Epigenetics and the Epigenome

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Epigenetics and the Epigenome

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Traditionally speaking, epigenetics is the study of changes in gene expression that is not mediated by the DNA sequence, but rather through the proteins found in the nucleus of the cell as well as the surface proteins of the cell membrane. (Lipton2005) [1].

Molecular mechanisms mediating epigenetic regulation include modification of DNA and chromatin and histones resulting in lack of genomic expression (Lipton 2013, Cheung et al 2005, Elgin 1996) 2-5. Therefore, genes do not control our biology, as previously believed. Furthermore, we are not victims of the foundations of heredity. Thanks to the identification of enzymes that are key in histone modification, the biological functions of many post-transcriptional histones are being discovered based on environmental signals and not on genetic determination (Van Steensel 2011)[5]. This means our nutrition, thoughts, meditation, e-Smog (radiation that comes from electromagnetic frequencies) emanating from electronic items that make our life very convenient. These play an important role in genetic control through epigenetics.

The change in gene expression is mediated by our perception of the world we live in, and happens in just hours. Our epigenome is constantly under the influence of our perception and signals coming from the environment. Therefore, histone methylation has aroused interest as it plays important roles in the epigenetic phenomenon[3].

When a protein called chromatin, which is found in the nucleus of our cells, condenses, it gives rise to the groups of genes found in the autosomes and chromosomes that constitute the karyotype of the human body, another group of genes is found in the heterochromatin which is known as junk DNA (Roudier et al, 2011)6. This constitutes 98% of the so-called non-coding DNA. This is very important since it conditions the biological behavior patterns of our being. Heterochromatin is very resistant to mutations, which does not happen with genes expressed through the reading of genetic information read by ribosomes. Our life experience is passed from generation to generation through the epigenome.

Proteins are what control the reading and decoding of genes and not the genes themselves. This is called epigenetics. That is, the phenotype changes and the genotype remains as such, that is, it does not change.

In Quantum Physics we talk about harmonic resonance, which has to do with the vibration between two or more waves that share both the same frequency and the same amplitude and that are distributed in nature. One influences the other, that means that the vibration travels between them. We can send vibration through our magnetic brain activity. So, with this process we become entangled with each other, as we also become entangled with the environment in this process. In this way, our brain frequency, thoughts and emotions are transmitted in what we can call the quantum energy field. Our thoughts recognize frequencies of others that emit the same vibration, and thus they return to us with greater amplitude due to their intensification. This allows the reactivation of our own resonance, and will intensify until the thought becomes a reality, that is, the energy materializes. And therefore we receive what we give, and the more we give, the more we receive. Sending positive thoughts to the environment does not return positive actions as much as a harmonious environment. This is important, because negative thoughts, for example, lead to negative circumstances. Our thoughts influence everything around us. This is known as behavioral epigenetics, which was made known as the Biology of Belief by Bruce Lipton.

Memories are passed from generation to generation through epigenetics. What our ancestors ate, absorbed, thought, is expressed in our epigenome when environmental signals induce its manifestation.

Eating and nourishing ourselves according to our epigenetics is now a reality. The S drive allows us to facilitate the process of making a decision about which foods to avoid, in such a way that our state of well-being and well-being is optimized.

Chromatin is found in two versions: Euchromatin and heterochromatin. Heterochromatin is generally found at the periphery of the cell nucleus. Despite the dichotomy, recent evidence obtained from studies in animals and plants indicates that there are more than two states of heterochromatin. In fact, five states have been postulated, each marked by different combinations of epigenetic markers.

Summary:

The epigenome:

- Allows cell differentiation
- It silences some genes while allowing the expression of others.
- It uses the process of histone and heterochromatin methylation to allow gene expression.
- Nutritional epigenetic plans change genetic instructions.
- It allows the development of epigenetic therapies by changing genetic instructions.
- The genome is inherited and the genotype changes. The epigenome is modified according to the signals it receives from the environment, that is, the phenotype changes.
- Understanding and altering the epigenome allows changes in expression that support maintaining well-being and well-being.

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Evidence of the Epigenome in the Influence of Gene Expression

Embryonic development and differentiation generate organisms with many cell types whose identities remain stable over many cell divisions. The maintenance of cellular identity depends on epigenetic control mechanisms that are linked and assembled with specialized chromatin structures.

