



Stopping the growth of scars





Even after heart attack patients leave the hospital, scarring causes their hearts to become weaker. The biologist Nuno Camba wants to find a way to stop the growth of scars.

It's not like there are no warning signs in the laboratory of Building 25 B at the Frankfurt University Hospital. There are warnings for sure. But they are about radiation, or germs, or about spreading dirt around where it doesn't belong. You are not warned that when you enter one of the many laboratories you might be confronted with transgenic mice used in biomedical research. But it could happen.



Fascinated by the embryonic heart

Camba has short, dark hair and an equally dark three-day's beard; he is wearing jeans and a white shirt to our talk. It's hot out, and his sleeves are rolled up. His manner is friendly, he speaks slowly, and maintains eye contact. Always.

It's as if he is observing the person opposite him in detail, and constantly studying their expression for any sign of brow wrinkling non-comprehension. He doesn't brush over questions, but takes the time to go into them – it seems to be important to him that his audience understands what he is talking about.

And what he is now talking about is his research – which, however, was not

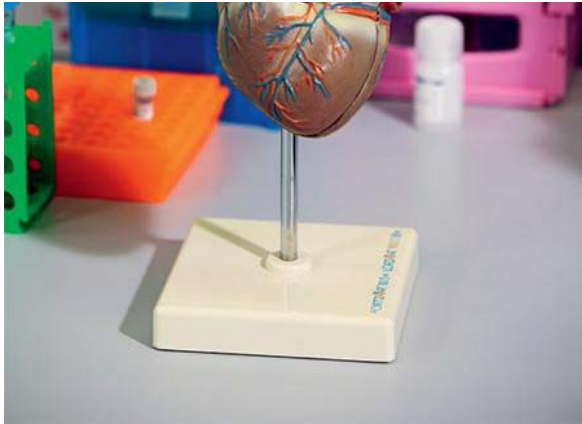
Preventing the scar growth

"A normal heart is constructed out of various cell types," Camba explains. During a heart attack, portions of the pumping cells die. The heart then replaces them quickly with other, smaller cells. "The new cells cause a scar that, while it can't pump, at least prevents the heart from falling apart," says Camba. But there is a critical problem:

"The scar spreads and grows into regions where still-functioning pumping cells are working. And then they also break down." This leads to the continuation of a significant risk for complications when someone is released from the hospital after a heart attack. What can be done about it?

"What's the best way to structure the research to prevent





One of the mice researchers can be found on the third floor: Nuno Miguel Guimarães de Sá Camboa, or Nuno Camboa for short. It wasn't one of his mice, however, as they are all still in the US in San Diego. Camboa has only been in Frankfurt since the summer of 2018. A hole punch, stapler and laptop sit on the table in his office with large stretches of empty, shiny table top between them. The small sideboard in the corner is only half full. After a half-year research stay in Milan, he came from California to "the Main".

initially heart research. Camboa is from Porto and when he begins studying biology there, the nearby ocean makes him want to be an marine biologist. "Gradually I learned about genetics and this fascinated me," he says. After a few lab internships, he ends up in cancer research. But when he comes across an article describing the embryonic development of the heart, this impresses him even more.

And what he is now talking about is his research – which, however, was not initially heart research. Camboa is from Porto and when he begins studying biology there, the nearby ocean makes him want to be an marine biologist. "Gradually I learned about genetics and this fascinated me," he says. After a few lab internships, he ends up in cancer research. But when he comes across an article describing the embryonic development of the heart, this impresses him even more.

"At first, the heart of an embryo is just a tube," Camboa explains, drawing geometric shapes in the air with his hands. The tube gradually curves around itself to ultimately form the

"we're looking for strategies to prevent this scar growth," says Camboa.

The prime suspect: transcription factors. Those are various proteins that occur in cells and determine what portion of the DNA are read and copied, ultimately defining the identity and function of each individual cell. "Once we know which cells replace which cells, then we can look at the transcriptions factors that coordinate the formation a fibrotic scar post-myocardial infarction," says Camboa. If the 36 year-old and his team can find them, they'll look for a way to turn off transcription factors driving cardiac fibrotic responses once these have completed their wound healing function. The overall goal would be a medication – but it could be years to decades before things get that far.



chambers. “It’s an extremely complicated yet simultaneously beautiful process that fascinates me to this day,” he says.

While still studying, he participates in an exchange programme, portions of which are completed at the University of California in San Diego. He writes his doctoral thesis there and dedicates all of his research activities to the heart. He stays in the US for four years after receiving his doctorate, until the German Centre for Cardiovascular Research (DZHK) lures him to Frankfurt with an offer he can’t refuse: € 1.25 million in research funds and his own team.

Here in Frankfurt, Camboa now studies the hearts of adults – a major factor being that it is much easier to get research funding for this. Why is that? “Because there is a strong possibility that this research can one day lead to the creation of practical applications,” says the biologist. He understands this. “Everything we do here is ultimately paid for by tax money. And if you asked taxpayers what they prefer, they would prefer research that would one day be useful to them if they get sick.”

Pleasure of sharing knowledge

Besides searching for knowledge, Camboa also wants to pass knowledge on. It’s the first time he’s led a group and he tries to keep things as democratic as possible. “Of course I make the decisions about which direction to take the research in the end,” he says. “But I always try to take the views of my team who work in the lab into consideration.” But the best thing about his new leadership role is that he can now pass on what he once learned and researched in San Diego. “It’s a great feeling to pass on all these things that I was once so excited about and to see how others get as excited as I did several years ago.” Sometimes he also shows them pictures of how the heart develops out of a tube.

By Jan Schwenkenbecher

Photos by Katrin Binner



Therefore, Camboa is now trying to understand why the heart loses so much strength after a heart attack and if this can be prevented.

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