

Biology texts geared toward pre-med students, analysis finds

September 4 2013, by Jeff Grabmeier

College biology textbooks cater to the needs of pre-med majors and not those of the majority of students who take introductory science classes, a new study reveals.

A text analysis of eight commonly used biology textbooks found that all of them closely follow the curriculum suggested for pre-med students by the Medical College Admission Test (MCAT).

That means the texts put a heavy emphasis on [molecular and cellular biology](#), while giving less attention to the big issues that have more relevance to students who don't plan on being [medical doctors](#), said Steven Rissing, author of the study and professor of evolution, ecology and organismal biology at The Ohio State University.

Rissing said his concern is for what he calls "general education" students. These are students who may take an introductory biology class to fulfill a science requirement for graduation, but have no intention of becoming a doctor or majoring in biology.

"These general education students are getting a lot about cell division mitosis from their textbooks when they really should be learning about things like personalized medicine, evolution and the impact of climate change," Rissing said.

"We need to have [biology education](#) for citizens and voters, not just for future doctors."

The study was published this week in the September 2013 issue of the journal *CBE-Life Sciences Education*.

For the study, Rissing analyzed eight textbooks published by McGraw-Hill and Benjamin Cummings that are commonly used in introductory college biology classes. Some were designed for biology majors, while others are marketed for students outside of biology who are fulfilling a general science requirement.

Rissing wanted to see how much these texts followed specifications established by the Association of American Medical Colleges, which designs and administers the MCAT.

The AAMC has developed MCAT Important Ratings (MIRs) which tell instructors which topics are most important for pre-medical students to know.

The result of the analysis showed that all the textbooks—those for biology majors and pre-medical students as well as those for general education students—closely followed the MCAT specifications.

Rissing found that the sequence of topics in the texts closely followed the AAMC importance ratings for the topics. All texts included at least 50 percent of the primary MCAT biology content specifications within the first 30 percent of text.

That means that cellular and molecular biology came first in the books. Biology of body systems, and developmental, organismal and population biology came last in the books, where it is more likely to be skipped if instructors don't have enough time over the course of the semester or quarter.

Rissing also analyzed how often the books used MCAT topic terms in

their texts. These are terms like "chromatids" or "mitosis" that the AAMC says pre-med students should know about to prepare for the MCAT.

Results showed that in the texts ostensibly designed for general education students, the density of these MCAT terms equaled or many times even exceeded that of the texts designed for biology majors and pre-medical students.

"Students who have no intention of going to medical school are primarily learning what they need to know for the MCAT exam," Rissing said.

"That means other biology topics that may be more useful to them are going to be left out."

Not only do the general education texts present topics in nearly identical sequence to the corresponding texts for majors, they also use very similar wording, Rissing said. In many cases, all the publishers do is abridge the content slightly.

But the way the content is abridged for general education students is not always helpful, and may unintentionally support common biological misconceptions, Rissing said.

For example, Rissing compared how different textbooks handled visual timelines of hominid evolution. In one text for biology majors, the timeline showed 13 ancestors and close relatives of modern humans. But in a comparable general education text, five of the human ancestors and close relatives had been taken out.

"Based on that timeline, some students may believe the evidence for evolution is not as strong as it really is," Rissing said.

He said general education [students](#) need to have an overview of the big issues in biology that will make them more informed citizens, voters and patients of health care.

"Personalized medicine has become a big issue as scientists learn how to tailor drugs to individuals. But people need to know biology in order to understand and follow directions of their health care providers," he said.

Students also need to understand how climate change will affect humans and ecosystems around the world.

"This isn't the same education you would necessarily give to future doctors," he said.

"We need a more scientifically literate public, but we're not doing a very good job. Our [biology](#) textbooks are one important reason why we aren't succeeding."

Provided by The Ohio State University

Citation: Biology texts geared toward pre-med students, analysis finds (2013, September 4)
retrieved 26 April 2024 from

<https://phys.org/news/2013-09-biology-texts-geared-pre-med-students.html>

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