Introduction to PillBot and Magnetic Robotics

It's very exciting. But, you know, I'm not an engineer. I'm just a guy thinking out loud. Football. And so it seems to me that if you had magnetic control through the skin, then you could back something out before it gets into trouble.

Right? So let's let's give some credit. So I have some heroes to reference. If you look at Atlas Endoscopy you've got Pietro Baldassare doing amazing work with external magnetic fields and soft robotics.

In the it's sort of like a tentacle like. And the scope that's piloted, but it's sort of actuated by external magnetic fields. And then the closest direct competition to neonics, is this amazing technology called Navvy Cam, which is FDA cleared there in the market right now.

They use external magnetic fields to fly camera pills around. Welcome to Doctor Talks, the podcast where every episode leads to a healthier you. Join us as we navigate the world of optimal health, uncovering groundbreaking strategies to conquer chronic disease.

In each episode, we'll bring you the latest insights from leading health experts, medical innovators, and wellness warriors. If you're seeking to transform your health journey, or if you're looking for answers to burning questions, you've come to the right place.

Get ready to unlock the secrets of lifelong health and vitality. This is Doctor Talks, real talk from real doctors on the issues that matter to you most.

Hi, welcome to another episode of the Recharge Biomedical podcast. I'm your host, Doctor Edward Park, and we're joined by Torrey Smith, the brilliant man up in the East Bay.

Hayward. How are you doing, Torrey? Doing fine. Glad to be here. Excellent. So this young man, was on stage in front of 400 people last week, and he swallowed a pill. It was the second pill.

And, it's not small. It's a difficult pill to swallow, as I say, literally and figuratively. But we watched as the pill went down and sloshed around his stomach, and it was amazing.

And he just did it with such aplomb, and it was unfazed. And it was like, oh my God, this guy's really doing it. So assuming it wasn't some kind of fake NASA project, I assume you saw the pill and we were looking inside your stomach, right?

Oh my God, there it is. Yeah. So basically, I dug this out of my, my pocket. So this is pill. Bot, pill is basically a drone that you can swallow. And basically what we've done is we're very inspired by the world of pill cameras.

And so we asked ourselves, you know, could we make a pill camera move?

Podcast Intro and Guest Background

And we basically just, you know, tried to take drone technology and filter it through med device with a little bit of deep tech, and wow, what you get at the other side of that is a little swimming robot, but we really hope it's the beginning of so much more than that.

You know, it's it's a moving eyeball in the human stomach, but in my mind, it's a platform to do a whole new kind of medicine inside the body. Oh my God. Yeah. No, just to get people caught up.

So for people that don't know, there have been, ingestible cameras, but they were passive. So what you've

developed is a self-propelled camera which can shoot back, 480 by four, 80, ten frames per second, an image and it'll come out, of course, in the store, single use.

And, it's beautiful. So you can control, I presume, like a little rocket ship in the X, y, and Z axis. So what is the method of propulsion? We use punch it.

And what what that really means is just small electric motors that instead of, vibrating old Nokia cell phones, we just removed those little weights. We put on some custom propellers, and we squirt water.

And so we build these little robots in such a way that they, they kind of float more or less neutrally in a column of water. And then with little puffs of pump jet power, we can start to move around.

Amazing, amazing. And we'll talk about the applications in a second. But was there anything in your childhood that would have predicted you're making this, I wonder?

Probably the the movie Inner Space more than anything else. I just lots of lots of aerospace lore in my in my childhood, lots of sci fi, lots of, you know, science news, Scientific American, but also like Popular Mechanics, popular science, like, I, I, I love movies, I love where people dream.

And, you know, I even read a lot of comic books and like, Astounding Science Fiction, right? If you add all that up, then you have this milky verse or this, this milieu rather of, right as a cool ideas floating around in your head.

And I think a lot of people have dreamt about tiny robot surgeons in the bottom. Yeah, but not many people have brought to market. I'm. You're on the verge of making this a commercial success, so that's exciting.

