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Teaching Exploration and Practice of the Ideological and Political Theories Teaching in the Courses of Basic Biochemistry

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Abstract: *Basic biochemistry refers to the chemistry of life, relevant to our daily life. It is an important basic course in biology, horticulture, agronomy, plant protection, resource environment, food, forestry and other biology majors in our university. As a new idea and mode of ideological and political education in Colleges and universities, the ideological and political theories teaching in all courses is important to educate and guide contemporary college students to strengthen their aspiration, strength of character and confidence to be Chinese and to cultivate a large number of successors who can take up the important responsibilities of the times. This paper explores the ideological and political connotation behind the basic knowledge of biochemistry from the perspective of teaching design, highlights the fundamental task to cultivate people with moral character, and cultivates composite applied agricultural and forestry talents, who meet the talent cultivation target of the university and the needs of the society, with the spirit of dedication, pragmatic and rigorous scientific spirit, enterprising and innovative spirit of exploration and positive values of life.*

Keywords: *Ideological and political theories teaching in all courses; Biochemistry; Composite applied agricultural and forestry talent*

1. Introduction

As for the overall design for the ideological and political theories teaching in all courses of Basic biochemistry, it adheres to take Xi Jinping Thought on Socialism with Chinese Characteristics in the New Era as the guidance, concentrates on the strategic orientation of the "four centers" of Beijing and the real needs of building a world-class harmonious and livable city, closely combines the school orientation of " located in the capital, serving the three rural areas, radiating to the whole country" and the school characteristics of "urban modern agriculture" to fulfill the demands for modern urban agricultural talents based on capital development and Rural Revitalization, and deeply explores the ideological and political connotation behind the basic knowledge of biochemistry to highlight the position of biochemical theory and practice in basic courses of horticulture, agronomy and other agriculture related majors.

The ideological and political theories teaching in all courses is always running through the main line of Xi Jinping Thought on Socialism with Chinese Characteristics in the New Era, revolving around the fundamental questions of "what talents are cultivated, how they are cultivated and for whom they are cultivated". Combining the firm ideals and beliefs, patriotism and scientific spirit with the teaching objectives and knowledge points organically, it thoroughly explores the ideological and political elements behind the relevant knowledge points. It also adopts various means such as historical review, knowledge popularization, in-class quiz, etc. to fully incorporate the scenario design for regulating the classroom atmosphere, and carries out the ideological and political theories teaching in all courses in a subtle way while imparting the course knowledge, so as to guide students to establish correct values and outlook towards life, develop good living habits, and cultivate positive and healthy college students.

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2. Teaching Team and Philosophy of the Ideological and Political Theories Teaching in All Courses

2.1. Establishment of teaching team

Biochemistry is an important basic course in biology, horticulture, agronomy, plant protection, resource environment, food, forestry and other biology majors in our university, providing a theoretical and experimental foundation for students of related majors to better study other courses and carry out various experimental researches. We have established a teaching team covering a faculty featured by rich teaching experience and reasonable age structure, among which there are 11 theoretical lecturers and 3 teaching experimenters. In the teaching team, the experienced professors are selected as teaching and research mentors to form a mutual support group between the new young teachers and experienced teachers; The experienced teachers with excellent moral character and virtues are hired by the university as the ideological and political mentors to guide young teachers in teaching, and to guide the revision of ideological and political teaching plans and the ideological and political examples. Members among the teaching team collaborate with each other in teaching theories, teaching methods, teaching skills, and ideological and political elements to continuously improve the thinking political literacy of professional teachers [1].

2.2. Teaching team philosophy

The team persists in conducting seminars on teaching and ideological and political theories teaching in all courses, explores their connotations in depth with the opportunity of the new round of syllabus revision, and incorporates them into the syllabus. Therefore, 1-2 sessions of the ideological and political theories teaching in all courses are designed for each chapter, integrating organically with the curriculum theory in a subtle manner to effectively strengthen moral education and cultivate people.

