

DNA Consciousness

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Abstract

There are many different theories about what consciousness *is* and if there are different types of consciousness other than human consciousness; e.g. animal consciousness and atomistic consciousness. Neurological consciousness is what is possessed by humans and is a function of the vertebrate brain and has evolved over time. DNA consciousness is a special form of molecular consciousness that gave rise to neurological consciousness. DNA consciousness and neurological consciousness can not exist without quantum physics (or quantum consciousness) and these quantum forces are most likely the derivative of all forms of consciousness. In the future, with the advent of genetic engineering, mankind will be able to alter his genome and may be able to induce the evolution of neurological consciousness into a newer form of consciousness.

Introduction

DNA Consciousness is the theory that the DNA molecule possesses a form of consciousness of its own (Grandy 2006c, Grandy 2006d). This form of consciousness is distinct and different from human (or neurological) consciousness. Neurologic consciousness is a function of the brain and central nervous system, and is therefore different than DNA consciousness. The DNA

molecule does not *see, hear, talk, or think* as human consciousness does. It also does not have *emotions or feelings* like we do because it does not have a central nervous system or a brain to provide these functions. The type of consciousness that the DNA molecule would experience is dictated mostly by quantum physics. Consequently, humankind would not be able to comprehend what DNA consciousness would be like. However, because humankind can not comprehend what DNA consciousness would be like does not mean that it does not exist. DNA consciousness is yet another phenomenon in the quantum realm that human consciousness struggles to come to terms with.

The concept of DNA consciousness was first proposed by this author in 2004. The phrase was first published in *The Encyclopedia of Anthropology* in 2006 (Grandy 2006c, Grandy 2006d). However, in those articles several issues were not addressed that will be addressed in this article on DNA consciousness. In this article I will discuss the following topics:

- I. Early speculations and theories of consciousness.
- II. Provide an overview of what is known about different *forms* of consciousness.
- III. An overview of neurological consciousness.
- IV. An explanation of DNA consciousness and how it is special in regards to other forms of molecular consciousness.
- V. The proposal that it is DNA consciousness that gives rise to neurological consciousness.
- VI. An explanation of how quantum physics plays a role in DNA consciousness and neurological consciousness.
- VII. Speculate on the future of DNA consciousness and neurological consciousness with the advent of genetic engineering.

Early Speculations on Consciousness: The Ancient Greeks

The ancient Greeks, like Plato and Aristotle, speculated on what was called the idea of *mind*, because they had no word equivalent for the word *consciousness* (Grandy 2009a). They maintained that the mind was something in the head (even though Aristotle thought that the brain was used to cool off the body's blood supply, like a radiator) and that physical objects outside the mind existed as impressions in reality. Plato believed that these impressions existed as geometric forms that came from the soul.

Aristotle, maintained most of Plato's beliefs of the idea of mind, but Aristotle was one of the first philosophers to integrate the notion of perception (sight and sound) into this idea of mind. This notion of perception and *awareness* would be the foundations of how human (or more appropriately called neurological) consciousness would be defined for several centuries.

The ancient Greek philosophers were obviously limited in the exploration of consciousness because they did not have the technology or the developments in neurology that exist today. This idea of mind incorporated with the notion of an immaterial soul would profoundly affect thinkers, such as Descartes, for centuries to come. This influence would dissipate drastically with developments and breakthroughs in the biological and physical sciences all throughout the nineteenth century.

Early Theories of Consciousness

It was once believed, for centuries (actually some still maintain this belief), that there was an immaterial and material component to human consciousness, known as *dualism*. Dualism was

made famous by Rene Descartes. However, dualism was in some ways just an extension of the Greeks' idea of mind because they both maintained a material and immaterial component to consciousness. This belief in dualism prevailed for centuries because scientific knowledge and the technology to explore and understand the vertebrate brain did not exist. In addition, the indoctrinating influence of Christian mythology had much to do with the survival of dualism (this is explained in more detail in the section on *the anthropistic theory of consciousness*).

Although Descartes believed in dualism he also tried to place some emphasis on neuroanatomy in respect to consciousness, even though his emphasis was incorrect. He believed that the pineal gland (*glandula pinealis*) was the “seat of the soul” mostly because of its position being centrally located in the brain. He also incorrectly proposed that the pineal gland was responsible for uniting immaterial consciousness with the material body. Of course this would be disproved in time, in fact the pineal gland is now known to have no connections with the autonomic nervous system and some believe this to a vestigial gland in humans. However, some studies support that it is involved in minor productions of melatonin (Beaumont, Kenealy, and Rogers 1996). Current data suggest that brain regions vital to neurological consciousness are; *intralaminar nuclei* in the thalamus, thalamocortical (and corticothalamic) connections, and the *midbrain reticular formation*. If ablation or damage occurs at any of these three regions neurological consciousness does not occur (Grandy 2006c, Edelman 2005).