So I'm a generation older than you. I remember Raquel Welch in the in the submarine. Fantastic, boys. You had to go back into the archives to watch that.

But inner space. I got to check that out. So I'd say you're always like, we are double engineer guy, mechanical engineer guy, or just an imagination guy.

I'm, I'm an aerospace engineer out of Cal Poly slo. Okay. I just love their learn by doing approach, right? Their wind tunnel was covered in stickers, and they used McDonald's straws, to to straighten out the streamlines at the front of the the intake.

Instead of, like, this expensive expanded metal hex grid. And I thought that was so creative. Right. Because it, it essentially more or less did the same exact thing, but for the price of free.

And it gave all these students access to amazing, wind tunnel technology. And I just feel like so much of engineering and R&D is kind of chasing your instincts and then using your computational power on the computer side to try to work with with the raw equations and the theory, try to line that up with what you're seeing on the experimental bench.

But, you know, hopefully in your heart, in your mind, you have sort of a sense of where things might need to be and where you want to go. You know, I think it's amazing.

And, you know, so this conference we were both at, as my first, you've probably been it was called abundance 360 by Peter Diamandis. And it was three days of really innovative futuristic people.

And you on the stage eating that or swallowing the pill. Amazing. But I think my hat is off to people who are willing to imagine something that doesn't exist and have the fortitude and the teamwork to bring it to market.

So let's talk about the applications you said on your website. You know, might cost two grand to do an endoscopy. I think that's a low ball estimate considering the anesthesia and the GI costs.

What do you what do you I mean, you know, people might call you 1500 bucks or two grand or five grand or ten grand. But really, what you're looking at for an upper endoscopy is three, 4 or 5 trips to a hospital, you know, from symptom onset to, you know, primary care to referral to GI to diet anti acids.

Finally qualify for that upper endoscopy.

How PillBot Works Inside the Stomach

Nine minutes into looking around in their stomach, they'll they'll tell you exactly what they see or what they don't see. And yeah we just ask and let me, let me play the devil's advocate here because please, you know, anesthesia, it's not benign.

You know, they can do conscious sedation, but there's still choking risk and whatnot. And but especially in the older people with the sort of calcified, not such great circulation, like, you know, anesthesia will never tell you this, but people don't always wake up the same when they undergo these procedures.

And I have a patient who had, terrible onset of tonight. It's after a five hour procedure. So, you know, it's good, it's safe, and if you need it. Yes, but certainly mitigating or even removing general anesthesia is huge promise, right?

Is, is if if there's value in giving the gastroenterology community an ability to fly into someone's body and look around, you know, in their stomach specifically as we begin, if there's value in making that, you know, available, we can probably extended into telemedicine very easily.

I mean, we already demo a pill bot via telemedicine, via E level every day here. And we've even had a doctor in New Zealand, control pill bot, here in, in our San Francisco Bay area facility over the internet connection.

So just the scalability and kind of the materialization of traditional physical hospital footprint is pretty exciting to us. It's huge. And, you know, I have a patient lives in, Los Gatos, and he makes software for hospitals to overcharge.

So if you get hit by a car in South Korea, you might get charged 20 grand for a surgery and hospitalization. Here, it might be $1 million. So the point is, like, there are so many points of interaction with the hospital system, the pre-op, the workup, the blah, blah, blah, even the biopsy pathology.

Let me again play the devil's advocate. So I assume by the time it reaches the large colon you have all that time and that you can't see anything or you can't see, you know, the s-word literally, that's all you can see.

So it's really more of an upper GI application, I would think. True. So for the super exciting Apple product like experience, it's the human stomach, right?

You use if for breakfast you drink a bunch of water like two pints. You know what? You do it. You swallow a pill bot and boom, you're you're having this virtual upper endoscopy experience with no seeming real cost to the patient in I love it.

I think it's exciting. I don't know if the old guys, the old guys can use an Xbox controller well, but maybe they'll have some young guy do it, I don't know, and I should say that, you know, we're under, you know, we're we're in clinical trials.

