# CAPELLI E PELI: LA MATRICE CHERATINICA

QUESTIONI INTERPRETATIVE

- **Concentrazioni delle sostanze trovate**

- **Ricerca di metaboliti per escludere interferenti o contaminazioni esterne**

- **Contaminazioni "interne" ed "esterne"**

- **Rilascio o ossidazione delle sostanze**

Deterioramento del capello

Mag = 3.50 K X   20µm   Detector = SE1
EHT = 20.00 kV   Date :16 Sep 2010

Mag = 1.50 K X   20µm   Detector = SE1
EHT = 20.00 kV   Date :7 Oct 2010

Deterioramento del capello

Mag = 1.50 K X
EHT = 20.00 kV
20µm
Detector = SE1
Date :7 Oct 2010
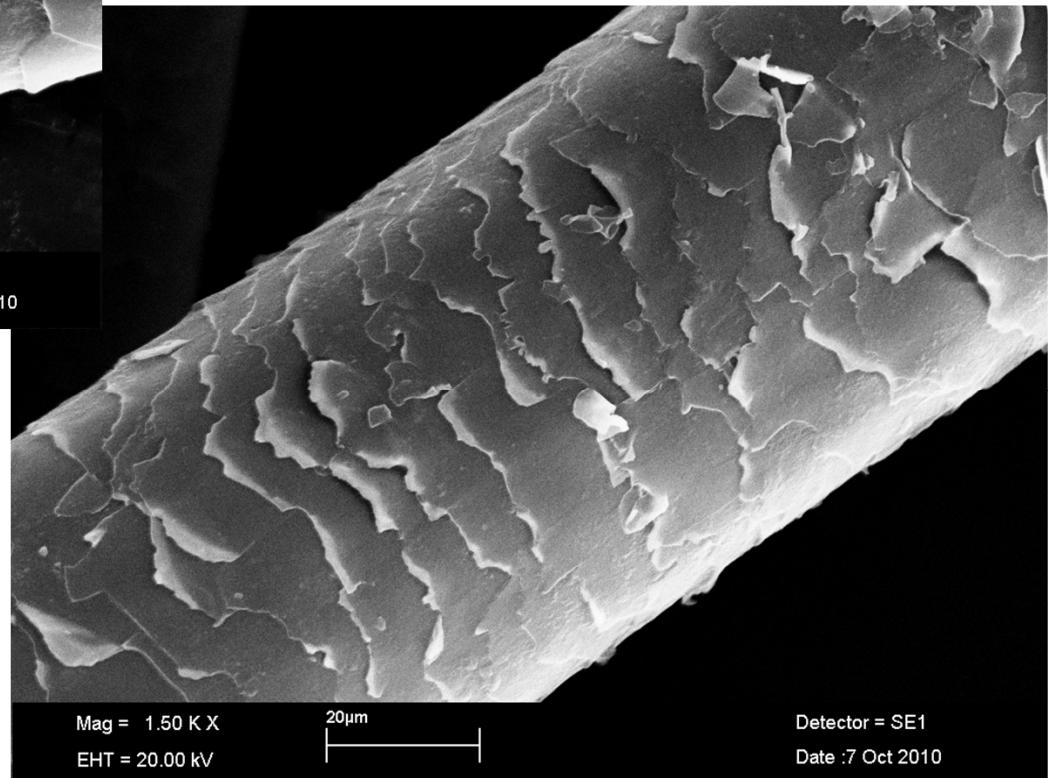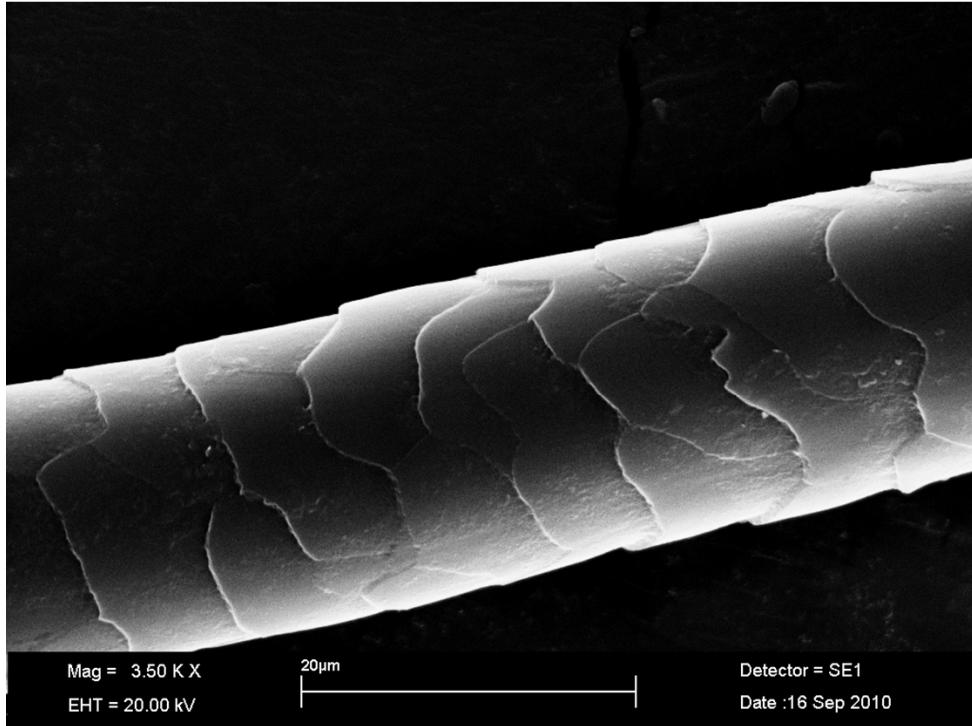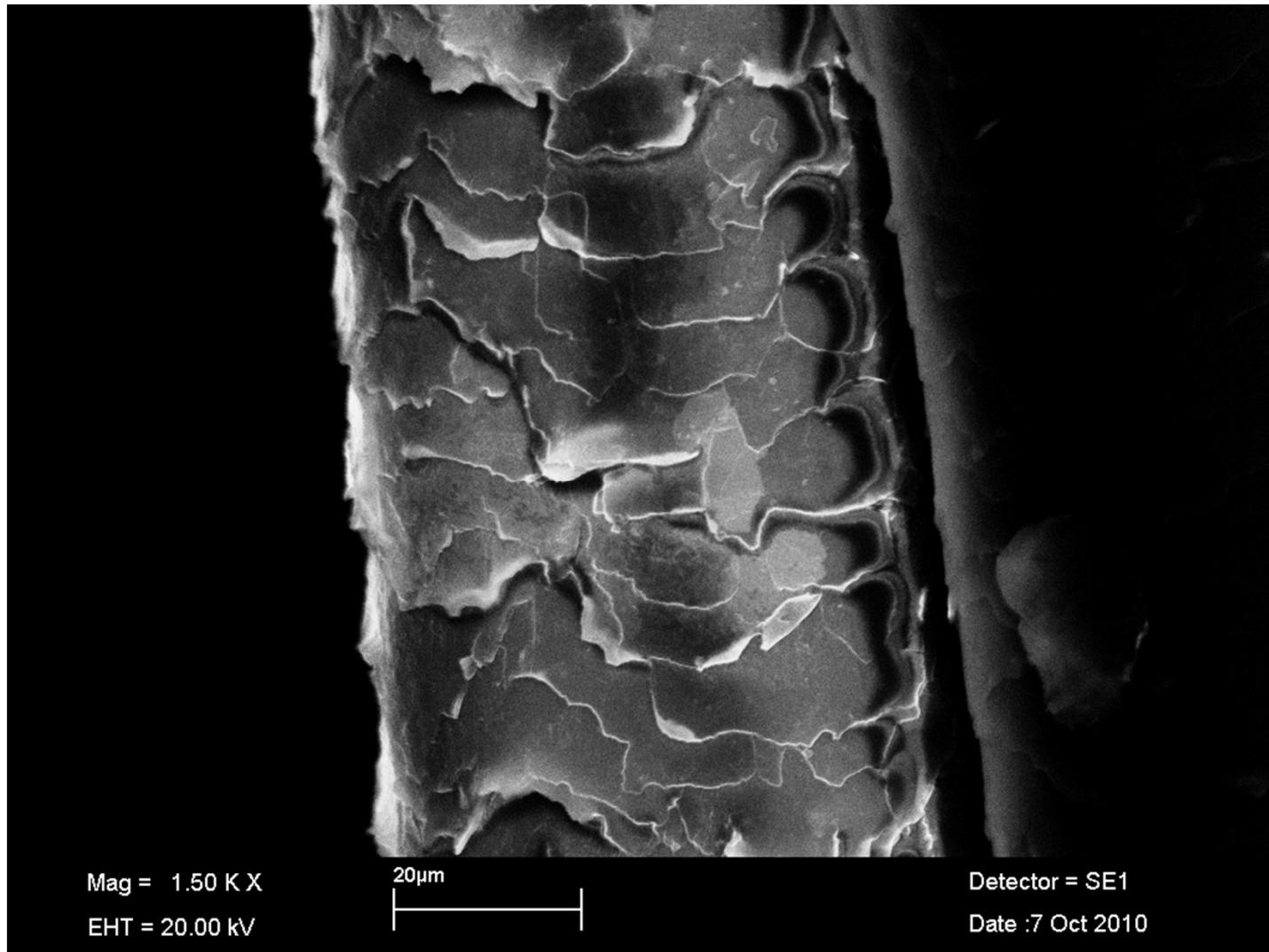
RILASCIO DI Δ^9-THC
TRATTAMENTO CHIMICO

