OFFICE OF COMMERCIALISATION AND INNOVATION

MACQUARIE University

Biomarkers for early stage detection of colorectal cancer

EXISTING PROBLEM

Colorectal cancer (CRC) is the third most diagnosed cancer in the world. Despite vast research carried out regarding screening procedures and surgical resection, blood-based screening of early stage CRC (where surgery is curative) remains a challenge. So-called tumour mutant DNA “liquid biopsy” tests have not yet delivered and although faecal occult blood haemoglobin tests are available, these have a low patient compliance and poor sensitivity/specificity. A preferred procedure for new CRC prognostics and diagnostics is through blood-based multiplexed protein biomarker assays. The biggest limitation to detecting the low abundance cancer biomarker proteins in plasma that play a critical role in assessing disease risk, response to treatments and indicate disease progression are that they are masked by very high abundance proteins also present in plasma. Our patented ultradepletion method (API) with commercial kits has now been carried out to deplete ~200 plasma proteins that mask proteins that lower in abundance and indicate better the presence of an early stage tumour. We have exploited this technology with SWATH mass spectrometry to identify new early stage markers of CRC that could be used for early detection of CRC prior to confirmatory colonoscopy and potentially curative surgery.

SOLUTION

Following ultraimmunodepletion, “pools” of blood samples from 20 patients with different stages of CRC (stages I-IV) or their respective controls were quantified using SWATH mass spectrometry using a strict statistical approach. We have (for the first time) identified six differentially-expressed lower abundance proteins (F2, HGFAC, PON1, CST3, ADAMDEC1 and CFD) that are markers of early stage CRC.

PUBLICATION


APPLICATIONS

✓ Demonstrates efficiency of abundant protein ultradepletion followed by SWATH MS for biomarker discovery.
✓ Quantitative approach identified 6 novel markers for early stage screening of CRC.

ADVANTAGE

Revealed a novel protein biomarker panel

BENEFIT

Early stage CRC screening prior to colonoscopy

INVENTORS

Professor Mark S Baker (Past HUPO President)
Dr Sadia Mahboob

INTELLECTUAL PROPERTY

Australian Patent Application: ‘Screening Methods’

LIKE TO KNOW MORE?

Anna Grocholsky +61(0) 437 463 317
anna.grocholsky@mq.edu.au