

PROGRAM -
GENETICALLY SPEAKING:
GETTING TO THE ROOT OF STEM CELLS

By: Lauren Brom

SAASTA SIGNATURE TUNE – FADE OUT

HOST: Welcome to SAfm's Science Matters! In today's episode we have a real treat; we will be speaking to an actual stem cell. Yes, you heard me right; we will be communicating with a stem cell.

I can hear all the listeners out there wondering, 'but how can you talk with a cell?' Let me explain. For today's programme only, we have set up a special apparatus that interprets the signals that the cell emits and we have adapted these signals into a format where we can interpret them to communicate with the cell especially for this broadcast.

Now I know there is a lot of world interest at the moment about stem cells. Today we hope to get to the bottom of this topic, so that by the end of these five minutes, you will know what a stem cell is and why they are so important to you.

So let's begin.

VOX POP INTERLUDE MUSIC. FADE UNDER AND HOLD

HOST: I'd like to welcome our guest 'The Stem Cell' to today's program. Welcome.

STEM CELL (SC): Hi.

HOST: So to begin, could you please explain to the listeners what a stem cell actually is?

SC: Sure. But first let me begin by explaining what cells are.

To all the listeners out there, your body is made up of trillions of cells. They are like the building blocks that form you. But you have different types of cells that you are built from. So you have eye cells that make up your eyes, lip cells, skin cells, blood cells and so on.

HOST: Okay, but then what are stem cells?

SC: Aaah. Stem cells, in my opinion, are the best cells of all.

HOST: That is quite a statement, why do you say that?

SC: You think that is a statement, let me add to it. Stem cells are like the long searched for "Fountain of Youth".

HOST: How can you say that?

SC: Because we can give rise to, or basically make any other type of cell.

HOST: What do you mean?

SC: I mean I can make eye cells, or blood cells or skin cells or liver cells. I, as a stem cell, can make just about any type of cell that you wish. That's why I am so special. And that is why I am called a stem cell, because other types of cells STEM from me.

HOST: What, but that sounds impossible? How do you do that?

SC: It's my area of specialisation you could say.

Let me explain:

Nearly all cells have the same DNA in them, DNA is like the instruction manual that we have, that tells us how to make a human.

HOST: But if cells have the same DNA how can they be different types of cells?

SC: Ah, this is the cleverness of your body! Different parts of your DNA form genes. And different genes are, let's call it, switched 'on' or switched 'off' in different cells. Or we can say they become 'specialised' into becoming different types of cells.

HOST: What do you mean by 'switched on' and 'switched off'?

SC: Like a light bulb; you switch it on and light is 'generated', or you switch it off, and the light stops being 'generated'.

HOST: So genes are 'switched on' and 'off' in the body at different times?

SC: Yes. So, to give our listeners an example: Take a liver cell. How did it become a liver cell? It had to start off as a stem cell, but the parts of your DNA, - the genes, that instruct it on making a liver cell are 'switched on', and so make it become a liver cell. But to make your eyes, the parts of you DNA, - the genes, that instruct on how to make liver cells are 'switched off' but the parts that instruct on making eye cells are 'switched on' to make it an eye cell. See what I mean?

HOST: Ahhha. But then what makes different parts of DNA switch on and off?

SC: That happens when the cell is still developing. All sorts of things can influence me into developing different types of cells. It can be the surrounding environment, or signals that the body sends out.

HOST: It sounds quite complex.

SC: It is, but here is an easy example to demonstrate this.
Have you ever scratched or cut your finger?

HOST: Yes, lots of times.

SC: So what happens when you do?

HOST: It heals naturally.

SC: Yup, and do you know how it does that?

HOST: How?

SC: New skin cells have to be made and sent to the area to heal over the scratch.

HOST: Yes of course.

SC: So when you get a scratch yourself, your immune system sends out all sorts of alarm signals that either cause the already existing skin cells to divide and multiply, or the signals tell me to start making up some new skin cells, from scratch, (if you'll excuse the pun.)

So I get to work doing that, more skin cells are made, the body heals and all is well.

HOST: Wow. That is quite a job!

SC: See why I said I am the best cell of all!

HOST: Actually you sound like out of a science fiction novel, a cell that can make any other type of cell. Sounds fantastically incredible!

SC: It is. If you think about it, your bodies are miraculous creations full of unbelievable things scientists will still uncover in the coming years.

HOST: But now that scientists have discovered stem cells, what do they want to do with them?

SC: Well think about it, a cell that can turn into any other type of cell. There is huge need for growing new organs, for replacing valves, so many things to help humans regain their health.

HOST: But is it really possible to use stem cells in a lab and turn them into new types of cells?

SC: Not only is it possible, scientists have already done it! They have taken stem cells and made them grow into actual beating heart cells, and into all sorts of cells that make up your bodies.

HOST: WOW!

SC: As we speak, across the world scientists are working together to try and use stem cells to make new tissues and organs to replace those that aren't working in humans.

HOST: But why can't you just have someone else donate an organ if someone needs it? Why use stem cells?

SC: Aaaah. I'll tell you why. Because of our DNA again. Everyone has their own special DNA, it is slightly different to anyone else's on the planet, except for identical twins of course, - they have the same DNA.

HOST: Right. So...?

SC: So if say you are having trouble with your kidneys and need a kidney transplant, the doctor will try and look for someone with similar DNA to you, so that your body doesn't reject the new organ. It will reject it if the DNA is very different to your own.

HOST: But why does your body reject different DNA?

SC: That is part of how your immune system works to keep you healthy. In order to destroy bacteria or viruses that infect you, your body recognises that they are different to your own body; because they have different DNA to you. So your body recognises it as foreign and attacks it to stop it infecting you. But the problem is that it also does that with an organ transplant if the DNA is too different to your own body.

HOST: Oh, but if you use your own stem cells then they have the same DNA.

SC: Precisely. So that means you can use your own stem cells to make more of the healthy tissue or organ you need and it will be your own DNA, so your body will accept it and not try and fight it off.

HOST: Very clever, very cool.

SC: What scientists are beginning to be able to do with DNA and Genetics and stem cells is unreal, yet real. And that is why in South Africa scientists are doing stem cell research! Here in South Africa we have some of the best scientists working on ways to keep us healthy in the future, by researching stem cells.

HOST: Well, thank you for explaining this to us. Now I understand why everyone is so interested in stem cells!

SC: Thank you for this opportunity to explain to the public what makes stem cells so special.

HOST: Now I get it! It's because of your ability to 'special'-ise' into different types of cells.

SC: Exactly!

HOST: Until next time, bye for now!

SC: Bye and Be Well!

SIGNATURE TUNE. FADE IN AND HOLD UNTIL END.