Convegno "Violenza Domestica e di Genere – Aspetti Medici e Giuridici"
Pad. Rama – Ospedale dell'Angelo, Mestre Venezia, 14-15 ottobre 2016

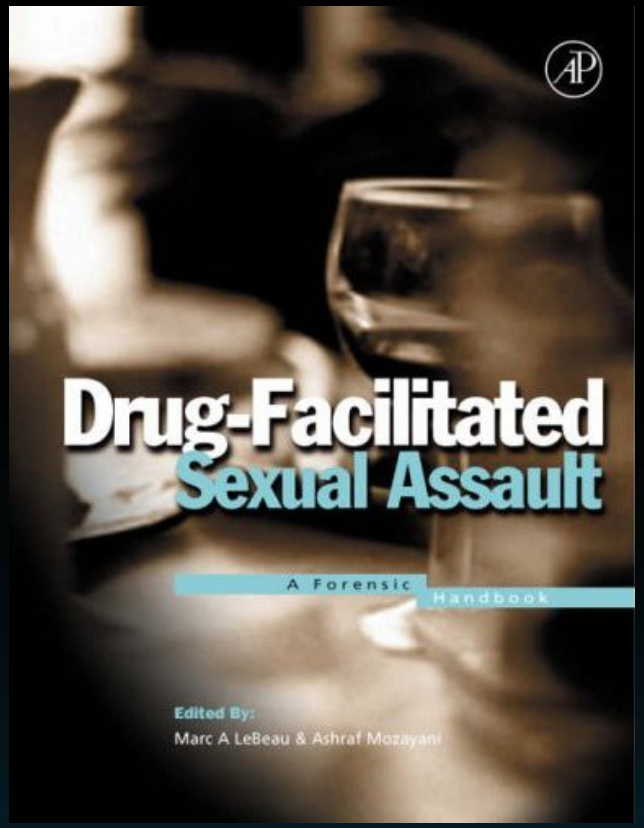
Sostanze Psicoattive e Violenze Sessuali: Il Ruolo del Laboratorio di Tossicologia Forense

Dr. Giampietro Frison

Laboratorio di Igiene Ambientale e Tossicologia Forense
Dipartimento di Prevenzione
Azienda ULSS 12 Veneziana

Drug-Facilitated Sexual Assault (DFSA)

Costrizione ad atti sessuali non-consensuali favoriti da notevole riduzione o completa perdita di coscienza, causate dalla somministrazione o volontaria assunzione di xenobiotici ad effetto neurodepressivo

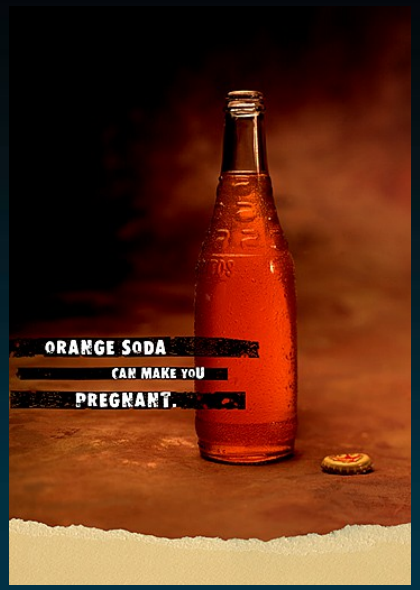


DFSA Proattiva (somm. incons. da terzi)

DFSA Opportunistica (assunz. volont.)

DFSA – Sostanze psicoattive incapacitanti

- ✓ Somministrazione sost. psicoattive
  - Bev. alcoliche (DFSA proattiva/opport.)
  - "Drink spiking": agg. xenobiotici a bevande analcoliche o alcoliche (eff. sinergico!)
- ✓ Caratteristiche sostanze psicoattive
  - Droghe o principi attivi farmaceutici
  - Incolori, inodori, rapid. solubili in acqua
  - Rapida insorgenza effetti neurodepressori
  - Basse dosi: rilassamento, euforia, disinibizione
  - Dosi moderate: sedazione, amnesia retrograda
  - Alte dosi: riduz./perdita funz. motorie e coscienza



DFSA – Sostanze psicoattive incapacitanti

TABLE 1. Society of Forensic Toxicologists (SOFT) Drug-Facilitated Sexual Assault Committee Recommended Maximum Detection Limits for Urine Specimens

Target Drug/Metabolite	Recommended Maximum Detection Limit
Ethanol	10 mg/dL
GHB and Analogs	10 mg/L
Benzodiazepines	
Alprazolam	10 µg/L
Chlordiazepoxide	
Diazepam	
Hydroxyalprazolam	
Lorazepam	
Nordiazepam	
Oxazepam	
Temazepam	
7-amino-clonazepam	5 µg/L
7-amino-flunitrazepam	
Clonazepam	
Flunitrazepam	
THCCOOH	
Barbiturates	
Amobarbital	
Butalbital	
Pentobarbital	
Secobarbital	
Antidepressants	
Amitriptyline	10 µg/L
Citalopram	
Desipramine	
Desmethylcitalopram	
Desmethyldoxepin	
Doxepin	
Fluoxetine	
Imipramine	
Norfluoxetine	
Norsertraline	
Paroxetine	
Sertraline	

TABLE 1. (*continued*) Society of Forensic Toxicologists (SOFT) Drug-Facilitated Sexual Assault Committee Recommended Maximum Detection Limits for Urine Specimens

Target Drug/Metabolite	Recommended Maximum Detection Limit
Over-the-counter medications	
Brompheniramine	10 µg/L
Chlorpheniramine	
Desmethylbrompheniramine	
Desmethylchlorphenir[illegible]e	
Desmethyldox[illegible]	
Dextrom[illegible]	
Di[illegible]	
[illegible]	10 µg/L
[illegible]ne Metab (EDDP)	
[illegible]orphine	
Normeperidine	
Norpropoxyphene	
Oxycodone	
Propoxyphene	
Miscellaneous drugs	
Carisoprodol	50 µg/L
Meprobamate	
Valproic Acid	
Cyclobenzaprine	10 µg/L
MDA	
MDMA	
PCP	
Scopolamine	
Zolpidem	
Clonidine	1 µg/L
Ketamine	
Norketamine	

✓ SOFT DFSA Committee

✓ > 50 sostanze considerate

✓ Classi sostanze

- -Alcol etilico
- -Benzodiazepine
- -Ipnotici non BDZ
- -GHB
- -Anticonvulsivanti
- -Neurolettici
- -Anestetici
- -Oppioidi
- -Barbiturici
- -Cannabinoidi
- -Anticolin./Antistamin.
- -Volatili (clorof., idroc. arom.)
- -(Amfet., Ketam., Cocaina)

MA LeBeau, *Ther Drug Monit* 30 (2), 2008

DFSA – Benzodiazepine - Ipnot. non BDZ

- ✓ Benzodiazepine
  - Effetti miorilassanti, sedativo-ipnotici; a rapida insorg. azione
  - Amnesia retrograda già a basse dosi entro 15 min
  - Flunitrazepam, Clonazepam, Bromazepam, Midazolam, Alprazolam, Lorazepam

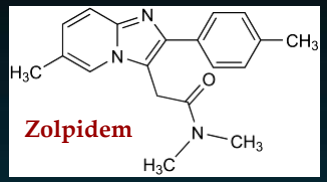
il mattino di Padova

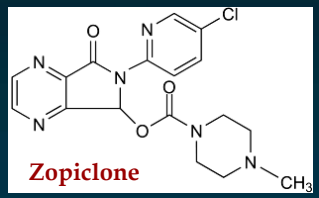
Assunta per una prestazione a domicilio, abbandonata sul ciglio della strada: cliente agli arresti domiciliari

Ingaggia la lucciola e la sevizia

Whisky drogato, legata mani e piedi, risveglio all'ospedale

- ✓ Ipnotici non BDZ
  - Zolpidem, Zopiclone, Zaleplon: new DFSA drugs
  - Legame a recettori omega SNC, no effetti periferici
  - Rapida azione, > amn. retrogr., no screening IA





DFSA – "Z" drugs

- ✓ Diversi casi in Italia (… e al LIATF)
- ✓ Metodo LC/HRMS per analisi sangue/urina/capelli in casi DFSA

Research article

Drug Testing and Analysis

Received: 30 November 2012 Revised: 24 January 2013 Accepted: 13 February 2013 Published online in Wiley Online Library

(www.drugtestinganalysis.com) DOI 10.1002/dta.1470

UHPLC-MS/MS and UHPLC-HRMS identification of zolpidem and zopiclone main urinary metabolites and method development for their toxicological determination

Sabina Strano Rossi,[a]* Luca Anzillotti,[a] Erika Castrignanò,[a] Giampietro Frison,[b] Flavio Zancanaro[b] and Marcello Chiarotti[a]

Zolpidem and zopiclone (Z-compounds) are non-benzodiazepine hypnotics of new generation that can be used in drug-facilitated sexual assault (DFSA). Their determination in biological fluids, mainly urine, is of primary importance; nevertheless, although they are excreted almost entirely as metabolites, available methods deal mainly with the determination of the unmetabolized drug. This paper describes a method for the determination in urine of Z-compounds and their metabolites by ultra-high-pressure liquid chromatography/tandem mass spectrometry (UHPLC-MS/MS) and UHPLC coupled with high resolution/high accuracy Orbitrap® mass spectrometry (UHPLC-HRMS). The metabolic profile was studied on real samples collected from subjects in therapy with zolpidem or zopiclone; the main urinary metabolites were identified and their MS behaviour studied by MS/MS and HRMS. Two carboxy- and three hydroxy- metabolites, that could be also detected by gas chromatography/mass spectrometry (GC-MS) as trimethylsylyl derivatives, have been identified for zolpidem. Also, at least one dihydroxilated metabolite was detected. As for zopiclone, the two main metabolites detected were N-demethyl and N-oxide zopiclone. For both substances, the unmetabolized compounds were excreted in low amounts in urine. In consideration of these data, a UHPLC-MS/MS method for the determination of Z-compounds and their main metabolites after isotopic dilution with deuterated analogues of zolpidem and zopiclone and direct injection of urine samples was set up. The proposed UHPLC-MS/MS method appears to be practically applicable for the analysis of urine samples in analytical and forensic toxicology cases, as well as in cases of suspected DFSA.

