

## **ABSTRACT**

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**Title of dissertation thesis:** Development of bioanalytical methods for the determination of diagnostic markers and drugs using chromatographic techniques

The presented dissertation is focused on the development and validation of chromatographic method for the determination of glycopeptide antibiotic vancomycin, and L-arginine and its pathway related substances in biofluids. Furthermore, the potential of neopterin, kynurenine and tryptophan as biomarkers of immune response to surgical procedure and prediction of postoperative complications is investigated in connection with oncological diseases.

In the theoretical part trends in instrumentation, stationary phases and extraction techniques are described. The issues of separation and retention of polar compounds and biological matrix pretreatment before analysis are also discussed there. Next part deals with selected analytes and their application to the clinical purpose for which the chromatographic methods are developed. It also provides an overview of published methods for their determination using liquid chromatography. In the last part there is an overview of validation parameters applied in bioanalysis.

The experimental part is interested in the development, optimization and validation of UHPLC-MS/MS methods for application in subsequent clinical research. First, the determination of vancomycin in three matrices: serum, urine, and pleural/peritoneal effusion applicable to large sample series study is introduced. Second method is focused on the measurement of L-arginine and its pathway related substances (L-ornithine, L-citrulline, and agmatine) in exudates obtained from chronic wounds. It represents an interesting but very complicated biological matrix. The optimized method has been validated and introduced into the spectrum of the research laboratory methods. In the last section of the experimental part

two selected biomedical papers are discussed. Presented works dealing with the determination of biomarkers of the immune response (neopterin, kynurenine and tryptophan) in relation with oncological diseases. I was involved in these studies during my doctoral studies. An overview of other cooperation, publications, grant projects, posters and lectures are given at the last part of the dissertation.