Exosomes

Use of exosomes in prevention and therapy of acute inflammation associated diseases

Invention

Exosomes are nano-sized, secreted cell organelles that are released by a huge variety of different cell species, including mesenchymal stem cells (MSCs). Containing a combination of lipids and proteins as well as RNAs, exosomes participate in intercellular communication processes.Due to the wide range of molecules they enclose and their cell type specific assembly, these small membrane vesicles get more and more in the focus of diagnosis, drug delivery and clinical applications. Some preliminary pre-clinical and clinical applications of MSC-derived exosomes of scientists at the University Duisburg-Essen revealed very promising results (see below). However, coupled with the fact that beneficial effects of MSC administration are controversially discussed, it appears very likely that not all MSC-derived exosome fractions will exert beneficial effects. To select for MSC exosomes being able to efficiently suppress inflammation associated symptoms the scientists compared immune modulating activities of independent MSC-derived exosome preparations. Aiming to treat a 22-years female patient suffering from severe therapy-refractory cutaneous and intestinal Graft-versus-Host Disease (GvHD) grade IV with MSC-derived exosomes, the scientists administered exosomes which revealed the strongest immune-suppressive effects in vitro. The documentation of the impacts on the clinical symptoms and the immune response showed that the selected MSC exosome preparation helped to suppress GvHD symptoms in vivo. Since the in vivo administration appears to be safe, MSC exosome administration of selected preparations turned out to be a promising new treatment option in the prevention and therapy of diseases associated with acute inflammatory processes, such as GvHD, stroke, heart attack and neonatal damages of the brain and lungs.

Effect of MSC exosome therapy on skin GvHD

Commercial Opportunities

On behalf of the University of Duisburg-Essen, PROvendis offers access to rights for commercial use as well as the opportunity for further co-development.

Current Status

In case of interest, we are pleased to inform you about the current status of the patent.

Relevant Publications

Kordelas, L., et al. (2014) MSC-derived exosomes: a novel tool to treat therapy-refractory graft-versus-host disease. Leukemia 28(4): 970-3.

Ophelders, D.R., et al. (2016) Mesenchymal stromal cell-derived extracellular vesicles protect the fetal brain after hypoxia-ischemia. Stem Cells Transl. Med. 5(6): 754-63.

An invention of the University of Duisburg-Essen.

Competitive Advantages

- Selected MSC exosome preparations exert immune suppressive functions
- New treatment option in diseases associated with acute inflammatory processes
- Well tolerated

Technology Readiness Level

1 2 3 4 5 **6** 7 8

Technology demonstrated in relevant environment

Industries

- Pharmaceutical Industry

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