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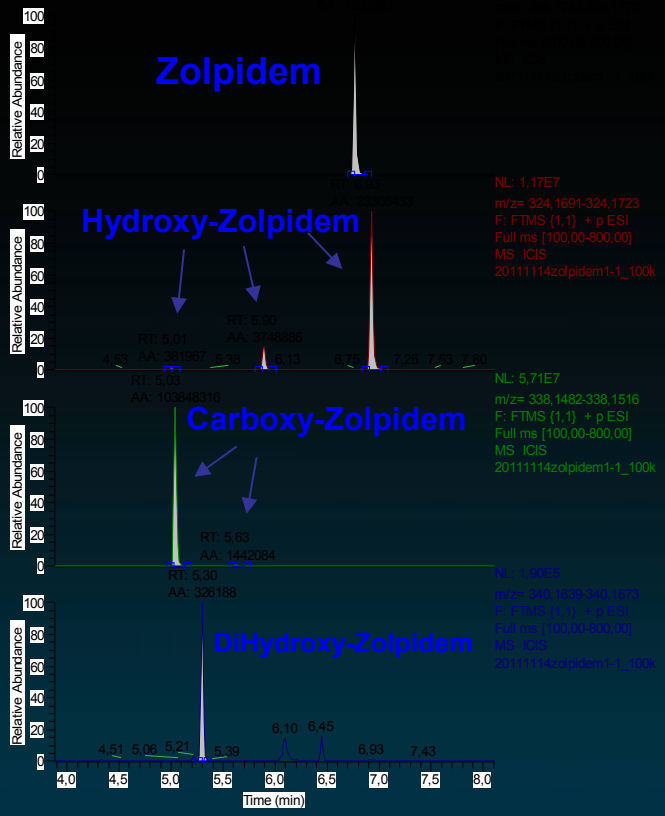
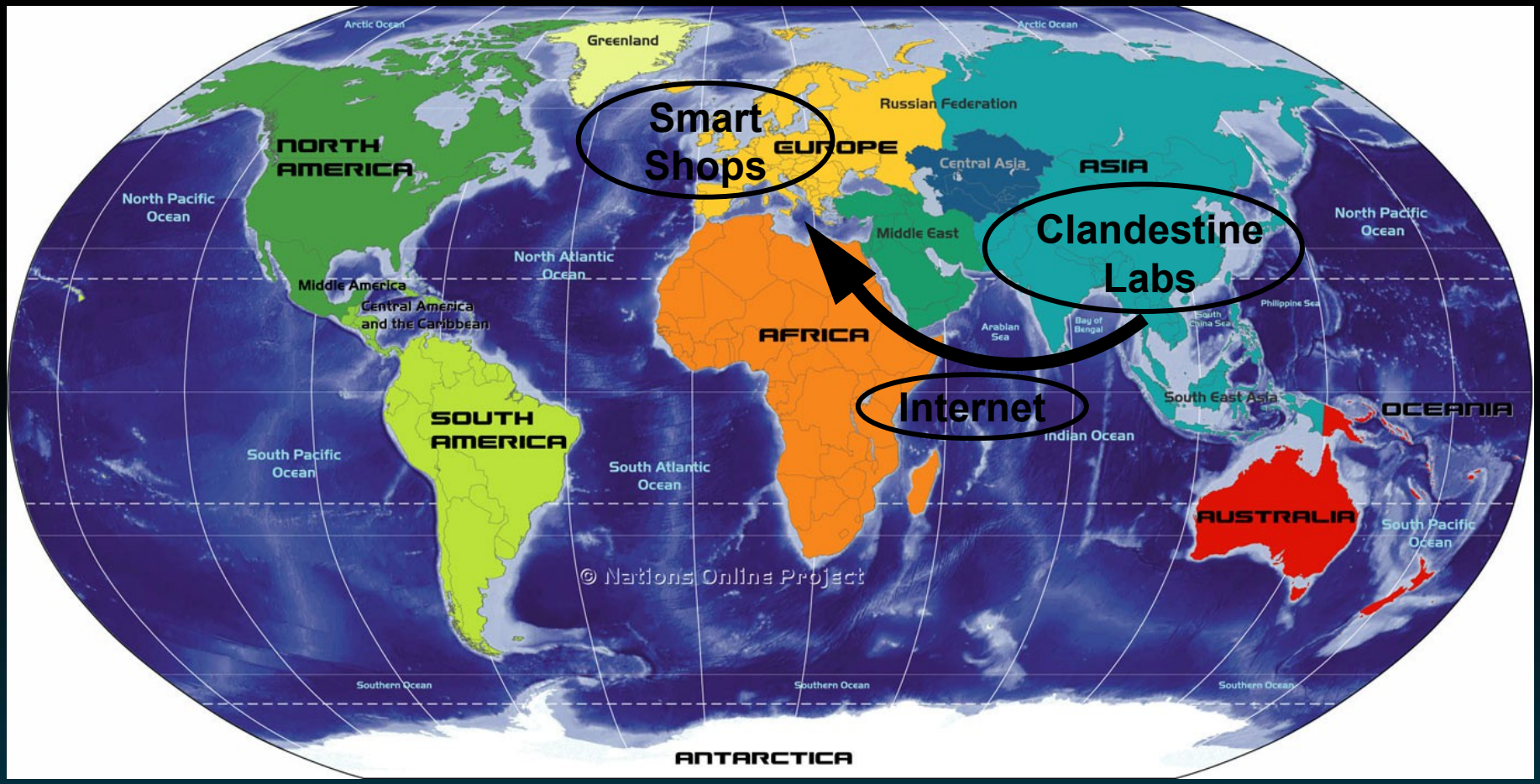
Keywords: zolpidem; zopiclone; metabolites; LC-MS/MS; LC-HR-MS; GC-MS

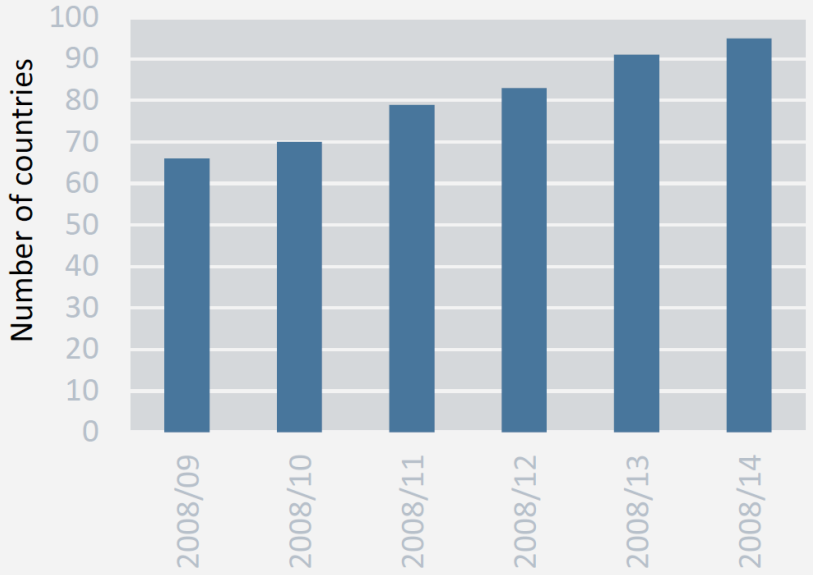


DFSA – Nuove sostanze psicoattive



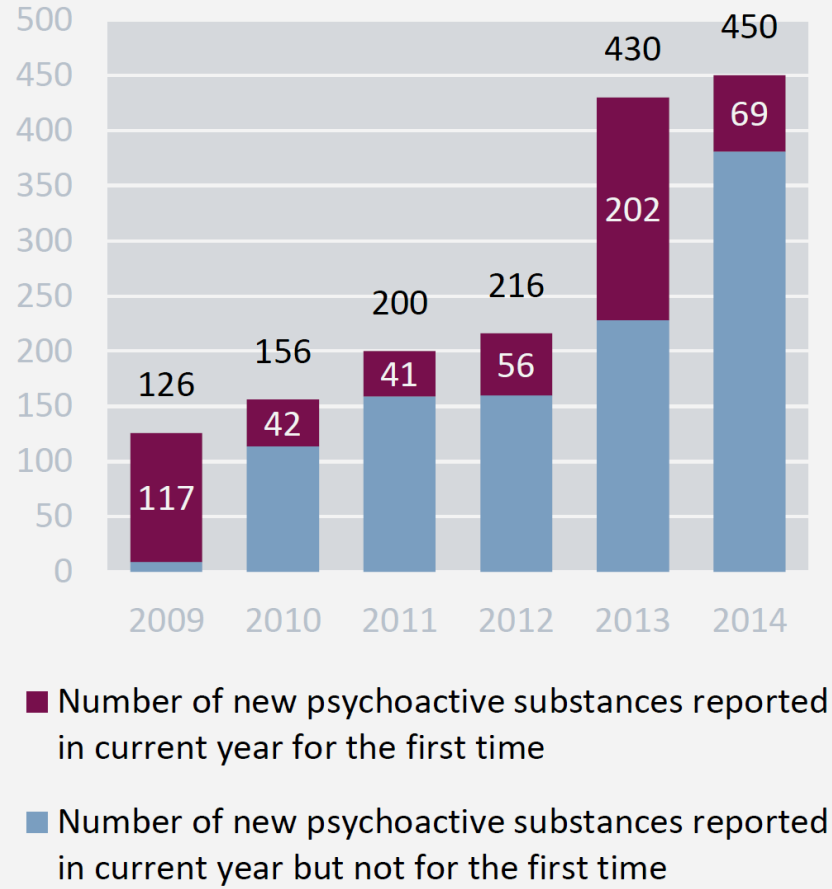
DFSA – Nuove sostanze psicoattive

FIG. 74. Number of countries and territories reporting new psychoactive substances, 2008-2014



Source: UNODC, early warning advisory on NPS, 2008-2014.

FIG. 75. Number of new psychoactive substances reported, 2009-2014



Source: UNODC, early warning advisory on NPS, 2009-2014.

Note: This graph represents only the number of different NPS reported during the respective reporting year. Not all NPS reported in one year were necessarily reported in the following year(s).

Oltre 450 NSP attualmente in fase di monitoraggio.
Il numero di NSP sul mercato supera attualmente il numero di sostanze psicoattive tradizionali.

European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)
United Nations Office on Drugs and Crime (UNODC)

Synth. Cannab. – A never-ending story

Labs Make New, Dangerous Synthetic Cannabinoid Drugs Faster Than We Can Ban Them

Nov 8, 2015 09:00 AM
By Samuel Banister, Iain S McGregor, and Roy Gerona

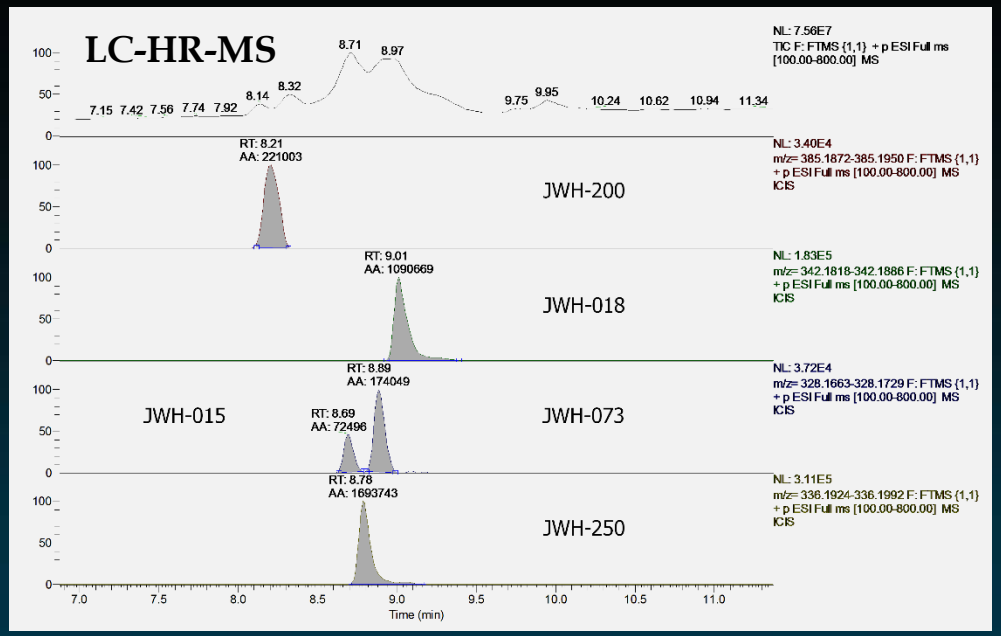
Synthetic cannabinoids — drugs that mimic the psychoactive effect of cannabis — have been linked to injuries and deaths. When one is banned, another rises to take its place.

- ✓ … XLR-11, PB-22, AB-FUBINACA, MAB-CHMINACA, 5F-AMB, …
- ✓ Molti casi di intossicazioni acute negli USA da MAB-CHMINACA
- ✓ In aumento il numero di morti da Cannabinoidi sintetici negli USA
- ✓ Gli ultimi prodotti (2014 – 2015) sono 700 volte più potenti del THC
- ✓ Il 1 settembre 15 approvata in Texas una legge che rende illegali le "prophetic structures" (1000 potenziali Cannabinoidi Sintetici)

Associazione di p. a. Cannabinomimetici

Nelle stesse bustine 5 diversi Cannabinoidi sintetici!!!

