

# DOPE LABS

## Transcript of Lab 041: Out of Control

**Titi:** Last week, the Supreme Court started hearing the case about abortion access in Mississippi, and this all started because Mississippi put a law in place that said you couldn't terminate your pregnancy after 15 weeks.

**Zakiya:** Well, that's in direct contradiction with *Roe v. Wade*, right? Which says you can terminate a pregnancy up until 24 weeks, which is considered the point of viability or when a fetus can survive outside the womb.

**Titi:** Right. And this is so monumental because this is the first time since 1973, so when *Roe vs. Wade* happened, that the Supreme Court is hearing a case that questions if it's constitutional to ban abortion before viability?

**Zakiya:** This feels like a lot is on the line.

**Titi:** Yeah, this could change everything, and it seems like we are in a time machine because I never thought that in my lifetime that we would go back to this way of thinking and have to go through court systems again about women's reproductive rights.

**Zakiya:** I've seen a lot of chatter... You know I like to scan the web...about like, Oh, well, you know, to have to worry about abortion if you are taking birth control and this and that. But baby, we need to talk about birth control.

**Titi:** Absolutely. Because not all that glitters is gold. This is not some magic pill that works for everybody the exact same way. So we have to talk about this. Welcome to Dope Labs, a weekly podcast that mixes hardcore science, pop culture and a healthy dose of friendship.

**Zakiya:** Reproductive rights have been under attack in the United States and with the recent abortion legislation in Texas. We want to take a closer look at one of the biggest factors in reproductive health.

**Titi:** That's right. So this week we're talking all about birth control. Specifically, we wanted to understand how it works to prevent pregnancy, some of the issues or side effects around birth control, and how people can be empowered to find the best option for them.

**Zakiya:** Let's get into the recitation.

**Titi:** OK, so what do we know?

**Zakiya:** Well, we know not all birth control is created equal.

**Titi:** Right.

**Zakiya:** You know, there's a lot of different types.

**Titi:** Yes, me and all my friends have all had a different one and have different thoughts about each of those things.

**Zakiya:** Yeah. The pill, the ring shot, IUDs, condoms, even spermicide. It seems like that's making a comeback. I recently saw an ad for that.

**Titi:** Do you remember that episode of Seinfeld where Elaine was talking about the sponge? I had no idea what that was when I was watching Seinfeld as a kid, but it was birth control and she was trying to get her hands on her favorite type of birth control, and it was like she was looking for drugs.

**Zakiya:** Really,.

**Titi:** It was very funny.

**Zakiya:** Now I'm going to have to go back and look for that. What else do we know?

**Titi:** We know that birth control is an important topic because half the population is looking for ways to decide or control when they get pregnant.

**Zakiya:** Or if.

**Titi:** Or if.

**Zakiya:** So what this boils down to is that birth control is affecting a lot of the population.

**Titi:** Yeah, so many people just think of birth control as something that people with uteruses are thinking about when really it can be partners that are thinking about it. So it really does affect way more than just the person with the uterus.

**Zakiya:** Yes. But it seems like a lot of people that don't have a uterus are making decisions about it,

**Titi:** sticking their non uterus in our business and telling us what we should be doing with our uterus

**Zakiya:** We also know there isn't a birth control pill for men right now. So what's going on with that? So what do we want to know?

**Titi:** I think for me, it kind of starts at the basics and I'm a little bit embarrassed.

**Zakiya:** This is a safe space.

**Titi:** I don't really know how birth control works.

**Zakiya:** You're just counting on it to work.

**Titi:** I think I kind of understand how the ring and the pill work. But IUDs, I know there's different types, and I think that's the part that I'm like, chemically, what is going on with these contraptions that we could possibly be putting inside of our bodies?

**Zakiya:** That's a good question. And then just as deserving of conversation is what are some of the side effects, right? What are some of the issues that come along with adding these things to your body, you know?

**Titi:** Absolutely. Because we already know that there are side effects. I think we've all heard. I just want to know what are all of them?

**Zakiya:** Yeah. And piggybacking off what you just said, we know there are tons of issues and the issues are different for different types of birth control. So how are doctors deciding who gets what and when? And is the birth control you got back in the day the same birth control you should be using later people on birth control for a long time?

