Table of Contents

Research Week 2024

Detecting and dissecting tissue resident memory T cells as an early melanoma biomarker

Rashi Yadav[1], Terri Clister[2], Khanh Doan[2], Wesley Yu[2], Rajan Kulkarni[2] and Joshua M. Moreau[1,2,3]

Keywords

Cancer Immunology, melanoma, tissue resident lymphocytes, early cancer biomarker, T cells, B cells

Abstract

Tissue-resident memory T cells (TRM) are enriched in nonlymphoid barrier organs where they typically reside long-term without recirculating. These cells are functionally highly specialized for their local environment and have been demonstrated to provide protective tissue immunosurveillance against infection and cancer. TRM exhibit a robust cytotoxic phenotype and have been found to play a vital role in promoting anti-tumor immunity across several cancer types. Tumor infiltrating TRM are also associated with favorable clinical outcomes. In contrast to the concept of strict tissue compartmentalization and retention, some recent evidence from both human and murine studies suggests TRM can re-enter the circulatory system as “ex-TRM.” Considering that ex-TRM appear to retain the phenotypic, functional and transcriptional signature (including TCR repertoire) of their parental population, we hypothesized that they can be leveraged as an early melanoma biomarker. Such a biomarker would be useful for early cancer detection as well as an analysis of the immunotherapeutic sensitivities of a given tumor. Using single cell RNA and TCR sequencing, we have profiled the immune landscape of stage 0-2 cutaneous melanomas and matching blood samples. Our data demonstrate the presence of TRM in these early tumors and points to the biomarker potential of these cells. In addition, our comprehensive transcriptomic analysis provides new insight into the evolution of the overall immune compartment in early primary melanomas.