CONCORSO PUBBLICO, PER ESAMI, A N. 1 POSTO AFFERENTE ALL'AREA DEI COLLABORATORI – SETTORE TECNICO, SCIENTIFICO, TECNOLOGICO, INFORMATICO E DEI SERVIZI GENERALI, CON RAPPORTO DI LAVORO SUBORDINATO A TEMPO INDETERMINATO PRESSO IL DIPARTIMENTO DI SCIENZE BIOMEDICHE, CHIRURGICHE ED ODONTOIATRICHE - CODICE 22461

La Commissione giudicatrice della selezione, nominata con Determina Direttoriale n. 11206/2024 e composta da:

Prof. Alessio Battistini	*Presidente*
Sig. Sebastiano Arnoldi	*Componente*
Dott.ssa Eleonora Casagni	*Componente*
Dott.ssa Annalisa Brengola	*Segretaria*

comunica i quesiti relativi alla prova orale:

GRUPPO DI QUESITI N. 1
Ricerca generale incognita per tossici organici non volatili in campioni non biologici
Brano in inglese:

1.2. Drug Effects

The use of drugs during pregnancy may pose a potential risk to both the mother and the fetus. Drug effects on fetal safety are generally evaluated using animal data or available experience from human pregnancies. Based on this approach, the United States Food and Drug Administration established a categorization of drugs according to safety in 1979, which is currently under revision (7). Although such categorizations provide a rough estimate for adverse fetal consequences, they are often derived from very limited data sets (8). In a recent study of prescription drug use in pregnancy, an estimated 64% of women were prescribed a drug other than a vitamin or mineral supplement prior to delivery (9), and as many as 40% received a drug during delivery from category C (drugs for which human safety during pregnancy has not yet been established) according to the FDA classification system.

GRUPPO DI QUESITI N. 2
Determinazione dell'alcool etilico in campioni di sangue con tecnica GC-HS-FID
<u>Brano in inglese</u>:

Fluid is collected using a special device such as a breast milk pump, after which well-established analytical techniques may be used to detect drugs-of-abuse (Table 5). Breast milk, which contains protein (1%), lipid (4%), lactose (7%), and water (88%), is mildly acidic. The average pH is 7.08 although it may range from 6.35–7.35. However, the high lipid content of milk may interfere or decrease the extraction efficiency or recovery of some drugs. Additional washing with non-polar solvents such as hexane may be necessary to remove excess lipids prior to chromatographic analyses. The effect of natural emulsifying agents in breast milk, which have detergent-like activity, may interfere with antibody–antigen reactions that take place in immunoassay screening tests. The daily variation of breast milk composition, combined with drug dose and time of administration relative to the expression of milk, is likely to affect the amount of drug present and the effect on the infant. The concentration of

GRUPPO DI QUESITI N. 3
Ricerca di sostanze d'abuso in campioni di urina con tecnica GC/MS, GC-MS/MS e LCMS/MS
<u>Brano in inglese</u>:

The direct impact of specific drugs on the newborn child is difficult to evaluate. Many substance-abusing women use multiple drugs, receive inadequate health care, and may be predisposed to other health problems that may impact both neonatal and maternal outcomes. A number of illicit, prescription, and over-the-counter drugs have been detected in amniotic fluid and breast milk using well-established immunochemical, chromatographic, and spectroscopic techniques. Much of the human data to date is quite limited and predominantly consists of individual case reports. Small animal studies, although more numerous, are subject to biological scaling and possible differences in drug metabolism, distribution and toxicity.

Long-term implications of prenatal drug exposure are limited, and many consequences of fetal drug exposure are still unknown. Despite adequate under-

GRUPPO DI QUESITI N. 4

Ricerca di sostanze d'abuso in campioni di capelli con tecnica GC/MS, GC-MS/MS e LCMS/MS

<u>Brano in inglese</u>:

The most obvious advantage and probably the most utilitarian application of nail analysis is the slow growth rate and, therefore, long retrospective analysis that is possible. This is especially true of the big toenail that may potentially represent 12 months of exposure (8). Other advantages are the ease of and non-invasive collection of the sample (clippings), stability of the drug once incorporated in the matrix, which makes storage easy at room temperature, and the longevity of nail as a sample. Nail is preserved for thousands of years and is often the only viable specimen remaining on skeletonized remains. Not only can this be useful in contemperory forensic cases but also in historic investigations such as studying the lifestyle of ancient people through analysis of nails in mummies. The small sample size required for nail analysis, typically 10–50 mg, is also attractive, and unlike more conventional samples, nails are difficult to adulterate.

GRUPPO DI QUESITI N. 5

Determinazione del profilo quali-quantitativo di sostanze stupefacenti in campioni non biologici

<u>Brano in inglese</u>:

Considering the large number of alcohol-associated problems, the diagnosis of excessive alcohol consumption is an important task from a medical point of view. The methods used for this purpose are based on indirect alcohol markers such as increased liver enzyme activity, increased erythrocyte mean cell volume, or presence of carbohydrate deficient transferrins. These markers may also originate from pathological conditions. Markers of ethanol consumption are ethyl glucuronide, and phosphatidylethanol or fatty acid ethyl esters (FAEE). The first investigation of a marker of alcohol consumption in hair was reported by Sachs and colleagues and focused on ethyl glucuronide (33); however, recent examination of the presence of this ethanol metabolite in hair was rather discouraging (34). Detection of ethyl glucuronide in hair is always associated with alcohol consumption, whereas a negative result does not exclude alcohol abuse. FAEE were used by Yeggles and colleagues (35) to monitor alcohol consumption. FAEE are formed in the presence of ethanol and free fatty acids,

GRUPPO DI QUESITI N. 6

Conoscenza delle principali tecniche di preparazione del campione biologico in ambito chimico-tossicologico e tossicologico-forense (SPE e LLE)

<u>Brano in inglese</u>:

Most screening tests for drugs-of-abuse are immunoassays. Antibodies used in immunoassays for detection of drugs in saliva must cross-react with the parent drug and lipophilic metabolites. For example, heroin and 6-acetylmorphine (6-AM), cocaine and ecgonine methyl ester, and Δ-9-tetrahydrocannabinol (Δ-9-THC) predominate in saliva. When drugs are leached into saliva from buccal depots such as is the case for smoked drugs, such as marijuana, parent drug and pyrolysis products will predominate in saliva. Immunoassays with cross-reactivity to free morphine and to 6-AM are most useful for the detection of opiates in oral fluid. Immunoassays that have been developed to detect the hydrophilic metabolites of drugs in urine will not be appropriate for saliva screening.

Milano, 29 luglio 2024

La Commissione

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