### Chapter 1

# Plasma Cocaine Metabolite Levels and Liver CYP450 3A4 Isoenzyme Activity as Indicators of Cocaine Metabolism in Rats Treated With Salako Supplements

**Natwaine Sherune Gardner** *University of the West Indies, Jamaica* 

**Kedon J. S. Luke** University of the West Indies, Jamaica

**Andrew O. Wheatley** University of the West Indies, Jamaica

**Winston De La Haye** University of the West Indies, Jamaica

Perceval Steven Bahado-Singh University of Maryland Medical System, USA

**Lowell L. Dilworth** University of the West Indies, Jamaica

**Donovan A. McGrowder** University of the West Indies, Jamaica **Everard Barton** University of the West Indies, Jamaica

Lauriann E. Young-Martin University of the West Indies, Jamaica

Ajibeke Salako-Akande Getwele Natureceuticals, USA

Henry Lowe Environmental Health Foundation, Jamaica

Errol Morrison National Commission on Science and Technology, Jamaica

**Denise Eldermire-Shearer** University of the West Indies, Jamaica

Helen Asemota University of the West Indies, Jamaica

DOI: 10.4018/978-1-5225-5406-6.ch001

Copyright © 2019, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

#### ABSTRACT

The effects of Salako nutritional supplements on cocaine-dependent Sprague Dawley rats was investigated. Rats were made cocaine-dependent using conditioned place preference (CPP) where craving was analyzed regularly. Cocaine metabolite levels were determined from blood samples. CYP450 3A4 isoenzyme activities were obtained using liver homogenate. Statistical analysis was done using SPSS oneway ANOVA and Duncans multiple range test. Results show that when cocaine use was discontinued, the supplements reduced craving of cocaine significantly. Blood plasma results showed higher benzoylecgonine equilibrium possibly indicating that the supplements aided the removal of stored cocaine metabolites which may have contributed to better management of craving in the rats. CYP450 3A4 isoenzyme activity was further enhanced by the supplements and is indicative of increased cocaine metabolism. The results indicate that the Salako nutritional supplements reduce craving caused by chronic cocaine administration by increasing the liver CYP450 3A4 isoenzyme activity, resulting in better plasma clearance.

#### INTRODUCTION

Cocaine  $(C_{17}H_{21}NO_4)$ , classified as a stimulant, is described as being the most potent, powerfully addictive stimulant of natural origin. The leaves of the Coca plant *(Erythroxylum coca)* can be harvested several times a year. The alkaloid, cocaine, is extracted from the leaves of the Coca plant, which originates in South America, and to a lesser extent, in Africa, Indonesia and India (UNODC, 2010). Cocaine is one of the oldest known psychoactive substances. Coca use has been traced as far back as around 5000 B.C. wherein the leaves of the plant were continually chewed in the mouth. Pure cocaine was isolated in the 1880's (National Institute on Drug Abuse, 2008). In the early 1900s, pure cocaine was the main active ingredient in numerous pharmaceutical and recreational formulations due to their properties that enhanced general activity and decreased fatigue.

Illicit cocaine from South America is produced normally as relatively pure hydrochloride salt (ranging from 80 – 95 percent) for export to the United States. Illicit cocaine is distributed ranging from a white crystalline powder (cocaine hydrochloride), to that of an off-white chunky material ("crack" or "rock" cocaine) (Drug Enforcement Agency, 2005). Street cocaine is usually adulterated with various substances such as mannitol, lactose and glucose, talc and flour. Due to the heat

19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igiglobal.com/chapter/plasma-cocaine-metabolite-levels-andliver-cyp450-3a4-isoenzyme-activity-as-indicators-ofcocaine-metabolism-in-rats-treated-with-salakosupplements/217760

#### **Related Content**

#### Measuring and Analyzing Power Quality in Electric Traction Systems

Andrea Mariscotti (2012). International Journal of Measurement Technologies and Instrumentation Engineering (pp. 21-42).

www.irma-international.org/article/measuring-analyzing-power-quality-electric/80249

### Smart System to Detect a Lethargic Driver and Parking the Car to Avoid Accidents

Tanmay Rajesh Jagtap, Mehank Hemant Jadhav, Chinmay Deepak Phade, Tanmay Rajeev Bhambureand Nayana Prakash Mahajan (2021). *International Journal of Electronics, Communications, and Measurement Engineering (pp. 60-70).* www.irma-international.org/article/smart-system-to-detect-a-lethargic-driver-and-parking-the-car-to-avoid-accidents/281142

#### Open Source Survey Software

J. Baker (2007). Handbook of Research on Electronic Surveys and Measurements (pp. 273-275).

www.irma-international.org/chapter/open-source-survey-software/20241

### Measurements and Characterization of Photovoltaic Modules for Tolerance Verification

C. Calò, A. Lay-Ekuakille, P. Vergallo, C. Chiffi, A. Trotta, A. Fasanellaand A.M. Fasanella (2013). *Advanced Instrument Engineering: Measurement, Calibration, and Design (pp. 144-152).* 

www.irma-international.org/chapter/measurements-characterization-photovoltaic-modules-tolerance/78176

## A Predictive Mechanism Based on Newton Interpolation for Underwater Wireless Sensor Network

Manel Baba Ahmedand Sofiane Boukli Hacene (2022). *International Journal of Electronics, Communications, and Measurement Engineering (pp. 1-28).* www.irma-international.org/article/a-predictive-mechanism-based-on-newton-interpolation-forunderwater-wireless-sensor-network/296280