If a heart attack does not kill a patient, there is a good chance that subsequent heart failure ultimately will. Cardiac tissue damaged by an infarction tends to be replaced for the most part with an inelastic, nonfunctional scar. The remaining functional heart tissue compensates, but over time this extra work takes its toll. The muscle eventually weakens and can no longer cope with the body’s oxygen demands.

Treating damaged heart tissue with stem cells that promote the growth of new muscle and blood vessels has become a pillar of hope in the heart failure field, and at the forefront of that research is Stefanie Dimmeler of the Institute of Cardiovascular Regeneration at Goethe University in Frankfurt, Germany. Dimmeler has not only led early clinical trials of cell therapies, but has also investigated ways to improve the cells’ functional activity and persistence at the site of repair.

But as Director of the Institute, there are not surprisingly many strings to Dimmeler’s bow. In addition to her research into cell therapy, she studies how epigenetic mechanisms and microRNAs regulate cardiovascular processes such as angiogenesis, to name but 2 of her assorted research interests.

From a recent conversation with Circulation Research, it is clear that Dimmeler has a passion for novelty, an aversion for dwelling on problems, and a natural talent for troubleshooting. All of which have undoubtedly contributed to her success in so many areas of cardiovascular biology, and at such a young age—she is just 46.

Where Did You Grow Up?
I was born and grew up near Lake Constance in a small town called Hagnau. It is a very rural area. My father was a vineyard owner, so he was making wine, and my mother worked at the vineyard too, but she was also a teacher.

When Did You First Become Interested in Science?
It is difficult to say. I was always interested in science—physics, chemistry, biology. It was just an interest in natural things, how they grow and how they work, but there was no special event that made me feel like I had to become a scientist. I did not think too much about my career at all. I was too busy playing around and helping my father.

Why Did You Decide to Study Biology at University?
It was a very difficult decision for me because I was good in a lot of different things, so I did not have a clear dedication to one subject. I was really eager to study natural science of some sort and I felt like biology had the broadest scope, so I could learn a lot and then make up my mind later.

Did You Have Any Leanings Toward Medicine?
In my immediate environment, there were no doctors or people involved in medicine, so I was never thinking about studying medicine, but I did love fixing things. For example, my grandmother had a broken leg and I was very keen to help her dress her wound and so on. But I never thought about being a medical doctor. I do not know why.

My leaning toward clinical science came later. When I was in the third year of university, I had to make up my mind between 2 offers for my degree project. One was in ocean biology and the other was in working with platelets and blood cells. I found it really difficult to make this decision. I was going back and forth a lot, but then finally I decided the medical topic was more my thing.

Have You Ever Considered an Alternative Career?
No. After my PhD thesis, I was very focused on getting into a clinical department even though my supervisors told me there were no career prospects in Germany for biologists in clinical fields. But I got a job interview and saw the intensive care station and the wards and all the patients; and I thought this is what I have to do, I have to solve the problems in this field.

My supervisor told me not to do it, and to go to a Max Planck institute or Karolinska institute. And I thought no, I have to go to the clinic.

Given Your Supervisor’s Warning, Did You Consider Getting a Medical Degree?
In the beginning, when I was in Cologne in the department of surgery, I considered studying medicine beside my job, but this was of course very naïve because I had a fulltime job and it was simply not possible. And I did not want to stop working because I loved working.
But I never felt that not having a medical degree held me back. I never felt in any way badly treated or not promoted in the medical field. I was really very happy wherever I was.

I think also the times have changed. Nowadays we have many biologists in the medical faculties. It was different 15 years ago, but maybe I was lucky that I was growing up during the time that the environment was changing. Now everybody is talking about translational medicine, which needs both basic scientists and clinical scientists.

**How Did Your Interest in Cardiovascular Science Develop?**

When I had been in the medical faculty in the Department of Surgery at the University of Cologne for a little over 2 years, I got an offer to move to Frankfurt University from a cardiovascular scientist named Rudi Busse. I told him I wanted to work in a clinic and he connected me with Andrea Zeiher, the head of the Cardiology Department. So I worked with him in the clinic and was also very much supported with respect to the experimental laboratory work by Rudi Busse.

**What Is Your Primary Motivation?**

I think my main motivation is curiosity, but I think the most rewarding moments are when there are new data coming from the laboratory and you say, wow this is exciting! This is one of the best moments. But I also like other aspects. I like working with people, I like the interactions with the international community that we have. There are only a few jobs where you can meet such interesting people from all around the world who are really bright.

Also, when we did the clinical trials and the first data were positive, this was a wow moment—one of the best moments in my career. But these big programs like the clinical trials or experiments take such a long time that you cannot only live for these few moments. You have to enjoy the daily work too.