**Titi:** Yeah, and our bodies are changing. We know that right is a one size fits all. Sometimes I feel like you're going to the doctor and they just got the birth control in a candy jar. And they're just like, Here now go.

**Zakiya:** Have one.

**Titi:** And then I think another really good question is, what is the future of birth control? I can't imagine that we are going to just be doing the same thing forever. I hope that there's some advances in the technology so that there aren't these issues that we're going to be talking about that persist with people who have a uterus.

**Zakiya:** Right? I feel like this is ripe for disruption.

**Titi:** Oh, absolutely, absolutely. All right. Let's jump into the dissection.

**Zakiya:** Our guest for today's lab is Dr. Elizabeth Ruzzo.

**Dr. Elizabeth Ruzzo:** I am Elizabeth Ruzzo. I am founder of Adyn and I got my Ph.D. in Human Genetics at Duke University.

**Titi:** So me and Zakiya both went to Duke with Elizabeth. Not just, oh, we were there at the same time and we might have met each other. No, we actually know Elizabeth.

**Zakiya:** Yes, very, very well. We graduated from the same program. All right. We have the same degree, so I am really excited to talk to her today.

**Titi:** Yes. And she's one of our very, very smart friends. So buckle in

**Zakiya:** So even though you hear us say, Elizabeth it's Dr. Ruzzo.

**Titi:** Yes. Put some respect on her name.

**Zakiya:** Let's start with the basics. So first, there's ovulation. That's the release of an egg from your ovary down the fallopian tube. So when that egg is fertilized, it implants in the side of the uterus. If there is no fertilized egg in that house, the uterus just comes crashing down. It shares the lining, and that's the 28 day cycle that we know as a menstrual cycle. And so that lining being shared, that's a period.

**Titi:** We know that birth control is a really important part of reproductive health for so many people, and we know it prevents pregnancy. But how exactly does it work?

**Dr. Elizabeth Ruzzo:** The highly effective methods work by either preventing ovulation or by preventing the sperm from successfully fertilizing the egg, which is usually the thickening of the cervical mucus. So with the exception of the copper IUD, they all work by adding low levels of exogenous hormones, and these are specifically synthetic forms of either estrogen or progesterone.

**Zakiya:** All right, so let's break that down.

**Titi:** OK, good because there's some words in there. I don't, I'm not sure.

**Zakiya:** So Elizabeth said that all of these, except for the copper IUDs, work by adding exogenous hormones. "Exo" means outside and "genous", you know root word genus is the origin so originating from outside the body.

**Titi:** My girl speak Latin. She speaks Latin yall.

**Zakiya:** And so when we think about it, we're saying like progestin. That's just a synthetic version of progesterone. Hormones are just chemical messengers, and they're like long range chemical messengers. They can travel through the bloodstream, reach different organs. They're important,

**Titi:** and they all serve different purposes

**Zakiya:** often. And I think it's a really delicate dance of the different hormones, which is why you often hear people say also hormonal imbalance because they're co regulated and some are blocking others, some amplify others, and it happens at different times, depending on different things that are happening in your body, right?

**Titi:** Sounds like a symphony.

**Zakiya:** Yes.

**Titi:** Like those strings come in at the right time to drown out those woodwind instruments.

**Zakiya:** There you go. So some of the hormones that these different birth controls add in are estrogen and progestin. Let's start with estrogen. This is something that's pretty cyclical. It follows the menstrual cycle. Estrogen thickens the lining of a uterus that saying, Hey, get thick. There's an egg that might get fertilized and it needs to be implanted into the side of here. Right?

**Titi:** Mm hmm. It's trying to make that environment ripe for the fertilization.

**Zakiya:** Right, And so hormonal birth control can prevent pregnancy by preventing ovulation, and that's just simply Humpty Dumpty coming tumbling down. That's an egg tumbling down through the uterus. Right? And so you can prevent ovulation or you can say, all right in the cervix, you know, if we're thinking about what reproduction is, what fertilization of an egg is, you're going to have to have sperm that can move through the mucus on the cervix to fertilize an egg. So if you make that mucus very thick, the sperm can't move through. Right. And so it's not able to enter the uterus and is not able to fertilize the egg.

