Immune patterns predict longer survival in pancreatic cancer

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Background and Rationale: Pancreatic cancer is among the deadliest cancers, and current treatments often have limited effectiveness. One reason is that these tumors typically contain very few immune cells, making it difficult for the body to mount an immune response. However, some regions within the tumor do have immune cells, and we wanted to understand whether these clusters influence patient survival.

Objectives: Our goal was to characterize the immune cells within pancreatic cancer tumors and examine how these cells are spatially organized, both in relation to the tumor and to each other.

Methods and Results: We analyzed tumors from 73 patients with pancreatic cancer. Using advanced imaging and computational analysis, we mapped the location of immune cells within the tumor and assessed how they clustered together. We found that patients lived longer when their tumors had more helper T cells (immune cells that activate other immune cells) near the tumor edge, where cancer meets surrounding tissue. These helper T cells often appeared alongside killer T cells (which can destroy cancer cells) and B cells (which support immune activation), forming organized clusters, or “immune neighborhoods.” Tumors with more of these neighborhoods were associated with better survival, whereas other immune cell arrangements did not show the same benefit.

Conclusions and Anticipated Impact: Our findings highlight that pancreatic tumors are not uniform. When specific immune cells gather and interact in organized patterns, patients tend to have better outcomes. Understanding these spatial patterns could help clinicians predict prognosis and potentially predict responses to therapies that enhance the immune system’s ability to fight cancer.