FICAN science webinar series

Wednesday 10.4.2024 at 15-16

Unveiling the immune landscape of colorectal cancer through quantitative, spatially resolved techniques

This time the seminar is organized by FICAN North. The seminar will be held online (Microsoft Teams) and is open to everyone interested in cancer research.

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Chair: Jussi Koivunen, Director, FICAN North

Speaker

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Get to know the Speaker: https://www.oulu.fi/en/researchers/juha-vayrynen

Abstract

Recent advances in cancer immunology have led to new cancer therapies activating anti-tumor immune responses. Studies have revealed that high lymphocyte densities are associated with favorable outcome in colorectal cancer, and the Immunoscore (IS), which measures CD3+ and CD8+ T-cell densities, is an independent prognostic factor in colon cancer, surpassing the traditional TNM (tumor-node-metastasis) classification. However, the IS only considers cell densities and overlooks the spatial localization of immune and tumor cells.

The immune system can also aid tumor growth by supporting cell proliferation and angiogenesis and dampening anti-tumor immunity. Immature myeloid immune cells can be abnormally produced in cancer, leading to myeloid-derived suppressor cell (MDSC) accumulation. Besides MDSCs, mature myeloid cells like macrophages are prevalent in the tumor microenvironment and affect tumor progression. Their role is complex, with a range of pro- and anti-inflammatory states, needing multi-marker approaches for accurate assessment.

We have utilized supervised machine learning based image analysis combined with hematoxylin-eosin staining or multiplex immunohistochemistry to recognize various immune cell populations in the colorectal cancer microenvironment. We have utilized spatial analysis methods to characterize the spatial patterns of immune cell infiltrates. Our results have identified several prognostically favorable (such as T cells, M1-like macrophages, mature monocytic cells, eosinophils) and unfavorable (such as M2-like macrophages and immature monocytic cells) cell types and shown that spatial immune features also harbor prognostic relevance. Our findings pave the way for developing advanced tumor-immune biomarkers for precision medicine.

Relevant references for this talk:

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