A novel diagnostic for human carcinomas as the first step towards treatment

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Technology description

Unlike most mammals, humans cannot synthesise the sialic acid N glycolylneuraminic acid (NeuGc). Nevertheless, NeuGc is understood to be preferentially taken up by human cancerous cells and subsequently secreted into the blood. Hence, NeuGc represents a specific biomarker for detection of a range of human cancers.Currently available reagents cannot readily distinguish between NeuGc and other sialic acids commonly found in the human body, resulting in poor specificity and sensitivity.
A highly specific NeuGc-binding ligand will enable early blood based diagnosis of a broad range of tumours including, but not limited to breast, prostate, ovarian, colon and lung.
We have discovered that mutated forms of the (non-toxic) binding subunit of a novel bacterial toxin (SubB) demonstrate unprecedented binding specificity and affinity for NeuGc, without binding to "normal" human sialic acid forms (such as NeuAc).
The research team has developed a large amount of surface plasmon resonance data for 2 mutant variants of the SubB protein, demonstrating either improved specificity and/or sensitivity in binding to the tumour antigen NeuGc over NeuAc.
Data have also been developed using an ELISA based assay using SubB to detect the presence of NeuGc in human serum. We have demonstrated clear dose dependent detection of NeuGc in serum, with sensitivity down to a concentration of 2 nM.

Application area

The technology may be used to develop a reagent for use in pathology testing to identify cancerous cells, or ultimately as a broad serum based diagnostic tool for the early identification of cancers.

Institution

The University of Adelaide

Inventors

Michael Jennings
James Paton

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com