Most modern thinkers in the area of neurological consciousness now consider dualism dead and maintain that neurological consciousness is purely a function of the brain. A *reductionist* is one who believes that neurological consciousness is purely a function of the brain. This point of view on consciousness is held by influential thinkers such as Gerald Edelman and Francis Crick.

In 1900, Ernst Haeckel enumerated six theories of consciousness in his book *The Riddle of the Universe*. They are:

- I. *The anthropistic theory of consciousness*- is the theory that only humans possess consciousness. This belief was made popular when dualism was *en vogue*. As previously mentioned, dualism, denotes that there is a material and non-material component to human consciousness, which Descartes incorrectly supposed was connected by the pineal gland. This was readily accepted because it is believed in Christian mythology that only humans have a soul, which is immaterial. Therefore only humans, who are believed to be a special creation with a special place in the universe, have an immaterial soul and consciousness (which has an immaterial component).
- II. *Neurological theory of consciousness*- is the theory that all “higher” animals with a nervous system possess consciousness. Therefore various degrees of neurological consciousness would exist because there are various degrees of neurological systems. This is sometimes called the Darwinian Theory of consciousness because this form of consciousness has evolved over time. Haeckel firmly believed that the consciousness of higher animals (such as apes and dogs) were so similar to humans in their faculty of presentation and sensation that “no further proof was needed to support this theory”. He also believed that they differed only in degree, not in kind, in terms of their consciousness. There is some debate in the neurological theory of consciousness as to where the cut off is between vertebrates and invertebrates because invertebrates are not considered “higher animals”. Vertebrates possess a notochord (spine) and cephalization (a distinguishable head) which give them a more centralized nervous system. However, the major neurotransmitters used in the human nervous system and brain have been well conserved in all vertebrates over time (Turlejski 1996). In fact, these same neurotransmitters predate the appearance of vertebrates and are present in all of the invertebrates. These neurotransmitters are also a form of chemical consciousness that I propose give rise (in collaboration with the DNA molecule) to neurological forms of consciousness.
- III. *Animal theory of consciousness*- is the theory that all animals (vertebrates and invertebrates) possess a form of consciousness that varies in degree from animal to

animal. Gerald Edelman defined this type of consciousness as primary consciousness (Edelman 1993), which is more of a fundamental consciousness. Carolus Linne proposed in his *Systema Naturae* that the animal and plant kingdom were divided by the fact that animals have sensation and consciousness, and the plants are devoid of them. I would argue strongly that animal consciousness is merely a degree of neurological consciousness because all animals possess a nervous system. However, because all of those nervous systems are different, and neurological consciousness is a function of the nervous system, then those forms of neurological consciousness would have to be different in degree but not in kind. Therefore, according to the animal theory of consciousness, this would exclude plants from possessing a form of consciousness because they do not possess a nervous system.

- IV. *Biological theory of consciousness*- is the theory that all biological life forms (as distinguished from inorganic substances) possess consciousness, including insects and plants. Obviously there is no nervous system in plants. Therefore, this would be the cut off from neurological consciousness. I would argue that the form of consciousness past the *neurological cutoff* is more of a chemical consciousness because that is how they (plants) are consciously interacting with energy and their environment. In fact, a plant's chemical form of consciousness predates neurological consciousness. Of course plants and animals do have DNA, so there is now a divergence in evolution where DNA developed neurological consciousness in one kingdom (animals) and continued with forms of chemical (or atomistic) consciousness in other kingdoms (plants).
- V. *Cellular theory of consciousness*- is the theory that consciousness is found at the level of the cell. In nature and in the human body (especially with the immune system) cells can be seen to interact with their environment and with each other in a manner that implies a cellular form of consciousness. However, due to cell size and proximity to the DNA molecule, I would argue that cellular consciousness is merely a larger scale (or larger degree) of DNA consciousness. I say this because within the cell is the DNA (in the nucleus in Eukaryotes and spread out diffusely in the entire cell in Prokaryotes) which is responsible for the vast majority of products made in the cell. Any chemical signal taken into the cell follows a cascade of chemical signals which ultimately sends epigenetic

factors to the DNA. The DNA molecule responds accordingly by producing a chemical blue print (mRNA) to manufacture the appropriate product (Grandy 2006d, Grandy 2010). Haeckel originally supported the cellular theory of consciousness in his *General Morphology* (1866) and in his paper “Cell-Souls and Soul-Cells”, however later he abandoned this theory because he felt that none of the cells or unicellular organisms (in particular he studied *protista*) possesses a developed *self-consciousness*; rather their sensations and movements were of an unconscious character. My argument would be that the terms *unconscious* and *conscious* are definitions of neurological consciousness and should not be applied to entities without a nervous system or brain, such as *protists*.

