

**ANTHONY:** There's going to be some killing happening. Killing bacteria.

[MUSIC PLAYING]

**GUEST SPEAKER:** If you've ever taken antibiotics, you've probably swallowed this molecule, or something like. This is penicillin G. Today in 5.301, the students are going to split up into teams. Each team will react 6-APA, that's this molecule, with a different acyl chloride, making a different kind of penicillin.

Tomorrow, the teams will test how good their penicillin derivatives are at killing bacteria. Phil hands out the different acyl chlorides. Even though his instructions are clear--

**PHIL:** Anything that has acyl chloride on it, in the hoods.

**GUEST SPEAKER:** Tengfei soon notices something.

**ANTHONY:** Do you smell it?

**LINA:** Smells so weird.

**HANSOL:** Smells bad.

**ETHAN:** It smells like grilled artichoke.

**LEALIA:** Potatoes and death.

**IKE:** Like a rotten rose.

**PHIL:** Old cabbage into a juicer.

**JOHN DOLHUN:** The acid chlorides can be quite dangerous.

**ROO-RA:** During lecture today, he's like, yeah, if you inhale too much of this.

**JOHN DOLHUN:** If you breathe enough of them and get them inside of your system, whoosh.

**ROO-RA:** And we were all like, ugh.

**JASON:** I know it's coming from my hood. If that's what you want me to say, yeah. It's coming from my hood. I'm sorry that the acetyl chloride that we're working with smells like death.

**JOHN DOLHUN:** Woosh.

**GUEST SPEAKER:** All the groups complete the reaction and are working out their finished products.

**DAN:** We were seeing the things precipitating, change color, and separate into layers. Me and my partner Hansol, we were doing it fantastically. It was going perfectly. Until we were right about to finish. And all we were doing was simply getting the crystals out of solution. And that's when we really, really messed up.

**TENGFEI:** Did you filter the sodium sulfate out for [INAUDIBLE]?

**DAN:** No.

**TENGFEI:** What?

**DAN:** In the procedure, we simply skipped the line. Skipped the line that says, filter. The product crystallized into a goop. And the drying agent was still in there in just one large, stinky, yellow goop.

**HANSOL:** Oh. [BLEEP]

**DAN:** OK, so how do we save this?

**PHIL:** Now they have to go back and do another work up and extraction.

**TENGFEI:** There's no way to get the sodium sulfate out.

**PHIL:** Not out of the penicillin.

**GUEST SPEAKER:** They have to backtrack and redo several steps.

**PHIL:** It's going to add another half hour, hour onto their work load.

**DAN:** During the process of reacidification, we added too much acid. Penicillin hydrolyzed. And so the NMR spectrum of it, we had absolutely no penicillin peaks. So the 4 and 1/2 hours in the lab, we ended up with crystals of essentially nothing.

**GUEST SPEAKER:** Meanwhile, other groups are doing well.

**IKE:** The white stuff is the crystal. That's the product. That's exactly what we want.

**PHIL:** People have really good samples.

**LINA:** This lab went really well.

**ANTHONY:** Phil said it's going take 2 and 1/2 hours if you an expert chemist. And we're on our second to last step. And it's been 2 and 1/2 hours. So bam. He says he does all of this in 2 and 1/2 hours. Bad Beep. But he also said that he would run a column too.

**LINA:** Don't you feel like you're really learning things as you go along?

**IKE:** From her. She's a monster. She's just goes [INAUDIBLE]. We're the first group to get done. Thank you very much.

**LINA:** No, thank you. High five.

**IKE:** [INAUDIBLE] good partner. Yeah.

**GUEST SPEAKER:** Everyone's excited to see whose brand of penicillin will be the best antibiotic. Find out next time on 5.301.

[MUSIC PLAYING]