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UNDERSTANDING THE INTERPLAY BETWEEN GENES AND ENVIRONMENT

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ABSTRACT:
Cells compose the fundamental functional unit of the human body and live in the fluid medium called the environment of the cell. In the human body, blood is the environment of the cell. According to Bruce Lipton's research, a cell's life is fundamentally controlled by its physical and energetic environment, with only a small contribution from its genes. Our genes play a significant role in determining our health, but so do our behaviours and environment, such as what we consume and how active we are. Epigenetics is the study of how our behaviours and environments can result in alterations to our genes' function. Epigenetic alterations are reversible and don't change our DNA sequence, but they can alter the way our body interprets DNA. Genes are merely the molecular blueprints used to build cells, tissues, and organs. Given that our environment and behaviours, such as diet and exercise, can result in epigenetic alterations. It is simple to see the relationship between our DNA, our environment, and our behaviours. Identical twins are the ideal illustration of epigenetics. Although they share the same DNA, their individual life experiences will cause some genes (but not others) to be expressed. This is why identical twins change in appearance and behaviour over time. These cells have their own consciousness. The environment of the cells in the human body can be changed by following certain practices and techniques, and by incorporating certain healing modalities at the physical, emotional, mental, and spiritual levels. The epigenome is subject to environmental influences, such as a person's diet and exposure to pollutants. An organism's epigenome is a record of the chemical modifications to its DNA and histone proteins; these modifications can be transmitted to offspring. In this article, details about the cells, cell environments. Our genes play a significant role in determining our health, but so do our behaviours and environment, such as what we consume and how active we are. How the cell environment affects cells, and a few practices and techniques to change the environment are shared.

Keywords:- Cells, Cell Environment, Genes, Healing Modalities, Epigenetics, Epigenome.

INTRODUCTION :

This paper talks about how it is not the genes that affect the cells but the cell's environment. This has been proven by many recent studies which are also discussed in this paper.

Let us start with the understanding of cells and their environment.

Cells are the fundamental structural units of all living organisms. There are 50 trillion cells in the human body. They provide the body with its structure; they absorb nutrients from meals, transform those nutrients into energy, and perform specialized functions. Additionally, cells include DNA, the genetic material of the organism, which contains genes and can replicate itself.

The cell environment is the medium in which the cells are growing.

In the laboratory, the cell environment is the culture medium in which the cells grow. In humans, it is the blood.

Earlier research vs latest research:

The earlier concept was that the genes we are born with control the characteristics of our life, the expressions of cells, and how they should function.

Genes have a significant impact on our health, but so do our habits and environment, such as our diet and level of physical activity.

According to new research by Bruce Lipton[1], a cell's life is fundamentally controlled by its physical and energetic environment, with only a small contribution from its genes. Genes are

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merely the molecular blueprints needed to build cells, tissues, and organs. The environment functions as a "contractor" which interprets and activates these genetic blueprints and is ultimately responsible for a cell's life characteristics. Similar to the qualities of a single cell, the traits of our lives are defined not by our genes but by our responses to environmental signals that propel life.

Here are a few research experiments which support the theory of the cell environment influencing the cells.

Experiment 1:

Bruce Lipton developed stem cells in a culture medium[2], which is a cell's natural habitat. In other words, cells are like fish, as they also require a fluid environment to live in, just as fish do. So, what exactly is a cultural medium? It is the synthetic equivalent or laboratory version of blood. If the cells are out of the body, they should be in a very similar environment, so Lipton created a synthetic version of blood for use in culture dishes. He could change the composition of his medium because it was a synthetic version.

Now, in the experiment that blew his mind , he generated three variants of the culture medium by altering some of its components. He placed these three habitats in three separate Petri dishes, but each dish contained the same culture of genetically identical cells. As a result, cells in environment A became muscle. In the second dish, B, the cells transformed into bone. In the third dish, C, the cells transformed into fat cells. What controls the fate of cells now remains a profound question.

All three cell groupings were genetically similar. The sole change was the content or chemistry of the culture medium—the cells' living environment. The conclusion was of the utmost importance. The environment is responsible for determining the genetic activity of a cell. This is vastly different from the situation in which genes determine what cells will be.

The functions necessary for the survival of a single cell are the same ones required for the survival of a community of cells. However, cells began to specialize when cells formed multicellular organisms.

Experiment 2:

In 2011, Michael Levin's team at the Tufts Center for Regenerative and Developmental Biology adjusted the bioelectrical voltage of tadpole cell membranes[1]. Remarkably, changing the membrane potential of cells from the backs and tails of tadpoles resulted in the growth of completely grown eyeballs in the backs and tails, a location far from where eyes ordinarily develop. (Pai, et al, 2011). The key to the success of the study was the team's discovery that during embryonic development of a tadpole, the membrane potential of cells destined to form an eye drops steeply from around -70 millivolts to approximately -20 millivolts. In their laboratory, Levin's team produced the identical decrease to -20 millivolts by injecting voltage-regulating calcium ion channel proteins into the membranes of the tadpoles' back and tail cells, so triggering the formation of a full eye. This finding is fascinating because it opens the door to the potential of correcting birth abnormalities and regenerating damaged human organs.