- VI. *Atomistic theory of consciousness*- is the theory that every atom is conscious. Haeckel never supported this theory and maintained that every atom has psychic qualities of “sensation and will”, which he attributed to be “unconscious”. I disagree with that notion and further maintain that atomic consciousness is present but in ways that we cannot perceive. I will mention some basic quantum physics in this article to address this theory. Atoms do interact with energy in their environment and with each other in ways that contradict our laws of classical physics (or Newtonian physics). This makes it impossible for humans with neurological consciousness to comprehend what atomistic consciousness would be like. The combination of atoms gives rise to chemicals and molecules. In this article I mention chemical consciousness and molecular consciousness, both of which are merely extensions of atomistic forms of consciousness. A great example of chemical/molecular consciousness is the actions of neurotransmitters and neuropeptides. These chemical signals are responsible for all neurological activity including consciousness in animals. DNA consciousness is a very special form of molecular consciousness. There is also the argument that the neutrons, electrons, and protons that make up atoms can be broken down in to subatomic particles; quarks, leptons, baryons, and gluons (Walker 2000). These subatomic particles would exert a form of consciousness as well called *quantum consciousness*. In the future scientist may be able to further breakdown these particles which could possibly unlock the mysteries of all forms of consciousness.

So far I have discussed many theories of consciousness from many different thinkers. I must briefly mention in this discussion the importance of Sigmund Freud and his impact on human consciousness. Freud was the father of psychoanalytical psychology (Grandy 2006f). He was one of the first observers to subject the human *mind* (not just the brain) to scientific observation (Grandy 2009a).

Prior to Freud's work, human beings were (and still are by some) considered divine creations and were not to be analyzed scientifically. During his time Freud's ideas were strange to some and today some of his theories have been replaced by more modern psychological theories. However, his importance should be noted because he was one of the first to observe the human mind and subject it to scientific inquiry and transcended the debate between material and immaterial consciousness. This would later allow humankind to explore human consciousness psychoanalytically and pave the way for *introspectionism*, which attempts to explain consciousness in the terms of a first-person account.

What is Consciousness?

The question always arises; *what is consciousness?* Definitions in text books and dictionaries give fairly vague descriptions of what consciousness is but typically define consciousness as *awareness*. I am proposing that consciousness *is* the interaction of a *thing* (be it an organism, DNA, or an atom) with the external environment and more specifically the interaction of energy with other forms of energy. With this definition we can apply conscious activity to subatomic particles, macromolecules, and neurological systems. In fact, I further propose that neurological consciousness can not exist without other forms of atomic, chemical, and molecular consciousness.

Perhaps one of the major problems that humankind has faced in comprehending consciousness is that humankind has made consciousness a very convoluted issue (which it is) and historically has focused on mostly human consciousness as the only form of consciousness (which again is the anthropistic view of consciousness). Consequently, humankind typically views consciousness as an *awareness* that is based on our neurological correlates. My argument is that this *awareness* is specific to neurological consciousness which is different from other forms of atomic, chemical, and molecular consciousness.

As discussed earlier there are different forms of consciousness and those forms can differ in degree. The type of consciousness that humankind is most familiar with is human consciousness, which is a form (or degree) of neurological consciousness. This form of consciousness has evolved by the centralization of the nervous system over time. Neurological consciousness incorporates the perception of the sense organs (which detect small portions of the electromagnetic spectrum), in some cases electro-chemical memory (Grandy 2009e), and motor activity which are all transmitted by neurons. All three of these neurological activities are products of quantum systems, which act at the level of atomic particles. Therefore when neurological consciousness is discussed, atomistic and quantum consciousness is implicit. Another way of stating this is that in order for neurological consciousness to occur there must be atomistic (chemical and molecular/DNA) and quantum consciousness present.

During the course of vertebrate brain evolution more complex structures evolved which gave rise to more complex behaviors and more complex forms of neurological consciousness (Grandy 2006c). The development of sensory organs (eyes, tympanic membranes, and olfaction) that allow the perception of more of the electromagnetic spectrum allowed more interaction with the environment and more forms of energy. However, I must reiterate that these sensory organs perceive matter and chemical sensations that operate at the level of quantum physics. Therefore, because humankind perceives only a small portion of the electromagnetic spectrum, our *neurologic reality* is based on our limited observation of the *real* picture.