We're not yet cleared through FDA. So what I'm what I'm describing is what we're trying to build or what we're telling you, the R&D level, we can send pill a lot deeper into the body actively.

But yeah, we want the entire GI tract. You're probably looking at doing a full prep so that you don't get caught up in all the mud that accumulates yet.

So let me deconstruct that for the non-medical person. So, bowel prep is you drink some kind of intense laxative for me. If I have a mango smoothie, it's the same thing.

But you're basically on the toilet for like, eight, 12 hours, and you just have diarrhea and it cleans you out pretty lickety split, like clean. So in the lower, colon, even in the nooks and crannies, there's not much poop, so it's just liquid diarrhea.

And, you know, it's go lightly. I don't know why they do that. That's pretty funny. So you can't. So you're saying, well, the problem is that there isn't really the liquid medium to swim around in, in the large bowel.

The whole point of the large bowel is to remove water and make it a dry, hard poop. Right. It's so it's you have to. If you did an enema, then you could create, you know, you know, in six, eight hours it's going to be in the colon.

Then you give them an enema, then they could swim right. The way that we can do this in the colon for, say, like a pill, a colonoscopy would be, you would send a patient to a colonic clinic where they basically use warm water, basically to just really you got to give it something, a swimming kick, you know, a medium to swim in that that would be a way to do it without a direct prep.

But starting in the stomach is so much more fun because it's just skip your breakfast, drink water, and you're good to go. Now, let's let me play the devil's advocate again, because I think the devil is in the details.

So what? The applications here, obviously. Esophagitis, like varices of the esophagus, some sphincter dysfunction going into the stomach, stomach ulcers or other cancers, neoplasms, the duodenum sphincter.

And then the upper duodenum. But then you got that, like, whatever, 12ft of small intestine or 18ft. You're not going to see much in there usually. I mean, so, the large intestine, once you make it to the cecum, you got to fill up at a colonic site to get water there.

So potentially you could see diverticulosis, you could see, other tumors in the large intestine. So you could get both bang for your buck upper and lower GI.

Right. We could do that. But it makes sense right now. You should set up for upper. Okay. Yeah. We just look at the upper endoscopy and say wow, 70,000,075 million of these around the the world every year that we think Colbert could either replace or just augment as a screening tool that sort of access really early.

So the question is like in medicine we always say, well, for neoplasm we want a tissue biopsy. But right now pill is not set up to take a tissue biopsy.

Not yet. That's another bit of engineering magic I'm sure it's coming. Surgeon. Yeah.

Childhood Inspiration and Engineering Path

Yes, I'm sure that's a surgeon. We just got a, important, patent granted to that effect. We age because our telomeres shorten and our stem cells deplete.

But what if we could support both? I've been taking care 65 for 17 years. It's the only supplement I trust to support better mood, better sleep and exercise recovery.

At age 57, I don't have any gray hair and I don't need reading glasses to 65 is available now. Go to Recharge Biomedical Alchemy to Hyphen 65 and enter promo code Recharge ten to save 10% off.

We're here to stay, right? My my personal mission. Right. All I can tell you, I'm Torrey Smith. Hi. My personal mission is micro robotics in the human body.

And I love to go everywhere in the human body. I want to go into blood vessels. I want to go into your I love it and go interstitial, but thank goodness for the human stomach because we can begin there with a tangible start. We call that.

All right. Let's close it up on Filbert. So, you know, there's some people with Diverticulosis. If they peanuts, they can get diverticulitis. It gets stuck in the.

Yeah. Is that a theoretical risk for your size profile. It's a contra indication. So if if you have diverticulitis or known strictures or certain types of, surgeries you've had in the GI tract, those are all kind of contraindications for a camera pill.

And our goal is to have the exact same contraindications for pill. But, as a typical capsule camera pill. So how long have camera pills been in the market?

