

Promotion of the Construction of Medical Immunology Course with the Goal of Creating "Golden Class"

Jun Hou, Xiaofang Wang, Dan Dong, Junying Xu, Suwen Wang, Jingzhou Wang, Xian Wang, Xueling Chen

Department of Pathogenic Biology and Immunology and Department of Basic Medicine, Shihezi University, Shihezi 832000, Xinjiang, China.

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Abstracts: In order to increase the gold content of immunology learning, stimulate students' interest in learning and improve the learning effect, we take building a "golden class" as the goal, carry out the construction of medical immunology curriculum, and use different immunology teaching methods to promote the mutual growth of teaching through the learning of clinical cases of immunology; We also carry out immunological literature learning, improve students' knowledge reconstruction and application ability, and carry out online phased testing, in order to make learning difficult and challenging, increase the timeliness, cutting-edge and application value of medical immunology teaching content, to effectively improve the teaching quality.

Keywords: Medical Immunology; Golden Class; Case, Science Frontier

In June 2018, the concept of "golden class" was first put forward by Minister of Education Chen Baosheng in his speech at the National Conference on Undergraduate Education of Colleges and Universities in the New Era. Its main purpose is to eliminate the "water class" existing in undergraduate colleges and universities and turn it into a "golden class" with depth, difficulty and challenge, so as to effectively improve the teaching quality of the course. Medical immunology is an important basic and pillar course in the field of medicine and bioscience. With the goal of creating a "golden class", it turns the course of medical immunology into a high-level course with depth, difficulty and challenge, and improves the gold content of this course is the direction of medical immunology course construction. ① It focus on offline classroom teaching, optimizes teaching design, and strives to break through key and difficult points in the classroom; ② It combines with clinical immunity, and promote teaching and learning through case study; ③ It pays attention to the frontier development of immunology and introduce the frontier knowledge of scientific development; ④ It can carry out a series of teaching reform measures, such as online phased testing, improving the quality and difficulty of proposition, making learning difficult and challenging. It is very necessary to build the medical immunology course in the direction of "golden course".

1. Optimizing the teaching design and focusing on breaking through the key and difficult points in the classroom

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Classroom teaching is the main position, channel and battlefield of "golden class". Medical immunology is a science with rapid theoretical development. Its knowledge system is based on a large number of scientific experiments. The basic principle of immunology involves the interaction of a large number of molecules in the body. Therefore, many students think that immunology is too difficult to learn and understand. Therefore, the first important link of teachers' offline teaching is to optimize the teaching design and strive to break through the key points and difficulties. We have carried out targeted teaching design for key and difficult points. Through targeted examples, vivid metaphors and a large number of pattern diagrams to help students understand.

For example, the introduction of adaptive immunity in the first chapter is to understand that the characteristic of adaptive immunity is immunity against specific viruses by introducing the story of Jenner vaccinia; The reasons behind COVID-19's vaccination are typical examples of adaptive immunity. When distinguishing innate immunity from adaptive immunity, we use "a pair of ordinary shoes" or "a pair of exquisite customized shoes" to describe the functional and specific differences between innate immunity and adaptive immunity; In the third chapter, in the study of T and B cell epitopes, B cells are used to identify the appearance and appearance of the enemy. The disadvantage is that "people know the face but not the heart"; T cells do not look at the appearance of the enemy, but see the real continuous amino acid arrangement inside, that is, linear peptides; In Chapter 5, when introducing the function of complement regulatory protein in the complement system, and the complement is compared to a grenade. What if grenades bloom everywhere and explode into their own cells? Human cells are equipped with many protective measures to prevent this from happening. Complement regulatory protein can be imagined as a "bomb removal force" to control the activation intensity and range of complement. For example, if pig organs are transplanted into baboons, these transplanted pig organs become plasma in a few minutes. Why do baboons themselves cause such obvious damage to these foreign organs? The culprit is the complement system. Complement regulatory proteins expressed in pig organs, such as CD59 and DAF, and do not regulate the complement system of baboons. When introducing the differentiation and development of B cells in Chapter 9, it is emphasized that the genes encoding BCR exist in the form of separated and numerous gene fragments in the embryonic stage. This means that, unlike other genes, their exons are not complete. Exons are cut into small fragments. For gene expression, these small fragments need to be spliced one by one to form a complete exon.

