

Erin Welsh	"Courage. Something shared by countless Americans. Those that risked their lives, those that battle serious illness. When I was diagnosed with cancer, I was primarily concerned with ridding myself of the cancer. But secondly I was concerned about postoperative side effects like erectile dysfunction, ED, often called impotence. You know it's a little embarrassing to talk about ED but it's so important to millions of men and their partners that I decided to talk about it publicly. And after all, it can be associated with many conditions including prostate surgery, high blood pressure, diabetes, or even smoking. The point I want to make is that there are many treatments available for ED. So my advice is to get a medical checkup. It's the best way to get educated about ED and what can be done to treat it. It may take a little courage but I've always found that everything worthwhile does."
TPWKY	(This Podcast Will Kill You intro theme)
Erin Allmann Updyke	I mean none of it was wrong.
Erin Welsh	I love it because it sounds more like a PSA than an advertisement.
Erin Allmann Updyke	It does. It totally sounds like it.
Erin Welsh	Yeah.
Erin Allmann Updyke	I mean they don't even say the name of the medicine, right. It's very under the radar.
Erin Welsh	So that was from the infamous, really historic Bob Dole commercial from 1998.
Erin Allmann Updyke	Bob Dole, Bob Dole, Bob Dole. Do you know that was one of my brother's first words?
Erin Welsh	Was he born near like the year leading up to a presidential election or what?
Erin Allmann Updyke	I don't know. I just remember during the presidential election, I'm pretty sure it was my youngest brother, it might have not even been him, but sitting there saying Bob Dole, Bob Dole, Bob Dole.
Erin Welsh	Oh no.
Erin Allmann Updyke	So it could have been the one who was 1990. I don't know.
Erin Welsh	That's someone who's watching too much TV and too many political commercials.
Erin Allmann Updyke	Right. Bob Dole, Bob Dole, Bob Dole. Anyways.
Erin Welsh	Oh man. Yes. Well hi, I'm Erin Welsh.
Erin Allmann Updyke	And I'm Erin Allmann Updyke.
Erin Welsh	And this is This Podcast Will Kill You.
Erin Allmann Updyke	And today we're talking about Viagra.
Erin Welsh	We are.

Erin Allmann Updyke

Oh, can we say trade names? We're talking about sildenafil.

Erin Welsh

We're talking about... I mean my part is mostly about Viagra, period.

Erin Allmann Updyke

Okay, yeah. Not sponsored by Pfizer.

Erin Welsh

Viagra is also not the first trade name that we would have said on this podcast by a long shot.

Erin Allmann Updyke

No, we spent a whole allergies episode talking about EpiPens.

Erin Welsh

Yeah, exactly. Epinephrine autoinjectors.

Erin Allmann Updyke

Right, exactly.

Erin Welsh

Too much to say. Anyway.

Erin Allmann Updyke

It's going to be a great episode.

Erin Welsh

It's gonna be a great episode. I am so excited for this one.

Erin Allmann Updyke

Yeah.

Erin Welsh

It's a rich topic.

Erin Allmann Updyke

Yeah. Rich.

Erin Welsh

Who knew? Who knew?

Erin Allmann Updyke

Yeah. We should have. We did. We did!

Erin Welsh

We did. That's why we picked it.

Erin Allmann Updyke

Yeah.

Erin Welsh

But before we get into all of that, Erin, what time is it?

Erin Allmann Updyke

It's quarantini time.

Erin Welsh

It is. And what are we drinking this week?

Erin Allmann Updyke

Nothing other than Little Blue Pills.

Erin Welsh

Yep.

Erin Allmann Updyke

It makes sense.

Erin Welsh

It makes sense. Pills. P-I-L-S, just one L.

Erin Allmann Updyke: Because It's a beer.

Erin Welsh: It's a beer drink. It's a Pilsner.

Erin Allmann Updyke: A Pilsner drink even.

Erin Welsh: And lemonade and blue Curacao. Sorry.

Erin Allmann Updyke: Sorry but not that sorry because it's clever.

Erin Welsh: Yeah. I mean we had to do the name and then the recipe was based on that.

Erin Allmann Updyke: Exactly.

Erin Welsh: And so there you go.

Erin Allmann Updyke: Enjoy it. Or don't.

Erin Welsh: Yeah.

Erin Allmann Updyke: Anyways, you'll find the full recipe so you can decide for yourself for that quarantini and the non-alcoholic, we'll do it, placeborita on our website thispodcastwillkillyou.com and on all of our social media channels.

Erin Welsh: And on our website you can find all sorts of goodies, including but not limited to transcripts, links to our bookshop.org affiliate account, our Goodreads list, music by Bloodmobile, links to a firsthand account form, a contact us form, so many forms.

Erin Allmann Updyke: So many forms.

Erin Welsh: Show notes, Patreon, merch.

Erin Allmann Updyke: Merch.

Erin Welsh: Erin's repping our new shirt today which I just am still in love with so much.

Erin Allmann Updyke: It's so good.

Erin Welsh: And other things. Check out our website thispodcastwillkillyou.com.

Erin Allmann Updyke: If you haven't already, please remember to rate, review, and subscribe on whatever podcatcher you like to listen to so that you don't miss our new episodes and because it helps us get up in the charts which helps new listeners find our podcast. So thanks. We appreciate it.

Erin Welsh: Erin, can we get started with today's topic?

Erin Allmann Updyke: We can. Right after a short break.

TPWKY

(transition theme)

Erin Allmann Updyke

Sildenafil is the medicine that we're talking about today. And it is of course most famous for its use as a treatment for erectile dysfunction under the trade name Viagra. But that is not its only use. So I want to give credit upfront that this is also an important medication that is used for the treatment of things like pulmonary hypertension in both adults but also tiny babies, off-label use. And that's a condition where the pressure in your blood vessels in your lungs is too high and it can make it really difficult to breathe. In babies this is often because they're born premature. But I'm saying that now because that's mostly the last time I'm going to talk about it. Because its use in other contexts is really overshadowed of course by its fame as Viagra. So to understand the use of this medication in the treatment of erectile dysfunction, we have to start by talking about erections. What are they? How do they work? What is happening when they don't work? And why does Viagra help? So we shall begin.

Erin Welsh

All of the questions that we should be asking.

Erin Allmann Updyke

Exactly. There is the potential, as evidenced by multiple like 20-50 page papers on the detailed biochemical reactions and the neurobiology and endocrinology of what's happening in a penile erection, there's the potential to go into way too much detail. But for this episode I will link to all of those papers, so people who want to dig deep can. What we need to understand is really the broad strokes of what an erection is. A penile erection is the end result of a pretty complex neurovascular process, which means that it involves a real web of our peripheral nerves, as well as our brain and spinal cord.

It involves both sensory and motor nerves and both are sympathetic and parasympathetic, so those autonomic nervous systems. It coordinates through tactile, auditory, visual, and other stimuli, and involves a pretty wide range of neurotransmitters as well as hormones. And all of this has to coordinate with our vascular system which is what deals with blood flow in and blood flow out. And we don't have to get deep, deep into the details to understand how this works and how Viagra, Sildenafil, can affect this process. But we do need to understand the anatomy of a penis. So anatomically the penis has some pretty specialized tissue, creatively called erectile tissue.

Erin Welsh

Wow, okay.

Erin Allmann Updyke

I know. Such creative naming. So if you were to look at the interior of a penis like in cross section, to me it kind of looks like a fly with like an open mouth going like ooh! Okay? Because like imagine a fly, a big fly eyes but then they have like a human mouth going like oh my gosh!

Erin Welsh

I don't like that image but continue.