First one was swallowed October 1997 and FDA cleared in 2001, to my knowledge. Yeah. And so we're actually kind of coming up on about 25 years. Amazing year. Yeah.

So I would assume that the, the stuff it's made up is inert and the actual functioning in the field is inert in terms of like EMF, it's not going to hurt anybody.

We do a lot of work on the biocompatibility side. Just from the materials that we choose. I have to say that we have had an immense, boon, coming in from the 3D printing world.

If you look at, at, at max is company Formlabs. A friend of mine, he started this company Formlabs that kind of brought SLA resin, 3D printing to the masses.

But they have this whole line of biocompatible resins that we've been using, that are passing biochem stability. And it means that we can we can be 3D printing, amazing, complex mechanical robotic geometries.

And then we send them out for bio and they pass and it there's nothing trivial about this. I mean, amazing. Yeah. Yeah. I mean in the. So that's 27 years in the past, someone swallowed a pill camera.

But the benefit of the pill is that, you know, a pill camera, you might just go by and they'd be like, you know, you're driving on a tour bus, there's the Eiffel Tower. You don't really see what you need to see.

You can move it around. But in the future you build a biopsy. But can you deliver a package like, let's say I like exosomes. So if I want to put exosomes in a stomach ulcer, that's coming two, right?

Because there's only three times I've used exosomes swallow. And that's when someone had esophagitis and peptic ulcer. And so but eventually can a pill but deliver the payload.

Yeah we that's what we call pill surgeon. Pill surgeon is the magic school bus that actually does things like that. You know, the difference between a pill bot and a camera pill is about 100 times the size of the total addressable market.

Because why? Because it moves. But it's not just like if you're in the wrong angle, you don't see the lesion in the. Yeah. So we're not we're not competing on camera pills okay.

We're we're we're trying to create the world's first virtual endoscope. Very exciting. So when you look back to your what's come back to your product and your your ramp up with your commercialization, but let's pivot to what you alluded to, which is the general idea of miniaturization.

Right. So I deal with exosomes which are 30 to 150 nanometers. And it's it's hard for people to wrap their head around what size we're talking about. So when you talk about white blood cell, that's like 13,000 nanometers.

It's relatively large. So, if you talk about the computer chip in your computer, the structures are 3 to 5 nanometers now, so I don't even know how they do that.

It kind of boggles my mind. But if we follow the logical conclusion out that Tori's going to get funded is going to be

viable, it he's going to keep on making things smaller and smaller.

Clinical Uses, Cost, and Telemedicine

You know, there's one big chip from the mouth to the anus, but there are tubes everywhere, like and the one of the big applications you alluded to is like from fantastic points, you get a clot in your neck or whatnot.

You want to look around the heart. But the problem I have with that, with going around those slightly, you know, smaller tubes is obviously, embolization, by the way, in case people don't know, arteries get, you know, smaller and smaller as they go away from the heart and veins get smaller or bigger and bigger as they go towards the heart.

So you don't want if you get, a thing that's too small and it causes a night. As for, clot formation, you have tissue damage, potentially, if there's no.

And as to Moses, it's for collateral. Fairly non-trivial. I spent nine years of my life designing the Phoenix after ectomy system that cuts plaque out of arteries.

But we did all of our work there in the arteries of the the lower extremities. So we were in arteries of the legs heading down into the feet. And, you know, if you would have some terrible problem if you perforate or if you, you know, cause some embolism or knock some plaque loose accidentally, you know, it would go downstream to the feet where you could sort of deal with it.

It's not like it's going into the brain, which is like terrifying, right? Yeah. And that was an appropriate arena to perfect Arthur Ectomy technology.

So all I will say is that I want to go everywhere, I think I think one thing we might do is like, say, we want to go into the brain and fight brain cancer.

That's cool. But maybe we could go kill a prostate cancer first with some, you know, sort of like entry level version of of. No, absolutely. It's very exciting. But, you know, I, I'm not an engineer.

