Huestis Borkenstein 2009 Cannabinoids

ABSTRACT: Cannabis is one of the oldest and most commonly abused drugs in the world. Tremendous advances have been made in our understanding of the endogenous cannabinoid system with the identification of cannabinoid receptors, cannabinoid receptor antagonists, endogenous neurotransmitters, metabolic enzymes and reuptake mechanisms. These advances have helped us to elucidate the mechanisms of action of cannabis and the side effects and toxicities associated with its use. Interpretation of positive cannabinoid tests in urine and blood, as well as in alternative matrices such as oral fluid, hair and sweat require an understanding of the drugs pharmacokinetics and pharmacodynamics. In addition, several potential therapeutic applications for the use of smoked and oral cannabis, cannabis extracts and synthetic THC (dronabinol) further complicate interpretation of this important class of drugs. Experimental laboratory studies have identified cognitive, physiological and psychomotor effects following cannabis. Epidemiological studies reveal that cannabis is the most common illicit drug worldwide in impaired drivers, and motor vehicle injuries and fatalities. Driving simulator studies also indicate performance impairment following cannabis use. The presence of Δ9-tetrahydrocannabinol or THC is critical for correlating with impairment; multiple older research studies did not differentiate between the presence of active, THC, and inactive, 11-nor-9-carboxy-THC, in defining cannabis impairment and drugged driving. Many states and some countries have developed per se laws for the presence of cannabinoids in biological specimens; however, our recent research on the disposition of cannabinoids in the heaviest chronic users indicates extended excretion of THC in blood, plasma and urine in these cases. We will review the pharmacokinetics and pharmacodynamics of cannabis use, biological markers of cannabis use, methods for estimating time of last drug exposure, and chronic cannabis use.