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Cross - Century Discovery: Mendelian Dualistic Genetics

By Muying Zhou

Abstract- This article is a summary and review of new insights into Mendel's gene assumption since its rediscovery in 2018. This is a cross-century discovery. The gene assumption told the world that the gene is the element that makes individuals being with parental specifications. The gene is the facilitator rather than the producer. New individuals with parental specifications are produced by the facilitator and its recipient in cooperation. This is conceptually roughly the same as making airplanes with two elements, the drawing and the production line. Thus, the hereditary material should consist of two elements; genetics is dualistic. T.H. Morgan, who founded the theory of the gene and regarded the gene as the producer of individuals, completely misunderstood Mendel, and pulled Mendelian genetics back into the mire of monism. O.T. Avery *et al.* confirmed that genes are DNA, thereby ushering in the era of the physical verification of the truth of genes. The scientific facts gathered in later 60 years finally prove that any individual, animal or plant (including single-celled organisms), is the product of the transcription of its DNA (genome) by the transcriptase (system) of an egg. In other words, the hereditary material able to give rise to the individuals consists of egg transcriptase (system) and DNA (genome).

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Cross - Century Discovery: Mendelian Dualistic Genetics

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I. Introduction

The hereditary material able to give rise to the individuals is the basis of genetics. So "What produces the individual" became the first question of genetics. Before the biological matter was clarified, people can only put forward hypothetical answers such as "miniature", "gemmules" and "Germ-plasm" using their imaginations. Each hypothetical element of these answers had two abilities: the ability to produce and the ability to make the individual meeting parental specifications. This is the inherent feature of monistic genetics. Without either of the abilities, the hereditary material is not able to produce individuals with parental specifications. The modern theory of heredity is rooted in genes discovered by Mendel and influenced by habitual thinking of the monistic genetics, resulting in people of the early last century conveniently regarding genes as the hereditary material. However, whether such an understanding is correct or not can be answered by whether genes have the above two inherent abilities. In 1944, genes were confirmed as DNA; thus, the answer was coming. Finally, science proved that genes (DNA) are only the template controlling individual specifications and have no producing ability. Gene-monistic genetics comes in a hopeless situation. Facing a hopeless situation is undoubtedly very painful, but it can also be the eve of a new breakthrough. When we went back to Morgan's <The theory of the gene> [1], we found the Mendel's gene assumption, and the gene it defined was completely consistent with the fact of today's DNA template: The gene is only an element that makes individuals being with parental specifications. Thus, Mendelian genetics is actually dualistic genetics.

II. The Hereditary Material and its Identification Standards

The hereditary material refers to the material transferred from the parent to the offspring (in the fertilized egg) that is responsible for biological hereditary facts. However, this only indicates from where the hereditary material originates and its logical responsibilities. However, there is no explanation or clarification for why it can, or should, be responsible for the hereditary facts.

Heredity is a well-known fact. It refers to parent–child traits being similar, or even the same, in living things. On the basis of data, we can conclude that the hereditary material is the producer of individuals, and it usually exists completely in the fertilized egg. These data are: 1) The fertilized egg is the direct and only material source from the parent to the offspring; 2) Eggs (fertilized) can produce chickens (individuals); 3) The producer should be responsible for everything in the product (it is natural. Just as if your TV set is broken, then who is responsible? The producer. Who is responsible for an aircraft crash due to a defect in the aircraft itself? The aircraft producer of course).

Thus, we realize that the hereditary material can, or should, be responsible for the hereditary features only because it is the producer of the individual. This leads us to the first gold standard for identifying the hereditary material: *the hereditary material must be the producer of the individual.* Surprisingly, the first gold standard naturally leads us to the second gold standard for identifying the hereditary material: *it must be self-replicating.* It is linked with reproduction. We can prove it

Author: The chief physician, a qualified doctor (Professor Level), The Central Hospital of Shandong Feicheng Coal-Mining Group Corporation, Taian, Shandong 271608, China.
e-mail: fckzmy@sina.com
ORCID ID: http://orcid.org/0000-0001-7415-6735?lang=zh_CN

with the following: 1 cell → 2 cells, where "→" represents producing. Thus, the formula states that the first cell produced a new cell. The cells here could be single-celled organisms, like bacteria. Who is the producer? Of course, it is the hereditary material. Every cell contains the hereditary material, so we can write cell as "cell (the hereditary material)". Consequently, the formula above becomes the following: 1 cell (the hereditary material) → 2 cells (the hereditary material). Note: The pre-formula hereditary material produces a new cell, and the new cell produced in the formula also contains the hereditary material. That is to say, the hereditary material has produced a copy of itself when it produces a new individual. Thus, the hereditary material is self-replicating material.