Erin Allmann Updyke

Okay. But it's in your brain now. So in cross section, it has these two big round, almost really they're like tubes that are full of this spongy type of tissue that's called the corpora cavernosa. And each of these corpora cavernosa has an artery that flows through the center. And then these two sponges are surrounded by a pretty dense fibrous tissue that forms a sheath, like a sword with a sheath, right, it's a firm area. And that is what looks like the fly eyes, like this pair of big wide eyes. And then beneath that, like on the dorsal underside of that if you're looking at a cross section, there's another tissue, spongy tissue tube called the corpus spongiosum. And inside this tube is the urethra where pee is going to come out as well as ejaculate is going to come out. And that's what looks like the mouth of the fly. This is surrounded by a thinner fibrous sheath of tissue. And then the whole thing is surrounded by a lot of different smooth muscle. Not skeletal muscle but smooth muscle.

Erin Welsh

So just like a lot of different types of tissue all layered together.

Erin Allmann Updyke

A lot of different types of tissue in these three pockets of spongy area.

Erin Welsh

Okay.

Erin Allmann Updyke

With a lot of smooth muscle tissue all up in there. And smooth muscle is the type of muscle that we have all over our bodies, it's what surrounds our arteries or is part of our arteries. It's what's in all of our internal organs except for our heart which has its own specialized kind of muscle. But unlike most other smooth muscle in our bodies, the smooth muscle that surrounds the corpora cavernosa in the penis is tonically contracted, which means that it's always a little bit, though not 100% completely, but it's a little bit clamped down, contracted rather than relaxed.

And what that does is it allows for only enough blood flow through to keep the tissues of the penis healthy without allowing too much blood in. So what happens in an erection, through again this complex series of neurotransmitters, hormones, blah, blah, blah, is that this smooth muscle starts to relax. And that causes the dilation of those arteries in the corpus cavernosa, in those flies' eyes, and that allows for increased blood flow. That blood flows out of the arteries into those tissues and fills up all of this spongy potential space. These are called sinusoids and they're basically like chambers in those spongy tissues. And as those tissues begin to expand, they actually compress the veins in the penis which are all located outside of that fascial tissue or in between layers of fascia but outside of those sponges.

Erin Welsh

So it's like let more blood in and prevent blood from leaving.

Erin Allmann Updyke

Exactly, exactly. And that traps the blood in those sinusoids, in the sponge. You have very little venous outflow and the more that that process continues through this kind of positive feedback loop, then eventually you have a really significant increase in the pressure inside of the penis. And then you have a contraction of nearby muscles called the ischiocavernosus muscles. And these are muscles like in the pelvic floor, not smooth muscles but skeletal muscles, and that provides a further rigidity. So that's how you end up with the rigidity of an erection. Does that make sense?

Erin Welsh

Yeah.

Erin Allmann Updyke

That's it. That's all it is.

Erin Welsh

All right.

Erin Allmann Updyke

We can make it as simple as that.

Erin Welsh

More blood in, less blood out, erection.

Erin Allmann Updyke

Erection. And to do that you first need a relaxation of that smooth muscle. So then if we understand that, then we can understand that there's a lot of ways that this process could go wrong. And that end result is called erectile dysfunction. And for this I'm going to just rely on NIH definitions, limited though they may be. Erectile dysfunction is the condition in which somebody cannot either achieve or maintain an erection that is firm enough for a satisfactory sexual experience. That's the literal definition. And there isn't one underlying cause of erectile dysfunction. Erectile dysfunction is an end result, right, it's a dissatisfying sexual ability or the inability to have this satisfying sexual experience because the erection is not as firm as either it used to be or as you want it to be. Now again, there's limitations to this and one thing that I'm not probably doing a good enough job in this whole episode is going into the nuances of how we define sexual health in general.

Erin Welsh

Right. Or what is a satisfactory sexual experience?

Erin Allmann Updyke

Exactly.

Erin Welsh

Right. Yeah, yeah, yeah.

Erin Allmann Updyke

Right. So that is beyond the scope of this. But if we're sticking with this definition, then what we're looking at really is that erection itself. And there's a lot of different things that can end up causing erectile dysfunction or a lot of different risk factors that end up relating to this, right. There are of course psychosocial issues like we said. Like what is healthy sexual function? What does it mean to that individual? What's considered disorder? But if you accept that I've got a disorder or I feel like there's a disorder, there's a lot of different things that can end up causing this. There's things like neurologic issues, whether that's a spinal cord injury or peripheral nerve damage, or either like demyelinating disease like MS. Or a whole host of other chronic diseases that can cause nerve issues.

There's also endocrine issues like low levels of testosterone. There's also vascular issues. And vascular issues likely account for the majority of erectile dysfunction, though it's a little hard to get great stats on this but a lot of papers estimate like 70% or so. And vascular disease is not one thing, right. There's a whole bunch of risk factors that lead to vascular disease that can lead to erectile dysfunction. Diabetes, high blood pressure, high cholesterol. All of these affect the lining of our blood vessels which is going to affect blood flow which is necessary for an erection. Aging in general causes oxidative stress and endothelial dysfunction. And then of course the hospital can do it to you, which it sounds like was what happened in our firsthand account because someone had treatment for cancer.

Erin Welsh

Oh. I was like what do you mean?

Erin Allmann Updyke

Treatment for something like prostate cancer-

Erin Welsh

Yeah, yeah.

Erin Allmann Updyke

Or other operations or medications that can sometimes cause erectile dysfunction.

TPWKY

(transition theme)

Erin Welsh

Erin, real quick, age. Why? Like I know you mentioned oxidative stress, blah, blah, blah.

Erin Allmann Updyke

Yeah.

Erin Welsh: But like why?

Erin Allmann Updyke: Why?

Erin Welsh: Why does the aging process lead to higher rates of ED?

Erin Allmann Updyke: Erin, this is a question that made... I wondered this but looking at the statistics, I wonder even more. Because okay, this is jumping ahead but statistically people say that anywhere from like 50%-100% of people with a penis over age 70 have erectile dysfunction.

Erin Welsh: Okay.

Erin Allmann Updyke: Again, meaning that they're not having a satisfying sexual experience because they're not able to achieve or maintain an erection.

Erin Welsh: Which real quick, again, does that definition include frequency? Is that every time? Is that just once in a month? Is that once in a week?

Erin Allmann Updyke: It doesn't include any of that.

Erin Welsh: Okay, all right.

Erin Allmann Updyke: It doesn't matter, right. Because it is subjective. It is a subjective experience that is meeting criteria for this dysfunction or disorder.

Erin Welsh: Right.

Erin Allmann Updyke: It's giving me menopause vibes where we're calling this a disorder because it is causing impact on your life which is valid.

Erin Welsh: Right.

Erin Allmann Updyke: But is it a disorder like evolutionarily? Maybe not, right. I don't know.

Erin Welsh: Girl, wait for it. Just wait for it. There's more where that came from. We'll get into it.

Erin Allmann Updyke: Yeah, I can imagine. Because again, it is very individual.

Erin Welsh: Sure.

Erin Allmann Updyke: Like what is a satisfying sexual experience for one person is not the same as for another person. For some people it might not even include an erection, it might not even include orgasm. Like there's so much nuance to this.

Erin Welsh: What's the end goal here for fixing-

Erin Allmann Updyke: Yeah, exactly.

Erin Welsh: Fixing this? Quote unquote "fixing". Yeah.

Erin Allmann Updyke

Fixing this, fixing this. And this, in the case of erectile dysfunction, is just the firmness of the erection.

Erin Welsh

But there is a real relationship between age and ED. So what is going on mechanistically? Like what is the basis for this physiologically?

