of the Body along with aches, pains, and headaches.

When I found out that Epsom salt bath tanks claimed to offer an abundance of health benefits, I scheduled a visit. Doing so was the best decision I could have ever made. I experienced the ability to feel weightless as if I floated in a zero gravity environment. This therapy was a must have in my list of Monthly self care routines.

I'm not going to sugar coat it, I did face challenges during my first float session. I was amazed to see how difficult it was to disconnect my thoughts from the real world. But definitely not impossible to master.



Finding silence and learning how to shut off all thoughts, turned into a skill that I realized was much needed. Meditation became a must that I needed to put into continuous practice. I must say that floating may not be for everyone - not everyone adapts well to an enclosed space, so be mindful of that if you have not tried it yet. But don't give up on it.

Not only did I seek health benefits for my body but my mental health was also a priority. Floating became a healthy distraction from the outside world and I learned to dedicate One Hour of "Me Time" -

A time where nothing mattered around me. By the third

float session, I truly learned how to embrace silence. You are given options to either float in pure darkness or with light and the best part is the relaxing music that plays while you float effortlessly. The sounds of waves crashing onto the ocean shore, birds chirping away in the wilderness, the waterfall echoing in the forest, all created quite a relaxing atmosphere. Can you just envision yourself there? I can.

I felt as though I was traveling to outer space as I would move my body freely, side to side while in the tank, allowing the tips of my toes to push me off the edges, all while holding my arms out to the sides where my fingertips

lightly emerged out of the water. The movements feel so free on my joints. By removing gravity's effects your body falls into alignment and becomes free to let go. I call them power naps. I'm sure we can all relate to the lack of rest we experience at times, the level of stress we carry, the worries and illnesses we face. Power Naps are needed but just not treasured enough.

Little did I know that in a sensory deprivation tank nothing else mattered but me. An environment heated to the same temperature as the skin, soundproof, and it had been around for years.

Are Floatation tanks safe?

Floating tanks can be safely used for women, men, new moms who are breastfeeding and there's reason to believe that it can help with milk production. They are howev-

er known not to be suitable for people under 16 years of age or people with certain medical conditions. Those seeking such therapies must have an open mind in doing so while responsibly seeking a healthier lifestyle for the mind, body and soul.

Let me share with you some of many known Health benefits:

Float therapy, floating or sensory deprivation tanks are used to ease mental anxiety and muscle tension. They may reduce stress and also help with migraine relief. They may provide you with an energy boost while removing harmful substances such as free radicals from your body. They've been known to reduce muscle tension and help you recover from workouts or injuries. The



best effect is perhaps that it gives your body a chance to reset, recover, and even improve your sleep patterns.

Poor circulation is out there as a common symptom for some people. Floating improves circulation by promoting blood flow throughout the body and has been known to help manage chronic pain. Float therapy may help relieve arthritis and joint pain. I can relate from personal experience.

Through research I have learned that Epsom salts are high in magnesium which can help remove harmful substances from our bodies. Free radicals are tiny particles that can increase the level of inflammation throughout the body which can result in the potential development of conditions, cancers and autoimmune disorders among other things not mentioned. These conditions are known to result in restrictions on mobility and bring on pain and stiffness.

Floating can bring on creativity. I could see how this is possible because while you are floating, there are no distractions and your mind is clear to think freely, if you let it. The first time I visited a professional Float Spa, I remember being told that if I fall asleep, it's ok and that some people do and others don't.. My questions to her were, "Can I sleep? I won't flip over and drown? How is this possible? Who wouldn't fall asleep?"The professional assured me that due to the abundance of Epsom Salt in the water it makes it difficult to turn over so you will stay on your back, even if you fall asleep.

Known information around this topic and myths are out there. I encourage you to research more about it and also ensure you discuss any concerns with professionals. There is a myth I read about that says floating can't fix

sleep disorders. In the past, there were times when I struggled to sleep. So to my discovery, floating in a tank for about one hour is equivalent to six hours of sleep.

The professional did express that there are conditions when not to use a float tank so consulting with your doctor is highly important. I am strictly just sharing my experience and what I have learned about Epsom Salt, Float therapy. Give it a try if you feel like you need a change in your life!

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About Whitney Minnelli Ferrer



Born in Puerto Rico, Whitney is a passionate writer centering around the holistic approach to healthy living. She is the founder of the blog, IAmJuicingWithPurpose.com. In the beginning she didn't have much knowledge but was determined to learn and survive harsh obstacles she faced along the way of her wellness journey. She recognized one day that life is too short and precious to let it just go to waste and allow the illness to take over without a fight. Although not a Doctor nor a Nutritionist, her mission & purpose is to inspire and encourage others; reminding them that they are not alone and that we all have been given such gifts and talents and are put through tests that in the long run make us stronger. We all bring something of meaning to this world. She is spiritual, loves to sing gospel music and enjoys family time along with nature in her free time. She has made it her mission to share all the knowledge she has learned along the way and how she overcame her illnesses with courage and persistence.

B.you B.inspired B.healthy B.happy

Website: <https://iamjuicingwithpurpose.com/>



*“One who looks around
him is intelligent, one
who looks within him is
wise.”*

— Matshona Dhliwayo

INNER



HOMEOMORPHISM IN THE FIRST LANGUAGE OF NEURAL REALITY

- PART 1

Introduction:

The following paper will explore the underlying principles of the innate communication system of the human being that is involved in self-organization and adaptation processes consistent with the dynamics found in neuroplastic change.

Homeomorphism - Definition:

The term "homeomorphism" is a combination of two elements - 1) homeo which means the "same" or "similar" and 2) morphism which means "shape", "form" and "structure-preserving map". The term homeomorphism in contemporary usage is found frequently in mathematics and topology and is also termed isomorphism and refers to a continuous function or continuous transformation between certain spaces.

In this paper, the term homeomorphism is used in a more general sense as to when two (or more) shapes/forms bear a same or similar structural design such as seen in this example:

XY XY

In this example, note that the basic shapes or forms are retained while also changing in stylistic structural design.

Interestingly, the first to use the concept of homeomorphism as related to the development of the human being was William James at Harvard in an 1890 publication. (1) Williams is considered the Father of Western Psychology and author of groundbreaking texts such as *The Principles of Psychology* (1890), *The Varieties of Religious Experience* (1902) and *A Pluralistic Universe* (1908).

The view of James, which agrees with the premise proposed in this paper, is basically that the human

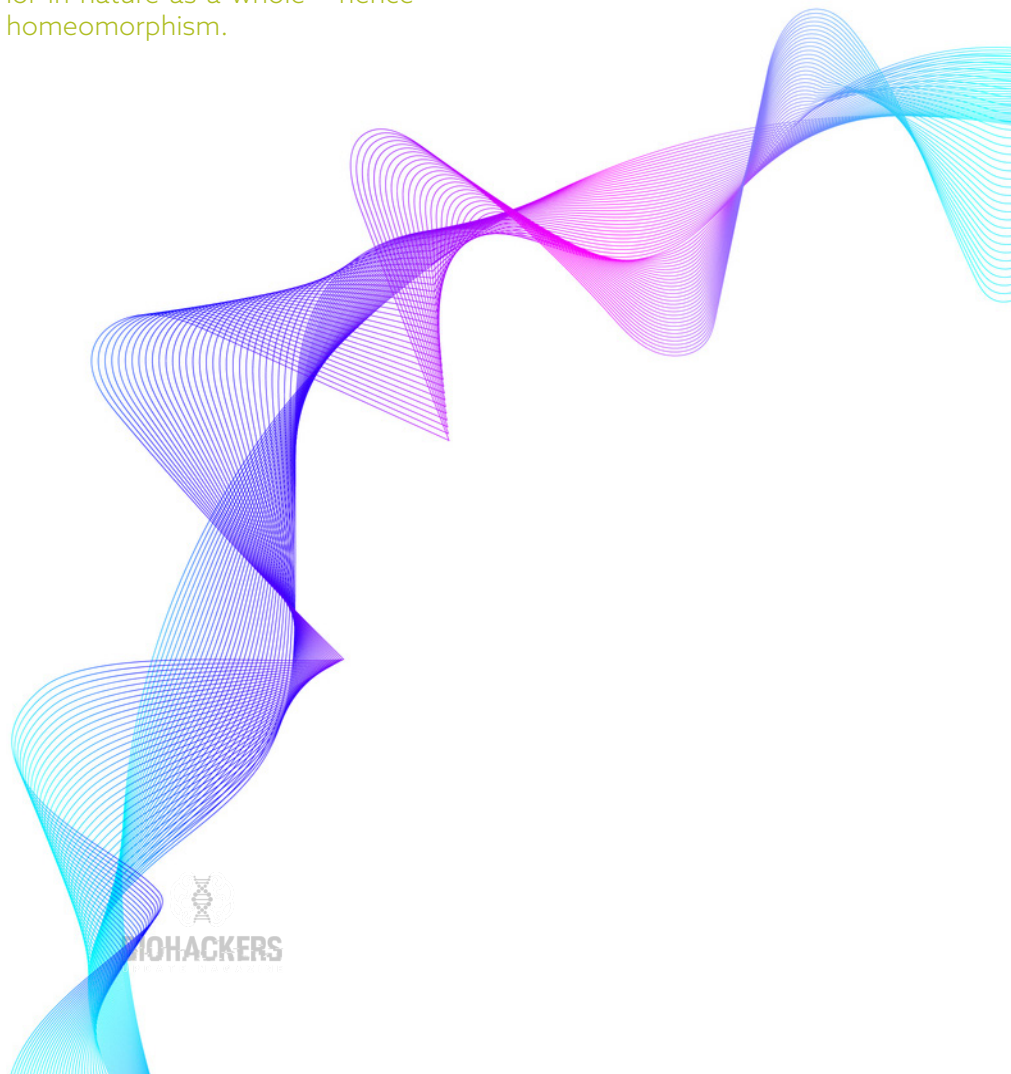
being evolved into existence and our current state as an indivisible entity in the larger planetary experience. Consequently, all of the laws, constructs and behaviors that are found in planetary life as a whole will also be found in the human being. As James puts it, "the faculties of our brain are adapted in advance to the features of the world in which we dwell". (1)

In this sense, one could possibly conceive of a "macro" planet and "micro" human being. Furthermore, it would be false to consider "nature" as something separate or "outside" from the human being. Accordingly, the human being is not "IN nature" but rather "IS nature".

Consequently, one can expect to discover critical aspects of human organization and behavior as replications of the same principles of organization and behavior in nature as a whole - hence homeomorphism.

Applying the principle of homeomorphism to evolutionary dynamics, one may consider the medium of universal morphogenetic information patterns (UMIP) acting as principled guidance systems in the processes of adaptive evolution. At a micro-molecular level, these UMIP may serve as epigenetic universals or causal mechanisms in origination patterns.

The principle of UMIP has a direct impact on the commonly accepted Neo-Darwinian concepts of: 1) the common descent of all living organisms and 2) natural selection via random mutation. Homeomorphism/UMIP stands in easy accord with the first concept of "common descent" as a fundamental aspect of shared information processes. UMIP offers a parallel complementary expansion of the second concept of "natural selection".



Dynamics of Adaptation in UMIP:

Neo-Darwinian thought forms the basis of the common prevalent scientific philosophy of our times. It has itself evolved through various augmentations and interpretations since the first days of Darwin and his predecessors and today is promoted in various schools of thought including "Modern Synthesis" and "Evo Devo" (Evolutionary Development). The concept of "natural selection via random mutation" stands firm in the minds of most even though other decisive challenges of come forth over time. Yet, as the concept of evolutionary forces itself continues to evolve, one must remain open to new insights that are able to advance our understandings. Surprisingly, one landmark challenge was that made at the turn of the 20th century (early 1900's) by D'Arcy Thompson, in his book *On Growth and Form*, which remains a classic amongst deep thinkers still exploring evolutionary dynamics.

