

Exploration and Practice of Course Teaching the "Detection Technologies of Biological Drugs"

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Abstract: The course of "Detection Technologies of Biological Drugs" is a core professional course of drug biotechnology specialty, which is a highly comprehensive discipline. Combining my own teaching practice, the author analyzes and explored the teaching modes, teaching methods, teaching focus and other aspects of the course of "Detection Technologies of Biological Drugs", so as to promote the teaching research and reform of the course.

Keywords: Detection technologies of biological drugs; Teaching research; Professional ethics education; Ideological and political theories teaching in all courses.

1. Introduction

On the basis of the analysis of traditional western medicine and traditional Chinese medicine, "detection technologies of biological drugs" is a new discipline developed rapidly to meet the needs of the rapid development of biological drugs. It is a discipline that studies the analytical methods, basic theories and operating technologies of biological drug composition based on the courses of Analytical Chemistry, Instrument Analysis, Molecular Biology, Immunology, Microbiology, Biological Pharmaceutical Technology, etc. Students can set a complete concept of medicine by studying this course, proficiently master the principles and operation techniques of the observation, identification, inspection and content determination of various biological drugs, and have strong experimental operation ability; can independently complete chemical inspection, biological inspection and health inspection of various drugs in accordance with the pharmacopoeia; in the process of preparation production, biopharmacy and biological new drug development, according to the requirements of drug quality standards, strengthen quality supervision, comprehensively control drug quality, and develop students' logical thinking ability on problems, rigorous and serious experimental attitude and correct experimental operation ability.

The author found some problems in the teaching process, I hereby put forward them in order to further improve the teaching quality of the course. I throw away a brick in order to get a gem, and hope that we can discuss and make progress together.

2. Orientation of the Teaching Contents of "Detection Technologies of Biological Drugs"

Biological drugs are a large class of products for prevention, diagnosis and treatment, which are processed and manufactured by using organisms, biological tissues or their components and comprehensively applying the principles and methods of biology, biochemistry, microbiology, immunology, physical chemistry and pharmacy. Biological drugs have developed rapidly and been widely used, they are called the three drug sources together with chemical drugs and

traditional Chinese medicine. The 2020 edition of the "Chinese Pharmacopoeia" is published in three parts, one is traditional Chinese medicine, two is chemical medicine and three is biological products. In the course teaching, at present, the most set course on drug analysis and testing is "Drug Analysis". The course "Detection Technologies of Biological Drugs" has only been set up in recent years, so it should be different from "Drug Analysis" in contents.

"Drug Analysis" is aimed at chemical drugs, while "Detection Technologies of Biological Drugs" is aimed at biological drugs. The drugs in "Drug Analysis" are classified in accordance with different chemical structures, for example; aromatic amine drugs, heterocyclic drugs, quinoline drugs, etc.; the drugs in "Detection Technologies of Biological Drugs" are classified in accordance with different physiological functions, for example; enzyme drugs, protein drugs, nucleic acid drugs, etc.

There are some particularities in the production process of biological drugs: the extraction and purification process are complex; stability is poor; it is easy to deteriorate. Therefore, in the inspection process, not only the physical and chemical indexes need to be inspected, but also the biological activity indexes need to be inspected, especially the safety inspection. This is also a major feature of biological drug detection.

Therefore, our teachers should fully understand these features of biological drugs in the course of preparing lessons. In teaching, students are required to pay full attention to it. This is the reason why we need to open a new course called "Detection Technologies of Biological Drugs", which is different from chemical drugs.

3. Optimizing Teaching Contents and Implementing Modular Teaching

There are many knowledge points in the course "Detection Technologies of Biological Drugs". In order to help students better understand and absorb these complex knowledge points, we can optimize the teaching contents of "Detection Technologies of Biological Drugs" as a whole and implement modular teaching. After the contents of various chapters are summarized and combined, which are divided into "Basic Requirements for Personnel of Biological Drug Quality Inspection Posts", "Basic Preparation for Biological Drug Testing", "Basic Procedures of Biological Drug Testing", "

Identification Test of Biological Drug", "Impurity Detection of Biological Drugs", "Safety Detection of Biological Drugs", Content Detection of Biological Drugs. The module teaching is designed in accordance with the workflow of the actual inspection post, so that the teaching contents are more practical.

