2005 Sept 9th 938 Live Body & Soul Bob Williamson

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Welcome to Body and Soul on 938 Live, with me, Debra de Souza. And you can check on our website by the way if you want to find out some of the topics that will be coming up over this weekend. We do have an encore broadcast of some of the topics that you may have missed over this week and it's www.938live.sg

Now cord blood is widely recognised as an emerging alternative to bone marrow as a viable source of blood forming stem cells to treat paediatric and adult patients with leukaemia, lymphoma, severe aplastic anaemia and other lethal diseases of the blood or immune system and also certain inherited metabolic diseases.

Well, there was a Fifth Singapore Obstetrics and Gynaecology Congress held just over this week. And we have one of the visiting internationally renowned scientists who spoke at this conference in the studio with us to tell us all about cord blood stem cells and how it can be used for cord blood banking as well as for other uses.

Professor Robert Williamson is a professor of Medical Genetics at the University of Melbourne, Australia. Thanks so much for being with us today.

Prof Williamson: Good afternoon, Debra.

Debra: Now let's find out all about cord blood stem cells. It is a kind of stem cells and we've heard all about stem cells but we don't really fully understand what it's all about. Maybe you can explain what stem cells are.

Prof Williamson: I'll try. Until about 10 years ago, we didn't know that the human body had stem cells for anything other than the blood supply. Bone marrow was known to have stem cells. But all of a sudden as a result of research in a number of places including Singapore, it became obvious that there were a lot of stem cells there that was sort

of held back, not able to reproduce and repopulate when a tissue was damaged.

Now it turns out that one of the single richest sources of stem cells is the cord blood. Cord blood is the blood that's left behind in the placenta. It belongs to the foetus so when the baby is born, it's there. It's usually thrown away but all of a sudden it's become obvious that this is one of the most valuable resources that a baby has.

Debra: So we're talking about the blood in the umbilical cord?

Prof Williamson: The blood in the placenta and umbilical cord. The way to get the blood is to drain it out of the placenta by putting a needle into the umbilical cord when the baby is born. So of course, the baby is closed off from, you don't want to take the blood out of the baby but you want to get it from the placenta. And there's probably a couple of cupfuls, something like 70 mls of blood in there for most people and this is an incredibly precious resource.

You see, you mention quite rightly that at the moment this is used to treat leukaemia, lymphoma, other blood diseases. These are very rare. And of course it's incredibly important for the one child in a thousand that there should be a transplantable cell available.

But the really interesting thing in the future and the reason why I am so excited by stem cells is the fact that it's beginning to look as if they can be used for cancer therapy, for diabetes therapy even for treating people who have a heart attack. So can you imagine how valuable it will when we're able to make use of cord blood that has been put down when a baby is born, to treat that child throughout its life when things go wrong.

Debra: And that's what cord blood banking is all about, to actually keep that blood.

Prof Williamson: Cord blood banking takes the blood, processes it and then puts it into a deep freeze, into liquid nitrogen and it's completely safe and stable there. And if it's needed whether for the child that was taken from or for another child, it can be reconstituted and used really effectively as a reservoir of stem cells. So these stem cells can repopulate the bone marrow, if necessary. And in the case of a child who has a very dangerous form of leukaemia, this might be the single most important thing in that child's life.

But I am really more interested in genetic diseases like Cystic Fibrosis and Thalassemia, Thalassemia being very common in Singapore and also diabetes. And at the moment, more and more children appear to be affected by diabetes and we're not quite sure why. But wouldn't it be wonderful if we could reconstitute the pancreas that doesn't work properly using stem cells.

Debra: Now, people have been using bone marrow stem cells for a long time?

Prof Williamson: Yes.

Debra: For treating, like leukaemia as an example. How does that compare then with using the cord blood stem cells?

Prof Williamson: Bone marrow does have stem cells. But one of the problems is as you get older, it has fewer and fewer. And as you get older they become much more set in their ways and they can only be used to reconstitute bone marrow.

There are now more transplants in most countries of the world being done with cord blood than with bone marrow. But the other thing to remember is, taking bone marrow from someone particularly from a child requires an anaesthetic, it's a painful procedure and it's not something that you would just go along and do.