III. Monistic Genetics and Dualistic Genetics

The theory claiming that the hereditary material should contain only one element belongs to monistic genetics, and the theory claiming that the hereditary material should contain two elements belongs to dualistic genetics.

a) Pre-Mendelian Genetics: Preformation, Pangenesis and Germ-plasm theories

Preformation, Pangenesis and Germ-plasm theories assumed "miniature", "gemmules" and "germ-plasm" respectively, as the hereditary material. Each of these theories belongs to monistic genetics. As the hereditary material of monistic genetics, "miniature", "gemmules" and "germ-plasm" each should have two capabilities: that of production and that of making individuals meeting parental specifications. Unluckily, such wonderful material has not yet been found in the real world. So, these theories have not yet been supported by any scientific facts.

b) Mendelian genetics

Mendel did not aspire to create a new theory of heredity, and he did not offer any answers to the first question. He submitted a paper on a plant hybridization experiment. He described a very specifically designed experiment that posed a new question that was completely different from the "first" question above and opened a new door on genetics.

i. *Mendel's experiment and its results*

Mendel used pea plants of different specifications (varieties; he listed at least seven pairs of different specifications, including individual height, seed color, seed smoothness and flower position) for hybridization experiments. A typical experiment was as follows: "He crossed a tall variety of edible pea to a short variety. The offspring, or hybrids, F_1, were all tall. These were allowed to self-fertilize. Their offspring were tall and short in the ratio of three tall to one short" [1].

ii. *The experimental result raised the second basic question of genetics*

The question raised by such experiments is "Why are there always two types of offspring from a cross between tall and short varieties (pea): one being the tall plants with the same specification as the tall variety, and the other being the short plants with the same specification as the short variety? Even when the F_1 were all tall plants, after F_1 self-fertilization, the short plants appeared again in the offspring". This question does not ask "What produces the individual"? at all, so it is not the "first" question of genetics. We refer to it as the second basic question of genetics [2]. This question is similar to "Why do our plant produced some planes that were big and some that were small? Why were the first batch all big? Why were the last batch big and small in a ratio of 3 big to 1 small"? It asks "What controls the specifications of the product"? We know that the specifications of the aircraft are controlled by the blueprints. Following the specifications implicit in the big aircraft blueprints we produce big aircrafts, and following the specifications implicit in the small aircraft blueprints we produce small aircrafts. Therefore, the questions raised by the experiment inspire us to assume whether the parents of tall and short varieties have their own hereditary elements controlling the product (individual) specifications, whether following the tall specification version can produce tall plants, and following the short specification version can produce short plants? The "second" question usually arises in sexually reproducing species (or crosses between two varieties). Because there are two parents (father and mother), for the producer (the fertilized egg), a new question arises: which version to choose between the father and mother versions to produce individuals? In daily life, the "second question" leads people to ask questions such as "Why is Tom's oldest son tall like Tom, while the younger son is short like Tom's wife? " "Why is Tom's son's nose similar to Tom's nose, but the ears are similar to those of Tom's wife? " or "Why do the noses of the Habsburg family seem to be produced from only one template"? etc.

iii. *Mendel's gene assumption and his dualistic genetics*

In response to the above question, Mendel proposed the gene assumption: "if the tall variety contains in its germ-cells something that makes the plants tall, and if the short variety carries something in its germ-cells that makes the plants short"[1] (Here the "something" is what was later called a "gene"). Mendel then assumed that the tall gene is dominant and the short gene is recessive, which successfully explained the phenomenon that F_1 all tall, and F_2 tall and short in the ratio of three tall to one short.

"The gene can make the individual (plant) to be tall or short (specification)", so it is the facilitator making the individual to be parental (tall or short) specification

rather than the producer of the character. One specification is controlled by a gene (or a group of genes), and seven specifications listed by Mendel would be controlled by seven genes (or seven groups of genes); Therefore, all specifications of an individual should be controlled by a set of genes (genome).

