Abstract

Sepsis is a worldwide health condition. It is caused by disproportionatly large immunity system response for patogene presence. Fast and accurate diagnosis of sepsis can make difference between life and death.

For clinical diagnosis of sepsis is used serum protein procalcitonin (PCT) as biomarker. Procalcitonin concentration level in patient bloodstream increases up to thousand times in short time period. Severity of sepsis can be determined by correlation with its concentration in bloodstream. To determine PCT level in patient bloodstream a broad variety of specialized instrument is used. All methods have same principle of measurement – PCT-antibody interaction. Procalcitonin level is then quantified by calibration curve method. During these measurements non-specific protein-antibody interactions can occur and distort the quantification of PCT level.

Mass spectrometry due to its properties comes into consideration as an alternative method, that can be used for PCT determination. Aim of this diploma thesis was *in situ* enrichment of PCT on surface modified affinity carriers with immobilized antibody against PCT. These carriers are compatible with matrix assisted laser desorption/ionization time of flight mass spectrometry. Mass spectrometry provides mass spectrum, where PCT and other signals representing non-specific interactions can be identified.

Affinity carriers were prepared by ambient ion soft landing method. The antibody was immobilized on glass, which was surface modified with thin layer of indium-tin oxide. Detection by MALDI-ToF MS was possible due to the *in situ* enrichment of PCT and application of precipitation protocol on the sample. The detection limit of recombinant PCT in serum sample was 7 ng/ml.

Key words: mass spectrometry, functionalized surfaces, MALDI, procalcitonin, quantification

[In Czech]