Erin Allmann Updyke

Yeah. Great question. I don't have a one single answer for you. I don't have like an aging equals this. There's a lot. There's the fact that as we age all of those other risk factors go up, cholesterol goes up, blood pressure goes up, the rates of diabetes go up. Aging also like I said already is thought to be independently associated with things that end up causing endothelial dysfunction, which is blood vessel dysfunction. Is it just that? There's a lot of different factors. I don't think that there's one thing that aging causes that leads directly to erectile dysfunction. I think it's a whole host of issues.

Erin Welsh

I just have so many questions. But keep going.

Erin Allmann Updyke

I don't know that I'm going to answer any of your questions. But out of all the different things, be they neurogenic, be they vascular, be they psychological, be they hormonal, very often the first thing that is used for treatment is one thing and that is Viagra. So no matter the cause, that's not usually investigated first thing, often not even second thing, the treatment is a blanket Viagra for all your woes.

Erin Welsh

And so what percentage of cases of ED does Viagra actually help with?

Erin Allmann Updyke

Most papers I read estimated 60%-70%.

Erin Welsh

Wow, okay.

Erin Allmann Updyke

It's pretty high. It's pretty high. Why is that? How does it work? Let me tell you. Sildenafil, Viagra, it's a phosphodiesterase or PDE inhibitor. What does that mean? PDE is an enzyme. It's not one enzyme, it's a whole group of enzymes and these enzymes are present on a whole bunch of our tissues throughout our bodies. But there's one in particular that Viagra is very strongly, like it really only works on this one type of phosphodiesterase called PDE5. And this particular phosphodiesterase enzyme happens to be present in very high concentration in the corpus cavernosum of the penis, that spongy tissue that's responsible for the majority really of an erection.

So through this again very complicated series of biochemistry, the end result of blocking PDE5 which is what sildenafil and other similar drugs do, it blocks the action of this enzyme. And that results in this cascade of events that causes increased relaxation of that smooth muscle. So that allows for blood flow into the corpus cavernosum to start and that allows the further steps of an erection to take place. That whole cascade of things can happen if you have relaxation of that smooth muscle and increased blood flow. And that's it. It can be as simple as that.

Erin Welsh

Yeah. What about other ED drugs?

Erin Allmann Updyke

So Cialis is the trade name for tadalafil which you can tell by the -afil at the end that it's the same type of medication.

Erin Welsh

Okay.

Erin Allmann Updyke

It has like a different half-life and blah, blah, blah but it's still a PDE5 inhibitor, so it acts in the same way. And there's a few other drugs that are really similar, just like different versions essentially but acting on the same enzyme. So all of those work in a very similar way. There are other medicines that are used. Some of them are like injectable medicines that you inject directly into the penis. Some of them you can put them in other ways. A lot of them still, like predominantly we target this phosphodiesterase pathway. The other ones might target different PDEs, so PDE1 instead of 5 or whatever. But that's predominantly what they're doing is targeting this pathway.

Erin Welsh

Erin, you said injectables and then you said and then put them in in other ways and you just tried to skate right by that. Can you go back to that?

Erin Allmann Updyke

It wasn't that exciting of other ways. I just mean like sublingual or injectable.

Erin Welsh

Okay.

Erin Allmann Updyke

I don't think that there are any that are just topical, though I think that that's been tried. Yeah.

Erin Welsh

Okay.

Erin Allmann Updyke

Not that exciting. So yeah, I mean honestly that's the basis of it. That's how Viagra works and that's why it works. Interestingly sildenafil still requires the initial steps of erection which includes sexual arousal. So you still need first this neurologic input before you get that relaxation of the smooth muscle from sildenafil. Because it's not like direct, the way that it happens is like the build up of certain precursors and then the blocking of calcium and blah, blah, blah. So sildenafil itself, Viagra itself does not cause an erection. It also doesn't affect libido or sexual desire. All it does is allow for increased blood flow so that in the context of an erection, it can be firmer and/or last longer.

Erin Welsh

Just opens the blood floodgates but waits for the signal from the brain.

Erin Allmann Updyke

Yeah. It makes the floodgates easier to open.

Erin Welsh

Yeah.

Erin Allmann Updyke

It allows for there to just be like a gentle push instead of like a big shove like of a heavy door.

Erin Welsh

Okay. So I have a bunch of questions.

Erin Allmann Updyke

Okay.

Erin Welsh

All right. You always see on the commercials if you have an erection lasting longer than 4 hours, etc, seek medical care.

Erin Allmann Updyke

Yeah. That's called priapism.

Erin Welsh

Right. Why is that happening? And second to that is kind of similar to that, like what are some of the other side effects that we see with use of sildenafil and why do we see those things?

Erin Allmann Updyke

Great question. So of course any medicine has the risk of side effects.

Erin Welsh

Yeah.

Erin Allmann Updyke

Most common side effects with Viagra are things like headache or flushing, you can have some dizziness or like stomach upset, also weirdly nasal congestion. I don't actually know why that one happens. Most of these have to do with the fact that because this is acting on smooth muscle and while it is specific to PDE5 and that is mostly found in the penile tissues, it's also found in some other places so this can cause relaxation of smooth muscle other places and then potentially drop your blood pressure and that might trigger some of these other symptoms. Really importantly, we see this happen if somebody is also taking a medicine that has nitrites in it, like nitroglycerin.

Erin Welsh

Yeah.

Erin Allmann Updyke

Which someone might take if they have angina or like that pain in their chest that's from their heart having blockage basically. If Viagra and a nitrite is taken together, these drugs actually interact with each other and then cause really severe drops in blood pressure, like potentially deadly, really problematic to take these two medicines together. Otherwise Viagra and similar medications are actually pretty safe. Most all the time when priapism happens, so that like prolonged erection, that can be very dangerous because again, with an erection you're having a lot of blood flow through the arteries into the penis and very little blood outflow. So that pressure can really build up and end up, if it lasts for too long and you don't have enough blood outflow, you can increase the pressure so much that you can start to damage tissue in the penis. So priapism is very serious. That generally only happens if somebody takes too much of this medication.

Erin Welsh

Okay.

Erin Allmann Updyke

At the doses that it's usually recommended, it's very, very, very rare to have priapism as a side effect. It's usually from doubling up on doses or it didn't seem like it worked so I took extra, etc.

Erin Welsh

And how is priapism treated?

Erin Allmann Updyke

A lot of times if it needs to be, it is treated by physically removing the blood from the penis with a large syringe. Any other questions?

Erin Welsh

That's it.

Erin Allmann Updyke

Yeah, it's not great, it's not great. There's other kind of trying to calm yourself to reduce that blood flow.

Erin Welsh

Okay.

Erin Allmann Updyke

Because again, there's a lot of like nervous system input that's going into this.

Erin Welsh

Right.

Erin Allmann Updyke

So if you can try and reverse some of that psychologically, sometimes that can help a lot with making that erection detumesce, it's called.

Erin Welsh

How do you just be like okay, don't think about this erection?

Erin Allmann Updyke Right.

Erin Welsh Don't think about this erection that I've had for 3.5 hours. Don't think about this.

Erin Allmann Updyke Understandably it's very hard, it's very difficult to do. So yes. So that's Viagra, Erin. That's how it works. That's how you get an erection and that's how it works. Erin, tell me how we figured this out. I cannot wait to hear the story, like the story of Viagra.

Erin Welsh Ugh. There are so many stories to tell, Erin, and I can't wait to get to them all right after this break.

TPWKY (transition theme)

Erin Welsh Step up to the plate. Let the dance begin. Love life again. This is the age of man. This is the age of Viagra. And of course, lest we forget, ask your doctor.

