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· 生物医学教学 ·

CBL 教学模式在细胞研究进展教学中的应用效果

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摘要 目的:探讨案例式教学(CBL)教学模式在细胞研究进展教学中的应用效果。**方法:**选择我校 2013~2015 级选修 "细胞研究进展" 的学生 80 人为研究对象,按选修课程时间的不同分为实验组及常规组各 40 例。常规组实施传统的教学模式(LBL),实验组实施 CBL 教学模式,调查两组学生的教学效果并比较两组学生考试得分情况。**结果:**实验组学生分析问题的能力、临床思维的建立、课堂积极性及教学满意度得分均高于常规组,差异均有统计学意义($P<0.05$)。实验组学生临床案例分析及临床操作能力得分均高于常规组,差异均有统计学意义($P<0.05$)。**结论:**对选修细胞研究进展课程的学生采用 CBL 模式进行教学,有助于其建立临床思维,提高临床操作能力,提高学生对教学的满意度。

关键词:教学模式;CBL;LBL;细胞研究

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Application Effect of Applying CBL in the Teaching of Cell Research Progress

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ABSTRACT Objective: To explore the application effect of applying case based learning (CBL) in the teaching of cell research progress. **Methods:** Selected 80 students who took "cell research progress" as an elective course in our school from 2013 to 2015, they were divided into the experimental group and the conventional group, each of the 40 cases, according to the different elective course time. Lecture-based learning (LBL) was implemented in the conventional group, the CBL teaching mode was implemented in the experimental group, teaching effects and test scores were compared between the two groups. **Results:** The ability of analyze problems, establishment of clinical thinking, classroom enthusiasm and teaching satisfaction scores in the experimental group were higher than the conventional group, the differences were statistically significant($P<0.05$). The clinical case analysis and clinical operation skill scores in the experimental group were higher than conventional group, the differences were statistically significant ($P<0.05$). **Conclusion:** Using CBL teaching mode in the students who take "cell research progress" as an elective course, is able to establish the clinical thinking, improve the ability of clinical operation, as well as the satisfaction to the teaching of students.

Key words: Teaching mode; CBL; LBL; Cell research

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前言

研究细胞生物学有助于了解细胞的结构和功能,掌握细胞生命活动规律,在细胞水平上认识人体生命及疾病的规律^[1]。而细胞的增殖及分化是个体生长发育、维持组织稳态、修复损伤的细胞学基础^[2,3]。因此细胞理论知识与细胞生物学的核心知识体系具有较好的统一性,有利于学生理解掌握细胞生物学的核心知识体系。近些年细胞理论知识发展较为迅速,在基因治疗、新药筛选、细胞治疗等多个方面均发挥着重要作用,了解细胞

研究进展,有助于开拓学生视野,及时掌握科研动态^[4-6]。细胞研究进展课程知识面广,教学难点诸多,授课时间有限,教学内容晦涩难懂,传统的教学方法学生往往很难理解掌握。提高细胞研究进展课程的教学质量,更新教学手段已经势在必行^[7]。案例式教学(case based learning, CBL)是以案例为基础,通过对案例的分析和设计,在教学中发现问题的,以期达到教学目标的一种新兴教学模式^[8]。为了提高学生的学习热情,对细胞研究进展知识理解更为透彻,我们将案例教学法用于"细胞研究进展"教学中,教学效果较为满意,现总结如下。

1 资料与方法

1.1 一般资料

选择我校 2013~2015 级选修 "细胞研究进展" 的学生 80 人为研究对象,按选修课程时间的不同分为实验组及常规组各

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40 例。实验组中男性 29 人,女性 11 人;2013 级学生 24 人,2014 级学生 10 人,2015 级学生 6 人。常规组中男性 27 人,女性 13 人;2013 级学生 23 人,2014 级学生 11 人,2015 级学生 6 人。两组学生性别、年龄比较差异无统计学意义($P>0.05$)。

