Immune Cell Interactions in High-Grade Serous Ovarian Cancer Tumours

Background

High-grade serous ovarian cancer (HGSOC) has had persistently low survival rates [1], with less than 50% of advanced-stage patients surviving five years and only 15% reaching ten. Prior research focused on individual immune cells, so studying their interactions may offer new insights into patient outcomes.

Study Cohort

We examined 1078 subjects and 28 immune cells from 1995 tissue microarray cores (TMA) from the Canadian Ovarian Experimental Unified Resource (COEUR) cohort.

Methods

We evaluated immune cell interactions in the tumour microenvironment using:

- Poisson log-linear models [4] to evaluate immune cell triplet associations (presence/absence) at the TMA core level, with a 0.005 false discovery rate adjustment.
- Cross K function analysis [5] and simulation envelopes to examine spatial relationships of immune cell pairs within TMA cores.

Results

The findings are as follows:

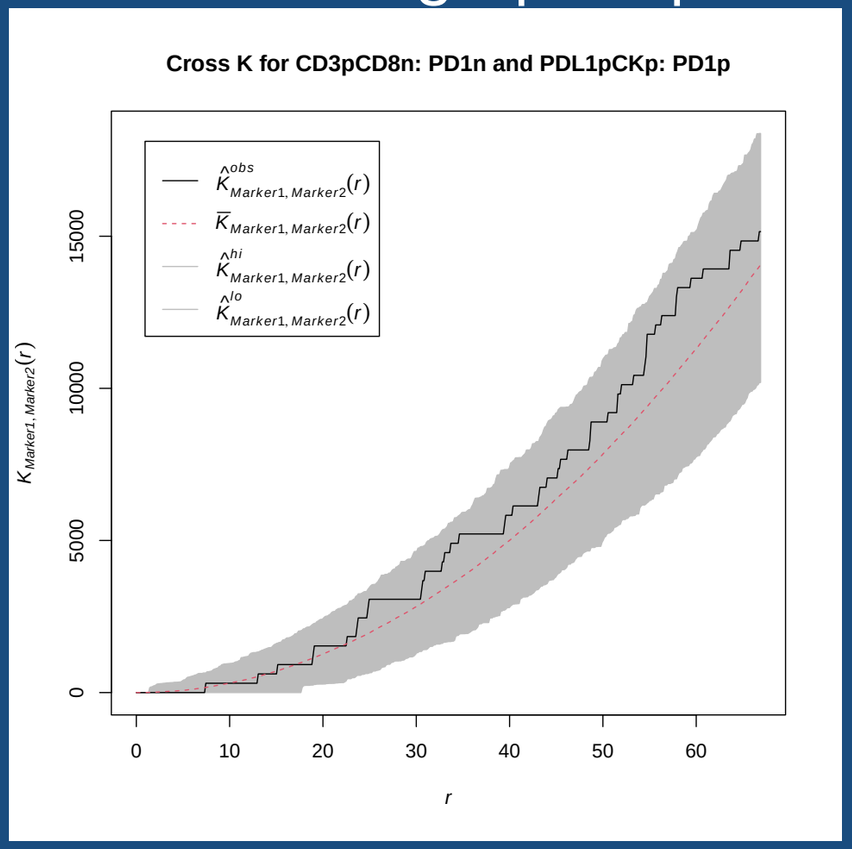
- Most immune cell pairs and triplets showed associations at the TMA core level (see Table 1 and Figure 1) indicating that the presence of one cell type on a core was associated with another.
- Preliminary spatial analysis suggests that some immune cells associated at the core level are not spatially associated.

	Interacting pairs	Non-interacting pairs
Set 1	284	67
Set 2	276	75

Table 1: Interacting and non-interacting immune cell pairs at the level of TMA cores (set 1 = first tumour sample, set 2 = second tumour sample).

Some immune cell associations in high-grade serous ovarian cancer tumours vanish when accounting for spatial distribution.

Ask me what this graph represents!



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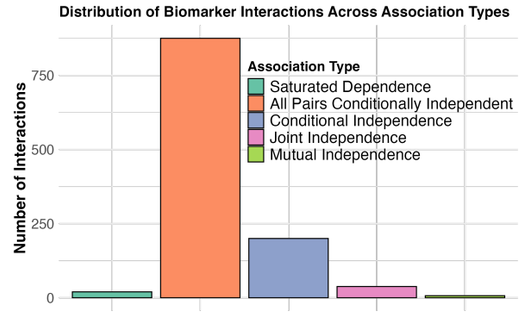

Figure 1: Distribution of interaction types across immune cell triplets at the level of TMA cores determined by estimated Poisson log-linear regression (ordered in decreasing strength of interaction).

Future Work

The following outlines the next steps for the research project:

1. Complete spatial analysis for all 351 immune cell pairs to identify potential interactions.
2. Conduct survival analysis to assess the impact of spatially associated immune cells to cancer survival. Investigate the effects of interactions between immune cells on survival.
3. Identify immune cell pairs with both spatial and synergistic survival effects.
4. Validate findings in an external cohort.

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