While discussing what consciousness *is*, let us swing to the opposite side of the pendulum and look at atomistic consciousness. As mentioned before, this form of consciousness is completely ensconced in quantum mechanics. Atoms (and all matter) are influenced by quantum entanglement. The theory of *quantum entanglement* (or interconnection) is a proposed property of a quantum system involving two or more objects, in where those objects can no longer be adequately described individually with out mention of the other counter part(s) even though those objects are spatially separated (Rosenblum and Kuttner 2006). This means that one atom or particle can affect another atom or particle, which can be separated by a large distance, even though no physical connection is present. These forces of quantum entanglement function independent of time. Additionally, quantum entanglement has given rise to the notion that all things in the universe are connected or *interconnectiveness*. This notion (as well as many others in quantum physics) conflict the laws of our neurologically observed reality; especially the lack of time dependence, because neurological consciousness evolved to be time dependent. This is the main reason that neurological consciousness does not possess the ability to truly comprehend atomistic (or DNA) consciousness.

As mentioned before, atoms interact with each other and can form larger chemical compounds. Those chemical compounds can become more complex, forming molecules and large proteins. The DNA molecule is a fairly large macromolecule, which can vary in size and also code for protein production. DNA (and RNA) can produce proteins and other chemicals to form cells. These cells can remain independent and move around or they can specialize (forming groups or layers) and make tissues that can become organs. Some cells specialize into neurons, which can make up something simple like a ganglion in an insect or something more complex like a brain and the nervous system in a vertebrate. From this point of view there has been an evolution of consciousness. This evolutionary view can be used to account for the emergence of neurological consciousness from DNA consciousness.

What is being demonstrated by my definition of consciousness is that during this evolution of consciousness there is a progressive accumulation of energy and matter that starts out as small as an atom and translates into something more complicated; like an organism. This energy and matter interacts with other forms of energy and matter in the environment and constitutes different forms of consciousness. These different forms of consciousness can give rise (from chemical and molecular consciousness) to neurological consciousness; however this does not imply a divine purpose or teleology. In addition, this progressive evolution implies that consciousness can continue to evolve.

This progressive accumulation of energy and matter is analogous to Fredrick Nietzsche's philosophy of the *will to power*, in where he proposed that power-quanta go on to form power-constellations (Sorgner 2007). According to Nietzsche, this accumulation of quanta is driven by a will to accumulate more power. The DNA molecule can be seen as a power-constellation which strives to survive, evolve, and accumulate power. This idea can be conceptualized as *DNA consciousness and the will to power*.

Understanding Neurological Consciousness

Neurological consciousness is purely a function of the nervous system and the brain, this is reductionism. Therefore, there are no immaterial or spooky forces involved (this is not to be confused with Einstein's *spook forces* in quantum physics). The realm of neurological consciousness would include vertebrates (and possibly invertebrates) with this physiologic feature.

Let us not forget however that neurological consciousness was not always believed to be purely a function of the brain. A major hurdle preventing humankind from understanding neurological

consciousness as purely a function of the brain was the belief that the brain did not evolve; rather it was designed (known as *creationism*). This major hurdle was obliterated by Darwin's theory of evolution (or more correctly known as the *fact* of evolution as a natural process), and reinforced much later with the discovery of the DNA molecule by Watson and Crick. However, it must also be noted that the fact of evolution is still not accepted by some despite an overwhelming amount of evidence. Despite this irrational resistance, the evolution of the vertebrate brain is a well studied area in the biological sciences (Striedter 2005). Within this framework we can visualize that the brain did evolve as the DNA molecule evolved. Consequently consciousness also evolved from simpler forms into more complex forms. Edelman vehemently upholds that the brain evolved and was not designed (Edelman 2005) and that understanding this axiom provides the ability to better understand human consciousness.

The brain of our primitive ancestors was similar but different than the brain of modern humans (Grandy 2006c). Therefore, their form of consciousness would have differed only in degree and not in the type because it was still neurological consciousness. This would imply that because humankind can continue to evolve that our consciousness can in turn continue to evolve.

Any changes in neurological consciousness would be directly tied to changes in the DNA molecule. In fact, any change in physiology is related to changes in the DNA molecule. The differences in the DNA molecule are reflected by the physiological differences in the organism. The DNA molecule is so complex that it is different in every human being (except identical twins). A good way to study this is the field of Biometrics (Grandy 2006b). Biometrics uses the differences in fingerprints, retinas, and voices to identify individuals. These subtle physical differences are based on the fact that every individual's DNA is slightly different and expresses physiologic features based on those differences which can be measured with biometrics.

Consequently, because changes in DNA can cause changes in physiology and physiological processes, these changes (if large enough) can also cause changes in neurological consciousness. In this way DNA consciousness is entangled with neurological consciousness because the DNA molecule provides the chemical instructions that puts the brain together, which gives rise to neurological consciousness. This is how neurological consciousness evolved and this is how neurological consciousness will continue to evolve; by changes in the DNA molecule.