SAMPLE N° 1

TAL QUALE

DOPO 1 TRATTAMENTO

NO VISIBLE DAMAGE

DOPO 5 TRATTAMENTI
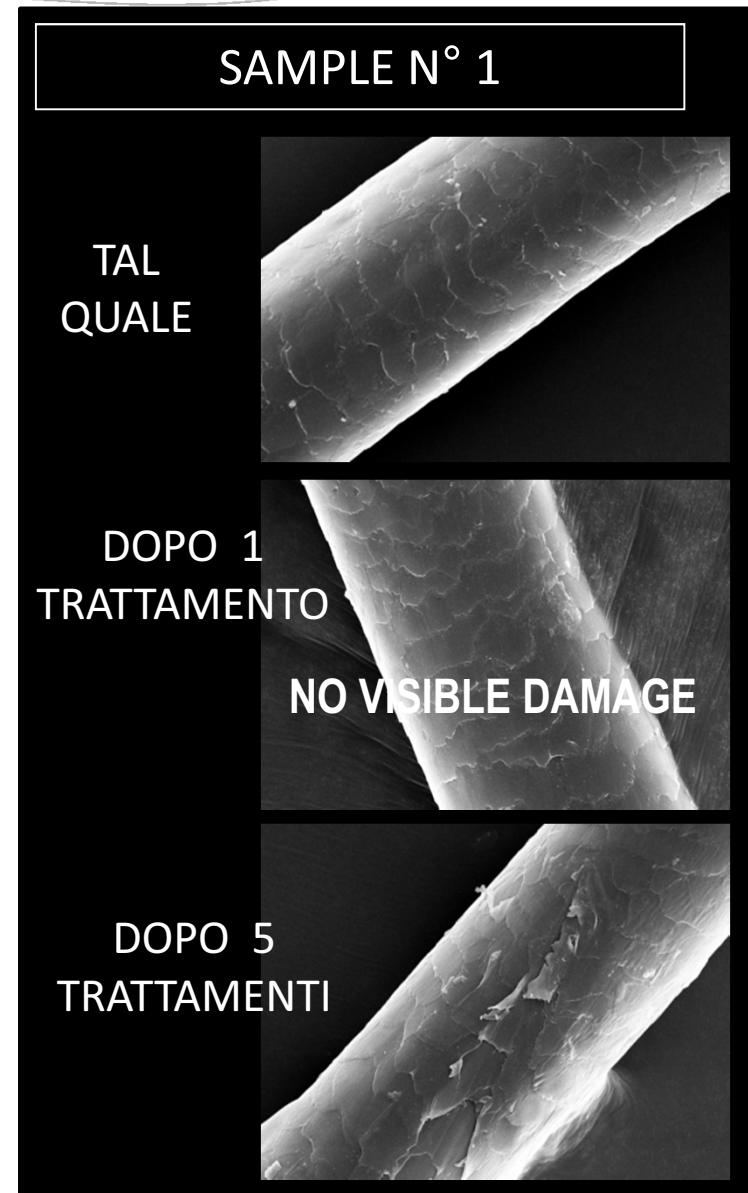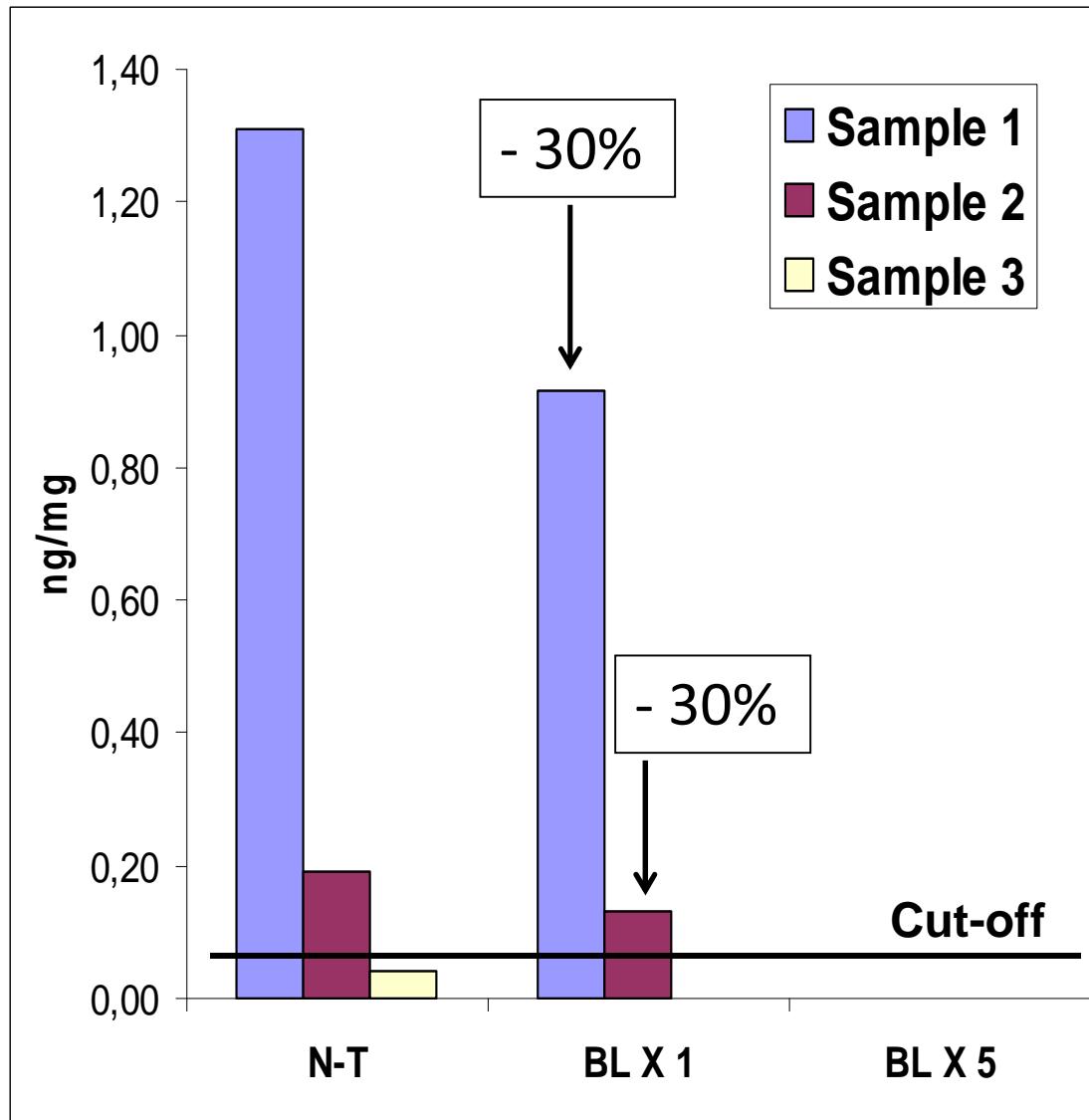