**Titi:** It's like quicksand for the sperm.

**Zakiya:** Yeah, the sperm is just not strong enough. Or another way is to thin the lining of the uterus to prevent the egg from even, attaching to it. So slip n' slide records no egg attaching to the uterine lining, right? If you want to remember it, those are our different ways. OK

**Titi:** That was a beautiful breakdown of how all this works. Dr. Ruzzo also mentioned the copper IUD, which is a non-hormonal type of birth control. So how does that method work?

**Dr. Elizabeth Ruzzo:** That one releases copper ions into the uterus and makes it inhospitable for sperm and can potentially also prevent implantation of the egg.

**Zakiya:** So like we said before, there are so many types of birth control the pill, the patch, the shot, the implant. Those are all hormonal types of birth control.

**Titi:** Non-hormonal types include the copper IUD, using condoms, and the fertility awareness method, also known as FAM, or the rhythm method. This involves tracking changes during the menstrual cycle to predict when you ovulate.

**Zakiya:** And the ways to use the different methods also vary. So for the pill, you take it daily at the same time every day, whereas with the patch, that's every week you're applying a new patch.

**Titi:** So birth control has proved to be extremely effective at preventing the fertilization or implantation of an egg in the uterus, but it also has some reproductive health benefits beyond preventing pregnancy.

**Zakiya:** I think the point we really need to make clear is that just having a uterus makes you susceptible to all kinds of things.

**Titi:** Yes, like uterine fibroids, PCOS, PMDD, endometriosis.

**Zakiya:** Yes. And so I think it's easy to think of birth control as just providing agency about when you will or will not have a fertilized egg. But it's also medicine for those other conditions that come along with having a uterus.

**Titi:** Right. Birth control can't cure these issues, but they do help alleviate some of the symptoms that come with them.

**Dr. Elizabeth Ruzzo:** It's also used as medicine to treat chronic reproductive disorders in women, everything from menstrual cramps to fibroids to PCOS.

**Titi:** I've known people who are having issues with their period. I knew someone that had their period consistently for like six months, and so the prescribed medication to help regulate it was birth control. And they had to go kind of like back and forth with their doctors trying to figure out the right dosage and things like that. But eventually they got to a solution which they were really happy about.

**Zakiya:** I'm glad it worked out for them. There has been so much conversation about fibroids, and these are not just one off issues. Right? So uterine fibroids, which are like growths on the uterus by the age of 50, almost two thirds of all women will have experienced uterine fibroids.

**Titi:** Right?

**Zakiya:** And then even when we know how many women are going to have fibroids, there are still disparities within those groups. So for black women between the age of 18 and 30, about a quarter of them will have experienced uterine fibroids, compared to six percent of white women in that same age range.

**Titi:** And then PCOS, which is polycystic ovarian syndrome. That's a condition where your ovaries produce an abnormal amount of androgens, which is male sex hormones that are usually present in women and only small amounts. So having more of those hormones, it starts to produce little cysts on your ovaries.

**Zakiya:** And so endometriosis, something that we often hear about and the difficulties related to this when you're pregnant, that's when that uterine lining that we talked about earlier grows outside of the uterus.

**Titi:** Oh my gosh.

**Zakiya:** OK. And so that can be really painful.

**Titi:** And then PMDD is premenstrual dysphoric disorder, and it's a lot more severe than what we call PMS.

**Zakiya:** So now that we have a solid understanding of first, how birth control works, second, the different types of birth control and third, the additional health benefits of birth control. Let's talk about how you actually get it. How is it prescribed? So first things first, how many different brands or versions of birth control do you think are currently on the market?

**Titi:** OK I feel like there's probably more than I think. Maybe more than 50, but less than a thousand. I'm just going to have a wide range.

**Zakiya:** I like that. That's a very safe guess.

**Titi:** Thank you. Yes.

**Zakiya:** I mean, it's hard when you really think about it because this feels like there's a lot of different categories and it has to be more than one brand in each of those categories, right?

**Titi:** Yeah. Because you know, when you go to any drugstore, you got Tylenol and you've got ibuprofen and then you got the CVS brand, you got this other brand and children's brands, all these different types of things. So I'm like, it's birth control like that?

**Zakiya:** All right. So how many are there on the market?

It's 181. So the vast majority of those are in the category of pill. But even within pill, there's multiple different kinds. So, for example, some have both estrogen and progestin and some are progestin only or commonly called the mini pill.