The perspective of adaptation dynamics found in UMIP includes significant influences from the new fields of Information Theory, Cybernetics, Chaos Theory and Complex Adaptive Systems (CAS), among others. The following is a limited attempt to express the fundamental ideas that run within these progressive domains and illustrate how they impact the premise of homeomorphism and First Language as well as offer an expanded modification of the second central concept of Neo-Darwinism (i.e. natural selection via random mutation).



Linear/Non-Linear:

The first underlying element of the exploration is to clarify the concepts of "linear" and "non-linear" functions in light of the fact that the dynamics of UMIP rely on non-linear dynamics.

A "linear" function has the basic characteristic in which effects are proportional to their causes. For example, if you hit a baseball twice as hard as before, the effect will be that the ball will go twice as far as the first time you hit it. Linear functions are found throughout mechanistic processes. For a period of time, early in the scientific revolution, living organisms as well as the entire known universe, were defined in purely mechanistic concepts. Certainly, it was the mechanical clock that epitomized this view and hence became the veritable symbol of the age and its progress. Many "non-linear" activities were actually able to slip into linear formulations by permitting a range of approximations that concealed the lack of true specificity. In a sense, the dynamics of non-linear complexity were hidden by "fudging" the findings whenever the results were not proven to affect the applications.

The essence of non-linearity is that effects are no longer proportional to causes. Small causes may have large effects

In a way, "sensitive dependence" is nothing more than the rediscovery by scientists of the old wisdom which is captured by the phrase "for want of a horseshoe the kingdom was lost". Another well-known adage derived from non-linearity is "the whole is greater than the sum of its parts".

Chaos & Randomness:

Processes which are very sensitive to small fluctuations are

called chaotic. This is because their trajectories are in general very irregular, so that they may give the impression of being random however they are not random because they are driven by deterministic forces even though these determining forces may not be evident.

It is common to find the terms "chaos" and "random" used interchangeably but this is a mistake. Simply put, "random" completely lacks order and information. "Chaos" is highly complex and difficult to ascertain however it maintains sets of "hidden" drivers and determined behaviors. Physicist David Bohm expanded this principle to cosmic dimensions when he developed his Implicate Order theory to include quantum levels of behavior.

Jumping back in this essay, one will recall the second premise of Darwinian/Neo-Darwinian theory - "natural selection via random mutation". The issue begins to surface as to whether all evolving organisms rely solely on "random" selections/choices" or whether there may be sets of "hidden determinants" acting within seemingly "chaotic" conditions.

New Order from Chaos:

Complex Adaptive Systems (CAS), such as our human body and brain, function in a non-linear fashion and, consequently, are able to sustain the paradoxical condition known as a "far-from-equilibrium state". The CAS uses an intriguing integration of Order and Chaos, of stable and unstable dynamics as the cardinal approach to the constant change of adaptation. It is how the CAS continues to "learn" because in its fluid environment, there exists a singular law..... adapt or die. The reflexive rule of unconstrained energy is the reduction





of all order and information with the final and absolute goal of entropy – the still and silent balance we call death.

A CAS, in an effort to adapt to change, cannot go directly from old Order to new Order. Order of whatever type or purpose always seeks to persist and exist. It will not “go quietly into the night” without a fight. Think of persistent order as a functional and self-serving habit. It has its “groove”. The CAS, and to be clear, this is also true of the human organism in general and the brain in specifics, is always “dancing on the edge of chaos”. A CAS entertains imponderable numbers of actions at speeds that seem improbable if not impossible. The human brain, for example, executes trillions of actions that are exhibited, somehow, as unified behaviors and outcomes. Researchers studying CAS behaviors are puzzled, charmed and sometimes alarmed at the tendency of a CAS to unexpectedly abandon degrees of order and manifest seemingly unprovoked chaotic manifestations before returning to more typical ordered actions. Is the CAS “losing its mind”, “exercising”, “researching” or just “playing”? No one knows.

When a complex system needs to shift into an adaption and modify its ordered behaviors, it will first soften the order by allowing a degree of disorder or chaos. The degree of disorder permits a new range of possible problem-solving adaptations to occur. Chaos should not be mistaken for randomness. Chaos will maintain degrees of order but often at obscure or hidden levels.

Randomness is a complete lack of order. Remember that order corresponds to information, hence degrees of chaos maintain degrees of information.



The only way to get the system out of a local ordered state is to add a degree of indeterminism to the dynamics, that is, to give the system the possibility to make transitions to states other than the locally most established ones. This can be seen as the injection of “noise” or chaotic perturbations into the system, which makes it deviate from its preferred trajectory. Physically, this is usually the effect of outside perturbations (e.g. vibrations, or shaking of the system) or of intrinsic indeterminacy (e.g. thermal or quantum fluctuations, or simply unknown factors that have not been incorporated into the state description). Such perturbations can “push” the system upwards, towards a higher potential of choices which may be sufficient to let the system escape from a local and inefficient ordered state.

In the period of destabilization, bifurcation vectors will occur. They are strongly related to the "strange attractors" that persist within complex systems when in destabilized chaotic phases. These are the potentials for new higher order adaptations to express within the complex system. In Neo-Darwinian terms, these bifurcations represent the possibility of adaptive mutations in the systems ordered processes. However, in the Neo-Darwinian view, the "choice" of which bifurcated vector is selected is completely "random" (remember the second aspect of Darwinian evolution as described above).

In the view of First Language

Homeomorphism and Universal Morphogenetic Information Patterns (UMIP), the bifurcating vectors that emerge as a consequence of chaotic destabilizations within the CAS may also present adaptive choices that have a deeply rooted adaptive advantage proven over countless millennia of shared communicated information.

These are not "blinded random mutations" but rather intelligent choices made related to decisions built upon the collective past.

The bifurcation is a "change" that presents a "chance" to make a "choice".

Change > Chance > Choice.

The resulting change now enters into the realm of probability in terms of adaptation. The new "learning" is not "certain", only "probable". The integrated factors within the system and its environment will act to either reinforce or resist the attempt at adaptive change, hence the probability will have degrees. In the end, the final expression is actualized as "certainty".

Change > Chance > Choice.
Possible > Probable > Certain.

Bi-Directionality - Definition:

All complex systems require flowing information to enable adaptation and self-organiza-



tion. In living organisms, this process is commonly called "feedback" which is a naturally occurring dynamic for self-preservation. Some feedback processes say "yes, more please" while others say "no, less please".

"Bi-directionality" is a core aspect of a feedback system. It essentially means that the information can flow in both directions (in and out, back and forth). Hence the "bi" which means "two". Homeomorphic expressions are utilized in feedback systems as highly efficient information packets carrying complex signaling in an easily identifiable code.

First Language - Definition:

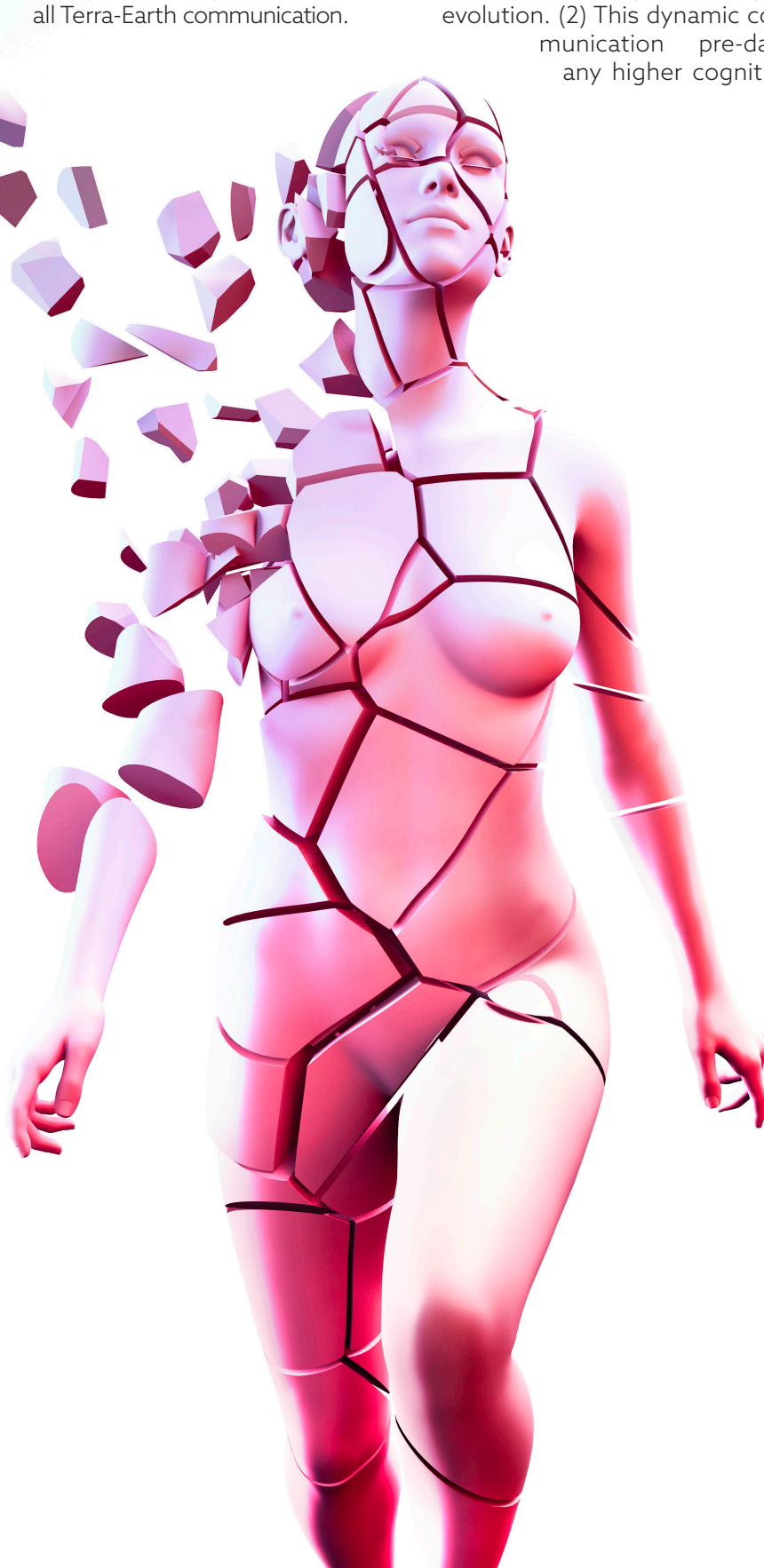
The "First Language" is new and novel term describing the primal capacity of human beings to directly experience and gain knowledge at a pre-intellectual level when awareness is turned towards the subtle states of consciousness and their internal sensory expressions.

Every organism relies on self-organization for its ongoing adaptation responses. This self-organization requires communication based on shared information in some manner of signaling. To put it more simply, if you are going to talk, you need a "language". It is the premise of this paper that, based on homeomorphism, all living organisms have always shared the same or very similar fundamental "language" and that, as organisms further develop and diversify, this foundational "language" is not lost and abandoned. Actually, this "First Language" is embedded in the increasing complexity of organisms and serves as an effi-

cient grounding for newer levels of communication. To further expand the novel terminology, First

Language can be considered as the core "biologue" (biological + dialogue = biologue) common to all Terra-Earth communication.

The premise of The First Language in the human proposes that the Central Nervous System (CNS) of the human being has an innate or intrinsic archaic language that evolved into usage at a very early phylogenetic stage of evolution. (2) This dynamic communication pre-dates any higher cognition,



intellectual stage of thinking or secondary symbolism and is still functional now in the human being. One could describe this First Language as a “Pre-Cog” form of communication (to adapt a term from the movie, *Minority Report*).

Regardless of the type of organism, successful adaptation to its changing circumstance and environment is key to its survival. Regardless of whether one believes in the primacy of “natural selection” or “teleological purpose”, every organism of high or low development relies on fundamental levels of organization.

Organization requires communication and communication requires language.

A key tenet of Neural Reality is that there exists a “First Language” shared ubiquitously by all organisms found in Nature. Necessarily, this First Language must pre-date any more advanced cognitive process and advancing intellect in order to serve even the most primitive organism.

