

DNA MONTHLY

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BREAKING NEWS: During the editor's personal quest to heal his chronic illness, he learned that the power of sound and light to activate DNA had recently been documented by the Gariaev group in Russia. Dr. Peter Gariaev and his brilliant team of geneticists and linguists proved that damaged DNA can be healed without gene splicing or other physical manipulation by merely immersing it in radio and light waves keyed to human language frequencies.

According to Gariaev's research, our DNA not only assembles our proteins but also stores and communicates data. His team found that the genetic code in *potential DNA* follows, for practical purposes, the same foundational rules as human languages. In order to prove this, the syntax, semantics and grammar of human language and DNA were compared. It was discovered that potential DNA's alkaline sequences closely mirror linguistic communication rules. This strongly suggests that the many human languages did not appear randomly, as is commonly believed, but reflect our essentially similar genetic structure. Supported by Gregg Braden's discovery that the ancient Hebrew name for God (YHVH) is actually code for DNA based on the latter's chemical composition of carbon, hydrogen, oxygen and nitrogen, Gariaev's findings offer scientific substantiation that in the beginning was the Word!

Gariaev and his colleagues also studied DNA's electromagnetic behavior. They concluded, "Living chromosomes function just like holographic computers using DNA's own laser radiation." The Gariaev team modulated certain linguistic frequencies onto a laser. With this technology of language-modulated radio and light waves, they were not only able to heal damaged chromosomes, they also successfully altered genetic expression. Amazingly, they obtained results similar to those documented by Dr. Yu Dzung Kangeng, who was the first to employ torsion energy to transfer DNA between organisms. Using radio and light waves keyed to human language frequencies to reprogram DNA, as opposed to gene splicing, Gariaev's team literally transformed frog embryos into healthy salamander embryos in the laboratory!

In this manner metamorphosis was achieved without any of the side effects encountered when manipulating isolated genes. The "random and risky nature of gene splicing has been sadly hidden from the public," writes Dr. Leonard Horowitz. "With gene therapy, researchers cannot definitively predict where on a [chromosome] the modified gene might land, raising a hazardous possibility of inadvertently disrupting other genetic expressions and cellular functions." Compare this to the organic alteration of genetic expression that can be achieved by simply applying vibration and language (or sound and intention, or *words*) to DNA. Gariaev's historical experiment points to the immense power of what many are calling "wave-genetics," an area which, contrary to current molecular biology dogma and propaganda, has a more primary influence on the origin of species than biochemistry.

Affiliates Program

FEATURED IN THE SEPTEMBER 2005 ISSUE OF DNA MONTHLY

1. "An Open Letter from Dr. Peter Gariaev, the Father of 'Wave-genetics'"
2. "Autoimmunity, Allergies & DNA Activation," by Sol Luckman
3. "Music to the Ears: The Infrared Frequencies of DNA Bases," by Susan Alexjander

Also, Also ... DNA-related Definition of the Month & Did You Know?



1. An Open Letter from Dr. Peter Gariaev, the Father of "Wave-genetics"

Currently, we have a situation in genetics, molecular biology and medicine in general, that is simultaneously paradoxical and promising. Long ago, science decided to investigate the human genetic code. Science has now completed the 10-year-long effort to map the DNA sequences of human beings, known collectively as the genome. All of the letters and sequences of human DNA are now known.

Owing to these preliminary results, the forces of transgenetic engineering have been gathering momentum. Already, scientists have introduced artificial gene sequences into plants, animals and bacteria, which are being used as carriers of such artificially introduced genes. Such experiments have been thought to hold great potential for human health applications, promising possible cures for many diseases and disabilities as well as the creation of disease-resistant foods--meaning greater abundance of food.

Paradoxically, however, the more success we have in such genetic and molecular biology technologies, the further we seem to be from understanding the actual foundational principles--the inner workings--of genetic codes. To date, successes in this direction have mainly been concerned with functions of particular gene sequences that fabricate various proteins, the building materials from which cells are made.

These particular gene sequences occupy only 2% of the genetic memory found in chromosomes. The other 98%, the major part of chromosomes, is not understood by mainstream genetics, and has for some odd reason been labeled as "junk" DNA. Many hypotheses have been brought forward to attempt to account for the existence of this "junk" DNA--from suggesting that it might act as "assistants" for primary DNA sequences, to

theorizing that this 98% of DNA arises as a "cemetery of viruses"--a rather difficult notion.

To ignore, or so poorly understand, the role of this 98% of the human genome is an appreciable error. Moreover, whether we correctly grasp the role of the genetic information represented by the known 2% of DNA is still in question--especially when the other 98% is presently *terra incognita*, unknown territory.

It is fair to say that we currently understand DNA only dimly. This is obvious because at our present level of genetic knowledge, we cannot completely cure cancer, resist AIDS, defeat tuberculosis, or prolong the lives of people beyond 100 years.