JWH-018, JWH-073, JWH-015, JWH-200, JWH-250



DFSA – Designer Benzodiazepines

The changing face of benzodiazepines

DFSA – Designer Benzodiazepines

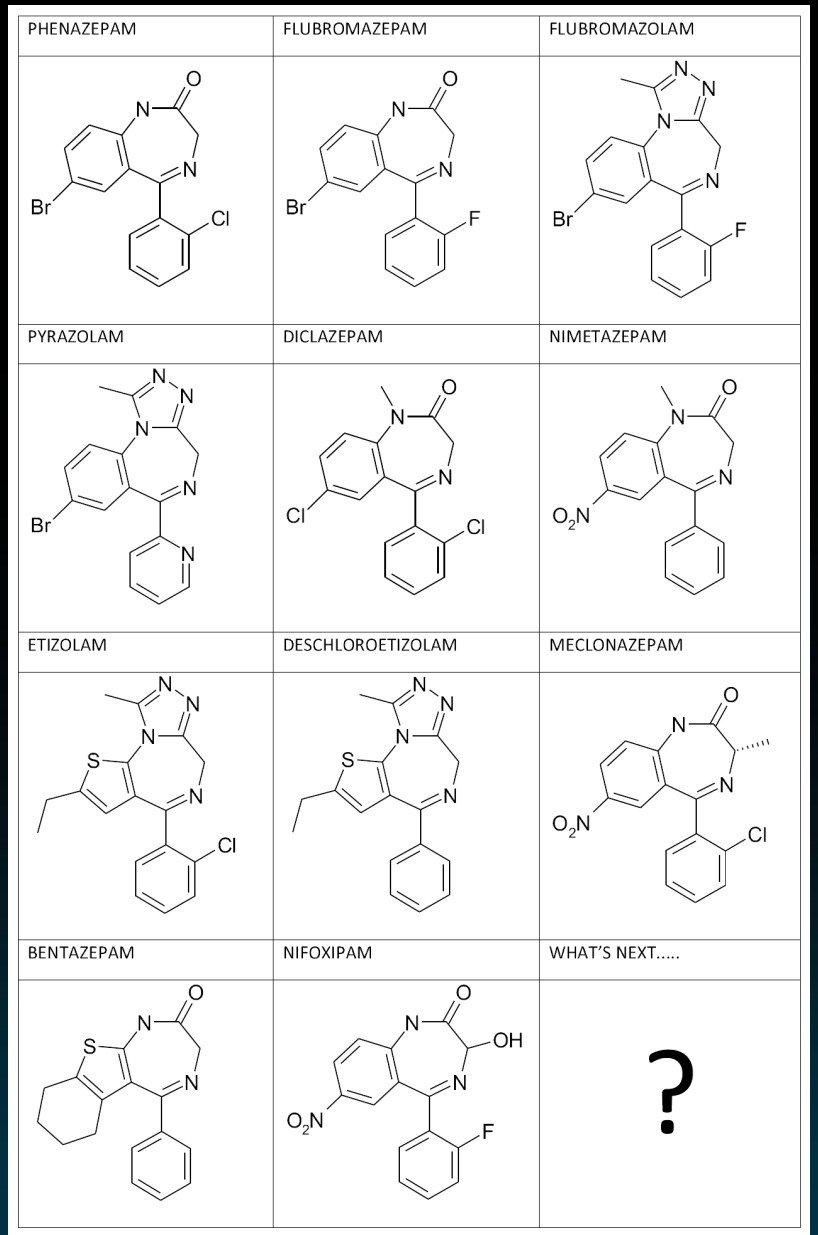


Table 2. Chemical structures of the new designer benzodiazepines.

- ✓ La prima (2009-10): Phenazepam (5x Diazepam)
- ✓ Etizolam (miorilassante ++)
- ✓ On-line nel 2013-14: Pyrazolam (12x Diazepam), Flubromazepam (h/l 106 h), Diclazepam
- ✓ Più recenti: Clonazolam, Deschloroethyzolam, Flubromazolam, Nifoxipam, Meclonazepam
- ✓ Nessuna approvata per fini terapeutici
- ✓ Venduti on-line in pellets per aggirare normative farmaceutiche
- ✓ 5 - 10 US cent per dose

DFSA – Designer Benzodiazepines

LETTER TO THE EDITOR

Designer benzodiazepines: a new challenge

In the February 2015 issue of *World Psychiatry*, Schifano et al (1) gave an overview of novel psychoactive substances and their potentially harmful effects. They highlighted that in the last couple of years the number of drugs offered via Internet shops has increased dramatically and that benzodiazepines are often used to treat intoxications with these drugs in the clinical setting.

We would like to point out that designer benzodiazepines have become a rapidly growing class of drugs of abuse in their own right in the last two years. We believe that mental health professionals should be aware of this new development.

The first designer benzodiazepines available online were diclazepam, flubromazepam and pyrazolam (2-4). Recently, five others became readily available (i.e., clonazolam, deschloroetizolam, flubromazolam, nifoxipam and meclonazepam), none of which has been approved for medicinal use in any country. Nearly all of these compounds have been synthesized as drug candidates by pharmaceutical companies and their syntheses, as well as basic animal testing data, are described in the literature along with many more potential successors (5). Typical formulations are tablets, capsules or blotters in various doses. Furthermore, the drugs are also offered as pure powders with prices as low as 5-10 US cents per dose.

Immunochemical tests applied in clinical settings and drug rehabilitation detect most of the designer benzodiazepines with sufficient sensitivity. However, the mass spectrometric methods needed for confirmation do not regularly cover the latest designer benzodiazepines, due to lack of reference materials. Practitioners should be aware of this limitation and carefully assess seemingly "false-positive" results.

Due to their high potency, compounds like clonazolam or flubromazolam can cause strong sedation and amnesia at oral doses as low as 0.5 mg. Such low doses are extremely difficult to measure for users handling bulk materials, and tablets often vary greatly in the content of the active ingredient. This can lead to unintended overdosing, and could also be of concern in drug facilitated crimes (6).

Designer benzodiazepines are often taken as "self-medication" by users of stimulant and hallucinogenic drugs, leading to "upper downer cycles" (7) and risk of severe addiction in people frequenting the party scene. Persons with anxiety disorders also tend to self-medicate on these drugs if a medical prescription cannot be obtained (8). The high availability of these drugs via online vendors and the low price may facilitate development of addiction in this population.

Many "classical" benzodiazepines are listed in Schedule 4 of the 1971 United Nations Convention. They are also in Schedule IV of the U.S. Controlled Substances Act, but it is unclear if designer benzodiazepines are covered by the Controlled Substances Analogue Enforcement Act, 1986. Similar legal problems exist in most other countries in the world, making it difficult to reduce availability of these dangerous new drugs.

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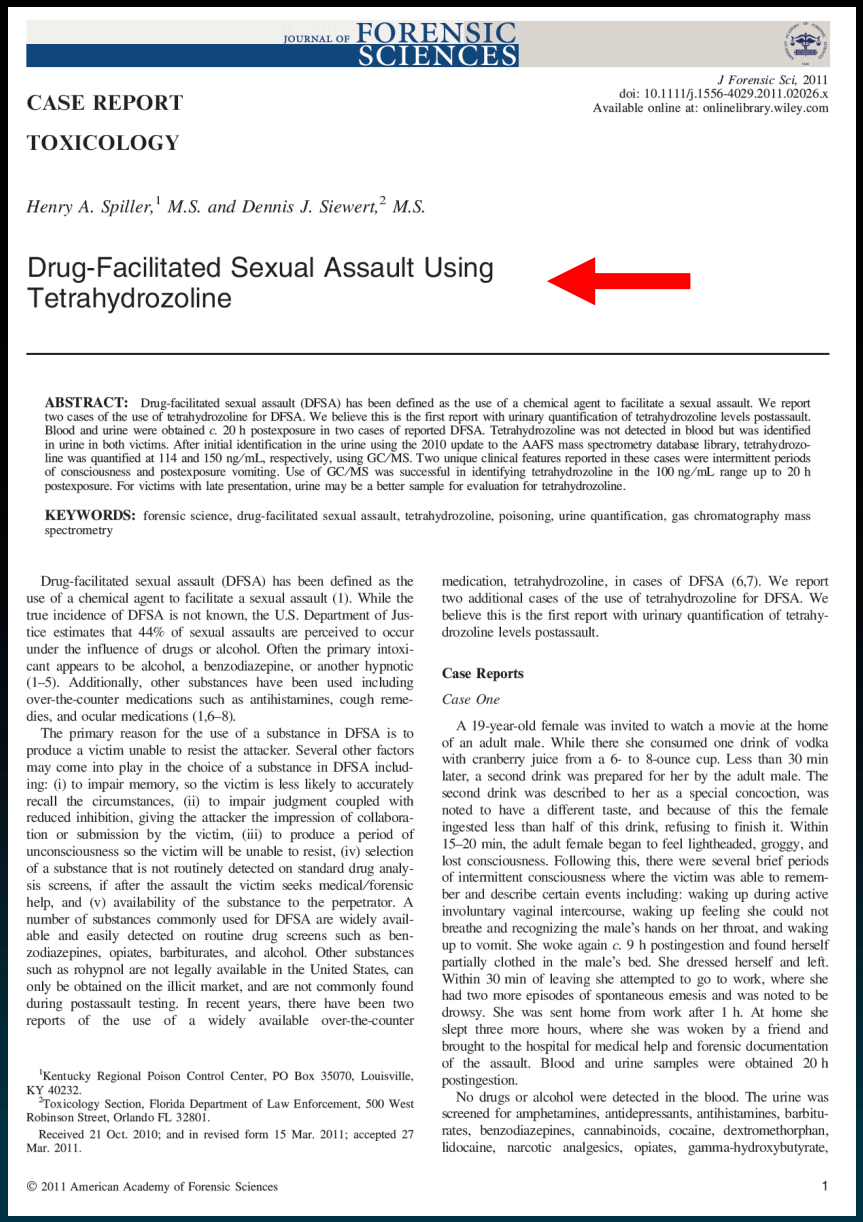
DOI 10.1002/wps.20236

- ✓ Designer BDZ: una nuova sfida sia in ambito clinico che laboratoristico
- ✓ Azioni farmacologiche ed effetti avversi misconosciuti
- ✓ In genere molto potenti, dosi di 0.5 mg sedazione ed amnesia ++
- ✓ Pellets, polveri da market on-line: difficile il dosaggio > overdosing!
- ✓ Principi attivi e contenuto % altamente variabili in prodotti on-line
- ✓ Utilizzate in DFSA o DFC

DFSA – Tetraidrozolina

- ✓ Decongestionante oculare/nasale
- ✓ Vasocostrittore locale
- ✓ Uso locale: no effetti sistemici
- ✓ Ingestione: supera BEE (lipofilo)!!
- ✓ Neurodepressore a rapida azione!
- ✓ Sonnolenza, depressione respir., ipotensione, flacc. muscolare, bradicardia, ipotermia, coma
- ✓ Effetto sinergico con Alcol!
- ✓ Incolore, inodore, insapore!



JOURNAL OF FORENSIC SCIENCES

J Forensic Sci, 2011
doi: 10.1111/j.1556-4029.2011.02026.x
Available online at: onlinelibrary.wiley.com

CASE REPORT

TOXICOLOGY

Henry A. Spiller,[1] *M.S. and Dennis J. Siewert,*[2] *M.S.*

Drug-Facilitated Sexual Assault Using Tetrahydrozoline

ABSTRACT: Drug-facilitated sexual assault (DFSA) has been defined as the use of a chemical agent to facilitate a sexual assault. We report two cases of the use of tetrahydrozoline for DFSA. We believe this is the first report with urinary quantification of tetrahydrozoline levels postassault. Blood and urine were obtained *c.* 20 h postexposure in two cases of reported DFSA. Tetrahydrozoline was not detected in blood but was identified in urine in both victims. After initial identification in the urine using the 2010 update to the AAFS mass spectrometry database library, tetrahydrozoline was quantified at 114 and 150 ng/mL, respectively, using GC/MS. Two unique clinical features reported in these cases were intermittent periods of consciousness and postexposure vomiting. Use of GC/MS was successful in identifying tetrahydrozoline in the 100 ng/mL range up to 20 h postexposure. For victims with late presentation, urine may be a better sample for evaluation for tetrahydrozoline.