Viewed from the perspective of phylogenesis, organisms advance in complexity by integrating lower, older successful dynamics into the newer evolving problem-solving experiences. As such, the successful organizing effects of communication via the First Language remain efficiently intact in all organisms regardless of the degree of complex evolution – this includes the human being and our brain.

In general terms, the First Language can be easily recognized as Light and Sound. Light requires no medium for the transfer of information while Sound requires one medium. Light is electromagnetic radiation in category and Sound is mechanical vibration. The expression of First Language may be extended to other factors such as pure electricity, magnetism and even gravity. These extended factors cross-over into the atomic and subatomic domains that underlie molecular charge based chemical reactions. However, in terms of simplicity and functional elegance, for our Neural Reality purposes, designating Light and Sound as the principle means of communication within Neural Reality works well.



About Garnet Dupuis



Garnet was born and raised in Canada and is a naturalized USA citizen. He is an Integrative Health and Wellness expert, teacher & inventor with specialties in inter-disciplinary methodologies. With a wide experience in advanced technologies, Garnet has taught neuromodulation applications in major USA universities, professional sports teams, the Marine Corp and Naval Hospitals and lectured in European and Asian countries.

Garnet has a broad education including college, university and graduate trainings in Classical and Clinical Homeopathy, Oriental Medicine, Massage Therapy/Bodywork, Hydrotherapy, Remedial Exercise, Biofeedback, Psychology and English Literature.

Garnet is co-founder of Lucid Studios/neuroVIZR, Thailand. He currently resides in the tropical mountain rainforest in Northern Thailand. He is a life-long meditator and practitioner of Tibetan Dzogchen. Garnet is active in wild animal rescue and conservation and has built, manages and funds a sanctuary for SE Asian apes.

Website: <https://neurovizr.com/>

CHRONOLOGICAL AGE **VS** BIOLOGICAL AGE

A photograph of two women sitting on a wooden park bench. The woman on the left is older, with short blonde hair, wearing a beige coat and a red shawl. The woman on the right is younger, with long red hair, wearing a plaid coat and grey jeans. They are both smiling and looking at each other. The background is a park with green grass and trees.

Are you older or younger than
you should be?

Did you know the term, 'lifespan' was not known to have appeared before the year 1831? In that year, the average global life expectancy was a full 29 years. Many advances in modern science, hygiene, food growth and production, etc., have since raised this number to above 75 years. Death is one thing that is certain about life, but to continue living, one cannot only focus on how long they should live, but more on how well they should live. The term for this could be called 'health-span'. Once people started living longer and seeing that for many, only disease and soreness from their younger years awaited them, a growing consensus started to take on the mission of defying aging, or at least slowing it down.

When we think of ageing there's too factors to consider: The Telomeres and The Epigenes. Telomeres are like end caps on the chromosomes of our DNA. They are in charge of getting the DNA copied correctly whenever our cells divide. Over time, they start to degrade or shorten, known as telomere attrition. Epigenes regulate gene expression by acting like the constant micro-manager at the office, telling the DNA precisely what they will become. As we age, the genes begin to lose that guidance and then things become disorganized and there's a greater chance that all hell could break loose. Genes that are supposed to be on, are turned off, or vice versa. Chronic diseases start to creep in.

So what can we do to help reverse, or even just stunt the ageing process? Well here's where some interesting science experiments come in. Japanese Biologist, Shinya Yamanaka developed a biological cocktail that could reprogram a cell's epigenome back

to its original form. He first tested it on mice but was astounding able to show that it successfully reset human skin cells to infancy. He won the Nobel prize in 2012 for his accomplishment.

Steve Horvath, a geneticist and biostatistician, was able to add more spice to the mix. In 2011, he took a DNA sample, measured its methylation (methyl groups being added to the DNA molecule, sort of like judge how used a pair of shoes are by the tread) and then ran the results through a machine learning algorithm. From this he was able to determine the estimated biological age. This came to be known as Horvath's clock and changed how we used to define ageing as a single term. Now we have a way to measure how old we are based off our biological make-up, our DNA's condition, and another is by actual numbers (the number of

trips we've taken around the sun). This is important because based off one's lifestyle, they can either be biologically younger than their chronological age, or vice versa.

Another scientist took this information to form his own experiment based off the hypothesis that one could repair one's ageing cell, just like one could repair a scratched, worn CD. He argues that the CD has all the necessary information and data, its just no longer readable, but could be repaired with special solutions. Sinclair thought the same could be said for our cells. He put his theory to the test. Taking two young mice, he effectively aged one of them by scratching its epigenome. Soon he noticed that the mouse showed all the signs of ageing, but in a short time frame. Graying hair, dementia, osteoporosis, even sickness. After proving that he could accel-



erate the ageing process, now he wanted to try to reverse it. Using a molecule known as nicotinamide mononucleotide (NMN), he treated the aged mouse and recorded his results. After two months the mouse experienced a 56 to 80 percent rise in endurance. The treated mouse could even run faster than its untreated pair. After double checking his results in the Horvath clock, he found that the mouse had indeed been de-aged. It doesn't stop here though. Sinclair was also remarkably able to set the mice's biological age back beyond its chronological age. It's worth noting that it's not just mice that have been the test subjects of NMN. Sinclair himself uses it, and has been for years. According to some writers, he's 50 years old, looks 40, and is a prime 31 according to the epigenetic clock.

Now that we know some of the science, it seems like humanity is on the right track towards slowing down or reversing aging scientifically. And although many of these potential hacks are years if not many years away for public use, there are still everyday simple biohacks we can do that will help ease the ageing process.

- Manage your stress level.
- Surround yourself with people you like.
- Eat less, live longer.
- Rack your brain.
- Switch to more natural cosmetics.
- Spend around 15 minutes in the sun.
- Dance more often.
- Go to bed one hour earlier.
- Add more vitamins to your diet.

References:
'Stuff you should Know' by Josh Clark and Chuck Bryant

<https://brightside.me/>



About Dallas McClain



Born in the USA, Dallas is a passionate reader of theological and personal development books. He holds a bachelor's degree in Biological Sciences. Teaching English abroad, Dallas has been immersed in various cultures and backgrounds while making friends all over the world. He is a Catholic Christian and enjoys time outdoors while being a tennis enthusiast. He is the Co-founder and Editor of Biohackers Update Magazine. He is currently living in Orlando, Florida with his wife & children, where he enjoys writing, sports, and nature hikes in his free time. Dallas can best be reached at his email: dallas.biohackersupdate.com@gmail.com



CORE

The turning point in the process of growing up is when you discover the core of strength within you that survives all hurt.
- Max Lerner

A portrait of Tyler W. LeBaron, Ph.D., a man with a beard and short hair, wearing a blue button-down shirt, smiling. He is positioned in front of wooden kitchen cabinets.

TYLER W. LEBARON, Ph.D.



EXCLUSIVE INTERVIEW

**FOUNDER, EXECUTIVE DIRECTOR OF
MOLECULAR HYDROGEN INSTITUTE
- A SCIENCE-BASED, NONPROFIT
PROMOTING HYDROGEN RESEARCH
AND EFFECTS**

**Listen to this conversation on our podcast by scanning this QR code or clicking here*

W So you started this nonprofit Molecular Hydrogen Institute. Can you give me a little bit of the story behind why you started this, what knowledge came to you and why you wanted to share this knowledge?

Yeah, absolutely. So, I had learned about hydrogen, molecular hydrogen back in 2009,

because I was introduced to alkaline ionized water or electrolyze reduced water. And there were so many claims of miraculous benefits and everything. So, I was thought, there's got to be something to this, but none of the science really checks out. And as I started investigating it, I learned that actually, when you do electrolysis of water, which electrolysis by definition is the decomposition of water into hydrogen gas and oxygen gas, that the oxygen gas that is going out during the process, that's not going to make any sense for drinking purposes, but the hydrogen gas, maybe there's something there. And I started looking in the literature and I found that hydrogen gas actually has therapeutic effects.

on looking at some of the more scientific articles again and I came across an article in Nature Medicine, which is a very reputable, medical journal. The article clearly demonstrated that a very small amount of hydrogen gas, 3 to 4% was effective at preventing brain damage in a rat when after they induce what's called the middle cerebral artery occlusion, which basically they just cut the blood supply to the brain. And that was a stroke model, right. A lot of the brain died, but when you gave it hydrogen gas, it prevented the death of the brain, just from hydrogen gas; Helium and Nitrogen gas, they didn't work, but hydrogen gas had this remarkable effect and it was a very powerful article.

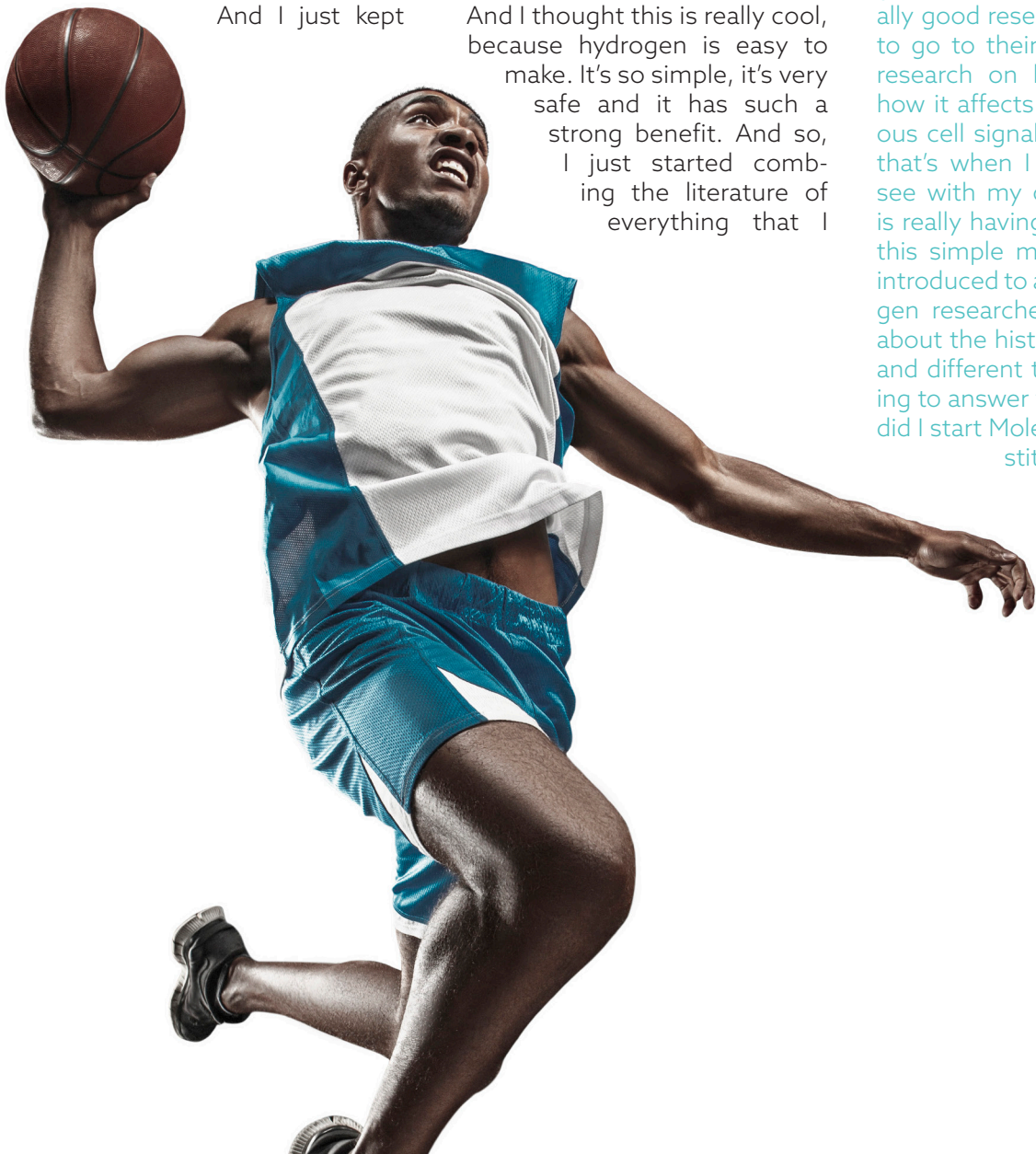
could find on molecular hydrogen. And at the time there was only maybe 50 articles or so that had anything to do with the therapeutic effects of molecular hydrogen. And I saw that most of research was occurring in Japan. And so, I was majoring in biochemistry at the time and for the completion of my degree, I needed to do an internship. And I thought, man, I want to do research on hydrogen gas. And so, I contacted different universities that were doing the research, including Loma Linda university in California. They had done some research on hydrogen gas.