Being only a facilitator, the gene cannot produce individuals alone, only by collaborating with the receptor that accepts facilitation can the gene achieve the facilitation result. For example, a politician promises the voters that "I can make this country great again". Here, he does not mean he can achieve this goal alone. As the facilitator, he can complete it only in cooperation with the people (as recipients) who accepts his path. So, the implicit logic of the gene assumption is that the hereditary material is composed of two elements: one is the gene controlling the individual specifications, and the other is the producing element that accepts the gene limit to perform the operation. The individual is produced by the producing element in the fertilized egg following the specifications limited by the gene (genome). Thus, Mendelian genetics is dualistic genetics [2,3,4.5].

iv. *The support of scientific facts for Mendelian dualistic genetics*

In 1944, Avery *et al*. confirmed that genes are made of DNA, and stated: "DNA is capable of stimulating unencapsulated R variants of *Pneumococcus* Type II to produce a capsular polysaccharide" [6]. This proved that "DNA can make *Pneumococcus* to be S-type (encapsulated) specification". Contrast this with "Genes can make the individual (plants) to be tall or short (specification)", The two sentences' pattern are exactly the same, but the corresponding words are different: genes are replaced with DNA, plants are replaced by *Pneumococcus*, and tall or short specifications are replaced by S-type (encapsulated) specification. It is indeed a miracle that Mendel's gene assumption has been confirmed by such consistent experimental facts 79 years after it was proposed (especially in the era when genes were misunderstood as the dominant ideology of individual producers).

After 1944, the substances that produced the individual in the fertilized egg were quickly identified. When the fertilized egg initiates egg's transcription, the activity of producing the individual begins. In transcription, DNA is the template, and as the template DNA completely matches the gene defined by Mendel; The only material that performs producing operation on the template is egg's transcriptase(s), ·so it is the producing element. There is no possibility of identifying other substances as producing element. That is to say, the two elements underlying the Mendel's gene assumption that form the hereditary material can be affirmed. Nevertheless, the authenticity of these two elements needs to be verified using the gold standards for identifying the hereditary material in the next section. Only those that meet the gold standards are truly the hereditary material.

c) *The theory of the gene, so-called modern theory of heredity (The bad result of ignoring Mendel's gene assumption -- Mendelian dualistic genetics is misunderstood as monistic genetics)*

Finally, we have to discuss the theory of the gene, so-called modern theory of heredity. It claims to be Mendelian genetics, but in fact, it is monistic genetics that arose from misunderstanding Mendel. Mendel's gene assumption cited in this paper from Morgan's <The theory of the Gene>. But there is no mention in the book that Mendel ever proposed the gene assumption. This clearly indicates that Morgan hardly noticed Mendel's definition of genes as the facilitator. But this did not delay his conclusion that "the characters of the individual are referable to genes" [7] and "So long as a complete set of units (genome) is present, the power to produce a new whole is potentially given"[8]. That is to say, Morgan saw Mendel's proposal of "something (gene)", but did not put in effort to distinguish between facilitator or producer. Because he believes that the gene is no different from the "miniature" "gemmules" and "germ-plasm" in history, that is, the hereditary material able to give rise to the individuals. After genes are confirmed as DNA, we can use the gold standards for identifying the hereditary material to test the correctness of the theory of the gene. Molecular biology tells us that DNA is a template, DNA has no producing capacity, DNA can't build 3', 5'-phosphodiester bonds. Then the conclusion is certain: 1) Due to the lack of producing ability, DNA cannot be the producer of the individual. 2) Because DNA cannot establish 3 ', 5' - phosphodiester bonds, DNA cannot replicate itself (DNA can only rely on DNA replicase to obtain passive replication). Visible genes do not meet the two gold standards for identifying the hereditary material. The theory of the gene, so-called modern theory of heredity is a failed theory.

IV. Determining Whether Transc × DNA is the Hereditary Material

We can use Transc × DNA to represent the union of the egg's transcriptase and genome (DNA). Now, we need to prove that Transc × DNA meets the two gold standards for identifying the hereditary material.

a) *Transc × DNA can produce the individuals*

The life of the fertilized egg is launched by Transc × DNA, Transc × DNA creates egg transcription. The fact is that any individual, whether animal or plant, is the product of a natural, preprogrammed, causally continuous and autonomously

producing process caused by the transcription of the genome (DNA) by the transcriptase(s) of the fertilized egg (unicellular organism included). Without egg transcription, no new individuals (new living things) could come into being. These are all undeniable objective facts. Not only does the new individual result from egg transcription, but also an individual in any phase of life results from this producing process (the individual in A, B..... Z phase is the result of this process progressing to the A, B..... Z phase, respectively, such that the individual in the N phase is the result of this process progressing to the N phase). An embryo is the result of this process progressing to the embryonic stage, a juvenile individual is the result of this process progressing to the juvenile stage, and an elderly individual is the result of this process progressing to the declining stage. Death is the result of the termination of this process owing to internal or external causes. It cannot be denied that an individual's life is a continuous process. During this process, the individual existing in each second is the automatic result of the individual existing in the previous second. Once this producing process is started, only death can terminate it. To put it another way, once the automatic and continuous producing activity initiated by egg transcription stops and no longer resumes, the individual's life is terminated. Thus, Transc × DNA not only can produce individuals, but is also the source creating an individual's life.