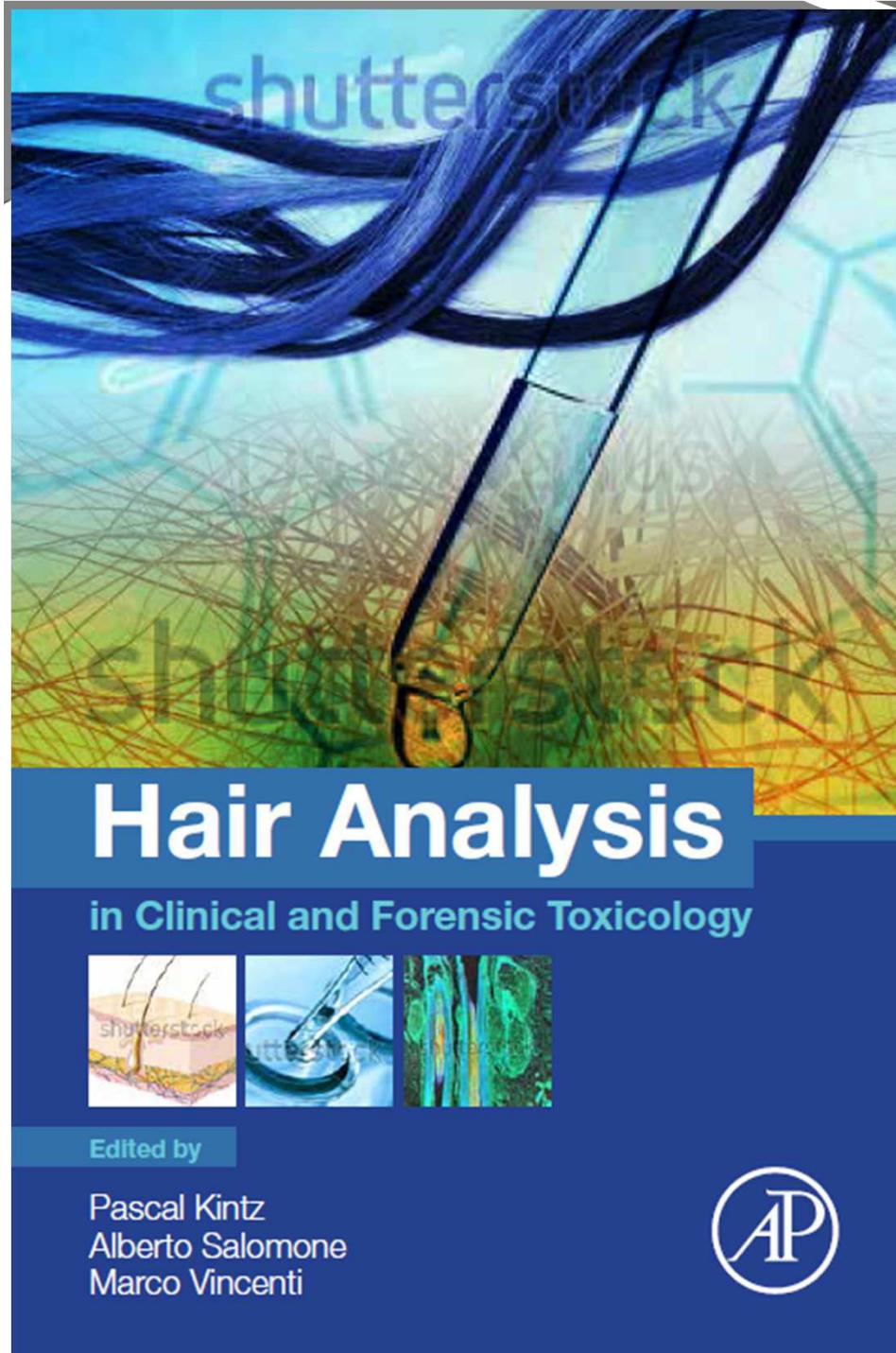
Chapter 12

