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Highly selective determination of drugs for inflammatory bowel disease treatment in clinical urine samples by capillary electrophoresis hyphenated with tandem mass spectrometry

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Azathioprine is the main thiopurine drug used in the treatment of immune based inflammations of gastrointestinal tract. For the purpose of therapy control and optimization, effective and reliable analytical methods for a rapid drug monitoring in biological fluids are essential. Here, we developed a separation method based on the capillary electrophoresis (CE), hyphenated with tandem mass spectrometry (MS/MS) for the simultaneous determination of azathioprine and its selected metabolites (6-thioguanine, 6-mercaptopurine, 6-methylmercaptopurine) as well as other co-medicated drugs (mesalazine, prednisone, and allopurinol). The optimized CE-MS/MS conditions provided a very efficient and stable system for the separation and sensitive detection of these drugs in human urine matrices. The developed method was successfully applied for the assay of the targeted drugs and their selected metabolites in urine samples collected from the patients suffering from inflammatory bowel disease (IBD) and receiving azathioprine therapy. The developed CE-MS/MS method, due to its reliability, short analysis time, producing of complex clinical profiles, and favorable performance parameters evaluated according to FDA guidelines for bioanalytical method validation, is proposed for routine clinical laboratories to optimize thiopurine therapy, estimate enzymatic activity, and to control patient compliance with medication and co-medication.

Biography

Peter Mikuš has completed his PhD from Comenius University. He is a Researcher, University Teacher, Professor in Pharmaceutical Chemistry (since 2017), Director of the Toxicological and Antidoping Center at the Faculty of Pharmacy, Comenius University in Bratislava (FPCU) and Head of the Department of Pharmaceutical Analysis and Nuclear Pharmacy (FPCU). His research team is focused on the development, validation and application of advanced hyphenated analytical methods, based on a combination of 2D-separation and spectral (UV-VIS, MS/MS) techniques, for pharmaceutical and biomedical research. He has published more than 80 papers in reputed CC journals with hundreds of citations.

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