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Screening of Drugs in Saliva

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Editorial

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Editorial

Saliva is an interesting medium for analytical research due to the ease of collection and sample preparation prior to analysis. On the other hand, many drugs diffuse through the salivary tissues and can be detected in the salivary fluidat concentrations similar to blood plasma [1,2]. Therapeutic drug monitoring and clinical pharmacokinetics studies are intensively conducted on blood samples withdrawn whether from healthy or patient subjects who is invasive mean of sampling and might be inappropriate for uncooperative subjects like children and elderly. Moreover, the collection of blood samples requires special facilities and highly trained personnel. Saliva provides fast and noninvasive sampling besides being the best choice for efficient screening of illicit drugs that are either ingested (ex. Alcohols) or smoked (i.e., cocaine, PCP, methamphetamine, and marijuana) following recent use [3]. However, the quantitative aspects for drug analysis in saliva may still be under question as the salivary drug levels are affected by different factors like salivary pH, protein binding and the pKa values which may vary from one subject to another according to the nutritional habits, time of collection regarding ingestion of food, ingestion of other drugs or the bacterial content [4]. Screening of drugs in saliva is to be very useful in case of investigation of illegal drug use with emergency room admission, as serum and urine screening methods cannot be convenient from potentially uncooperative patients. Thus, saliva samples as a rapid and minimally invasive analytical technique can introduce the optimum alternative. The composition of salivary fluid, containing 99.5% water, facilitates the analytical processes and sample preparation [5]. Saliva exhibits only the free fraction of a drug as the protein bound fraction cannot diffuse to the salivary tissues as well as both the parent compound and metabolites can be detected which may give a clear demonstration of the drug profile after administration. Saliva can be collected easily using adsorbent pads placed in the oral cavity to collect pooled saliva for 1-2 minutes then compressed against the collecting container [4].

A study conducted on Cocaine has shown that the saliva levels of cocaine and its metabolite are significantly correlated with plasma concentrations. Moreover, the ratio of the metabolite/parent in salivary fluid can indicate the time of last use [6,7]. A study have shown that Cocaine detected in saliva reached concentrations up to 4.9 times higher than in urine and plasma. Cocaine was detected in all saliva samples while urine and serum samples from same subject had no detectable levels [8].

Methamphetamine and amphetamine can be detected rapidly in plasma and oral fluidafter administration. It was reported that the concentration levels of amphetamine to methamphetamine in saliva werehigher than plasma concentrations by approximately four times [9]. On the other hand, Amphetamine and p-hydroxymethamphetamine are metabolites of methamphetamine and their presence in oral fluid can indicate the substantiate use [10]. MDMA or 3,4-Methylenedioxymethamphetamine reaches the peak saliva and plasma concentration following oral administration to humans after 1.5 h of drug administration [11]. The concentrations of MDMA in salivary fluid were higher than in plasma. However, salivary concentrations of MDMA were found highly

correlated with plasma. The detection of MDMA at high concentrations in human saliva after intake was related to thelow plasma–protein binding of MDMA [5,11].

Delta-9-tetrahydrocannabinol (THC) the major constituent of cannabis was detected in oral fluid after recent smoked and orally ingested cannabis [12-14]. On the other hand, a rapid decline was shown in THC oral fluid concentration similarly to plasma concentrations [15]. The high THC salivary concentrations have been attributed to the high deposition in the oral cavity following the intake, rather than from transfer from blood.

Techniques such as HPLC-MS/MS and GC-MS/MS are very useful in the detection of trace levels of drugs in saliva with broad application to different types of samples (biological or environmental). Minor sample preparation procedures are required in case of saliva samples. Micro-extraction by packed sorbent (MEPS) is a miniaturized technique that can provide highly efficientextraction of target analytes using a programmable automatic pipette eVol® which facilitate handling and maintain the reproducibility of the method [4,16].

In conclusion, Saliva can be a real alternative to serum and urine analyses regarding investigation of recent illicit drug use and in a non-invasive manner that applies suitably for all kinds of subjects as well as drug-related emergency admission.

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