

Editorial

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Epigenetic, Depression Gene, Book of Genesis and Pauline Theology of Faith, Hope, Love and Redemption

Faithful readers of this space recall the article on epigenetic that defies Darwinian Theory of evolution. Darwin asserted that it takes millennia to evolve changes in an organism. The studies of the families in northern Sweden, sparsely populated Norrbotten, just six people per square mile, reveal that it takes only a couple of generations to effect evolution. The ancient Biblical story in Genesis chapters 41 through 47, which describes the Egyptian Pharaoh's dream of "seven years of plenty and seven years of famine," prove to be relevant to the science of epigenetic and the rapid two-generation-evolution-cycle instead of two millennia. Epigenetic, a 21st century science, is the study of changes in gene activities that does not involve alteration to the genetic code but is passed down to successive generations. Many scientists including British colleague, neurologist/polymath, Raymond Tallis, the 2010 Fall Meymandi Fellow, National Humanities Center, call this phenomenon as "Darwinits." Here is a summary of research described previously:

In the 19th century, a province in northern Sweden called Norrbotten literally experienced seven years of famine followed by good harvest and abundance of food. The feast and famine period that occurred in this sparsely populated province (only six people per square mile) has offered astonishing epidemiologic and scientific data that have given birth to the science of epigenetic. The years 1800, 1812, 1821, 1836, and 1856 (the year of potato famine in Ireland) were years of total crop failure and famine for the people of Norrbotten. But in 1801, 1822, 1828, 1844, and 1863, there was excellent harvest and an abundance of food. Scientists of the renowned Karolinska Institute, Stockholm, Sweden, have undertaken the painstaking work of

evaluating this history of famine and feast to see how it affected the lives of the children. They have found that "life conditions could affect your health not only when you were a fetus, but also well into adulthood," concluding that parents' experiences early in their own lives change the traits they pass on to their offspring. The result of the study shows that the years the children were well fed, their own subsequent offspring grew up to be healthier and physically bigger. Epigenetic makes it possible to enhance the activities of the good genes and silence and discourage the activities of the bad genes. The task is not very difficult. To chemically flip the "good" switch on, one must intro-



duce a methyl group (CH₃) to the side chain of DNA—a very simple procedure; or vice versa, to flip it off, introduce a demethylate compound to suppress the activities of the bad genes.

The exciting science of epigenetic is very much like a switch on the outside of the genetic circuits and genome that influences the behaviors of a gene. The very prefix *epi*, which means to lie outside of the root

structure, helps explain that, while not an integral part of an organism's genetic code, epigenetic can influence the gene's activities from the outside. Flipping the switch enhances (turns a gene on) or inhibits (turns a gene off) DNA activity. Now we are learning that genetic configuration and longevity of a cell is very much related to telomeres. In 2009 Elizabeth Blackburn, Jack Szostak, and Carol Greider, won the Nobel Prize in Physiology or Medicine for their elucidation of the structure and maintenance of telomeres (the tips of chromosomes). These investigators discovered that telomeres are DNA sequences with a structure that protects chromosomes from erosion and that a specific enzyme, telomerase, is involved in their repair after mitosis. In daily psychiatric practice one wonders why the incidence of suicide is so high in so many families irrespective of socio-economic and religious orientation. Here is an examination of depression. Is there a depression gene?

Depression Gene

Recent suicide of Ali Reza Pahlavi, 44 year old son of the late Shah of Iran (Jan. 4, 2011) which followed by the suicide of his sister, Leila Pahlavi in 2001, has stirred many questions regarding the genetic aspect of depression. We have known depression as a distinct clinical illness since the days of Hippocrates (460 BC-370 BC) and Galen (129 BC-217 BC). It was called melancholia with the fascinating etymology of *melon*, black; *cholia*, colon, or black bowel. The ancient clinicians thought the origin of depression was in the intestines. It was not until the Persian physician-polymath, Abu Ali Sina (Avicenna 980-1037 AD) and Abū l-Walīd Muḥammad bin Aḥmad bin Rušhd (Averroes 1126 – December 10, 1198), and his contemporary colleague, the Jewish physi- [Continued on page 3]

cian, Rabbi, theologian and philosopher, Moses Maimonides of Cordoba (Rambam 1135-1204) who stirred up academic kerfuffle and forwarded the basic thesis that depression had to do with the brain and not the guts. Rambam in 1150, not yet 25, a physician to the Muslim Caliph, described depression, obsessive compulsive disorder (*Vasvas*), and designed methods of treatment that we today continue to use, namely cognitive behavioral treatment (CBT). Of course, they used many herbs and botanical products. Their pharmacopeia is replete with plants, herbs and roots. Edinburgh University in Scotland, around 350 years ago, created the famous Edinburgh Botanic Garden with nearly 400 acres of plants with the single purpose of copying Avicenna's pharmacopeia. Avicenna's medical textbook "*Cannon of Medicine*" was taught in all European medical schools well into the nineteenth century. Sir William Osler's writings have many references to these giants of medicine. Three learned colleagues interested in history of medicine, Mohammad M. Sajadi, MD; Davood Mansouri, MD; and Mohamad-Reza M. Sajadi, MD, of Baltimore, Maryland, have written a comprehensive article in *Ann Intern Med.* 2009;150:640-643. Visit www.annals.org for further details about the genius of Avicenna as a clinician, teacher, author and polymath. Avicenna's brilliance continues to shine and give guidance to the teachers of medicine even a millennium after his death.