The initially bright promises of the creations of transgenetic research have actually turned out only dangerous hybrid foodstuffs that are extremely hazardous to the biosphere on which our very lives depend. The cloning of animals has produced only ugly and useless creatures, or animals that grow old and die abnormally quickly, as in the well-known case of the cloned sheep, Dolly.

How are we to transcend this condition of an abundance of flawed and dangerous experiments, where many inconsistent and hazardous results are caused by a lack of any proper understanding of DNA and a dramatic deficiency in grasping the foundational operating principles of the human genome?

In order to achieve success in our attempts to treat various medical problems and curb the processes of human aging, it is clearly necessary to understand the languages by which cells communicate. To some extent, those of us who have pioneered the field of "wave-genetics" have managed to accomplish this. It appears that the languages we were looking for exist, in fact, in the 98% or "junk" DNA contained in our own genetic apparatus. The foundational principle of these genetic languages is similar to the language of holographic images as well as texts constructed from human speech.

What gives us this new knowledge? The answer is that we now understand these mechanisms. We have experimented broadly with both the physical processes and mathematical descriptions of these genetically guided informational functions. We have built sophisticated laboratory equipment and mathematical apparatuses that allow us to accurately model the informational functions of the living cell and all of its DNA, including the neuron network.

Such devices represent the first "quantum biocomputers." These devices have allowed us: 1) to carry out distant (multi-kilometer) transfers of genetic/metabolic information in the form of special physical fields; 2) to introduce this information into human biosystems; and 3) to perform strategic management functions concerned with biosystems, biochemical systems, and actual physiological conditions.

In particular, we have found it possible to regenerate endocrine glands in animals. By the same means, we have significantly curbed the aging process in human cells and even grown new adult human teeth in individuals who had lost them.

Frustratingly, even with such documented successes, the mainstream scientific establishment is such that I have found it difficult to maintain funding for my work in my home country of Russia. If you or someone you know are interested in assisting me, I am willing to relocate if necessary to continue my research and would love to establish a dialogue to possibility.

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[**Peter Gariaev**, Ph.D., is renowned for his discovery of the "DNA Phantom Effect" and as one of the founders of Wave-based Genetics. The basic concept of the revolutionary approach to morphogenesis proposed and developed by Dr. Gariaev's team of geneticists and linguists combines physical models of holographic associative memory and mathematical formalism having to do with intrinsic wave patterns in DNA. The underlying principles of holographic storage and solitonic wave transfer of morphogenetic information reveal previously unknown "energetic" aspects of biological systems functioning. This new insight into the nature of morphogenesis makes it possible to treat the genome as a holographic bio-computer that generates endogenous solitonic acoustic and electromagnetic (sound and light) waves to carry 4D epigenetic (alternative coding) information used by biosystems for spatial and temporal self-organizing. In other words, this new model of genetic creation establishes the primacy of energetic, as opposed to biochemical, activity in directing cellular metabolism and replication--a notion that, when finally accepted by the mainstream, will radically transform genetic science. For more information [click here](#). Contact Dr. Gariaev by email at gariaev@aha.ru.]

DNA-related Definition of the Month

Morphogenesis: Stedman's Dictionary defines **morphogenesis** as 1) the differentiation of cells and tissues in the early embryo that establishes the form and structure of the various organs and parts of the body; 2) the ability of a molecule or group of molecules to assume a certain shape.



2. Autoimmunity, Allergies & DNA Activation

Sol Luckman

Having spent nearly a decade dying, I am deeply grateful for the pioneering of Dr. Devi Nambudripad, developer of Nambudripad's Allergy Elimination Technique. NAET employs muscle testing (kinesiology) to determine allergies--a term encompassing chemical, environmental and nutritional sensitivities that tend to derange the immune system and contribute to a variety of "incurable" ailments. A goal of this innovative method is to treat chronic illness through acupressure stimulation of the nervous system. This initiates a "clearing" theoretically capable of removing allergic "blockages" that keep bioenergy from flowing properly through the body.

At twenty-seven life inexplicably came crashing down. One day I was playing basketball three hours at a stretch, able to eat and drink whatever I pleased; the next I was gripped by a mysterious illness that, one by one, took away the foods, drinks and sports I loved, even--in the insidious way chronic illness has of stripping you clean--many people I loved.

At first I was diagnosed with the medical profession's catchall for baffling conditions: "depression." I felt deeply, however, that depression was the result not the cause of whatever was degenerating my once athletic body. But I dutifully popped my pills until I nearly died of an adverse reaction. Growing desperate, I headed into "alternative" territory seeking solutions.

My first stop on a twisted journey into the Wonderland of complementary therapies was at my mouth. A holistic doctor suggested I'd been poisoned by mercury and other heavy metals leaching from my dental work, so I spent a fortune getting my crowns and fillings replaced with supposedly benign materials. For all the damage this did to my wallet, removing such a toxic load from my system produced almost total symptom relief--for several months.