Gerald Edelman proposed that consciousness is a neurological process that evolved (Edelman 2005) and he also proposed that there is primary and higher order consciousness (Edelman 1993). According to Edelman, *primary consciousness* is more instinctual and it is the form of consciousness possessed by animals; whereas *higher order consciousness* is being conscious of being conscious, and a state of consciousness in where one has a remembered past, an awareness of self in the present, and the ability to speculate a future. He proposed that humans have both primary consciousness and higher order consciousness; and that they interact with each other to provide a model for human consciousness.

Although I agree with (and am influenced by) much of Edelman's ideas, I do not believe that the cut off is that drastic between primary and higher order consciousness. If you view this in terms of vertebrate brain evolution, the forms of higher order consciousness arise with more complex brain structures, and those are derived from the primary forms of consciousness. What I am stating is that there are different forms of neurological consciousness which range from simple to complex, and those complexities are based on more sophisticated functions of the brain. This increase in complexity is based on changes in the DNA molecule that has evolved over time. Therefore changes in DNA consciousness reflect changes in neurological consciousness.

The evolution of the vertebrate brain has been a long gradual process therefore the cut off between having higher order consciousness and having only primary consciousness can not be

that drastic. I maintain this mostly because there is too much gray area. For example, ape cognition studies show that apes display behaviors that are amazingly identical to some (but not all) aspects of higher order consciousness (Jensvold and Sheeran 2006). However, there are some obvious differences between human consciousness and ape consciousness which are merely different degrees (or forms) of neurological consciousness. These neurological differences are marked by differences in neurophysiology which are differences in what is expressed by each species' DNA.

Thus far I have mentioned brain function being responsible for neurological consciousness. At this point I will be a little more specific in terms of anatomy. Neurologically, the ability to remember is based on *hippocampus* functioning, the awareness of self is a function of *sub-cortical structures*, and the ability to plan ahead is a function of the *pre-frontal cortex*. Primary consciousness and higher order consciousness are degrees of neurological consciousness that are based on differences in those three brain regions. Some vertebrates do not have a well developed prefrontal cortex or hippocampus. This would prevent them from developing higher order consciousness.

So once again, differences in brain morphology and function are based on differences in what is expressed (or not expressed) by the DNA molecule. In addition, those neurological processes that are involved in neurological consciousness are run by neurotransmitters, neuropeptides (both of which are forms of chemical and molecular consciousness), and electro-chemical impulses (which is a form of quantum consciousness). Based on this neurological consciousness can not occur without molecular, chemical, atomistic and quantum consciousness.

In summary, any change in morphology or physiology is directly related to changes in the genetic constitution of an organism; that is the DNA molecule. Therefore it is reasonable to propose that DNA consciousness underlies neurological consciousness because changes in the

DNA molecule can result in changes in brain function, which can lead to changes in neurological consciousness. It will be discussed in the next section that the *hox* and *pax* genes are involved in the embryological formation of the brain. It is during this process where it becomes lucidly clear that DNA consciousness gives rise to neurological consciousness.

The DNA Molecule and DNA Consciousness

DNA consciousness is a form of molecular consciousness, which in essence is a conglomeration of atomistic consciousness. The concept of DNA consciousness is unique because it appears to be the link between atomistic consciousness and neurological consciousness; and also it is responsible for giving rise to neurological consciousness. Therefore consciousness as a process can be viewed as evolutionary: from atom to DNA molecule, then from DNA molecule to cell, and from cells to the evolution of neurons. But what is so special about the DNA molecule in comparison to other molecules that allows it to give rise to neurological consciousness?

DNA consciousness is special in regards to other forms of molecular consciousness for many reasons:

- I. The DNA molecule self replicates (Grandy 2006d); it can do this with out any apparent external influence. It is able to make an identical copy of its self and then divide; a process call *mitosis* (Grandy 2010), giving rise to two identical entities (minus any mutations or mistakes). This process can take place several million times. However, when DNA stops replicating in an organism or cell, death occurs. In fact, death is ultimately defined as the point at which DNA stops replicating (Grandy 2009c). Very few molecules can self replicate. The RNA molecule can replicate itself and in all likelihood was a precursor to the DNA molecule (Grandy 2006h), but it can not self replicate to the magnitude that the DNA molecule does. RNA viruses are a good example of this ability to self replicate in a manner that implies consciousness. Using

nanotechnology (the study of controlling matter on an atomic and molecular scale), scientist are able to construct self-replicating molecules under laboratory conditions. These self replicating molecules have also been observed to evolve on their own (Lincon and Joyce 2009).