The fact that the egg's transcription leads to the life of the individual can be seen throughout the world. In a chicken farm, after thousands of eggs enter the incubation room and egg transcription is initiated, the emergence of thousands of chickens is a predictable fact. Even the whole life course of these chickens before being slaughtered has an inherent causal relationship with egg transcription. In silkworm-rearing workshops, when tens of thousands of fertilized eggs start transcription, the appearance of tens of thousands of young silkworms is expected with a high probability, and death is the only accident that can stop the activities led by an egg's transcription. The eons of survival history of various single-celled organisms are also the result of egg transcription in the first cells of these species. Transc × DNA is the root substance responsible for all these facts.

A fact that must be stated: In this section you can see that egg transcription initiates a continuous automated producing process, much like the automatic producing process of the car. An automatic automotive production line contains a series of accessories to ensure the appropriate and reasonable output of various components in time and space smoothly throughout the assembly process. Similarly, the transcriptase operating on the template also requires a series of transcription factors as attachments to ensure the appropriate and reasonable output of various products in time and space smoothly throughout the assembly process. Thus, to be precise, the producing element is a series led by the egg transcriptase that contains the complete set of transcription factors prestored in the egg, *the egg transcriptase system.* However, there is no doubt that the transcriptase is the leader of this system, and it is the only factor that actually consumes energy, does work and is responsible for establishing 3', 5'-phosphodiester bonds [3,5].

b) Transc × DNA can produce itself

Because Transc × DNA is the maker of the individual, it must be able to replicate itself owing to their inevitable connection. In the aforementioned formula: 1 cell (the hereditary material) → 2 cells (the hereditary material), if we change (the hereditary material) to (Transc × DNA), then we get the following: 1 cell (Transc × DNA) → 2 cells (Transc × DNA). The Transc × DNA in the first cell is the producer of the new cells, but the new cells also contain Transc × DNA. Thus, the first Transc × DNA has produced a new Transc × DNA, showing that Transc × DNA can replicate itself.

V. Conclusion

The Mendel's gene assumption leads us to find Mendelian dualistic genetics, the ultimate scientific genetics. Scientific facts have shown that the hereditary material able to give rise to the individuals consists of egg transcriptase (system) and DNA (genome). Transc × DNA not only is the source of producing the individuals, but also is the source of the individuals' lifelong existence.

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[For Peer Reviewer]

Highlights of this manuscript

1. *Correctly realize the Mendel's gene assumption*: "if the tall variety contains in its germ-cells something that makes the plants tall, and if the short variety carries something in its germ-cells that makes the plants short"[1] (Here the "something" is what was later called a "gene"). "The gene can make the individual (plant) to be tall or short (specification)", so *it is the facilitator making the individual to be parental (tall or short) specification rather than the producer of the character.* Being only a facilitator, the gene cannot produce individuals alone, only by collaborating with the receptor that accepts facilitation can the gene achieve the facilitation result. *For example, a politician promises the voters that "I can make this country great again".* Here, he does not mean he can achieve this goal alone. As the facilitator, he can complete it only in cooperation with the people (as recipients) who accepts his path. So, the implicit logic of the gene assumption is that the hereditary material is composed of two elements: one is the gene controlling the individual specifications, and the other is the producing element that accepts the gene limit to perform the operation. The individual is produced by the producing element in the fertilized egg following the specifications limited by the gene (genome). Thus, Mendelian genetics is dualistic genetics.
2. The gold standards for identifying the hereditary material
   - The hereditary material must be the producer of the individual
   - The hereditary material must be self-replicating.
3. Compare the following two sentences:
   - 1865 Mendel said that genes can make the individual (plants) to be tall or short (specification);
   - 1944 Avery *et al*. said that DNA can make *Pneumococcus* to be S-type (encapsulated) specification".

It is indeed a miracle that Mendel's gene assumption has been confirmed by such consistent experimental facts 79 years after it was proposed (especially in the era when genes were misunderstood as the dominant ideology of individual producers).

4. *New discovery:* Transc × DNA (represent the union of the egg's transcriptase and genome) not only is the source of producing the individuals, but also is the source of the individuals' lifelong existence.