When my problems with Candida and fatigue returned, it was with a vengeance. My old nemeses were joined by a bewildering array of seemingly unrelated symptoms that continued to defy medical diagnosis. Despite a series of "negative" tests, I lay in bed at night terrified I was dying. In addition to my debilitating food allergies and exhaustion, I suffered facial neuralgia, muscle spasms, back pain, hypoglycemia, shortness of breath, and chemical sensitivities.

In an effort to halt my deterioration, I took handfuls of nearly every supplement on the market. I received regular intravenous chelation. I did parasite cleanses, special Candida diets. I experimented with ozone and infrared saunas. I tried reiki, acupuncture, homeopathy, biofeedback, magnets, "zappers." I underwent EMDR, hypnosis, radionics, even "psychic surgery." I tried practically everything and spent thousands, but after six years, I was sicker than ever and getting worse.

The word "inspiration" best conveys the intuitive process I began in 2002 that led me to consider the radical notion that if I could somehow "reset" myself at the genetic level, my thirty or so bizarre symptoms would eventually go away. I found myself on this path after reading a disturbing book by Harvard-trained Leonard Horowitz entitled *Emerging Viruses*. Basing his claims on meticulous research, Dr. Horowitz persuasively argues that vaccines are the real cause of a variety of autoimmune diseases, including AIDS.

This may strike anyone who accepts the official line that vaccines are safe and effective as unbelievable. But after a year spent testing Horowitz's ideas using kinesiology (muscle testing), I concluded belief is not required for immune-wrecking retroviruses to penetrate the bloodstream via "immunizations" and alter the genetic code, potentially sabotaging health under a myriad of creative diagnoses such as "fibromyalgia," "chronic fatigue," and "multiple chemical sensitivity."

The root cause of many autoimmune illnesses is genetic damage through factors such as vaccines compounded by cellular toxicity. As evidenced by the expanding body of literature on the topic, I am far from alone in this opinion. I contend that cells collect and hold toxicity for the purpose of slowing down the many mutant pathogens, such as simian 40 retrovirus ("monkey AIDS"), released in the organism under the radar of the immune system by

vaccines. The body knows that toxic substances--heavy metals and pesticides, for instance--are not only poisonous to the host, but also to pathogens. Such a Catch-22 can lead to environmental illness and immunological breakdown in which the body starts attacking its own toxic cells, but it may be the only choice a biosystem operating with damaged DNA has.

Many people are led to believe that since they have an autoimmune disorder or disease, they are more toxic *because* of their chemical, environmental or nutritional sensitivities. Another way of saying this is that it is commonly assumed the body becomes more toxic in autoimmune states because it cannot or does not know how to detoxify. Based on my research and personal experience of genetic collapse, however, it appears that autoimmunity is induced by foreign genetic invaders (which can include genetically modified foods) that negatively reprogram DNA by utilizing the RNA transcription process, instructing the body to replicate artificial codes inside cells. In other words, once DNA is reprogrammed, it literally has the ability to grow new pathogenic--perhaps "pathogenetic" would be a better word--cellular cultures.

According to Horowitz and many other researchers, vaccine-induced pathogens, in addition to simian 40 retrovirus, can include prions, mycoplasmas, bovine lymphotropic virus, feline leukemia virus, Epstein-Barr virus, and Rous sarcoma virus--to name only a few. When these are "uploaded" into the genetic code using the reverse transcriptase ("backward writing") enzyme, any number of autoimmune conditions can result--from lupus to leukemia, depending on the individual's constitution and lifestyle and the number and type of vaccines received.

The body, in its wisdom, realizes it has been fundamentally altered, but like a computer it must carry out the codes in its reprogrammed DNA. This can lead to a degenerative defense response as the body accumulates more and more toxicity in an attempt to "short-circuit" the foreign pathogens being grown like weeds in the cells. The body simply uses what is available from the environment in its biological war against itself.

What often happens with Candida following such genetic damage is very telling. There is nothing inherently wrong with Candida. In a properly functioning body, *Candida albicans* keeps tissues healthy by scavenging potentially harmful microorganisms and toxins. Candida only gets out of control when the body tries to defend itself from some other invasion, usually of a genetic nature. This cycle is nearly impossible to halt without interceding "ener-genetically" because the problem is in the DNA, which unless directed to resume normal biological operations, continues a vicious cycle of replicating its mutated codes, then futilely trying to clean up microorganism overgrowth with more overgrowth!

Sensitivities and allergies result when the body is so occupied in the war going on at the level of the cells and the immune system it cannot handle or take on additional foreign substances. In many cases, microorganism populations are so out of balance they actually consume the host's food and produce additional toxic waste, such as fungal mycotoxins, inside and outside cells--further exacerbating an already genetically entrenched state of autoimmunity.

Dr. Nambudripad's promising approach came into my life when I had just been forced to resign my teaching job and was practically bedridden. NAET gave me hope of being able to heal my genetic damage from a series of hepatitis and yellow fever vaccines, detoxify my cells, and rebuild my deteriorated tissues. Initially encouraged by this method, I trained in an offshoot of BioSET, an NAET derivative, and after partially recovering, made my living this way before losing ground once again. In the process, I identified two blind spots with traditional energy clearings such as those used in NAET and its derivatives that limit their ability to address chronic autoimmunity.