**Zakiya:** I feel like your guess was good

**Titi:** It definitely fell within the range and I said, Thank you. I appreciate that.

**Zakiya:** And you're right. I mean, it's not quite acetaminophen, but birth control that includes, you know, brand names as well as the generic options, too. That might be more affordable.

**Titi:** Yeah. And the mini pill, which is progestin only is typically given to people who are breastfeeding or at risk for blood clots. And all of these methods have different levels of

effectiveness. After abstinence and sterilization, the implants and IUDs are the most effective methods of birth control, all about 99 percent effective or better.

**Zakiya:** And that makes sense because both of those have a lot less room for human error. Once it's in, it's in well, for the most part. Methods like the pill or the patch, now that's going to require you to stick to a regular schedule and to always remember to take whatever your method is or to apply your method, and that is way more susceptible to human error.

**Titi:** There was one time I forgot to put my own shoes on when I was leaving my apartment in grad school, and I didn't realize until I turned on my car and stepped on the brake

**Zakiya:** You put your foot to the pedal

**Titi:** And I was like this does not feel right. . So you already know things are getting forgotten.

**Zakiya:** So I guess it's to the question of which method is best?

**Titi:** For real the best method is one that fits your lifestyle, right? But I don't know if doctors are asking those specific lifestyle questions like, Are you a forgetful person?

**Zakiya:** Right?

**Titi:** Have you ever gotten to your car without your shoes? You know what I mean,

**Zakiya:** because that is crazy levels of forgetfulness to me, right?

**Titi:** Yeah.

**Zakiya:** And something that even if you are forgetful person, you might not even consider because it's your day to day life that might not feel forgetful to you. I mean, yes, no shoes, but like, Oh man, where you are having to say, did I turn off the stove? Did I turn off to this, you know.

**Titi:** Right. And may be taking something every day and you set your alarm on your phone and it's easy for you. And so it's no problem at all. But some people want to be able to take breaks like with the pill and the patch.

**Zakiya:** Yeah, that makes complete sense.

**Titi:** Some people might be sensitive to hormonal changes, so they don't want to opt for birth control that will change their hormone levels. So then they opt for, you know, things like condoms, the rhythm method or the copper IUD.

**Zakiya:** So when you consider all this stuff, there are so many options to pick from one hundred eighty one different ones, it seems. How are doctors deciding who gets which type of birth control?



**Dr. Elizabeth Ruzzo:** It's complicated, right? The average contraceptive counseling appointment in the US is 13 minutes, 13 minutes. And so doctors kind of prescribe based on what they're comfortable with, what they've seen work in their practice. And anecdotally, a lot of them are like, you know, I kind of have a couple of favorites. I start with those. If they don't work, we go back to it. And so this creates this process of women and their doctors going through potentially years of trial and error. The majority of women try four or more methods with the main reason that they quit being unwanted side effects.

**Titi:** So you heard that right years, years just to figure out the right birth control. A lot can happen in a year and imagine having to go through that. That's so frustrating.

**Dr. Elizabeth Ruzzo:** Certain ones have different pros and cons, right? Like some of them are also known to and have FDA approval for being used in the treatment of acne. Some are great at managing heavy menstrual bleeding, and others aren't. If a patient comes in with like, this is my main complaint or issue or concern on top of preventing pregnancy, then yes, doctors kind of know which of the bins to pull from.

**Titi:** Dr. Ruzzo told us about the U.S. medical eligibility criteria, or U.S. MEC for Contraceptive Use, which lists out some dangerous combinations of birth control and patient criteria.

**Dr. Elizabeth Ruzzo:** So, for example, if you're a smoker over thirty five, you should avoid combined oral contraceptives because they increase your risk of blood clot and stroke, things like that.

**Zakiya:** But even with that said, it's really a crapshoot, and there's no way to predict the possibility of unwanted side effects.

**Titi:** Yeah, because I mean, I feel like most people are walking into the doctor and just saying, Hey, I need birth control, and you might not even necessarily know to think about some other things that might affect your reaction to a certain type of birth control. I know I didn't. I just said, Hey, look for the birth control, you got some here?

**Zakiya:** So when we talk about these side effects, they really span the total range of something that feels inconvenient, like a headache or nausea to full-blown migraines. Changes in period weight gain changes in your mood or sex drive. Blood clots. High blood pressure. I mean, the list goes on.

