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(Editorial)

Epigenetic and Ethics: How are Ethical Traits Inherited?

Dariush D. Farhud

School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
Dept. of Basic Sciences/Ethics, Iranian Academy of Medical Sciences, Tehran, Iran
Ethics Committee on Genetics, WHO, Geneva, Switzerland
World Academy of Sciences, Trieste, Italy

In the nineteenth century, a scientist named Jean-Baptiste Lamarck proposed a view that, although it was a successful one and greatly contributed to the dissemination of the idea of evolution, it was overshadowed by the discovery of DNA and even by some scholars in the field of evolution has been rejected. Interestingly, in recent years, the reformed version of Lamarck's view has been re-considered as a topic called epigenetic.

Epigenetic

The environment has two effects on the genome. First, the influence of the environment on the structure of the genome, which includes monoclonal mutations, and second, is related to the effect of the environment on the expression of the gene. These environmental effects are observed in two forms of limited and sustained in expression of genes. Those changes in the expression of a gene that are caused by the environment and have been remained stable for a long time in the absence of an inducible agent in the memory of the cell are considered as epigenetic changes (1). These changes can be effective in the manifestation of various traits and their individual and social consequences as well as behavioral characteristics. Epigenetics is the study of external or environmental factors that turn genes on and off and affect how cells read genes (2) and consider the procedure of evolution as the result of a two-way exchange between environment and inheritance. Therefore, it can be said that epigenetic is the balance point of environment and genetic.

Also, epigenetics can be considered as a study of cellular and physiological differences that are not caused by changes in the DNA sequence. Hence, epigenetic research look forward to describe dynamic transformations in the potential cell transcription.

Epigenetics strategies and inheritance of acquired traits

As already mentioned, epigenetics refers to genetic factors that alter biological functions and living features without altering the actual DNA sequence (3). In other words, the mode of occurrence of genes changes, but the sequence of the genes does not change. There are three general models of inheritance (figure 1) (4, 5):

* **Corresponding Author:** Email: farhud@sina.tums.ac.ir
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A- Hard heredity: Heredity is transmitted through the transfer of the allele of the genes and the various species of DNA sequences from parents to children without affecting the environmental factors of these alleles.

B- Soft heredity: In this form of inheritance, traits are inherited by the transfer of allele genes from parents to children, but these alleles are in some way related to acquired traits that are created through environmental factors.

C- Epigenetic heredity: In this type of heredity, two forms of genetic inheritance and acquired characteristics occur simultaneously. In this way, the inheritance of acquired properties does not change the DNA sequence, but creates a change in the genome, phenotypes and genetic manifestations of the organism.

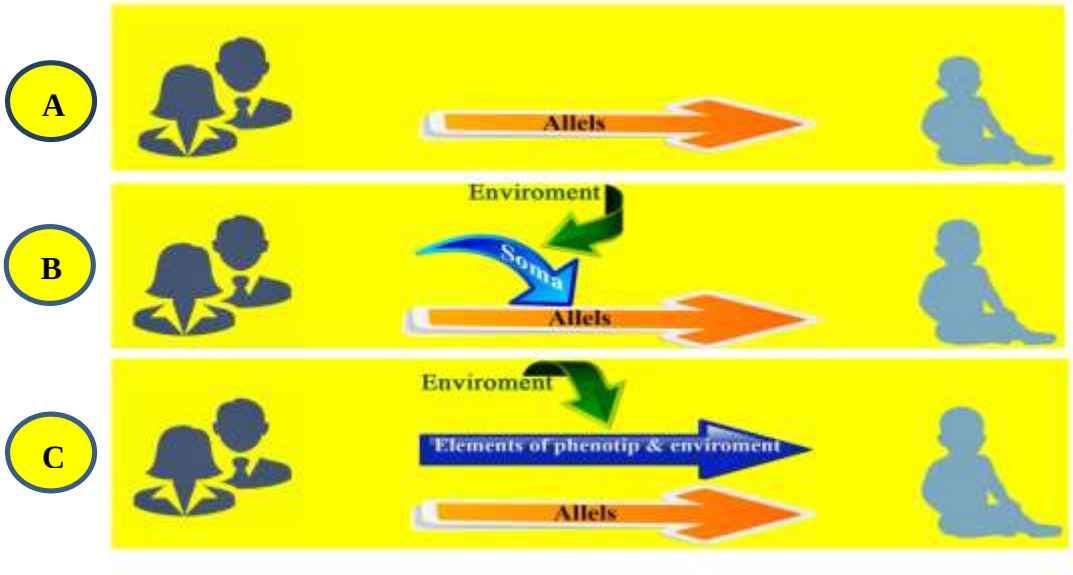


Fig. 1: Modes of heredity (5)

Given that epigenetics refer to phenotypic changes that are unrelated to changes in the DNA sequence, it includes Genomic imprinting, paramatation, polycomb silencing and various environmental effects (6). According to the epigenetic view, genes produce proteins throughout their lives that can produce different proteins in different environmental conditions and produce different phenotypic outcomes. Therefore, epigenetics create the complexity of genetic codes. Interactions with the environment and effects of environment may lead to epigenetic changes in living organisms, change the way the genes function, and eventually transfer acquired properties to the next generation.

