

Ideological and Political Practice of Molecular Biology Course with Ideological and Political Element Mining

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Abstract: Classroom teaching is the main position for universities to implement academic education and cultivate morality. Ideological and political education in colleges and universities should run through all courses and the whole learning process. “Molecular biology” is the main course of biology majors. This paper explores the teaching reform ideas of ideological and political education in the course of “molecular biology” from the aspects of curriculum objectives, ideological and political elements mining and implementation path, in order to achieve the talent training goal of double cultivation of morality and industry and both morality and ability.

Keywords: Curriculum Thought and Politics; Molecular Biology; Reform in Education

In 2016, general secretary Xi Jinping held the National Conference on ideological and political work in colleges and universities and in the report of the 19th National Congress of the Communist Party of China in 2017, it was clearly proposed to take building morality and cultivating people as the fundamental task of comprehensively implementing the party’s educational policy and running a socialist university with Chinese characteristics. College teachers must combine knowledge transfer with value guidance, and combine knowledge education with the education of cultivating and practicing socialist core values and ability education, so as to better cultivate students, truly teach and educate people, and promote and carry out “curriculum thought and politics”. Molecular biology is the professional core course of students in the Biotechnology Department of our university. The implementation of curriculum thought and politics in this course plays two roles. On the one hand, teachers teach professional knowledge to make students recognize the importance of their major and lead to the realization of students’ own value; On the other hand, due to the obscure content of molecular biology professional knowledge, students’ learning interest is not high and gradually lose their learning self-confidence. Through the silent integration of ideological and political content, students’ learning interest and self-confidence are stimulated, so as to lay a good foundation for students’ future professional quality, and then realize the training goal of biotechnology professionals. This is also the specific practice of implementing the spirit of the National Education Conference and practicing the “Rural Revitalization Strategy”. It is the bounden responsibility of young teachers in the new era to “inherit the red gene, educate people with populus euphratica spirit and serve Xinjiang and border consolidation”.

1. Teaching contents and course objectives of molecular biology

As a core course, molecular biology includes nucleic acid, structure and function of genome, replication, transcription, translation, gene expression regulation of prokaryotic and eukaryotic organisms, etc. The course is mainly offered in the fourth semester of sophomores. The theoretical teaching is 40 class hours and the experimental teaching is

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16 class hours. The required pre courses include many courses such as biochemistry, microbiology and botany. At the same time, it is also the core courses for students majoring in biotechnology, such as basic courses such as biopharmaceutical, genetic engineering and cell engineering. It mainly explains how genetic material is transmitted in organisms with the main line of “central law”, the structural characteristics and functions of genes and genomes, how to repair errors in the process of DNA replication, as well as the commonly used experimental techniques and theoretical methods of transgenic, so as to finally cultivate the rigorous scientific research thinking and scientific innovation spirit of biotechnology students, and finally improve the comprehensive quality of the organic combination of students’ theoretical knowledge and time operation.

2. Main problems and solutions in the teaching process

The first problem is that teachers do not establish the concept of curriculum ideological and political teaching. University professional course teachers generally believe that they are responsible for the explanation of professional knowledge, and the ideological and political course is the content of ideological and political teachers. At the same time, they believe that their professional knowledge cannot be well integrated with the ideological and political content. The main reason for this situation is that professional teachers have a narrow understanding of ideological and political education, and believe that ideological and political education is mainly about socialist ideological education such as Marxist theory, party spirit education and patriotism theory. In fact, curriculum ideological and political education is a concept of curriculum education, which aims to make students in the international vision and pattern through the implementation of a series of professional knowledge teaching activities; Ci Hai and craftsman spirit; Sincere cooperation, silent dedication, unity of knowledge and practice; Social responsibility, legal awareness, humanistic quality and professional ethics have been improved, and finally to give back to the country a high-quality professional talent with both morality and talent.