**Titi:** Right. Even when you look at when there's a birth control commercial at the end, when you know, in the past it's talking too fast and they're telling you all side effects and they are saying it really fast so you can't even catch onto it and blah blabblah. Yeah, all those things are listed in there. They're like depression, suicidal thoughts. And I'm like, Wow, uh, what? You know, it's just crazy.

**Zakiya:** Are these my only options?

**Titi:** Why? Why is this happening?

**Zakiya:** So I think this is the tricky part, right? This feels like a catch 22, Titi.

**Titi:** Yeah.

**Zakiya:** Because on one hand, we have birth control that you're taking to alleviate certain symptoms and feelings that you have. So migraines or changes in period mood.

**Titi:** Yeah.

**Zakiya:** But on the other hand, if you don't have the right combination of birth control or if the birth control you have isn't right for you, you can then get these exact same side effects.

**Titi:** From the birth control.

**Zakiya:** Yes, it's like a mixed bag, like, oh, maybe it's a treat. Maybe it's a trick. I don't know.

**Titi:** Honestly. In 2014, Merck & Co the company behind the NuvaRing, which is a hormonal form of birth control. They settled out of court for \$100 million after facing thousands of lawsuits alleging injury and death from serious side effects like blood clots, strokes and heart attacks from folks that were using the NuvaRing.

**Zakiya:** And that's the part that makes it really terrible, right? Overall, you think of birth control as this thing that gives you more agency and control over your body and your health. Right. But then it's coming along with these really serious side effects. And some of them, like we said, are not just one offs, right? These are long term side effects.

**Dr. Elizabeth Ruzzo:** So that's where I think we really could use improvements and just take this big data approach that we're taking to try to understand, OK, this group of people were on the same birth control. Half of them felt great and half of them felt miserable. What is different about their underlying biology? And can we save that group of people who felt miserable from going on the wrong one in the first place?

**Titi:** So that really makes me think like, why is it so complicated? It seems like drug companies and health care providers could be doing a better job with this. Is their funding going into R&D for better birth control?

**Dr. Elizabeth Ruzzo:** This is a stat I heard recently that blew my mind. So a typical drug, 50 percent of the profits from that go back into R&D for improving that drug, right? Because you can always lower that blood pressure a little bit more. Birth control two percent goes back to R&D two percent.

**Zakiya:** Now, why are we getting the short end of the stick?

**Titi:** I can think of one very large reason

**Zakiya:** I feel like just because a method is effective at preventing pregnancy, like, that's not it. We still can work on some of these other things over here. We just rattled that list off very fast on the commercial.

**Titi:** For real. And I mean, that's what's being done with other drugs like Elizabeth was saying. When you think about blood pressure medication and all these different types of drugs, I feel like they're constantly getting better. They're always trying to make sure that your blood pressure is going to get even lower, even lower with each iteration. But it doesn't seem like the same type of energy is being brought to birth control.

**Zakiya:** Right. And like Elizabeth said, if people are getting off of birth control because of the side effects, that means the birth control isn't effective because they're not taking it right. That's introducing more gaps. Come on, folks.

**Titi:** What's not clicking, Stephen?

**Zakiya:** And we said at the top, where's the disruption? This is your mama's birth control. Like this feels like the same birth control over and over, whereas a new birth control.

**Titi:** Right. We got a retro birth control.

**Zakiya:** Yes.

**Dr. Elizabeth Ruzzo:** There are people trying to work on male contraceptives, for example. Some of those clinical trials were stopped pretty early because men were complaining of waking acne and mood changes. So imagine that unfortunately looks like a lot of the other things where if you look at, you know, prostate cancer versus breast cancer research dollars, turns out sexism is reflected in all aspects of our government and budgets.

**Titi:** It's just wild to me that men are complaining of these side effects. You know, weight gain, mood changes, acne when these are the exact same side effects that everybody else has been dealing with taking birth control.

**Zakiya:** Right it's like, Oh, you don't like that?

**Titi:** Neither do I. You know,

**Zakiya:** have you seen the tik tok where the girlfriends are showing the birth control pamphlet?

**Titi:** Yes, their partners are reading through the birth control, and they're like, What the heck is all this stuff?

**Zakiya:** They are shocked. They cannot believe how many side effects come along with taking birth control.

**Titi:** If you seen a birth control pamphlet, you know that it is the size of a city block and the type is very, very tiny and it has all of the chemicals, how to take the birth control, all of the side effects and everyone's blown away. And then the men, they complaining about these things and I'm just like, Wow, but it's OK for us to go through all of that. Hmm, that's very interesting.