- II. The DNA molecule responds to external stimuli, which are in form of epigenetic chemical and molecular pathways, and in response to these chemical signals it prints chemical instructions (mRNA) to produce molecular products (mostly proteins). During this process, the DNA molecule selectively unpacks and then unzips portions of it's self (Grandy 2006d and Grandy 2010). This is a very direct and high degree of molecular consciousness that no other molecule is capable of doing (as far as we know).
- III. The DNA molecule stores information by using a genetic code, which is made of nucleotide bases (Grandy 2010). This is a chemical record or chemical memory that can be accurately reproduced time and time again (and passed on to future generations when it replicates it's self). This chemical memory is different from neurological memory, which is stored electro-chemically in the hippocampus through a process called *long-term potentiation* (Grandy 2009e). The analogy between chemical memory and neurological memory is similar to the contrast between chemical consciousness and neurological consciousness because they are processes that exist, but are preformed differently; i.e. one is preformed chemically and the other cellular.
- IV. The DNA in eukaryotic cells can split in half and recombine with another strand of DNA. A great example of this is sperm and ova cells. These two cells are produced by a process called *meosis* (Grandy 2010) and they both posses a half of stand of the original DNA, which remains thermodynamically stable for a long enough amount of time to allow fertilization (that is the union of the sperm and the ovum DNA). During fertilization the DNA in the ovum and sperm combine their DNA to form a new DNA molecule. The amazing thing about this is that approximately 30 hours after fertilization the original cell (which resulted from fertilization) has already made a copy of it's self, including another exact copy of the DNA molecule which in humans contains over 30,000 genes (Grandy 2006g). If you think about the fact that it took scientists; with the help of computers, which is a field known as *Bioinformatics* (Grandy 2006a), nearly

seven years to just sequence the human genome project, but the DNA molecule can make an exact copy of that same complex molecule (i.e. it's self) in only 30 hours, that is truly amazing!

- V. The DNA molecule has the ability to mutate and change. This process is known as *mutation* (Grandy 2006d). Because the DNA molecule is composed of only four nucleotides (adenosine, thymine, cytosine, and guanine) a mutation (e.g. a substitution or deletion) to any one of them in the molecule will have one of three possible effects; a beneficial change, a harmful change, or no effect at all. It is through this process that the DNA molecule presents another special ability, the ability to evolve.
- VI. The DNA molecule itself, has evolved over time (Grandy 2009b). It is able to evolve because it (as already mentioned) has the ability to mutate. Recently researchers have discovered that an artificial self-replicating RNA molecule (called R3C), under laboratory conditions, evolved the ability to replicate faster (Lincon and Joyce 2009). Therefore the ability of the DNA molecule to evolve gives all DNA-based (and RNA-based) organisms the ability to evolve.
- VII. There are families of genes; known as the *Hox* and *Pax* genes, that are responsible for embryological body patterning and brain development. These genes are found in other animals (for example mice) but no comprehensive comparative studies for all vertebrates exist. However, if any damage is done to those genes the brain and thus neurological consciousness does not develop. It is in these genes where DNA consciousness gives rise to neurological consciousness.
- VIII. DNA is the only molecule to give rise to a species that evolved and developed the technology to discover it's self (DNA) scientifically; as far as we know. We could call the DNA molecule *the molecule that discovered it's self*. Of course the DNA molecule discovered itself through the works of many important organisms such as Fredrick Griffith, Oswald Avery, Rosalind Franklin, Maurice Wilkins, James Watson, and Francis Crick (Grandy 2009b)

Now that I have established why the DNA molecule is special compared to other molecules and that the *Hox* and *Pax* genes are what give rise to neurological consciousness in some vertebrates (perhaps all), I will now briefly discuss how quantum physics (or quantum consciousness) plays a role in DNA consciousness and neurological consciousness.

Quantum Physics and DNA Consciousness

Presently the topic of quantum physics is being addressed when discussions about consciousness arise. Why is this? What does quantum physics have to do with consciousness? Once again, the DNA molecule is composed of atoms, and these atoms follow the laws of quantum physics (as opposed to macroscopic objects which follow classical or Newtonian physics). I will need to briefly simplify the structure of the DNA molecule (for more details please consult the references): it is a double helix that is composed of ladder-like rungs which are nucleotides connecting to each other that are supported (and connected to) a phosphate sugar backbone (Grandy 2006d, Grandy 2009b, Grandy 2010). These ladder-like rungs are connected by hydrogen bonds between the paired nucleotides. Those hydrogen bond connections are solely quantum physical interactions, which are based on particles with spin. That means that the DNA molecule is *held together* by quantum forces. Therefore quantum consciousness, in this respect, underlies DNA consciousness. In addition, DNA consciousness could not exist without quantum consciousness. It can now be seen clearly that DNA consciousness is the link between atomistic (and quantum) consciousness and neurological consciousness. This is because atomistic (and quantum) consciousness gives rise to DNA consciousness (a special form of molecular consciousness) which then gives rise to neurological consciousness.