KEYWORDS: forensic science, drug-facilitated sexual assault, tetrahydrozoline, poisoning, urine quantification, gas chromatography mass spectrometry

Drug-facilitated sexual assault (DFSA) has been defined as the use of a chemical agent to facilitate a sexual assault (1). While the true incidence of DFSA is not known, the U.S. Department of Justice estimates that 44% of sexual assaults are perceived to occur under the influence of drugs or alcohol. Often the primary intoxicant appears to be alcohol, a benzodiazepine, or another hypnotic (1–5). Additionally, other substances have been used including over-the-counter medications such as antihistamines, cough remedies, and ocular medications (1,6–8).

The primary reason for the use of a substance in DFSA is to produce a victim unable to resist the attacker. Several other factors may come into play in the choice of a substance in DFSA including: (i) to impair memory, so the victim is less likely to accurately recall the circumstances, (ii) to impair judgment coupled with reduced inhibition, giving the attacker the impression of collaboration or submission by the victim, (iii) to produce a period of unconsciousness so the victim will be unable to resist, (iv) selection of a substance that is not routinely detected on standard drug analysis screens, if after the assault the victim seeks medical/forensic help, and (v) availability of the substance to the perpetrator. A number of substances commonly used for DFSA are widely available and easily detected on routine drug screens such as benzodiazepines, opiates, barbiturates, and alcohol. Other substances such as rohypnol are not legally available in the United States, can only be obtained on the illicit market, and are not commonly found during postassault testing. In recent years, there have been two reports of the use of a widely available over-the-counter medication, tetrahydrozoline, in cases of DFSA (6,7). We report two additional cases of the use of tetrahydrozoline for DFSA. We believe this is the first report with urinary quantification of tetrahydrozoline levels postassault.

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[2]Toxicology Section, Florida Department of Law Enforcement, 500 West Robinson Street, Orlando FL 32801.

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Case Reports

Case One

A 19-year-old female was invited to watch a movie at the home of an adult male. While there she consumed one drink of vodka with cranberry juice from a 6- to 8-ounce cup. Less than 30 min later, a second drink was prepared for her by the adult male. The second drink was described to her as a special concoction, was noted to have a different taste, and because of this the female ingested less than half of this drink, refusing to finish it. Within 15–20 min, the adult female began to feel lightheaded, groggy, and lost consciousness. Following this, there were several brief periods of intermittent consciousness where the victim was able to remember and describe certain events including: waking up during active involuntary vaginal intercourse, waking up feeling she could not breathe and recognizing the male's hands on her throat, and waking up to vomit. She woke again *c.* 9 h postingestion and found herself partially clothed in the male's bed. She dressed herself and left. Within 30 min of leaving she attempted to go to work, where she had two more episodes of spontaneous emesis and was noted to be drowsy. She was sent home from work after 1 h. At home she slept three more hours, where she was woken by a friend and brought to the hospital for medical help and forensic documentation of the assault. Blood and urine samples were obtained 20 h postingestion.

No drugs or alcohol were detected in the blood. The urine was screened for amphetamines, antidepressants, antihistamines, barbiturates, benzodiazepines, cannabinoids, cocaine, dextromethorphan, lidocaine, narcotic analgesics, opiates, gamma-hydroxybutyrate,

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Il ruolo del laboratorio di tossicologia forense

LIATF – Attività tossicologico - forensi

- Determinazioni quali-quantitative di principi attivi stupefacenti su campioni in giudiziale sequestro

  (polveri, liquidi, materiale vegetale, etc.)

- Indagini morfologiche e comparative

  (principi attivi, adulteranti, diluenti, involucri)

LIATF – Attività tossicologico - forensi

Disabilità alla guida
(Codice della Strada)

Idoneità alla guida
(Candidati/Titolari Patenti di Guida)

Idoneità al lavoro
(Workplace Drug Testing)

Tossicologia postmortale

Reati facil. da sost. psicoattive
(DFSA e DFC)

LIATF – Reati facilitati da sost. psicoattive

- ✓ Protocollo ULSS 12
- ✓ Incarichi P.G. e A.G
- ✓ Collaborazione con Associazioni
- ✓ Richieste da singoli Cittadini

Azienda Ulss 12 Veneziana	Procedura Operativa **GESTIONE DEI CASI DI VIOLENZA SESSUALE** Dipartimento Ospedale Territorio	PO_00003 REV3

GESTIONE DEI CASI DI SOSPETTA VIOLENZA SESSUALE

REDATTO	**Dott.ssa Cristina Potì** Dir. UOSD Risk Management	
VERIFICATO	**Dott. ssa Giorgia Marcato** RQD	
APPROVATO	**Dott. Onofrio Lamanna** Direttore Dipartimento Ospedale-Territorio	

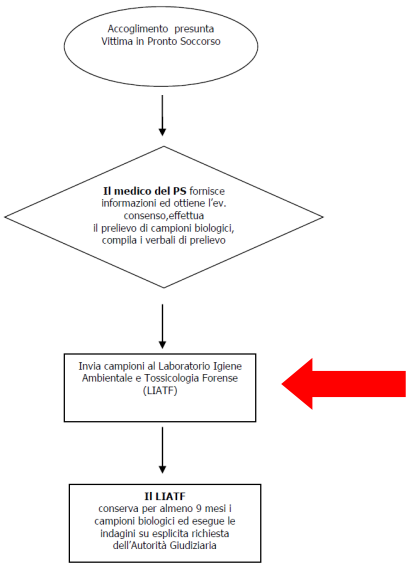
SINTESI DELLE MODIFICHE RISPETTO ALLA VERSIONE PRECEDENTE		
Riferimenti	**Modifiche/integrazioni**	**Motivazioni**
	Conservazione cautelare per un tempo massimo di nove mesi, anziché sei, del materiale biologico per tipizzazione genica e dei campioni per esami tossicologici, da eseguirsi su richiesta dell'AG . Conservazione in Reparto di tamponi e vetrini da inviare all'UOC di Anatomia Patologica, sino all'apertura del Servizio Aggiornamento IO10_PGO400_DIP Inserimento Checklist materiale biologico consegnato al Lab.Analisi Rif:D04_IO10_PGO400_DIP	Eventuale richiesta da parte AG del materiale di prova nelle ipotesi di proposizione di querela allo scadere dei termini di legge

IN VIGORE DAL 2 SETTEMBRE 2014

Sistema Gestione Qualità Azienda Ulss 12 Veneziana	File: PO GESTIONE DEI CASI DI VIOLENZA SESSUALE- rev.03.doc	Pagina **1** di 37

Azienda Ulss 12 Veneziana	Procedura Operativa **GESTIONE DEI CASI DI VIOLENZA SESSUALE** Dipartimento Ospedale Territorio	PO_00003 REV3

17. DIAGRAMMA DI FLUSSO PER ESAMI TOSSICOLOGICI



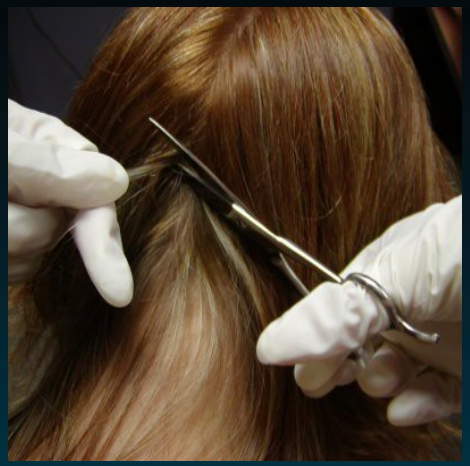
Sistema Gestione Qualità Azienda Ulss 12 Veneziana	File: PO GESTIONE DEI CASI DI VIOLENZA SESSUALE- rev.03.doc	Pagina **28** di 37

DFSA – Quali campioni biologici?