Students do not pay attention to the ideological and political content is another prominent problem. On the one hand, students also have misunderstandings about ideological and political courses and curriculum ideological and political courses. They think that curriculum ideological and political courses are ideological and political courses such as Marxism Leninism at the freshman stage, which have been studied and do not need to be studied later. At the same time, this part is not related to future work and skill learning and seems to be of little help. Second, professional knowledge is necessary for future work, which leads to the misunderstanding of students’ understanding of ideological and political course, and finally makes students not understand and pay attention to it in their future study. Molecular biology is one of the most rapidly developing frontier disciplines in the field of life science. With the high-throughput sequencing technology, gene editing technology and the rapid development of nucleic acid detection technology and gene therapy technology, the emergence of these frontier biotechnology means provides a powerful technical means for human beings to passively test nature to actively transform nature. Therefore, higher requirements are put forward for talents engaged in relevant professional posts in the field of life sciences. There is an urgent need for comprehensive talents with solid professional knowledge, cutting-edge biotechnology skills, strong innovation ability and professional quality. So, college students should not only master solid professional skills through the study of professional courses, but also pay attention to the study of curriculum ideology and politics to cultivate the sense of responsibility and become useful talents who can better serve the country and society.

3. Finding the breakthrough point and digging deep into the ideological and political elements of the curriculum

According to the Curriculum Ideological and Political Implementation Plan issued by the educational administration of Xinjiang Agricultural University in March 2019, combined with a series of requirements for carrying forward the core values of socialism with Chinese characteristics in the new era, epidemic prevention and control, student safety and stability, Molecular Biology introduces relevant ideological and political content around the central law and gene expression regulation.

3.1 Tracking the frontier of disciplines and cultivating international vision and pattern

With the rapid development of molecular biology, some new theories and technologies emerge one after another, which requires professional teachers to have keen current affairs research and control ability, integrate the latest research contents and new technologies into classroom theory teaching activities, and inspire students to acquire new knowledge, creative thinking, so as to enable students to achieve academic growth through the construction of academic classroom. For example, “Olfactory receiver pseudo-pseudogenes (Nature, 2016)” and “Evolutionary genetics: Smiles like a pseudogene (Current Biology, 2016)” two research reports on pseudogenes with certain functions break the traditional understanding that pseudogenes are pseudogenes without biological functions in the genome. In the traditional sense, DNA replication initiation requires a segment of primers, which is due to the lack of heavy head synthesis function of

DNA polymerase. However, Professor Zhu bin, an excellent scientist in China, found a DNA polymerase without primers in the study of deep-sea volcanic virus. This conclusion breaks the traditional cognition that a segment of RNA must be used as a primer at the beginning of DNA replication. The automobile exhaust published by American scholar Lee contains polycyclic aromatic hydrocarbons (PAHs) substances lead to the shortening of human telomeres. Chinese scholars Duan Huawei and Zhang Xiao found that diesel engine exhaust is related to DNA damage. Introducing these latest research results into classroom teaching will not only enable students to understand the latest frontier progress of molecular biology and broaden their international vision, but also establish a world-wide mind, base on China and contribute to the strength of the country through their own efforts the determination to give your strength.

3.2 Enhancing students' sense of national identity and national self-confidence

China's research level in the field of life sciences has entered a qualitative leap, from no voice in international innovation to the continuous strengthening of voice. For example, China accounts for only 1% of the seats in the human genome project. At this stage, China has comprehensively analyzed the genomes of a large number of plants such as cotton and rice and animals such as reptiles, shellfish, shrimp, crab and fish. Shi Yigong's team published the high-resolution three-dimensional structure of the spliceosome in the international top magazines *Science* and *Cell*, and connected the spliceosome mediated RNA splicing process completely for the first time, providing the clearest and most comprehensive structural information for understanding the molecular mechanism of RNA splicing. On April 25, 2014, Chinese scientists Li Guohong and researcher Zhu Ping analyzed the high-definition three-dimensional left-handed double helix advanced structure of 30 nm chromatin formed by DNA and protein folding for the first time in the world. Introducing the high-level research results of Chinese scientists into the theoretical knowledge points of molecular biology, on the one hand, it will promote students to understand the important research results obtained by Chinese scientists in theoretical innovation and molecular machine analysis, and integrate some Chinese elements, such as introducing the agricultural production experience of "Laurel bears laurel, and Tung bears Tung" when talking about DNA semi retention replication, and in the annals of the nations of the Eastern Zhou Dynasty, the words "You get what you sow, you get what you sow" enable students to understand the excellent traditional Chinese culture and enhance national self-confidence.