But again, most of it was really coming out of Japan and Nagoya university, which is a very prestigious university doing some really good research and I was able to go to their university and do research on hydrogen gas and how it affects or modulates various cell signaling pathways. And that's when I was really able to see with my own eyes that this is really having biological effects, this simple molecule. And I got introduced to a lot of other hydrogen researchers. I learned a lot about the history and the culture and different things. And so, going to answer your question, why did I start Molecular Hydrogen Institute?

Well, for two reasons. In Ja-

And I just kept

And I thought this is really cool, because hydrogen is easy to make. It's so simple, it's very safe and it has such a strong benefit. And so, I just started combining the literature of everything that I





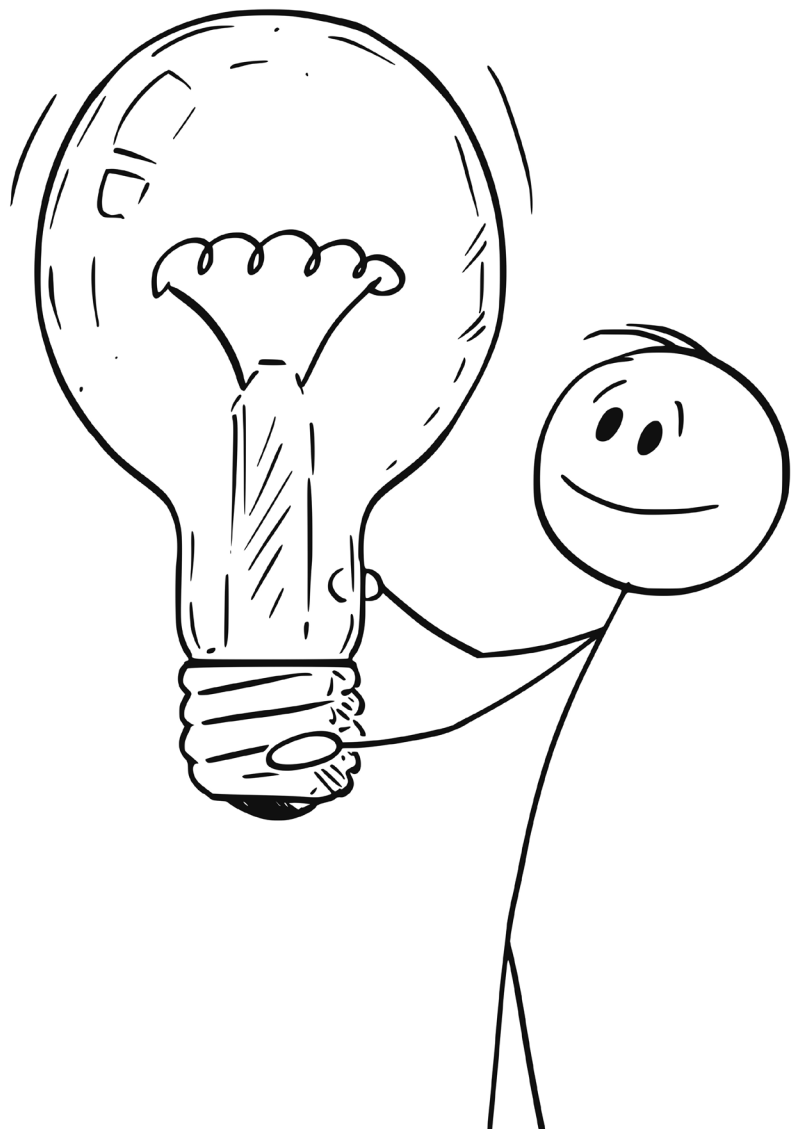
pan at the time, there was a lot of pushback on hydrogen research because there was so much, what we would call pseudoscience surrounding this area because of the mischaracterization and misunderstanding of what molecular hydrogen was. And when hearing about hydrogen research, a lot of people would think about pH for example, because pH stands for potential hydrogen. But so this is about acid and alkaline or and our research has nothing to do with that at all. That potential hydrogen is referring to the hydrogen ion, which is a proton, as a positively charged, cation. Whereas what we're talking about is hydrogen gas, which is the flammable explosive stuff. We use it in rocket fuel.

You combine it with oxygen you make water, it's very powerful, right? It's three times more energy dense than gasoline. And that's the type of hydrogen we're talking about versus, again, acid/alkaline things, or even these claims about, H minus or Hydride or active hydrogen, atomic hydrogen, or other things that are not really scientific. And the only scientific information about it is the information that debunks those concepts rather than supporting them. And so, I realized that America and the English speaking countries really don't know a lot about this. And this does have some really cool benefits to it. And the word will start to get out. And if the word gets out incorrectly, like it did in Japan, where there is misinformation and things, it can really stifle the research and harm the industry. And so, when

I came back in 2013, I started Molecular Hydrogen Institute for those two purposes. One: to educate people in general about the potential benefits of molecular hydrogen and two: to help prevent the spread of potential misinformation about hydrogen in ways that are completely unscientific and wrong, because that would impede the progression of research and understanding and its acceptance.

Why do you think the word wasn't getting out about the molecular hydrogen gas and benefits? Were there ulterior motives there, maybe hands behind the scenes at play that didn't want the word to get out for their own benefit?

Well, it's actually an interesting question. There's several parts to



that. So, in Japan, there was just so much misinformation about it that even the hydrogen researchers like professor Ohno and others that have a very solid academic career, they were concerned about researching this hydrogen gas because they were going to be considered like, a pseudoscientist, basically. And so, there's just this misunderstanding of what it is that's being researched itself, which would prevent the progression of the research.

Also, as I told you, I had learned about hydrogen when I was really studying, alkaline ionized water. And I found that any benefit is actually attributed to the hydrogen gas and that's been conclusively demonstrated. And I started teaching this. I started explaining that it turns out, there's no benefit to alkaline pH and this concept of electricity changing the water structure and all this stuff is actually not legitimate science. And in fact, when we remove the hydrogen gas from the alkaline ionized water, despite it retaining all the other properties, it, it gives no additional benefits, compared to just normal control group. Well, that created a problem because at the time a lot of people were promoting the benefits of alkaline ionized water in terms of just the alkaline pH, and nothing about molecular hydrogen. And so, I actually got a lot of messages and even some very threatening messages, telling me to stop talking about hydrogen and to stop confusing people. They would say to just keep things simple and talk about false things. Of course, they didn't say false things, but it was false, and I thought, well, there's nothing simpler than hydrogen. And then as the research and acceptance of it has continued to progress, we've really been able to do a lot more clinical studies, we're able to see these

effects.

I could see how people could start making an argument that the powers that be don't really want to see this type of research or easy, simple therapeutic getting out there because, you can't easily patent it. There's so many ways to get hydrogen and it's not going to be controlled by a pharmaceutical company or something like that. I'm not down into

the conspiracy of all the whole Pharmacocracy stuff, but obviously there's a lot of corruption and things that have happened where I've seen research not getting out because, of all these ties to other funding and companies or whatever. And so that's always a little bit discouraging, but it's making its way, it's going to get there.

[In the last interview, I talked with](#)



Robert and Victor from Litewater, a company that specializes in the Deuterium depleted water, which might very well be a totally separate thing, but I know it's still dealing with the hydrogen atom in particular. So, does that fall into a different category than this pH water and product line? And is it something that aligns more with the whole molecular hydrogen approach you are taking?

I'm really glad you asked that question. It is a growing area of interest and there's a lot of confusion with that. So, they are completely different. So first when it comes to deuterium depleted water, deuterium is just an isotope of hydrogen and hydrogen has three isotopes. You have protium, which is an electron, proton and no neutron and 99.9% of all hydrogen atoms are protium. And that is the hydrogen that we're talking about. That is therapeutic for us, the protium. It is the protium gas that we use in our research, and this is what's therapeutic.

Now, if you add a neutron to protium, then we call that deuterium. So now it has an electron, neutron and a proton, and now you have deuterium and so that's what this research is showing, that high levels of deuterium in your drinking water or your food can be damaging to the body, or to the mitochondria and other areas, because of what's actually called the kinetic isotope effect. Deuterium weighs twice as much as protium, because it has a neutron. It can have a pretty profound impact if those levels get too high. And then you have tritium, which has two neutrons and that's radioactive.

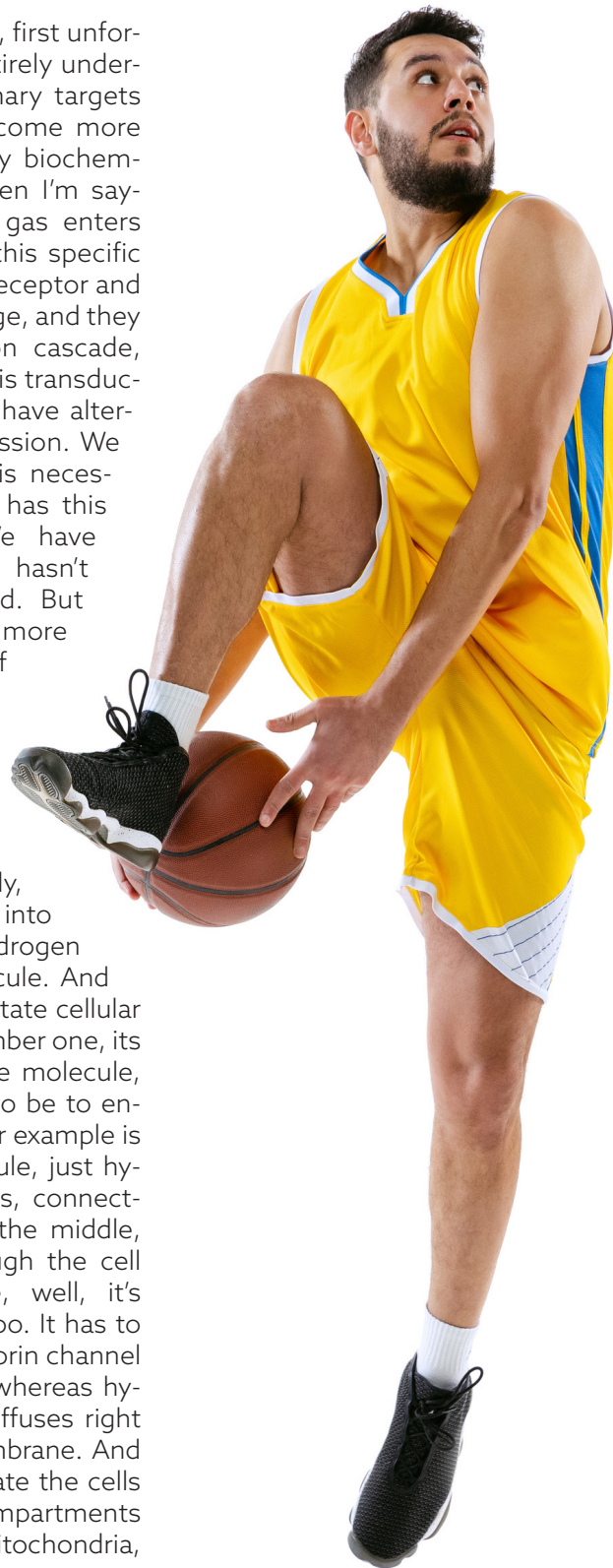
Can you give me a breakdown, in the most layman's terms pos-



sible, of how the molecular hydrogen exactly modulates these cell signaling pathways to lead to these benefits?

