# Automated Tumour-Stroma Interface Zone Detection for Anti-Tumour Response Assessment by Immunogradient Indicators

PURPOSE

The Immunogradient indicators are aimed at assessing tissue immune response properties in the context of tumour microenvironment and has a potential for prognostic/predictive biomarkers in cancer patients.

BRIEF DESCRIPTION OF THE TECHNOLOGY

The novel set of Immunogradient indicators are based on an automated grid analytics in digital immunohistochemistry images. The method first identifies the tumour edge, shown as yellow hexagons below, using a set of explicit rules applied to image analysis data of tissue classes and their areas. Then, by ranking the hexagons by the distance to the tumour edge the tumour-stroma interface zone (IZ) of any width can be extracted. Below, green hexagons represent the stroma aspect and red hexagons the tumour aspect of the IZ. The interface zone allows computing tumour-infiltrating lymphocyte density profiles across the tumour-stroma interface zone (IZ), see insert below. From the density profile, the Immunogradient indicators, which express lymphocyte "propagation toward-tumour gradient" can be calculated, and these were found to strongly predict overall survival of both hormone receptor positive breast cancer and colorectal cancer patients.
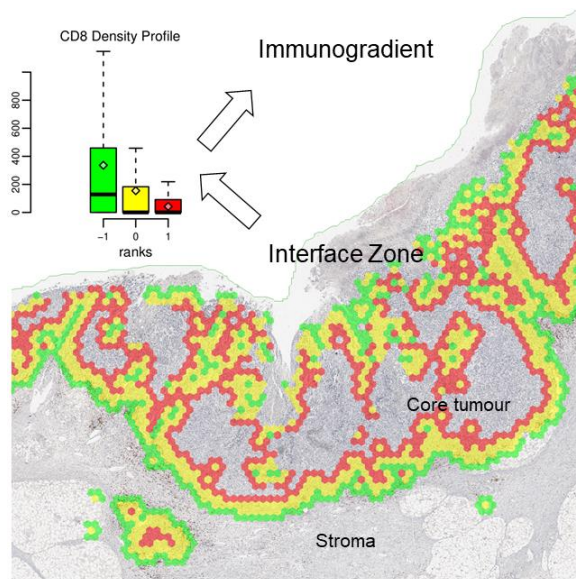
TECHNOLOGY READINESS LEVEL

Proof of concept that data-driven, automated, operator-independent IZ sampling enables spatial immune response measurement in the tumor-host interaction frontline for prediction of disease outcomes.

INTELLECTUAL PROPERTY

PCT patent application (pending); Lithuanian patent application (LT2019 509). Applicants: Vilnius University (Lithuania).

INVENTORS

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PUBLICATIONS

Rasmusson, A., Zilenaite, D., Nestarenkaite, A., Augulis, R., Laurinaviciene, A., Ostapenko, V., Poskus, T., Laurinavicius, A. "Immunogradient Indicators for Antitumor Response Assessment by Automated Tumor-Stroma Interface Zone Detection", The American Journal of Pathology, (2020); https://doi.org/10.1016/j.ajpath.2020.01.018.

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FIELDS OF APPLICATION

- medicine,
- biomedicine,
- immunology,
- pharmacy,
- clinical diagnostics (oncology).

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