Energy & Epigenetics 1: The Infant Brain is Unique

Readers Summary

1. Is it true that if we stop learning today, we stop teaching tomorrow?
2. How do immunity, epigenetics, organ structure all meet in the human brain?
3. What are the beacons of human reproduction?
4. Why is ketosis critical for humans in infancy and when their brain is suboptimal?
5. Why does having a rocket ship in a babies head give us insight into other epigenetic human processes?

Today, we begin to examine levee's 6, 14, and 26 in the Quilt document for the first time. We begin to show examples of these levees by examining how the human brain forms and functions in an infant. This example will act as an analogy to help us understand many other processes as the blog series rolls on.

There are many countervailing influences in life that on the surface confuse our intellect. They create the appearance of paradox, enigma, and myths, and mysteries. I find when we look at the world through the hull of a glass-bottom ship, to look through a kaleidoscope at the galaxies that exist on the edge of our mind, we begin to see the sense that nature makes from the chaos of the world. I like the irony that mysteries often create. Today, we are going to use some "other observations" we have all made to show you how the mysteries of our modern world might be solved asking better questions instead of settling for the answers we have been given.

The Human Infant

It is clear in modern medicine now that we can not have optimal human brain development unless we have a secure nutrient-rich food supply for both mother and child. This relationship also needs to be maintained postnatally for several years after birth until neuralation is successful. It does appear in modern neurosurgery research that human brain development is programmed genetically to a certain extent, but is more malleable then we thought because of the new scientific findings of epigenetics. This is also more apparent in humans than other mammals because our brain is so complex that even small changes in functional regions can lead to massive clinical changes that become apparent as the child develops. ***Autism and spectrum disorders are a good example of this phenomena***.

Brain-selective nutrients are critical to optimization of function. I laid this foundation out in Brain Gut 5. Inadequate DHA and iodine levels increase the risk of neurological developmental delay and early adult onset psychiatric issues and early neurodegenerative cognitive decline. They also are tied to many common diseases like obesity, Hashimoto's, Alzheimer's disease, Parkinson's disease, and diabetes. We discussed the mechanism of these issues in Quantum Biology 4. It should appear to anyone reading the quantum biology series that human evolution could not have proceeded very far without finding a consistent solution to these energy and nutritional constraints placed upon our species by our brain. There is also a lot of evidence in our world today of suboptimal neural development in humans living on a diet that does not provide these substrates. ***Energy dynamics is directly linked to epigenetic expression.***

There is also a lot of data over the last fifty years that an "altered field" also causes the same symptoms common to many

of these diseases as well as laid out by Robert Becker and Russ Addy. The field refers to the local environment that cells and the organism find themselves in. The field constantly changes as we move through the environment. This includes the nutrients available to us and the electromagnetic field around us. The field we face at sea level is not the same as the one on the top of Everest. The field we near a fault next to a volcano is not the same as the one found on an ice sheet in Antarctica. Since our brain never perceives the field of vision, sound, touch, taste, or smell the mind never accounts for the effect of the field on its cells. It is almost like it never exists. This problem is compounded when you consider a new child's brain has to navigate an altered electromagnetic background before it is fully developed, as well in our modern world. As it turns out, children are more sensitive to the field because their brains are un-myelinated. This allows us to gain insights to just how the field affects human epigenetic expression. These are things we need to pay deep attention to if we are going to understand the mystery of how our genes are expressed.

The effect of the electromagnetic field on cells

How the infant's brain works on a quantum level is radically different than an adult brain does because of the way it is embryologically derived. Functional MRI data is showing this now.

What most people do not realize is that a child's brain is far more sensitive to calcium efflux in grey matter and the pineal gland when the brain is **un-myelinated.** *Myelin protects the*

deeper grey matter from the effects of an altered electromagnetic field.