4. Effective Learning Method-- Comparison Method

The course "Detection Technologies of Biological Drugs" is a comprehensive and highly applied course. It requires that students have mastered the early knowledge of inorganic chemistry, organic chemistry, analytical chemistry, immunology, genetics, microbiology and pharmacy. The knowledge point required for this course is numerous and scattered, most students find it difficult to grasp the rules, cannot improve their learning level, and even difficult to learn the rudiments. How to help them remove these obstacles has become very urgent and imperative.

In the teaching process, I suggest that students use the comparison method for learning. Let the scattered contents form a certain system, compare them in the system, find out the similarities and differences, and facilitate students to understand and remember.

For different kinds of drugs or the same kind of drugs with different sub classifications, the fixed framework is adopted in the arrangement of teaching contents. Drug overview - structural features - physical and chemical properties - identification and inspection methods - impurity inspection - content determination - valency determination - other determinations.

In teaching, the contents of each drug are arranged in the same framework. In this way, students can build a clear learning idea, connect different drugs in the same project. For example, polysaccharide drugs include mucopolysaccharides, bacterial polysaccharides, and fungal polysaccharides. The identification methods of the three drugs are: mucopolysaccharides are precipitation method (red precipitation of cuprous oxide) and standard reference method; bacterial polysaccharides is precipitated (red precipitate of cuprous oxide); fungal polysaccharides are α -Naphthol reaction, ninhydrin reaction. Students found out the similarities and differences through horizontal comparison, enhanced the systematization and logicity of knowledge points, greatly improved the learning efficiency and reduced the learning difficulty.

5. Strengthening the Teaching Intensity of "Chinese Pharmacopoeia" in Course Teaching

"The Pharmacopoeia of the People's Republic of China" is the full name of the Chinese Pharmacopoeia, shortened to the Chinese Pharmacopoeia, it is the legal technical standard of drug development, production, inspection and national supervision and management of drug quality in China. According to the requirements of the syllabus of this course, the contents related to the "Chinese Pharmacopoeia" is in the introduction of Chapter 1, with 2 class hours. In this limited time, we can only roughly introduce the general situation of the Pharmacopoeia and the basic structure of the Chinese Pharmacopoeia to the students, and master some terms related to drug testing. Most students are still vague about the specific

use methods of the "Chinese Pharmacopoeia", let alone the importance of the pharmacopoeia. The end result is that most students still don't know how to use it.

As a teacher, I deeply know the importance of the "Chinese Pharmacopoeia" in the process of drug production, marketing and use. If students hold pharmaceutical posts in pharmaceutical enterprises in the future, their mastery of the "Chinese Pharmacopoeia" will also affect their working ability. Therefore, it is very important and urgent to strengthen the teaching of "Chinese Pharmacopoeia" in the course teaching! Therefore, in the teaching process, teachers should adopt the teaching mode of chapter-by-chapter infiltration and step by step, so that students can gradually master the contents of various parts of the Chinese Pharmacopoeia, as well as the function and importance of each part of the Pharmacopoeia.

First, we can carefully explain the standard terms and relevant provisions by copying the examples in the pharmacopoeia, so that students can gradually understand the relevant terms and correctly understand the contents of the texts in the pharmacopoeia.

Second, the electronic version of the "Chinese Pharmacopoeia" and the courseware made of special cases are used to teach students to use the Pharmacopoeia to search for drugs. In the study of drug identification, inspection, content determination and content determination, students can see the corresponding contents in the pharmacopoeia in the form of courseware, which can visualize this part of knowledge and make students remember deeply.

Finally, in the teaching of the experimental course, students can inquire about the inspection items and appendixes of the relevant test drugs in the pharmacopoeia before doing experiments, and deeply understand the guiding role of the "Chinese Pharmacopoeia" in the biological drug inspection work, which is an indispensable tool book in the work.

