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Cellular and Molecular Medicine; the Lost World in Postgraduate Medical Education

Cellular and molecular medicine is an integrated part of translational medicine, which endeavors to bridge between the traditional classification of "***basic and clinical***" medicine; aiming clinician-scientists to use their knowledge in designing and developing novel interventions and other specific tools for prevention, diagnosis and treatment of abnormal health conditions (1).

Molecular biologists believe that their research outcomes will have a great impact on curing a variety of abnormal health conditions and influence understanding pattern of diseases worldwide. However, there is still a considerable gap between "knowledge and practice" in the field of cellular and molecular medicine; especially when applying the research results into patient care (2, 3). Besides technical difficulties, one of the main reasons that cellular and molecular medicine has not overcome the problems of integration in clinical practice is the process of integrating the process of translational medicine in residency programs and other postgraduate medical education programs. In other words, the current practicing clinicians have not been trained for this purpose in a systematic manner. However, during recent years, medical education has influenced undergraduate and postgraduate levels. Continuous access to online medical resources has changed the process of teaching and allowed "flip-flop" classes to become popular (4).

Traditional teaching methods using evocative chalk and blackboard were the norm of teaching a couple of decades ago. Well, now they are considered as part of the history of education or at least as an old-fashion method. Lecturers are using relatively innovative methods like problem-based learning, which is integrated with group discussions. Lecture based teaching using modern audiovisual technologies has revolutionized the teaching methods with great impact on both trainees and trainers (5, 6). Information technology has led to introduction of great achievements in education; enhancing the process of education in various ways such as computer-assisted learning, computer-based assessments, patient simulation and many other methods; a detailed list of novel methods has been incorporated as the result of this process (7). This evolutionary process in medical education was started a few years ago; first at the level of undergraduate education; nowadays, medical schools prefer using modern teaching methods for postgraduate programs too. In postgraduate clinical teaching, this trend is not fully adopted yet. One reason may be the fact that during residency training, there is a limited time for didactic learning and the trainee are biased to focus on developing their clinical competencies.

Anesthesiology residency programs are among those postgraduate programs that would fulfill both basic and integrated training of molecular and cellular medicine very well. Anesthesiologists are clinicians who need to know molecular medicine on their everyday clinical practice. They applicate various cellular mechanisms of drug molecules in order to modulate stress responses during each anesthesia procedure (8). In this issue of *Journal of Cellular & Molecular Anesthesia*, Fadaeizadeh, *et al.* discussed a tele-medicine approach in *Shahid Beheshti School of Medicine Anesthesiology Residency Program* resulting in higher level of satisfaction for residents, appropriate results regarding time saving and overcoming the problems related to long distance in the physical location of trainees and trainers (9). This is one of the many modern samples of education in residency programs; an area of "expertise and knowledge" which should be revised considering the many developments in telecommunication industry in the current world.

References

1. Cui M, Wang H, Yao X, Zhang D, Xie Y, Cui R, Zhang X. Circulating MicroRNAs in Cancer: Potential and Challenge. Front Genet. 2019 Jul 18;10:626.
2. Sung NS, Crowley Jr WF, Genel M, Salber P, Sandy L, Sherwood LM, et al. Central challenges facing the national clinical research enterprise. JAMA. 2003;289(10):1278-87.
3. Crowley Jr WF. Translation of basic research into useful treatments: how often does it occur? Am J Med. 2003 Apr 15;114(6):503-5.
4. Chen F, Lui AM, Martinelli SM. A systematic review of the effectiveness of flipped classrooms in medical education. Med Educ. 2017 Jun;51(6):585-97.
5. Patterson F, Knight A, Dowell J, Nicholson S, Cousans F, Cleland J. How effective are selection methods in medical education? A systematic review. Med Educ. 2016 Jan;50(1):36-60.
6. Jones RW. Problem-based learning: description, advantages, disadvantages, scenarios and facilitation. Anaesth Intensive Care. 2006;34(4):485-8.
7. Nochomovitz M, Sharma R. Is It Time for a New Medical Specialty?: The Medical Virtualist. JAMA.319(5):437-8.
8. Dabbagh A, Elyassi H. Cellular and Molecular Anesthesia: from Bench to Bedside. J Cell Mol Anesth. 2016;1(1):1-2
9. Fadaizadeh L, Vosoughian M, Shajareh E, Dabbagh A, Heydari G. Is Tele-Education a Proper Substitute for Regular Method to Train Anesthesiology Residents? J Cell Mol Anesth. 2019;4(1):15-9

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