

**Samantha:** Hey Swathi.

**Swathi:** Hey Samantha.

**Samantha:** So today we have a pretty big subject.

**Swathi:** Yeah, and I guess you could say it's pretty fundamental too. The beginning of life.

**Bhatty:** Am I allowed to use gynaecological terms?

**Swathi:** In this episode, we are hearing from Professor Siladitya Bhattacharya.

**Bhatty:** I'm a gynaecologist by trade. I'm also the head of the School of Medicine, Medical Sciences and Nutrition in Aberdeen.

**Samantha:** Welcome to Beyond Boundaries from the University of Aberdeen. This podcast is about the groundbreaking research being done here and what studying Aberdeen looks like.

**Swathi:** I'm Samantha. And I'm Swati. And this time we are talking about fertility, contraception and assisted reproduction.

**Bhatty:** The outcomes we are thinking about all the time in reproduction is having a healthy offspring and a healthy mother. And ultimately healthy families. That's what it's about. And I think we can't afford to lose sight of that ultimate mission, that ultimate goal.

**Swathi:** Professor Siladitya Bhattacharya is usually known by the nickname Bhatty. So that's what we're going to call him today in this episode.

**Samantha:** He starts off by talking about how human reproduction or how having babies has changed over the past century.

**Bhatty:** I think we need to go back to the big disruption in the world of reproduction that occurred in the 20th century with the advent of contraception, particularly the oral contraceptive pill.

This was the event that disconnected sex from reproduction. Thereafter, nothing was quite the same because reproduction was something that could be planned. That wasn't the case prior to that ever in history. With the 20th century coming

to an end, the other things that developed were the advent of in vitro fertilization.

IVF, where sperm and eggs could be taken out of the body, brought together in the laboratory to create an embryo, which was then implanted back in the uterus. Then came the ability to freeze first embryos and then gametes, that's eggs and sperm. And with that, everything was changed, because obviously, now, reproduction could be planned, and with planning came expectations of reproduction on demand.

To give you an example of how that unfolded, consider somebody going on the oral contraceptive pill. Reproduction can be prevented at will. The expectation then is, of course, when you discontinue the pill. stop contraception, reproduction can then be switched on at will. But unfortunately, science wasn't very good or equally good at both ends.

So as a community of clinicians, we are better at switching reproduction off than switching it back again. And the reason for that Our contraceptives, particularly the pill, is pretty much effective, you know, close to certainty in terms of doing what it's meant to do. In terms of something like in vitro fertilization or assisted reproduction, the chances of pregnancy per attempt can be something around 30, 35 percent.

So it's nowhere close to 100 percent. So, I think we are still trying to balance the two ends of this reproduction switch. And we are probably still a little bit better at switching off than switching on. but outcomes following assisted reproduction are much better than they used to be. So that's one part of the story.

**Samantha:** It's insane that science has like, evolved to such a, like, we're taking, like, I don't know, how is that even possible? We're here now, but how did we get to such a point where this is even possible and that there's so many different varieties of how you can go about assisted reproduction? The idea of creating humans is weird to me.

**Swathi:** I was just sitting with the thought that for me, I guess it's about having autonomy on our body, like, especially for women.

**Samantha:** Yeah, I would love to continue this conversation. Let's hear a bit more.

**Bhatty:** The second part of the narrative is about the demand element. So the initial bit, which is about getting pregnant when somebody is ready to be pregnant, brings an element of predictability, which is hugely welcomed by women.

So this is where we reach a tipping point where the expectation as a society is of predictable and almost perfect reproduction. And that's where other scientific advances that have come in in the late 20th and early 21st century have begun to engender very high expectations. This is about the point where some work that we've done separately from getting people to deal with infertility and more about preventing, say, genetically transmitted illnesses has led to technology that people are considering bringing into the field of planned reproduction.

So, this is about testing embryos. prior to implanting them so that they're deemed to be chromosomally normal and in some cases to go beyond not just having a healthy baby but a healthy baby with certain desirable characteristics. So where do we go from a healthy baby as an outcome to choosing to have a designer baby as an outcome?

A more common example is the ability to choose the sex. of your baby. Now this is legal in some countries and not in others, but clearly this is something that society has a view on.

**Swathi:** So what Batty is mentioning here is about designer babies. The term designer baby usually refers to a child whose genes have been selected or altered before birth to make sure it has or doesn't have certain genes.

I mean, the concept of design a baby is quite absurd for me. It's sad,

**Samantha:** I don't

**Swathi:** know,

**Samantha:** in a way. Sounds like a bit of conditional love when it comes to the child rather than unconditional. Because I think, yeah, it isn't having a child at all about the unconditional love aspect. But now if you're like designing it or like choosing the little, um, characteristics and stuff.