3. Teaching Design of the Ideological and Political Theories Teaching in All Courses

As for the overall design for the ideological and political theories teaching in all courses of Basic biochemistry, it adheres to take Xi Jinping Thought on Socialism with Chinese Characteristics in the New Era as the guidance, concentrates on the strategic orientation of the "four centers" of Beijing and the real needs of building a world-class harmonious and livable city, closely combines the school orientation of " located in the capital, serving the three rural areas, radiating to the whole country" and the school characteristics of "urban modern agriculture" to fulfill the demands for modern urban agricultural talents based on capital development and Rural Revitalization, and deeply explores the ideological and political connotation behind the basic knowledge of biochemistry to highlight the position of biochemical theory and practice in basic courses of horticulture, agronomy and other agriculture related majors. In addition, the ideological and political course highlights the fundamental task to cultivate people with moral character, and cultivates composite applied agricultural and forestry talents, who meet the talent cultivation target of the university and the needs of the society, with the spirit of dedication, pragmatic and rigorous scientific spirit, enterprising and innovative spirit of exploration and positive values of life.

Basic biochemistry is a science that studies the chemical nature of the vital movements, involving the chemical composition of living organisms (structural biochemistry) and the chemical changes and their laws in the life processes (metabolic biochemistry). The structural biochemistry is composed of amino acids, proteins, enzymes, vitamins and nucleic acids; the metabolic biochemistry consists of glycometabolism, biological oxidation, lipid metabolism, nitrogen metabolism, replication, transcription and translation of DNA and metabolic regulation [2].

Biochemistry refers to the chemistry of life, relevant to our daily life. Taking full advantage of it, the ideological and political elements are explored in each chapter of *Basic Biochemistry* in conjunction with the revision of the new syllabus, so that at least 1~2 ideological and political in-class sessions in each chapter are offered. In the chapter of "Introduction", for example, our ancestors' contributions to the world culture in the fields of brewing and Chinese medicine are introduced in the chapter of the history of biochemistry development; The students are guided to explore the importance of "To investigate things is to attain knowledge" proposed by Confucianism in scientific research in the chapter of biochemistry research methods, fully reflecting the "cultural confidence". By introducing Professor Tu Youyou's Nobel Prize for artemisinin, the students are guided to cultivate good research

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habits and establish the values and outlook of life regarding the strenuous research and overcoming difficulties for the urgent needs of the motherland and the people; In the in-class quiz session, it uses the original biochemistry question of the National Agricultural Graduate Entrance Examination, "(China) synthesized biologically active alanine aminoacyl tRNA for the first time in the world", to consolidate the theoretical knowledge. In addition, it introduces the historical background behind the achievement of a major research project by the former scientists who worked together under extremely difficult conditions and overcame difficulties, so as to guide students to establish "the confidence in the culture" and "the confidence in the system". With the introduction of the "melamine incident", the protein content determination method is introduced to emphasize that scientists should make use of their research achievements for the benefit of people and society, instead of speculating, minding their own economic interests and endangering the public. When introducing the secondary structure of insulin, the students are guided to establish correct ideals and values as a result of the introduction that China synthesized active insulin for the first time in the world under extremely difficult conditions in 1965. This is a major scientific and technological advancement at the Nobel Prize level. During the introduction of common protein and amino acids, the students are taught to develop cultural confidence by introducing the contribution of our scientists in the discovery of the 22nd amino acid. The ideological and political objectives and case designs in each chapter are shown in Table 1.