Sangue

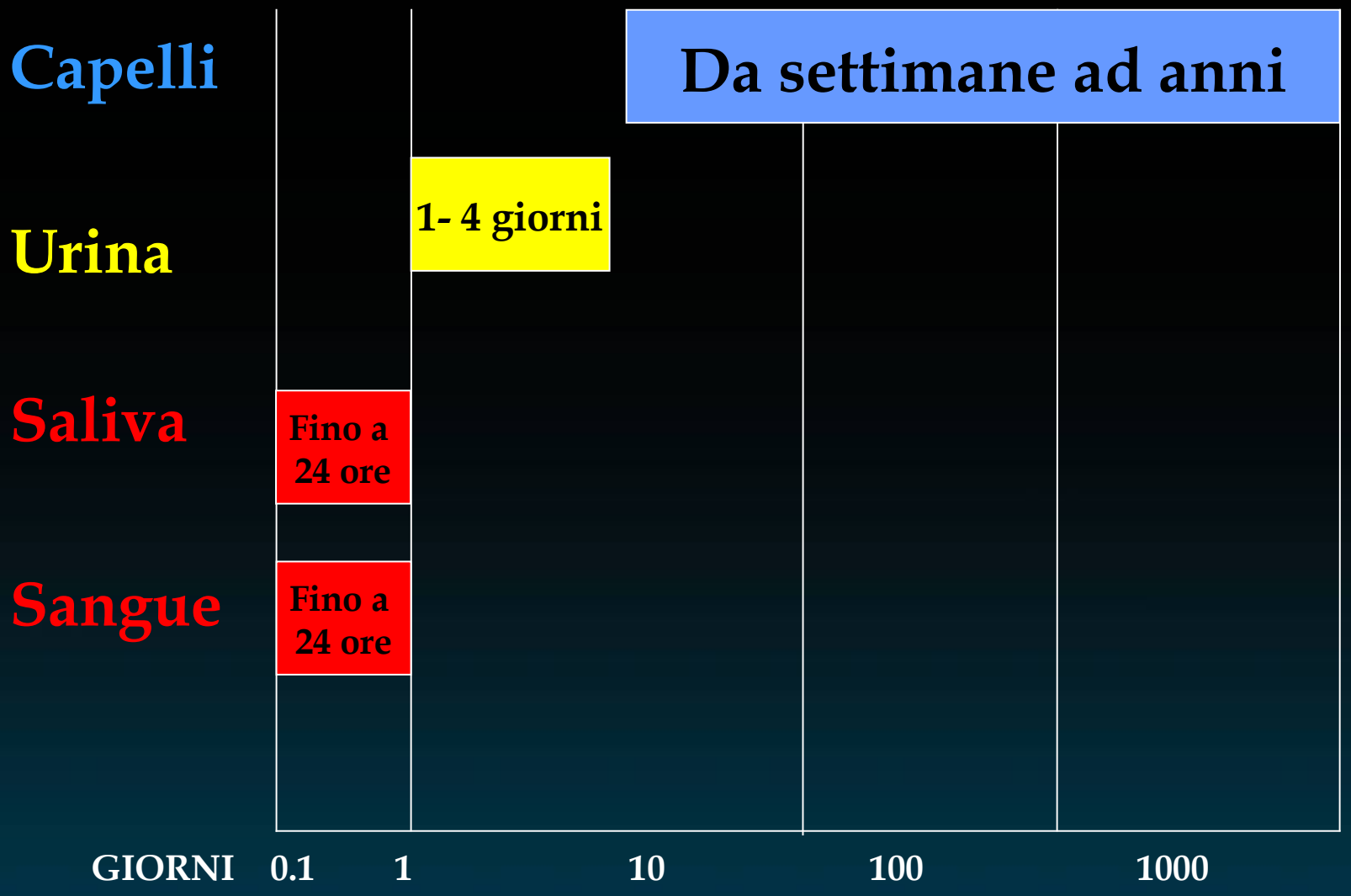
Urina

Saliva

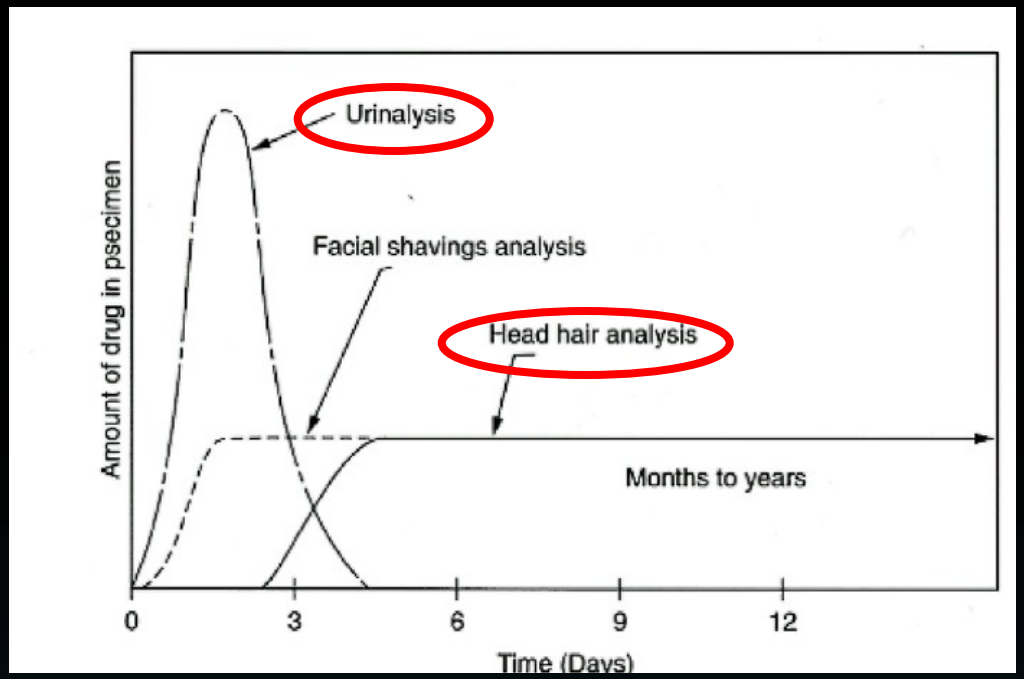


Form. pilifere

Range temporali di rilevabilità sostanze



Analisi di capelli e altre formazioni pilifere



Accumulo di sostanze assunte nelle formazioni pilifere e mancata metabolizzazione ed eliminazione:
Sequestro delle sostanze incorporate

Ampia finestra temporale analitica (da giorni a mesi/anni): possibilità di valutazioni tossicologiche retrospettive

Correlazione tra crescita capello (circa 1 cm/mese) e pres. sostanza

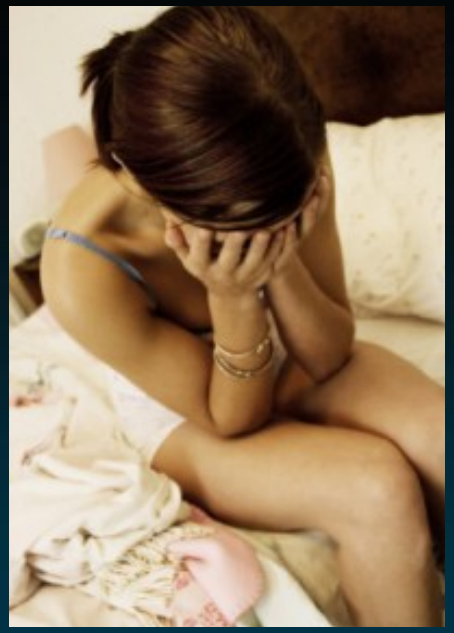
Prelievo non invasivo, non inestetismi, non problemi di conservazione, ripetizione di campionamento e analisi possibili

HRMS - High Resol. Mass Spectrometry

- Specificità e sensibilità molto elevate
- Identificazione analiti senza standard di riferimento
- Ricerca mirata di sost. psicoattive e metaboliti anche in ultratracce

DFSA e DFC - Casi rappresentativi

DFSA – Modus operandi



- ✓ Il violentatore
  - Frequentazione casuale
  - Freq. abituale (amico, collega, etc.)
- ✓ L'ambiente
  - Pubblico, familiare, professionale (es. sanitario: medici, dentisti, infermieri, badanti, etc.) > rapporto intimo con vittima + disponibilità farmaci!
- ✓ La vittima
  - Sconosciuta, amica, fidanzata,parente
  - Disabili psichici o fisici, sogg. con diff. psicologiche, anziani, etc.

Caso n. 1

- ✓ Soggetto di sesso femminile di circa 60 anni, ospedalizzato per asportazione neoformazione lipomatosa polso dx
- ✓ Sedazione con propofol in infusione, analgesia locale con mepivacaina/ropivacaina
- ✓ Paziente cosciente, trasferita in reparto accompagnata da ausiliario di S.O. mediante passaggio in ascensore, manipolazione fleboclisi con iniezione xenobiotico, sottoposta a violenza sessuale, arrivo in reparto dopo circa 2 ore, incosciente
- ✓ Consulenze ginecologica e psicologica, raccolta camp. biologico (sperma) per analisi mirate
- ✓ Nessuna raccolta di sangue e/o urina per analisi tossicologiche

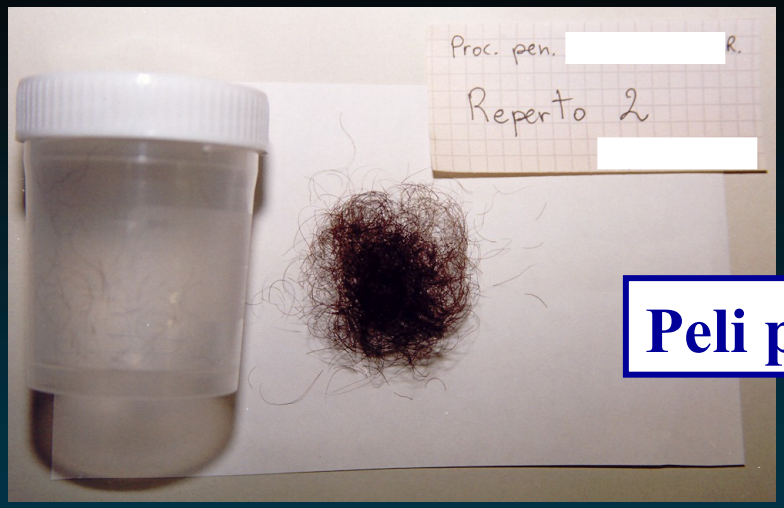
Caso n. 1

- ✓ La vittima presenta Denuncia e Querela c/o la Procura della Repubblica del Tribunale di competenza
- ✓ Circa 1 mese dopo la vittima contatta il lab. richiedendo CT (identificazione xenobiotico surrettiziamente somministrato)
- ✓ Raccolta di capelli e peli pubici, conservati in attesa di indirizzare le indagini tossicologico-forensi
- ✓ Nel frattempo analisi chimico-tossicologica di fluido residuale nel set di infusione: presenza di Tiopentale!!
- ✓ Nessuna somministrazione terapeutica di Barbiturici nel periodo antecedente il ricovero e durante il ricovero stesso
- ✓ Tiopentale e Pentobarbital: analiti target per analisi formazioni pilifere!

Caso n. 1 - Formazioni pilifere

Capelli

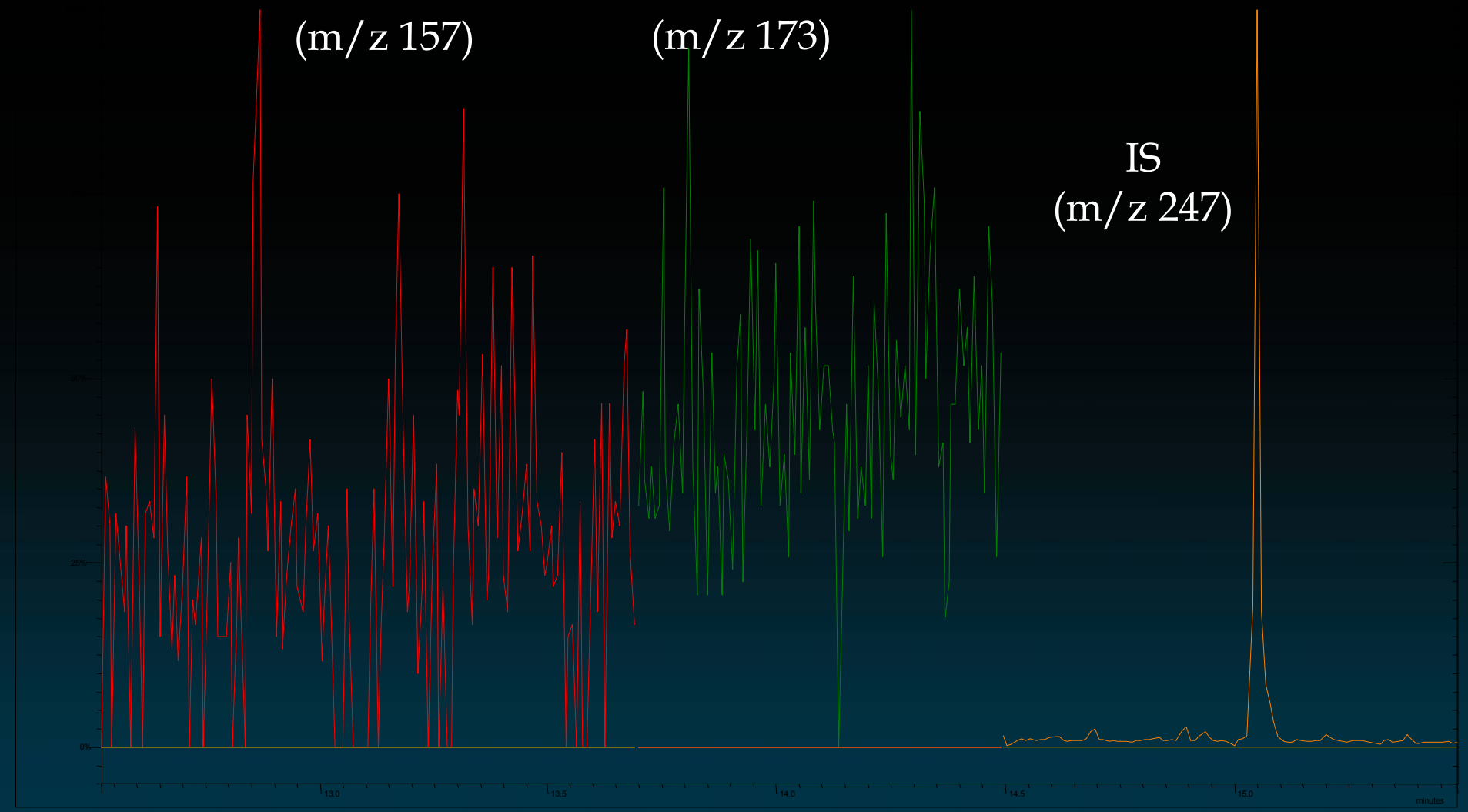
Capelli (fraz. prox.)



