

A Science Outreach Story

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Story Key Points

It is important to engage young students and the public about what we, as scientists, really do and challenge many of their assumptions about important topics in science.

Preparing presentations to inform the public about your research is very effective in helping you better articulate the broader impacts of your work.

Be open for surprises. The process of communicating science may even help you find peace with your inner self.

About

About: Claudia Willmes is a Postdoctoral researcher at DZNE and science writer/blogger at cns-newsletter.blogspot.de. Since she started her PhD, she has been actively involved in science communication and science outreach activities.

As far as I can remember, I always had an affinity for preparing presentations and public speaking. As such, I was all in when the director of my graduate school asked if I wanted to participate in a local science outreach project. The audience was a high school in a small town about 80 km south of Berlin. For the annual Science Day, the school regularly invites scientists to inform their students about scientific research and careers in science.

In my first year, I spoke about what I do on a daily basis in the lab. Pursuing a PhD in medical neuroscience, I was investigating the role of a protein called Drebrin in synaptic plasticity with the help of genetically modified mouse models. So, I explained the principles of electrophysiology and immunohistochemistry. I had put a lot of effort in my presentation and used analogies to make complicated science sound captivating and comprehensible. However, I quickly realized that students were more concerned about the fact that I am working with animals than they were actually interested in my research. Instead of asking, how can you record electric currents from a brain that is cut into slices, they asked, "Wow, you killed a mouse! Was that really necessary?" Given this strong interest, I decided to shift the focus of my talks for the next several years to the very sensitive and emotional topic of animal research.

What happened after the switch in focus? Well, I had a sleepless night before my first talk. I wondered: Will the students hate me for sacrificing animals for my research? Will they shout at me? Will I be able to make them understand the importance of animal research? Surprisingly, it turned out to be a great day! Starting with a few ice-breaker questions relaxed the atmosphere and gave me a good first impression of my audience. I asked questions such as: “Are you vegetarian? Do you have a pet? Would you describe yourself rather pro or contra animal research? Are you taking any medication, or do you know anyone whose life depends on medical advancements?” After getting to know my audience, I introduced myself and explained how I got involved in research. I told them that back then – when I graduated from high school – I had top grades in biology and was longing to better understand the underlying causes of human diseases. Thus, I decided to study biomedical science. Only when I started my bachelor thesis, it occurred to me that I would need to use and ultimately sacrifice animals for my research if I wanted to understand the molecular principles of human diseases. I hadn’t been prepared for that, and to this date, I still don’t find it easy to justify animal research.

Luckily, I am not the first to inform the lay audience about animal research. I used the great online resource from [Tierversuche Verstehen](#) for my PowerPoint presentation, brought empty mice and rat cages from my institution and encouraged the students to ask me anything. I also presented short videos to show them how an animal facility looks like.

I used all that material to make it as personal as possible. Why? Well, who wants to hear the summary of ethical principles like the 3Rs: Replace, Reduce, Refine? I explained to them what the 3Rs meant for my research and how I had to come up with a specific description of my research and calculation of animal numbers before I could start my PhD project. I started out by describing my pilot experiments for which I knocked out Drebrin (the protein in which I was interested) in just a small number of neurons in the brain. I told them about recording miniature excitatory postsynaptic currents in these mice and how I used the obtained data to predict sample sizes for the experiments I had planned for my PhD project.

I further elaborated that I had to write an animal license where I had to clearly define study cohorts and explained that I needed to show the statistical model I used to calculate the animal numbers. I also explained that I could not use cell culture models to answer my research question since the goal was to understand brain connectivity. As such, I needed an intact network as a model that the mammalian brain provides. Obviously, I also needed to state the indispensability of my research, and the benefit it will have for humankind. My experiments aimed to improve the knowledge of the central nervous system developmental disorders and the mechanisms underlying reduced cognitive abilities in the elderly and Alzheimer’s disease. In doing so, I explained that I hoped to contribute to the development of new therapeutic strategies.

Likewise, instead of giving a history class about the advancement of science, I picked a few examples like diabetes treatment and the invention of the cardiac pacemaker. I asked: did you know scientists used dogs in their first

experiments to test cardiac pacemakers in the 1920s? I explained that in the early days, these medical devices were big machines that got only smaller in 1985 with the help of research done on pigs and guinea pigs. Aren't we lucky that we have such a medical advancement today? I told them that nowadays, the treatment of heart disease relies on the biological healing of the damaged heart through the use of stem cells or gene therapy technologies. I emphasized to the students that studies in this direction are already being carried out on zebrafish, mice and pigs.

Of course, it was not all fun. I got a few very provoking comments and questions that weren't easy to answer especially during my first talk. However, that only helped me prepare better for the next science day. One very difficult question that stuck with me was an estimate of how many animals in total have died to date in the attempt to understand and ultimately cure Alzheimer's disease.

The science day this year was again very rewarding for me. The discussion with students showed me once again how important it is to inform the public about what we, scientists, really do. I was shocked to hear the misconception that cosmetic products would be tested on animals and was confronted with the idea that animal research is unnecessary.

Overall, I enjoyed helping students understand the importance of animal research and to challenge their assumptions about the kind of experiments that scientists conduct. For me, it was especially rewarding because I could immediately see the impact of my work. I can only encourage my fellow scientists to take part in science outreach and dispel persisting myths about animal research. We can indeed have control over the spread of correct information if we inform the public ourselves.