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EXPTEL: A Novel Non-Destructive Method for Mining Soluble Tumor Biomarkers

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Introduction: Secreted cancer proteins are important modulators of tumor growth and progression. This protein group has always been considered a major source of potential biomarkers. Unfortunately identification of novel and clinically useful secreted tumor-specific proteins is difficult since their concentration in serum or urine is very low. Alternatively to this, mining tissue proximal fluid has emerged as a powerful approach to identify potential candidate biomarkers. However, current methods rely on ex vivo culture that takes considerable time and exposes tissue biopsies to uncontrolled degradation through endogenous proteases.

Aim: Aim of the project is the discovery of new soluble biomarkers for early detection, diagnosis or prognosis of human cancer disease.

Methods: In the present work we have developed a novel and efficient method for the collection and analysis of tumor secretome. The approach, which we termed Expel, extracts soluble tumor biomarkers within few minutes and without altering the tissue morphology. For this purpose a small tissue biopsy is incubated in a slightly hypertonic extraction buffer while subjected to alternating pressure. Upon extraction the tissue is fixed in formalin and can be used for histological analysis. The soluble extract is further prepared for proteomic analysis using bottom-up mass spectrometry approach.

Results: In a proof of concept study we have extracted and analysed soluble biomarkers from human colorectal carcinoma liver metastases as well as primary colorectal tumors. In an extensive tissue validation study we confirm that Expel procedure does not alter tissue morphology or subsequent molecular pathology tests. The comparison of proteins identified in tumor lesions with those found in adjacent normal tissues revealed a group of differentially expressed soluble proteins. Their potential usefulness as diagnostic or predictive markers is currently being explored

Conclusions: The Expel protocol provides clinicians with a new tool enabling them to non-destructively discover new biomarkers and preserve precious tissues (like colon polyps) for pathology evaluation

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Metabolomic, Proteomic and Preclinical Imaging of Patient Derived Tumor Xenografts for Improving Treatment of Liver Metastases Patients

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