Erin Allmann Updyke I'm sorry, your face, I cannot.

Erin Welsh Oh yeah. Really trying to embody all of these commercials that we have seen.

Erin Allmann Updyke You're doing such a good job. Like literally such a good job.

Erin Welsh When Viagra hit the market in 1998, it sent shock waves around the world. Late night talk shows made countless jokes, cultural commentators wrote article after article about how Viagra would transform sex and relationships, millions of men made long overdue appointments with their doctor. Hey, any way you get in the door is great. Pfizer counted their millions and other drug companies got to work trying to create their own blockbuster drug. The impact that Viagra has had is huge. It changed the way drugs are marketed. It contributed to the medicalization of sex. It opened up discussions about a formerly taboo subject, sex in older adults. It highlighted gender bias in drug production and insurance coverage and research. I don't think the world had seen a drug like it before in terms of how much controversy and discussion it prompted. Its release reminds me actually a lot of the chatter and hype around Ozempic and related drugs, which we should really do an episode, and this sort of like 'this will save us' or 'this will be the end of us' extreme perspectives.

Erin Allmann Updyke Wow.

Erin Welsh Like everything is so like whoa, this is the end of relationships. Oh, this is the age of a new era. Like that kind of thing.

Erin Allmann Updyke Wow.

Erin Welsh Yeah.

Erin Allmann Updyke Also 1998. I don't think I realized it was so recent.

Erin Welsh Oh yeah. Yeah.

Erin Allmann Updyke Okay, I can't wait.

Erin Welsh: And it just slipped into like our cultural consciousness.

Erin Allmann Updyke: Right.

Erin Welsh: Yeah. It's here.

Erin Allmann Updyke: Yeah. Weird, okay.

Erin Welsh: But before there was Ozempic, there was Viagra. And before there was Viagra, there was nothing. That's the story that you've likely heard and the story that Pfizer seems to love to tell. Nearly every publication that references the origins of Viagra uses the word 'serendipity' or one of its synonyms.

Erin Allmann Updyke: Okay.

Erin Welsh: As the story goes, Pfizer was testing out a new drug for a heart condition and stumbled onto greatness by utter chance. That might be part of the story but it's certainly not all of it. The truth is that the hunt for an erectile dysfunction cure had long been underway. And I'm not talking about like herbal extracts or animal glands, which like millennia, people have been using those or trying those out. I mean that there had been since at least the 1970s and 1980s a real concerted effort in medicine to create a medication, a device, or a surgery to treat what had long been known as impotence but was getting rebranded as erectile dysfunction. The history of impotence is a separate topic entirely but relevant to this discussion is what people thought caused it throughout that history. And that was your brain. For much of modern medicine, impotence as it was then known was considered a condition primarily of psychogenic origin.

Erin Allmann Updyke: Right.

Erin Welsh: Meaning it was caused by your brain, anxiety, stress, depression, your wife's frigidity. Yeah, that was one of the leading causes.

Erin Allmann Updyke: Frigidity?

Erin Welsh: Frigidity.

Erin Allmann Updyke: Cool, cool, cool, cool, cool.

Erin Welsh: And accordingly it was treated by the folks who dealt with your brain, psychologists and psychiatrists. This notion replaced the previous dominant concept that impotence was a normal part of aging. And it began the shift in seeing impotence as something to treat, as something to manage, as something to cure. It redefined what quote unquote "normal" looked like. People did recognize that there were some cases of impotence that seemed to have a physical or organic origin but the most commonly cited statistic, which by the way no one can really figure out where this statistic came from, up until the 1970s or even the 1980s, was that at least 90% of cases of impotence were psychological in origin.

Erin Allmann Updyke: Yeah.

Erin Welsh: Compare that to today which is basically the reverse. Quote: "Current medical consensus on erectile dysfunction is 10%-30% psychogenic and 70%-90% organic." End quote.

Erin Allmann Updyke Right. And I don't know where they're getting those numbers either.

Erin Welsh Pfizer.

Erin Allmann Updyke All of it, yeah, all of it is very interesting and doesn't even get into like female sexual dysfunction which is still considered psychogenic and entirely in your brain.

Erin Welsh Yeah. Oh yeah. Right.

Erin Allmann Updyke Yeah. But cool.

Erin Welsh What happened to cause this reversal?

Erin Allmann Updyke Yeah.

Erin Welsh It wasn't Viagra. Or at least it wasn't Viagra alone, since the tides began to turn at least a decade or two before the drug came on the scene. It was Viagra's predecessors that helped to transform impotence into erectile dysfunction. Devices, surgical treatments, or even injectable medications that were developed and tested in the 1970s and 1980s showed that for at least some men, erectile dysfunction could be treated with medical rather than psychological intervention alone. And this led to a shift in who treated erectile dysfunction, as it was beginning to be known, from therapists to urologists, as well as increased interest in the physiological basis of erections and ways to induce them via medication. Which brings me to the story of Professor G. S. Brindley.

Erin Allmann Updyke Okay.

Erin Welsh Have you heard this story?

Erin Allmann Updyke Nope.

Erin Welsh Okay. Name doesn't sound familiar?

Erin Allmann Updyke Nope.

Erin Welsh Okay.

Erin Allmann Updyke Should it? By the end of this I won't forget it.

Erin Welsh Yeah, I think that's sort of how I feel. It's now scarred into my brain.

Erin Allmann Updyke Okay.

Erin Welsh Nothing could have prepared me for this.

Erin Allmann Updyke Oh dear. Oh my god.

Erin Welsh Let me set the stage. Yeah, truly.

Erin Allmann Updyke

Okay.

Erin Welsh

The year, 1983. The location, Las Vegas AKA Sin City. The occasion, the annual meeting of the American Urological Association.

Erin Allmann Updyke

Hot stuff.

Erin Welsh

On this fateful day, referenced in every history of Viagra article and book, Professor G. S. Brindley made his way to the lecture hall where he was scheduled to give an evening talk titled something along the lines of Vasoactive Therapy for Erectile Dysfunction, something innocuous, unremarkable. The audience was not substantial, around 80 or so people, mostly urologists who dragged their partners along for one last lecture before the evening reception began. The first sign that something was amiss appeared even before the lecture began. The audience watched as the 57 year old Brinley climbed the stairs to the lectern, dressed in a blue tracksuit, not at all professional attire for this kind of meeting.

Erin Allmann Updyke

I'm nervous.

Erin Welsh

It's not ecology after all.

Erin Allmann Updyke

I'm very nervous right now.

Erin Welsh

You should be. And this tracksuit stood in sharp contrast to those in the seats who were in their evening best. If the lecture had followed a normal course, perhaps no one would remember the blue tracksuit. But from the very first slide, it was apparent that this was anything other than a normal talk.

Erin Allmann Updyke

Oh god.

Erin Welsh

Because the very first slide was a penis.

Erin Allmann Updyke

Yeah.

Erin Welsh

Okay, it's a urology meeting. Penis pics are to be expected.

Erin Allmann Updyke

Right, lots of penises.

Erin Welsh

That's not abnormal, right. But this wasn't just any penis. This was Brindley's penis.

Erin Allmann Updyke

Brindley's penis. I knew it.

Erin Welsh

And not just one slide-

Erin Allmann Updyke

Multiple.

Erin Welsh

But dozens.

Erin Allmann Updyke

Yeah.

Erin Welsh

Why?

