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FIRST PERSON

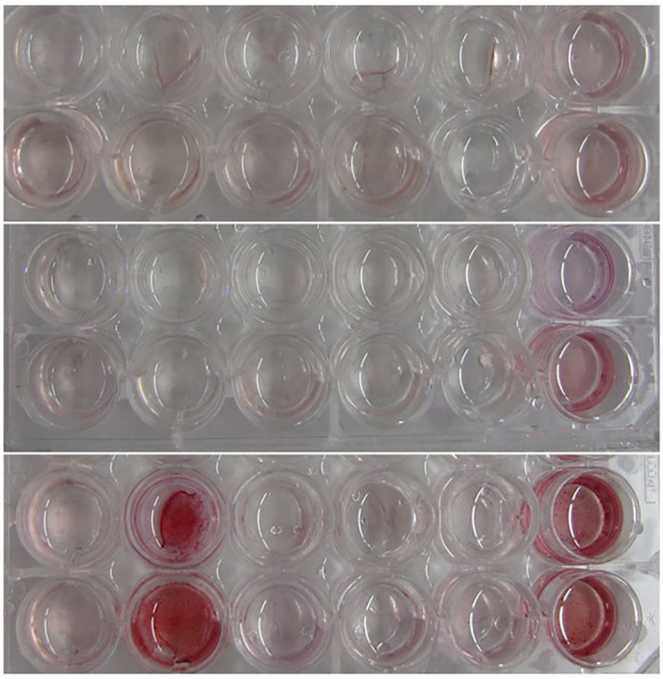
First person – Tanja Mang

First Person is a series of interviews with the first authors of a selection of papers published in Journal of Cell Science, helping early-career researchers promote themselves alongside their papers. Tanja Mang is first author on 'BMPR1A is necessary for chondrogenesis and osteogenesis, whereas BMPR1B prevents hypertrophic differentiation', published in JCS. Tanja conducted the research described in this article while a PhD student in Dr Anne Gigout's lab at Merck KGaA, Darmstadt, Germany, where she worked on the development of relevant preclinical cell culture models to provide systems for testing drugs and identifying specific biomarkers.

Tanja Mang

How would you explain the main findings of your paper in lay terms?

Within our body are proteins, like BMP2 or GDF5, that are important for the formation of cartilage and bone. These proteins mediate the formation of cartilage and bone by binding to receptors on the cell surface, and the most important such receptors known are BMPR1A and BMPR1B. However, the respective roles of BMPR1A and BMPR1B in the formation of cartilage and bone are still unclear, which is the reason why we tackled this question by using a completely new strategy. Instead of using genetic manipulation, we introduced minor changes within GDF5. By doing so, we generated various GDF5 variants that differentially activate the receptors BMPR1A and BMPR1B. This allowed us to study the role of these receptors in the formation of cartilage and bone. First, we discovered that the activation of BMPR1A is essential for both the formation of cartilage and bone. Second, we found that the activation of BMPR1B stabilizes cartilage cells. One of our modified GDF5 proteins strongly induces the formation of cartilage and also acts as a better cartilage stabilizer compared to the unmodified GDF5 protein, and could therefore become a promising therapeutic option for cartilage repair.



Time course of osteogenesis under different culture conditions. Calcium deposition is revealed by Alizarin Red staining.

Were there any specific challenges associated with this project? If so, how did you overcome them?

One of the challenges associated with this project was to establish the 3D culture and differentiation protocols for the multipotent mesenchymal precursor cells. In addition, there was a large number of compounds to be tested, and the differentiation culture – without pre-cultivation and analysis – was performed over four weeks. It was necessary to be organized and well structured, with very good time management.

When doing the research, did you have a particular result or 'eureka' moment that has stuck with you?

The moment when I realized that we had not only reached our goal of elucidating the respective roles of BMPR1A and BMPR1B, we had also moved one step further and showed that the R399E variant could be an 'improved' version of GDF5 for cartilage repair.

Why did you choose Journal of Cell Science for your paper?

We chose Journal of Cell Science as it is a cell biology journal known for publications of high scientific excellence and a broad scientific community.

What motivated you to pursue a career in science, and what have been the most interesting moments on the path that led you to where you are now?

I am a very curious person who loves to discover the 'new'. As a scientist, you experience surprises and new insights every single

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day, and that's why no day is like another. The most interesting moment was when I accepted that every result or observation, even a negative one, is an important contribution to science.

What's next for you?

From the beginning of my studies I had the aim to work in industry. That's why I did my research project followed by my bachelor's thesis at Merz Pharmaceuticals GmbH and my master's and PhD theses at Merck KGaA. In retrospect, this was absolutely the right decision for me. In the future, I would love to gain much more experience within the pharmaceutical industry and to face new challenges.

Tell us something interesting about yourself that wouldn't be on your CV

I love travelling and discovering new cultures and 'ways of life'.

Reference

Mang, T., Kleinschmidt-Doerr, K., Ploeger, F., Schoenemann, A., Lindemann, S. and Gigout, A. (2020). BMPR1A is necessary for chondrogenesis and osteogenesis, whereas BMPR1B prevents hypertrophic differentiation. *J. Cell. Sci.* **133**, jcs246934. doi:10.1242/jcs.246934