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# OVERCOMING THE DISSECTION PARADIGM IN HIGH SCHOOL BIOLOGY

by Julie Shaeffer

To many, dissection in high school biology may seem a relic of the past; however, the majority of biology teachers that I work with still hold steadfastly to its use. As a biology faculty member with Boulder High School, I have experienced this first-hand. My choice to not use dissection is the subject of this article. This decision was strongly opposed by some members of my school's biology department and administration. While I was ultimately awarded permission to use alternatives, it was not without many barriers to overcome. I hope other biology teachers who oppose dissection, and experience pressure to do it anyway, can use my story to navigate this surprisingly tumultuous ground.

My story begins late January 2010, when I was asked for my "rat order" by a colleague, or, in other words, how many preserved rat specimens I would need for the anatomy unit usually taught in early April. I asked for a hold on ordering for my classes until I could address some concerns I had regarding dissection. Two weeks and lots of research later, I decided I would not be dissecting, and informed the other three regular-level biology teachers, as well as our department head, of my decision and rationale.

The next day, I scheduled a meeting with the school administration to inform them of my decision. During this meeting, I was told that "You will do dissection," and "You should be looking for a job elsewhere if I feel like you can't fit in here [and do dissection]." The discussion was heated and lasted 45 minutes. I explained my rationale for choosing not to dissect: the educational value of alternatives, my findings regarding cost and disposal issues, as well as a gamut of ethical concerns. With no resolution in sight, the matter was moved to the next level, and I was scheduled to meet with our principal.

One meeting turned to four, during the last of which I received a written directive that said I must do dissection or vacate my classroom without pay while a substitute teaches dissection. I filed a grievance against that directive, and three weeks later attended a meeting with our district assistant superintendant and head of human resources, the principal and assistant principal of my school, and two representatives from the teachers' union.

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I'm not sure what it was that shifted the district administration's thinking. It may have been data I presented from an anonymous survey asking my students how many would like to opt out of dissection. It may have been letters from two students who had taken biology in previous years, sharing their negative experiences with dissection. Whatever the reason, I was given permission to teach a non-dissection alternative to all of my students who wanted it. Joyfully, during the first two weeks of April 2010, with the help of materials borrowed from Animalearn, I taught anatomy without harming one animal.

Planning the lessons was simple. I adapted the traditional rat dissection manual used by the other teachers in my department to correlate with the rat, cat, and shark models I borrowed from Animalearn's The Science Bank. Some wording needed to be changed. For instance, where the traditional manual said "cut here," my manual did not, but all of the structures students were expected to find during the traditional dissection were visible on the models. Use of the models required less time than traditional dissection and I was able to also include detailed lectures on human anatomy specifics and comparative anatomy between species for each of the five body systems students studied during this unit.

Students who used the alternatives learned just as much about anatomy and physiology as students who performed the rat dissection. This was evident in the post-unit assessments, although the dissection group was tested only on rat-specific anatomy and physiology, while the alternative group was tested on human anatomy and physiology as well as cat, rat, and shark anatomy.

My decision to not dissect, however, was not without a price. By May 2010, my job was threatened, I was ignored by colleagues on many days, my research into dissection specimen sourcing and disposal was called inaccurate and slanderous, and I spent hours in meetings just to get to the place where I could teach those 10 days of class without harming animals. I was also informed one week before the end of the school year that I would be transferred to another school due to conflicting philosophies regarding dissection.

I often wonder why my colleagues responded this way. Research shows time and time again that alternatives teach the concepts of anatomy and physiology just as well as dissection.[1,2] Disposal of specimens creates waste that could be avoided. The treatment of animals as they are collected, sold, transferred, and killed so that they can be used as dissection specimens would be unthinkable for most, but it is somehow okay to pay others (random source Class B dealers and science supply companies) to do it for us. Why, with all of these problems, is anyone still using dissection?

The responses I heard went something like this: "Studying the structure and function of living organisms is fundamental to the study of biology, and the shared experience of animal dissection is the only (and best) way." Sounds convincing. And hearing this from our supposed experts (biology teachers) has been enough to keep this outdated practice in use decades longer than it should be.

My response is this: The relationship between structure and function is, of course, fundamental to biology, but it can be taught with other methods. Shared experiences are also of great importance, but there are many shared experiences that could be incorporated into a biology classroom that do not involve the killing of animals or traumatizing of students, something dissection does to many. Why not share the experience of ethical behavior, the awareness of the effects of our actions on other living organisms, and of choosing the path of least harm? That alone would be much more empowering than dissecting a rat.

The summer brought many surprises for me, the most exciting of which was being named the Humane Educator of the Year by Animalearn, an award presented during the annual Taking Action for Animals conference in Washington, DC. Along with that award came $3,000 worth of dissection alternatives for use in my classroom. Another welcome surprise was finding myself still a biology faculty member at Boulder High for the 2010/2011 school year, and receiving the go ahead to pilot the use of non-dissection alternatives for all of my biology classes. I'm thrilled to be back, and I am empowered by the changes taking place at my school regarding the use, or non-use, of dissection.

As Jeremy Bentham writes, "A basic ethical principle asserts that if we have a choice between two ways of achieving something—one that causes pain, suffering, and death and the other that does not—then ethical behavior dictates the latter method." I completely agree. Let's overcome the dissection paradigm in high school biology together.

[1] Patronek, G., Rauch, A. (2007) Systemic review of comparative studies examining alternatives to the harmful use of animals in biomedical education. Journal of the American Veterinary Medical Association, 230 (1), 37-43.

[2] Waters, J.R., Van Meter, P., Perrotti, W., Drogo, S, Cyr, R.J. (2005). Cat dissection vs. sculpting human clay structures in clay: an analysis of two approaches to undergraduate human anatomy laboratory education. Advances in Physiology Education. 29, 27-34.

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