Peli pubici

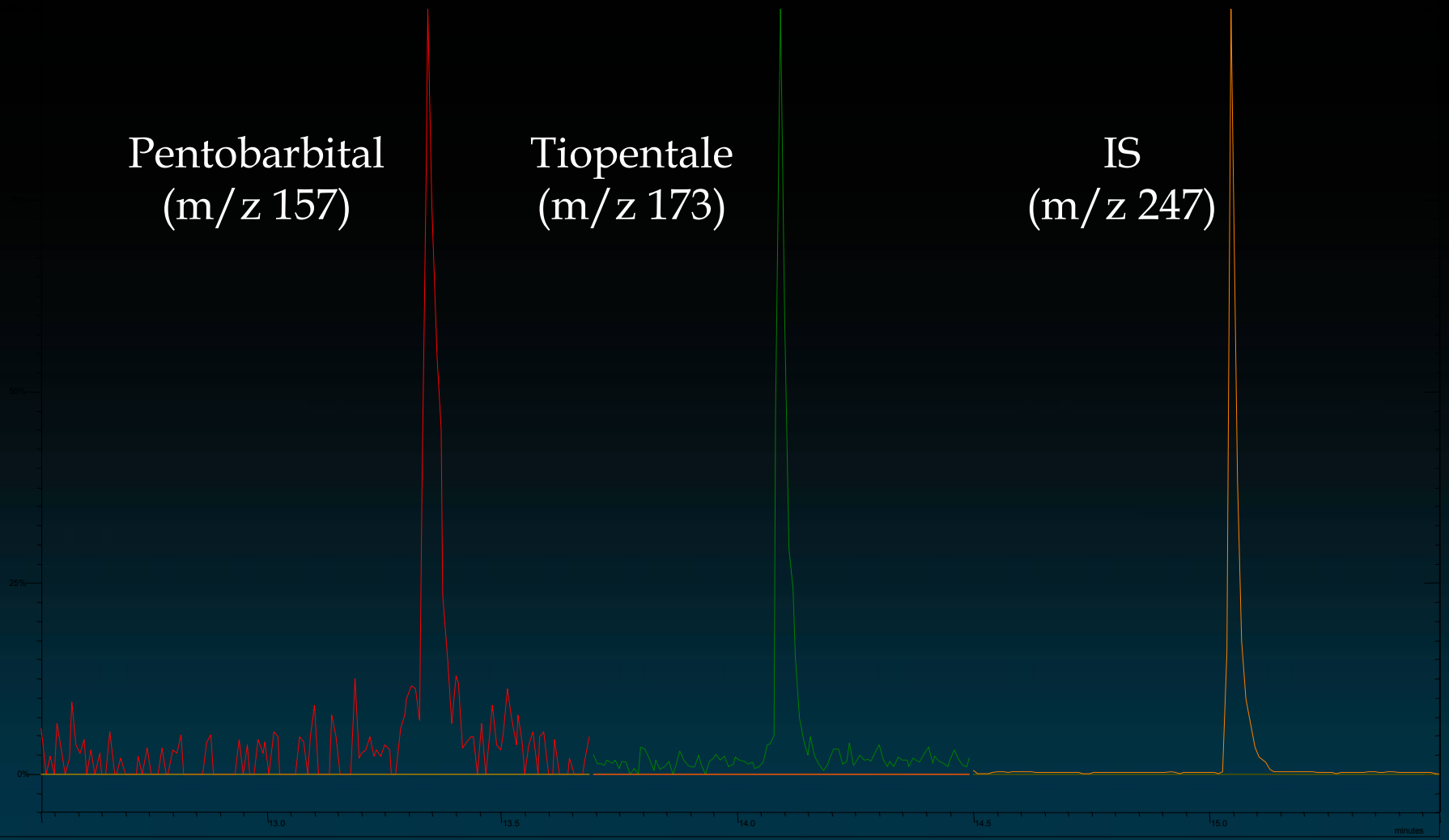
Caso n. 1 - Risultati analitici (GC-MS/MS)

CAPELLI – Frazione distale



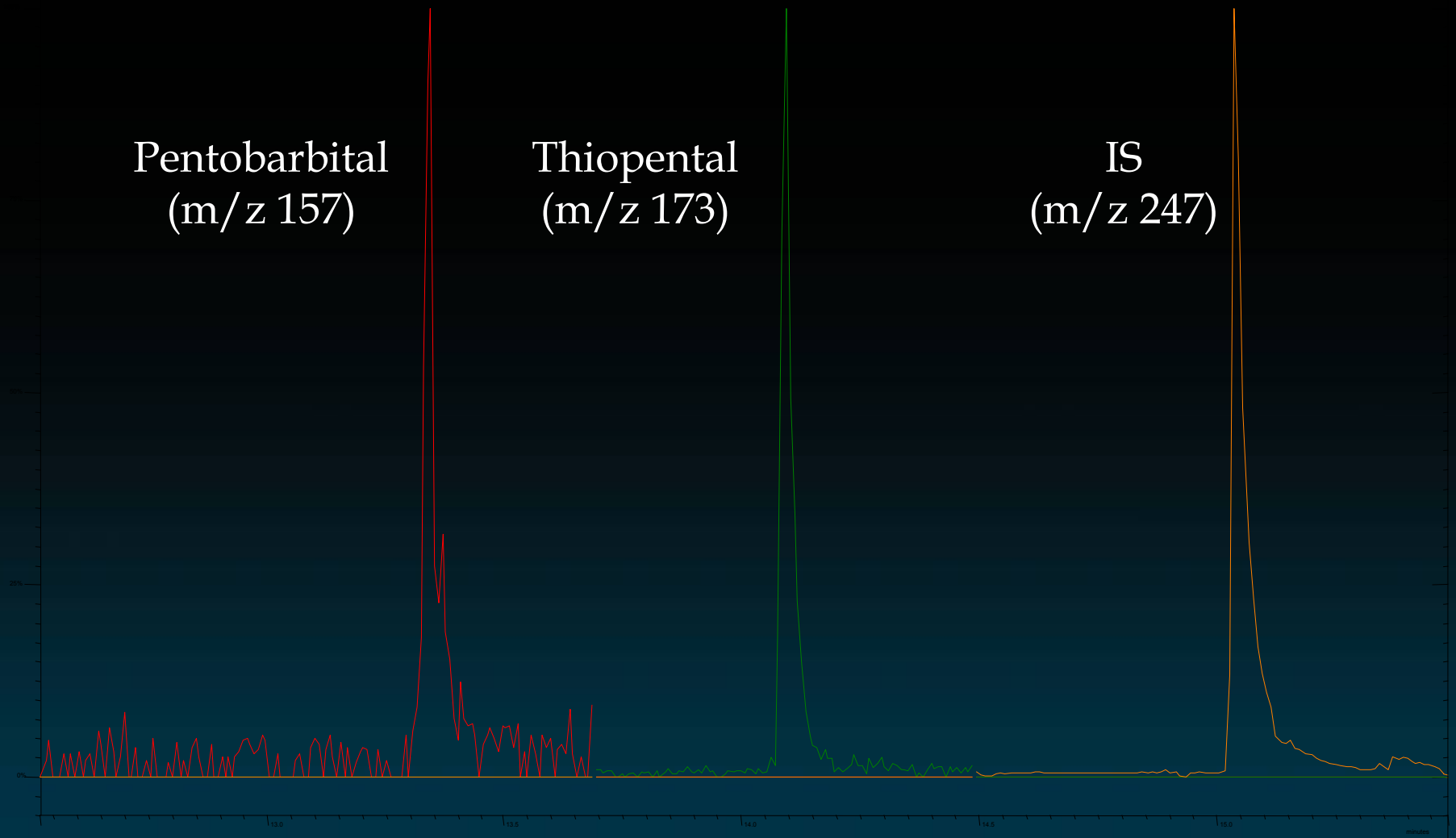
Caso n. 1 - Risultati analitici (GC-MS/MS)

CAPELLI – Frazione prossimale



Caso n. 1 - Risultati analitici (GC-MS/MS)

PELI PUBICI



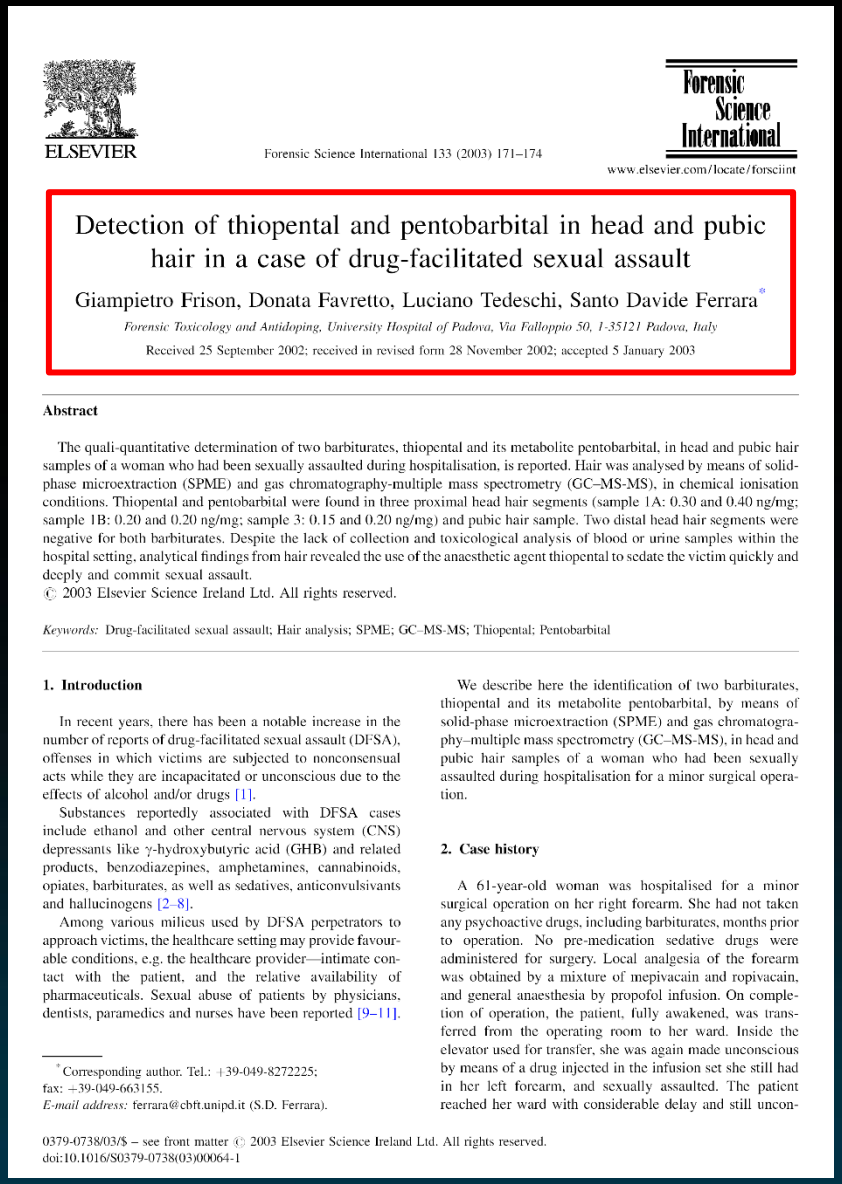
Caso n. 1 – Conclus. tossicologico-forensi

- ✓ Presenza di Tiopentale nelle frazioni prossimali di capelli e nei peli pubici, assenza nelle frazioni distali: compatibilità con assunzione di Tiopentale in epoca corrispondente al ricovero
- ✓ Presenza del metabolita Pentobarbital: prova indiretta di assunzione Tiopentale (assenza in commercio di farmaci contenenti Pentobarbital)
- ✓ Non somm. terapeutiche di barbiturici nel periodo antecedente il ricovero e durante il ricovero stesso
- ✓ Uso di farmaci contenenti Tiopentale consentito solo in ospedali e case di cura. Vietata la vendita al pubblico
- ✓ Compatibilità con risultati analisi liquido fleboclisi

↳ Tiopentale > effetto incapacitante > violenza sessuale

Caso n. 1 - Aspetti giudiziari

- ✓ Violentatore identificato
- ✓ Indagato e rinviato a giudizio
- ✓ Testimonianza CT
- ✓ Dichiarato colpevole del reato di violenza sessuale (art. 609 bis CP comma 1, 2), con aggravanti a) uso di sostanze alcoliche, narcotiche e stupefacenti, b) su persona sott. a limit. libertà personale (art 609 ter CP comma 2, 4)
- ✓ Condannato a pena di 5 anni di reclusione, pag. spese processuali, interdizione perpetua da strutture sanitarie e pubblici uffici, risarcimento danni in sede civile



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Detection of thiopental and pentobarbital in head and pubic hair in a case of drug-facilitated sexual assault

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Abstract

The quali-quantitative determination of two barbiturates, thiopental and its metabolite pentobarbital, in head and pubic hair samples of a woman who had been sexually assaulted during hospitalisation, is reported. Hair was analysed by means of solid-phase microextraction (SPME) and gas chromatography-multiple mass spectrometry (GC–MS-MS), in chemical ionisation conditions. Thiopental and pentobarbital were found in three proximal head hair segments (sample 1A: 0.30 and 0.40 ng/mg; sample 1B: 0.20 and 0.20 ng/mg; sample 3: 0.15 and 0.20 ng/mg) and pubic hair sample. Two distal head hair segments were negative for both barbiturates. Despite the lack of collection and toxicological analysis of blood or urine samples within the hospital setting, analytical findings from hair revealed the use of the anaesthetic agent thiopental to sedate the victim quickly and deeply and commit sexual assault.