**Zakiya:** Mm-Hmm.

**Titi:** Let's take a break. And when we come back, we're going to talk all about how Elizabeth and her company, Adyn, are shaping the future of birth control.

**Zakiya:** we're back. And before we dove back into our discussion with Dr. Elizabeth Ruzzo, what are we going to be dissecting next week?

**Titi:** Next week, we're talking about HIV. It's been around for decades, but recently there's been huge strides in developing an HIV vaccine, and we're going to get into it with Dr. Christine Daniels

**Zakiya:** Also starting next week. Dope Labs is going to be exclusive to Spotify, so if you're listening to us from somewhere else, go ahead and sign up for free on Spotify and follow us there so you can make sure you catch next week's episode. Plus, all the other stuff we have in the pipeline this semester.

**Titi:** You don't want to miss it. So what are you waiting for? Just do it. Just do it!

**Zakiya:** Let's get back to today's lab. So we're talking to Dr. Ruzzo, and this is all about birth control. In the first half of the dissection, we focused on what's not working with current birth control methods. Sure, if taken correctly, they can be effective at preventing unwanted pregnancy, but they also introduce a host of unwanted side effects to the patients. Many patients have to go through a cycle of trial and error, leading to a really frustrating experience trying to find a birth control that works for their bodies. The average person tries for a different birth control methods before finding one that actually works, and that feels like a terrible shooting rate for a product that's been on the market since the 1960s.

**Titi:** And for a medication that is as old as my parents, at least they should be doing way better than that.

**Zakiya:** In 2019, Elizabeth founded Adyn a company on a quest to revolutionize how birth control is evaluated and prescribed.

**Dr. Elizabeth Ruzzo:** People have very passionate opinions around birth control, right? They either think it's great and they need it, and they're so glad we're trying to solve something that hasn't been addressed before or they've had a bad experience, or they're in that unfortunate category of struggling with fertility and they're really angry and they're like, my birth control is the devil, right? And so I get it. I mean, I wouldn't have, you know, switched my academic career to work on this if I wasn't also passionate about realizing that we need a better standard of care.

**Titi:** Adyn uses an approach that's called precision or personalized medicine. So our first question about Adyn is what is precision medicine?

**Dr. Elizabeth Ruzzo:** Precision medicine or personalized medicine at its most basic level is just accepting something that I think we all know, which is that one size does not fit. All right. We are complicated. We are different. Why would you think our insides would respond the same to different drugs?

**Titi:** Exactly. Different medication affects people differently, and it shouldn't be one size fits all.

**Zakiya:** So understanding what Adyn is designed to do, how does it work? What does it look like? What is the ideal Adyn workflow that would lead to better birth control experiences?

**Dr. Elizabeth Ruzzo:** How it works is you get a test kit sent to your home and you spit into a tube for saliva that we use to extract your DNA. And you also provide a drop of blood from your finger that we use to analyze hormone levels of these six different hormones.

**Titi:** Dr. Ruzzo gave us two examples about how the data collected from the kits will improve health outcomes for people who use birth control.

**Dr. Elizabeth Ruzzo:** The first is that we're looking at genetic risk for experiencing blood clots. So there are a couple of well known sites in the genome that if you have them increase your risk for experiencing blood clot five to 12 fold, depending on which site you're looking at. But if you happen to have one of those genetic markers and you're on a birth control that's known to increase your propensity for experiencing blood clot, that risk goes up to like 30 fold. So it's a really massive risk and it's not currently checked in the standard of care.

**Zakiya:** That's a huge risk, and quite frankly, I'm shocked that they're not checking for this.

**Titi:** Honestly, why isn't this part of it if I have to go to the doctor to get a prescription to get the birth control? Why aren't they doing this to figure out if I'm at risk for any of these things? It just seems like it should be pretty natural, right?

