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Medical education: addressing questions that require attention

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Medical schools have a clear and practical educational objective: to cultivate professional medical doctors. A doctor's professional development should be maintained and developed through continuous medical education and experience throughout his or her professional career; acquiring a medical license after 6 years of education at a medical school is therefore only the end of the beginning. In other words, graduation from medical school is the first step, and it is necessary to ensure continuous education thereafter.

The curriculum and pedagogy of medical education are evolving based on the role and competencies of doctors and according to society's needs. Medical education is based on profound academics to a lesser extent, and is more concerned with the highly practical objective of producing expert professionals. The education system is extremely important as it is the mold that shapes the contents and methods of medical education. The government-driven, graduate-entry, 4-year medical school program introduced in 2005 has been considered inadequate in Korea for a number of reasons. At present, most of Korea's medical education programs have returned to a 6-year undergraduate curriculum, consisting of 2 years of premedicine and 4 years of medicine, as was historically the case. Medical education in Korea faces many challenges. Some of these challenges have left unsolved questions in Korea, such as the usefulness of premedical education, the effectiveness of basic foundational medical education, and the reformation of degree programs at graduate schools of medicine.

The first question is as follows: Is it still useful to separate the 6 years of medical education into the premedical course and the medicine program? Among those countries that require 6 years of medical education, including certain European nations and Japan, it is believed that Korea is the only country where the premedicine course is still legally binding. The term "premedicine" is defined as the 2-year preparation process during which one acquires the prerequisite knowledge necessary for enrollment in medical school. It is now considered unnecessary, however, to distinguish between medical education at medical school and pre-

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paratory knowledge of science or the humanities. Moreover, longitudinal, integrated education is becoming increasingly important, calling into question the usefulness of 2 years of premedical education. In fact, many students are largely concerned about not being able to make the most of the 2-year premedicine period. The abolishment of the Professional Graduate School of Medicine resulted in a return to the 6-year medical education system, and the Law of Education still maintains a clear distinction. We have thus now reached a point when we must to answer the following questions: Must we maintain the distinction between premedicine and medicine? If we do maintain this distinction, what are the implications and objectives of doing so?

The second question concerns foundational education in basic science. In the absence of basic medical scientists with medical degrees, how should we educate future doctors in the scientific foundations of medicine? When educating medical students, it is highly important to help students to understand the scientific foundations of the human body and its diseases. Instruction should ideally be provided by basic science teachers who graduated from medical schools and who understand diseases and the healthcare system. In reality, however, the number of doctor-educators capable of providing basic medical education is falling rapidly. This situation —the apparent lack of basic scientists with medical degrees—should be taken seriously. We should establish solutions based on this reality that explore different approaches to realizing the provision of education on the scientific foundations of medicine. The shortage of basic medical scientists with Doctor of Medicine (MD) degrees is multifactorial. Medical research transcends the role of doctors alone and is developed through the participation of engineers and life scientists. Moreover, an increasing number of clinical doctors conduct not only clinical research but also basic research into human disease. The crisis of basic MD scientists is structural rather than temporal. In this situation, we should also address how medical students are taught and how to increase the number of basic MD scientists.

Thirdly, how are we going to reinforce the future competencies of doctors? The era of uncertainty has come to an end. Our contemporary reality is characterized by the Fourth Industrial Revolution, with the recent development of information communication and artificial intelligence. Accordingly, modern medicine pursues personally tailored treatments through precise medicine. Didactic lecture-based education in large classrooms is gradually declining, and there is a growing demand for student-centered, self-directed, and personalized education, such as small-group education, simulation teaching, and flipped classrooms [1-3]. The objective of education has shifted from the simple delivery of knowledge to an effective understanding and application of knowledge in real situations. Therefore, the existing curriculum certainly limits the production of more diverse competencies, since it is rigidly scheduled and focused on major courses in traditional subjects. All medical schools now face the challenge of developing an innovative medical curriculum providing various learning opportunities based on medicine, which cultivates students' holistic capabilities. In addition to the reformation of curricular contents, medical schools should establish a solution to the challenge of classroom reformation through efficient use of current digital technology, including computers, the internet, and smart devices.

The final question concerns whether or not graduate medical programs achieve their intended purpose. The residency training program is a type of specialized professional vocational education. Conversely, the degree program in a graduate school of medicine involves academic education based on research. In fact, Korea is

unique in that it offers a system that allows students to complete these two different types of programs simultaneously. This inevitably results in a structural shortcoming with the poor quality of both and leads to a crisis in academic education and the research function of graduate schools. Given that the university operates based on the two different engines of medical schools and graduate schools, the weaknesses of the graduate schools undermine the function, status, and continued development of studies. This leads to doctors lacking basic medical research competencies and could seriously hinder the development of medical science in Korea.

Medical educators and school leaders have diligently made attempts over a number of years to overcome many challenges; however, the aforementioned questions still need to be addressed in Korea. Problem solving needs to be timely. How many challenges in medical educational issues have thus far been solved in a timely fashion? Are we adequately addressing health maintenance and curriculum improvement issues? Have we changed teaching contents to match the ever-increasing demands created by the elderly population and their health problems? What has been done about interprofessional education and education in the many other nontechnical soft skills that are needed, regardless of specialty or profession? In addition to answering these questions, we should also thoroughly reevaluate teaching methods, including to what extent we apply smart devices and technologies in classrooms and educational fields.

Living in a condition of good health and wellness is a human right that can be assured through the provision of effective and high-quality healthcare. All healthcare stakeholders are devoted to innovating medical education. We desperately need open minds for the future.

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