ROBIN: I performed the experiment exactly as Donna described in her protocol. And compared with her results, mine just aren't matching up. I just can't get the results to be statistically significant.

HARRY: Well, something may be wrong with the way you're doing it then.

ROBIN: I guess...

HARRY: This was the fourth protocol that Donna perfected when she was postdoc-ing here in the lab. I mean, this is a good study design. I really don't get why you can't reproduce it either.

ROBIN: I'm following everything to the "t" exactly as it's described. It's just so weird that it won't work.

HARRY: Well, let me ask you this. How many samples did you use?

ROBIN: I used 8 mice per group.

HARRY: Well, let's try this. Add two more mice to each group. Then, try a different statistical method. If I remember correctly, I believe Donna performed a two-way ANOVA. See if changing those parameters gets you the results we're looking for here.

JAMAL: That's a good idea. Remember, Robin, toss out anything greater than 10. The normal range for living cells is 3 to 7, so anything higher than that is probably due to cell death. So, keep that in mind, it could make a difference.

ROBIN: OK. Thanks, Jamal.

HARRY: And let me know how you do, ok?

ROBIN: Of course, Dr. Fielding.

HARRY: Please, call me Harry.

JAMAL: "Doctor" Fielding…

HARRY: Hey, she's new. You did the same thing.

JAMAL: No, I didn't.

HARRY: Yes, you did.

JAMAL: Oh, come on!

HARRY: So, where are we here?

ROBIN: I did what you said and added the 2 mice per group, and look! It's still not statistically significant. These results are inconclusive and don't match with Donna's results at all.

HARRY: And you varied the statistical test? Ran a two-way ANOVA this time?

ROBIN: Yes. I mean, why is this happening?

HARRY: Robin, I've been watching you a little bit, in the lab here, and I hate to say this, but it seems like you're struggling a bit.

ROBIN: What?

HARRY: Sometimes, students come in and just can't hack it in grad school.

ROBIN: It's just embarrassing that I can't repeat this test.

HARRY: I'm worried too. We do consistently high quality work here, Robin. We just can't afford to lower our standards like this.

ROBIN: I'm sorry, Doctor Fielding.

[inaudible]

ROBIN: God, here he comes. I hope I don't get another lecture.

JAMAL: No, no, no. You're OK... OK?

HARRY: Jamal and Robin, do you have a second?

ROBIN: Of course.>>JAMAL:Sure.

HARRY: Well, I think you both know that I've been concerned about Robin's work, and that experiment not being reproducible. So, I decided to take a look at Donna's old lab notebook. It took a while to decode, but I think it was worth it. I found something.

JAMAL: Really?

HARRY: First, I found that some samples were excluded from the experiment, but there's no explanation as to why. There's no justification for leaving these out, and no criteria for outliers or excluding samples appears anywhere either.

ROBIN: I wonder why...

JAMAL: So, if she'd included those samples in the analysis, what would it have looked like? Is it similar to what we were looking at before? Or is it more like Robin's results?

HARRY: More like Robin's.

ROBIN: Wow, really?!

HARRY: [affirmative] And there's more. As I was digging further into the notes, I realized that all of the outliers were actually samples from female mice.

ROBIN: That's so strange...

HARRY: And significant. Rigorous research; which, by the way, Robin, you were doing, requires considering sex as a biological variable when using mice, or any animal samples. I was the one who was not doing a very good job, and I should have caught that.

ROBIN: Oh, that's OK.

HARRY: No, it isn't. I never even thought to tell you which sex to choose when I told you to add those two mice samples.

ROBIN: Well, I didn't think of it either...

HARRY: Yeah, but I'm the PI, and I am supposed to train you in designing and conducting experiments. And I changed the design of the study halfway through... I had no business doing that. So, what I'm thinking is I should take my own medicine, so to speak, and get back to a more carefully designed study; more consistent and most importantly, much more robust. I think we should stop, regroup and start over. I'll need you on this too, Jamal. We need to discuss the best way to do this.

ROBIN: Great.

HARRY: So I'll see you at 3 to discuss?

JAMAL: I'm good.

ROBIN: Me too. I'm in! Thanks so much, Doctor Fielding.

HARRY: Please, call me Harry.

ROBIN: OK. I'll try... Harry.

JAMAL: See you at 3, 'Doctor' Fielding! What?