

Abstract

Charles University, Faculty of Pharmacy in Hradec Králové

Department of Analytical Chemistry

Candidate: Mgr. Dorota Turoňová

Supervisor: Assoc.prof. RNDr. Lenka Kujovská Krčmová, Ph.D.

Title of doctoral thesis: Application of liquid chromatography in the analysis of biological material for clinical research

The dissertation focuses on the use of liquid chromatography for clinical research. It is divided into two main sections, Theoretical part and Commentary on selected published articles.

The theoretical part describes the application of high-performance liquid chromatography in practice. Key parameters for the development of LC methods and trends in current bioanalytical practice are discussed. Furthermore, the sample collection and preparation of different biological matrices is explained, including all the obstacles and pitfalls that need to be taken into account. Modern trends are also briefly mentioned. The chapter on sample preparation also includes a section on derivatization and its use in the analysis of platinum derivatives, which is related to the commentary on the published work.

The main part of the thesis deals with commentary on four published articles. The first presents a review article dealing with the use of microextraction in pipette tips in clinical and forensic toxicology. The advantages and disadvantages of each application are discussed with emphasis on its practicality and applicability. The second and most discussed is a paper dealing with the use of HPLC for the determination of platinum drugs in various types of biological matrices after derivatization with diethyldithiocarbamate and its suitability for use in routine practice. Attention is mainly paid to the occurrence of various matrix effects and thus affecting the robustness of the method. The aim was to develop a simple, inexpensive and demanding instrumentation-free approach for use in routine practice. The third and fourth commentaries focus on biomedical papers that address the potential of using markers of immune response activation to predict the response of the cancer-affected organism to immunotherapy treatment and disease progression, and to manage the treatment of COVID-19. These were developed in collaboration with other departments of the University Hospital Hradec Králové and the University Hospital Olomouc.

A list of publications and other outputs is also included at the end of the dissertation.