Fast forward the clock of medical science and technology. We now know that DNA provides powerful clues to understanding disease. Data from the National Institute of Mental Health strongly suggest a particular gene may increase the risk of depression. The scientists have found that people with one form of a protein that transports serotonin, one of the many mood-related neurotransmitters, are especially prone to depression when faced with traumatic events, such as alienation, loss of power, country and princely positions. The displacement is especially consequential for members of disposed royalties. In exile, these privileged children often forget their native tongue and do not learn the language of their adopted country which exacerbates the sense of alienation and social isolation.

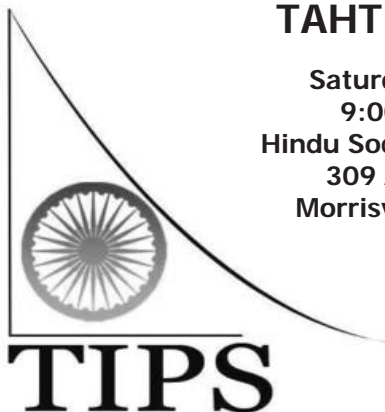
The version of the particular depression gene prevents the neurons (brain cells) from re-absorbing serotonin, which leads to feelings of sadness and negative mood and may make it harder for

them to recover emotionally from a crisis. Depletion of the good juices of the brain such as Dopamine, indoleamine, serotonin and catecholamine, epinephrine and nor epinephrine leads to depression. Untreated depression often leads to poor quality of life, addiction to, abuse of, substance and other forms of self destructive behavior including suicide.

Just as there are families predisposed to paucity of brain Dopamine and familial suicide, I know of many families genetically predisposed to an abundance of brain Dopamine, especially in the Locus Coeruleus and the Limbic system, particularly hippocampus, the seat of memory in the brain. This is the biochemical and neuroendocrinological equivalence of Pauline theology of hope, love, faith and redemption. Fortunate folks with well endowed Dopamine circuitry face adversities and vicissitudes of life with optimism and possibilities. Science has accumulated enough knowledge about the mechanisms of cognition, mentation and perception and their molecular underpinnings at the synaptic junctions that we can make bold advancement in the area of understanding the nature of depression gene. We reviewed the book by the learned science journalist Sharon Begly, "*Train Your Mind, Change*

Your Brain", in which she cited her work with Dali Lama and the interest His Holiness, has exhibited in neuroplasticity. One of the strongest findings in neuroplasticity, the science of how the brain changes its structure and function in response to input, is that "it is almost magical to observe the ability to physically alter the brain and enlarge functional circuits..." We may have depression genes. But we also have a plastic brain, and chromosomes that have flexible telomere length, even making us live longer.

We now are learning the molecular biochemistry and endocrinology of joy, a constant running brook of Dopamine, producing Straussian symphonic poem of life. Let it be known that joy is not the same as happiness, Happiness is the uncorking a bottle of wine and celebrating an evanescent moment. Joy, on the other hand, is steady, permanent, and life giving. Like a running brook, it is constant and it refreshes. Joy changes the morphology and molecular structure by our brain. And these changes may be brought about by a simple change in our attitude and approach to life. Scientists have shown that by just showing purpose and determination, and by merely uttering positive words and intentions, the level of brain Dopamine is raised. §



TAHT HEALTH FAIR

Saturday, June 18, 2011
9:00 am to 1:00 pm
Hindu Society of North Carolina
309 Aviation Parkway
Morrisville, North Carolina

The Third Annual Triangle Area Hindu Temples (BAPS, HSNC and SV temple) and Triangle Indian-American Physicians Society (TIPS) Health Fair 2011 is scheduled for Saturday, June 18, 2011. For the past two years, this event has attracted people from all walks of life and last year, over 750 people took an advantage of great event. The Health Fair committee and community were very appreciative of the enthusiastic participation by the physicians last year, which ensured the success of the Health Fair and would like to thank each for their dedication of time. Like last year, this year's health fair is being hosted by the Hindu Society of North Carolina in their Main Hall. Physicians from all specialties including primary care are requested to serve in this community event. Physicians would review lab results and consult on various medical issues.

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