1.2 实施方案

两组学生用 36 课时学习细胞研究进展课程,常规组实施传统的教学模式(lecture-based learning, LBL),教师按照教学大纲认真备课,采用多媒体设备进行教学,课堂以教师口授,学生认真听课为主。实验组实施 CBL 教学模式,具体方法为:教学前准备:教师每次课后将下周的计划、参考文献、英文教材有计划地布置给学生,方便学生自主学习,提高学生浏览文献、查阅资料、独立学习的能力。学生自行选择组成 5~7 人的学习小组,布置课后作业,根据每个章节所学习知识的不同,提出该章节的重点问题,并分配给每组,问题难度设置不宜过大,应紧扣教材,且学生能通过组间讨论、查阅资料的方式得到解决。课堂中讲解:课堂中教师的教学围绕案例进行,将传统教学中的重点及难点置于真实的案例中。因此教师在此环节中应注意激发学生的热情,引导学生积极的参与。教师的讲解则需精简,做到知识要点系统化,操作流程形象化,讲授案例分析时,不仅应注意知识点的涵盖,还应抛出案例分析中的诊疗思路,为更深层次的学习做好铺垫。每堂课快结束时,让学生讲解案例分析的体会,并对重点难点问题进行阐述,了解学生知识掌握情况。学生通过学习不同的案例,在案例分析中进行组间讨论,不断发现问题,能充分发挥学生的主观能动性。而讨论是 CBL 教学模式

的重要环节之一,进行组内讨论及组间讨论,把教学目标引入更深层次。讨论时先进行组内讨论,力求做到人人发言,人人都有自己的见解。老师根据学生的分析进行质疑和点拨,之后进行组间的讨论。最后由学生尝试自行对本章节重点及课堂教学中案例分析结果通进行归纳总结并统一记录。

1.3 观察指标

最后一节课时对两组学生的教学效果进行调查,调查内容包括:知识掌握程度、分析问题的能力、临床思维的建立、课堂积极性、教学满意度。评价等级分为明显、一般、无变化。分别记为 2 分、1 分、0 分。比较两组学生考试得分情况,考试包括理论考试(30 分)、临床案例分析(40 分)及临床操作能力(30 分),共计 100 分。由两名未参加教学的教师进行阅卷。

1.4 统计学处理

数据处理工具采用 SPSS20.0 统计学软件,计量资料采用($\bar{x} \pm s$)表示,经 t 检验, $P<0.05$ 表示差异有统计学意义。

2 结果

2.1 两组学生教学效果调查情况比较

最后一节课时对两组学生的教学效果进行调查,结果显示,实验组学生分析问题的能力、临床思维的建立、课堂积极性及教学满意度得分均高于常规组,差异均有统计学意义($P<0.05$);两组学生知识掌握程度比较,差异无统计学意义($P>0.05$)。见表 1。

表 1 两组学生教学效果调查情况比较(分, $\bar{x} \pm s$)

Table 1 Comparison of the teaching effects of the two groups (points, $\bar{x} \pm s$)

Groups	n	The master degree of knowledge	Ability of analyze problems	The establishment of clinical thinking	Classroom enthusiasm	Teaching satisfaction
Experimental group	40	1.68 $\pm$ 0.49	1.75 $\pm$ 0.36	1.73 $\pm$ 0.32	1.81 $\pm$ 0.59	1.83 $\pm$ 0.32
Conventional group	40	1.76 $\pm$ 0.51	1.52 $\pm$ 0.45	1.53 $\pm$ 0.39	1.47 $\pm$ 0.45	1.66 $\pm$ 0.36
t		0.715	2.524	2.507	2.897	2.232
P		0.476	0.013	0.014	0.005	0.028

2.2 两组学生考试得分情况比较

根据考试得分来看,实验组学生临床案例分析及临床操作

能力得分均高于常规组,差异均有统计学意义($P<0.05$);两组学生理论考试得分比较,差异无统计学意义($P>0.05$)。见表 2。

表 2 两组学生考试得分情况比较(分, $\bar{x} \pm s$)

Table 2 Comparison of test scores in the two groups (points, $\bar{x} \pm s$)

Groups	n	Theoretical examination	Clinical case analysis	Clinical operation skill
Experimental group	40	25.89 $\pm$ 4.54	34.96 $\pm$ 5.63	26.64 $\pm$ 4.34
Conventional group	40	25.92 $\pm$ 5.36	29.26 $\pm$ 5.54	23.53 $\pm$ 5.21
t		0.027	4.564	2.900
P		0.978	0.000	0.005

3 讨论

LBL 是以教师教授,学生听课为主的教学模式,也是国内目前大多数医学院校采用的教学模式^[9,10]。教师按照教学大纲的教学目标,整个教学过程的重点是让学生掌握系统的理论知识。随着多媒体设备的应用,LBL 教学模式中避免了教师教学

中需要进行大量的板书,使课堂内容更为直观、知识更为丰富^[11]。此教学模式是以教师为主导,有利于教师将知识完整、系统的向学生进行讲解,不仅保证了教学内容的准确性,同时确保了知识的连贯性和系统性^[12]。这种教学模式符合我国目前教学力量薄弱的国情,同时对教师及学生的素质要求相对较低,可以照顾学生接受知识能力的同时完成教学任务。但“细胞研