6. Strengthening the Basic Training of Experiment and Training Students' Experimental Skills

Pharmaceutical analysis is a discipline with strong practicality, experimental teaching is an important link for students to consolidate and deepen their understanding of detection theory of biological drug, it plays an important role in training students' rigorous, meticulous and practical scientific style. In the course of experiment class, students' basic operating skills should be strictly trained from experimental accuracy, experimental speed, experimental records and experimental reports, and wrong operating methods should be corrected in time, so that students can develop the habit of standardized operation, correct use and care for various instruments. It is of great significance to improve the quality of experimental teaching!

Therefore, the author believes that the arrangement of biological drug testing experiment courses should be divided into two types: testing experiment and design experiment. The testing experiment aims to improve students' practical operation skills through strict operation training. The design experiment is an experiment project proposed by the teacher, which allows students to design experiments by themselves, write the experimental process, drugs and instruments required for the experiment through the knowledge they have learned, or by consulting the literature and the "Chinese

Pharmacopoeia". Through two types of courses, students' ability to integrate theory with practice and comprehensively apply knowledge is improved, and students' scientific thinking methods are preliminarily trained.

7. Integrating Ideological and Political Theories Teaching in All Courses in the whole Process of Teaching

7.1. Permeate Professional Ethics Education in Teaching Activities

Drug is a special commodity, and its particularity is reflected in that unqualified drugs may endanger the lives of patients. Therefore, inspection as an important barrier to ensure the quality of drugs, the responsibility of the staff on the inspection post is very important. Any mistake not only causes great losses to the enterprise, but also requires the inspection staff to bear legal responsibility.

These professional ethics educations do not need to be done specially, and can create an atmosphere and scene suitable for infiltrating professional ethics education in the teaching process, so that students can form professional ethics behavior habits unconsciously.

When students complete the experimental training, writing the training record report is a link that is very suitable for infiltrating professional ethics education. For example, drugs need to be weighed in the process of the experiment, Weighing requires a certain degree of accuracy. Weighing "0.1g" means that the weight can be 0.06-0.14g. Only when the weighing is accurate and has a certain degree of accuracy can the test results be more accurate and correct, so that they can be written into the record report. Secondly, we should emphasize to the students that the writing of the training record report of this course is different from that of the past. The biggest difference is that there must be a verification conclusion. We judge whether the drug is qualified based on the "Chinese Pharmacopoeia", the measured value is compared with the value specified in the pharmacopoeia, and then we can draw a conclusion of "qualified" or "unqualified". Finally, signatures of inspectors and reviewers are required. The students in the same group can play these two roles and perform different duties.

Teachers should repeatedly emphasize that "quality is the life of the enterprise", and good quality should come from the work of responsible inspectors. How to reflect responsibility? We must follow the record report written by everyone, once the inspection is qualified, the drugs will enter the circulation

field and be sold to hospitals, pharmacies and patients. If problems are detected, there will be irreversible consequences.

In these hidden teaching links, make students constantly establish the concept of professional ethics of respecting life, love their jobs, respect their integrity, abide by labor discipline and strictly follow professional norms.

7.2. Use Cases to Infiltrate "Craftsman Spirit" in Teaching Activities

This course is the first professional core course that students come into contact with, II the course of ideological and political infiltration, the logic of professional identity-emotional internalization-behavior promotion are adopted. The demonstration of cases can enhance the sense of professional identity while infiltrating the "craftsman spirit".

For example, as the first basic theoretical research achievement in the world after the birth of New China, the crystalline bovine insulin synthesized by Zou Chenglu's scientific research team has caused a great sensation in the world. Sino pharm COVID-19 Vaccine has been approved by about 80 countries and international organizations for registration, marketing and emergency use, the vaccination population has covered 196 countries, becoming the most widely used and most effective COVID-19 vaccine in the world. These cases reflect the features of China's biotechnology drug research and development, contribute to building a healthy China, realizing the Chinese Dream of the great rejuvenation of the Chinese nation, and benefiting China and the world.

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