Yeah, absolutely. So, first unfortunately we don't entirely understand the exact primary targets and mechanisms. I come more from a pharmacology biochemistry perspective when I'm saying when hydrogen gas enters the cell, it binds to this specific protein, area or this receptor and this causes this change, and they have an amplification cascade, and then you have this transduction effect then you have alterations in gene expression. We don't know what it is necessarily that hydrogen has this affinity towards. We have some ideas, but it hasn't been fully elucidated. But what I can talk about more is the actual effects of hydrogen, which in many ways answers the same question.

When hydrogen gas is taken into the body, it's rapidly up taken into the cells because, hydrogen is the smallest molecule. And so the things that dictate cellular bioavailability are number one, its size - the smaller, the molecule, the easier it's going to be to enter the cells. Water for example is a pretty small molecule, just hydrogen on both sides, connected to an oxygen in the middle, but it can't go through the cell membrane, because, well, it's polar and it's larger too. It has to go through an aquaporin channel to get into the cell, whereas hydrogen gas, it just diffuses right through the cell membrane. And so it's able to penetrate the cells and subcellular compartments and get into the mitochondria, into the nucleus and so on.



And then we start seeing the direct cell effects. So, when you administer the hydrogen gas, you start seeing modulation of cell transduction, which includes things like down regulation of inflammatory cascades. So, things that cause inflammation like tumor necrosis factor alpha, activation of the transcription factor, NFkB, or various cytokines, all these are inflammatory molecules or proteins. Hydrogen is able to largely down regulate their excessive production. So, there's one area for an anti-inflammatory effect. And then it also has an antioxidant effect. And it does this also largely through, signal modulation. For example, you have the master, antioxidant regulator, which is known as the Nrf2 protein, when Nrf2 gets activated, it diffuses into the nucleus where it can then interact with the DNA, binding to the antioxidant response element, portion of the DNA.

And, then you get the production of lots of cytoprotective enzymes and proteins and detoxification. There are actually over 200 different proteins that are produced via Nrf2, that are modulated by Nrf2. And these are the phase two detoxification and antioxidation enzymes. And there's a lot of things that can activate this such as exercise, compounds, foods that we eat, and other therapeutics, but hydrogen gas can also do this. And like I said, its because it has such a high bio availability. And it modulates it as well in the sense that if you don't need to have super high levels of Nrf2, then it's not going to drastically upregulate it too much. And

that's a really neat thing about Hydrogen, is that its rather selective. It's more of a modulator than a direct inducer or suppressor. Its adaptogenic.

It brings the body back to homeostasis. And that's really why hydrogen has such a high safety profile; it's able to modulate, numerous pathways. We talked about the anti-inflammatory and antioxidant effects, but there's also areas like apoptosis and metabolism in general, there's a lot of other areas where Hydrogen has this adaptogenic-like effect, where it can mildly increase something or mildly decrease something that's excessive, and just helps to bring things back into homeostasis and promote overall cellular health and longevity.

So, talking about the molecular hydrogen and all the studies that you're behind and you've seen, have there been any new studies that are kind of groundbreaking or making a splash in the scientific realm of publications?

I would say one thing is the fact that we have seen human studies with positive effects. Because, in research, there are so many studies where you can do amazing things in animal models. You're curing cancer, reversing this disease, reversing aging for crying out loud; there's so many things that can be done in animal models, but a very low percentage of that is actually translatable to what actually happens in human studies. So that would be probably one of the next ground-

breaking things that you could say; we've taken research, from the animal model and then applied it to a human study. Take stroke, for example. There was a study with stroke patients, and, and they used hydrogen gas after the stroke.

They compared the effects of hydrogen gas to an approved medical drug for stroke and it turned out molecular hydrogen was more effective. You could see the different rating scores and the different diagnostic tests they did, like with the MRI, both were greater, significantly better than the drug group, for example. So, this gives a good indication that Hydrogen really does have important therapeutic effects even in human clinical studies.



What's the method of administration usually for hydrogen gas?

Yeah, so breathing is one of the ways, but it's actually not even the most common way. So, you can also take the gas and dissolve it into water; just like you have CO₂ gas and you can dissolve CO₂ into water and you have carbonated beverages. You can do the same thing with H₂ gas. It doesn't taste carbonated because it's not interacting with the water, so it's not like carbonation in that sense, but it's just dissolved in the water and then you can drink it. And most of the studies are actually done by drinking hydrogen water.

We did a study for six months in subjects with metabolic syndrome and we used a hydrogen water using hydrogen producing tablets. We saw really quite remarkable effects, and they didn't make any major changes in their life, everything was the same, but they just drank water that had high levels of molecular hydrogen in it. And we saw reductions in weight. We saw improvements in their BMI. We saw improvements in their waist to hip circumference. So, these are phenotypical, actual body compositional changes just from drinking hydrogen water. And then we saw improvements in cholesterol levels and triglycerides, inflammatory markers and antioxidants markers as well. And so, nothing super powerful or whatever, right but these are clinically significant and very important benefits that we saw from just drinking water that contains dissolved hydrogen and believe it or not, everyone I know drinks water, so it's a pretty simple thing to do and it's safe.

So, when people are drinking this hydrogen water, is there a certain regimen that they need to

follow to see these effects?

Well, so in our study, it was six months. There are people who notice differences earlier than that but a lot of the studies, some people might see an effect within the first dose. I mean, everyone's different, but for some people maybe they're more sensitive or whatever, and they notice an improvement in their energy and their mood or their ability to sleep or their cognitive function. Well,



one of the most recent studies actually with this is we used another product that is a ready-to-drink beverage, but it's a functional beverage that is infused with hydrogen gas.

And because this is Hydrogen Gas we're talking about, we know that it is the smallest molecule. It can diffuse throughout pretty much any container. So, this product, called Hydro Shot is in an aluminum can, with a coating and everything, so it's safe, but the gas has been infused in there.

We've seen that this then produces nitric oxide in the body. We've done studies on this, where after people take this Hydro Shot product, we can measure within 15 minutes, increased fractional exhaled nitric oxide. We can measure increases in temperature, like at the extremities. We can actually see changes just from the increased blood flow.

You can measure increases of the nitric oxide or measure the nitrite in the saliva and then we actually measure the blood flow directly. And this increased in like 15 minutes, and then in like in 45 minutes to an hour, you kind of hit your peak, but it was maintaining this peak for like four hours. Then it was continually elevated above baseline for 16 hours or something. And this is, to me, groundbreaking when you talk about the ability of a product to change blood flow and improve blood flow like this. Because when you're aging, your blood flow, your cerebral blood flow and everything decreases and your ability to make nitric oxide decreases dramatically.

By the time you're 80 years old, you have, like 25% or something of your ability to make nitric oxide compared to a 20-year-old. And so, it really is a problem. And we use this product and we can see this increase in nitric oxide and with the increase in nitric oxide, we saw the increase in blood flow. And then with the increase in blood flow, we saw the actual symptomatic improvements. So, we did various tests with cognition and things that we were able to show to these people, that while they drink this product, their cognitive performance goes up tremendously. It's very obvious. We published this in the Journal of Integrated



Neuroscience.

There really seems to be a synergistic thing about this when it's all together, because the fact is if you were to take just Citrulline or Arginine or other nitric oxide-producing molecules, you tend to see an increase in nitric oxide levels, but they don't last very long. So, you can only do so much with this type of thing. And so, there's something special when you're adding the hydrogen gas in there that really makes it much more powerful.

Nitric oxide is extremely vital for your health, but it is also very damaging. It has a dark side to it because nitric oxide is the molecule that reacts with super oxide to produce Peroxynitrite. And a lot of your audience will be aware that Peroxynitrite is one of the most pernicious, damaging oxidants there is. It's very pathological in nature. So, this are two

issues then, because that means when nitric oxide is produced, when it does react to super oxide, well, now you don't have the benefits of nitric oxide anymore because it's been used up.

You also just created Peroxynitrite, and now Peroxynitrite is doing a bunch of damage. Hydrogen gas has the ability to modulate nitric oxide metabolism. So, it actually increases the circulating half-life because it regulates super oxide production as well. And if you do that, then you're going to make nitric oxide last longer, because it's not going to disappear because it hasn't reacted with super oxide. If you decrease super oxide levels, then it's not going to react with nitric oxide.

So, based on the long history of Hydrogen and its existence on Earth, what do we know about the potential of what this hydro-

gen can give the human race today?

Well, I don't know how much we can fully extrapolate on the correlations of what it is, but it is kind of a romantic story just in the sense that when you consider that hydrogen was the very first molecule. It was produced in the big bang 13.8 billion something years ago, and you get the formation of atoms, hydrogen being the first. When you look at the Periodic Table of Elements, hydrogen is number one, right? And then all the other elements were formed basically from hydrogen. The sun basically takes hydrogen and fuses it together to form helium, and all the other elements are created through this building block with hydrogen being number one.

And then you have earth where it appears that life probably started



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like these deep-sea hydrothermal vents where hydrogen gas is being produced by these reactions of metals or whatever with the water. And then this serves as an energy substrate for life to start because hydrogen is a very rich energy source. And so, you start to extract the electrons and be able to make life. And as you continue this evolutionary process, you get your eukaryotes, plant & animal cells out of the prokaryotes and its kind of a scientific consensus, to say that hydrogen gas played a very important key in getting this to happen during this evolutionary process.

The evolution of eukaryotes from prokaryotes, for example, as we continue down this chain, now we have humans, and we start to see that we have developed a very unique symbiotic relationship with our intestinal bacteria. That's the hot topic right now, the gut bacteria. And it turns out that some of these bacteria can metabolize the fibers that we eat and produce hydrogen gas, which itself has a lot of benefits. There's a study in Japan where these centenarians tend to have a higher level of naturally intestinally produced breath hydrogen gas than their counterparts.

It is an interesting correlation. Maybe there's some significance there that we have literally always been exposed to hydrogen from the beginning of time, from the big bang, from the creation of life, the Genesis of life, the evolution of life. And now here we are. And then if you think about back in the day, maybe we would eat more fibers and had lot more fiber than we do today. We'd have a better microbiome, maybe producing more hydrogen gas, and now we have so many antibiotics and lower quality diets and different things. Maybe you're not getting as much of the hydrogen gas. And getting molecular hydrogen,



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dissolved in water one simple way. And that's what our body wants. It's ready for it. It's built a mechanism. Obviously, we have some type of conserved, evolutionary, biological, mechanism where we respond to hydrogen in a favorable way.

Even with oxygen, we need oxygen of course, to breathe and to live because it's an oxidizer right. It drives life by oxidizing things. So, when you eat food, then the electrons in food are being attracted to the oxygen. And so, through this process of metabolism, it's going to take those electrons out and you're going to make your ATP and get your energy and everything. So, there is so much focus on oxygen, hyperbaric oxygen or oxygen therapy, but we tend to forget the other side of this yin and yang relationship, mainly the reducing side. You have oxidation and you have

reduction, and hydrogen is what characterized that other side.

You can't have just oxidation, right? You've got to have the reduction as well; it has to be in homeostasis. But when the two of these molecules react together, oxygen as the oxidizer and hydrogen as a reducer, then you get the life-giving solvent water and it's this perfect balance. So, we sometimes tend to focus too much on the oxygen, and not necessarily enough on the hydrogen. There's a balance and ratio.

When you're working at the Molecular Hydrogen Institute and going to these presentations, how do you keep yourself balanced? Are you using hydrogen therapy on yourself or what are your daily practices to keep yourself in check Tyler?

Well, I don't know that I'm bal-

anced. I'm kind of an extremist in everything. I'm a big avid runner. I like to compete in races, Spartan races, I just did my first one. I'll run anywhere from 60 to 100 miles a week sometimes. I do incorporate hydrogen into my life because I'm trying to balance out some of that excess oxygen I'm breathing because it is an oxidizer. And I do that for just my normal overall health and longevity.

And then if I want to get a bigger kick or something, I'll take that, Hydro shot product that we did research on, because you get that benefit of the nitric oxide and increased blood flow. You can really tell a difference with higher levels of exercise anyway. I think exercise really is medicine. I admit that I sometimes am maybe a little extreme in some of this, because of the exercising so much, but it's fun. I enjoy it. I enjoy pushing myself as hard as I can.