**Swathi:** Like a designer dress. I don't know. So what would you do if two partners have two different opinions? It's like. if you want blue eyes and if your husband wants green. So what do you, what do you do?

Yeah, it's quite weird. It would be nice to embrace the uniqueness of a child. As they come, instead of having it predetermined. So, you know, that's kind of a condition you impose on a child.

**Samantha:** But hey, I guess like, I guess if the option is there, then why not use it? I mean, I'm just, since, since science has come in quotation marks so far that we can do this, I guess.

Some people would give it a go, huh? I mean,

**Swathi:** I'm just curious. Do you have any desired characteristics you would want for your baby?

**Samantha:** Um, I'm not gonna have a baby.

So let's hear a bit more about the ethical questions in assisted reproduction.

**Bhatty:** Some of the procedures that are available have been developed for very specific conditions. So one example is using embryo biopsy and embryo screening for chromosomal or genetic disorders in couples who are at particular risk of having babies who are affected.

One of the potential extensions of that is to use it in couples who don't have a similar risk simply to meet their personal demands in terms of the type of baby they would like to have. This is something that's closely regulated in the UK because we've got a regulatory oversight body called the Human Fertilization Embryo Authority and that provides a framework within which we address some of these challenges.

I think it's very important when we do research into embryos or into new methods of treating illnesses, that it's done in a regulated environment such that it provides the rest of society with assurance that whatever we're doing is safe and is within the bounds of what people would consider acceptable and normal ethical practice.

There are lots of examples in assisted reproduction, as in other areas of medicine, where we try and balance innovation, what an individual might want, and what most people in society would find acceptable.

I think the worst case scenario you could have is could be looking at in terms of commercially exploiting some of the technologies that we have in countries

where there is no oversight or regulation that the possibility that people could screen embryos for just general chromosomal normality or abnormality.

This is already done in many places. And some of the conditions that people could think of looking at are late onset conditions that don't necessarily affect the child, are not incompatible with people living up to a reasonable age, up to attaining adulthood, but could result in illnesses beyond that.

And the question is, do we have the, the moral right to screen embryos for these conditions? What might that do to a society where everybody does that? What might that mean to people who have these conditions and are then seen as the outsiders in a society that absolutely values, within inverted commas, normality over everything else and how would the definition of normality change over time? There are the countries that I'm not necessarily going to name where exactly that has happened in terms of sex selection, where people screening for sex might choose to discard embryos that are not of the right sex. Sometimes sex selection has occurred beyond the point of an embryo being formed, i. e. in early pregnancy. And therefore, in those circumstances, has been linked with choosing not to continue with a particular pregnancy. If you fast forward to a society where this has been the norm in the past, you can imagine that there's a, there's a massive gender imbalance and you would have thought that having fewer, um, adults of a particular gender or sex would mean that they'd be more valued, but in actual fact, this hasn't necessarily been the case for women in certain societies where they've been, despite being fewer in number and therefore, uh, technically, um, less attainable, they've been subjected to violence and discrimination.

**Swathi:** Well, I do know in some parts of, uh, of my country, like they do prefer males over females, and that's quite sad. So if you can choose the sex of the child, I don't know how fair it's going to be and how it's going to impact the ratio of males and females in the society in the future. So that's quite concerning for me.

**Samantha:** Yeah, I'm a little bit at a loss for words and trying to process most of this.

**Swathi:** So we're back with Professor Siladitya Bhattacharya and he says there have been a lot of technological advancements in assisted reproduction that have actually seemed exciting but haven't lived up to the hype.

**Samantha:** When it comes to an emotive and personal area like childbirth, it's better to take things slowly and to fully understand new technologies and scientific advances.

**Bhatty:** This is where the University of Aberdeen and the work we've been doing here certainly for the last 30 years has been at the forefront of guiding innovative but also evidence-based effective clinical practice because not everything that's new is effective and infertility has been full of pitfalls for people who've been sold dreams at considerable personal expense, only to find that the delivery doesn't always match the expectations.

The whole science of assisted reproduction is still caught in this dilemma about whether to go all in with some of these new advances, or whether to pause and subject them to the sort of robust scrutiny that certainly we in Aberdeen have always advocated. And I think it's still worth doing the latter because some of these treatments are invasive.

Some of them are expensive, but all of them technically could be used in lieu of payment, and therefore, ethically, there's always the argument that we're doing something that is inappropriate for people who are too desperate to take the time to reflect on their decision, whether to go for it or not.

Where I think we've made our mark as a university, when all these techniques were in their infancy, I think we had the foresight, the will, to subject these interventions to rigorous examination and therefore would like to think that we've shaped the way in which these techniques are being used in contemporary practice.