The first oversight is a typically "Western" focus on physical issues without acknowledging their origins in our bioenergy fields. One of my mentors was an important figure in the field of radionics, a chiropractor named David Tansley. Dr. Tansley provided a foundation for my notions about the bioenergy fields--which can be envisioned as a series of high-frequency electromagnetic bands surrounding the body, each responsible for the proper functioning of a particular gland, organ, etc. Following Tansley's lead, and supported by the quantum sciences' view of the body as a hologram, I began to understand these fields as the electromagnetic blueprint that gives rise to the human form.

My theory was that when "mapped," the electromagnetic fields would reveal themselves as "ecosystems" where a number of interdependent factors work either harmoniously to create vitality or disharmoniously to produce disease. From an energetic or vibratory standpoint, *disharmony is disease*. A critical concept to grasp here is that disruption of the harmonics of the bioenergy fields, through toxicity or trauma, creates disturbances in the body's blueprint that underwrite all disease processes. I knew if I could find a way to reset this blueprint, I could go directly to the root of my illness.

The second problem with traditional clearings is that the nervous system simply cannot process all the frequencies encoded in the electromagnetic fields so as to transform a damaged blueprint. Contrary to the conservative paradigm that insists healing can only be achieved "one baby step at a time," my own experience suggests that chronic illness in particular requires a radical, simultaneous bioenergy reset--one that can only be accomplished by way of DNA. Through extensive kinesiological research, my partner Leigh and I identified more than 3,000 energy signatures over the body-mind-spirit continuum of the human electromagnetic blueprint. A traditional clearing of this size would far exceed the capacity of the healthiest nervous system. But DNA is designed to re-harmonize the entire energetic system.

After mapping the electromagnetic fields, we set out to press the "reset button" on this bioenergy blueprint. It was at this stage we began to understand that the nervous system was never meant to repattern the human bioenergy blueprint, that only DNA, our "bio-computer," can heal the energy body, and that therefore, some other method of initiating an electromagnetic reset besides acupressure stimulation of the nervous system had to be found.

We realized that if we were to activate DNA's self-repair potential, one we intuited along with many cell biologists such as Glen Rein and Bruce Lipton, we had to find or develop a way to

access DNA without laboratories or test tubes. But how do you do that? How do you activate DNA without physically manipulating it?

At this point I was fortunate to stumble on another book that forever changed the way I viewed medicine: *The Cosmic Serpent: DNA and the Origins of Knowledge*, by French anthropologist Jeremy Narby. Dr. Narby spent years studying the seemingly miraculous healing techniques of Amazonian shamans (medicine men), who apparently cure people using sound to stimulate a self-healing potential in human DNA.

Intrigued (and desperate) enough to delve into this subject, I learned that the power of sound to activate DNA had recently been documented by the Gariaev group, a Russian team that brought together geneticists and linguists. One revolutionary implication of this research is that to activate DNA, one can simply use words.

Finally, I had found the genetic reset mechanism I was seeking. The approach Leigh and I took was to develop a completely new type of synergistic clearing, which we named Potentiation Electromagnetic Repatterning, using *sound* and *intention* to activate DNA in a manner similar to that of the Russian research studies. This permitted us to work across the body-mind-spirit continuum of the electromagnetic fields. It also allowed us to work noninvasively to stimulate the body's self-healing potential.

Potentiation employs particular combinations of sounds embodying healing intentions that are remotely transmitted to the recipient's DNA, initiating a domino effect of electromagnetic repatterning designed to reset the body's bioenergy fields to harmonic functioning. This is done without altering the individual's basic DNA by simply activating a genetic potential that already exists.

The session, a one-time event, takes thirty minutes. The resultant shifts surface in the weeks and months following as the DNA activates and the electromagnetic fields recalibrate. For some those shifts are felt dramatically, for others they flow into a subtle upswing. The entire process takes just over nine months (42 weeks) to complete: interestingly, a human gestation cycle.

In my own case, Potentiation was a metamorphosis. The journey was challenging as my body-mind-spirit healed at an "ener-genetic" depth I never imagined possible. But there can be no doubt as to the profundity of my transformation. At thirty-seven I can swim two miles at full speed, my food allergies and problems with Candida have disappeared, and--though no longer exactly a young man with my hair starting to silver--I'm like a fine wine, getting better with age.

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[**Sol Luckman** is editor of *DNA Monthly* and cofounder of the Phoenix Center for Regenetics, offering cutting-edge educational services and materials designed to activate unity consciousness and actualize human potential. The developers of the Regenetics Method are educators and ordained ministers, not medical doctors, and do not purport to diagnose or treat illness. The preceding article is taken from Book One on the Regenetics Method, *Conscious Healing*. For information [click here](#).]

