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Pharmacokinetics of mitragynine, a major analgesic alkaloid in kratom (Mitragyna speciosa): A systematic review

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Abstract

Background and objective: Kratom (Mitragyna speciosa) is a tropical tree found in southern Thailand and northern states of the Malay Peninsula. Kratom is commercially available and used as an alternative to treat opioid withdrawal. Mitragynine is the major indole alkaloid found in kratom leaves. This review aimed to summarize available pharmacokinetic information about mitragynine.

Methods: PubMed, Scopus, and Web of Science were systematically searched from their inceptions to June 2018. All types of pharmacokinetic studies of mitragynine were included for further systematic review.

Results: Seventeen articles were reviewed. Mitragynine is a lipophilic weak base passively transported across the intestinal wall and blood brain barrier. 85-95% is bound to plasma protein and extensively metabolized by phase I and particularly phase II enzymes. Actions on CYP enzymes are unlikely to impact drug metabolism at concentrations likely to exist in kratom-consuming humans. In rats and humans, mitragynine is rapidly absorbed after orally administration (T_{max}~1.5 h, C_{max}~0.3-1.8 μM). V_d was 37-90 L/kg; $t_{1/2}$ was 3-9 hr; mostly excreted as metabolites in urine. Bioavailability was estimated as 21%. It also rapidly penetrated and redistributed in brain. A quality assessment tool tailored for pharmacokinetic studies was also created which rated some studies of lower value.

Conclusion: Rudimentary pharmacokinetics of mitragynine was described in this systematic review. However, the discovered studies provided scant information on the role of metabolism and redistribution into tissues nor the rate of excretion.

Keywords: Kratom; Mitragyna speciose; Mitragynine; Pharmacokinetic; Systematic review.

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