Whereas getting cord blood is just retrieving cord blood from a tissue that otherwise is usually just thrown away. So we have the wonderful potential to obtain our stem cells in a way that is completely risk-free, completely ethical and it doesn't raise any problem from the point of view of the baby. The baby is very happy to give up its cord blood because the baby is already separated from the placenta.

Debra: So let's talk about the ethical issue then with cord blood stem cells. There are ethical concerns with some types of stem cells being used. Do you think there's any concern with cord blood stem cells?

Prof Williamson: Many people have been trying to get embryonic stem cells from human embryos and this raises very real ethical concerns. There are many people who regarded it as unacceptable. There are probably many more who don't regard it as unacceptable themselves but who respect the people who regard it as unacceptable.

One of the best things about cord blood stem cells is there are no ethical issues at all involved. This is a tissue which otherwise would be disposed of, discarded. The stem cells are not embryonic, they do not have the potential to be come embryos and yet they are early enough to be of enormous value across the board. Indeed it's even possible that they can be used to reconstitute the heart muscle, to reconstitute the bone marrow after cancer therapy.

So all of a sudden, it seems to me there is an alternative way to go that has many of the advantages that are claimed for embryonic stem cell research but without any of the ethical disadvantages and without any of the safety concerns. So I believe that we should see a lot of research focusing on the use of cord blood stem cells because this could solve many problems without raising ethical concerns at all. No one, no one from any religion, no one from any philosophical point of view, has ever had any ethical problems with cord blood stem cell research.

Debra: And you're removing the blood when the cord has already been detached from the baby?

Prof Williamson: Yes, usually you clamp the cord off and then remove the blood at that stage.

Debra: So you're not removing while it's still –

Prof Williamson: Oh no, no, no, you wouldn't want to remove it from the baby.

Debra: Okay.

Prof Williamson: The baby needs its blood.

Debra: Okay. So in that sense, there is no ethical concern as you say for using this type of stem cells. And you said that, you know, there's so much potential as to what cord blood stem cells can do for the health concerns that we have today, various health diseases. How does it actually help with all these different diseases?

Prof Williamson: As of now, many of the research the studies that have been carried out have really just been done with animal model systems or with children who are very sick. Because of that, we are talking about the future. The present use of cord blood is mostly for leukaemia, lymphoma and metabolic diseases, genetic diseases of childhood.

What we do know from those studies is that cord blood is safe to use. And because it's safe to use, people are now looking at ways of taking those cord blood cells and turning them into cells that can line the lung in the case of cystic fibrosis.

Now I will talk about cystic fibrosis, this is the disease I've worked on for almost 30 years. In cystic fibrosis which is the most common genetic disease affecting Europeans, the lungs don't work properly because the cells that line the lung cannot transport salt across them

properly and the mucus becomes very thick. And this thick mucus is a place where bacteria, where bugs can grow very very easily. If we can take cord blood stem cells and grow them in a mixture that's starts to kick them along the lung cell pathway and then inject them into the lung, the blood supply of the lung, the lung circulation. We know from mouse model systems, those cells will restore the function of the lung at least in those mice. Now can we do it in people? I'll tell you in three or four years' time.

We certainly have high hopes. I suppose the reason why we are cautious about overstating it is that 15 years ago when the human genome project was really at its peak, everyone said "Gene therapy. Gene therapy is going to be the next big thing". We are going to use healthy copies of genes to cure diseases like Thalassemia, cystic fibrosis, diabetes. And it turned out to be very very hard to use genes to treat those diseases because the body is protected against genes. Unfortunately, gene therapy has not lived up to its early promise. So anyone who works on stem cells doesn't want to overstate it until we can do it.

Having said that, we do know that stem cells work. And we know they work because a baby has got stem cells. And a baby uses stem cells to grow its own tissues. So I think we are much more likely to be on a winner in the case of stem cell therapy.

And I suppose if I had to name a disease that I think a common disease that I think will really come under scrutiny first, I think about diabetes. Because in diabetes, the cells in the pancreas that make insulin have died and it may be possible to use stem cells to regenerate those cells in the pancreas. And this is a situation which is being very actively studied in many places throughout the world and the early results really are quite promising.

Debra: So stem cells are very good for conditions that are inherited such as diabetes, cystic fibrosis as well as inherited kind of disease.

Prof Williamson: And inherited, yes.