Did you know . . . Dr. Peter Gariaev's research reveals even more far-reaching implications with respect to the unlimited healing power of human genetic consciousness? The Russian team found that wave-activated DNA can manipulate the space matrix, producing small electromagnetic wormholes of a subquantum nature. These DNA-activated wormholes, whose energy signatures are similar to those of Einstein-Rosen bridges found near black holes, are connections between different areas in the multiverse through which data can be transmitted outside space-time. DNA magnetizes these bits of information to itself and then forwards them to our consciousness. Grazyna Fosar and Franz Bludorf, authors of an excellent summary of Gariaev's findings entitled *Vernetzte Intelligenz* ("Networked Intelligence"), refer to this data transfer process as "hypercommunication," pointing out that it is often experienced as "intuition" or "inspiration."

When hypercommunication occurs, according to Fosar and Bludorf, an extraordinary phenomenon can be observed in DNA. They relate how Gariaev irradiated a DNA sample with a laser until a typical wave pattern formed on his monitor. When the DNA sample was extracted, the pattern remained intact. Many control experiments showed that the pattern still emanated from the absent sample, whose energy field apparently remained undisturbed in the holding chamber, causing light to spiral all by itself following the shape of the physically removed double helix.

This nonlocal, light-bending torsion energy phenomenon has since become famous as the "DNA Phantom Effect." It is theorized that torsion waves from outside space-time continue to flow through the activated wormholes even after the DNA is removed. Remote (i.e., distance) healing is thus easily explained as an ener-genetic transfer of data or consciousness riding on torsion waves. "Most people tend to think that the DNA created the [phantom] energy field," writes David Wilcock, "and that the energy field is somehow just a 'shadow' of the DNA ... However, I believe that the wave actually exists before the DNA ... [The] only logical explanation is that the phantom energy of DNA is actually the creator of DNA." Since this phantom spiritual energy pervades the galaxy, wherever the "materials that create life exist, the subtle, spiraling pressure currents of this energy will arrange the DNA molecule into existence."

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3. Music to the Ears: The Infrared Frequencies of DNA Bases

Susan Alexander

[Note: In 1988 the author and biologist Dr. David Deamer collaborated on a science/art project that consisted of measuring the vibrational frequencies of the four DNA base molecules, translating them into "sound," programming them into a Yamaha synthesizer, and using this tuning system as the basis for original compositions entitled *Sequencia* (1990 and '94 CDs). The translation of biological infrared frequencies into sound resulted in unusual insights into the harmonic fabric of DNA. Reactions from listeners suggest that our bodies may have a way of recognizing their own electromagnetic patterns through the resonance of tone.]

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Introduction

If we could hear the body, delve into its rhythms and frequencies, what might it sound like? Would we recognize patterns pleasing to the ear? consider them beautiful? musical? Is our biology harmonically ordered? If so, what could this mean? There are many ways to explore such questions. One direct way is to access the frequencies of deoxyribonucleic acid (DNA), the primary carrier of genetic information in living organisms.

In 1988 the author, a composer, posed these questions to David Deamer, a cell biologist. Dr. Deamer is internationally known for his research on the origins of life. Some years before, he created very interesting music cassettes (*DNA Suite* and *DNA Music*) based on the mapping of sequences of bases in the double helix of DNA. He was intrigued by my questions and offered to help.

One significant challenge of this project was to collect vibrational frequencies directly from the molecular realm. These frequencies were then arranged as "scales" of tones and used as the basis for musical composition. Two years later, in April, 1990, the cassette version of *Sequencia* was recorded, and in 1994 the CD with additional music was produced. *Sequencia* consists of three performances of original music--*Eikos*, *Sequencia*, and *Pataphysical Thymine*--performed on traditional instruments plus electronic keyboard, based entirely on a tuning system derived from frequencies that occur naturally in DNA.

The problem of getting the frequencies within hearing range was solved by recognizing that any hertz number divided in half or doubled will produce its corresponding lower or upper octave, respectively, whether it be sound or light. Thus, 8.7×10^{13} Hz can be divided in half, again and again, to create lower and lower octaves. After dividing 36 times, we derive a workable frequency which, if sound, would fall within the range of hearing. Thus we would have for the example above 1266 Hz, which is a very comfortable frequency for the ear, corresponding to a (slightly sharp) D#.

Methods & Materials: The Science

There are about three billion base pairs in the DNA of each human cell. If they were strung out they would measure approximately three feet long. Yet each of these bases remains absolutely consistent in its chemical makeup. The four DNA bases--adenine, cytosine, guanine, and thymine--each consist of carbon, hydrogen, oxygen, and nitrogen. A variety of chemical structures exist whose bonds bend, stretch, and rock upon absorbing infrared light with a specific frequency related to the energy and strength of the bond and the mass of the atomic nucleus.

A tighter, smaller bond from, say, hydrogen, will absorb light with a higher wave-number (number of waves per centimeter) and a higher "note" in the infrared spectrum. (The original energy for these motions comes from the sun in the form of infrared radiation. Solar photons cause heating in the molecule as orbiting electrons jump to a higher energy state). The tuning system for *Sequencia* was derived directly from the laboratory chemistry of the four bases and had nothing to do with a particular gene.