I'm just a guy thinking out loud football. And so it seems to me that if you had magnetic control through the skin, then you could back something out before it gets into trouble.

Right. So let's let's give some credit. So I have some heroes to reference. If you look at Atlas Endoscopy, you've got Pietro Baldassare doing amazing work with, external magnetic fields and soft robotics.

In the it's sort of like a tentacle like, and the scope that's piloted, but sort of actuated by external magnetic fields. And then the closest direct competition to neonics, is this amazing technology called Navi Cam, which is FDA cleared.

They're in the market right now. They use external magnetic fields to fly camera pills around. And because you don't want your camera pill that you put in the groin, getting to the heart, doing the heart surgery and then going symbolizing to your carotid, that would be a stroke.

Yeah. Well, the amazing thing about Navi Cam is that they're in the stomach, too, just like us. But, you know, they get this great three dimensional control from the magnetic field.

And then people are doing this beyond the GI tract, like bio, not labs funded by Peter Diamandis, Bold Capital Partners. They have microscopic helical swimmers that are magnetically actuated that the differentiation though that the unique thing that we're trying to add to this conversation, you know, as we stand on the shoulders of these giants, is self self-actualization actualization.

Like, I want these robots to move under their own power. I want them to be decoupled from capital equipment. I want them to be decoupled from the hospital.

Right. I, I want this to be a package that could be the size of, you know, like maybe a deck of cards, right? But like, at the capillary level, like, let's say nature has its own nanobots, right?

White blood cells. And so they move by a point, right? They move by a maybe fashioned diaper. They can squeeze through the nooks and crannies. I mean, I don't know what the limits of mechanical biomimicry are, but probably you're not going to get that good in the near future.

But what you can do is make them so small, like nanites like that. Like really so small. But the question is, what's the what's the freeway like? You know, if you're in the bloodstream and you're pumping at 160 over 80, that's a lot of flow to swim against, isn't it?

I think I personally can be involved in robots that go down to race green size, which is still huge. Still huge. Yeah. Yeah. Some of the stuff you're talking about.

So my, my personal ambitions are probably to drive to race green size and see what that world like. All I will say is that so long as human beings or robots for that matter, are actually cutting into the human body with scalpels, right?

Yeah. As long as we're making incisions and poking tools, sliding tubes for laparoscopic surgery, as long as we're putting instruments into the human body.

The question I'm going to ask is, could we potentially have the tip of that instrument, that just the cutting element in the form of a micro robot, minus the entire stack behind it, including the hospital, right.

Yeah, that's that's what I'm when I'm really trying to go here is like, let's leave a world where we do a brain surgery by doing an incision, removing a part of your skull, going in with scalpels, and trying to cut out a piece of a brain tumor.

Let's ask ourselves, could that be could that same brain tumor have six, seven, 12 little microbots eating away at it, you know, 24 seven no, I think it's brilliant.

And there have been attempts at like, radio late, I mean, antibody labeling, immune therapy for cancer, leveraging the immune system to target.

Upper GI Focus and Future Biopsy Plans

But, you know, as one of the speakers was talking about CBI, which is computer brain interface, and they put up that brilliant slide of, you know, neural stem cells in a hydrogel and beating it to your brain to become a board.

And, Oh, is that your buddy? Okay. Yeah. He's, you know. No, no, I am a I am a fanboy of Max Kodak. I was I was extremely grateful to be able to hang out with them a little bit at the event and, yeah, I was honored, you know, to spend a few minutes here and there with him.

But, but he was very forthright with the fact that the brain is kind of squishy and solid. So the minute you start going in there with the tip of your instrument or your nanobots, you're doing damage.

Even though he'll be the first to admit you can't take it out. There's no take backs. You know, it's growing in it's making its dendrites, its connections.

But that's not a technique I'm trying to. I just returned my galaxy ring because I was like, this is making me too neurotic. But when you actually, like, if you're at if you're at rice grain size, you're doing brain damage.