究进展"课程的知识覆盖面较广,涉及的知识重难点诸多,教学内容相对枯燥,同时授课的时间有限,不利于激发学生的学习热情,不利于调动学生的积极性,不利于培养学生自主学习、独立思考的能力^[13,14]。因而在以往"细胞研究进展"课程中采用LBL教学模式的教学效果不尽如人意^[15]。CBL教学模式是以案例为基础,引导学生进行讨论及分析的教学模式。文献表明,CBL教学模式教学效果优于传统的LBL教学模式^[16]。但CBL教学模式不是所有的学生和课程均适用^[17]。有些学生习惯了LBL教学模式,对CBL教学模式适应起来比较困难,也有学生自主学习能力较低,无法达到预期的教学效果^[18]。

本次研究中,探讨了CBL教学模式在"细胞研究进展"中的教学效果,通过对学生的调查显示,实验组学生分析问题的能力、临床思维的建立、课堂积极性及教学满意度得分均高于常规组($P<0.05$);同时实验组学生临床案例分析及临床操作能力得分均高于常规组($P<0.05$)。以上结果表明,CBL教学模式有助于提高学生建立临床思维,提高临床操作能力,提高分析问题的能力,提高学生在课堂上的积极性,提高学生对教学的满意度。之前与之前的报道相似^[19]。与传统的LBL教学模式相比,CBL教学模式在"细胞研究进展"教学中优势明显:(1)"细胞研究进展"课程中知识相对枯燥、内容晦涩难懂,以案例为基础进行教学,使内容更为直观生动,将细胞研究进展成果以案例的方式呈现给学生,将抽象的文字具体化,便于学生的理解与掌握。(2)"细胞研究进展"知识面较广,课堂教学时间有限,无法面面俱到,需要学生课后自主学习,自行查阅文献。而LBL教学模式课堂多数时间为教师口授为主,课堂气氛比较沉闷,不利于激发学生的学习热情。CBL教学模式中讨论为十分重要的环节,从而将课堂的主动权交给了学生,学生从被动接受知识转换为主动思考、主动发现问题、主动获得新知,增加了课堂的趣味性,提高了学生的学习热情,充分发挥了学生的主观能动性。(3)教师的知识也有限,不可能对所有的"细胞研究进展"都能充分掌握,学生课下带着问题通过查阅文献的方式去解决问题,可能发现解决问题的新途径,从而拓宽了学生的知识面。同时在查阅文献的过程中,潜移默化的增强了学生自主学习的能力。(4)"细胞研究进展"课程为理论知识为主,通过CBL教学模式对临床案例进行再现,理论联系实际,有助于学生将理论知识活学活用,培养学生的临床案例分析能力。通过提出问题、学生独立思考、组内进行讨论、小组总结得出结论的模式有助于培养学生独立思考、提高学生解决问题的综合能力。(5)作为医师,良好的沟通能力及倾听能力,有助于建立良好的护患关系,有利于患者配合治疗。CBL教学模式中,学生与教师的角色分工比较明确,通过不同的分工及相互配合,有助于加强教师与学生之间的交流,使学生学会沟通、学会倾听^[20]。

细胞研究进展为目前各国的研究热点,知识更新的速度十分迅速,不是所有的研究层次均适用于课堂教学。为了达到理想的教学目标,案例的选择中应当注意:(1)教师在案例的选择上应进行严格的筛选,首先应符合细胞研究进展的前沿性,案例的时间及特点应尽量新颖。(2)案例的选择应紧扣教学大纲要求,最好能立足于书本而高于书本,难度不能太高或太低,使用多个案例教学时应采用由浅入深的原则进行排版。

CBL教学模式为今后医学教学的改革提供了新的思路,但在具体的实践中仍然存在诸多困难,如:案例收集筛选、传统模式的束缚、案例的编写等。新的模式能否良好的实施,重点在于教师能否从LBL教学模式中走出来,学习新的知识及观念。教师的职能不再是纯粹的授课,而是作为课堂教学的设计者及引导者,因此教学改革应注重师资力量培养,使CBL教学模式灵活的应用到课堂教学中,使学生真正的受益。

参考文献(References)

