Improved Detection of Cardiac Troponin I with Reduced Antibodies

Lin, Matthew

Chang, Chia Chi

Cardiac Troponin I (cTnI) has been the ideal biomarker for myocardial infarction diagnosis in the past decade. In our experiment, we presented a new method for increasing the sensitivity of a specific cTnI antibody, coated on a 7 x 1.5cm cellulose filter paper for cTnI detection. Pepsin resin was used to reduce the antibody to F(ab')2 fragments to achieve higher sensitivity and better immobilization of the antibody. The reduced antibodies were then coated and dried on the cellulose filter at room temperature (ranging from 20-25 degrees Celsius) in a sealed plastic bag containing 2 grams of silica. The antibodies that were immobilized on the cellulose filter paper showed a higher sensitivity in comparison to that of the whole antibody. Results that were recorded over the course of four days for the sensitivity and specificity of the dried, reduced antibodies were relatively consistent. This shows that the paper biosensors can be kept up to four days at room temperature without interferences. However, our data also shows that there was a steep drop in sensitivity after the fourth day of data collection, which could perhaps be due to lack of moisture absorbed by the grains of silica. Our method of immobilizing reduced cTnI antibodies to the cellulose filter paper to increase sensitivity and immobilization of the antibodies proves to be a promising and cost-effective method for the diagnosis of myocardial infarction. We hope to be able to increase shelf life with our on-going research.

Awards Won: