Proteome analyses in colorectal carcinoma reveal major protein alterations upon cancer development and metastasis

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Facts & Figures
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Results
Multilevel Partial Least Square-Discriminant Analysis (PLS-DA)

Primary tumor vs. normal tissue

Metastatic tumor vs. normal tissue

Primary tumors vs. metastases

Challenge
Despite significant advances in standard of care therapy, the survival rate of colorectal carcinoma (CRC) remains relatively poor. CRC is a highly heterogeneous cancer where patients respond to the same drug in different ways. The OncoTrack IMI project has provided a basis to collect and extensively analyze tumor samples from over 100 CRC patients at different disease stages and having undergone different treatments. The purpose of the present substudy was to reveal fingerprints from high-throughput protein analyses during CRC development and metastasis, and to identify the most important proteins correlating with CRC biology and the heterogeneity between patients and also within a malignancy.

Approach & Methodology

Value of IMI collaboration
The OncoTrack project brought together leading academic, clinical and industrial scientist, allowing multidimensional molecular analyses of colorectal cancer patient samples, collected in a comprehensive database that also includes extensive clinical data with follow-up. This valuable resource provides a background for specific analyses, such as the PEA studies presented herein. We next aim to relate our protein data to DNA and RNA sequencing and other data accumulated in the OncoTrack project for a more comprehensive understanding of the disease.

Impact & take home message
By applying the highly sensitive and specific multiplex PEA technology, we compared alterations of protein profiles between primary and metastatic tumor tissues as well as their corresponding surrounding normal tissues, and identified the most significantly changed proteins. These findings increase the understanding of CRC biology and pave the way to identify promising diagnostic and prognostic protein markers for CRC.

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