The Biological Basis of the Cultivation of Medical Senior Innovative Talents

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Abstract. Every new discovery in the history of biology, such as the essence of life, the origin of life, the discovery of cells, the establishment of cytology, the cell biology at the molecular level, etc., the biologist has left brilliant track in the journey of scientific innovation. The home climbs the glorious footprint of the Science Footills. Nowadays, to cultivate cross-century competitive high-quality talents, we must advocate the spirit of not afraid of difficulties, fore ahead, and be brave to explore; we must conscientiously study and master the basic concepts, theories and methods of biology, with history and philosophy. Trace back to these concepts, theories and methods. In this way, we will improve our ability of innovation, continue to have new and more discoveries in science.

1. Introduction
Medical students who have just entered the university are generally unfamiliar with scientific research activities and feel that research work unattached The problem is that students have too little knowledge about the scientific research’s foundation. According to this, the mystery of scientific research and innovation can be broken by consciously introducing the basic knowledge of scientific research. It advocates the spirit of not being afraid of difficulties, forging ahead, and being brave to explore. This is a kind of exercise and tempering for the will quality of college students. It can develop into no fear of suffering, tiredness, and cultivate their strong curiosity, And innovative spirit. The great discoveries that called "scientific innovation", while adding treasures to tresaurus of human knowledge, have left, more or less, or implicitly or directly, the footprints of biologists climbing the mountains of science. In order to uncover the mystery of heredity, countless scientists have gone to work hard to build a monument. Today, while learning and mastering the basic concepts, theories and methods of biology, we trace the ins and outs of these concepts, theories and methods from a historical and philosophical perspective, which helps to open students’ view about scientific research in thinking and innovative spirit, Broaden your thinking and inspire thinking. Cultivate the spirit of scientific innovation.
2. The essence of life
A general topic and concept of biological research is about the essence and origin of life. It involves the most basic questions of biology: What is life? Where does life come from? The answer to them reflects human nature and the essence of life. The overall or fundamental view of its developmental law, also known as the "life view", which constitutes an important component of the human nature view. There are two kinds of objects in the various and complicated nature. One is an inanimate object, and the other is a living, that is, a living body. This is also clear to the people of ancient times. So, I asked a question: What is life? When you pick up an egg and compare it to a cobblestone of the same size, the problem is well prominent. Since the day of biological research, humans have been obsessively exploring it, trying to uncover its mysteries.

Self-regulation, self-replication, and selective response is the most basic characteristics of life differed from non-life, and the essence and basis of life law different from physical and chemical laws. Of course, there are also mechanical, physical, and chemical processes in life activities. And They are abundant. However, these processes in the living body are only a secondary form, and they are subject to the laws of biology.

3. The origin of life
Where does life come from? This is a question that must be answered in any philosophical view of life. The origin of life, the events that happened quietly on the earth at least 4 billion years ago, after the vicissitudes of the earth, seems to have left nothing we can trance. It is well difficult to find the real cause of the origin of life, but humans have been looking forward to uncovering this mystery.

In 1953, American scientist SL Miller, inspired by the theory of Obalin, put a mixture of methane, ammonia, water vapor and hydrogen into a closed system, according to some ideas of his director h. c. urey, and generated electricity for a week by continuous sparks, resulting in a large number of organic compounds. The reaction products were identified as 11 amino acids, including glycine, alanine, aspartic acid and glutamic acid. Miller simulated the primitive earth conditions to synthesize biological small molecules, which had a significant impact on the study of the origin of life and became a key experiment in the history of the study of the origin of life. Although the instrument used by miller is very simple, his rigorous conception and exquisite design can well meet the requirements of the experiment, which has great enlightenment to future generations. Since then, many scientists have synthesized many kinds of organic compounds by simulating the primitive earth conditions.

Although the experimental simulation of the chemical evolution of the origin of life has done a lot of work, it mainly focuses on the synthesis of small biomolecules. As for the synthesis of important biomacromolecules, progress is not great, and the work on the original cell model is limited to the hypothesis and Presumably, there is still a big gap from the original life on the original earth. The origin of life is to study the problem of how the material "lives from death" more than 4 billion years ago. The difficulty can be imagined. Only by strengthening multidisciplinary cooperation, especially cosmology, geology, organic chemistry and molecular biology, can we gradually overcome the fortress of life origin.

4. Cell discovery
For a long time, human beings mainly relied on the naked eye to observe various things in the world. From the 16th century to the beginning of the 17th century, microscopes and telescopes were invented almost simultaneously. The advent of the microscope set off a craze of using it to observe tiny objects. The school of microscopists is generally called the school of microscopists.