So you've got to do the cleanup crew who's going to clean up after the elephants go down the parade. You know, that's the problem with it. So first of all, Max directly said, you know, the tiny, tiny cells in our body are like little tiny alien machines, right?

And he's absolutely right. Now, my my kind of response to that is, well, we're still cutting people open and doing major invasive brain surgeries. Right?

And what I'm trying to do is replace the major invasive surgery with microbots. So you might be able to take the the invasiveness of modern, you know, intensive surgery.

You might be able to take that down by an order of magnitude, say, which is not to zero, it's just a substantial reduction, like one of the microbots I envision might leave a tissue trapped behind like a large needle snake, which is not trivial, but it might be much better than the surgical cut down to gain access to the internet.

Listen, I'm not, Luddite. I mean, as someone who used to cut people up and sew them up. I mean, you know, there's something to be said to be able to improvise on the spot.

You know, if the intern cuts an artery, you know, but yeah, the the trend has been generally towards laparoscopic arthroscopic. We're talking, you know, 5 to 7 sometimes three millimeters.

And robotics to which a lot of the older surgeons don't like. But there can be advantages, you know, limiters in how many errors and what kind of errors you can make.

But what you're talking about is having, like, you know, a drone symphony in the sky, you know, over the Shenzhen or whatever. Like they can organize that work together in a way that is less invasive, faster recovery.

But still, as a surgeon, I'm thinking like, what if what if they cut an artery? So, you know, there's always going to be the art of it. I what I want to do is kind of approach the eventual handshake that takes place.

Right. Eventually the world of the biological and the world of the mechanical are going to do a handshake at some order of magnitude. And right now, many orders of magnitude away from that would peel back.

Even at the right screen size, we still remain many orders of magnitude away. Yeah. However, what I'm trying to demonstrate and what we are trying to demonstrate with this company, is that we can actually cut the cord on the capital equipment.

The hospital, we, we can operate small robots inside the human body, and we have a lot of growing room to, to get even, you know, smaller and more sophisticated.

So we, we hope that, we're kind of kicking off a new market category of micro robotics in the human body. I think you are. And for the money, like, let's think about what you said about the cost of this.

I mean, you could have someone in Zimbabwe swallow a pill, and someone at the Mayo Clinic can direct the local, use of that through the internet. And, you know, there you go. You're saving money.

The whole system benefits. And I would argue that you don't really need a tissue biopsy in most cases. A lot of the things humans that I maybe with eye image analysis, perhaps will be able to make most of the diagnosis within a range of comfortable, predictable, security.

I think you can do a lot visually, but we also are, you know, very excited to lean in to lab on chip technology. My friend. Voytek proto is doing, photo spectroscopy inside the human body using chips that he implants into his arm.

And it interrogated by a smartwatch with RFID. And you're getting, like, hundreds of biomarkers without, any, like, active onboard power source. No, no, no, I mean, it's it's breathtaking.

People wearing these glycemic things. But you could have something that's more accurate in your system doing real time monitoring, for sure. And so tonight I have to give some credit to to another company, robot who just closed their series A, they're already at the race.

Brain size in the human brain. I think they're doing, like, mice, rat brains right now. But you in a car, Turkey and their CEO, Bertrand de plant, based in Paris.

It looks like they're going to be setting up shop here in the United States. They're actually doing in brain microbots, with with their own technology.

I think they have a little bit of a connection to hospital equipment, but it's again, it's just drastically lower levels of, of intrusion compared to the traditional cut down.

Miniaturization, Microbots, and Broader Applications

Right. So I but, you know, obviously there is a limit to miniaturization, but we're nowhere near that. I mean, if they can make computer chips out of 3 to 4 nanometer, you know, I see these.

Richard Feynman said there's plenty of room at the bottom. Right. And he also he also recommends that we swallow the surgeon. Right. That's, that's, scary.

I feel like it's, it's kind of a call to action. I think that, my, my future may involve, you know, exotic forms of power. Shall we say, there. Okay, let's let's talk about that for a second.

