Alexandra Magold

Good morning, Science. My name is Alexandra Magold. When children require artificial heart valves, unfortunately, they have to undergo the surgeries multiple times because they grow. However, Life Matrix a start-up by the Wyss Institute in Zurich has found a solution. Nino Jejelava how does this work?

Nino Jejelava

At LifeMatrix we have developed a unique bioengineering technology offering lifelong solutions for patients. This disease heart valves, blood vessels or other structures of the heart. And globally, one out of a hundred children is born with a heart defect. Such congenital heart defects are commonly treated today by replacing the missing or damaged parts with synthetic and prosthetic materials. A major drawback of this material is that this graft needs to be replaced regularly in the child. So you implant the implant in the child of a certain size, and when the child grows, the implant cannot accommodate any more the needs of this child.

Nino Jejelava

So you need to actually re-operate and life matrix implants can overgrow these limitations by providing material which actually transforms into living tissue after transplantation. We have developed a unique tissue engineering technology to grow replacement tissue in the lab, which will be compatible with every patient, regenerate and grow in the recipient. It is cell free. It is cost effective, it has off the shelf availability. It is scalable and none-immunogenic. Usually some heart defects might need even three times to be re-operated just to forego the growth of a child.

Nino Jejelava

And here you implant something and then this implant will drive your own cells to basically. Recreate the structure and it will grow with the child to create tissue cells of human origin are first grown in the cell culture on the scaffold, in the shape of the heart valve or blood vessel or the shape you want to have. And in a process called decelerations, the cells are then removed, leaving behind a perfectly shaped, biologically neutral human tissue matrix called life matrix.

Nino Jejelava

And after implantation, the recipients own cells can actually repopulate into the life matrix, replacing the biodegradable scaffold and this tissue will continue to grow with the patient, and this graft will avoid repeated major surgeries and its associated risks.

Nino Jejelava

You basically take what the product you are given the size you want, and then you implant it. That's all you need to do. Then this because the scaffold is biodegradable, it will drive your own cells to come into

the right place and your own cells will basically replace it. So they will slowly start to replace it and the scaffold will degrade. And so at the end you will have only your own cells.

Alexandra Magold

Right. So these are mainly pediatric cases. Could that also help in cases where you have bacterial loss of a valve or something like that?

Nino Jejelava

Our technology is such that you could basically grow it to any size for the adult suitable and for a child.

Alexandra Magold

That's amazing.

Nino Jejelava

So the best part about the team is that when the team was recruited, there was no filter of saying that, OK, you come from the obesity background or you come from physics and you cannot work in the cardiovascular field. The approach in the recruitment was as follows. Are you capable to do the job you are hired to do or not? And that is the best thing you can dream of when you are interviewing for the job and you feel from the beginning like you are not getting like a lot of questions of kind of like, I don't know what you would take with you on a spaceship.

Nino Jejelava

And I do truly believe that this approach is the best approach you can have because you get the complementary skills and different scientists can bring different skills and integrate it into the what is best. So by having this composition of the team, you can really see what is it we can really optimize in a most efficient way. Your final product, and that is what matters at the end.