The first person to observe the cells through a microscope was the British physicist R. Hooke. In 1665, is responsible for the royal society of optical instrument repair job, hook in homemade a magnification of 40 ~ 140 times by the compound microscope, used cut a knife from a piece of clean cut a piece of cork smooth chip, and carries on the observation under the microscope, he seemed to see a small hole, but not too clear. After that. He cut the very thin piece more carefully and placed it on two black plates (because it was white), so he clearly saw that the cork sheet was originally composed
of neatly arranged honeycomb cells. Hook called these cells - cells, the original meaning of the cell is "empty room." He introduced the process of discovering cells in "Microscopic Spectrum" and said: "It is judged from the light and easy deformation of cork... If I am more careful, I think I can see it clearly with a microscope.... The deep convex mirror casts on it, and I can see very clearly that it is all porous, much like a honeycomb." In fact, the “cell” that Hook saw at the time was actually not a living cell. It is the cavity left by some cells in the cork tissue. Despite this, people still think that Hook is the first person in the world to discover cells. Hook’s discovery sparked interest and enthusiasm for exploring the mysteries of biological structures, and many people used microscopes to observe various materials and provided a lot of knowledge about cells.

5. Establishment of cytology
The completion of the cytological establishment is the work of two German biologists Schleiden and Schleiden was born in Hamburg, Germany, the son of a famous doctor. He studied law at the University of Heidelberg in his early years and returned to his hometown to work as a lawyer after graduation. In 1931, Schleiden did not hesitate to abandon his lawyer career, went to the University of Göttingen to study medicine, and later went to the University of Berlin to study botany. Schleiden was an eccentric but talented and creative scientist. His quick thinking and ability to grasp the essence of the problem through the phenomenon made him a great success in science. But he is arrogant, prone to excitement, and the subject matter is often subjective, which also makes him have many mistakes in his work. He took the sensitivity to science and started from the nucleus discovered by Brown, which was followed by people's attention. He found that the nucleus is closely related to cell development, thus further exploring the problem of cell production and formation. According to observations and research, Schleiden published a book on "Plantogenesis" in 1838, expounding his views on the structure of plants and their growth and development from cells to individuals. He believes that all plants, regardless of their complexity, are made up of different kinds of cells. These cells are produced in the same way. Therefore, cells are the basic unit of life of all plant structures, and all plants are developed from cells. Schleiden's good friend, Swang, was born in Neuss, Germany. He studied medicine in Würzburg and Berlin in his early years. After graduating in 1834, he became an assistant to the famous physiologist J. P. Muller of the Berlin Institute of Anatomy. With the encouragement of Miller, he has made important contributions in histology, physiology, and microbiology. Shi Wang is a devout archbishop with a gentle temperament, good at thinking, and cautious and conservative. His character is in stark contrast to Schleiden in many ways. However, they have always maintained a deep friendship.

Cytology is the first theory of biology about the structure of the body, and the first structural theory put forward from the whole biological world. Its establishment is a radiant milestone in the history of biological research. Its establishment marks the rise of cytology, a new discipline, which means that people's understanding of biological structure has entered the cell level from the level of the uterus; it also marks a turning point in biological research and academic views. It has far-reaching impetus and guiding significance for the further development of biology. Cytology shows us the basic components of animals and plants and the basic units of life activities. Although animal and plant cells vary widely in shape and function, they share common basic structures and basic characteristics. They develop according to common laws and have similar life processes. Cells are not immutable, but have their own growth and development processes. This corrects the misconceptions of the two life circles in the animal and plant world. With the occurrence and development of the cell itself, it confirms and reveals the common origins in the structure of plants and animals, and follows the common law. Since then, the unity of animal and plant structure is no longer a philosophical inference, but a fact of natural science.

6. Entering cell biology at the molecular level
In the past 20 years, with the rapid advancement of molecular biology, new methods and technologies have been used to raise bamboo shoots after the rain. Endlessly, cell research has reached the
molecular level. Only the contribution of C. Blobel will be introduced here. Blobel is a German cell biologist. In 1971, he proposed a "signal hypothesis" about how cells control egg transport. In his view, the newly synthesized protein molecules inside the cell are like letters in a mailbox, each with a zip code or address tag. The postcode of a protein molecule is a special sequence of amino acids inside the molecule, called a "signal sequence" or "signal peptide" in the protein, which indicates the destination of the protein molecule. In other words, proteins carry signals inside their molecules that help them pinpoint their place in the cell. The signal hypothesis was originally a matter of pure speculation, a product of imagination and intuition. In the absence of any data at the time, it would have been arrogant to suggest such a speculative view. As a result, Blobel's "signal hypothesis" attracted a lot of criticism at that time. Papers trying to refute this hypothesis kept appearing, and his paper was rejected numerous times. However, blobel firmly believed in his theory and with an indomitable determination to test all the predictions of his hypothesis. Blobel recalls: "the hypothesis was originally a fantastic idea, but at the time it was so advanced that there was no evidence of protein 'signal sequences'. But it was the best hypothesis we could build at the time."