2. Combining with clinical immunization, promoting teaching and learning through case study

Immunology of traditional Chinese medicine is also one of the examination subjects in the qualification examination of clinical practitioners. Due to the limitation of the number of class hours, the teaching of immunology focuses on the mastery of basic knowledge and basic theory. If according to the requirements of the outline of the qualification examination for medical practitioners and the integration of basic and clinical, the part of clinical immunology is also within the scope of the examination for medical practitioners. Need immunology teaching is the content of self-study requirements, and often appears in exams. Therefore, in teaching, we should integrate clinical immunology into basic immunology teaching, especially the knowledge points closely related to clinical diseases, such as a variety of primary immunodeficiency diseases, common complement system deficiency diseases and autoimmune diseases. Only by integrating with clinical immunology can we better contact the medical practitioner examination, and truly train clinicians who meet the professional requirements. At the same time, the study of clinical cases can also promote the growth of teaching and learning, which is conducive to the construction of teachers. The collection of cases and the design of problems require teachers to have solid professional knowledge and clinical knowledge, so as to promote teachers to constantly update their knowledge and enrich themselves through various ways. In order to promote the connection between immunology and clinic and understand the role of immunology in the process of disease development through cases, we translated and discussed some cases in the foreign language textbook *Case Studies in Immunology*, which was carried out in the way of student preview and classroom explanation in class. Through the interspersed case explanation in offline teaching this semester, it is found that students are still very interested in case learning, which expands students' clinical thinking and improves their ability to apply basic immunology knowledge to solve clinical immune problems.

3. Paying attention to the frontier development of immunology science and introducing the frontier knowledge of scientific development

Immunology is a subject with rapid development. There is some lag between the basic knowledge in textbooks and the clinical application of scientific frontier, which requires teachers to act as a bridge in the classroom. By combining the basic knowledge of immunology and the frontier knowledge of immunology, students can apply what they have learned and strengthen their ability to master and apply knowledge. For example, when it comes to cytokine TNF- α . We will introduce Adalimumab (TNF)- α Blocker) — the first fully humanized anti TNF in the world- α . The application of drugs in autoimmune diseases will also be combined with the story of antibody phage display technology and "divine drug" adalimumab. Through the stories of George Smith and Sir Gregory winter, who won the Nobel Prize in chemistry in 2018, we will explain in detail how phage display technology is used to promote the research and development of monoclonal antibodies. When talking about the surface molecules of T lymphocytes, we will first introduce that immune checkpoints are a series of important co inhibitory molecules represented by PD-1, in which PD-1 combined with ligand PD-L1 can inhibit the proliferation of T cells and IL-2 and IFN- γ . By introducing the story of immune checkpoints, this paper introduces the application prospects of immune checkpoints that have attracted much attention: CTLA-4, PD1/PDL1, TIGIT, TIM-3, LAG-3 and related drugs, such as Epimumumab and Pabolizumab. While introducing the important co inhibitory molecule CTLA-4 (CD-152) on the surface of T cells, transmitting inhibitory signals, down regulating or terminating T cell activation. Further introduce the "past life", "present life" and "future" of epimumumab and the proposal of the 2018 Allison Nobel Prize in physiology and medicine, that is, the whole humanized CTLA-4 immune checkpoint therapy. While learning the basic theory of immunology, students can better contact the clinic and provide theoretical knowledge and technical support for clinical treatment through the understanding of scientific and clinical frontier knowledge.

4. Carrying out online phased tests to improve the quality and difficulty of final exam propositions, making learning difficult and challenging

In terms of testing, we divided immunology learning into two stages. The first nine chapters and the last nine chapters of the learning content were tested in the rain classroom. Each test contained 40 questions, all of which were single choice, and the specified answer time was 30min, which was carried out in the form of open book. The test questions have certain difficulties. The purpose of the phased quiz is to consolidate learning. Through the course learning survey after the final exam, it is learned that students prefer to increase the number of phased tests and hope to carry out this phased test after each chapter.

5. Conclusion

The classroom teaching of immunology should focus on in-depth understanding, application, analysis, evaluation and creative high-level understanding. Because there are a large number of online self-study resources, the focus of teachers' classroom teaching is no longer to cover every knowledge point, but to give a more in-depth explanation of the key points and difficulties in detail. Through targeted examples, vivid metaphors and a large number of pattern diagrams to help students understand. We should use different immunology teaching methods, such as learning clinical cases of immunology, introducing a large number of cutting-edge knowledge of scientific and clinical development, and actively carry out online phased testing, so as to increase the timeliness, cutting-edge and application value of medical immunology teaching content, and effectively improve the teaching quality of medical immunology.

References

1. Xi Q, Li C, Huang M, et al. Exploration on teaching reform of medical immunology. Chinese Journal of Medical Education 2021; 41(01).
2. Liu B, Wu C, Shen K, et al.. Medical immunology is closely combined with the practice and exploration of clinical application teaching. Dasic Medicine and Clinic 2018; 38(12).