The process of "collecting" frequencies from the bases of DNA begins with a spectrophotometer, a device about the size of a breadbox. Using this instrument, infrared light with frequencies ranging from 600 to 3000 wave-numbers (in units of cm^{-1}) is passed through the sample, in this case a base molecule of DNA. The bases of DNA and RNA have certain resonance frequencies related to the absorption of infrared light. This is a common property of all organic molecules. In fact, infrared spectra are used as a primary diagnostic characteristic in analytical procedures.

As light is passed through the sample, it is absorbed at specific frequencies and the instrument plots the absorption bands as a spectrum--a process analogous to a glass chime sounding when it is struck. For example, the C-H (carbon-hydrogen) bond absorbs infrared light with a wave-number of approximately 2900 cm^{-1} . Once the wave-number is known, the following equation is used to convert it to hertz: *Frequency (Hz) = velocity (speed of light) x wave-number*. For example, if the wave-number is 2900 cm^{-1} , then $F = 3 \times 10^{10} \text{ cm/s} \times 2900 \text{ cm}^{-1} = 8.7 \times 10^{13} \text{ Hz}$.

These gigantic hertz numbers are problematic in two ways. First, they are light frequencies, not sound. Second, they are too high to be heard, even if they were sound, since our ears can only register frequencies between 20-20,000 Hz. Below 20, vibrations are "felt" rather than heard. Frequencies above 20,000 belong to ears more discerning than ours.

The question of "translating" light into sound is more a philosophical one. Sound sped up can of course never be light, since the former depends on molecular activity while the second derives from electromagnetic radiation. One could argue that what is important here is not so much the medium but the ratios involved: the relationships between frequencies. The ears can detect about ten octaves of sound, while the eyes can only perceive a little over one octave of light, or color.

An octave in light is the same ratio as an octave in sound--2:1. A perfect fifth, or a relationship of 3:2, is the same proportion in light as in sound and can be interpolated to the world of geometry, architecture, movements of the planets, and so forth, so long as there is a periodic or regular vibration. By discovering patterns of ratios in light, we are simply translating into a sound medium to "hear" information and assess interrelationships. It could also be argued that both light and sound refer back to a common archetype which, as yet, is unknown to us, not unlike cousins who relate back to a common relative.

To reiterate, four base molecules were measured. After being subjected to light, each molecule yielded about 15 or 18 frequencies--60 in all. Once this data was collected, it was translated to a hearing range and programmed into a Yamaha DX7 IID synthesizer which

then created sound banks from hertz numbers provided as input. A special electronic keyboard was needed because the tunings derived were almost all microtones, or tones smaller than a normal half-step (for instance, any C to C#) on a piano.

Story: The Art

Before describing what the tunings sounded like, it is of interest to address a rationale for doing this at all. Pythagoras, who is credited with explaining musical harmonics to the Western world, is reputed to have described a stone as frozen music. He knew nothing of physics but intuited that the mathematics of frequency which occur in processes such as planetary rotations, cycles of the seasons, and even down to the atomic world of elemental matter, are not just lifeless pieces of data but reveal movements, rhythms, relationships and meanings which may be loosely translated as "stories." Stories, in turn, generate meanings and artistic expression. Etymologically, mathematics derives from "mathema," which comes from the Old French "mathein": "to be aware; to awaken."

The art, then, assists in "telling the story" of the data. The process is mythic as well as "mathic." There is a reasonable degree of certainty that deep within our molecular beings, beauty will show up as a central issue. It can be found in all other stellar, planetary and natural processes, from the growth of a flower to the wanderings of a river. Why not DNA? At another level, if the body recognized itself in sound, might this mean something in terms of health, or at the very least, inspire the imagination to understand ourselves in vibratory relationship to our environment?

Microtonal World

A first hearing of these 60 pitches from infrared spectra was discouraging. The scales and clusters created sounded so alien one despaired of ever creating a beautiful work of art, or even making any coherent "sense" out of them. An overall description might be "tight relationships ... densely packed microtones, with curious leaps."

The four individual nucleotide bases are very similar in terms of ratio relationships, or the distances between the separate "pitches" in each base. If they are configured like a musical scale, arranged from lowest frequency to highest, there is about a 2 1/2 octave span for all four with a noticable gap, or distance, of a Major 6th/minor 7th in all bases. Intervals on the keyboard are named Major and minor seconds, thirds, sixths and sevenths, depending on how many steps they are from the beginning note, or tonic. A Major 6th in the scale of C would be C to the sixth note, or A, above, and a minor 7th would be C to B flat above. In addition to major and minor intervals, we also recognize the Perfect fourth (C to F), the Perfect fifth (C to G) and the tritone (C to F#), the interval which cuts the scale perfectly in half.

