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Abstract: 86O

Using Tethered Bilayer Lipid Membranes to test Phospholipase A2 Activity as a Biomarker for IBD Flare Events

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Inflammatory bowel disease (IBD), is a chronic disease that mainly affects wealthier and rapidly urbanising countries (Ng et al., 2017). Patients suffering from IBD have periods of chronic disease-related inflammation during their lives, referred to as “flare events” and currently there is no cure. With over three and a half million cases of IBD within Europe and Northern America, and associated medical costs in the US exceeding $17 billion in 2015, IBD is of significant global prevalence (Peery et al., 2019). Faecal calprotectin is recognised as the gold standard for IBD proteomic biomarker detection. The presence of calprotectin in stool samples is typically ascertained using ELISA, with the test offering significant specificity (Khaki-Khatibi et al., 2020). Its elevation within IBD indicates the aggregation of neutrophils to intestinal linings, resulting in an elevation of inflammatory levels (Pathirana et al., 2018). However, studies have determined the presence of phospholipase A_2 (PLA2) enzymes in cases of inflammatory diseases (Murakami et al., 2020) and that this could also be a biomarker for flare events in IBD patients, this knowledge could unlock a plethora of potential biomarker studies and technologies that could greatly reduce the chronicity of IBD. Our goal is to ascertain the effectiveness of a membrane-based phospholipase biomarker test for PLA2 from faecal samples from individual IBD patients over time. Tethered bilayer lipid membranes (tBLMs) are self-assembling artificial cell membranes created by anchoring a lipid bilayer to a gold electrode substrate. Using alternating current (AC) electrical impedance spectroscopy (EIS), the integrity of the tBLM can be determined in response to enzymes such as PLA2(Garcia et al., 2020). Here we present the results of using a tBLM PLA2 sensor in a longitudinal study as part of the 2019/ETH11443: *Defining the Australian Inflammatory Bowel Disease Microbiome – The AIM Study*.

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