By 1975, Blobel had finally deciphered the first protein signal sequence and expanded on the hypothesis made in 1971 that there was a protein channel in the cytoplasmic endoplasmic reticulum membrane through which proteins to be broken down would enter the endoplasmic reticulum. Over the next 10 years, Blobel worked out the molecular mechanisms at each stage of the process, proving that the "signal hypothesis" is not only true, but also a general rule that applies to microbes, plants, and animal cells. After completing a series of experiments in the early 1990s, Blobel is finally very proud to announce that his team has confirmed the existence of the long elusive endoplasmic reticulum protein pathway. The elucidation of intracellular protein transport mechanism based on Blobel signal theory has a profound influence on biology and medicine. It has laid a foundation for modern molecular and cell biology, and truly extended the research of cell biology to the molecular level. It has become a new milestone in the development of cell biology, and at the same time, it has provided new ideas for the research of diseases. Blobel won the 1999 Nobel Prize in physiology or medicine.

7. Uncover the mystery of heredity

7.1 Mendel discovers the laws of inheritance

Genetics and variation are one of the basic characteristics of life. Since ancient times, people have a strong interest in the inheritance and variation of living things. Although they have tried to reveal the mystery of genetics, they can only rely on speculation and speculation because of the limitations of the scientific level at that time. Since the late 18th century, plant hybridization experiments have been carried out vigorously. The initial plant hybridization experiments mainly focused on the development of new plant species through hybridization. Many people have found that the first generation produced after plant hybridization is more consistent in traits. The second generation of traits will begin to become diverse, and the final result of the hybridization is unpredictable and ultimately does not find anything regular. The situation changed when you went to Mendel: “To know the truth from the simplest things”. Mendel first found 34 types of peas. It took two years of effort to cultivate pure lines, and took out 22 types with distinguishable stability, and removed the types with insignificant traits. Finally, 7 was selected. For relative traits: 1 round and wrinkled at the beginning of the seed; 2 yellow and green at the cotyledon color; gray and white with 3 skin colors; 4 full and underfilled in the shape of the pod: 5 green and yellow of the color of the immature pod; 6 inflorescences top and twin: 7 high and short. In the process of hybridization experiments with plants with the above traits, Mendel's initial use of the parent and the female parent only required a trait, which simplifies the phenomenon being studied and facilitates the observation of the traits of plant traits. After hybridizing seven pairs of relative traits, he found that the traits of the first generation were similar to one of the two parents. "The type of gradual transition between the two parental traits has never been observed or the continual tends to both parents. The type of one." In the second generation of the child generation after self-pollination, the traits of the two original parents were simultaneously expressed, resulting in the
separation of traits. The discovery of the dominant phenomenon and the separation phenomenon after this hybrid provides an important argument for Mendel's hypothesis of the "granularity" of genetic factors. After the preliminary identification of the single traits, he introduced new factors, and studied the genetics of two pairs, three pairs, and more traits, gradually complicating the research objects, from simple to complex, step by step. The study also found the law of free combination.

7.2 Methodology for discovering DNA structure
The molecular structure of the nucleic acid proposed by J. D, Watson and FH Crick in 1953 - a structural model of deoxyribonucleic acid, is the greatest biological discovery since the 20th century. It is found that making biological research from the cellular level to the molecular level, the whole biological appearance is new, creating a new era of molecular biology.

In this scientific competition, five scientists ran in the front, and they belonged to three groups. One group is the chemist of the California Institute of Technology, L. Pauling, and the other is the physicist Wilkins and R. Franklin of Hopkins College in London, England. Watson and Crick of the Cavendish Laboratory at the University of Cambridge, England.

In exploring the structure of DNA, Watson and crick paid special attention to the role of modeling in scientific research. Under the premise of certain observation experiments and existing background knowledge, the model method is to abandon the research object, (prototype) external representation, abstract the basic characteristics, so as to build a reflection of the prototype of the simulation, (model), with the help of the model analysis, indirect geographical clear prototype of the internal structure and movement rules. This proves the saying that opportunity favors those who have brains. Furthermore, opportunity plus persistence and hard work are the prerequisite for innovation.

8. Conclusion
The 21st century is an era of knowledge economy. It is an urgent task for us to cultivate high-quality talents with cross-century competitiveness. The key to implement quality education is to cultivate students' innovation ability. The cultivation of students' innovation consciousness and ability is related to the realization of the strategic goal of rejuvenating China through science and education. As future medical talents, whether they can lead the new trend of reform and development in the 21st century in the era of knowledge economy depends on the cultivation of innovative spirit and ability. In order to train high quality creative medical talents for the 21st century, universities should insist on the spirit of scientific innovation throughout the whole teaching process in the teaching of biology. The purpose is to cultivate students' awareness of scientific research, scientific attitude, innovative thinking, and constantly improve students' comprehensive quality.

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