Table 1: The objective and case design of the ideological and political theories teaching in all courses of Basic biochemistry

Chapter	Teaching objectives	Objectives of ideological and political education	Case designs of the ideological and political courses
1 Introduction	Connotation, research contents, development history and research methods of Biochemistry	Cultural confidence and academic norms	The discoveries and contributions of Chinese ancestors and scientists in the Biochemical field; Professor Tu Youyou won the Nobel Prize for artemisinin; China synthesized biologically active alanine aminoacyl tRNA for the first time in the world.
2 Protein Chemistry	Structure and properties of amino acids and proteins, research methods of proteins	Academic morality, correct ideals, beliefs and values, cultural confidence	Melamine incident; Wu Xian, a Chinese scientist, put forward the concept of protein denaturation; China synthesized active insulin for the first time in the world; Chinese scientists are involved in the discovery of the 22nd amino acid.
3 Enzymology	Chemical essence of enzyme, catalytic mechanism, enzymatic kinetics, determination of enzyme activity, vitamins	Cultural confidence, vitamins and Health Science Popularization	The ancient Chinese used the vitamin to treat the diseases in practice, such as the treatment of night blindness with animal liver and the treatment of beriberi with a soup made from grain peel in the Tang Dynasty by the medical sage Sun Simiao. Daily vitamin use and health.
4 Nucleic acid chemistry	Types, distribution, chemical composition, molecular structure, physicochemical properties and research methods of nucleic acids	Academic ethics and norms	The discovery of the double helix structure of DNA by James Watson and Francis Crick illustrates how the intercommunication among different disciplines is important for scientific discovery as well as academic standards and academic misconduct.
5 Carbohydrate metabolism	Glycolysis, citric acid cycle, HMP pathway, gluconeogenesis, glycogen metabolism	Good lifestyle habits and the concern for the health of the family	Students are guided to cultivate good dietary habits, concern for their own and their family's health, and actively participate in science popularization by the introduction to diabetes and other diseases through abnormal glycometabolism.
6 Biological Oxidation	Introduction to biological oxidation, electron transfer chain, oxidative phosphorylation	Confidence in the culture and system	ATPase is the smallest molecular motor in the world, while the hydraulic turbine set of Three Gorges is the largest motor worldwide.
7 Lipid metabolism	Lipids, fat consumption and decomposition, decomposition and anabolism of fatty acids in organisms	Good diet and exercise habits	Through the introduction of lipid metabolism diseases such as fatty liver and obesity, students are guided to cultivate good eating and exercise habits and actively participate in the science popularization.
8 Nucleotide metabolism	Structure and composition of nucleotides, decomposition and anabolism of nucleotides	Good dietary habits and health science popularization	Students are guided to cultivate good eating habits, concern for the health of others, and actively participate in the science popularization in terms of the causes and treatment of ventilation.
9 Metabolism of amino acid	Protein decomposition, and decomposition and anabolism of amino acid	Good dietary habits, four types of confidence	The scientific and technological progress in China is introduced in terms of transaminases, the incidence rate of hepatitis B in China, and free vaccination of children under 15 years old against hepatitis B; Vaccine for hepatitis B was awarded as one of the top ten advances in science and technology over the past 30 years of reform and opening-up in China, ranking third after Shenzhou spacecraft and hybrid rice.
10 Biosynthesis of DNA	Semiconservation replication process, replicative enzyme and reverse transcription of DNA	Insistence on scientific research with the correct values	Cultivate the originality and sentiment of devoting to scientific research and the development of our country from the perspective that McClintock is all devoted to seedling transposon research.
11 Biosynthesis of RNA	Transcription characteristics and process of prokaryotic RNA, related enzymes transcribed by prokaryotic RNA, post-transcriptional processing of RNA.	Cultural confidence, correct scientific research attitude and method	Important discoveries by Chinese scientists in the field of gene editing take over the international frontier.
12 Biosynthesis of protein	Protein synthesis system, protein synthesis process and post-synthetic processing	Confidence in the culture and system	China synthesized alanine aminoacyl tRNA for the first time in the world
13 Metabolic regulation	Metabolic pathway connection, metabolic regulation forms, prokaryotic gene expression regulation	Confidence in the culture and system	Chinese characteristics underlying the complex processes of manned spaceflight, lunar exploration project, manned deep-sea submersible, BeiDou navigation, high-speed railroad, etc.

