

Physiology of today is the medicine of tomorrow: Is physiological science heading in the right direction?

Sir,

The famous quote of Nobel Laureate Prof. Ernest Starling is often cited by physiologists around the world but the question is: Does physiology really matter for medicine? Physiology is, first and foremost, a science: It is concerned with how living organisms work. Ultimately, understanding how living organisms work will allow us to understand what goes wrong in disease and provides a rational scientific basis for the treatment of disease. Many medical educators today believe that physiology is no longer on the cutting edge of medicine and will not lead to any new insights into diseases. This belief is becoming so strong that we are witnessing the dismantlement of Physiology Departments in various medical schools of USA and other developed countries. Even in India, one of the heritage universities in Kolkata dismantled the Department of Physiology and was replaced by Department of Biology.

Michael J. Joyner, M.D., Professor of Anesthesiology at the Mayo Clinic in his defense to support physiology as a basic core subject in medicine has stated that decisions made by many universities in USA to close Physiology Departments within medical schools were premature. Ignoring physiologically based insights and therapeutic approaches providing vast and significant inroads into clinical medicine will not serve any purpose of medical sciences as a whole. He cites the discovery of endothelial-derived relaxing factor (EDRF) and the subsequent identification of nitric oxide as the main EDRF as the most notable example of the continued success of physiology as the backbone of medicine.^[1] This discovery, made using a less exciting but highly valuable organ bath of isolated blood vessel preparations, led to such advancements as identification of a new family of gas-based biological signaling pathways, new ideas about the role of the vascular endothelium in health and disease and new treatments for a number of diseases including erectile dysfunction and pulmonary hypertension.^[1]

Advancing in molecular biology and epigenetics systematically promotes system biology rather physiology,

anatomy or pathology, etc., individually. The new vogue for systems biology is an important development, since it is time to complement molecular biology by integrative approaches.^[2] Prof. Denis Noble advocated multilevel approach from a physiologist's standpoint to understand system biology and contribute in it.^[2]

Characteristic strength of physiologists is their ability to make use of new technological and conceptual advances as they become available. In applying "new biology" to physiology, it should be stressed that the research goal of physiologists is to solve physiological problems of interest and we can use molecular and cell biological approaches among others as tools. We must not think of molecular biology and physiology as an alternative to each other rather we should, aim at integrating these and other scientific disciplines to understand how the body functions, as a whole. This rational approach will benefit not only physiology but medicine as well. One should not forget that the link between physiology and medicine is nothing but mathematical modeling through pharmacokinetics - the concept that Leonardo da Vinci described as the "Art of Science".^[3]

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