Calcium efflux causes cellular signaling to break down. For example, loss of calcium in the pineal gland causes circadian cycle disruption. Environmental fluoride exposure and exposure to artificial light also cause this phenomenon. Modern children are more exposed to environmental fluoride and fake light now because of cultural beliefs in healthcare and dentistry. The modern water supply is now supplemented with it for the same reasons. *We must remember, however, the human brain does not finish myelination until early adulthood (25-28 yrs old).* Most of the myelination occurs postnatally between 0-6 years old when the brain begins to approximate its adult size and skull growth ceases. You may begin to question why we do some of the things we do. To me, it is no wonder children now have many new neurologic diseases that have exploded in the last 50 years.

Humans and their primate relatives

The most interesting parts of humanness we have not hit on yet in this series is the development of little humans with immature brains. Humans infants are born fat and immature neurologically compared to our nearest ancestors, the chimp. The difference between chimp and humans infants is dramatic when one looks at them side by side even though they are 99.9{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} genomically the same. It also appears that being born with a substantial layer of subcutaneous fat is a prerequisite for developing a human brain and not a chimp brain. In humans, body fat is the backup plan for an alternative fuel source to feed the 'energy hog' in our heads. The brain, unlike other tissues in humans, has no place to store energy. It uses the subcutaneous fat as its main energy store. This is why leptin status in humans is of critical importance to the brain. Leptin determines proper energy

balance and fuel partitioning on a daily basis based upon the environmental signals the brain gets from our senses. The brain uses the most energy in our body and therefore its development and function are linked directly to the hormones that control energy balance.

What are the beacons of reproduction in humans

The human placenta is under the control of two major hormones. Those two hormones are progesterone and leptin. Progesterone is pro-gestation. Leptin powers the energy to the placenta during pregnancy. The goal of the human placenta is simple. Its job is to steal the DHA, iodine, and Vitamin D stores in the pregnant women's buttocks and hips where it is stored and it transfers it slowly over the 9 months to the infants forming neural circuits. This action depletes the woman's stores as time elapses. If she starts off the journey depleted, the child's brain will pay that toll in diminished neurologic function. A woman's normal hip to waist ratio is ideally at 0.7. This too is controlled by optimal levels of DHA and the brain-specific nutrients in her body. Her natural curves are present as an evolutionary signal to males that she is a good candidate for mating because she has the correct amount of brain-specific nutrients to make an optimal human brain. This is how evolution helps us select mates ideally using epigenetics. The hip to waist ratio in women is a key symbol to males that DHA is present in abundance, while inflammation is low, and her hormones are optimal to support gestation and successful reproduction of a progeny. Modern life, culture, and socialization have destroyed many of these ancient evolutionary signals in our species. Women who are infertile usually are leptin resistant and do not have the correct hip to waist ratio because they are either lacking DHA or have too much omega 6 fat in their bodies to support placental function. In many of my educational consults, I

explain to people that the goal of the human placenta in the mother is to “spin” the brain specific nutrients into her child’s head from her body, just like it is her own gut’s job to spin the brain specific nutrients in her diet into her own head. The process in her gut parallels the placental physiology. It is controlled by the progesterone to estradiol ratio, inflammation, and leptin function. There is little difference from a biochemical standpoint. What many of them do not realize is that blocking the normal extremely low EMF fields by the combination of man-made EMF’s has the same effect as a very poor diet. In many cases, this effect is far more dominant than just diet alone.

All life is about energy. And when we lack it or cannot transfer it properly to new cells of a new developing organism, neolithic diseases usually follow. This is how the brain and gut are tied to one another again by evolution. Form always follows function in life. It is a human adaptation in the shortened gut that helped us able to encephalize from transitional apes as the diet and field our environment gave us changed. During human evolution, there is nothing in the fossil record to make us think that an altered EMF signal was present. For the last 112 years, however, there is an abundance of evidence the field has changed dramatically, while the food sourcing has also been altered by manufacturing and the food Agra- complex and government interventions via regulation.