3.3 Strengthening the shaping of professional spirit

The emergence of new theories and technologies in molecular biology is inseparable from the hard work of countless scientists for decades. For example, in 1928, British bacteriologist Griffith carried out the famous "Griffith experiment" with two strains of pneumococcus R and S, and found the transformation law. After 16 years, American scientists such as Avery carried out in vitro transformation experiment based on the transformation experiment of pneumococcus, which further proved that DNA is genetic material. Through the introduction and explanation of the story, students need to understand that the birth of major experimental discoveries requires thoughtful experimental design, standardized experimental operation and cooperation among experts in different fields. Through the story of DNA as a double helix model proposed by British biologist Watson, British biologist, physicist, neuroscientist Crick, British molecular biologist Wilkins, British physical chemist and crystallographer Rosalind Franklin, students are made aware of the need for interdisciplinary and joint disciplines in collaborative research and innovation. In the future work, we must establish the concept of teamwork. tRNA is always carrying amino acids in the process of protein synthesis. This is just like the spirit of Lei Feng, who is always regrets, diligent and selfless in the COVID-19 service, and is worth learning and developing. Polymerase chain reaction (PCR) technology is used to complete the amplification of in vitro DNA under the cooperation of DNA template, primer, dNTP, Taq enzyme and other reaction elements, and introduce the spirit of adhering to post responsibilities and conscientious collectivism to maintain harmonious social relations and good social order.

3.4 Establishing the concept of rule of law and ecological civilization

When explaining the regulation of gene expression, the orderly progress of various life activities of organisms is mainly the result of the switching and regulation of various genes in the genome according to a certain time and space sequence. We can guide students to proceed from the overall situation consciousness in the "five consciousness", be able to be fearless of the supervision and inspection of any organization at any time, and adhere to the moral bottom line, but do not touch the legal bottom line, nor completely stick to the rules, just as genes can not only stably express and ensure the stability of species, but also produce genetic variation conducive to species evolution. We should have the courage to keep pace with the times, dare to innovate, but don't rush forward, otherwise it will wantonly destroy the life order like abnormal cell cancer cells, and finally the whole life, in order to enable students to establish the concept of legal system. The universality of genetic code can be extended to the world, just like a global village, and the protein that eukaryotic cells fold incorrectly and is not degraded by protease will pollute the intracellular environment like garbage on the street, lead to loving nature and treating life well, and establish the concept of ecological civilization of "green water and green mountains are golden mountains and silver mountains".

4. Ways to promote ideological and political teaching of molecular biology

4.1 Improving teaching resources

In the process of compiling the syllabus, we can integrate ideological and political education into the curriculum, rebuild the curriculum system, and fully mobilize students' interest in learning by integrating ideological and political cases into obscure theoretical teaching, so that students not only master professional theoretical knowledge, but also get education in the shaping of socialist core values and outlook on life, family and country feelings, sense of national identity and pride, communist ideal and sense of mission of the times, integrity, friendliness and moral cultivation, professional ethics and industrial ethics.

4.2 Changing teaching methods

Driven by new educational technologies such as multimedia and combined with new educational ideas, the classroom teaching mode has changed from "teacher as the center of classroom teaching activities" to "student as the center of classroom teaching activities". Teachers need to use TBL, CBL, PBL, flipped classroom, bilingual teaching and other teaching modes. When the professional course teachers put forward scientific problems, students will "build knowledge, analyze problems and solve problems", in order to improve students' scientific research thinking and innovative thinking by actively establishing the discipline knowledge structure.

4.3 Expanding the ideological and political carrier of molecular biology course

Since the university issued the Curriculum Ideological and Political Implementation Plan, the university has approved the curriculum ideological and political project for many times. The purpose is to encourage teachers to improve the ideological and political level of professional teachers by participating in teaching and research project research. Through the improvement of teachers' ideological and political level, some innovative experiments are carried out in the theoretical teaching of molecular biology, and students are encouraged to take groups as units, from experimental design, drug allocation to mutual cooperation to jointly complete experiments. In the whole process of experimental teaching, in addition to exercising their scientific literacy, they also enhance their spirit of mutual trust, unity, cooperation and selfless dedication, in order to deepen their understanding of ideological and political education and broaden the curriculum. Ideological and political education is limited to the carrier of theoretical teaching. In addition, the teaching and research office has also cooperated with some biotechnology industries to establish practical teaching bases, such as biopharmaceutical factories. Through on-site observation and learning in the practice base, we can guide students to apply what they have learned, exercise students' practical operation ability, and find and solve problems, so as to further improve their professional recognition and enhance their sense of social responsibility.

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