

Seminar series TRR 305 – Striking a moving target: From mechanisms of metastatic organ colonisation to novel systemic therapies



Wednesday, 25 January 2023
15.00 h

hybrid (on site in Regensburg)

seminar room H5 2.13
University Hospital Regensburg

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Generation and use of custom-made macrophages for (non)therapeutic applications

Immune cells are specialized cell types with a broad range of functions. As a consequence, harnessing the immune system to combat diseases is of great interest for both academia and industry. Enhancing the cellular immunity can be achieved either by modification of the host immune cells or by adoptive transfer of pre-designed immune cells directly into the patient. Various types of immune cells are currently investigated, paving the way for the use of different immune cells to discover novel drugs and validate their safety as well as to establish new cell-based immunotherapeutic applications. In our work, we concentrate on macrophages and the scalable generation of these cells from different stem cell sources incl. induced pluripotent stem cells (iPSCs). We established innovative differentiation platforms, which can be performed in small, intermediate and large scale. The generated macrophages share important hallmarks with macrophages derived from peripheral blood monocytes, introducing a highly standardized cell type which can now be generated in pure quality and high quantity. Using these systems, we are exploring various therapeutic avenues of macrophage-based immunotherapies, especially for lung-related diseases. The talk will highlight various aspects of macrophage cell manufacturing and will outline the broad application of macrophages in industry and in treating diseases.

Ackermann, M., Kempf, H., Hetzel, M., Hesse, C., Hashtchin, A. R., Brinkert, K., Schott, J. W., Haake, K., Kühnel, M. P., Glage, S., Figueiredo, C., Jonigk, D., Sewald, K., Schambach, A., Wronski, S., Moritz, T., Martin, U., Zweigerdt, R., Munder, A., & Lachmann, N. (2018). Bioreactor-based mass production of human iPSC-derived macrophages enables immunotherapies against bacterial airway infections. *Nature communications*, 9(1), 5088. <https://doi.org/10.1038/s41467-018-07570-7>

Happle, C., Lachmann, N., Ackermann, M., Mirenska, A., Göhring, G., Thomay, K., Mucci, A., Hetzel, M., Glomb, T., Suzuki, T., Chalk, C., Glage, S., Dittrich-Breiholz, O., Trapnell, B., Moritz, T., & Hansen, G. (2018). Pulmonary Transplantation of Human Induced Pluripotent Stem Cell-derived Macrophages Ameliorates Pulmonary Alveolar Proteinosis. *American journal of respiratory and critical care medicine*, 198(3), 350–360. <https://doi.org/10.1164/rccm.201708-1562OC>

Zoom-Meeting-Link

<https://uni-regensburg.zoom.us/j/67949795657?pwd=N1NiYXpqNmFGL25DYUpvNDRKOWM0dz09>

Meeting-ID: 679 4979 5657

Kenncode: 028782