Why ketosis is critical to a human brain

Human infants are born with an immature nervous system. Their major fiber tracts in their brains are not myelinated. This makes the infant brain very susceptible to inflammation, metal toxins, EMF, and metabolic acidosis during this time. A child risks are quite different than an adult’s risks because of

these differences. As an analogy, think of an electrical wire in your house. It is normally covered by a rubber or plastic to insulate it so it does not short out. When a wire is exposed in your house it can spark and cause a fire or short out a circuit and the appliance it is connected to won't work. This is why children can't walk, talk, and see well when they are born. Those circuits in their brains are all short-circuited because of a lack of myelination on those neural circuits. Myelin performs the same function as the plastic or rubber on an electrical wire in newly formed brain circuits. It also is extremely important in connectivity, regeneration of circuits, and developing the DC current that is measurable and responsible for helping us heal wounds in our body. This is in part why children immunity and wound healing are lacking earlier in life. This work came from Dr. Robert O. Becker's lab that we briefly mentioned in EMF 8. His work on bone regeneration showed us how important myelin really is to us. Within the myelinated network is a series of collagen tubes where interfascial water collects. It appears this water is important in transferring energy from one place in the body to other places at faster rates than nerves can conduct an action potential. In fact, in Becker's work on bone regeneration, this DC current of injury was found to make bone glow by using the photoelectric effect to facilitate these energy transfers. This photoelectric signal was then changed to a mechanical signal using a piezoelectric energy transfer. Energy can not be created nor destroyed but it can be changed into other forms for life to work. In bone, we use the DC current from the interfacial water (syncytium/interstitium water) in the covering of our myelin to make bone "glow" with light, and then use that light to transfer its energy into a piezoelectric mechanical signal that allows the bone to form from the stimulus compression. When there is no tension and no light we get bone resorption.

Truth Bomb Alert: Why researchers just do not get it

Since humans are born un-myelinated it means infants are designed to be **energy deficient** at birth. If you remember back to EMF 2, I told you obesity is tied to a lack of photons and electrons in our body. This intuition is very counter-intuitive to most people who are overweight or who study obesity. When we are energy deficient we gain masses and increase the amount of fat we have. We do this to minimize our loss of energy efficiency. Being larger makes us more able to handle a lower energy state. This is why an elephant is large and has a slow metabolic rate and why a mouse is small and has a very fast metabolic rate. Compare a human genome to a mouse genome and saying because the two show so much homology they are good models for one another shows a distinct lack of insight to the mass equivalence equation of energy. This is a law of nature. It also belies why you can never equate a rodent with a human. Rodents are nocturnal and we are diurnal and how we use proton isoforms varies. They do not use energy in the same fashion. This law is called the **quarter-power scaling law. Obesity researchers make this error every day of their life in their work. Ultimately, it is not what we don't know that hurts us, it is what we "know" that just ain't so that does.**

Here we see how a human infant explains why we really are or get fat because of an evolutionary design principle. The quarter-power scaling law uses fractal design, among other things, in order to get this effect. Soon you will see how important this basic law of nature is in understanding mass equivalence and its relationship to energy. The brain is born immature to exit the female pelvis safely. This creates a child who needs constant care and who's brain needs ketosis in order to mature. The child being born immature puts the mother and child at a big evolutionary disadvantage on the

surface until one realizes why Mother Nature did it. The process gives us major insight into the quantum physics of mass and energy. It is directly tied to the mass equivalence equation. When we evolved from other primates we never had to face a lack of energy from our environment at all. I laid this out in Brain Gut 3. You'd be making a big mistake if you do not go back and read these hyperlinks in relationship to this blog. We also evolved at the junction of three actively separating tectonic plates that gave us a very strong field for millions of years which drove our unusual epigenetic expression.

