# "Polyp-Print": A Methodology To Identify Which Colon Polyps Are Likely To Proceed To Colorectal Cancers

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## Technology description

Researchers at UC San Diego have developed a method whereby they can determine the microbe-associated gene signature which accurately predicts which polyps are at the greatest risk for progression to cancer. Using the combined synergy of patient-derived tissues and mouse and human organoid-based model systems they showed that inhibition of the tumor-suppressive SPS-pathway may serve as one of the protective host responses that are compromised early during the initiation of microbe-associated and/or inflammation-driven cancers. Such inhibition is invariably associated with signature gene expression changes that coordinate diverse cellular programs, all of which are known to facilitate neoplastic initiation and/or progression. Because this unique gene signature that is indicative of polyp-progression was validated in an independent cohort and experimentally recapitulated in the EDM-Fn co-culture model, the researchers conclude that this is a distinct microbe-associated colon cancer signature (MACS).

The inventors have demonstrated that the degree of activation of the SPS-pathway can be monitored byImmunocytochemistry (IHC) approaches using a custom antibody to a unique phosphorylated biomarker. The abundance of expression of this biomarker can serve as a reliable marker of the SPS-pathway and a surrogate measure of the integrity of the gut barrier; its presence indicates integrity and its absence indicates leakiness.

Colorectal cancer (CRC) is thesecond leading cause of cancer deaths in men and women combined in the United States,according to the American Cancer Society.Every day, patients undergo routine screening colonoscopies around the world for assessment of their risk of CRC. CRCs always arise from precursor lesions, called polyps. Since most patients with polyps are asymptomatic, tracking these lesions through fecal occult blood, rectosigmoidoscopy and colonoscopy enables the suspicion, detection and removal of the lesion. Since 2000, colonoscopy has become the most important examination to track polyps and CRC. Nowadays, in the USA, one out of four colonoscopies aim to track polyps. Besides detecting polyps, their removal through endoscopic polypectomy has proved to be effective to reduce the incidence of this tumor. Anatomopathological analysis enables the histological classification of adenomas, and also allows checking for dysplasia or neoplasm, as well as vascular and/or lymphatic invasion. This assessment determines if polypectomy and/or mucosectomy were effective to heal the patient who presented with polyp or CRC, or if therapeutics will be necessary. Typically, screening colonoscopies begin at age 50, and are done every 10 years. If polyps are

encountered, based on their size and number and location, the risk is determined to be high vs low (completely arbitrarily, with no molecular basis at all). Bottomline, right now, there is no way to tell which polyp will become a cancer and which will not. Hence, some patients may be receiving over Rx and some may be under Rx. Clearly, what is needed is an invention that can predict the timing and consequences of multiple host events during CRC initiation and progression.

## Application area

Development of an IHC panel kit for widespread use in clinics across the world—to fulfil a major unmet need in clinical Gastroenterology. Screening for colon cancer and CRC risk determination in polyps by IHC will be the major use.

## Advantages

This represents a new approach and development of a signature for CRC initiation and progression.

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