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Predictive Biomarker for Hepatocellular Carcinoma (HCC) Recurrence

Stanford researchers have developed a predictive biomarker for hepatocellular carcinoma (HCC) recurrence post-treatment that provides key spatial distribution information about cell interaction.

Hepatocellular carcinoma is the most common form of liver cancer and has poor five-year survival rates of below 20%. Early-stage HCC patients often undergo surgery to remove damaged livers as a means of disease intervention. However, the effectiveness of surgery is often counteracted by high recurrence rates, which can range from 50-70%. To reduce high recurrence, adjuvant therapies can be used in the clinic, yet these therapies cause severe adverse events in more than a third of the patients.

One of the primary challenges of combating early recurrence is identifying reliable biomarkers to help predict patients who are most likely to experience HCC recurrence after treatments like surgery or chemoembolization. Prior biomarkers for HCC, such as gene signatures or protein expression, are limited in their ability to provide information about the spatial distribution of cells or how cancer and immune cells interact with each other.

To address this gap Stanford researchers developed a novel spatial signature/ biomarker capable of identifying patients at high risk of recurrence with high accuracy. This predictive capability could enhance patient outcomes by making more informed selection of patients for risky adjuvant therapies, as well as enabling more tailored post-operative treatment plans. The technology is also designed to work with standard histology samples, making it easily integrable into current clinical and commercial workflows without the need for specialized equipment or processes.

Stage of research
In vivo data

Applications

- Predictive diagnostic tool for liver cancer
- Identifying patients who need adjuvant therapy
- Personalized medicine & patient management (aid more effective post-surgical treatment decisions)
- Monitoring and managing HCC recurrence

Advantages

- Incorporates complex spatial contexts of cellular interactions.
- More accurate prediction of disease progression.
- Easily integrable into current clinical workflows.

Publications

- Lemaitre, L., Adeniji, N., Suresh, A. et al. Spatial analysis reveals targetable macrophage-mediated mechanisms of immune evasion in hepatocellular carcinoma minimal residual disease. Nat Cancer (2024).

Patents

- Published Application: WO2026024813

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