Back to the baby

I am now showing you that infants are also born **energy deficient** by evolutionary design. You already know observationally that little humans are a ball of fat. Now I am explaining why they are fat by evolutionary design. When we lose energy for any reason at all, we get larger by physics laws. We do this because the bigger capillary networks we have in adipose tissue that use the quarter scaling law to allow all life to get by on less energy from our environment. It should also make sense to you know why we really get fat as adult humans for any reason (VERMONT 2017). As a consequence of a loss of energy, the laws of nature require we get bigger to compensate for the loss of energy to maintain physiologic functioning. In reality, human infants are **the only primate born** with close to 13{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of their body weight as subcutaneous fat! Chimps are born razor thin and have no subcutaneous fat. Chimps are also born with almost completed adult neural development, yet a human infant has close to 25 more years of neural development ahead of itself. Observationally, you know that infants can not fend for themselves for the first few years of life. Why would evolution design a child this way? Connecting any dots yet?

It has been well established that evolution uses fractal design as a fundamental law of phylogeny. Being born energy deficient has another hidden benefit for human infants. The likely reason for this is to deliver their massive heads through a small vaginal canal. The female human pelvis is small to account for a big-brained baby. Moreover, human heads emerge from the vagina face down. Chimps arrive face up. The reason? Chimps brains are smaller, and if our brains were fully developed like a chimpanzee brain, there would be no way a woman could deliver that child with the size of her pelvic outlet.

Survival is all about successful reproduction as the first step. **Modern human birth differs from modern non-human primate birth in three fundamental ways:**

(1) the neonatal head and body generally pass through a series of rotations during birth in response to the close correspondence between neonatal head and shoulder dimensions and maternal pelvic dimensions;

(2) the neonate usually exits the birth canal in an occiput anterior position; and

(3) human birth occurs in a social context with others in attendance.

Now ask yourself, why might cesarean sections really rise in the modern world? Why are babies being born fatter and larger every day today? It means the mother is more energy inefficient or deficient prior to pregnancy and the effect is seen in how her offspring have to enter this world in order to live. This observation has deep implications of how the field we currently live in has dramatically altered our species already. It also is a huge clue why we get fat as adults. The best place to study obesity is in humans who are all fat uniformly by evolutionary design. That is why we are discussing the infant brain and fat mass today. Studying a

chimp or a mouse or a rat is far too simple to gain this insight because the basal metabolic rate is tied energy mass equivalence at a very fundamental level. Obesity is not genomically determined as most obesity researchers believe. If it was, why are we 99.9{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} genetically the same as a chimp, yet our infants are born massively fat and helpless, and chimps are born razor thin and quite functional early in life? Mice are even more functional at birth. They have basal metabolic rates 8-13 times a human infant. The manner in which they use energy is vastly different than we do. If your perspective is skewed toward genes, you lose the forest through the trees in understanding how energy and mass are designed to work by nature. Why are genes not the story? Humans have more non-coding DNA than every other primate. This is the dark matter that made us human from a chimp. In this, "junk DNA" are the instructions of how energy/information transforms matter to create a new species in the primate tree. Humans are the naked ape. Protein is the matter coded for by DNA. Chimps and humans share the same genes 99.3{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} but we differ radically in how we energize our DNA and process information. This is what ultimately makes us a different species.

Myelination is not complete in the adult human brain until 25 years of age. At this time, this is when the frontal lobes are finally myelinated. This usually signals full maturity and we see a loss of impulsive behavior after the age of 25. Many people are not aware that this neurologic reason is why a person below 25 years old is not permitted to rent a car or a hotel room by themselves before this age. I have always found it ironic, that we allow those below 25 to vote and fight wars. It seems the government seems to know how to use neural chemistry to their advantage.

Since the newly formed neural circuits are not well protected by the fat myelin layer in the neonate, they need a backup system while the myelin develops. It uses the infant's subcutaneous fat stores as its part department for its developing brain. The subcutaneous fat in infants allows them to remain in ketosis. The mother's milk depot is also constituted by evolutionary design to keep the child ketotic for the first 3-5 years of its life. Yes, people, human children are designed for extended breastfeeding contrary to modern cultural belief.