- [1] Kukulja Taradi S, Taradi M. Making physiology learning memorable: a mobile phone-assisted case-based instructional strategy [J]. *Adv Physiol Educ*, 2016, 40(3): 383-387
- [2] Gaupp R, Körner M, Fabry G. Effects of a case-based interactive e-learning course on knowledge and attitudes about patient safety: a quasi-experimental study with third-year medical students [J]. *BMC Med Educ*, 2016, 16(1): 172
- [3] Brokaw JJ, O'Loughlin VD. Implementation of an education-focused PhD program in anatomy and cell biology at Indiana University: lessons learned and future challenges [J]. *Anat Sci Educ*, 2015, 8(3): 258-265
- [4] Rosemann A, Sleetboom-Faulkner M. New regulation for clinical stem cell research in China: expected impact and challenges for implementation [J]. *Regen Med*, 2016, 11(1): 5-9
- [5] Kapoor N. Teaching pathology of breast cancer to medical undergraduates by case based learning method [J]. *Indian J Cancer*, 2015, 52(2): 215-216
- [6] Daniels FM, Fakude LP, Linda NS, et al. Nurse educators' experiences of case-based education in a South African nursing programme [J]. *Curationis*, 2015, 38(2): 1523
- [7] Luciano GL, Visintainer PF, Kleppel R, et al. Ambulatory Morning Report: A Case-Based Method of Teaching EBM Through Experiential Learning [J]. *South Med J*, 2016, 109(2): 108-111
- [8] Lin PY, Chua WL, Mok WQ, et al. Using a case-based animation on physiological compensatory mechanism to remediate nurses' misconceptions about changes in patient vital signs [J]. *J Clin Nurs*, 2016, 25(3-4): 566-568
- [9] Nadeau MT, Tysinger J, Wiemers M. A case-based approach for teaching professionalism to residents with online discussions [J]. *J Adv Med Educ Prof*, 2016, 4(1): 1-7
- [10] To MJ, MacLeod A, Hwang SW. Homelessness in the Medical Curriculum: An Analysis of Case-Based Learning Content From One Canadian Medical School [J]. *Teach Learn Med*, 2016, 28(1): 35-40
- [11] Shaw-Battista J, Young-Lin N, Bearman S, et al. Interprofessional Obstetric Ultrasound Education: Successful Development of Online Learning Modules; Case-Based Seminars; and Skills Labs for Registered and Advanced Practice Nurses, Midwives, Physicians, and Trainees [J]. *J Midwifery Womens Health*, 2015, 60(6): 727-734
- [12] Krupat E, Richards JB, Sullivan AM, et al. Assessing the Effectiveness of Case-Based Collaborative Learning via Randomized Controlled Trial [J]. *Acad Med*, 2016, 91(5): 723-729
- [13] Gillham D, Tucker K, Parker S, et al. CaseWorld™: Interactive, media rich, multidisciplinary case based learning [J]. *Nurse Educ Pract*, 2015, 15(6): 567-571