What about your recent adventures with arm wrestling? Have you noticed, any change from when maybe you didn't use therapy from hydrogen?

So, I've only been arm wrestling a year or something, so it's new. Sometimes after a practice meet, it'll take partners I know, weeks to recover. Whereas with me, I'm ready to go pretty quick afterward; I recover pretty quick and who knows what all those factors are. But obviously one differentiating thing is that I'm taking molecular hydrogen, and they're not, and that's, that's one of the things, you know, that maybe I'm doing, they're not, I'm, I'm sure I do a lot more cardio than they do, but, but you could argue that could have the opposite effect because you have a sustained increase in AMPK and inhibition of mTOR. And so, you know, I'm just saying you can have the opposite effect as well that way, but all the research is so inconclusive on that.

Are there any testimonials from clients or successful people who've attributed much of their success to hydrogen therapy?

Well, it's interesting, people may have been using hydrogen in a way that they didn't even realize. For example, some of the Kenyans or other athletes, for their specific types of diet, they eat of a lot of fiber. They're producing a lot more hydrogen gas than the normal person would from the bacteria.

Is there an at home hack for people that really wanted to try and make this hydrogen gas?

It's pretty simple. The most common products would be like the Hydro Shot, for example.



And again, that's not that's not just a hydrogen product. That's also with your nitric oxide and a functional, healthy energy product. Then you have the hydrogen producing tablets that we use for clinical studies all the time because it's very consistent and it's a very high dose, the highest dose that you'll get out there. And then there are different machines that you can buy, and you can make hydrogen water at home through electrolysis, but buyer beware; I've tested a number of these and the concentration of hydrogen gas on some of these can be so off from what the claims are to be making. I tend to be quite skeptical when it comes to a lot of these types of machines out there.

There are portable bottles out there. I know some of them can work; I actually do have a couple that I'll use, but they often end up breaking over time or something. But it is possible. I'm just saying that you can't just go find the cheapest one. The cheaper it

is, the more likely it doesn't work, unfortunately.

So, to do it yourself, you can buy pure magnesium and then then mix it with Citric acids or some vinegar or acid of some type and then do that. But of course, now you run into the problem of, are you getting way too much magnesium, because people have done that. They've taken these magnesium bars or whatever it is and then they end up getting hundreds and hundreds of milligrams of magnesium without even knowing it. And they get like magnesium toxicity or something, or maybe the form they're using is contaminated with different metals or something.

You can even do your own electrolysis device. You can take some electrodes, put it in water and you make hydrogen gas. But I would be concerned even more unless you have platinum electrodes, which is expensive. I think everyone should, should do their due diligence when it comes to



that stuff. And maybe just bite the bullet and get the product and use that for a while until you increase that knowledge.

You said that hydrogen was shown to be anti-inflammatory and to have an antioxidant effect as well. But I saw on your website how it mentioned that it was also anti-allergy in a way. So, my daughter has some allergies with certain foods, and she has eczema. I'm not saying this would like cure her or anything like that, but what have you guys seen in the field of allergy that hydrogen has been able to do? Does it have a preventative effect or is it more like an after effect?

Probably both, prophylactic, as well, the treatment. There's not a whole lot of, research on this area, but on more of a molecular level, it's effect on the immune system is where we see these modulating properties. It's ability to influence the NADPH oxidase system,





for example, which causes this hyper inflammation and a lot of other issues. It can modulate this via a non-antioxidant method, which is really unique. And in fact, that's actually kind of groundbreaking area, just in the sense that we have demonstrated that the benefits of hydrogen can be independent from any antioxidant activity, which is really neat.

There are some published studies and clinical case reports you can find, where people with psoriasis, for example, bathe in Hydrogen water. They have before and after pictures in these publications, you can directly visualize and tell for yourself the differences. Some people tend to

really respond to this really well. And so, yeah, I suppose if I had this, I would try it. It certainly is safe. You could make water like this, and then you could soak your skin in there.

We have a long way to go in terms of clinical studies but there are some out there that show some pretty revealing results. Although we don't have that research, we do have a lot of independent research from researchers all over the world. I am just one small fish in the pond. I've only published 30 - 40 articles, which is actually quite a bit in my small time but there's over 2000 articles. And so, I'm just happy to be part of all of this. And, um, anyways, it's pretty exciting though.


We have a long way to go, but I think with the safety profile of hydrogen being so high and the research that we have, its starting to show that people can incorporate it into their lives, especially in conjunction with other biohacking methods and therapies. And in fact, a lot of potential synergistic effects, like the combined use of hyperbaric oxygen/ ozone or things along with hydrogen show some benefits from balancing each other out. There's research on these areas showing maybe even a synergistic or at least an additive or protective effect,

[How people can find out more and get more involved and learn more about your company, Mo-](#)

lecular Hydrogen Institute, and yourself as well.

Yeah, you can look at our website, molecularhydrogeninstitute.org and we have information there. We even have some certification classes and there's going to be some new ones actually coming up hopefully by the end of the year. People can go through and learn some of these basic things about molecular hydrogen, what it is, how it works. And of course, you can find me on my social media, Instagram, Facebook, Tyler LeBaron or Tyler W LeBaron. I'm happy to connect.





THE LIQUID CRYSTAL BEHAVIOR OF THE HUMAN BODY

Analogies with
Semiconductor
Technology

Introduction

The work of Dr Gerald Pollack author of "The Fourth Phase of Water" and others caused some intriguing insights, what Francis describes as "the Liquid Crystal behavior of the Human Body". This behavior shows a strong analogy with the crystalline nature of the materials used in semiconductor technology and the capability of modern semi-conductors to store, process, and transfer information. These phenomena will be explained in a very digestible (layman terms), yet scientific and technological manner.

The Relevance to Biohacking

Biohacking can be described as changing your chemistry and consequently your physiology, by means of medical, nutritional, and electronic techniques. The most common Biohacks are lifestyle and dietary changes. The influence of physics on biochemistry, and the concept of hacking the information system of the human body is generally not so well understood. Which is interesting, as the term "hacking" did originate from the information technology (IT) where "hackers" were trying to alter (protected) software and hardware of a computer to make it work better and/or faster.

For this article in Biohackers Magazine, I will explain the human body as an information system, with technology features enabling data storage and processing beyond the brain, and data transmission beyond the nerve system. As the title refers to, these features are enabled by the Liquid Crystal behavior of the Human Body which show analogies with semiconductor technology.



What would be needed to perform those functions?

- Information carriers
- Transfer medium
- Storage medium
- Code
- Transducing medium

What can we do to influence such systems for optimum health?

All of this will be explained in this article, while looking into some of the bio energetic systems which

make up such an advanced information system.

What makes up the human body?

Electric cells?

What's happening inside of our cells?

The significant of the abundance of water in the human body

The hypothesis of the liquid crystal behavior of the human body and the associated bio energetic phenomena are supported by the following scientific publications:



What makes up the human body?

The human body is built up from cells. Different cell types have specific functions, collectively performing functions as uniquely required for the various organs: skin, brain, lungs, heart, liver, kidney, blood etc... Cells constituting a human body is about 50 trillion.

In addition, our bodies contain nearly six times as many bacterial cells, 300 trillion. Although bacterial cells are much smaller than human ones, we are obviously largely outnumbered by those "foreign invaders". Most bacteria are beneficial, aiding in digestion and in support of strengthening our immune response system.

Consider your body as a hotel with an extraordinary large number of guests. So, it's vital that we attract the right clientele and take care of them and let them take care of us.

Electric Cells

Prof. Gerald Pollack, in his publication "The Fourth Phase of Water", provides evidence that the potential difference arises, at least as part from the unique characteristics of intercellular water. Later in this article I will further explain the specific characteristics and attributes of what professor Pollack calls the Exclusion Zone (EZ) water, a unique structure of a water matrix established near hydrophilic substances. As most tissue in the human body including collagen, fascia and the cell membranes exhibit such hydrophilic (water loving) behavior, the proposed EZ water structure is significantly present in the intercellular and extracellular level of our human body.

Already in 1936, research conducted by Harold Saxon Burr reported an Electric Dynamic Theory of Development while a Voltmeter was used to measure the voltage potential of cells.

The interior of the cells commonly has a negative electrical potential of 50 to 100mVolt. To create this potential difference, the ionic contents inside of the cell must differ from the outside of the cell.

Doing the math, as Dr. Bruce Lipton, author of "Biology of Belief" in his full lecture (May 2019), the body's estimated Voltage value is larger than 3.5 trillion Volts.

50 trillion cells with an average cell membrane potential of 70 mVolt (0.07 Volt) equates to 50 trillion \times 0.07 Volts = 3.5 trillion Volts. Since the cell nucleus has a membrane potential as well and 300 trillion "guest cells" also, that adds up to a total potential of 49 trillion Volts.

What is happening inside of our cells?

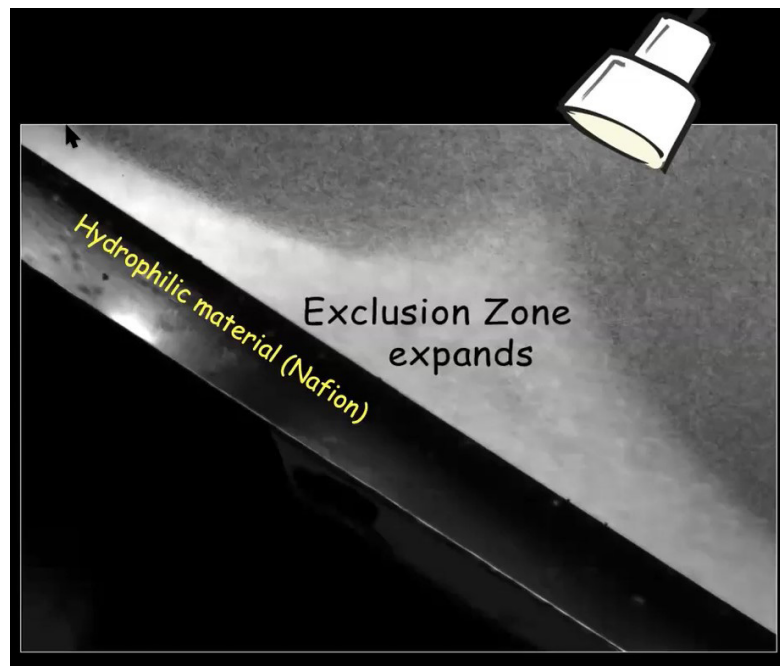
In every cell there are about $10E9$ chemical reactions taking place per second. Multiplying that by our estimated number of cells, 350 trillion \times $10E9$ equals 350 sextillions chemical reactions per second. From high school

textbook chemistry, we know that during a chemical reaction an electron changes energy bands and consequently a photon (light particle) is being emitted or absorbed.

What is happening with those photons in our body? Could they fuel at any time an optical communication system, which runs literally at the speed of light? Similar to the fiber optical communication systems we nowadays have in place to allow fast communication around the globe? For such a system inside of the human body we would require waveguides. The microtubules inside of the cells are surrounded by crystalline EZ water as well as the collagen in the fascia, which then would make perfect waveguides i.e., interbody fiber optics systems. This perspective causes us to look a bit deeper into the role and the specific structure inside of the human body.