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Keywords: Drug-facilitated sexual assault; Hair analysis; SPME; GC–MS-MS; Thiopental; Pentobarbital

1. Introduction

In recent years, there has been a notable increase in the number of reports of drug-facilitated sexual assault (DFSA), offenses in which victims are subjected to nonconsensual acts while they are incapacitated or unconscious due to the effects of alcohol and/or drugs [1].

Substances reportedly associated with DFSA cases include ethanol and other central nervous system (CNS) depressants like γ-hydroxybutyric acid (GHB) and related products, benzodiazepines, amphetamines, cannabinoids, opiates, barbiturates, as well as sedatives, anticonvulsivants and hallucinogens [2–8].

Among various milieus used by DFSA perpetrators to approach victims, the healthcare setting may provide favourable conditions, e.g. the healthcare provider—intimate contact with the patient, and the relative availability of pharmaceuticals. Sexual abuse of patients by physicians, dentists, paramedics and nurses have been reported [9–11].

We describe here the identification of two barbiturates, thiopental and its metabolite pentobarbital, by means of solid-phase microextraction (SPME) and gas chromatography–multiple mass spectrometry (GC–MS-MS), in head and pubic hair samples of a woman who had been sexually assaulted during hospitalisation for a minor surgical operation.

2. Case history

A 61-year-old woman was hospitalised for a minor surgical operation on her right forearm. She had not taken any psychoactive drugs, including barbiturates, months prior to operation. No pre-medication sedative drugs were administered for surgery. Local analgesia of the forearm was obtained by a mixture of mepivacain and ropivacain, and general anaesthesia by propofol infusion. On completion of operation, the patient, fully awakened, was transferred from the operating room to her ward. Inside the elevator used for transfer, she was again made unconscious by means of a drug injected in the infusion set she still had in her left forearm, and sexually assaulted. The patient reached her ward with considerable delay and still uncon-

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Caso n. 2

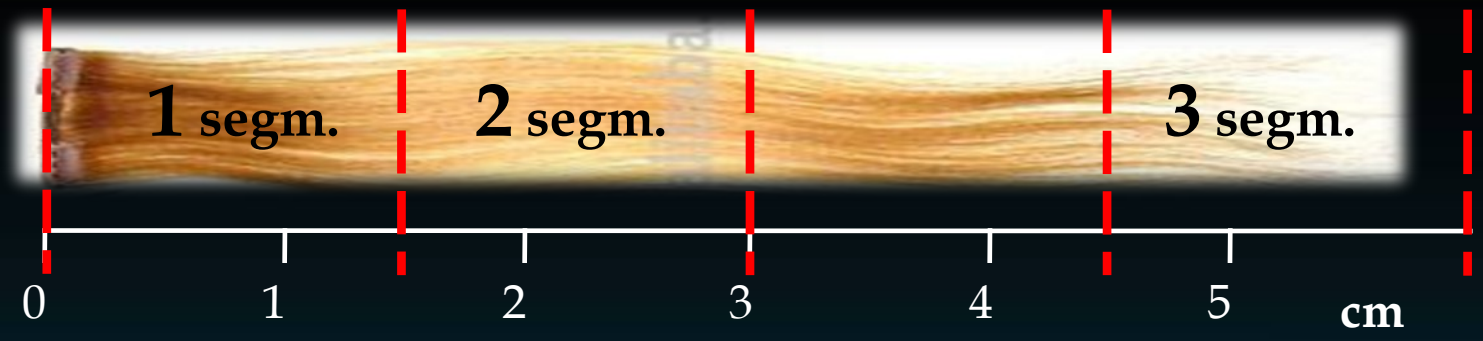
✓ Riassunto

- Ragazza di 28 anni, serata in discoteca con amici
- Consumo moderato di alcol, scambio di birre!
- Sintomi/segni (durata per 36-48 h)
  1. Turbe cognitive/comportam. (confusione, agitazione)
  2. Iperattività neuromuscolare (mioclono, iperriflessia, rigidità muscolare)
  3. Turbe SN autonomo (tachicardia, nausea, vomito, midriasi, visione offuscata, arrossamento cute)
- Accesso a ospedale, screening urinario droghe NEG

Caso n. 2

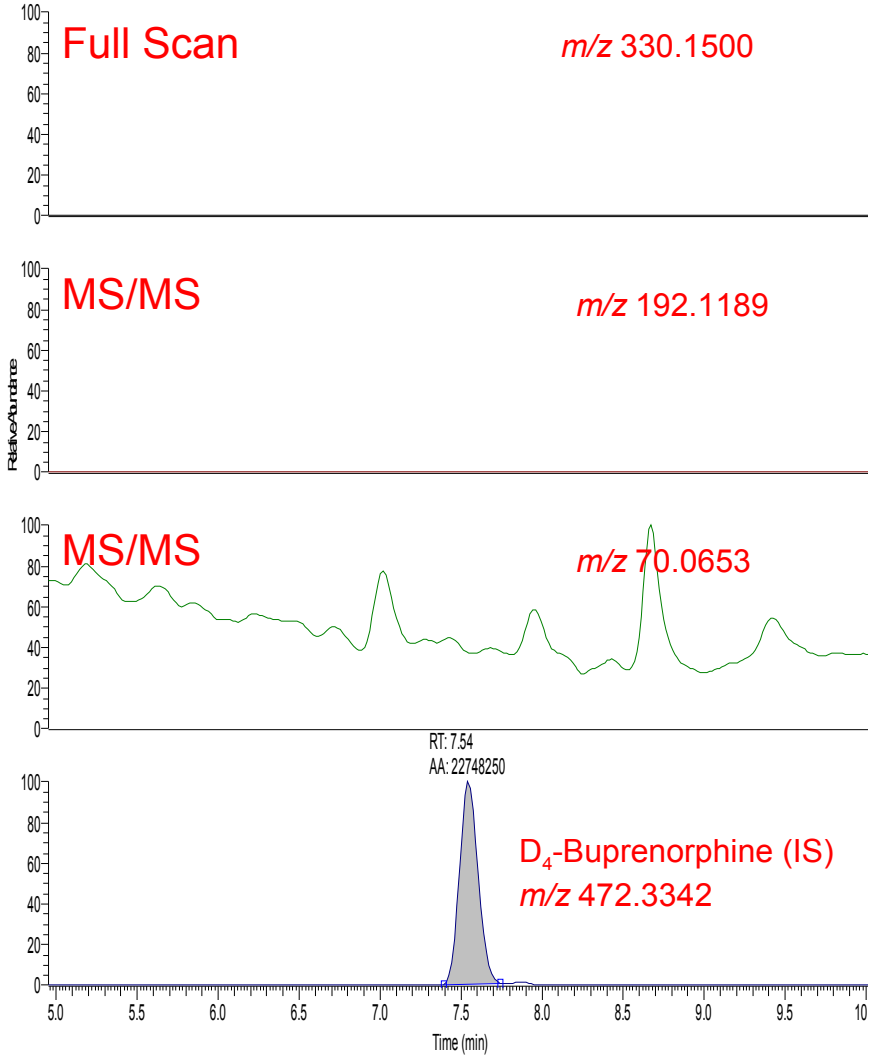
✓ Analisi segmentale dei capelli c/o LIATF

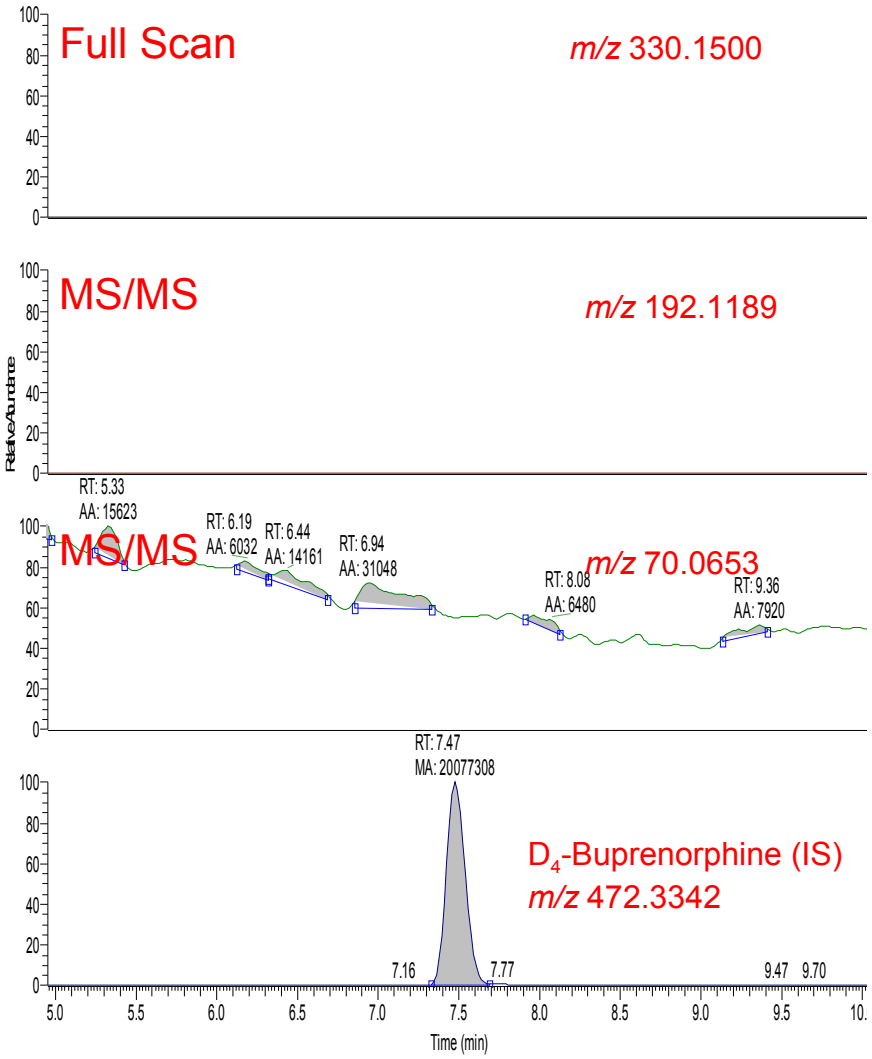
- Analisi dei capelli circa 2 mesi dopo serata in discoteca
- Nessun uso di droghe o terapie farmacologiche
- Tre segmenti capelli: (0 – 1.5) (1.5 – 3) (4.5 – 6) cm