The smaller, microtonal intervals, or ratios, tend to rub against each other when heard, creating beats. Beats occur when two frequencies are extremely close together--within a few hertz of each other such as 254 and 257 Hz (two very slightly different middle Cs). The frequencies will be heard as the same pitch, C, but slightly out-of-phase. The phasing results

in occasional louder moments, or "wa-wa" beats, when they phase together. To the ear this bears a striking resemblance to the quality of "aliveness" or organic movement found in living processes.

As these microtones were played over and over on the synthesizer, some arrestingly beautiful combinations began to appear. The question remained, however, what to do with them?

Compositional Considerations

Microtones present formidable complications for composers, not to mention performers. First, it is virtually impossible to play them on a normal keyboard. Microtonal scales can be mastered, with practice, by those performing on stringed instruments such as cellos and violins, who can play any pitch on their string once they have found it. However, microtones are often too difficult for many "fixed pitched" instruments such as clarinets and trumpets. The voice has the easiest time matching microtones. If a singer's ear can hear it, s/he can produce it. And percussionists, of course, need not worry about them at all.

In addition to difficulty of tone production, microtones play havoc with the idea of "key," or tonality. What one is working with is a clump of "random" sounds with seemingly no tone order or organization. Soon, however, something very interesting began to happen. After weeks of experimenting with different sound combinations on the synthesizer, a tonal center began to emerge. One pitch seemed to draw other pitches to it, lending coherency to the mass. This pitch turned out to be a kind of a C#, common to all the bases, which produced an average hertz of 544.2.

Most pianos are tuned to around 554 for C#. An acute ear would be able to discriminate between 554 and 544--an approximate 1/4 tone. It is important to emphasize that this discovery was cemented musically in the compositions first by ear, not by the data. Interestingly, this particular C# seems to act as a balancer for the entire spectrum of DNA base frequencies.

The pitch which shows up the most frequently and ought to have asserted itself as a tonic, or tonal center, is F#. It is found no less than three times in each base collection. But instead, it is its fifth, the C#, which acts as the organizing force. The first composition, *Sequencia*, was written for tabla, or tuned drum, with the drum tuned to C#. The drum keeps a steady rhythm throughout the ensemble sections. While the synthesizer plays an ostinato, or repeating pattern, with the original sounds of the frequencies, the added instruments--violin, cello, and voice--revolve harmonically around this central stabilizing force and match the tunings with their melodic shapings.

It is fascinating to observe that most of the gongs, bells and drums of the non-Western world are tuned to this keynote--lending support to the idea that that perhaps we as a species and planet may be trying to "tune into" something collectively. One theory involves a recently discovered pulsar called Vela X (PSR 0833) which collapsed into its pulsar state about 11,000 years ago. It is beaming radio waves towards earth with a period frequency of 11.24

Hz, or an F# equivalent. Its fifth, or C#, turns out to be a hertz frequency of 16.86 or 539.52.....exceedingly close to our DNA's 544 Hz.

Are the Frequencies in DNA Bases Harmonically Ordered?

They most certainly are. By comparing all 60 pitches, one can find all of the precise ratios found in the first 16 harmonics of the overtone series: octaves, P5ths, P4ths, Major and minor thirds, Major and minor 2nds and 7ths, even a "flat" seventh. Mathematically, the odds of this happening randomly are almost nonexistent. The author has not taken the time to measure the higher harmonics, but Randy Masters of Aptos, California, is refining this step of the process. He is trying to discover a fundamental that could possibly be generating all of the DNA frequencies as overtones. This finding would be invaluable to all those involved in sound and the healing arts as well as scientists and artists.

It is not known what information is encoded in these DNA base ratios, but one particular pattern appears striking. Research revealed a curious leap in all four bases from the pitch F# up to the D# above, roughly a Major 6th/minor 7th. The interval between, G to D, contains no measurable frequencies at all. Its mirror, the G to D an octave below, contains a tightly packed cluster of 22 frequencies, over a third of the total frequencies measured.

What is the function of this "shadow" gap? Is it just a coincidence, or are we looking into some kind of anti-matter, a fourth-dimensional phenomenon? More and more, we are finding that things contain their complements, their opposites. It is almost a "law" of the universe. The aforementioned gap could be important, especially because it is balanced on its lower and upper edges by D#-F# intervals: 9 pitches in the lower cluster and 10 pitches in the upper cluster. Almost perfect symmetry.

Possible Physiological Manifestations through the DNA Code

Math makes processes visible. It decodes meanings. We can see the self-organizing power of the universe, and because the universe is a community, it is constantly communicating. Are the sounds of DNA communicating anything to us?

Sequencia begins to communicate that we can hear the hidden beauty of life. This helps give us a perspective and find our place in the "Great Tone." This comes directly out of the ancient Greek definition of education: the purpose of studying science and the natural world is to find our proper place in it, allowing us to fulfill our role in the larger pattern. In such truly "student-centered learning," the natural world is the primary educator. Art processes which translate directly from nature allow us deeper access to levels of being.