Genes that are located in the silent domain of heterochromatic DNA exhibit different latency states that result in gene expression. These states are maintained during cell division and are examples of epigenetic states that result in changes in chromatin structure. Research in my laboratory focuses on elucidating and understanding the mechanisms that are involved in the formation, function and transmission of heterochromatin.

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Heterochromatin and Gene Expression

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Summary:

Eukaryotic DNA is structurally organized into two domains that regulate gene expression and chromosome behavior. Epigenetically, the heritable domains of heterochromatin control the structure and expression of autosomal and chromosomal domains that are required for the proper segregation and formation of chromosomes and autosomes. Recent studies have identified many enzymes and structural proteins that work together in heterochromatin assembly. The assembly process appears to occur in sequential steps involving histone methylation that result in genomic silencing, that is, in the lack of gene expression, the spreading of chromatic fibers by self-oligomerization. As well as by the association of the terminal amino acid tails of histones. Finally, the role of RNA interference and non-coding RNAs in epigenetic chromatin has been identified.

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Glossary:

Epigenetic: The term epigenetics refers to heritable changes in gene expression (active vs. inactive genes) that do not involve changes in the DNA sequence; in other words, the phenotype changes without a change in the genotype.

Phenotype: Physical and biochemical characteristics of an organism based on the combination of the organism's genes and environmental factors.

Genotype: Endemic genetic inheritance of the cell.

Epigenoma: Modifications that do not change the DNA sequence can affect gene activity. Chemical compounds added to genes can regulate their activity; These modifications are known as epigenetic changes. The epigenome encompasses the entire range of chemicals and signals that resonate with DNA (genome) as a way of regulating the activity (expression) of all genes within the genome. The chemicals in the epigenome are not part of the DNA sequence, but are attached to or attached to the DNA. The word epi means on or above in Greek). Epigenomic modifications are maintained as cells divide and, in some cases, are inherited across generations. Environmental, nutritional, emotional and attitude influences towards life also impact the epigenome.

Chromatin: A stainable substance in the nucleus of cells, consisting of DNA, RNA, and several types of proteins that form chromosomes and autosomes during cell division.

Heterocromatina: It is a highly condensed form of chromatin, opposite to that found in euchromatin, which is diffuse.

Euchromatin: It is a form of chromatin that is diffuse and poorly condensed that contains structural genes and is transcriptionally active.

Structural Gene: Any gene that codes for the production of specific RNA, structural proteins, and enzymes that are not involved in genomic regulation.

Histones: Proteins that surround DNA.

Genetic: The Science that studies inheritance.
Gene: The fundamental, physical and functional unit of heredity.

Gene expression: The translation of information encoded in genes for the synthesis of proteins or RNA structures that are present and operate in the cell. Expressed genes include those that are transcribed into messenger RNA (mRNA) and then translated into proteins, as well as genes that are transcribed ribosomal RNA (rRNA) and transfer RNA (tRNA) that are not translated into protein.

Genetic Determinism: Mechanism by which genes, as well as environmental conditions, determine or condition the morphological phenotype of species.

Chromosome: Strand of linear DNA associated with proteins of the cell nucleus that contains genes and functions in the transmission of hereditary characteristics and information.

Autosoma: Autosomes are chromosomes that are not allosomes, that is, sex chromosomes. The autosomes are diploid, and the sex chromosomes are haploid since they determine sex. For example, the human diploid genome contains 22 pairs of autosomes and only one haploid sex chromosome. When the 22 autosomes of one individual are combined with the 22 autosomes of another, the resulting karyotype is 44 autosomes and two sex chromosomes, one from each individual. If the chromosomes are the X of a woman with the X of a man the result is a woman, if it is the X of a woman with the Y of a man the result is a man.

Harmonic Resonance: Harmonic resonance is an extraordinarily diverse phenomenon found in gravitational, universal resonances, electromagnetic oscillations, acoustic vibrations that range from the very manifestation of energy to the elementary particles that form the material and the universe itself. It is given by the biophotonic coherence that exists, which is clearly the product of light vibration.