The significance of the abundance of water in the human body

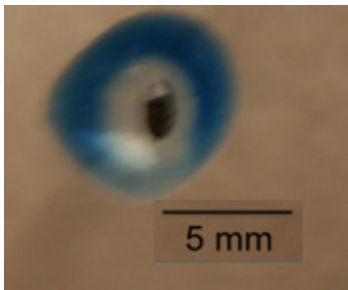
Nearly 2/3 of the human body mass is water. What kind of water



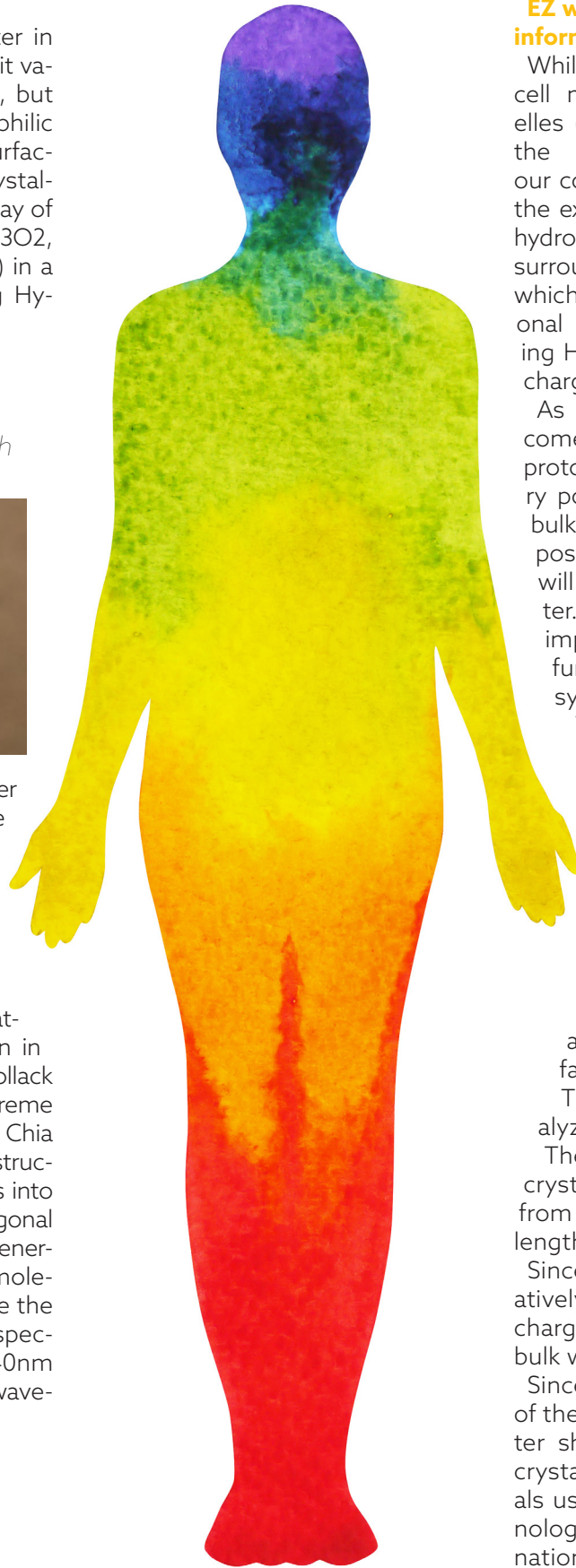
is it and what is its purpose?

To a large extent, the water in our body is not liquid, nor is it vapor nor ice. Its liquid based, but as it is surrounded by hydrophilic substances (water loving surfaces) it takes on a unique crystalline structure, an ordered array of water molecules (forming H_3O_2 , which is negatively charged) in a hexagonal structure sharing Hydrogen bonds.

Chia seed with surrounding EZ water structure emphasized with blue die



To explain hydrophilic (water loving) behavior, let us have a look at Chia seeds. What happens when you put water in a cup with Chia seeds? It becomes a jelly, like a pudding. Now you may think that proteins inside of the seed are diffusing out creating a semi saturated solution in water. But as Prof. Gerald Pollack explained to me, it's the extreme hydrophilic behavior of the Chia seeds, which catalyzes the structuring of the water molecules into the EZ (Exclusion Zone) hexagonal structure, while the kinetic energy, which makes the water molecules move, comes from the the ever surrounding Infra-Red spectrum. In particular the 940nm and 1070nm near Infrared wavelengths.



EZ water and the Liquid Crystal information system

While the bodily tissue from cell membranes to cell organelles (like the microtubules) and the collagen, the protein of our connective tissue making up the extracellular matrix, being all hydrophilic, these surfaces are surrounded by water molecules which have taken on the hexagonal crystalline structure forming H_3O_2 , which has a negative charge.

As EZ water grows, and becomes negative, by releasing protons, these complementary positive charges build in the bulk water. Consequently, also positively charged pollutants will accumulate in the bulk water. This phenomenon is an important contributor to the functioning of the lymphatic system

The next few illustrations (courtesy of Prof Gerald Pollack) summarize and explain the process of formation, and some of the characteristics of the EZ water (4th Phase of Water).

EZ water hexagonal (H_3O_2) structure is formed adjacent to hydrophilic surfaces

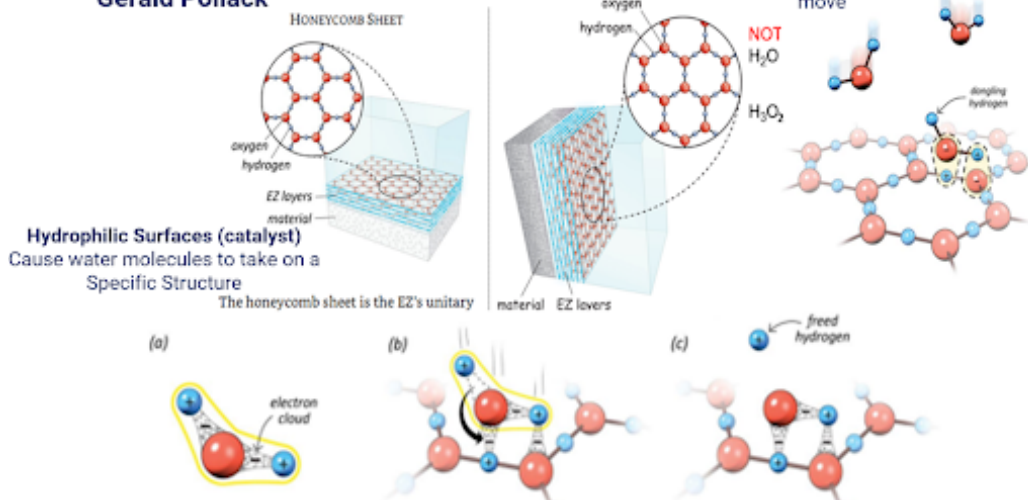
The hydrophilic surfaces catalyze this process.

The energy to create such crystalline structure comes from light with specific wavelength

Since H_3O_2 structure is negatively charged, positively charged pollutants move to the bulk water (detoxification)

Since this crystalline structure of the inter- and extracellular water share characteristics of the crystalline nature of the materials used in semiconductor technology there is a plausible explanation how the human body can

The 4th Phase of Water Gerald Pollack



also store, process and transfer information.

In semiconductor technology, the principle of a field effect transistor is based on the following atomic structure.

In Crystalline Silicon (Si), each individual Silicon atom shares an electrode from the outer energy band with four neighboring Silicon atoms. Placing an electron donor atom like Phosphorous (P) into the crystalline structure of the Silicon, then provides for a free electron in this structure while, an electron acceptor atom like Boron (B) provides for a free

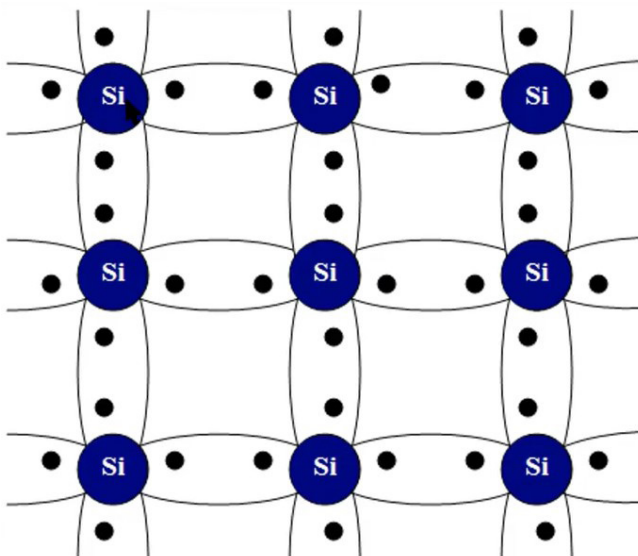
electron space, called a hole in such structure. Such a structure then provides for enabling electric current to flow and an electric field, to control such current in specific areas.

How would such principles play out in the case of the liquid crystal water arrangement in the human body? Let's first consider the state of Oxygen in this liquid crystal structure, which can have 5 different states: -2, -1, neutral, +1 and +2. While in the classic Silicon semiconductor a switch would either be on or off represented by a 0 or a 1, in the liquid crystal ma-

trix where the Oxygen atom can be present in the structure with 5 states instead of just two, offers a substantial larger amount of data storage capability.

Furthermore, the freed up hydrogen, basically a proton H⁺, which in such structure of nano-confined water would allow for superconductivity.

In addition, the photons involved in the enormous number of chemical reactions (350 sextillion per second) taking place throughout the cells in our body, have access to a vast network of a waveguide system, created by the crystalline ordered water around the collagen of our connective tissue as well as along the microtubules inside of our cells. In Traditional Chinese Medicine (TCM) such "waveguides" have been empirically discovered and are called meridians. Experimental studies have been published placing a laser on a specific meridian (pericardium) point and a detector (photon counter) at another point of the same meridian, giving matching results. Also, IR heat imaging studies have been conducted (Dr. Fritz Albert Popp et al.), showing energy activity along the assumed areas of the bladder meridian, along both





SUMMARY

sides of the spine. This activity, in TCM generally described as Qi movement, could also be a manifestation of the aforementioned proton super conductivity model.

This may be a bit of stretch to consider, but could a schematic of H₃O₂-molecule arrangement in a locally clustered crystalline structure with certain protein arrangements and the presence of ferromagnetic trace metal, operating like a crystal radio sender/receiver, explain the existence of Chakras as described in Ayurvedic medicine? Dr. Esther del Rio, mentions increased concentration of ferromagnetic traces in those specific chakra areas.

Summary

At the introduction of this article, I made a statement of the human body being an information system, with technology features enabling data storage and processing beyond the brain and data transmission beyond the nerve system. We had a close look at some of the bio energetic systems like the cells and the unique characteristics of the water structure.

Now let's do a quick check if the model described meets the requirements of, enabling storage, transfer, and processing of information at a greater speed and capacity than just the brain and nerve system. Does the system described provide for the elements needed to perform those functions?

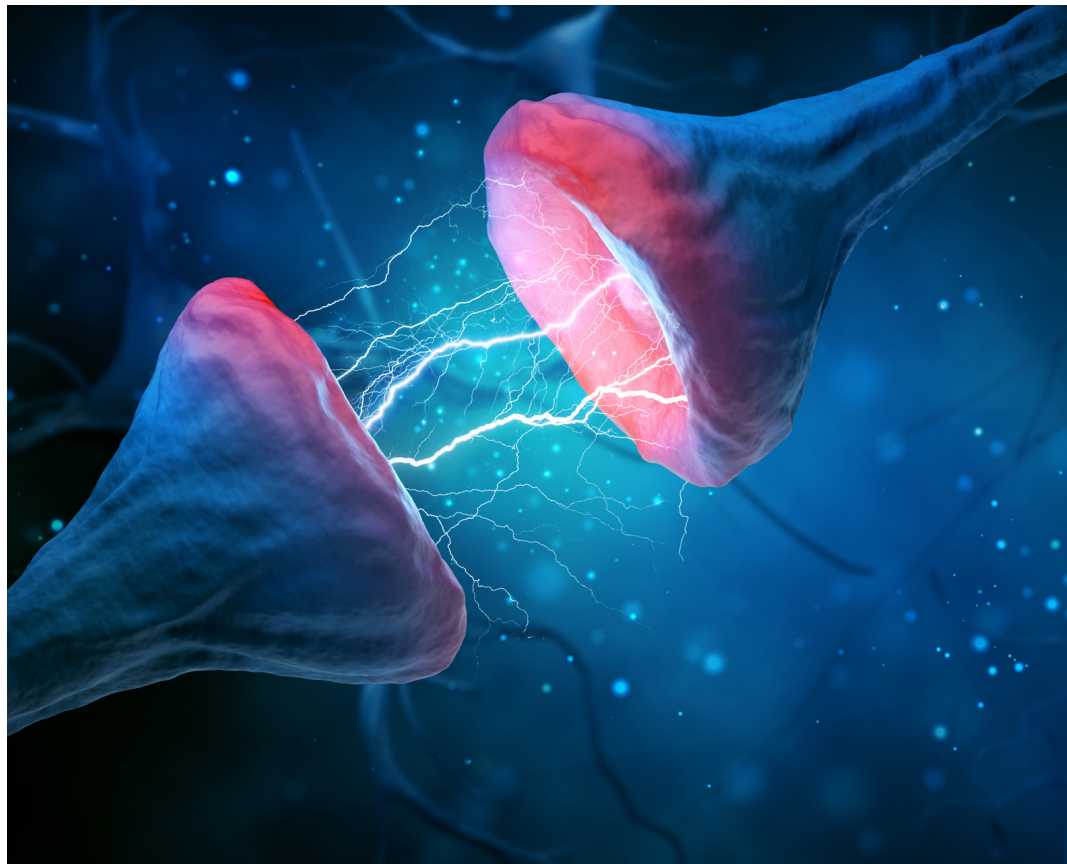
<u>Requirement</u>	<u>Provision</u>
Information carriers	Yes -> Electrons, Photons & Protons
Transfer medium	Yes -> EZ water making up wave guides (for photons)
Storage medium	Yes -> EZ waters hexagonal crystalline structure
Code	Yes -> Oxygen state in EZ-water (-2, -1, 0, +1, +2)
Transducing medium	Yes -> Heart and Chakra

Conclusion

It has become evident that the vast amount of water in our body, with its special structure, 4th phase behavior around the hydrophilic nature of bodily tissue, makes up a matrixed system throughout our human body, exhibiting "Liquid Crystal behavior".