Another way *Sequencia* communicates is simply because it is music. This is more than a casual statement. We are attracted, often like moths to a flame, to music. Music, or organized sound, is a nearly perfect metaphor for life. It is born, goes through a process of evolution and transformation, perhaps repeats itself or creates new avenues of life, and dies. (If you really listen, after it is over you can still hear the music). The components of music express a yearning for balance. Energy is gathered for forward motion, then released.

Pulses, small ones for frequencies, larger ones for rhythms, and still larger ones for phrasing, all act in concert. Relationships are constantly forming and re-forming as new tones, rhythms and events enter the picture and others recede.

Music is the active way we live our lives; the way we like our lives to be. It is the very life process itself. If the music doesn't flow we are deeply disturbed. How long can you tolerate a stuck recording? Bringing physics into the picture adds to this metaphor. Music literally mirrors the essence of nature in its chaos patterns and mathematics.

The same mathematical formulae that characterize the ebb and flow of music have been discovered to exist widely in nature: the flow of a river, the beating of a human heart, the wobbling of the earth's axis. This is more than just simple pulse. The rhythms closely resemble irregular patterns of coastlines, clouds, mountain ranges. On some level, the brain must perceive its reality as a musical landscape. And turning this around, the music we hear must feel like our earthly home. No wonder we love it.

It is likely that something unusual is being communicated directly through the combinations and ratios of spectral music. The descriptive adjectives one hears most often are: soothing, comfortable, spacious, expansive. *Sequencia* is not "new age" or demonstration music, nor was it composed it to "heal" anyone. It was written because that is what a composer does in the world: write music. But after ten years of hearing unique reactions and virtually no complaints from those who hear these strange tunings for the first time, one cannot help but wonder what is transpiring.

Some listeners admit that they never (or hardly ever) listen to music because it is too "invasive." Many of these individuals, however, love, even crave, these DNA sounds. About one in every four or five persons has a deep, almost devotional response. Movement teachers love it, saying their students respond deeply. Would people react in the same way to compositions employing 60 random, microtonal combinations? Certainly, there are endless styles of tonal arrangement. But these particular DNA ratios, originating in light, are profoundly arresting to the ear. This first wakes up the nervous system, putting it on the ready. What follows in sound is then allowed to enter our psyches on a deep level. People report feelings of connectedness, familiarity. It is tempting to speculate that the body is recognizing itself, and is communicating this to the psyche.

The Impact of Sound on the Body

It is still a matter of debate how sound, the raw stuff of creation, impacts our being and consciousness. Mysteriously, we decode meanings which come to us through sonic carrier waves, perceiving these waves as a full-body experience not only through the ears but directly through the bones, tissues, and organs. The body feels sound as pressure. We know that the body is constantly piezoelectric, translating pressure into electrical signals, similar to the way in which the inner ear sends signals to the brain. Sound, therefore, impacts many realms of the molecular world directly and somehow finds its way to the parts of us that create meanings.

We know for sure from the work of many medical institutions that sound can affect hormonal levels and other physiological systems. Dr. Valerie Hunt (*Infinite Mind: The Science of the Human Vibrations of Consciousness*) has done extensive work measuring the strengthening effects of sound on the auric field, the energy field surrounding the body. Dr. Hunt did most of her research while a professor at UCLA. A sophisticated knowledge of resonance has led many practioners and researchers throughout the world to use sound in a variety of successful ways. Sound can be directly introduced to the body from the practioner's voice, the client's voice, or by machine. These methods can create coherence, allowing the patient's natural healing ability to take over.

Communication on all levels, physiological and emotional, often becomes clearer, brighter and healthier thanks to sound. Nature loves resonant states where little energy is wasted. There is every reason to believe that our psyches and physiologies can recognize the infrared (light) patterns of life through sound. What we do with this information is up to us.

Conclusions

The story that presents itself when working with the spectral tones of DNA is one of underlying beauty and order. The fact that perfect harmonic ratios exist in DNA's frequency data could, and should, lead to further stories of interconnectedness with the rest of life and the universe, since so much of our world is ordered. We express creatively through harmonic proportions and their variations in music, architecture, paintings, dance--in virtually all that we are and do.

The freedom to express and improvise has been our salvation as a species for thousands of years. Our music has always reflected a love of two things: order and spontaneity. DNA, the chemistry of life, seems naturally at home in a musical venue. In our inner beings and in our listening there has always been a deep yearning, a knowingness that music is who we are. The mystic Sufi poet Rumi said it best: "All day and night, music. A quiet, bright reedsong. If it fades, we fade."

Coda: Future Projects

Composition continues into the exploration of the genesis of musical forms from the physical properties of matter. The author has created, with filmmaker Diana Hobson, sound designs for two films, *Into Being* and *The River*, as well as *Zero Waiting*, an artistic representation of the Zero Point Energy Field. Both films use tuning banks from the frequencies of pulsars, the magnetic spins of atomic nuclei (Larmor Frequencies), and other natural phenomena. David Deamer generously continues to advise and further this research.

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Coming in our October issue ... "From Helix to Hologram: An Ode on the Human Genome" & so much more!



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