

## Development of a Diagnostic Device to Predict Clinically Significant Inflammation Associated with Cardiac Surgery

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**Abstract :** Cardiopulmonary bypass is known to cause inflammatory response during open heart surgery. It includes the initiation of different cascades such as coagulation, complement system and cytokines. Although the immune system is body's key defense mechanism against external assault, when overexpressed, it can be injurious to the patient, particularly in a cohort of patients in which there is a heightened and uncontrolled response. The inflammatory response develops in these patients to an exaggerated level resulting in an autoimmune injury and may lead to poor postoperative outcomes (systemic inflammatory response syndrome and multi-organs failure). Previous studies by this group have suggested a correlation between the level of IL6 measured in patient's blood before surgery and after polymeric activation and the observed inflammatory response during surgery. Based upon these findings, the present work is aimed at using this response to develop a test which can be used prior to the open heart surgery to identify the high-risk patients before their operation. The work will be accomplished via three main clinical phases including some pilot in-vitro studies, device development and clinical investigation. Current findings from studies using animal blood, employing DEHP and DEHP plasticized PVC materials as the activator, support the earlier results in patient samples. Having established this relationship, ongoing work will focus on developing an activated lateral flow strip technology as a screening device for heightened inflammatory propensity.

**Keywords :** cardiopulmonary bypass, cytokines, inflammatory response, overexpression

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