Humans are born into and should live in ketosis while they are myelinating. Rarely is this the case any longer in modern humans. Ketone bodies are made from the subcutaneous fat and form the brains favorite fuel source during neural development. A little-known fact outside of neurosurgery and neurology **is that ketones are the main substrate for synthesis of brain lipids that are vital for optimal brain function as a child develops.**

This is how the infant's brain makes cholesterol and many fatty acids to build out its neural network blueprint. Ketones are not stored in the body but formed from the fatty acids released from this subcutaneous fat in infants. This is precisely why a human child actively puts on massive subcutaneous fat in the third trimester of pregnancy under the direction of placental progesterone and leptin. This is why humans have subcutaneous fat under their skins and chimps do not. Chimps are born with a nervous system that is fully functional at birth. In fact, most mammals neural development is quite ahead of humans. This implies another deep secret of our evolution. It means that human brain evolution required a nutrient dense enriched habitat loaded with the brain specific nutrients, as I laid out in Brain Gut 5 to be constantly present in order to facilitate enough energy transfers from mother to child in reproduction. Our brain development is vulnerable when these nutrients are not plentiful in our

environment. Today's modern world is our biggest nightmare for our species and why we have been de-evolving since the Younger Dryas. There is evidence that shows hominids have lost 125 grams of brain tissue in the last 125,000 years.

This study we discuss next examined differences in primates and humans concerning brain development. So much for us being 99{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} identical! Another reason why mice data can never be extrapolated to human data.

A mixed background group of US researchers has found in studying chimpanzee brains, that development of myelin, the fatty sheath that covers the connections between nerve cells, occurs at a different rate than for humans, and as they write in their paper published in the Proceedings of the National Academy of Sciences, the differences might account for the greater instance of mental disorders in people than in both chimpanzees and other primates, such as macaques.

Human babies are born with barely any myelin at all. Shortly after birth, they have a spurt of sorts, with a lot of developing occurring and continuing on slowly thereafter for some thirty years. Other primates, in contrast, begin developing myelin while still in the womb and it keeps up just until the animal reaches sexual maturity, at which point, it stops completely.

The researchers speculate that the differences in myelin development may explain some of the unique mental abilities of people, as being born with little to no myelin, **allows for more openness to learning from the environment as opposed to relying on information passed on through genes**. They also suggest those same differences might be putting people at more of a risk of developing mental illness though, as the possibility of something going wrong during the process grows greater over longer periods of time.

Body fat {a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}: The real purpose of the subcutaneous fat we are designed to have

In adult humans, body fat contributes 15-25{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of body weight in the optimal range. In wild terrestrial mammals, they rarely exceed 5{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of their own body weight in fat. This distinguishes humans even further from the mammalian clade. The reason is simple. Subcutaneous fat is the "informational backup system" needed to fuel a brain that is an energy hog. Since fat liberates CO2 and protons from free fatty acids, it uses these protons it got from its mother in the last trimester to grow its body. That hydrogen from Mom is not like all the other hydrogen made in the mitochondria. A term infant weighs about 3500 grams and has a brain weight of 390 grams, their relative brain weight is around 11{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}. A term infant has 500-600 grams of subcutaneous body fat. This means 14-15{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of its total body weight is fat. Chimps do not have these characteristics in their infants. In fact, when we correct for human fitness, human term infants have relative brain sizes almost **30{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} greater** than our nearest relatives offspring. This means that a term human is one third the size of an adult brain, but the relative brain weight at birth is much greater

