DKMS Stiftung Leben Spenden

Project Summary

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CRISPR-based Modeling of Genetic Resistance to CAR-T Cell Therapy for Multiple Myeloma

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Chimeric Antigen Receptor (CAR) T cell treatment is an emerging form of cancer immunotherapy. This approach involves removing a patient's T cells from the blood, modifying them in a lab so they can recognize and attack cancer cells, and then infusing them back into the patient. CAR-T cell therapy was recently approved for the treatment of certain leukemias and lymphomas and research to expand the therapy's application to other cancers is ongoing.

Multiple Myeloma (MM) is a blood cancer that can be managed in many patients for years, but currently there is no cure. Recently, CAR-T cell therapy directed at the BCMA protein has shown encouraging disease responses, even in MM patients that have previously been treated with many different drugs. However, in the majority of MM patients their disease stops responding to BCMA-directed CAR-T cell therapy after a while. Currently, it is unknown what causes MM cells to become resistant to BCMA CAR-T cell treatment. Our group has developed a novel CAR-T cell therapy for MM that does not solely rely on targeting the BCMA protein but is able to find and destroy MM cells based on a second protein, TACI. This holds promise to lead to more durable disease responses in MM patients.

Using new CRISPR gene editing tools, we aim to model the development of disease resistance of MM cells to different types of CAR-T cell therapy. Understanding how MM evades current CAR-T cell treatments will enable us to design more potent next-generation cellular immunotherapies.