So, there's this conspiracy theory out there that there's something called graphene, which is self-assembling, but we know from nature that microtubules, which form the structure of all, cell cytoskeleton and the machinery of mitosis, these are self-assembling little things, too, like those little magnetic toys.

So I know there's paranoia over graphene as the government putting it and stuff that we eat or whatever. What's your opinion about self-assembling graphene and its, ability to be controlled?

I mean, I've been following graphene and nanotubes and colossal carbon nanotubes, you know, ever, ever since I first started learning about the possibility of doing a space elevator.

And when you look at space out, that don't make no sense to me. Yeah, but space are okay. When you look at the the tensile strength required to, to to basically hang an asteroid or some kind of space station at tension beyond, you know, the where, where a geostationary satellite would be where it's 1 to 1.

If you have a station beyond that point, it's it's going to want to escape. And if you hang it to that right, you can create it, you can create a space elevator and you just.

Yeah, going up like an elevator. And, the only problem is that the, the tensile strength of a material required, goes beyond anything known on Earth until people started looking at, some of the numbers associated with graphene and, interesting.

Oh, it can be that strong and so and organized. It's just kind of interesting. Right. And it's not like space elevator is necessary for us to leap into the next phase of, of our technological development.

But, there is a lot of work yet to do in the fields of material science, in advanced physics. I mean, we are getting tantalizingly close to room temperature superconductors, right? Yeah.

Fascinating. There is, there's just an incredible renaissance unfolding for, for well, I mean, if you believe the people who say Tesla was a genius, apparently he's tried to patent radiant energy harvesting.

So, yeah, I, my friends and I built a very large Tesla coil once and, took it out to the desert, to, to hang out with about 80,000 people and, that was it sounds like Burning Man.

That was, that was a hit for sure. I think I think Tesla is, is a really interesting character because he clearly made incredible contributions to the world, like three phase power, the Tesla itself, a lot of power transmission things.

And then he was certainly an eccentric guy who, you know, as, as a bit of a, of a, of a loner, probably had that magnified a little bit. You know, I think there's a little bit of lure and, you know, maybe a little bit of mysticism.

Associate as I, you've never read the rated energy patent. Okay. So I agree with you. Earlier on, Mr. Smith, you said Mr. Anderson. So let's talk about the matrix.

So for people that don't know your refrigerator and your watch and your thermometer and your phone all know a lot about you, and somewhere in watching you.

But, I remember going to a presentation at Renaissance Weekend, like ten years ago, the guy was talking about the Internet of Things. Now, at this point, people are wired.

Things can be wired smart devices. But the miniaturization I heard there were rice grain size or smaller, backdoor vulnerabilities in servers that being sent out of China to the US.

So this whole thing about nanoscale or really small stuff that you don't know is there. It's not just for peeping toms. It's like for the government, too.

So if you think people have, you know, no one ever reads a Eula end user license agreement. You know, when I click, yeah, I want that app to play, you know, some little candy crush.

You know, I'm sending my data to the CCP, to Peter Thiel, and they're abstracting it so to people have a right to privacy on the nano scale. Or if you eat something from a Smithfield, strip of bacon and somehow they didn't tell you on page 182 that there's a nanobot in there.

Do we have a right to refuse this tact or is it coming whether we like it or not? Well, HIPAA, HIPAA laws are pretty darn power full, right? Like a lot of the work that we do on the cyber security front is just demonstrating that we are actually capable of handling information at that level.

And, and treating it as a fully and responsibly. I think one of the first things that we can do with, with the pill ecosystem is make that amazing data you get from one of these cases available to the patient immediately on their phone, right?

So instead of feeling like there are several layers of bureaucracy between you and what just happened to you, we want to make sure that when you do a pivot procedure, you immediately get the cool, exciting, oh no, it's awesome.

Yeah, they with regards to keeping that appropriately private, that's an incredible conversation right there. Because on the one hand, you know, let's absolutely honor that.