than it is in an adult. This is a huge evolutionary issue to naturally select for because it means the infant's brain is an **even bigger energy drag** on the child's built-in resources than it is in an adult human. This puts their mother's at risk as well. This is why preterm humans infants carry such poor prognosis going forward when compared to their term cohorts. It also implies that human children had to be born into an environment deep in brain-specific nutrients to support our evolution. This heavily supports a coastline evolution for our species. Since the fossil record is so poor for modern hominids and our evolution so quick from transitional apes, this also lends heavy support that the cradle of our species ascent, had to be nutrient dense with brain-specific nutrients to limit this risk. It is clearly not present in savanna food chain of any terrestrial mammals even today. The data is simply overwhelming when one considers the what a human infant brain requires from just an energy standpoint alone. It also points out why people with some fat tend to live longer than those without much fat. Modern health care finds the results of these studies perplexing because they just do not understand the purpose of fat in "human primates."

We have a Ferrari in our skull, but a baby has a rocket ship in it skull

At birth, the infant's brain consumes an unreal **75{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of the energy needs of the child**! (Holliday, 1971) To put this in perspective, the neonate brain energy needs exceed an adult human brain by a 300{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}, while this immature brain gives it ***no real initial*** survival benefit. Stop and think for a minute, why would evolution do this?

This implies that the infant brain lacks energy at birth but rapidly acquires it in the postnatal period. This is directly opposite what we see in chimps at birth. We have many similarities to our nearest ancestors, but what separated our evolution was the massive environmental changes in the East African Rift zone that drove dramatic differences in brain development. Among all primates, human infants are the most helpless despite their brains receiving this massive payload of energy supply from itself and its environment. One has to ask, why would evolution select for such a unique imbalance? Moreover, the situation is even more counterintuitive when you realize that a defenseless infant also puts the nursing mother's survival at greater risk by the nature of its birth and needs postnatally. One has to wonder why this was selected for naturally. It implies the ecologic environment for humans had to be radically different than other primates. These conditions could not have just been present for the last 100,000 years, they had to be present for at least the last 5 million years according to the skulls we have found for our nearest ancestors. In primate brain evolution, the investment of increased size and cognitive performance was favored, with the tradeoff being an increased vulnerability to environmental insults that would risk developmental delay. That gamble must have been made because the risk did not exceed the benefit, and we are the result of the gamble. Today, the field we live in has dramatically changed and that risk is now our biggest rival as a species. It may begin to explain the infertility crisis we see in the modern world. It also helps explain many of the neuro-immune, and cognitive issues like autism, ADHD, OCD, and depression that seem to be exploding in children in the modern world. Before 1970 these diseases were considered rare. Now they are keeping pediatricians and psychiatrists clinics filled.

Let us examine energy dynamics of the developing brain

A child gains most of its weight in the third trimester of gestation. It does this by removing energy from the placenta and directly from the mother. The mother compensates for this energy drain by increasing her progesterone level. This massive increase in progesterone allows her to retain massive amounts of water in order to offset energy the losses to the child. Progesterone major effect in women is to make them more energy efficient with fewer photons and electrons from their food because the child acts like a siphon for her energy from food. This may give you an insight why I think obesity and mass equivalence is directly tied to energy loss or deficits. Most obesity researchers believe being obese is a sign of energy excess.

The progesterone levels in early pregnancy ordinarily double or triples during the first several weeks of pregnancy. By the third trimester, the levels can rise 10-20 times the normal level in a healthy mom. The progesterone levels during pregnancy can be as much as 350 mg to 500 mg per day. If the mother goes into pregnancy energy inefficient or depleted they are likely going to be big issues for the child and potentially for mom. In a study of the head growth of 633 term-born children, from the Avon Longitudinal Study of Parents and Children cohort, it was shown that prenatal growth and growth during infancy were associated with subsequent IQ. The study’s conclusion was that the brain volume a child achieves by the age of 1 year helps determine later intelligence. Growth in brain volume after infancy may not compensate for poorer earlier growth in the first few years of life.