Debra: And, you know, it can be used to regenerate, for example as you mentioned in diabetes, you know, cells that have already died. But what about as a preventive measure? I mean, you already know that you know your parents have diabetes, as an example, you predisposed to that and you start early even before you've gotten it.

Prof Williamson: Prevention is a very very exciting possibility. One of my colleagues in London, Charles Coutelle, has actually been injecting stem cells into sheep that have cystic fibrosis. You can actually have sheep with the same genetic diseases that people have. And he has been able to beat the disease right in that last week of pregnancy by actually treating the foetus. How much better to treat a disease in the very early stages and make someone healthy than to go through all the problems of either terminating a pregnancy or having a sick child. So the idea of very early intervention is of course important.

Having said that, most people will eventually suffer or die from diseases like cancer, heart disease, mental illness. And using stem cells to prevent those diseases is really something for the future, it's for your children and my grandchildren who may see that happen. But in order to use stem cells to prevent common disorders, I think we're going to be looking at something that will happen but not for another 30 or 40 years.

Debra: We're talking today with Professor Robert Williamson. He is a professor of Medical Genetics from the University of Melbourne, Australia. He's a visiting internationally renowned scientist who has just spoken in fact at the Fifth Singapore Obstetrics and Gynaecology Congress here about cord blood stem cells. So we're going to find out more about that in the second half and open the lines to you if you got a question regarding this on 66911938 on Body and Soul on 938 Live.

Well welcome back to Body and Soul on 938 Live, with me Debra de Souza.

And today we're talking about cord blood stem cells. Well, the Fifth Singapore Obstetrics and Gynaecology Congress is happening and over this week and in fact there was a presentation of the Scientific Medical and Ethical Case for Cord Blood Banking presented by Professor Robert Williamson who is a visiting internationally renowned scientist. He's also a professor of Medical Genetics at the University of Melbourne, Australia. And we have him in the studio to talk to us all about cord blood stem cells and cord blood banking. Cord blood is in fact widely recognised as an emerging alternative to bone marrow as a viable source of blood forming stem cells to treat paediatric and adult patients with conditions like leukaemia, lymphoma and other lethal diseases of the blood or immune system as well as certain inherited metabolic diseases.

Now, if you've got a question of this, give us a call on 66911938. And in fact I'm just going to go straight to the lines now because we have Mrs Chong waiting with a question. Mrs Chong?

Mrs Chong: Hi, I would like to know what do I look out for when I am looking for a cord blood bank to store my child's blood in?

Prof Williamson: Mrs Chong, that's an excellent question and I think it's a very wise thing to ask. Because in the same way as when you look for a doctor or you look for a lawyer or look for any other professional, it's very important to know that they know their business and they do it right.

Now in Singapore, there's the public cord blood bank. The public cord blood bank takes donations of cord blood. Now this is not for everyone because it's really a very magnanimous thing to do, you're giving your blood to the public bank where it could be used for your

child but it could be used for anyone. The advantage is the Public Cord Blood Bank doesn't charge, the disadvantage is that they only collect at two or three centres and if you're not giving birth at those centres, obviously you can't give to the Public Cord Blood Bank. And the other disadvantage is you have no control at all, you have no say at all over the use of that cord blood once you've donated it. There are a couple of private cord blood banks, I don't suppose I can mention them by name but you can find them.

I think the really important thing to ask yourself is, have they got some sort of accreditation. Have they proven that they really meet international standards? And I think that every cord blood bank should be looking for accreditation, looking for approval by one of the national or international testing bodies. And I know that certainly the Singaporean Cord Blood Bank is thinking about this, one of them certainly has approval internationally.

And why does this matter? In the first place, it's very important that you can be confident after you've paid for cord blood banking that that cord blood really is ready to use, that it really would be there for your child or for a brother or sister of that child or even for you or your husband, if you needed it.

The other reason is, you want to be certain that the company has got plans in place so that in 10 years' time, 20 years' time, even 40 years' time, there still will be that cord blood laid down and appropriately stored so that it can be used. Because we're not looking at something that's really going to be important in the next month or two, we're looking at something that's for decades possibly even generations to come. So I think you are absolutely right, Mrs Chong, to put a lot of emphasis on the fact that you only should deal with reputable and ethical people in this field as in every other field.

Debra: Do you have further questions?