Erin Allmann Updyke	Loves his own peen.
Erin Welsh	Well Brindley explained to his stunned audience he had no other choice. His hypothesis was that if you injected vasoactive agents like papaverine and phentolamine into the penis, you could induce an erection. But lacking easy access to an appropriate animal model, he decided to test it out on himself. It doesn't end here unfortunately. Because while a picture may be worth 1000 words, a live demonstration, you can't put a price on that.
Erin Allmann Updyke	No, you really can't. That's why you need a tracksuit.
Erin Welsh	Brindley was worried that the audience wouldn't believe that the erection featured in these pictures was induced by the injection alone. And so prior to the lecture, he had injected himself with papaverine and deliberately wore his loose tracksuit so that he could pull his pants tight against himself. Which is exactly what he did after stepping out from behind the podium. As to what happened next, let me read you this quote from one of the audience members.
	Quote: "At this point, I and I believe everyone else in the room was agog. I could scarcely believe what was occurring on stage. But Professor Brindley was not satisfied. He looked down skeptically at his pants and shook his head with dismay. 'Unfortunately this doesn't display the results clearly enough.' He then summarily dropped his trousers and shorts, revealing a long, thin, clearly erect penis. There was not a sound in the room. Everyone had stopped breathing. The sense of drama in the room was palpable. He then said with gravity, 'I'd like to give some of the audience the opportunity to confirm the degree of tumescence.' With his pants at his knees, he waddled down the stairs, approaching, to their horror, the urologists and their partners in the front row. As he approached them, 4 or 5 of the women in the front rows threw their hands up in the air and screamed loudly. The screams seemed to shock Professor Brindley, who rapidly pulled up his trousers, returned to the podium, and terminated the lecture." End quote.
Erin Allmann Updyke	He didn't realize that maybe this was inappropriate until people screamed?
Erin Welsh	I mean okay, so I have so many thoughts on this. So many thoughts on this. I was processing this story for days.
Erin Allmann Updyke	It's so many, it's so many... You're at a conference, a meeting. And you... I mean, I don't have the right words.
Erin Welsh	This is a guy who doesn't have friends to tell him, hey man, maybe not.
Erin Allmann Updyke	You can't drop trou on stage at a scientific conference.
Erin Welsh	I mean and let's be real, you shouldn't need to have friends who are your moral guideposts like that. Like that should be something that you know to not do.
Erin Allmann Updyke	Right. You can't do that.
Erin Welsh	You cannot, you cannot do that. But he did.
Erin Allmann Updyke	Okay.

Erin Welsh: He did. And so what can we take away from Brindley's lecture? One, and this is the thing that's most often referenced when this is mentioned in any article or book about Viagra, is that his demonstration showed that you could induce erections with a vasoactive compound. This was 15 years before Viagra came on the market. And so this is why the story is often mentioned because it's like oh, this is proof that people had been working on medications for erectile dysfunction long before Pfizer got into the game.

Erin Allmann Updyke: Right.

Erin Welsh: And sort of the same physiological basis was used as like how to induce an erection.

Erin Allmann Updyke: Yep.

Erin Welsh: Okay, fine. That's the first thing.

Erin Allmann Updyke: Sure, sure.

Erin Welsh: But the second thing that we can take away, and this is the thing that I didn't see mentioned in any articles or books that included this story is excuse me but like what? What?

Erin Allmann Updyke: Yeah. What?

Erin Welsh: Like how was this allowed to happen? How was this not disciplined afterward? And how has no one commented on how messed up this was?

Erin Allmann Updyke: Yeah.

Erin Welsh: Like not only that but people generally write about Brindley as this quirky, eccentric guy whose lecture was "unique, dramatic, paradigm shifting, and unexpected." This is a quote, right, from unique. "It is difficult to imagine that a similar scenario could ever take place again." End quote.

Erin Allmann Updyke: Yeah!

Erin Welsh: I mean I certainly hope not.

Erin Allmann Updyke: No kidding!

Erin Welsh: I mean it's the same thing we see time after time with certain people getting away with anything if their work is seen as valuable.

Erin Allmann Updyke: Right. Like literally exposing your erect penis to an entire room without consent.

Erin Welsh: Yes.

Erin Allmann Updyke: Or even warning. Like I mean not even warning, much less consent.

Erin Welsh: Not even warning. Not like hey, what you're about to see is pictures of a penis on whatever... Like that's, we can even, okay.

Erin Allmann Updyke: I would honestly expect it at a Urologic Society conference.

Erin Welsh: Yeah.

Erin Allmann Updyke: Though I would still expect in the 80s some kind of warning, like I don't know.

Erin Welsh: In the 80s?

Erin Allmann Updyke: I don't know. I guess you're right. Today I guess.

Erin Welsh: That's generous of you. Yeah.

Erin Allmann Updyke: Sorry.

Erin Welsh: Yeah. But it's amazing. Like the article where I pulled these quotes from is titled 'How Not to Communicate New Scientific Information'. And it was written in 2005 and it's still Brindley is like what a quirky guy, this was so unforgettable, wow. He goes down in history as a really eccentric dude.

Erin Allmann Updyke: So wait, sorry, this is an article about how not to communicate things. Are they lifting him up as an example of good job or like less good?

Erin Welsh: No. It's mostly like cheeky, like wow, what a guy. I can't believe he did this. What a scoundrel.

Erin Allmann Updyke: Cool.

Erin Welsh: So I mean the reflection is still not there. I mean 2005 was 20 years ago but still.

Erin Allmann Updyke: Yeah. All right.

Erin Welsh: Okay. So I've already given enough airtime to Brindley. Let's get back to Viagra. The 1970s and 1980s saw a number of developments that set the stage for Viagra's introduction. Injections with vasoactive compounds that gave people erections, erectile dysfunction perceived as a deviation from the norm rather than a normal part of aging, and the switch in thinking of erectile dysfunction's cause from psychogenic to organic. All of these things opened the door to reframing ED as a medical condition that affected quality of life and thus was a therapeutic target. It's true that Pfizer didn't set out to make an erectile dysfunction drug but this reframing made it possible for them to seize the opportunity when it presented itself, which it did in 1992.

Pfizer had for a few years been working on a medication to treat angina, experimenting with a few different compounds including one called sildenafil citrate which had been synthesized by Pfizer in their sandwich labs in the UK. Essentially they were looking for an alternative to nitrates which worked in the short term but became less effective over time as tolerance developed. Early studies showed that sildenafil dilated the blood vessels, lowering blood pressure, a good thing because it meant sending more blood to the heart. But it could also lower blood pressure too much when used in combo with nitrates, as you mentioned, Erin, and that was a common prescription for their intended consumer group. Plus, the short half-life of sildenafil meant you had to take it 3 times a day, which was not ideal and it was associated with a few adverse events like indigestion, headache, and erections. Specifically more frequent and longer lasting erections. And that's how it was described, like erections were labeled or were described as an adverse event.

Despite what later versions of the story would have you believe, there was no light bulb moment where Pfizer scientists proclaimed finally, an erection drug! Initially this side effect was just kind of noted down along with the rest of them. And even if someone did spend a few minutes of thought on it, sildenafil didn't seem like it would be the best ED drug. The increased erection didn't happen until a few days after taking the drug, which you had to do 3 times a day, and the clinical trial involved young men, so there was no reason to think that it would have the same effect in older men who had ED-

Erin Allmann Updyke

Interesting.

Erin Welsh

Along with vascular disease.

Erin Allmann Updyke

Okay.

Erin Welsh

So if you wanted an erection on Saturday, you'd have to start taking the meds on Wednesday and not skip one of your 3 daily doses.

Erin Allmann Updyke

Interesting.

Erin Welsh

Yeah.

Erin Allmann Updyke

Based on their studies as an adverse effect.

Erin Welsh

Based on... Right, right. Because this was not like... At this point sildenafil had not been tested specifically for erections.