Summary

In human adults, we have between 15-20{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} body fat normally. In terrestrial mammals, they rarely exceed 5{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} body fat when zoologist have looked at terrestrial species. They do not need a lot of fat because they do not have a large central nervous system. Human infant brains are quite special. They are born obese, with large amounts of subcutaneous fat, to fuel myelination of the grey matter. This is also something radically different amongst primate infants. Infantile chimp brains are close to fully developed at birth.

Due to the brain’ s voracious energy needs during human infancy, the role of baby fat is especially important in optimizing brain development. The role of myelin is massively understood in medicine today. This has huge implications for people suffering from myelination problems like those who have Multiple Sclerosis, Guillain Barre syndrome, and central pontine myelinolysis. This blog may give you some keen insight to what type of diet those with MS should be eating to repair their myelin. Ketones are generated from fatty acids stored in the fat reserves and are by far the most important fuel for the developing brain. As I laid out in the Quantum biology 8, **the electron density of ketogenic diets** provides the higher current of any diet on the inner mitochondrial membrane for electron chain transport. If you are following the crumbs I am leaving you, and you will begin to see that any state of un-myelination or altered myelination is a state where there is a total energy deficit in the system. It means you have to live on ATP alone, because you have lost the ability to maximally use coherent energy transfers from water, DHA, and collagen. This brings us right back to EMF 4 blog post. Are you seeing how everything is connected yet?

The developing brain not only needs a guaranteed fuel reserve but must also synthesize a large part of its cellular structures from within. Aside from their critical role backing up glucose as a brain fuel, ketones are also the main substrate for synthesis of brain lipids that are vital for brain function, principally cholesterol and some fatty acids used for myelination. **Ketones are the substrate used for how myelin is maintained in humans.** Glucose is not the dominant fuel in the brain. Ketones always form the backbone to maintain the integrity of myelin. Myelin maintains the neural network and generates the DC current in the brain for regeneration of many processes in humans. All of this was worked out over 50 years ago by Robert O. Becker. It is high time people in medicine go back and find out what a neuroepithelial junction does in humans. His work is exquisite in this area.

Full-term, healthy human babies weigh about 3500 grams and have an average brain weight of 380 g, so relative brain weight in the human newborn is about 11{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}. However, 500 600 grams or about 14{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6} of newborn body weight is fat. Since other terrestrial mammals species do not have fat babies, for more accurate comparison of relative brain sizes, the fat component of the body weight of human infants should be excluded. Thus, an average healthy newborn human has a corrected lean body weight of about 2900 3000 grams and has a relative brain weight of 13{a7b724a0454d92c70890dedf5ec22a026af4df067c7b55aa6009b4d34d5da3c6}. We are born fat and energy deficient for an evolutionary reason. It is time you begin to think about these observations and how they link to diseases we are facing today. Marry this blog and the quantum biology series to the July 2013 webinar. Now you may begin to see how these things make sense of modern reality.

Are you connecting dots yet?

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    - Search for Evidence of Axial Current Flow in Peripheral Nerves of Salamander. Becker RO. Science. 1961 Jul 14;134(3472):101-2.
    - Longitudinal direct-current gradients of spinal nerves. Becker RO, Bachman CH, Slaughter WH. Nature. 1962 Nov 17;196:675-6.
    - Stimulation of partial limb regeneration in rats. Becker RO. Nature. 14 January 1972;235(5333):109-11.
    - Electron paramagnetic resonance in non-irradiated bone. Becker RO. Nature. 1963 Sep 28;199:1304-5.
    - Photoelectric effects in human bone. Becker RO, Brown FM. Nature. 1965 Jun 26;206(991):1325-8. **(a must read)**
    - Electron paramagnetic resonance spectra of bone and its major components. Becker RO, Marino AA. Nature. 1966 May 7;210(5036):583-8.
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    - Regeneration of the ventricular myocardium in amphibians. Becker RO, Chapin S, Sherry R. Nature. 1974 Mar 8;248(444):145-7.