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- [24] Pellegrini M, Calzascia T, Toe JG, et al. Il-7 engages multiple mechanisms to overcome chronic viral infection and limit organ pathology [J]. Cell, 2011, 144(4): 601-613
- [25] Byrne WL, Mills KH, Lederer JA, et al. Targeting regulatory t cells in cancer[J]. Cancer research, 2011, 71(22): 6915-6920
- [26] Gupta S, Thornley TB, Gao W, et al. Allograft rejection is restrained by short-lived tim-3+pd-1+foxp3+ tregs[J]. The Journal of clinical investigation, 2012, 122(7): 2395-2404
- [27] Sakuishi K, Ngiew SF, Sullivan JM, et al. Tim3foxp3 regulatory t cells are tissue-specific promoters of t-cell dysfunction in cancer[J]. Oncoimmunology, 2013, 2(4): e23849
- [28] Ono M, Yaguchi H, Ohkura N, et al. Foxp3 controls regulatory t-cell function by interacting with aml1/runx1[J]. Nature, 2007, 446(7136): 685-689
- [29] Kang MJ, Kim KM, Bae JS, et al. Tumor-infiltrating pd1-positive lymphocytes and foxp3-positive regulatory t cells predict distant metastatic relapse and survival of clear cell renal cell carcinoma[J]. Translational oncology, 2013, 6(3): 282-289
- [30] Kim PS, Ahmed R. Features of responding t cells in cancer and chronic infection [J]. Current opinion in immunology, 2010, 22(2): 223-230
- [31] Ahmadzadeh M, Johnson LA, Heemskerk B, et al. Tumor antigen-specific cd8 t cells infiltrating the tumor express high levels of pd-1 and are functionally impaired[J]. Blood, 2009, 114(8): 1537-1544
- [32] Baitsch L, Baumgaertner P, Devereux E, et al. Exhaustion of tumor-specific cd8 (+) t cells in metastases from melanoma patients[J]. The Journal of clinical investigation, 2011, 121(6): 2350-2360
- [33] Konishi J, Yamazaki K, Azuma M, et al. B7-h1 expression on non-small cell lung cancer cells and its relationship with tumor-infiltrating lymphocytes and their pd-1 expression [J]. Clinical cancer research, 2004, 10(15): 5094-5100
- [34] Herbst RS, Soria JC, Kowanzet M, et al. Predictive correlates of response to the anti-pd-1 antibody mpdl3280a in cancer patients [J]. Nature, 2014, 515(7528): 563-567
- [35] Barber DL, Wherry EJ, Masopust D, et al. Restoring function in exhausted cd8 t cells during chronic viral infection[J]. Nature, 2006, 439(7077): 682-687
- [36] Fourcade J, Sun Z, Benallaoua M, et al. Upregulation of tim-3 and pd-1 expression is associated with tumor antigen-specific cd8+ t cell dysfunction in melanoma patients [J]. The Journal of experimental medicine, 2010, 207(10): 2175-2186
- [37] Iwai Y, Terawaki S, Honjo T. Pd-1 blockade inhibits hematogenous spread of poorly immunogenic tumor cells by enhanced recruitment of effector t cells[J]. International immunology, 2005, 17(2): 133-144
- [38] Strome SE, Dong H, Tamura H, et al. B7-h1 blockade augments adoptive t-cell immunotherapy for squamous cell carcinoma [J]. Cancer research, 2003, 63(19): 6501-6505
- [39] Nakamoto N, Cho H, Shaked A, et al. Synergistic reversal of intra-hepatic hcv-specific cd8 t cell exhaustion by combined pd-1/ctla-4 blockade[J]. PLoS pathogens, 2009, 5(2): e1000313
- [40] Jin HT, Anderson AC, Tan WG, et al. Cooperation of tim-3 and pd-1 in cd8 t-cell exhaustion during chronic viral infection[J]. Proceedings of the National Academy of Sciences of the United States of America, 2010, 107(33): 14733-14738
- [41] Gubin MM, Zhang X, Schuster H, et al. Checkpoint blockade cancer immunotherapy targets tumour-specific mutant antigens [J]. Nature, 2014, 515(7528): 577-581
- [42] Ribas A. Clinical development of the anti-ctla-4 antibody tremelimumab[J]. Seminars in oncology, 2010, 37(5): 450-454
- [43] Hodi FS, O'Day SJ, McDermott DF, et al. Improved survival with ipilimumab in patients with metastatic melanoma[J]. The New England journal of medicine, 2010, 363(8): 711-723
- [44] Rizvi NA, Mazieres J, Planchard D, et al. Activity and safety of nivolumab, an anti-pd-1 immune checkpoint inhibitor, for patients with advanced, refractory squamous non-small-cell lung cancer (checkmate 063): A phase 2, single-arm trial[J]. The Lancet Oncology, 2015, 16(3): 257-265
- [45] Wolchok JD, Kluger H, Callahan MK, et al. Nivolumab plus ipilimumab in advanced melanoma [J]. The New England journal of medicine, 2013, 369(2): 122-133

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- [14] Park EJ, Park M. Effectiveness of a Case-Based Computer Program on Students' Ethical Decision Making [J]. J Nurs Educ, 2015, 54(11): 633-640
- [15] Hashim R, Azam N, Shafi M, et al. Perceptions of undergraduate medical students regarding case based learning and tutorial format[J]. J Pak Med Assoc, 2015, 65(10): 1050-1055
- [16] Bhardwaj P, Bhardwaj N, Mahdi F, et al. Integrated teaching program using case-based learning [J]. Int J Appl Basic Med Res, 2015, 5(Suppl 1): S24-S28
- [17] Vora MB, Shah CJ. Case-based learning in pharmacology: Moving from teaching to learning[J]. Int J Appl Basic Med Res, 2015, 5(Suppl 1): S21-S23
- [18] Behar-Horenstein LS, Catalanotto FA, Nascimento MM. Anticipated and Actual Implementation of Case-Based Learning by Dental Faculty Members During and After Training [J]. J Dent Educ, 2015, 79(9): 1049-1060
- [19] Aljarallah B, Hassan MS. Problem based learning (PBL) vs. Case based curriculum in clinical clerkship, Internal Medicine innovated Curriculum, Student prospective[J]. Int J Health Sci(Qassim), 2015, 9(2): 147-152
- [20] El-Sappagh S, Elmogy M, Riad AM. A fuzzy-ontology-oriented case-based reasoning framework for semantic diabetes diagnosis[J]. Artif Intell Med, 2015, 65(3): 179-208