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Technology Offer

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Dual Inhibition of plexin-B1 and plexin-B2

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A novel molecular target of the semaphorin-plexin system to develop treatment options for cancer and for osteoporosis.

Background

The semaphorin-plexin system consists of several classes of semaphorin ligands and of several classes of plexin transmembrane receptors that all together mediate cell-cell interactions in many different tissues in mammals under physiological conditions [1]. Beyond that, the semaphorin-plexin system also plays an important role in several pathophysiological processes, such as cancer, inflammatory and immune diseases, bone diseases and microvascular diseases [1]. In this respect, the semaphorin-plexin system has already been extensively studied in order to identify potential molecular targets for therapeutic interventions.

Technology

Researchers of the Max Planck Institute for Heart and Lung Research and of the Philipps-Universität Marburg (University of Marburg), Prof. Stefan Offermanns and Prof. Thomas Worzfeld, propose the disruption of a specific combination of semaphorin-plexin interactions as a novel approach to develop treatment options for cancer and for osteoporosis. When working with a mouse model of colorectal tumorigenesis, Prof. Offermanns and Prof. Worzfeld were able to demonstrate that the inactivation of plexin-B1 and plexin-B2 in the intestinal epithelium causes a significant reduction of tumor formation. Importantly, their study shows that the simultaneous disruption of plexin-B1 and of plexin-B2 signaling aims to intervene exclusively with the function of the cancer stem cells, while the intestinal epithelium itself can compensate for this intervention under physiological conditions. Further, Prof. Offermanns and Prof. Worzfeld set out to better understand plexin-B1 and plexin-B2 signaling in the context of bone tissue formation, using a primary osteoblast cell culture model. From their experimental results they reasoned that the dual inhibition of plexin-B1 and plexin-B2 might promote bone formation – a highly desirable feature when it comes to developing novel treatment options for bone metabolism diseases like osteoporosis. To summarize, Prof. Offermanns and Prof. Worzfeld identified a novel molecular target of the semaphorin-plexin system, that is, the dual inhibition of plexin-B1 and plexin-B2. This new approach may have a therapeutic potential in the context of cancer and osteoporosis treatment.

We are now looking for either a licensing partner, or a collaboration partner to further develop this project.

Publication

[1] T. Worzfeld and S. Offermanns, Nature Reviews Drug Discovery (2014) 13:603-621

Patent Information

A priority establishing patent application has been filed in 2019.