Explore the impact of immune health on cancer outcome

Master's Thesis (30 ECTS)

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Abstract

Immunosenescence refers to age-related changes that impact the immune system, increasing susceptibility to age-related diseases. T cells, which are key effector cells in the adaptive immune system, play a central role in the defense against pathogens. However, T cells undergo functional decline with age due to immunosenescence. This study includes eight T cell receptor (TCR) sequencing datasets from both healthy individuals and cancer patients to explore the dynamics of the TCR landscape. In both healthy individuals and cancer patients, the TCR-β landscape changed with age, showing a decrease in the proportion of non-expanded clones and an increase in expanded clones as age increased. Analyses of TCR-β diversity revealed sex differences in the diversity of individuals over 30 years of age. Cancer patients with low TCR-β diversity experienced worse survival outcome. Longitudinal analysis of melanoma patients showed changes in TCR-β diversity after immunotherapy treatment. Additionally, investigating the relationship between tumor stage and TCR-β diversity revealed a potential association, indicating that lower diversity correlates with more advanced tumor stages. The TCR-α landscape exhibited similar trends to those observed in the TCR-β landscape.

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