

Electrochemical simulation of cocaine metabolism : a step toward predictive toxicology for drugs of abuse.

Autorzy

Przemysław Mielczarek

Hana Raoof

Jolanta H. Kotlińska

Piotr Stefanowicz

Zbigniew Szewczuk

Piotr Suder

Jerzy Silberring

Rok wydania

2014

Czasopismo

European Journal of Mass
Spectrometry

Numer woluminu

20

Strony

279-285

DOI

10.1255/ejms.1284

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

Knowledge of the metabolic pathways and biotransformation of the most popular drugs, such as cocaine, amphetamine, morphine and others, is crucial for the elucidation of their possible toxicity and mechanism of action in the human body. In vitro studies on metabolism are mainly based on the incubation of drugs with liver cell homogenate and utilizing living animals. These methods need to be followed by isolation and detection of metabolic products, which makes these techniques time-consuming and technically demanding. We show here that the oxidative metabolism that occurs in the liver cells and is mainly caused by cytochrome P450 can be successfully mimicked with the electrochemical system [EC] connected on-line with electrospray ionization mass spectrometry. Cocaine was chosen as a model drug for these studies and was analyzed with a previously described system under various conditions using the boron-doped diamond working electrode. The results were compared with the number of metabolites generated by a standard procedure based on the reaction with the rat liver microsomes. Two electrochemical products of cocaine oxidation were created, of which one was a natural metabolite of cocaine in the human body-norcocaine. The EC provides a promising platform for the screening of the addictive drug phase I metabolism. The metabolites can be directly analyzed by mass spectrometry or collected and separated by liquid chromatography. No liver cell homogenate or microsome is necessary to generate these metabolites, which simplifies separation of the mixtures and reduces time and costs of all experiments.

Słowa kluczowe

electrochemistry, cocaine, metabolism, norcocaine, mass spectrometry

Adres publiczny

<http://dx.doi.org/doi.org/10.1255/ejms.1284>

Strona internetowa wydawcy

<http://www.impublications.com/>

Plik został wygenerowany dnia 2026-10-09 17:21:00

Adres w repozytorium https://old.chem.uni.wroc.pl/pl/repozytorium/_9f3XV1.