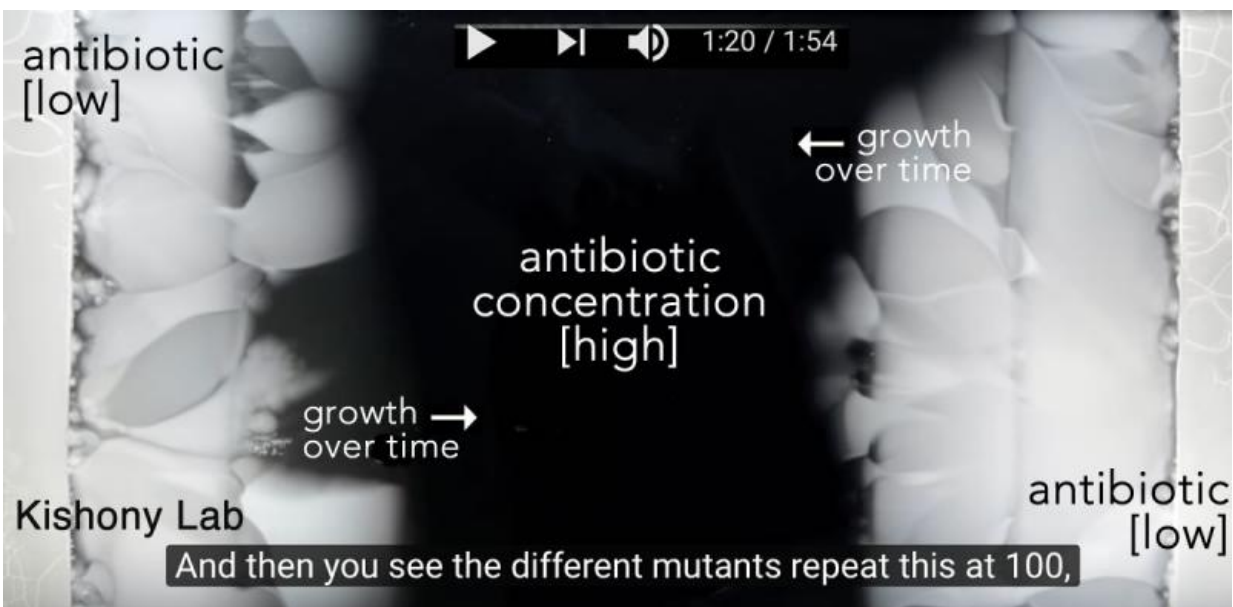


# 'Teaching the controversy' is the best way to defend science, as long as teachers understand the science

May 29 2017, by Mike Klymkowsky



Often "controversy" arises when scientific explanations have broader social, political, or philosophical implications. Religious objections to evolutionary theory arise primarily, I believe, from the implication that we (humans) are not the result of a plan, created or evolved, but rather that we are accidents of mindless, meaningless, and often gratuitously cruel processes. The idea that our species, which emerged rather recently

(that is, a few million years ago) on a minor planet on the edge of an average galaxy, in a universe that popped into existence for no particular reason or purpose ~14 billion years ago, can have disconcerting implications [[link](#)]. Moreover, recognizing that a "small" change in the trajectory of an asteroid could change the chance that humanity ever evolved [see: [Dinosaur asteroid hit 'worst possible place'](#)] can be sobering and may well undermine one's belief in the significance of human existence. How does it impact our social fabric if we are an accident, rather than the intention of a supernatural being or the inevitable product of natural processes?

Yet, as a person who firmly believes in the French motto of liberté, égalité, fraternité, laïcité, I feel fairly certain that no science-based scenario on the origin and evolution of the universe or life, or the implications of sexual dimorphism or racial differences, etc, can challenge the importance of our duty to treat others with respect, to defend their freedoms, and to insure their equality before the law. Which is not to say that conflicts do not inevitably arise between different belief systems – in my own view, patriarchal oppression needs to be called out and actively opposed where ever it occurs, whether in Saudi Arabia or on college campuses (e.g. [UC Berkeley or Harvard](#)).

This is not to say that presenting the conflicts between scientific explanations of phenomena, such as race, and non-scientific, but more important beliefs, such as equality under the law, is easy. When considering a number of natural cruelties, Charles Darwin wrote that evolutionary theory would claim that these are "as small consequences of one general law, leading to the advancement of all organic beings, namely, multiply, vary, let the strongest live and the weakest die" – note the absence of any reference to morality, or even sympathy for the "weakest". In fact, Darwin would have argued that the apparent, and overt cruelty that is rampant in the "natural" world is evidence that God was forced by the laws of nature to create the world the way it is,

presumably a world that is absurdly old and excessively vast. Such arguments echo the view that God had no choice other than whether to create or not; that for all its flaws, evils, and unnecessary suffering this is, as posited by Gottfried Leibniz (1646-1716) and satirized by Voltaire in his novel *Candide*, the best of all possible worlds. Yet, as a member of a reasonably liberal, and periodically enlightened, society, we see it as our responsibility to ameliorate such evils, to care for the weak, the sick, and the damaged and to improve human existence; to address prejudice and political manipulation [[thank you Supreme Court](#) for ruling against race-based redistricting]. Whether anchored by philosophical or religious roots, many of us are driven to reject a scientific (biological) quietism ("a theology and practice of inner prayer that emphasizes a state of extreme passivity") by actively manipulating our social, political, and physical environment and striving to improve the human condition, in part through science and the technologies it makes possible.

At the same time, introducing social-scientific interactions can be fraught with potential controversies, particularly in our excessively politicized and self-righteous society. In my own introductory biology class ([biofundamentals](#)), we consider potentially contentious issues that include sexual dimorphism and selection and social evolutionary processes and their implications. As an example, social systems (and we are social animals) are susceptible to social cheating and groups develop defenses against cheaters; how such biological ideas interact with historical, political and ideological perspectives is complex, and certainly beyond the scope of an introductory biology course, but worth acknowledging [[PLoS blog link](#)].

In a similar manner, we understand the brain as an evolved cellular system influenced by various experiences, including those that occur during development and subsequent maturation. Family life interacts with genetic factors in a complex, and often unpredictable way, to shape behaviors. But it seems unlikely that a free and enlightened society can

function if it takes seriously the premise that we lack free-will and so cannot be held responsible for our actions, an idea of some current popularity [see [Free will could all be an illusion](#)]. Given the complexity of biological systems, I for one am willing to embrace the idea of constrained free will, no matter what scientific speculations are currently in vogue. Recognizing the complexities of biological systems, including the brain, with their various adaptive responses and feedback systems can be challenging. In this light, I am reminded of the contrast between the Doomsday scenario of Paul Ehrlich's *The Population Bomb*, and the data-based view of the late Hans Rosling in [Don't Panic – The Facts About Population](#).

All of which is to say that we need to see [science](#) not as authoritarian, telling us who we are or what we should do, but as a tool to do what we think is best and why it might be difficult to achieve. We need to recognize how scientific observations inform but do not dictate our decisions. We need to embrace the tentative, but strict nature of the [scientific enterprise](#) which, while it cannot arrive at "Truth" can certainly identify non-sense.

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