The DNA molecule also gives rise to sensory organs; eyes, ears, olfactory, and gustatory, just to name a few. These sensory organs interact with the quantum world. Here are a few examples:

- I. The Eyes- photons enter the eye and interact with the retina, which then send an electro-chemical signal via the *optic nerve* to the visual cortex in the brain. The brain then interprets this signal neurologically. This interaction started on the quantum scale (a particle of light), then translated to the chemical and molecular scale (in the retina), and ultimately to the neurological scale (through the optic nerve and visual cortex).
- II. The Ears- sound waves enter the auditory canal and cause the tympanic membrane to vibrate. These vibrations move three small bones (the malleus, incus, and stapes) and ultimately conduct a signal to cranial nerve VIII (the vestibulocochlear nerve), which sends an electro-chemical impulse to the auditory cortex and is interpreted by the brain. This interaction with sound waves occurs on a quantum scale and is translated (as with light in the eyes) to the neurological scale.
- III. The Nose- cranial nerve I is the *olfactory nerve*. This is a very primitive structure and is present in the simplest and most ancient vertebrates (Striedter 2005). This structure is unique because it interacts with molecules and sometimes atoms in the environment and transmits an electro-chemical signal to the brain which interprets these signals. Again, the interaction between the molecules and the olfactory nerve happen on a quantum scale.

Based on these three examples it can be seen that some neurological awareness is derived from electro-chemical impulses that are created by interactions with quantum phenomenon. As I mentioned earlier, this neurological perception is only a fraction of the *real* picture. This brings up the debate that what the vertebrate brain perceives is not in fact what reality *is*. However, it is extremely important for us to regard it as *real* for all intensive purposes otherwise we would not be able to survive in this reality.

I have briefly discussed how quantum physics is involved in DNA consciousness and also how it is involved in some forms neurological consciousness. The topic of quantum physics can be very complicated and confusing. This is because neurological consciousness evolved in the macroscopic world that is governed by the laws of classical physics, which is time dependent.

Quantum physics, on the other hand, is not dependent on time and involves the microscopic world. It is because of this factor that neurological consciousness struggles when attempting to comprehend quantum, atomistic, and DNA consciousness.

DNA Consciousness and the Future of Genetic Engineering

As humankind finds its self on the brink of emerging teleology (which is the idea that humankind will have control over its own evolution with genetic engineering) there is the opportunity to improve our genome with genetic engineering (Grandy 2010). This opportunity can provide humankind with enhancements in perception, memory, and motor function; thus evolving neurological consciousness. I have proposed that this process of genetic engineering could in turn give rise to *Homo sapiens genomicus* or “the man with the wisdom [technology] to alter his genome”. It is also conceivable that scientists could make genetic alterations to improve the human immune system to better tolerate the implantation of electronic devices or computer chips which could give rise to *Homo sapiens roboticus*. These are only two of several post-humanism possibilities.

Why a sub-species *Homo sapiens genomicus* or *Homo sapiens roboticus*? When genetic engineering on humans for non-therapeutic purposes begins there will be an intermediate experimental phase and not enough physiologic change will be made to justify a change in the species. However, I do believe that degree of change may eventually take place in time. It is also conceivable that in the future genetic enhancements can be made to make it possible for humans to survive in space or on other planets (Grandy 2009d) which will give rise to new sub-species or entirely new species that will adapt to these new environments.

Anthropologist H. James Birx proposed *Homo futurensis* or the “man of the future”. However, I do not believe that is applicable because there would have to be an intermediate phase *Homo sapiens genomicus* or *Homo sapiens roboticus* (or even something else) preceding that. In addition, the phrase *Homo futurensis* should be avoided for one very important reason; unless the *Homo* genus becomes extinct there will always be a “man of the future”. From a taxonomy point of view an extinct *Homo futurensis* would appear ludicrous in a museum or text book.

Much debate will arise with the future applications of genetic engineering. However, many strong arguments exist for the use of it. As already mentioned, the use of genetic engineering could improve neurological consciousness and also allow human beings to survive on other planets. Another argument is that humankind has recently failed to improve it’s genome by natural selection, known as *failure to improve the species* (Grandy 2009c). In these modern times more and more genetically inherited diseases are being propagated into the gene pool. Medicine and technology are now keeping sick individuals; that would have normally died off with natural selection, alive for longer periods of time. Because our species has failed to improve itself with natural selection there is now a very potent argument to improve it with genetic engineering. So what would be the difference between prolonging lives with medical intervention verse genetic intervention?

The idea of improving the species through selective breeding is known as *eugenics*. The idea of improving the species through education and improving the environment is known as *euthenics* (Grandy 2006e). Theoretically, the use of genetic engineering could fall into any of these two areas, depending at what point it would be applied (pre-genetically or post-genetically). I proposed a newer idea of combining eugenics and euthenics, called *proliferagenics* (Grandy 2010), in which case genetic engineering could be applied pre-genetically and/or post-genetically.