Erin Allmann Updyke

Exactly. Right, right, right, right.

Erin Welsh

But even with all these odds stacked against sildenafil, researchers still thought it might be worth a shot. They had the molecular action of sildenafil mostly figured out. So they reasoned that maybe sildenafil in the absence of sexual stimulation equals no erection but sildenafil plus sexual stimulation equals erection. And so Pfizer put together a couple of pilot studies in 1993 and 1994, testing sildenafil for the treatment of ED. They recruited volunteers with ED, gave them sildenafil or placebo, put them in a private room with erotic materials, and then monitored their erections using a device called the RigiScan. Yes, that's the actual name.

Erin Allmann Updyke

RigiScan. I love it.

Erin Welsh

RigiScan. A note on the RigiScan, 60% rigidity was considered successful.

Erin Allmann Updyke

Okay.

Erin Welsh

Which corresponded to the amount of rigidity for vaginal penetration. So quite a heteronormative measurement there.

Erin Allmann Updyke

Not surprising.

Erin Welsh

It's not surprising.

Erin Allmann Updyke

At all.

Erin Welsh

I just thought that it was so interesting.

Erin Allmann Updyke

I think about erectile dysfunction as very heteronormative.

Erin Welsh

Yeah.

Erin Allmann Updyke

Yeah.

Erin Welsh

The results of these pilot studies were promising. Sildenafil seemed to work and what was even better was that it worked after a single dose. This opened the door to larger clinical trials involving thousands of individuals which were also successful. Participants allegedly didn't want the trial to end, so Pfizer got permission to keep them enrolled in a long term trial. This is from someone affiliated with Pfizer, so grain of salt. In fact actually a lot of the papers, a lot of the papers both about the history but especially about the effects of Viagra or sildenafil are like you can look and you're like oh, Pfizer labs.

Erin Allmann Updyke

Yeah. Oh not surprising.

Erin Welsh

Pfizer, Pfizer, Pfizer, yeah. There did seem to be a few worrying side effects which you touched on a little bit, Erin. But by and large it seemed relatively smooth sailing for Pfizer and sildenafil, in large part because its safety had already been assessed in previous years. So in 1997, Pfizer filed a new drug application for Viagra, as it was now known, with the FDA. The FDA gave Pfizer priority review status which is used for drugs that quote "represent major advances in treatment or fulfill a significant medical need". End quote.

Erin Allmann Updyke

Wow. Okay.

Erin Welsh

Within a year, the FDA approved Viagra for treatment of erectile dysfunction and the first oral medication for ED landed on the market in 1998. Viagra's launch was anything but a quiet slipping onto the market and it drastically changed the marketing landscape for pharmaceuticals. You might think that an erectile dysfunction drug kind of sells itself but in fact at the time similar medications or devices were considered kind of seedy. And so Pfizer had to carefully strategize their marketing campaigns. One way they did this was to make it clear that Viagra was for only certain kinds of people. Essentially the straight, married, middle class, older white men that they featured in their early ads, many of which didn't necessarily say or focus on erectile dysfunction or Viagra outright. Or if they did, they made it very clear that erectile dysfunction was entirely a medical issue, not a psychogenic one.

These ads also portrayed Viagra as a relationship drug, promising to restore happiness as well as masculinity as narrowly defined in these ads. Pfizer was also one of the first to use celebrity spokespeople like Bob Dole in advertisements and paid consultants like urologists to appear on daytime talk shows or in commercials. And importantly these consultants didn't readily reveal their connection to the company, instead portraying themselves as unbiased experts.

Erin Allmann Updyke

Whoa! Shade.

Erin Welsh

This direct to consumer advertising seems super familiar to us now, although still bizarre and icky and dystopian. Like I don't have regular TV and so when I'm like in a hotel-

Erin Allmann Updyke

Yeah.

Erin Welsh: And there's commercial after commercial after commercial for drugs-

Erin Allmann Updyke: Every single commercial is for a drug and it really drives me crazy.

Erin Welsh: It's horrible.

Erin Allmann Updyke: Especially because very much like the ad for Viagra where they didn't even say Viagra, like now they all say the drug.

Erin Welsh: Right.

Erin Allmann Updyke: But a lot of times they won't say the condition even. So it'll make everyone who's listening think well I need to go talk to my doctor about this medicine, I have no idea what it's for, no idea what it's treating, but everyone on the TV needs it and they're so happy.

Erin Welsh: Right, right. Look at me. I can eat yogurt happily again.

Erin Allmann Updyke: Right. Look at me, I'm playing in the sunshine, flying a kite. What?

Erin Welsh: Pushing my grandchildren on a swing. Like it's just...

Erin Allmann Updyke: Ye.

Erin Welsh: We laugh so we don't cry. But yeah, at the time that Viagra was released this sort of direct to consumer marketing was super new. The FDA had only lifted the ban on these types of ads 6 months before the drug was released.

Erin Allmann Updyke: Also they used to be banned and then they were lifted? I'm so curious. We need to do a whole episode on that.

Erin Welsh: Yeah, we really, really, really need to. The World Wide Web, which was relatively new in 1998, also provided another avenue for people to gain more information about Viagra and to try to buy the drug online without a prescription. Viagra was the butt of a million and one late night talk show jokes, it made appearances in storylines on TV shows, and soon everyone knew the name of this drug.

Erin Allmann Updyke: Yeah.

Erin Welsh: Many men took the slogan 'ask your doctor' to heart. And there were some reports that visits to doctors' offices actually increased for some groups of men who made their first appointment in years to ask about Viagra. Erectile dysfunction went from a disorder treated in the 1960s by psychiatrists to then be treated by specialists like urologists to one treated by general practitioners. Within the first three months of its release, Viagra made \$411 million in sales.

Erin Allmann Updyke: Is that in 1990s dollars?

Erin Welsh: I believe so, yeah.

Erin Allmann Updyke: Holy guacamole!

Erin Welsh: And 2.7 million prescriptions were written in the first three months.

Erin Allmann Updyke: Wow.

Erin Welsh: Yeah. It became the fastest selling drug in history, grossing over \$1 billion in its first year and netting \$7.4 billion in total sales for Pfizer in its first five years.

Erin Allmann Updyke: I am aghast.

Erin Welsh: I know.

Erin Allmann Updyke: Agog.

Erin Welsh: Just like the audience in Brindley's lecture.

Erin Allmann Updyke: Exactly.

Erin Welsh: Some commentators sung the praises of Viagra, like Bob Guccione, which I don't know if I'm saying that right, the publisher of Penthouse, who wrote that quote "feminism has emasculated the American male and that emasculation has led to physical problems. This pill will take the pressure off men. It will lead to new relationships and undercut the feminist agenda." End quote.

Erin Allmann Updyke: I'm gonna lose it. I'm gonna lose it.

Erin Welsh: Less sexist and more reasonable people pointed out that Viagra had made sex, especially for older adults, more of an open topic of conversation and it reduced the stigma attached to erectile dysfunction. But there were some, many even, critics of the drug, mostly centered around fears of how Viagra would change relationships, lead to addiction or recreational use. From an article in Time before Viagra's release, quote, "Doctors are concerned that an anti-impotence pill could be subject to widespread abuse. Reports indicate that some Hollywood bedroom athletes have already tapped into an underground market for an injectable erection drug. The danger is that otherwise healthy men will take sildenafil to bolster their sexual performance and then become psychologically addicted, unable to achieve an orgasm without it." End quote.

Erin Allmann Updyke: Bedroom athletes, first of all.

Erin Welsh: Bedroom athletes. Hollywood bedroom athlete.

Erin Allmann Updyke: Love that.