In this regard, a topic as behavioral epigenetic in the area of genetic has been raised. Behavioral epigenetic is a domain for studying the role of epigenetic in forming behavior of living organisms. It provides a framework for perceiving how the expression of genes is influenced by peripheral experiences and how behavior, cognition, personality and mental health transformed to genetical traits.

Then, the question is; can ethics, as a behavioral factor, be able to survive for generations with such a mechanism in genetic memory? To answer this question, we first need to consider the concept of ethics and the role of the environment.

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Definition of ethics

Ethics is a domain in philosophy that deals with the aspects of conscientiousness and human behavior. In terms of terminology, the English word of "ethics" is derived from the Ancient Greek word *ēthikós* (ἠθικός), meaning "relating to one's character", which itself comes from the root word *êthos* (ἦθος) meaning "character, moral nature" This word was transferred into Latin as *ethica* and then into French as *éthique*, from which it was transferred into English. Ethics refers to views, values, and perceptions and justifications for these values, while conscientiousness includes traditions and habits of the people and communities. Nevertheless, these two words are used in most cases instead of each other, and they are synonymous (7).

The role of environment in expression of ethical issues

With a look at the history of ethics it can be found that since Socrates came up against the relative sophistication, the scientist and perspectives have been discussed the theory of ethics and most of them focused on the role of environment in forming ethical traits (8).

Current psychologists have shown that the psychological and ethical characteristics of a person have a logical and inseparable connection with the conditions of childhood, mental development, and emotional development, and in general, their environmental characteristics. Environmental features refer to the factors that influence on sperm through environment. These factors can be divided into two categories:

1- Prenatal environment: oxygen, nutrition, temperature, maternal status, drugs and medicines
2- Natural environment: climate, nutrition, geographical area, social environment (family, school, peers, society, culture, religion,..)

These environmental factors influence the individual in a variety of ways and create the conditions for change or transformation. The most important influence of environmental factors on ethics is achieved by training ethics in family and school, through modeling and replication.

But the question that today's experts in science are confronted with is the quality and type of the interaction between inherited traits and natural environment.

Are ethical traits inherited?

Epigenetic behavior believes that individual differences in mood, personality, and behavior can be attributed to the stabilization of acquired features in genes. This is due to the fact that such features have a multi-genial nature. In other words, several genes, some of which are inhibitors and some accelerators, have a role in expression of these ethical features. Also, environmental features can be inhibitors or accelerators as external factors. Therefore, Epigenetics has provided the best explanation for these heritages (5).

Ethics as a behavior can have a multi genetic nature. Accordingly, ethical features that are more often classified as acquired behaviors can be manifested as genetic factors in alternative generations due to changes in the environment in the way they express genes. Environmental conditions can activate epigenetic mechanisms, including DNA methylation and histone alteration, and lead to inheritance of ethical characteristics over many generations.

According to the behavioral epigenetic view, a variety of ethical features such as courage, kindness, violence, accountability, self-control, etc. can be genetically transmitted from generation to generation. These features can be acquired through generations and transform the gene expression and enter into the genetic memory. This is an epigenetic process that can well explain why some ethical features are more common in some societies. For example, why hard work and accountability are common among the Japanese? Is it an acquired or genetic trait, or is it documented by epigenetic mechanisms in the genetic memory of the Japanese?

References

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1. Omidi M, Zarinpanje N (2010). Genome imprinting. *Genetic Novin J*, 5(3): 5-12. (In Persian)
2. Ichan School of Medicine at Mount Sinai (2015). Epigenetic. Available at: https://icahn.mssm.edu/research/friedman/research/epigenetics. Accessed: 2 jun 2018.
3. Haig D (2007). Weismann rules! OK? Epigenetic and the Lamarckian temptation. *Biology & Philosophy*, 22: 415-428.
4. Bonduriansky R (2012). Rethinking heredity, again. *Ecology & Evolution*, 27(6): 330-337.
5. Malmir M, Farhud DD, Khanahmadi M (2014). Inheritance of acquired traits: Expression of happiness & violence gene. *Journal of Laboratory & Diagnosis,* (30): 27-34. (In Persian).
6. Martin C, Zhang Y. (2007). Mechanisms of epigenetic inheritance. *Current Opinion in Cell Biology,* 19: 266-272.
7. Farhud DD (2007). Review of ethics history with gathering of ethics fields. *Ethics in Science & Technology,* 2(1,2): 1-6. (In Persian).
8. Farhud DD, Malmir M, Khanahmadi M (2019). *Ethical Relationship between physician, patient & society.* Miaad Publication, Tehran. (In Persian).

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