Experiment 3:

Theodore M. Hollis in his lab at Pennsylvania State University[2] had taken samples of blood from the specialized strain of rats he used to study human atherosclerosis—the hardening, and narrowing of arteries that is the leading cause of death in the United States. These animals had such high levels of cholesterol in their system that blood appeared milky. Despite their toxic cholesterol levels, these rats did not develop the endothelial cell plaques characteristic of atherosclerotic blood vessels.

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The secret was that Hollis added an antihistamine drug available without a prescription when he introduced the cholesterol. Because antihistamines were able to counteract cholesterol's apparent role in the creation of atherosclerotic plaques, his research demonstrated that cholesterol alone was not the cause of blood vessel dysfunction.

Histamine is a stress-related hormone that prepares the body for predicted injury and inflammation when the fight-or-flight response is engaged by a perceived stressor. Decades later, histamine's involvement in promoting atherosclerosis has been established. In recent experiments with mice, the genes for histamine synthesis were "knocked off." These genetically engineered animals, unable to produce histamine, were resistant to stresses that led to inflammation and atherosclerosis in control mice. The results of animal studies point to the role that chronic stress plays in the creation of histamine; hence, cholesterol is not the only factor responsible for heart diseases.

The cause of 90% of cardiovascular illness is not an organic failure in the mechanisms of the cell, but a behavioral response to environmental signals in the blood.

Over the last 100 years, quantum physics has shown that, at a subatomic level, atoms are 99.99% empty space. which means that 99.99% of everything that we see and feel, and which appears to be solid, is just vibrating energy.

By changing the vibration of energy surrounding the cells, we are changing the cell environment which can cure or control diseases.

We can change the cell environment by following the practices at a physical, emotional, and mental level as mentioned below.

Our genes play an important role in our health, but so do our behaviors and environment, such as what we eat and how physically active we are. Epigenetics is the study of how our behaviors and environment can cause changes that affect the way our genes work. Unlike genetic changes, epigenetic changes are reversible and do not change our DNA sequence, but they can change how our body reads a DNA sequence.

However, they can influence how our bodies interpret and utilize that sequence. The relationship between our genes, behaviors, and environment becomes evident when we consider how genetic changes can be triggered by our surroundings and lifestyle choices.

The term "epigenetics" refers to the influence of environmental exposure on epigenetic modifications [16]. Our life experiences, habits, and surroundings shape our identity and impact our epigenome and overall health. For instance, while identical twins may have the same genetic makeup and appear similar on the surface, they exhibit distinct differences as individuals due to epigenetic factors. These differences arise from variations in gene expression influenced by factors such as behavior, nutrition, and exposure to toxins and pollutants.

Since our environment and behaviors, such as diet and exercise, can result in epigenetic changes, it is easy to see the connection between our genes and our behaviors and environment.

Physical Exercise

Physical exercise not only aids in controlling high blood pressure, but also aids in body weight control, strengthens the heart, and reduces stress. During exercise, the body requires more energy, which it obtains by metabolizing fat. Fat is released into the bloodstream, where it is transported to the muscles to provide them with the needed energy. This improves muscular function and aids in the reduction of fat cells.

All this happens in the environment of the cell, and not exactly within the cells themselves.

Physical exercise (PE) is a powerful gene modulator that induces structural and functional changes in the brain, resulting in enormous advantages for cognitive functioning

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and well-being ((Weinberg and Gould, 2015; for a review, see Fernandes et al., 2017)). PE is also a neurodegenerative protective factor[6].

While exercise creates an important stimulus to our body to initiate epigenetic change, this is not possible without a diet that also supports genetic change – namely, by being able to supply chemical tags and fuel processes within the cell that make these changes possible.

Proper Food

Regardless of age, millions of individuals worldwide suffer with type-2 diabetes, which can be caused by unhealthy eating habits, obesity, insulin resistance, and hereditary factors. Even though the diabetic genes are present (in a cell) in a person, they are actually triggered by external factors (such as unhealthy food, or improper emotions).

A healthy diet rich in fruits, vegetables, whole grains, and low-fat dairy can help to reduce the risk of heart disease by maintaining proper blood pressure and cholesterol levels. Omega-3 fatty acid-rich foods (olive oil, fatty fish, fish oil, nuts, and seeds) aid in the maintenance of the cell membrane. Here the proper healthy food is maintaining the proper composition of the blood (which is nothing but the cell environment).

Adequate intake of minerals such as iron, zinc, magnesium, manganese, calcium, selenium, chromium, and copper has been shown to be particularly important for triggering genetic modifications. Additionally, incorporating foods like garlic, broccoli, caffeic acid, citrus fruits, apples, soybeans, tea, grapes, tomatoes, turmeric, cinnamon, and cashews into our diet can strongly support epigenetic changes.

When we eat a healthy diet and exercise regularly, our body can change how many specific genes are expressed in two primary ways: 1) by altering how the genome is packaged inside the cell and 2) by placing chemical tags onto specific genes in the genome.

While exercise provides a crucial stimulus for initiating genetic changes, it cannot occur without a diet that supports these modifications. Certain minerals have been found to be particularly important for triggering genetic alterations, including iron, zinc, magnesium, manganese, calcium, selenium, chromium, and copper. It is important to consult a healthcare professional for personalized advice regarding our specific needs.

Including the following foods in our diet can strongly support epigenetic changes: garlic, broccoli, caffeic acid, citrus fruits, apples, soybeans, tea, grapes, tomatoes, turmeric, cinnamon, and cashews.

Water plays multiple essential roles within the body. It constitutes a major component of most cells, excluding fat cells, and aids in brain and joint lubrication. Additionally, water facilitates the transport of nutrients to cells and the removal of waste from the body.

Louise Hay in her book “You Can Heal Your Life” mentions how she healed herself of cancer with proper food and affirmations.[5]

Proper Breathing

Proper breathing involves using the diaphragm correctly to inhale maximum oxygen. A proper breathing technique offers several benefits to our body including a reduction in blood pressure and heart rate, and an improvement in relaxation, making it easier for our body to release gas waste. A rising volume of empirical research suggests that diaphragmatic (abdominal) breathing may induce relaxation responses in the body and improve both physical and mental health.

An article titled "The Effectiveness of Diaphragmatic Breathing Relaxation Training for Reducing Anxiety"[7] states how an experimental group achieved significant reductions in anxiety.

In almost all spiritual schools, and in various schools of yoga, emphasis is placed on proper breathing.

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By doing proper breathing, the correct amount of oxygen is provided to the blood, which in turn changes the cell environment.

Proper Physical Environment

A properly lit, well-ventilated, and clean room will have positive impact on a person's emotion which in turn will affect the cell environment. In this physical environment there are people around us as well, so they will also affect us by becoming the influencers to cause changes in our cell environment.

The common experience of one person's extreme energy infecting a room makes more sense. When someone walks into a space with very irritable energy, the reason we begin to feel irritated is that that energy is radiating out and impacting everyone in its vicinity. The exact opposite happens when a happy and loving person enters the same room and we feel happy and relaxed.

The effect of the physical environment was proven by Bruce Lipton in a few of the experiments he mentioned in his book "Biology of Belief" which are stated at the start of this paper [2].

Positive social connections are integral to both mental and physical well-being, including our relationship with ourselves. Surrounding ourselves with positive individuals and practicing self-kindness and positivity have significant benefits. Taking care of ourselves and fostering meaningful relationships can lead to a more peaceful and fulfilling life, regardless of the size of our personal network.

Emotions and Thoughts

The Japanese scientist Masaru Emoto is famous for showing how the energetic vibrations we send out have a direct impact on the world around us. In a series of experiments, he showed how water droplets formed into completely separate crystalline shapes when told, "I love you" versus "I hate you." The "I love you" droplets formed symmetrical, beautiful shapes, while the "I hate you" droplets were asymmetrical and ugly.

Positive Affirmations

The continued repetition of certain thoughts over time has been proven to change the brain, the cells, and even the genes, which is done via neuroplasticity. [8] MRI research suggests that particular brain circuits are strengthened when individuals perform self-affirmation exercises. (Cascio et al., 2016). To be super-specific, the ventromedial prefrontal cortex—involved in positive valuation and self-related information processing—becomes more active when we consider our personal values (Falk et al., 2015; Cascio et al., 2016). Positive affirmations are one of the easiest and strongest ways of reprogramming the subconscious mind, which in turn helps to change the cell environment.

Meditation:

The attitude shift brought on by regulated breathing and heightened concentration is not limited to the mind: It actually affects our brain structure and the way our genes function.

In 2012, Gaelle Desbordes, a Harvard neuroscientist and radiology lecturer, researched the brain's activity during meditation using MRI scans that captured images of the brain and assessed brain activity. Comparing pre- and post-meditation scans of meditators, she discovered alterations in the way the brain works. Other studies have shown that meditation alters the brain regions responsible for concentration, bodily awareness, memory, emotion regulation, and communication.

Just 15 minutes per day spent on resting our thoughts can also influence the operation of our cells. A 2017 Harvard Medical School study revealed that after eight weeks of daily meditation for 15 minutes, 172 genes that regulate inflammation, sleep-wake cycles, and sugar metabolism were altered in meditators.

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These modifications lowered their blood pressure.

SUMMARY:

We can change the environment we live in; we can also change our perceptions. Therefore, we are not victims of our genetic activity, rather we are its rulers.

Our genes undoubtedly play a crucial role in our well-being, but our behaviors and environments, such as our dietary choices and level of physical activity, also contribute significantly. Epigenetics explores how our behaviors and environments can alter gene function. Unlike genetic changes, epigenetic modifications are reversible and do not involve alterations to our DNA sequence.

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