**Zakiya:** Dr. Ruzzo gives us another example. The second example looks at risk for depression.

**Dr. Elizabeth Ruzzo:** Which, as you probably all know, is a complex disease, meaning it's not just about a single site in the genome or just about your genetics. It can also be about environment, but there's been a lot of great work done in the genetics of depression. So we've used a new technique called Polygenic Risk Score, which you can think of as basically a cumulative risk for experiencing depression. And we're using that to try to help people who are at a high risk for depression to not further exacerbate that by adding a drug, specifically a birth control drug that's also known to increase the likelihood of experiencing depression.

**Titi:** Could you imagine if everyone could have a personalized birth control method that was safe and effective without the risk of side effects? Without that trial and error process.

**Zakiya:** That would be ideal. That would be ideal.

**Titi:** I mean, honestly.

**Dr. Elizabeth Ruzzo:** Our mission is really to make scientific discovery more inclusive and to become the world's most patient centric precision medicine company. So even though we're starting with birth control, I really see us as doing precision medicine in an area that hasn't been well studied before, which is endocrinology plus genetics. So what we're doing with our first product, which is the birth control test, is we are looking at both your genetic predisposition as well as your hormone levels, together with self-reported information on your own medical history and preferences.

**Zakiya:** Adyn analyzed 600000 sites in the genome and six different hormone levels to find the best birth control.

**Titi:** By adding hormone analysis to this process. Adynn is able to get a more precise picture of someone's medical chart and predisposition to certain side effects. They're also able to continue analyzing hormone levels over time.

**Dr. Elizabeth Ruzzo:** Because we know that these hormones change not just throughout the course of a cycling month, but throughout somebody's lifetime. As you move from, you know, puberty to menopause, they look quite different. And we also know that there are sort of these broad reference ranges that don't take into account things like weight and age and ethnicity that we all know play into what somebody is, quote unquote normal, is. So our goal is to help make those more personalized in a way that would also unlock our ability to be predictive about what somebody is disease state might look like.

**Zakiya:** The other mission for Adyn is just broadening the research that's currently available when it comes to birth control, which up until now has been underfunded, which we talked about a little bit earlier and is just generally lacking.

**Dr. Elizabeth Ruzzo:** And to your question about, you know, what's the data that's out there? What does it look like? It is lacking. It is severely lacking. So a lot of our preliminary data, you know, we are standing on the shoulders of other scientists who have cared to focus on this, who have done work to show, for example, that certain kinds of birth control are more associated with depression and that certain kinds of birth control increased propensity for blood clots, things like that. When we went to start, a lot of the preliminary data was me, like mining databases that were out there and trying to clean it up to make sense of like, What do we know? What are the patterns that we see?

**Titi:** And that also means including everyone in the research, including women and people of color.

**Dr. Elizabeth Ruzzo:** I think as of 2018, it was something like 80 percent of genome wide association studies were done only on individuals of European descent, which just limits our power to understand the biology in everyone. We're hurting everyone, by the way, that we're

approaching this. So I think part of our mission is, like I said, to make scientific discovery more inclusive. And that's not just about paying attention to women, although we really need to do that because women weren't required to be included in clinical trials until 1993, which has led to this massive medical research gender gap. But it's also about making sure that we have diverse representation in the samples that are there to continue to make discoveries that actually benefit everyone.

**Titi:** Women weren't required to be in clinical trials until 1993.

**Zakiya:** That's very recent.

**Titi:** What that means is that you could have whole trials go through, and the people that are doing the research know the effects that it has on men, but they don't know the effects that it has on women and then they end up being prescribed to everybody. So then it could possibly be negatively affecting women, and they have no idea.

**Zakiya:** Yeah. Dr. Ruzzo mentioned that birth control is really just the first step for Adyn. We wanted to know what's next. What does the future of Adyn look like?

**Dr. Elizabeth Ruzzo:** The short term step is for birth control we get more and more specific about how we can make recommendations. So I'm not out here saying on day one for every single person, I'm going to get you on the right birth control for the first time because we just do not have that data. We're going to try our best, but we're also going to learn as we go and make our recommendations more and more specific. People go on birth control, often in their teens to treat PMS or PDD right like they potentially could start their journey with Adyn and stay with us to understand their hormones over time.

**Zakiya:** It feels like this was really illuminating. You know, there are things that just get taken for granted or that become the status quo. And it's just ah just leave it like it is. And this is a place where we don't need to leave it like it is. Yes. Somebody shake the table.

