Identification and characterization of high affinity peptides for the recognition of the myocardial injury biomarkers troponin I

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Several clinical biomarkers are commonly used for the early detection of heart disease including CK-MB, myoglobin and others. But troponin I has rapidly become the biomarker of choice due to its high specificity and selectivity for AMI. In this study, we have used polyvalent phage display to isolate unique linear peptide motifs which recognize both the human and rat homologs of troponin I. Enzyme-linked immunosorbent assays (ELISAs) were used to evaluate the binding interactions, and the two phage-displayed peptides exhibited some cross-reactivity, but they were both more specific for the troponin I homolog they were selected against. The binding affinities of the phage-displayed peptides were decreased by the presence of complex tissue culture media (MEM), and the addition of 10% calf serum further interfered with the binding of the target proteins. Kinetic indirect phage ELISAs revealed that both troponin I binding peptides were found to have nanomolar affinities for the troponin proteins while attached to the phage particles. These new peptides may have potential utility in the development of new clinical assays for cardiac injury as well as in monitoring of cardiac cells grown in culture.