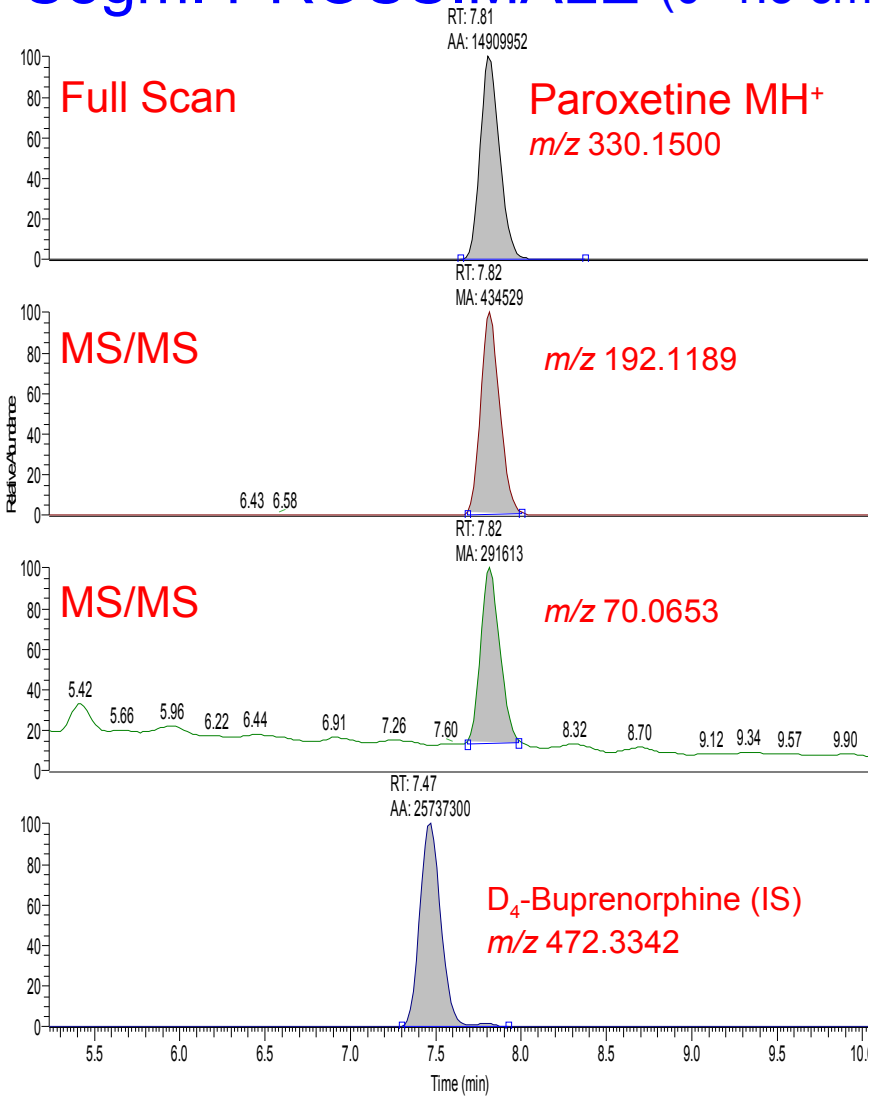
- Tutti i segmenti NEG per sostanze DFSA
- Segmento (0 – 1.5) cm: POS per paroxetina
- Segmenti (1.5 – 3) (4.5 – 6) cm: NEG per paroxetina

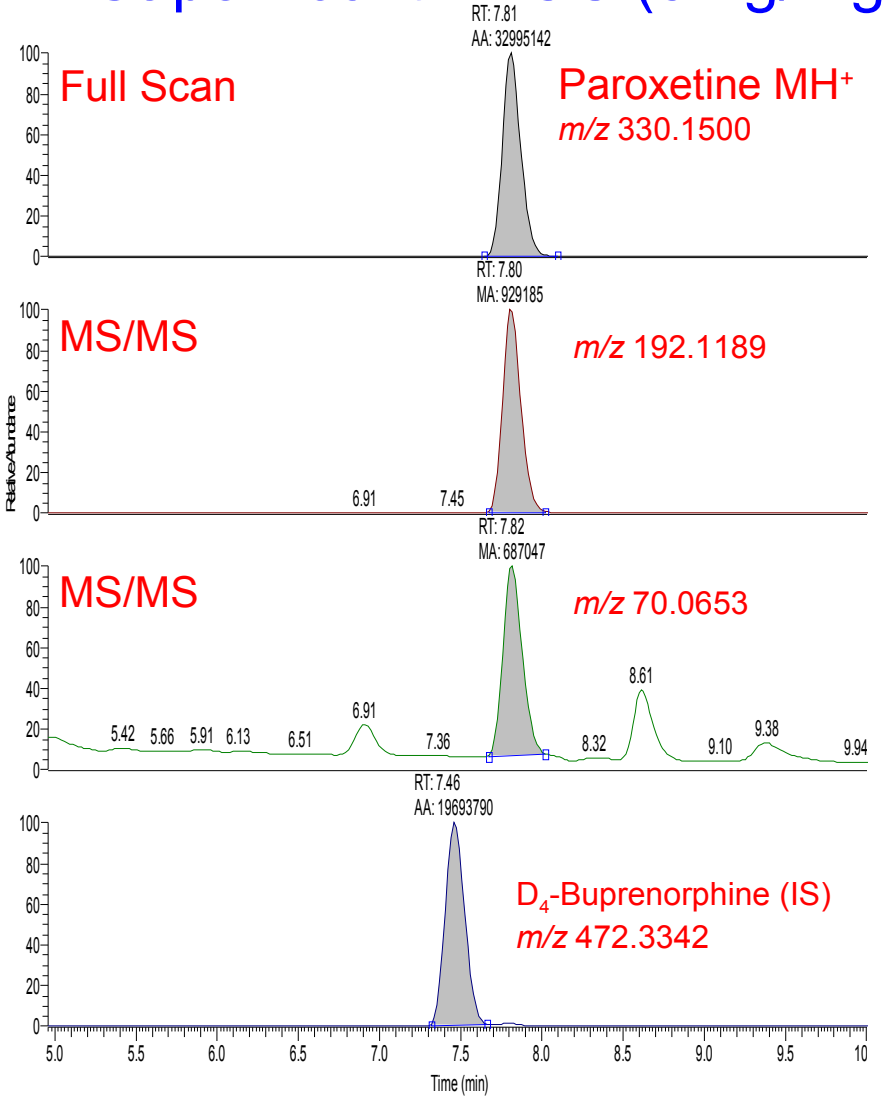
Ricerca Paroxetina nei capelli (LC-HRMS)





Ricerca Paroxetina nei capelli (LC-HRMS)





Caso n. 2 - Conclusioni

1. Positività del segmento prossimale di capelli compatibile con le condizioni cliniche della ragazza.

2. Sindrome serotoninergica causata dalla involontaria assunzione di paroxetina durante la serata in discoteca (scambio di birre?!).

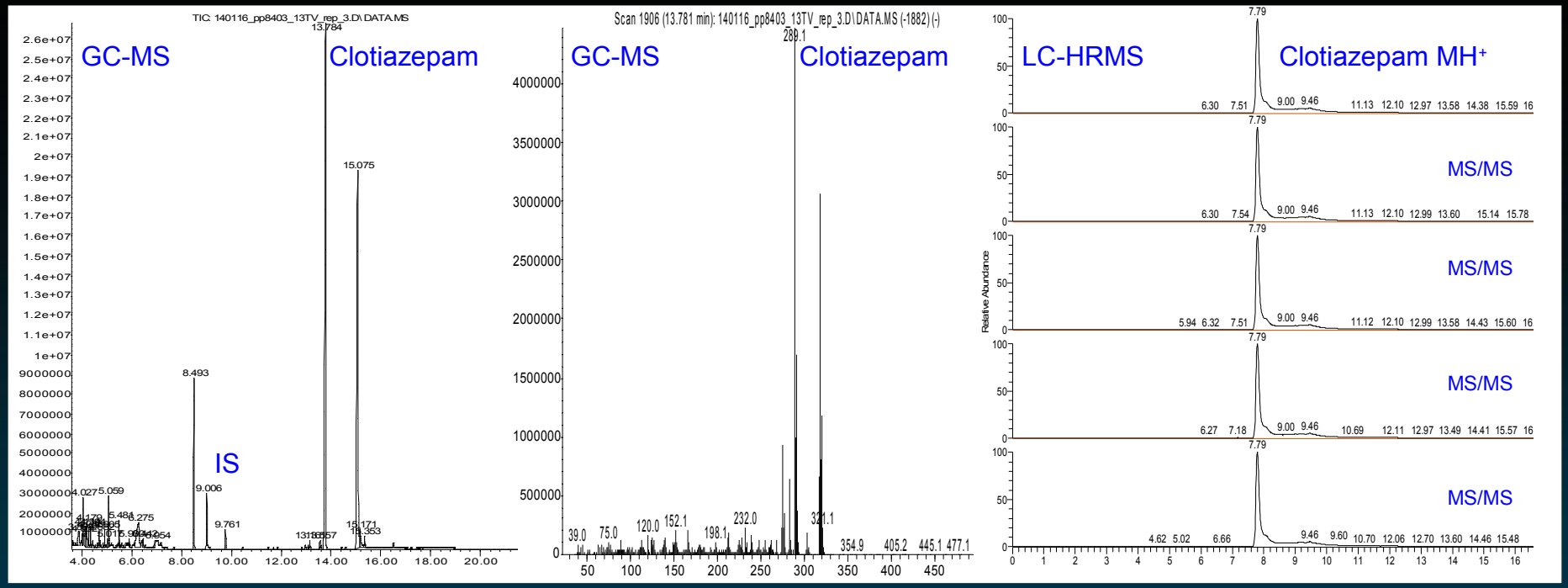
3. Sindrome serotoninergica : sindrome iatrogena, potenzialmente letale, causata da un aumento della serotonina nel SNC, a seguito dell'uso di farmaci (in combinazione o in overdose) che ne aumentano abnormemente la concentrazione (antidepressivi SSRIs come paroxetina, o MAOIs).

Caso n. 3

✓ Riassunto

- Soggetto di sesso maschile, circa 70 anni, incontra a casa propria giovane ragazza per un certo periodo
- Furto notturno nella sua gioielleria
- La Polizia accerta la sottrazione e l'uso delle chiavi del negozio da parte della ragazza
- L'uomo dichiara che la sera del furto gli venne offerta dalla ragazza della Coca Cola
- La polizia recupera in casa e nei dintorni 4 bottiglie vuote di Coca Cola, e ne richiede l'analisi al LIATF

Caso n. 3 – Analisi bottiglie Coca Cola



Caso n. 3 – Analisi segmentale capelli

✓ Clotiazepam

- Benzodiazepina
- Ansiolitico, miorilassante, anticonvulsivante, sedativo
- Tienor, Rizen (compresse, gocce)

Clotiazepam aggiunto a Coca Cola bevuta la sera del furto!!!!

✓ Analisi segmentale dei capelli

- Campionamento effettuato circa 1.5 mesi dopo il furto
- L'uomo dichiara un uso personale occasionale di Rizen gocce!
- Necessità di dimostrare una assunzione maggiore di Clotiazepam in occasione del furto rispetto ai mesi precedenti

Caso n. 3 – Analisi segmentale capelli

Capelli								
Seg mento	S1	S2	S3	S4	S5	S6	S7	S8
Cm	0 -0.5	0.5 -1.0	1.0 -1.5	1.5 -2.0	2.0 -2.5	2.5 -3.0	3.0 -3.5	3.5 -4.0
Conc. (pg/mg)	11	12	8	5	6	5	5	6

Assunzione clotiazepam nel periodo del furto

Assunzione occasionale clotiazepam nei mesi precedenti il furto

Grazie per l'attenzione!