AN INVITATION TO READERS

The editors welcome readers’ contributions in the form of letters about any aspect of physiology education. Please write to the Editor, Advances in Physiology Education, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991.

LETTERS TO THE EDITOR

Misconceptions in Physiology

To the Editor:

I was delighted to read the article on students’ misconceptions by Michael et al. (1). It brings to fore an issue that has engrossed me for nearly a decade and one-half. My own concern for students’ misconceptions finds a mention too in another article in the same issue of Advances in Physiology Education (5), wherein I have pleaded that encouraging students to write multiple-choice questions may be a systematic way of bringing to light some of their misconceptions. I am, however, more concerned about teachers’ misconceptions that tend to propagate widely.

For years, I had believed that misconceptions were largely prevalent among teachers in India and other third-world countries that do not have easy access to good, authentic textbooks. For the same reason, I thought that the issue of misconceptions would not interest an international audience. However, working at the University of Texas Austin as a Fellow of the International Union of Physiological Sciences, I was convinced about the universality of misconceptions. At the Human Anatomy and Physiology Conference in 1996 held in Portland, Oregon, I gave a spot quiz (a questionnaire with 13 questions) to the participants. Thirty-two teachers responded. Some of those questions are reproduced below. The figures in brackets indicate the percentage of respondents who checked each option. Without debating the most appropriate answers, what can be said is that there is little agreement among teachers on certain basic questions in physiology that can be enough reason for creating confusion among students.

A patient is said to be anemic if his/her . . .

- a. hemoglobin concentration is subnormal (15.6%)
- b. red cell count is subnormal (15.6%)
- c. either (43.8%)
- d. both (25%)

During exercise . . .

- a. the end-diastolic volume of the heart increases (43.8%)
- b. the end-systolic volume of the heart decreases (9.4%)

- c. both (31.3%)
- d. neither (12.5%)

During exercise, hyperventilation occurs due to . . .

- a. increased arterial Pco₂ (59.4%)
- b. decreased arterial Pco₂ (6.3%)
- c. both (12.5%)
- d. neither (21.9)

The apical alveoli of the lungs have a greater Po₂ because . . .

- a. apical alveoli are larger (6.3%)
- b. apical alveoli are better ventilated (53.1%)
- c. both (6.3%)
- d. neither (25%)

During sphygmomanometry, the manometer should be kept at the level of . . .

- a. the eye (12.5%)
- b. the heart (65.6%)
- c. both (3.1%)
- d. neither (18.8%)
It is noteworthy that only 12.5% of the teachers felt that during sphygmomanometry, the manometer needs only to be kept at the eye level. The popular misconception that the manometer should be at the heart level during sphygmomanometry probably stems from the principles of direct blood pressure measurement. For over a decade, I have been frustrated in my efforts to eradicate this misconception. A letter published by myself in a popular Indian medical journal for practitioners (4) not unexpectedly had little impact, largely because the books are not on my side. Most of them, including cardiology books (3), are silent on the issue. An article in the British Medical Journal (2), although mentioning that the manometer was to be kept at eye level, does not stress the redundancy of keeping the manometer at the heart level. However, one illustration in it does show the manometer placed well above the heart level. Hutchison’s Clinical Method (6), a book that is widely read by medical students, maintained through successive editions that “the manometer is placed so as to be at the same level as the observer’s eye.” However, in a complete turnaround in its 20th edition (7), the book modified the statement, saying “The manometer is placed so as to be at the same level as the cuff on the patients arm and the observer’s eye.” It meant by implication that the manometer had to be placed at the level of the heart (since the cuff must be at the heart level), and the observer’s eyes had to be brought to that level. It goes to show how misconceptions, if sufficiently widespread, can make inroads into some of the best books! It has left me feeling the need for a forum at which such questions can be authoritatively addressed and misconceptions effectively weeded out. A column in the Advances in Physiology Education in which eminent teachers and research scholars are invited to answer readers' queries in physiology might just be the right step in that direction.

SABYASACHI SIRCAR
Department of Physiology
University College of Medical Sciences
Delhi, India 110095
sircarss@bol.net.in

REFERENCES