New Challenges & Perspectives in Hair Analysis

Marco Vincenti & Pascal Kintz

Introduction

Conditioning Factors and Sources of Variability

- Physical and Chemical Agents
- Interaction Between Hair Constituents and Incorporated Substances
- Distribution of the Xenobiotic Substances Within the Hair
- Individual Factors

Innovative Technologies & Instrumental Advancements

- Broad-Spectrum Toxicological Analysis
- Highly Demanding Investigations
- Minute Hair Availability and Single Hair Analysis

Hair Analysis

in Clinical and Forensic Toxicology

Edited by

Pascal Kintz
Alberto Salomone
Marco Vincenti

AUMENTATE POTENZIALITA' – AUMENTATE RESPONSABILITA'

Table 1. Influencing factors and processes

Mean of intake/administration (ingestion, injection, inhalation, absorption)
Metabolism of the substance (kinetics & metabolites' distribution)
Distribution of the marker into the body fluids (blood, sweat, sebum – plus urine, etc.)
Mechanisms of marker transfer from blood, sweat, sebum to hair and relative importance
Mechanism of incorporation of the marker into the keratin structure
Interaction of the marker with melanin by hydrogen bonding (hair color)
Longitudinal and radial diffusion of the marker
Washing-out phenomena (porosity)
External contamination
Physical transformation processes (heat, light)
Chemical transformation processes (oxidants, dyes, strong alkaline agents)
Type of hair (head, pubic, axillary, chest, legs)
Growing rate of hair and phases
Site of sampling (for head hair)
Length of hair sampled and investigated
Decontamination procedure
Hair fragmentation
Extraction of the marker
Purification of the extract
Analytical method
Quantification method

Decomposition by bleaching and UV radiation
Extraction by shampooing and hair cosmetics
Sweat
External sources (dust, smoke, dirty hands, mediated by sweat)
Sebum
Delayed incorporation from surrounding tissues
Incorporation from blood

Table 2. Classification of influencing factors

Individual:
- Genetic determiners & polymorphisms (& their expression)
- Personal factors (gender, age, body-mass index)
- Physio-pathological factors
- Behavioral factors:
  - Mode and frequency of substance intake
  - Hygienic habits
  - Cosmetic habits
  - Diet habits
  - Intake of interfering medicines
  - Clothing habitually used (fabric, heavy/light, special clothes, i.e. hat, foulard, scarf)
  - Other frequent sources of (self)-contamination (i.e. pillow, armchair with headrest)