Erin Welsh: What? Prior to Viagra's release, Pfizer anticipated this opposition and quote "sent a delegation to the Vatican to find out how the Roman Catholic Church would respond to the pill. The Vatican gave its blessing on the basis of Viagra's contribution to improving family relations." End quote and barf.

Erin Allmann Updyke: I can't. The Pope approved Viagra?

Erin Welsh: The Pope approved. Yes. The Pope's seal of approval stamped on every blue pill.

Erin Allmann Updyke

Oh my god.

Erin Welsh

Yeah.

Erin Allmann Updyke

I have so many feelings I can't express them.

Erin Welsh

I mean not enough time in the world for me to process all of the thoughts and feelings I have.

Erin Allmann Updyke

The Pope approved Viagra.

Erin Welsh

Improving family relations.

Erin Allmann Updyke

Yeah, family relations. That's what Viagra improves.

Erin Welsh

Absolutely, Erin. Others drew attention to the manner in which Pfizer had branded erectile dysfunction, accusing them of creating a disease or problem and then inventing and marketing a solution. Classic capitalism. Then there was the question of normal. Even before Viagra, medicine had sought to create a baseline for what was considered normal and what wasn't in terms of erections, arousal, masculinity, femininity, aging, sexuality, relationships, and bodies in general. By constructing boundaries around what is quote unquote "normal" or acceptable, medicine can other people and make them feel like there is something wrong with them and they should be striving to achieve that normal. We've talked about this before in our menopause episode, sort of the medicalization of a normal part of aging and some of the issues that come with that.

Erin Allmann Updyke

Yeah.

Erin Welsh

But like we also said in our menopause episode, that doesn't mean that we should completely reject these drugs that might make some people's lives a little easier, a little better, or a lot better.

Erin Allmann Updyke

Right.

Erin Welsh

Just because something is a normal part of the aging process doesn't mean that we can't or shouldn't do something about it if we want to and if it doesn't harm us.

Erin Allmann Updyke

Right. If it's causing problems in your life.

Erin Welsh

Yeah.

Erin Allmann Updyke

Like same like we talked about with menopause. Is that totally a normal part? Yes.

Erin Welsh

Right.

Erin Allmann Updyke

Is some of it very uncomfortable and impacts your quality of life? Yes. Do something about it. Same thing with ED.

Erin Welsh

Absolutely. Yeah. And so I want to push back a bit on this idea that erectile dysfunction is solely a problem invented to sell a solution.

Erin Allmann Updyke

Yeah.

Erin Welsh

Because clearly millions of people around the world have benefited from the use of Viagra and related drugs and have reported that their quality of life has improved because of them. And the last criticism that I want to discuss is not about Viagra itself but about what Viagra highlighted when it came to gender bias in medicine and what is considered medical necessity. Yep.

Erin Allmann Updyke

Love this.

Erin Welsh

Within a few months of Viagra's release in 1998, most major American health insurance carriers covered it.

Erin Allmann Updyke

Also wow.

Erin Welsh

Yeah. Well because there were a few lawsuits pending and so they quickly were just like all right, we see this coming in our future, let's just cover it.

Erin Allmann Updyke

Within a few months. Do you know how many insurance companies still won't cover Ozempic and other similar? I mean Wegovy more, like not Ozempic but the ones that are marketed just for weight loss, that's a whole other thing.

Erin Welsh

It's a whole other thing. Yeah.

Erin Allmann Updyke

Wow. Okay. All right, cool, cool, cool.

Erin Welsh

But this was not the case for birth control pills.

Erin Allmann Updyke

Right.

Erin Welsh

When Viagra came out, most people still had to pay for it out of pocket. The year Viagra was released, 1998, women paid 68% more in out of pocket health expenses compared to men because most reproductive health services were not covered.

Erin Allmann Updyke

Well Erin, birth control is not approved by the Pope.

Erin Welsh

Right. It's absolutely not.

Erin Allmann Updyke

It's not. It's very much not.

Erin Welsh

The reasoning was that Viagra is a medical drug intended to treat a legitimate medical condition while birth control was and is seen as a quote unquote "lifestyle drug".

Erin Allmann Updyke

Oh my god.

Erin Welsh

And therefore optional.

Erin Allmann Updyke

I'm gonna vomit.

Erin Welsh

Nevermind the fact that many people use birth control to treat medical conditions. Nevermind the fact that birth control was approved by the FDA in the first place to treat menstrual disorders. Viagra also brought to light other differences. For 15 years after its initial release, the birth control pill could only be prescribed to married women who often had to obtain their husband's permission. Only in 1972 were unmarried women allowed to obtain the pill. Can you imagine any law prohibiting an unmarried man from getting Viagra? For requiring that he get his wife's permission?

Erin Allmann Updyke

Right. So that she knows what he's up to.

Erin Welsh

And I acknowledge that it's a bit apples and orange comparison here.

Erin Allmann Updyke

Is it though?

Erin Welsh

But swap out Viagra with male birth control and the point remains. And finally there's the sheer existence of Viagra which was made possible only by years of studying the decline in erections over a man's life. Similar studies in women happening at the same time were few and far between, tinged with sexist assumptions, and kind of came to the conclusion 'well who even knows? There's just too much going on here, women are just too complicated'. The switch from impotence is a psychogenic disorder to erectile dysfunction is an organic condition happened lightning fast. Compare that to the long, long tradition of women being told that it's all in their head. Even when it comes to quote unquote "female Viagra", it's the same thing. Quote: "Is it a mind or body problem?" end quote, read the cover of a 2000 copy of Newsweek.

In early studies of vasoactive drugs for female sexual dysfunction, participants were required to see a sex therapist first who quote "evaluates the context in which the patient experiences her sexuality, her self-esteem and body image, and her ability to communicate her sexual needs to her partner". End quote. Oh it's hormonal, oh it's about blood flow, oh it's all in her head, oh it's about her partner, oh it's about the general state of the world, oh maybe it's a combination of all of them and we'll never figure it out. How about arousal is not the same for everyone?

But part of the issue seems to stem from the fact that the study of female sexual dysfunction takes the blueprint from male erectile dysfunction. Researchers are looking for a direct parallel. What is the female equivalent of an erection? But what if there isn't one? In these studies, what is the outcome that the researchers are looking for and how are they measuring it? Is it vaginal lubrication? Is it clitoral engorgement? Is it perceived arousal? Is it orgasm? Or is it some mix? Why has it taken so long to develop a female Viagra? Great question. Let's tell that story someday.

Erin Allmann Updyke

Also Erin, it hasn't changed. I mean first line on up to date for female sexual arousal disorder is see a sex therapist.

Erin Welsh

Right. And it's never considered like oh, erectile dysfunction is so simple because we've been studying it for so much longer and we've put so much more funding into answering this question. But female arousal, female sexual dysfunction is so complicated because we don't really care about it and we haven't cared about it.

Erin Allmann Updyke

It's such a mystery.

Erin Welsh

Such a mystery!

Erin Allmann Updyke

It's also like it does a disservice to everyone.