Mrs Chong: No, thank you.

Debra: Okay. That answers your question. Thanks so much for joining us with that. How long can the cord blood be kept from birth?

Prof Williamson: Cord blood has now been kept for about 15 years, 20 years. Other forms of stem cells have been kept or bone marrow stem cells have been kept for 40, 45 years. And skin cells and cells from the eye have been kept for 70 years. Everything that we know tells us that provided that these cells are stored properly under liquid nitrogen, they don't change, they are there, they are ready to use. They are ready when they are thawed out. They are pretty much just as good as when they were put down. So I personally think that there are things to think about.

Actually more of a concern than what happens when they are stored is what happens if you grow them up. Suppose there aren't quite enough cells there in the cord blood to do the job you want, to repair a heart that's had a heart attack, to repair bone marrow after cancer therapy in an adult. When you amplify the cells, when you multiply the cells in the test tube, are they exactly the same as they were when you started. That's the kind of question where researchers are really needing to look very carefully. Because remember the one thing we mustn't do, Debra, is anything that could cause harm to a patient. The last thing we want to do would be to introduce a problem through using a stem cell.

Debra: Do they not multiply on their own once they are already in your body, you know?

Prof Williamson: They do multiply on their own in the body but it does appear for bone marrow as if you need a critical mass. So if you're actually going to use your stem cells to reconstitute the bone marrow, you need a critical number. And this is important because one of the uses for which cord blood stem cells have been proven to work is in relation

to leukaemia. Children who, for some reason or other, do not have a good prognosis after leukaemia therapy actually need a critical number of cord blood stem cells in order to regain their white cell function.

Debra: In general, do we have – is there sufficient stem cells in one cord blood, for example for yourself, I mean for your child, for example? If you kept it for many years and your child develops a heart disease or so, do you think there's enough to treat more than one disease?

Prof Williamson: All of our experience has revolved around using cord blood stem cells in leukaemia, lymphoma and other conditions that affect the bone marrow. And if you use cord blood for that purpose, you have just enough for an older child in most cases. Sometimes you can mix a couple of them together but this is actually a very restricted use.

And there's one difference between using it for leukaemia and using it for anything else. In leukaemia, a little bit of mismatch, a little bit of non-identity is actually useful. And the reason is, the cord blood transplant or the bone marrow transplant actually attacks any remaining leukaemia cells and kills them off. And the ability to do this is a good thing. So a tiny bit of mismatch is a good thing in leukaemia.

But for any other use, for heart disease, for Alzheimer's Disease, for reconstitution after cancer chemotherapy, for any other use, it would not be a good thing. You want an identical match if you can get it.

Debra: But it can be used to treat more than one disease, it's not -- other than leukaemia for example, if you had diabetes and cancer.

Prof Williamson: At the moment, the conditions that cord blood stem cells are used for are rare conditions. And there are other conditions there but

they're all rare. There are genetic diseases, there are metabolic diseases, they mostly involve the bone marrow.

The question that is out there and the question which none of us, to be honest, know the answer to because this is a very new field. Is this something that's going to be incredibly important for a small number of people which is clearer it already this or is this something that's going to be incredibly important for a large number of people, people who are at risk of heart disease, people who are at risk of the common cancers? And we'll find out, we'll find out as the research goes on over the next five or ten years.

Debra: Let's take another call from somebody waiting on the line. Grace, you got a question. We have lost Grace unfortunately. Grace, if you want to cal us back, you can do so on 66911938. We're taking questions on cord blood stem cells, our topic for discussion today. You know, you talk about public banks that people can donate their cord blood stem cells as well. What happens if you're using someone else's cord blood stem cells? It's completely different isn't it from your own cord blood.

Prof Williamson: If you have a donation to a public bank, then that's going to be used anywhere in the world and chances are that it will be used for someone who is completely unrelated. The chance of it being used is quite small but the public banks are there really to rescue children who have failed leukaemia treatment. There are several hundred of these a year.

And it's wonderful that Singapore now has a public bank and that this participates in the international effort. But remember that the public bank is a small bank, it cannot only collect at two or three sites and it's not going to be something that will be for everyone. Some people want to be sure that their cord blood or their child's cord blood will be available if they need it.