Environmental (domestic, work-related, leisure-related)
Climatic (meteorological, geographical, seasonal)
Methodological (sampling, sample treatment, analysis)
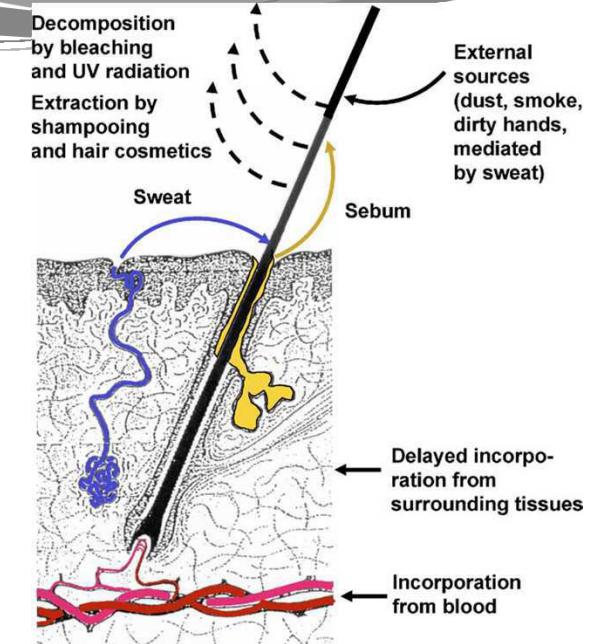
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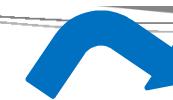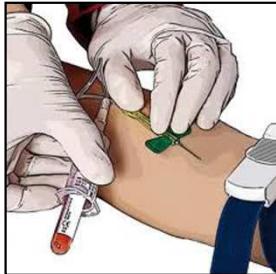
Determinazione di 108 farmaci e droghe in meno di 25 minuti

21:00

Top-left panel (Intensity, cps vs Time):
1. 7-aminonitrazepam (
2. Zopiclone (389.000 >
3. 7-aminoclonazepam
4. Zolpidem (308.100 >
5. 7-aminoflunitrazepam
6. Midazolam (325.900
7. Flurazepam (388.100
8. Bromazepam (315.9
9. Nitrazepam (282.100
10. Lorazepam (321.000
11. Clonazepam (316.00
12. Alprazolam (309.000
13. Triazolam (343.000
14. Desalkylflurazepam
15. Nordazepam (271.00
16. Flunitrazepam (314.
17. Delorazepam (304.9
18. Lormetazepam (335
19. Diazepam (285.000
20.

Top-right panel:
1. Procaine (237.000 > 100.000)
2. Paracetamol (152.000 > 110.000)
3. Dihydrocodeine (302.200 >199.100)
4. Oxycodone (316.000 > 298.100)
5. Norketamine (224.000 > 207.000)
6. Ketamine (238.000 > 125.000)
7. Lidocaine (235.100 > 86.100)
8. Norfentanyl (233.20 > 84.300)
9. Tramadol (264.100 > 58.100)
10. Remifentanil (377.100 > 317.200)
11. Norbuprenorphine (414.200 > 187.000)
12. Pentazocine (286.200 > 218.200)
13. Phenacetin (180.000 > 110.100)
14. Alfentanil (417.000 > 197.200)
15. Phentanyl (337.000 > 188.200)
16. Buprenorphine (468.000 > 55.200)
17. Sufentanil (387.200 > 238.100)
18. Methadone (310.000 > 265.100)

Bottom panel:
1. Oxymorphone (302.200 > 284.000)
2. Atenolol (267.100 > 145.000)
3. Levamisole (204.900 > 178.100)
4. Scopolamine (304.100 > 138.100)
5. Metoclopramide (299.900 > 227.000)
6. Methylphenidate (234.200 > 84.300)
7. Dextromethorphan (272.200 > 171.100)
8. Vardenafil (489.200 > 151.000)
9. Diphenhydramine (256.100 > 167.000)
10. Oxcarbazepine (252.9 > 236.000)
11. Sildenafil (475.200 > 58.100)
12. Diltiazem (415.000 > 178.000)
13. Ramipril (417.200 > 234.100)
14. Carbamazepine (237.000 > 194.100)
15. Tadalafil (390.000 > 268.000)
16. Telmisartan (515.200 > 497.000)
17. Loperamide (477.000 > 266.100)
18. Disulfiram (297.100 > 116.000)