Erin Welsh	Yes.
Erin Allmann Updyke	Because A) sex therapy is great and B) so is medicine.
Erin Welsh	That's exactly what I have here. Yeah. Because what what Viagra did is that it reduced male arousal to one dimension.
Erin Allmann Updyke	Right.
Erin Welsh	And it led many researchers to do the same for female arousal. This is not good for anyone, right.
Erin Allmann Updyke	No.
Erin Welsh	And I think that this is a really under told part of the story where it's like Viagra is great and if it works for you, whether the ultimate cause of erectile dysfunction is psychogenic and Viagra is working because it's whatever, helping you overcome that-
Erin Allmann Updyke	Right, it makes things easier, then you're less in your own head, whatever it is.
Erin Welsh	Yeah. Right, whatever it is. But it's like shouldn't we consider the whole picture instead of being like it's blood flow?
Erin Allmann Updyke	Right.
Erin Welsh	It's blood flow.
Erin Allmann Updyke	It's blood flow.
Erin Welsh	And for women, yeah, we don't really know.
Erin Allmann Updyke	We don't know.
Erin Welsh	It doesn't seem to be just blood flow for you. So sorry, best of luck.
Erin Allmann Updyke	Yeah, yeah.
Erin Welsh	I think this is why the story of Viagra is so fascinating to me is because of all of these dimensions; is because of the huge legacy that it has had on marketing, on sexuality, on the way that we talk about drugs and on like blockbuster drugs. I mean everything.
Erin Allmann Updyke	Yeah.
Erin Welsh	And so I'm really curious, Erin, what you can tell me about Viagra today.
Erin Allmann Updyke	I don't know, not much. I think we've covered it all but I'll try and wrap us up right after this break.
TPWKY	(transition theme)

Erin Allmann Updyke

Erin, we already talked about a lot of the statistics when it comes to the prevalence of erectile dysfunction, which again nears 100% in those over age 70, 50% or more as you... It's estimated to increase with each decade usually over age 40, so starting from like 40%-50% around age 40 and kind of going up from there. Exactly how are these statistics determined? It's a little bit unclear from all of the papers that I read. And that is not to, like we've mentioned, undercut the importance of erectile dysfunction in a person's sexual health because we already underappreciate sexual health especially in US healthcare. Like it is just ignored across the board for a lot of people. And Viagra and similar medications are often seen as this kind of easy fix, a blanket fix for any kind of erectile dysfunction. Is that the fix for everyone? Maybe, maybe not.

There's also statistics that I saw in a number of papers that I don't know where these came from and they weren't good but also that estimate that a large proportion of people who maybe have erectile dysfunction or are suffering in some way with their sexual function don't actually ever access even a drug as ubiquitous as Viagra. So again just a lot of it comes down to the way that we communicate about sexual health and the taboos that are still in existence about sexual health, even though Viagra has become sort of the butt of so many jokes and is so easy to come by these days.

Erin Welsh

Right.

Erin Allmann Updyke

It's also estimated that in the US the cost of treatment for erectile dysfunction is \$15 billion a year. How much do we spend on female sexual health? Almost nothing probably in comparison.

Erin Welsh

I have a question. Did you come across any studies looking at the effects of Viagra on women?

Erin Allmann Updyke

Great question. I didn't. I know that they do exist. I didn't. I probably should have spent more time looking for them specifically but I know that they do exist and I know that there are other medicines that are targeting like female sexual dysfunction specifically. The one that I know of the most is not like a vasodilator, it doesn't work in that way. It's more closely related to like the SSRIs, it works I think in relation to serotonin which is another neurotransmitter that is very much involved in like the erectile process as well. But yeah, it is an area much less explored.

Erin Welsh

Okay. But in terms of like women taking Viagra specifically-

Erin Allmann Updyke

Women taking Viagra. It is a thing that has been done. I don't know the stats on it.

Erin Welsh

Oh okay.

Erin Allmann Updyke

Yeah. Yeah, I don't know the stats on it. There are though also a lot of other treatments for erectile dysfunction aside from Viagra. There's similar medicines like the Cialis or tadalafil and others, some of which are now approved to take on a low dose daily basis rather than an as needed basis, which is how Viagra has always been taken and marketed. There are also other things like vacuum devices which use negative pressure to stimulate blood flow, that helps the process along. There's injectable medications, there's suppository medications. There's other surgical interventions especially depending on the cause of the erectile dysfunction to begin with and you might need a surgical intervention. Some of these are like semi-rigid all the time, some of these have pumps that you physically pump up when you need.

But there aren't, as far as I could tell at least as of 2019, any new oral medicines that are targeting like very novel biochemical pathways to treat erectile dysfunction. There's also a lot of supplements and nutraceuticals that are at your own risk, entirely unregulated, see our supplements episode. And then there's newer therapies like shock wave therapy or PRP. All of these very, I don't know, I have a couple of papers if you want to go in detail on what the evidence of these are, they're all still very much in trials and not anything that's available on the market. But there is still a hefty amount of research going on on new and better ways to treat erectile dysfunction.

Erin Welsh

It's a profitable business.

Erin Allmann Updyke

It really, really is.

Erin Welsh

One thing that I want to add, I know that someday we will do a female Viagra episode because I think that is really needed. But I think that if we demand equal funding to find a female Viagra, we should also demand equal evidence that what we find is therapeutic and not full of side effects and is as easy to take as Viagra; that it actually does what it claims to rather than just paying lip service to equality in medicine, capitalism masquerading as feminism, which is I think some of the problems that are associated with some of these female Viagras today where it's just like look, we did it.

Erin Allmann Updyke

Right.

Erin Welsh

This is what you've been asking for. It's the equivalent. Oh, don't mind those side effects. Oh, don't mind this, don't mind that the evidence is kind of a little bit vague and leave something to be desired.

Erin Allmann Updyke

Well and to do that we would need to do a lot more research on sexual health in general.

Erin Welsh

Yes, yep. But yeah. Sources, sources. I have a bunch. I didn't really, honestly I feel like a lot of these were grain of salt. And again, like I mentioned in terms of where they came from which was people who were working with Pfizer at the time. Or were kind of one dimensional in other aspects. Anyway, there was a book called 'The Rise of Viagra: How the Little Blue Pill Changed Sex in America' and this is from like shortly after, just a few years after its release by Meika Loe. And then if you want to read more about the detailed how Pfizer found this or how Pfizer like decided to shift their focus to sildenafil as a treatment for erectile dysfunction, there's a book titled simply 'Sildenafil' and there's a chapter about the discovery of sildenafil.

Erin Allmann Updyke

Love it.

Erin Welsh

Yeah.

Erin Allmann Updyke

A whole book.

Erin Welsh

Yeah.

Erin Allmann Updyke

Phenomenal.

Erin Welsh

Yeah. Right?

Erin Allmann Updyke

I have a lot of papers that go far more into the detail of the neurobiology and biochemical pathways of erections. There was a paper that I found really helpful by Dean and Lue from 2005 called 'Physiology of Penile Erection and Pathophysiology of Erectile Dysfunction'. Another by Gratzke et al from 2010, 'Anatomy, Physiology, and Pathophysiology of Erectile Dysfunction'. A few others that are specific to sildenafil and like the pharmacology more of sildenafil and other medications. And at least one on other ways that we use it because again, we use this medicine for other things too. But you can find the list of our sources, all of them from this episode and every one of our episodes on our website thispodcastwillkillyou.com and it's under the EPISODES tab. That's where it is.

Erin Welsh

Thank you to Bloodmobile for providing the music for this episode and all of our episodes.

Erin Allmann Updyke

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Erin Welsh

Thank you to everyone at Exactly Right.

Erin Allmann Updyke

And thank you to you, listeners. Hopefully you found this episode enjoyable, learned something new.

Erin Welsh

Yeah. As always, reach out, let us know what you think.

Erin Allmann Updyke

Have an image seared in your brain that will never go away perhaps?

Erin Welsh

Brindley, man. Yeah. And a special thank you to our wonderful patrons. We really do appreciate your support. Like it means so much to us.

Erin Allmann Updyke

It really does, thank you.

Erin Welsh

Until next time, wash your hands.

Erin Allmann Updyke

You filthy animals.