

Biotechnology Education

Commentary: Taking a Stand for Science

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There have been some serious setbacks for those who propose that evolution is a “mere theory” to be approached with skepticism and that science is to be debated in the public square instead of rigorously tested by experimentation. To put this in an historical context, an excellent summary of the legal and political battle over the teaching of evolution has been recently provided [1]. Although courts have ruled, voters have decided, and legislatures have passed rules, new levels of action make it clear that the controversy over the teaching of evolution is not an issue that is going away. Also, as the conflict moves to a new arena, it has become front and center for us as biochemistry and molecular biology educators.

It almost appears that the attack on evolution, excuse the expression, evolves. A 1987 Louisiana law required the teaching of “creation science” as part of the teaching of evolution. After this law was struck down by the U. S. Supreme Court (*Edwards versus Aguillard*), the creationists devised the thinly disguised “intelligent design” (ID)¹ concept. Although Federal District Court Judge John E. Jones III struck down the teaching of ID as non-science (*Tammy Kitzmiller et al. versus Dover Area School District*), the antiscience attack continues, albeit in new forms. A recent report in the *Los Angeles Times* [2] recounts the efforts of a high school biology teacher who tried to teach evolution in what is likely a typical public school science class. He is also likely to be representative of a cadre of teachers who are prepared to teach their students and who are dedicated professionals educated in our finest institutions. Despite their ability and intentions, however, they are being ambushed by students who are well prepared with arguments based on specious logic and a flat refusal to accept scientific evidence, all of which sounds plausible to other students who come in to a classroom from a context that is skeptical and ignorant of science. For teachers who try to maintain an atmosphere of open discussion with an exchange of ideas based on scientific observations, the attacks must be devastating. As was noted in the news article, many teachers are now avoiding the topic of evolution altogether.

The results of decades of research leave no doubt as to

the validity of evolution as essentially the unifying concept in biology. The explosion in genomic information has provided a rich appreciation for the details of evolution, and even recent experimental work adds further mechanistic proof. A recent article [3], for example, provides yet more detailed experimental proof that one of the core concepts of ID (namely “irreducible complexity,” *i.e.* one cannot evolve the lock and the key simultaneously) is untrue. In the accompanying “Perspectives,” my colleague Chris Adami [4] clearly points out the elegance of the experimental work and correctly notes that any further debate about the validity of ID is purely political and not in any way scientific. However, for those who reject carbon dating, the fossil record, and experimentation, little is left but disruption and distraction, desperate yet powerful tools when used in a background of scientific ignorance.

There are numerous groups providing teachers with background and information to fight the battles that will unfortunately be waged in their classrooms, and we need to support and enhance those efforts whenever possible. Most importantly, as biochemists and molecular biologists, we need to assure the best and most current curricula not only in our advanced courses but also in all of the earliest teaching in biology. It is only when teachers who might not have been biology or biochemistry majors have strong enough backgrounds in the science of evolution that they will be comfortable taking on the disruption and confusion created by students filled with good intentions and bad science.

I ask you to join me in making BAMBED the source of material and curricula that can be incorporated at the beginning of the biology curricula, demonstrating that evolution is the cornerstone of modern biology. I welcome your suggestions as to how to formalize and expand this effort so that we can ultimately provide all of our students with quality science education.

REFERENCES

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- [3] J. T. Bridgham, S. M. Carroll, and J. W. Thornton (2006) *Science* **312**, 97–101.
- [4] C. Adami (2006) *Science* **312**, 61–63.

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¹ The abbreviation used is: ID, intelligent design.