**Tell Me More About the Clinical Trials.**

The clinical trial—putting bone marrow cells into patients with myocardial infarction—was one of the most exciting endeavors we have undertaken. From isolating the cells in the laboratory to organizing everything and then to treating the first patient and seeing that we had a very nice effect, this was a very, very rewarding process.

Of course, we still do not have proof that this is really working; so if the phase III clinical trial, which we are now starting, is positive, this will be clearly fantastic. But it is a very long journey. It is not that you are doing some small project that can be finished in 2 years. It is a very long-term investment. Like Eric Olson always says, science is not a sprint, it is a marathon. And for this project, that saying is particularly apt.

The phase I and II trials went well, but then of course you need to raise money and then it is difficult because for these large clinical trials you need a lot of patients and you cannot do this by yourself and you need to have interactions with a lot of different clinical partners, which is very nice but is not that easy. And also, it is a bit distant from the laboratory because after establishing everything it becomes more routine, and the clinicians are recruiting patients and doing that sort of thing. In the beginning, I really knew every patient enrolled in the trials.

**If the Trials Are a High Point of Your Career, Have There Been Any Low Points?**

I had one really low point—there were some papers published from my laboratory with incorrect figures, and it led to a number of allegations against me and it was really a mess. Truly this was the worst time in my life.

I knew the data were true, but it was still a nightmare, because you worry whether there has been a mix up or a mistake—even the best people can make mistakes. So we spent one whole year preparing data and controls. It was very stressful. But fortunately, everything was fine and now everything is sorted out and back to normal and the whole incident is best forgotten.

**Indeed. What About Smaller Setbacks? How Do You Overcome Those?**

Occasionally, there are these momentary setbacks, but they do not last for long because I always find new aspects or solutions. I may be worried for 1 or 2 days, but I am not usually a person who is then worried forever. Troubleshooting is not something that would dampen my overall enthusiasm for long. I just sit down and say, ok, now let us find a solution, and in a short time I find a way out of it, or I change direction or something like this.

**Do You Enjoy Troubleshooting?**

Well, of course, I prefer it when everything is working, but if there is a problem and I can find a solution, then this is very rewarding for me as well.

I was always like this, even as a student very early on. I would never do an experiment 10 times, if I see that it has gone wrong after 2 tries. I would think about what I had changed or try something else.

**How Hard Do You Work?**

I work very hard if there is a need to. Also, if things are moving, then I do not feel that working hard is difficult. What I hate is if things are not moving and you are working hard. It is not that at 6:00 PM I think, ok, I have to go home. If at 6:00 PM I have to do things that are not working then I feel bad, but if I have things that are running well, then I have no problem working until 9 or 10 in the evening.

Working hard is important, but also you need to have some breaks because otherwise in the long term you are exhausted and you lack creativity.

**What Do You Do to Take a Break?**

I really love everything outdoors, so I love all types of sports starting from running to biking to swimming to whatever, and usually we take one week’s ski vacation each winter. I really like to be outdoors—growing things in the garden. I also like cooking. And I like watching soccer, which takes me away from science entirely.

**Do You Have Any Advice for Young Scientists?**

I tend to advise people that they should think very carefully about what they like doing because I strongly believe that if you like what you are doing you automatically are better and can work harder. You are more productive. Of course, you also need a talent and you need to know what your talents are. This is, maybe, the most important point. Be honest in what you can do. I think if people choose a job that they are not really good at, it must be very frustrating.

Also, a good environment is key. Having people around who can inspire you and who really support you and give you advice—this is very important.

**What Are You Currently Excited About in the Laboratory?**

I am currently interested in microRNAs. I thought it was just a fantastic exciting scientific discovery that deserved to be explored.
in the cardiovascular setting. It offers so many opportunities both for working on microRNAs as biomarkers disease as well as therapeutic targets. One of the great things is that you can easily buy microRNA inhibitors, meaning you can move quickly into translational medicine questions. I personally believe that this is really a very good opportunity for finding drugs in the future for cardiovascular diseases. Of course, there are a lot of different microRNAs involved in cardiovascular biology; and determining which will be the best for devising treatments, only time will tell.

We are also now working on noncoding RNAs in general. Ninety-seven percent of the human genome does not encode proteins; however, much of it is transcribed. The functions of many of these noncoding RNAs are unclear. They may control epigenetic mechanisms or work as signaling hubs—some of them are cytoplasmic. It is early days, but it is something that captures my attention. And this is something that I love—new areas that are unexplored. That is very fun to work on.

Disclosures

None.

References


Stefanie Dimmeler: Passionate, Persistent, and Highly Productive
Ruth Williams

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