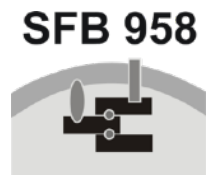


Die (molekularen) Maschinen der Forschung (The (molecular) machines of research)



Prof. Dr. Oliver Daumke // MDC Berlin-Buch

Research: 3D structure analysis of proteins

Many people think that we natural scientists just stand in the laboratory all day!
But is that really the case?

My name is Oliver Daumke. I am a group leader at the Max Delbrück Center for Molecular Medicine and a professor of biochemistry at Freie Universität Berlin. I also lead a project in Collaborative Research Center 958.

The topic of my research group is structural biology.

We determine the 3-dimensional structure of proteins, i.e. their exact folding in space.

This allows us to understand their function.

We are particularly interested in so-called molecular machines. These are proteins that perform mechanical movements using energy. Just like real machines, our molecular machines are made up of different individual parts, that each perform specific tasks.

One such molecular machine is dynamin, a protein that plays an important role in the transmission of information between neurons.

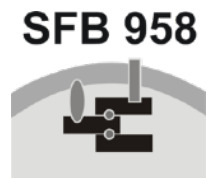
At the contact points between neurons, the synapses, messenger substances are released from small sacs called vesicles. These vesicles are subsequently recycled. To do this, they must be separated from the membrane and can then be refilled with the messenger substance.

And this is where the molecular machine "dynamin" comes into play. Dynamin arranges itself in many copies around the neck of the vesicle, like a molecular loop. It then uses a cellular fuel molecule to contract around the neck of the vesicle until it is severed.

Discovering something completely new myself and gaining new insights through my own experiments, i.e. finding out something that no one has really ever seen before, is what my heart really beats for.

Planning an experiment, preparing everything in detail, carrying out the experiment and then analyzing and discussing the results in detail is something I can spend days, weeks and months doing without getting bored.

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As the leader of a working group, I am actually rarely in the lab anymore. It's much more organizational activities that make up the day-to-day work.

One of the most important tasks is supervising group members, on a professional and social level. You have to bring the right people together in a team, because only then can you produce really good research.

And what also makes for good research are good publications. With interrelated experiments, we want to answer a specific structural biology question in detail. But before such a paper can be published, it is reviewed by other researchers. And they usually find a fly in the ointment and ask for revisions and sometimes even new experiments.

Often, articles are rejected immediately.

Writing project proposals enables us to finance and thus implement our research ideas. The first requirement for approval is a good research question that is particularly relevant for future development in our field.

But the success of past research also plays an important role. In principle, each individual project is a puzzle piece of a much larger research field.

We get a lot of public money for our research. Most of the funding is provided by the state through tax money. And we owe it to the public that we also report what exactly we do with these funds, thereby creating transparency.

Workday: Teaching

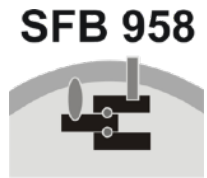
As a hardcore scientist, I would naturally like to attract new hardcore scientists. Here at the Max Delbrück Center, I am not in as close contact with the students as I might be at a university. But I also give various seminars in which I not only talk about our own research, but also impart the basics of biochemistry and structural biology.

Text transcript to video:

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Sometimes we also bring students here to the lab to explain and feature our work. In fact, some of them have already started studying biology or biochemistry.

So, as a research group leader, you rarely stand in the lab, because you design and organize the projects, supervise your collaborators and take care of keeping the research going.

A good organization of the research environment is a prerequisite for us to develop creative ideas. And if we carefully interpret and analyze our data, we come up with new ideas and experiments.

And for me, that's exactly what everyday research is all about.

Project website: bcp.fu-berlin.de/nos

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