**Swathi:** So Aberdeen takes research beyond boundaries, but also with rigorous examination and ethical consideration, I guess.

**Samantha:** Yeah, I suppose. It's quite reassuring to know that we're in the hands of good people.

**Swathi:** Okay. So next let's hear a bit about the history of IVF or in vitro fertilization in the UK.

**Bhatty:** So we have to go back to the 1980s. So IVF started in the UK in 1976. IVF came to Aberdeen in the mid-80s, and as was the story in all IVF units around the world, there, there were a lot of initial hiccups in setting up a service, getting techniques to work because you were setting up labs from scratch.

All the kit, the technology that is now available off the shelf, wasn't available at that point. A team needed to be created. And I think from that began a very successful programme of treatment, which sat within the University but operated from NHS premises and we're very lucky because of course we sit within a joint health campus here in Aberdeen.

Also, Aberdeen was one of the places. where sperm injection, or ICSI as it's known now, was first used in Scotland. So we were the pioneers of that north of the border, and we had a lot of early successes, but equally we used it responsibly, and so there, we led the trial, the first large trial, to compare ICSI with conventional IVF in areas where we felt it wasn't as an automatic need, such as non male infertility.

Because where sperm quality is impaired, I think everybody would agree that sperm injection was the way forward. But where there was normal sperm, I think we were talking about a time where people were tempted to to use ICSI for everybody, and we did the trial that showed that it didn't actually have any benefit.

And again, a trial done 20 years later has confirmed that. So we were there first, as it were. If you're going to talk about scientific advancements in reproductive science and assisted reproduction, there are two dimensions to consider. One's the ethical dimension, which I think I've spoken about. The other bit is purely the scientific and clinical, just because something is new or novel, does not mean that it's clinically effective, i. e., in this context, give couples a higher chance of having a baby. And I think sometimes we miss that because in an area where success rates are always lower than what people would ideally like, ideally people would like 100%, and it isn't that, there's always a temptation to believe that something new would give us that extra edge that we're missing in reality, though, that needs very, very careful interrogation and evaluation simply because history shown us that many of the techniques we thought were would transform our specialty have failed to live up to their expectations.

And because, as I've said before, these, these interventions, these treatments come at a price in terms of invasiveness, in terms of cost. It's absolutely important that before they are rolled out to populations of patients that they are subjected to the same sort of scrutiny as we would any new drug or any new operation.

**Samantha:** Okay, well, I reckon if you're listening to this podcast, then you'd be interested in studying at Aberdeen. So what do you need to know about your planning on studying medicine or medical sciences?

**Bhatty:** I think medical students of the future are going to practice in a world that's going to be very different to the world that we've practiced in.

Medicine has traditionally been about amassing lots of information. A lot of that information will be at the end of a phone for a lot of doctors of the future, you could almost argue that there'll be too much information in the sense that there'll be information from a lots of different sources, sometimes contradictory. So, what medical students of the future and for medical sciences students of the future, what the challenge will be, will be to be able to discriminate between information that is correct, that's relevant, that's accurate. to the particular circumstances that they are considering, rather than almost adopt an open, unfiltered, welcoming approach to any information that they can find.

So, starting with that approach, I think what I've talked about in terms of our approach to adopting new technology in the context of reproduction should be a case study of the way we go about adopting future technologies into medicine as a whole, because there'll be many. And I think this approach, where we consider what the technology is, use it in a controlled, ethically approved setting, within a framework of governance, subjected to rigorous scrutiny through appropriately designed experiments, such as randomized clinical trials, before rolling it out to a widespread scenario across patients in different clinics, but also understanding that where techniques are relatively new, and there isn't the opportunity to do a trial, or where the evidence from a trial is unclear, I think there's also a case for undertaking some of these techniques in a controlled setting, with consent from patients, but recording the data. So what, what we would then label that is within research conditions, so that we are following up on the outcome of those techniques. And I think in a way it serves as a paradigm for how medicine ought to be learned, practiced, and evaluated in the future. In Aberdeen, that's how we do it.

**Swathi:** I actually like that. In Aberdeen, that's how we do it. It could be the name of our podcast, don't you think?

**Samantha:** Yeah, for sure. Well, thank you to Professor Siladitya Bhattacharya for guiding us through the past and the future of fertility and reproduction.

**Swathi:** So, if you want to join the Boundary Breakers, You can come to one of our open days and see our historic campus. You can also download our digital prospectus@[www.aptn.ac.uk](http://www.aptn.ac.uk),



**Samantha:** and to hear more from us, check out the rest of the podcast. Each episode discusses boundary breaking research from one of Aberdeen's academics.