

3rd International Conference on

MASS SPECTROMETRY

October 10-11, 2016 Kuala Lumpur, Malaysia

Time-course measurements of drug concentrations in hair and nails after single administrations of pharmaceutical products by LC/MS/MS

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In forensic drug testing, hair and nails are often used to prove chronic intake of drugs over several months. The aim of this study was to evaluate the effectiveness of drug testing using hair and nails and the feasibility of determining when drugs were ingested by measuring the time courses of drug concentrations in hair and toenails after single administrations of various drugs. Hair and toenails were collected at predetermined intervals up to 12 months after administrations of eight drugs to healthy subjects. Micropulverized extraction using a stainless steel bullet was used for simple homogenization of the matrices and effective drug extraction. The concentrations of the administered drugs and their main metabolites in hair segments and nails collected at every sampling time were measured using liquid chromatography/tandem mass spectrometry (LC/MS/MS). The time courses of drug concentrations were compared between hair and nails. Acidic compounds such as ibuprofen and its metabolites were not detected in both specimens. Neutral and weakly acidic compounds such as allyl isopropyl acetylurea and acetaminophen were detected in nails more frequently than in hair. For fexofenadine, a zwitterionic compound, and for most basic drugs, the maximum concentrations in hair segments tended to be higher than those in nails. The hair segments showing the maximum concentrations varied between drugs, samples, and subjects. Drug concentrations in hair segments are greatly depended on the selection of the hair. Careful interpretation of analytical results is required to predict the time of drug intake.

Biography

Kenji Kuwayama (PhD) is a Researcher of National Research Institute of Police Science, Japan. He did his Master's in Drug Analysis and Forensic Toxicology. He has published more than 25 papers in reputed journals.

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