**Titi:** Honestly, And there's a lot of people doing a lot of really important work to make sure that that happens and that the laws that are put in place are put in place to give women more agency and more freedom to make a choice with their own bodies. And so when we do have that freedom, a company like Adyn is giving us the ability to get those medications and have it work to our benefit and not to our detriment in the background.

**Zakiya:** Another good point that Elizabeth raised is our bodies change over time. When you think about how long folks are on birth control, birth control that worked for you at age 16 might not be birth control for you at age 36 or 46, you know?

**Titi:** Yeah, my body lotion that I was using at that age would not work, I need pure Vaseline to moisturize this crusty body. I can only imagine what's going on on the inside.

**Zakiya:** I think something that's so important that Adyn is doing is collecting stories from people. Yes, that made it really real and it made me think back on my own experiences. How

many things just get pushed under the rug or dismissed because it's not the experience of the majority?

**Titi:** Yeah. And so with her collecting these stories, she might even be able to shine a light on something that might be a shared experience between a lot of different women, and they just had no idea it was linked to their birth control. This type of research is definitely going to improve the quality of life of so many people.

**Dr. Elizabeth Ruzzo:** Birth Control Odyssey is calling them. So if you go to our website, you can go to our stories and submit your own birth control odyssey to help destigmatize, help people feel less alone in their experience. I've learned so much from these stories. I'm blown away by how no two stories are the same.

**Titi:** All right, it's time for our one thing. What's your one thing this week?

**Zakiya:** My one thing this week is actually an app. It's called Todoist. t-o-d-o-i-s-t.. I found this app while reading about digital productivity, because if you're like me, you have a notebook and maybe another small notebook and a series of sticky notes and a calendar. You're trying to keep in emails and bookmarks and read it later, and it was too much stuff. So todoits is a place where I can kind of consolidate all of my things and keep my day on track.

**Titi:** I love that. So my one thing is a food item, and it's probably my favorite comfort food right now. And it's a breakfast bagel from this place called Call Your Mother. If you live in the D.C. metro area, you all know about it. You may not have been there, but if you are in the area or if you're planning on being in the D.C. metro area, you should definitely look for a call your mother location. I think they have like four or five locations now. They just opened one near my house and it is a gift and a curse. My favorite thing to get there is the Sun City bagel its an everything bagel with cheese, eggs, bacon and siracha jam, and it is perfection. It is a struggle for me to not go there every single day.

**Zakiya:** That's it for lab 041. What did you think about today's lab? Do you still have questions? Call us at two zero two five six seven seven zero two eight and tell us what you thought or give us an idea for another lap we could do this semester. We'd like to hear from you. That's 202-567-7028

**Titi:** And don't forget, there's so much more for you to dig into on our website. There'll be a cheat sheet for today's lab, additional links and resources in the show notes. Plus, you can sign up for our newsletter. Check it out at [DopeLabspodcast.Com](http://DopeLabspodcast.Com). Special thanks to today's guest expert, Dr. Elizabeth Ruzzo, founder of Adyn.

**Zakiya:** You can follow her on Twitter @sequinlabcoat. If you want to sign up for early access to Adyn's birth control tests, you can learn more about art and science at [adyn.com](http://adyn.com)

**Titi:** Adyn is on Twitter and Instagram @AdynHealth. Dope Labs is a Spotify original production from MegaOhm Media Group.



**Zakiya:** Our producers are Jenni Radelet Mast and Lydia Smith of Wave Runner Studios.

**Titi:** Editing and Sound Design by Rob Marczak.

**Zakiya:** Mixing by Janice Brown

**Titi:** Original music composed and produced by Taco USA Osawa and Alex Sugiura

**Zakiya:** from Spotify. Our executive producer is Gina Del Back, and creative producers are Barron Farmer and Candice Mann request.

**Titi:** Special thanks to Shirley Ramos, Yasmin Afifi, Kumu Algolia Till Crack, and Brian Maki,

**Zakiya:** executive producers for Mega O Media Group R s T Show Dilla and Zakir Watley.

**Zakiya:** But sometimes you know what happens to me. My brain switches up urethra and uterus, and those are not the same.

**Titi:** No pee out your urethra.

**Zakiya:** Yeah, I know. You know, I never can like, I just pull a U word down when I'm talking.

**Both:** Umbrella!