My personal view is that the public and private banks really should come together and work together. Cord blood in the private bank should be available on the public system so that they can be accessed, if they are the best to save the life of someone. On the other hand, people who donate to the public bank should also have a say in what happens to their children's sample. And I think if we can reach somewhere of working together between the public and private banks, it will be to everyone's benefit.

Debra: But your body's not going to reject someone else's cord blood stem cells?

Prof Williamson: Your body will reject someone else's cord blood stem cells unless you have some immuno suppression. But whether you need a lot or a little, we're not sure. The one thing we do know is that cord blood stem cells are very much better from this point of view than stem cells from bone marrow from an older person. As we get older, I am afraid our stem cells, just like everything else, get a bit older and more set in their ways and they are rejected more easily.

Debra: Let's go to the line, I'm not sure it's Grace. Grace?

Cindy: Hello!

Debra: Are you Grace? No.

Cindy: Hi, I'm not.

Cindy: My name is Cindy. How do I decide whether or not I should actually store my child's cord blood. For example is it only when like when I have a child who is really sick or if I know of some genetic disorders within the family line.

Prof Williamson: You only get one chance to store cord blood so it's only after birth that you can store it. My personal view, if you want my personal view

on this, if you are one of the people who is giving birth at the public bank hospitals and there are a couple, you should certainly offer to give your cord blood to the public bank. This is free and because it will probably be there if you ever need it. If have any history of a genetic disease or a partially genetic disease like diabetes in your family, you know your child will be at increased risk, you should certainly store your cord blood, if you can. Otherwise it's a question of how lucky you think you're going to be and how much money you have and where you're having your child and all of those issues.

There are many people today who think that storing your baby's cord blood is a form of insurance. It's a form of insurance that like any other form of insurance you may not need. I mean, many of us insure our homes against burglary and we hope that we will never ever have to use that insurance because if we have to use, it will be a bad thing. And I hope that people store their children's cord blood because I think it's a valuable – and it's a valuable thing, it's a wonderful, wonderful source of stem cells. I also would be very very happy if most people have wonderful healthy children and never had to use the cord blood.

Debra: Yes, okay. Does it answer your question?

Cindy: If I choose to store my child's cord blood.

Debra: Could you say that again, we lost you for a while?

Cindy: Sorry, how many times can I actually use the sample?

Prof Williamson: As of now, the sample is usually used just once but that's because of the way it's stored. And it's interesting you ask me that question because just this morning I was talking to the people at one of the cord blood storage companies and I was suggesting they should divide the sample into three or four units instead of one-and-a-half because that way they would have more chance to use the cord

blood for more than one time. But the answer is, as of now, as of this minute in time, it's stored in the way so that it's used once but in the long run, my guess is it's going to be used several times.

Debra: All right, okay.

Cindy: Thank you.

Debra: Thank you for your question. Let's go to George now, George? Hi George! Go ahead please with the question and listen to the phone not the radio, thank you.

George: Hello, yes. My name is George Lee. I was a postgraduate from Melbourne University but I am a survivor of multiple myeloma.

Prof Williamson: Yes.

George: And stem cells have been already stored in Mayo clinic.

Prof Williamson: Yes.

George: So how long actually will this be effective? It was eight years ago, I am an eight years survivor, they clamped my stem cells then but is it possible?

Prof Williamson: Well, congratulations on being a survivor. That's wonderful news I'm sure for you and your family. The cells that are stored are really stored permanently. As long as they're not thawed, as long as they're kept in liquid nitrogen, they are okay. So the good news is, those cells at least will be there and ready for you when you need them.

Debra: Okay. Well, thank you for your question George, because we've run out of time unfortunately. My last question to you Professor Williamson is just how much will it cost us to store the cord blood?

Prof Williamson: The private cord blood banks charged just over S$1,000 and in addition people would have to pay about $50 a year for the liquid nitrogen to make sure the cells really are still there when they come to need them. So it's a bit of an expense and for some people it might be a lot of money. On the other hand, there are many people who can afford $1,000 or $1,200, $1,400. And if you can afford it, as I say, it's a sort of insurance policy. It's a bit different from other insurance policies because we are not certain yet exactly how good it will be. It may be of incredible value, it may be a value only to a few children but it's still a way of investing in the future.

Debra: Professor Williamson, thanks so much for being with us today on Body and Soul on 938 Live.