And then on on from another perspective, I don't think the medical community will have ever had access to the amount of data that the pill ecosystem is going to create.

Just because you're taking something that's really hard to do an upper endoscopy, you're going to turn that into something that's really easy to do, like maybe a hundred times easier.

Privacy, Data, and Commercialization Strategy

Yeah, more accessible, etc.. So with that flood of data that's inevitably coming, my goodness, I think there's a lot of value there. I think we're going to be able to train up models to, to sort of do a lot of the boring work more with more.

Yeah. I mean, I think it's great. I mean, ethically good safety, good cost savings. Good. So the question is, you know, a good day for the lion. It's the evil day for the lamb.

So will the gastroenterologist be able to monetize this? I mean, one of the very first things we did with this company

was we we read the the tombstone, you know, epitaphs of all the companies that have failed.

In and around the space, like Proteus Digital Health was doing electronic pills that didn't work out. People have tried to do pills in the stomach, just camera pills.

And those had issues in the US market, for, for gastroenterologists, uptake rate reasons. So right from the beginning, we basically sat down and we said, look, we want to make this amazing technology, these little robot drones that can actually swim around. It's super cool.

But from the very beginning, we have to make a tool that a gastroenterologist is going to be really excited to use. That is going to immediately make them more money than they would make using the existing tools around them.

There you go. Yeah, we said align the incentives. Yeah, right. If we can pull that off, then people will actually get used and that'll be good for us.

But we had to actually put ourselves directly into the shoes of a gastroenterologist. Like, that's how many years did it take for you to become a gastroenterologist?

How many years ago? You know, I mean, people, they've become Luddites, for sure. Like you own this clinic with some buddies, you know, like the the amount of weight pressing down on a GI is incredible.

And if we don't understand their world, there's no way they're we're going to come up with a product they actually want to use. And so that's great. I mean, I was talking to this guy and he was saying, this lady was selling donkey milk for whatever gut biome stuff that she thought the FDA or that where the US AG was coming after, it was actually someone's brother in law who is like, you know, milk farmer.

So you never know what the consequence is. Really good that you consider that. But so as far as pill pill bots entry into the market, I assume that you're pretty far down the FDA approval.

Are you still looking for our investment partners? All I would say is, we're really excited to have our new CEO, man. Nita Shockey, who has this incredible, history in, really advanced health care tech.

He's been through it all. He has put us on a laser path to revenue through FDA. So. Yeah, we're we're under, you know, we're entering our are more official clinical trials.

We've been doing IRB clinical trials up until now. And, you know, maybe, like, maybe like 12 to 18 months to get our first product into the market. That's amazing.

And just so people know, you've been at this for six years assembling the skill materials, doing the testing, the reiteration. So this is a great, blessing to mankind and the fruition of a lot of work on your part.

So congratulations. You know, it was it was a dream for for more than six years though, right? So I spent more time dreaming about it than I have spent actually building out with this team.

And that should be a lesson to the prospective founders out there, which is, if you have an idea that's, just burning a hole in your brain and you just you, you the world seems crazy because it's not being done.

You should probably launch the company. Right? And don't wait until you feel like you're ready. Like, if you have an idea that's real, go for it. You know that what you have to lose is waking up and realizing that you're a CEO and that you just learned some hard lessons.

You know what's amazing? I mean, it's amazing. My hat is off to, serial entrepreneur and venture, dreamer. It's amazing. Torrey Smith, thank you so much for, enlightening us.

We'll look for Pill Bot and your other amazing bots in the future. I think it's going to be a real blessing. Thank you.

It's a pleasure and an honor to be here.

Thank you. Thank you for tuning in to Doctor Talks. We hope today's episode has enlightened and inspired you on your path to optimal health. Each day is a new opportunity to make choices that empower your well-being.

For more insights and strategies, subscribe to our podcast and visit our website w ww di doctor Law.com. Stay connected, stay healthy and join us next time on Doctor Talks.

Real talks from real doctors on the issues that matter to you most.