Lisa Beutler, Graduate Student, Genome Sciences, University of Washington

Interviewer: So we are going to move to a couple of questions now about science and this one is pretty hard but how would you describe science in big general...?

LB: So I guess I would describe science as the process of forming and testing hypotheses and this is kind of in the real world very different than what it is in a high school lab or an undergraduate lab course where you are doing experiments where the answers are already have been determined by thousands of undergraduates before you doing this experiment. And in real life what science is you have a question that is interesting to you or personal to you or is something that needs to get done for a grant and um you form experiments that with either support or negate your hypothesis and that is what the practice of science is. And then from that first set of results you form a new hypothesis and design experiments to test your revised hypothesis and so on and so forth. And it turns into a career.

Interviewer: Can you give an example of a question you would ask?

LB: So um a question I've asked in my study is: Are NMDA receptors which are a type of neurotransmitter receptor that are involved in all forms of behavior that are related to addiction, um in the nucleus accumbens, which is one of the pleasure centers in the brain, are these receptors involved in this region for behavioral sensitization? and then to test this I go into this region surgically and remove remove the gene using a virus. And then test control animals which haven't received the surgery and compare them to the animals which have and see whether both groups develop sensitization.

Interviewer: So you can deliver a virus just to a certain part of the mouse brain which will take out the gene that has to do with the NMDA ?

LB: Exactly. Exactly. So that is what I spend my days doing is surgeries into different regions and then I put all the mice through this month-long process of behavioral sensitization and kind of begin to put together the puzzle of where this gene is required for this process.

Interviewer: And how do you measure their behavior after you have done this to them?

LB: Um we have a bunch of locomotion chambers. They are just standard mouse cages that have um we out in this apparatus that has beams going across it and as the mice run around they break the beams and that information is send to a computer which converts that into distance traveled.

Interviewer: So every time they go across a beam like uh in a movie that its trying to be security or something, then that will help you measure how far they have gone?

LB: Exactly.

Interviewer: So then your, the distance is the thing you are measuring?

LB: Is the output, yeah. The computer basically spits out an excel file that says how far they have gone and I just compare it between groups that have received virus in their brain regions.

Interviewer: Interesting. And how long if you are doing one virus is different brain regions or one knocking out in different brain regions, how long would that take you?

LB: An experiment will take me from start to finish about 6 or 7 weeks, because you need everything, actually about 8 or 9 weeks cause at the end of it you have to make sure you hit the place you thought you did in the mouse brain and that takes a couple extra weeks. But yeah 8 to 9 weeks per experiment.

Interviewer: And then do you do, does that include data analysis or do you look at your data after that?

LB: That includes data analysis.

Interviewer: What kind of setbacks have you encountered in doing these studies.

LB: Um

Interviewer: What is one example you can think of?

LB: One example that I can think of is um I think a number of people working in this field have encountered as well is um when you do the virus injection you are basically committing yourself to a 9 week experiment. Um but you don't know until the end of those 9 weeks whether the injection worked and so sometimes the needle that we use to do the injection gets plugged up. And you can't really make heads or tails of your data until 9 weeks later when you look at the actual brains and see where the virus went.
And then you're like oh this virus didn't even get into this animals brain at all, I have to throw him out. Or I thought I hit region X but really I hit region Y because the needle wasn't straight or you know whatever but basically its very very easy to put 9 weeks into a study and then at the end have nothing. Um because your injection, your step 1 didn't work and there is no way of knowing whether it did until the end. So that's probably been the most frustrating setback for me.