Antibody Microarrays: A new tool for testing leukocytes for inflammation

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Currently, no blood-based test can rapidly and objectively distinguish between stable angina pectoris (SAP - chest pain when increased myocardial oxygen demand is not satisfied by an appropriate coronary blood flow), and unstable angina pectoris (UAP - where inadequate coronary flow produces pain at rest). In the search for appropriate identifying biomarkers, most methods have focused on serum-based tests. However, since leukocytes play an active role in the progression of coronary artery disease, we hypothesize that these cells can provide novel markers of SAP and UAP and may indeed be able to distinguish between them. Here we use antibody microarrays containing 82 cluster of differentiation (CD) antibodies (plus isotype controls) that selectively immobilize specific types of leukocytes from a suspension of applied peripheral blood mononuclear cells. This differential capture depends on the expression patterns of CD antigens expressed on their surface membranes. We find that the pattern of immobilization of leukocytes from both SAP and UAP patients with coronary artery disease (CAD) significantly differs from age- and gender-matched healthy subjects (Australian Red Cross Blood Service blood donors). Within the CAD group, 15 SAP patients exhibited significant ($p < 0.05$) changes in the intensity of 10 of the 82 CD antibody spots in the array compared to 19 healthy blood donors. In the UAP group, the intensity of these 10 changes increased and an additional eight CD antigens differed significantly ($p < 0.05$) between the blood donors and UAP patients. These preliminary data suggest that it is now appropriate to engage a larger clinical trial to test the hypothesis that these antibody arrays can be used to diagnose CAD and can monitor the progression from SAP to UAP.