

## **Christiane Fuchs**

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### **Desmin gives your heart a better beat**

The first organ to develop in an embryo is the heart as the driving machinery of life. Nowadays the society has to cope with a major problem in health - the number one cause of death - heart failure and heart diseases.

The group of Georg Weitzer at the Max F. Perutz Laboratories researches at the basis of heart development using mouse embryonic stem cells and so called embryoid bodies, which can be seen as an in vitro model mimicking embryonic development.

Their major focus is on the intermediate filament protein desmin, which can be described as a long chain of proteins, such as those found in hair and muscle. It is represented in smooth, cardiac and skeletal muscle. Many functions have been classified for the protein desmin, such as mechanical and structural roles as filament forming unit itself; but some hypothesis propose that desmin might even has some regulatory roles, like the ability to bind to DNA and to affect cell signalling, meaning communication.

“Our group has supportive evidence that desmin is not just a structural element of the cell, it is as well part of direct and indirect activation of genes” says Christiane Fuchs, currently diploma student in Weitzer’s group.

More and better beating heart cells are produced when the mouse embryonic stem cells used are producing more desmin as in normal cells. Important cardiac genes like nkx2.5, brachyuri, nodal and sparc, which promote heart differentiation, are upregulated in cells with a higher level of the desmin protein.

The scientist’s conclusion is that desmin plays a key role in heart development and understanding the basis of desmin’s role is possibly leading to efficient stem cell therapy to cure heart failures or increases quality of life after heart attacks.

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Topic: TGF $\beta$ -signalling during early cardiomyogenesis

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