Catching a killer red-handed: Using proteomics to identify risk markers for sudden cardiac death in blood

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The killer: What is sudden cardiac death?
- Sudden cardiac death (SCD) refers to death from a cardiac event within 60 minutes of the onset of symptoms
- SCD is linked to arrhythmias, abnormal heart rhythms which if sustained can stop the heart from pumping effectively
- Those at high risk can receive an implantable cardioverter defibrillator (ICD), which senses arrhythmias and shocks the heart back into a healthy rhythm
- Current risk markers for SCD misattribute risk; only 31% of patients receiving ICDs experience arrhythmias that require their use

Finding the suspects: Using proteomic methods to find biomarker candidates
- Plasma, the liquid component of blood, is a rich source of protein biomarkers
- Huge variations in the concentrations of proteins in plasma (by up to 10,000,000,000 times), mean potential biomarkers are hidden by the usual suspects: highly abundant proteins
- A novel two-pronged method was used, which isolates two distinct subsets of plasma proteins for analysis
- Samples from patients with ICDs were sorted into two groups: those whose ICDs had been activated and those whose had not been activated
- The two samples from each patient were analysed using Liquid Chromatography Mass Spectrometry (LC-MS) to identify and quantify proteins

Interrogating the suspects: Verifying the biomarker candidates
- Protective biomarker candidates were identified based on their functions and through statistical analysis of the data
- A novel highly sensitive and specific targeted MS method is being developed to detect and quantify the candidates with high accuracy
- These results will confirm whether these candidate biomarkers can be more confidently linked to arrhythmias and ICD activation

Continuing the investigation: further work
- The targeted MS method could be used with more patient samples to further confirm links between these markers and risk of SCD
- If confirmed, these markers could be used to develop a routine blood test to act as an indicator of risk for SCD

References