This makes the fascia a storage place (memory – beyond the brain) of our life experiences, events and in particular emotions and trauma. It also provides for communication channels to exist besides the nervous system, like waveguides for optical communication (meridians) as well as wireless communication (Chakras). These communication systems are much faster than the nervous system, and instantaneous. Such speed of communication is essential to control and steer the enormous amount of biochemical processes taking place throughout our body.

In other words, "physics controls chemistry". The physical phenomena mentioned are predominantly of an electromagnetic nature. Therefore, we should also mention the significance of the heart, as the organ with the strongest rhythmic electromagnetic field. The heart's



electrical field is about 100 times greater in strength than the field generated by the brain and can be detected up to 3 feet away from the body.

Now imagine how thoughts, originating from our brain activity, can be imprinted / programmed, into the storage medium of the EZ water matrix in the fascia. This can be thoughts, emotions, and trauma. A traumatic experience can have been a "fight or flight" response, which now is imprinted as a piece of memory in the fascia and gets triggered or re-activated like the cookies and caches function in the background of computer's data browsing. That explains why many chronic dis-ease often manifests somewhere in the fascia and adjacent organs, because of repetitive triggering of old (no longer relevant) information. This explains why in TCM and Ayurvedic science many emotional states are related

to specific organs.

Biohacking the systems

Taking control of the electromagnetic processes

Positive thoughts and meditation with calming breathing techniques is extremely powerful, as they synchronize calmness in the brainwaves with the heart coherence (a technique described and promoted by the Heartmath institute), and as such support re-imprinting the matrix.

Re-calibrating with electromagnetic systems

PEMF devices can help to recalibrate the electromagnetic communication inside of the bodily matrix, erasing old, unneeded information, as well as help remove blockages for self-healing in the information transfer systems. When choosing a device for this purpose make sure you choose a

device which works on the principles of proton resonance.

Essentially our body is made up of organs, tissue, cells, molecules, and atoms. At the level of atoms, we come to small oscillators or subatomic particles, such as protons, neutrons, and electrons. The proton is the sub-atomic particle with the longest lifetime, next to the neutron having a high mass and greatest stability. The proton (and neutron seen as an excited proton) contribute for more than 99.99% of the mass of the body and at a level of all scales, of the whole universe. The natural oscillation of a resting, non-stressed proton is the leading force of the creation of harmonic structures. In nature everything is structured according to the principle of proton resonance and therefore in harmony, where it's interconnection and communication, and cooperation, provides for operating at the least effort and at the highest energy efficiency.

Maintaining the EZ water structure

Healthy food and nutrients help maintain a healthy state of the EZ

water liquid crystal matrix. Extensively processed food destroys the hydrophilic nature of the cell membranes and tissue of that same food, and consequently breaks up the EZ water liquid crystalline structure. Microwaved food destroys the cell membranes and excites the water molecules causing deformation of the natural structure of the water being part of the plants.

Consuming alcoholic beverages excessively consequently dissolves water, breaking up the structured water liquid crystal matrix and creating discontinuations (gaps / leaks) into this information and communication matrix.

Red light therapy

Because hydrophilic surfaces act as a catalyst for the formation and maintaining the structure of our EZ water liquid crystal system, the energy fueling the movement of the water molecules is the omnipresent Infra-Red energy. Exposing ourselves to sunlight in a responsible way, like early morning greeting the sun, and also occasionally using devices for light therapy supports

the maintenance of a healthy liquid crystal EZ water matrix.

Other methods

Spending time in nature; massage therapy, stretching, sound healing, yoga,

Acknowledgement and references

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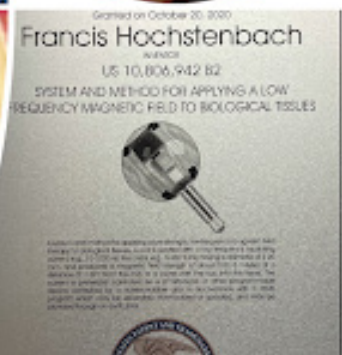
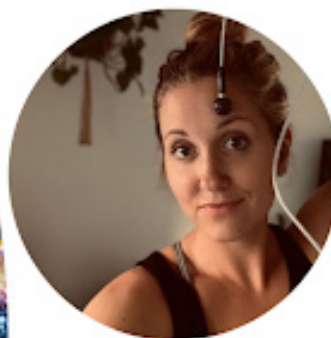
"High-Capacity Optical Channels for Bioinformation Transfer: Acupuncture Meridians" by Jiri Pokorny, Tomas Martan, Alberto Foletti

"Studies on the nature of water, the assertion of the existence of liquid crystal molecules in the inner water of the body and the relationship thereof with a magnetic network covering the whole organism explain the rapidity of biological responses on cellular level" by Dr. Esther del Rio

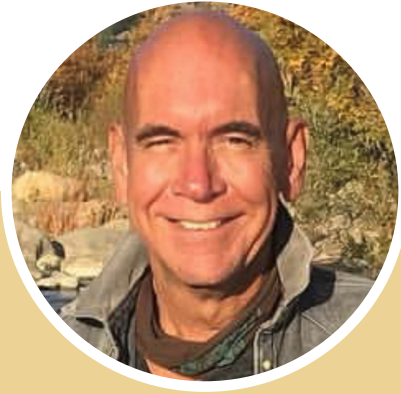


Thank You!

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About Francis Hochstenbach



Francis Hochstenbach has an engineering background in semiconductor manufacturing technology (Microelectronics, e.g., Microchips-Integrated-Circuits, used in computers, cars, and smartphones), with more than 34 years of experience. He has served at leading companies, such as Philips Semiconductors (NXP), Applied Materials, Bede X-Ray Metrology (Bruker), Cymer Lasers (ASML), and VDL Enabling Technologies Group (currently), where he has held senior positions in engineering, product development and executive management. As COO for NES Health, he played an instrumental role in transferring a prototype of a personal PEMF therapy device, the miHealth™, into production and continuously improving the product into maturity. Additionally, Francis assumed an honorary ambassador role for the Institute for Venture Science's professor Dr. Gerald Pollack, author of the Forth Phase of Water.

*Francis his fascination with the characteristics of the body's self-healing capacity led him to develop an application for using smartphones as an affordable source for PEMF therapy (Pulsed Electro Magnetic Field). This app is called Mannavibes™ Xtal**.*

*** Xtal technology "System and Method for applying a low frequency magnetic field to biological tissue" was rewarded with US patents granted October 2020 and May 2022.*

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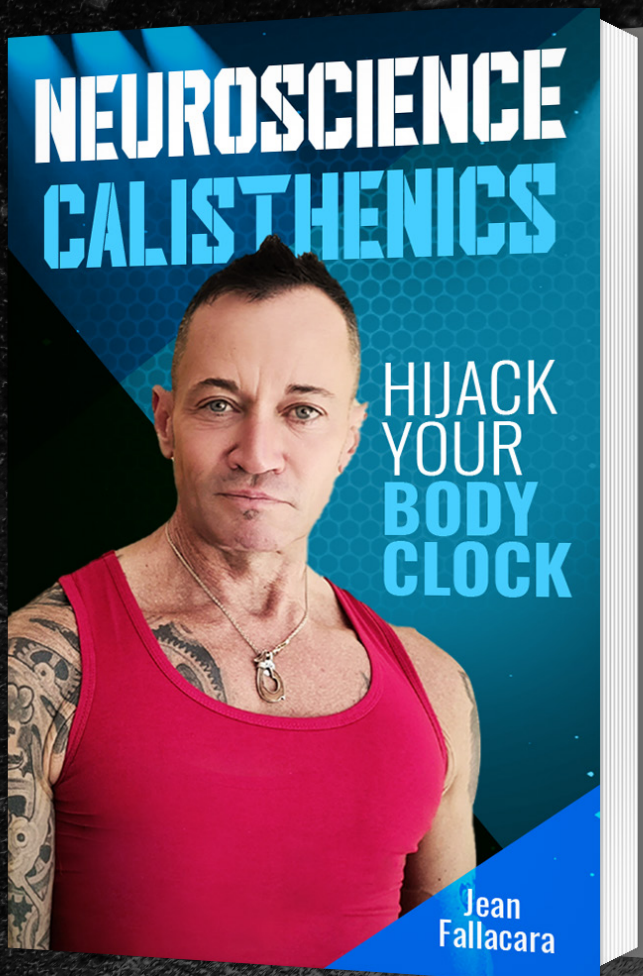
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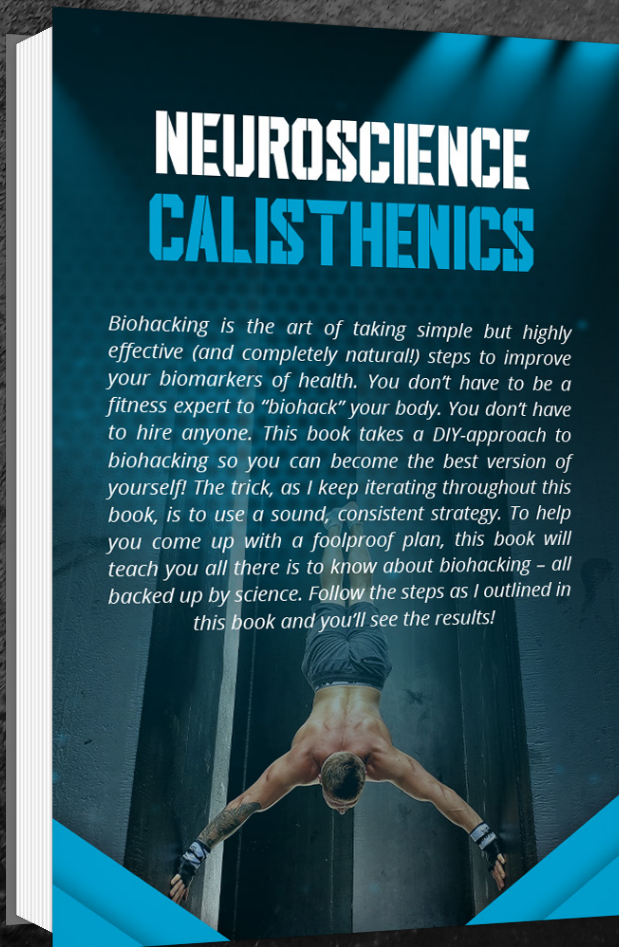


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