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4. Curriculum Features and Innovation

The course is designed to deeply excavate the ideological and political elements behind the knowledge points related to biochemistry, and combine the ideological and political elements such as firm belief in science, love of the Party, country and socialism with the teaching objectives and knowledge points. By adopting various means such as historical review, knowledge popularization and in-class quizzes, the ideological and political theories teaching in all courses is carried out in the subtle way, which not only teaches professional knowledge but also enlivens the classroom atmosphere. In addition, it can achieve a "multi-win" effect of teaching the course through implementing the fundamental task to cultivate people with moral character [3].

(1) Case 1: Kjeldahl method and the Social Conscience of Scientists (who is trained)

Teaching contents: Protein content determination

Teaching objectives: Fundamental principle of Kjeldahl method for determination of protein content

Teaching emphasis: Average nitrogen content of amino acids

Teaching difficulties: The potential problems or loopholes of the Kjeldahl method.

Teaching methods: Questioning and exploratory discussion

Teaching method: PPT courseware and picture

Ideological and political theories teaching in all courses: It is the melamine incident that exploited the loopholes of the Kjeldahl method, taking high nitrogen compounds of non-protein as a substitute for milk. As a result, the protein content of raw materials was false high, eventually bringing irretrievable social problems and economic losses. Scientists should adhere to bottom line awareness.

(2) Case 2: ATP synthase and Three Gorges Dam (confidence in the system)

Teaching contents: ATP synthase

Teaching objectives: Structure and capacity mechanism of ATP synthase

Teaching emphasis: Structure and chemical permeation theory

Teaching difficulties: Structure and capacity mechanism of ATP synthase

Teaching methods: Questioning and analogy

Teaching means: PPT courseware and picture.

Ideological and political theories teaching in all courses: ATP synthase and the turbine set of the Three Gorges Dam are the smallest and largest generating units in the world, respectively, and the capacity mechanism of ATP synthase resembles the principle of power generation of the Three Gorges Dam.

5. Teaching Practice of the Ideological and Political Theories Teaching in All Courses

The teaching team gives instruction for multiple majors, and the interaction between the teachers and students from different majors helps to generate different inspirations for the teaching of "the ideological and political theories teaching in all courses" throughout the teaching process. Through the discussion among the course team members, the teaching team members communicate with each other to learn each other's strengths, and expand their innovative thinking by virtue of the power of the group [4]. In addition, the course has been completed through lectures, literature reading, and proven theoretical experiences for the improvement of the teaching system of the ideological and political theories teaching in all courses of biochemistry. Faculty and student evaluations are used at the end of the course to find out the effect of teaching practice. The assessment and evaluation of the ideological and political theories teaching in all courses involve: the understanding of students about the ideological and political theories teaching in all courses, the content of the ideological and political theories teaching in all courses that students are interested in, the appropriate ratio of the ideological and political theories teaching in all courses incorporated, and the evaluation of the implementation effect by students. According to the research, students are most interested in the personal experiences, good qualities and technical applications of famous people in their daily lives. The content of the basic

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biochemistry course has close relationship with the "three rural" issues, such as efficient breeding, environmental pollution, biological disease detection and treatment and other issues. As the "Three Rural" issues have been the focus of society at present, it is necessary to serve the "Three Rural" issues both in the technical services and in the personnel training. By teaching the ideological and political theories teaching in all courses, we cultivate the emotion of "liking, loving and respecting agriculture" among agricultural students [5-6].

6. Conclusion

Biochemistry is an important professional basic course. Being a teacher of this course, we should pay attention to the ideological and political theories teaching in all courses and find the combination of professional teaching and ideological and political theories teaching in all courses effectively. This paper sets the corresponding ideological and political points of each chapter surrounding the ideological and political theories teaching in all courses of Biochemistry in higher education, and lists the corresponding ideological and political examples of the course in the teaching process. However, the work on this ideological and political theories teaching in all courses is still in the initial and exploratory stage at present. Not only the teacher and student improve their ideological and political literacy, but the management departments also need to give guidance to the key teaching links such as the course training program, syllabus and textbook selection, so that this new educational concept and educational mode of the ideological and political theories teaching in all courses can become the regular teaching content.

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