UNIVERSITY OF AMSTERDAM

CO VAN LEDDEN HULSEBOSCH CENTRUM
CLHC

FORENSIC RESEARCH PROJECT

RESEARCH PROJECT

Title	: The Forensic Toxicological potential of bone material
Keywords	: forensic toxicology, bone,
Forensic Expertise Area	: toxicology, analytical chemistry
Department	: research group analysis techniques in the life sciences (ATLS)
Institute/Company	: Avans university of applied sciences
City	: Breda
Country	: NL
Supervisor	: Dr. Ben M. de Rooij
Email address	: bm.derooij@avans.nl
Telephone number	: 06 1023 1886
UVA Examiner	: Prof. dr. Arian C. Van Asten
UVA Coordinator	: Prof. dr. Arian C. Van Asten

SHORT DESCRIPTION

In forensic casework skeleton remains are sometimes found and investigated. DNA can be extracted and analysed but may not match with genetic info in databases. From the toxicological point of view the bone and bone marrow are interesting matrices and relevant compounds were identified in it, for instance: opioids, benzodiazepines and antidepressants were found (Francesretti *et al.* 2020, Vandenbosch *et al.* 2020).
The question could be asked whether other compounds in bone and bone marrow can provide information on the donor. Information on food habits, used medication or hormonal set-up might provide valuable information on the donor, that could help in the identification of an unknown person by narrowing down the search for that person. Other toxicological relevant compounds like pesticides can give valuable information as well.
From the analytical point of view untargeted analysis by High Resolution Mass Spectrometry (HR MS) can identify organic compounds in bone and bone marrow. However, expected concentrations are low and therefore targeted profiling methods can be used to identify compounds in low abundance.
In the research group analysis techniques in the life sciences, targeted profiling was developed in the SherLOK project, where hair samples were used for donor profiling. Also HRMS equipment is available. In the SherLOK methodology 25 markers are determined by LC-MS/MS and GC-MS instruments. Potential new markers can be added from chemical groups like pesticides and antibiotics accumulating in bone material.
The investigation will be performed in bone material provided by the group medical biology at the Amsterdam UMC (prof dr RJ Oostra). Processing and analysis will be performed at the research group ATLS in Breda.

Planning:
Month 1: preparation of proposal

Month 2+3: test protocols for processing bone and untargeted / targeted analysis
Month 4+5: apply protocols to human bones and data-analysis
Month 6: prepare article and presentation

REQUIRED/RECOMMENDED EXPERTISE

We are looking for a motivated student with a biomedical- or chemistry background with a strong interest in Forensic Toxicology. Basic knowledge of analytical chemistry, i.e. mass spectrometry and data science, is beneficial but further training can be offered. The student is curious, shows perseverance and is capable to work with different scientists. Its required that the student can work with human material. The anticipated starting date is January / February 2021.

Interested in this project? Please send CV and motivation letter to Ben de Rooij: bm.derooij@avans.nl.

REFERENCES

Francesretti et al. 2020 Drugs in bone: Detectability of substances of toxicological interest in different states of preservation. J Forensic Sci 2020:00, 1-10, DOI: 10.1111/1556-4029.14636

Vandenbosch et al. 2020 Skeletal tissue a viable option in forensic toxicology? A view into post mortem cases. Forensic Sci Int 309, 110225. http://dx.doi.org/10.1016/j.forsciint.2020.110225 0379-0738