Conclusion

DNA consciousness has evolved over time from atoms. It then progressed to the level of the cell and then to the magnitude of the vertebrate brain. DNA consciousness has given rise to neurological consciousness, but both forms of consciousness are dependent on quantum phenomenon. Even though neurological consciousness does not perceive all the electromagnetic spectrum and it has consistent difficulties in understanding the realm of quantum consciousness, it still provides a very reliable model of consciousness. This model of consciousness has not only allowed the survival of many vertebrate species, but it also gave rise to a species that would discover the DNA molecule and in time manipulate that molecule on a molecular scale. In the near future humankind will have the opportunity to genetically engineer adaptations into his genome which could allow countless opportunities. Some of these opportunities could include improvements in neurological consciousness, improvements in medicine increasing human lifespan to hundreds or thousands of years, and the ability to survive on other planets.

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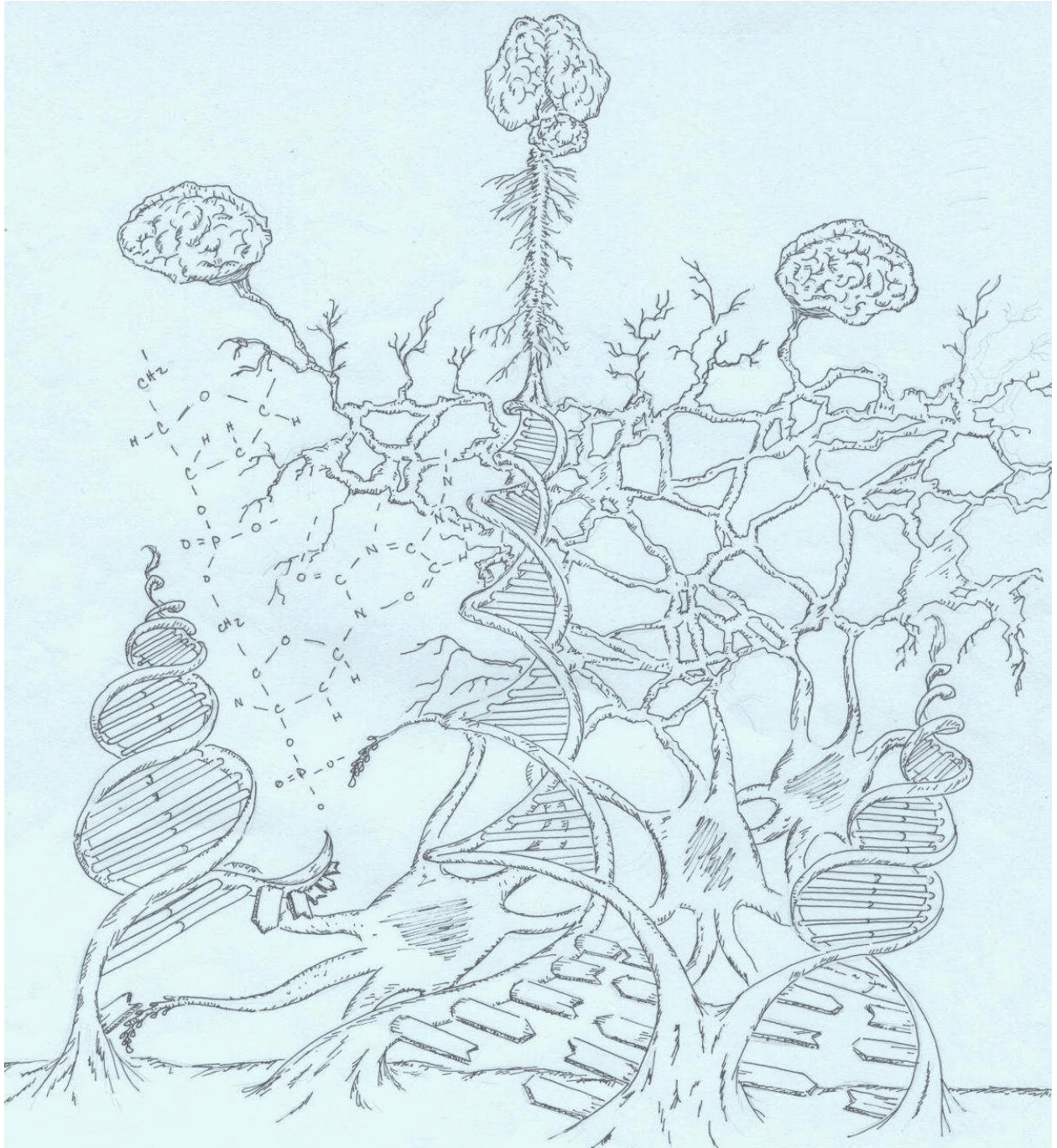
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