G58 Characterization of Adipocere Formation in Animal Species

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After attending this presentation, attendees will understand the chemical process by which adipocere forms, the requirements for its formation, the types of animal species it has been observed on, and an example of a case study in which its identification was required.

This presentation will impact the forensic community and/or humanity by discussing the value of adipocere as evidence and the limits associated with confirming its human origin in cases of homicide or human rights issues.

The aim of this presentation is to demonstrate the importance of identifying the species origin of adipocere samples collected as evidence. After attending this presentation, attendees will understand the chemical process by which adipocere forms, the requirements for its formation, the types of animal species it has been observed on, and an example of a case study in which its identification was required.

Adipocere is a soft white substance formed postmortem from fatty tissue in a decomposing body. Its formation is characterized by the hydrolysis and hydrogenation of the neutral fats into a mixture of predominantly saturated fatty acids. Under suitable conditions adipocere may form on both human and animal remains. The majority of research investigating adipocere formation has focused on either human remains or porcine remains, as a model for human decomposition. However, no studies of the nature of adipocere formation in other animal species have been reported. This study was conducted as a result of two enquiries from independent forensic laboratories to assist with the identification of adipocere collected as evidence in homicide cases. In both instances, the species origin of the adipocere fragments was in question.

Adipocere was formed in a controlled soil environment by burial of fatty tissue samples of several different animal species. Infrared spectroscopy was used to provide a lipid profile of the fatty tissue and adipocere samples. Gas chromatography-mass spectrometry was employed as a method for the identification of fatty acids in the original tissue and adipocere. Of the six species investigated, adipocere did not form on two of the species due to their reduced fat content. The adipocere that formed from the other species' tissue could not be visually discriminated between species.

The chemical characterization demonstrated identifiable differences in the fatty acid content of the original adipose tissue. Characterization of the adipocere samples also demonstrated differences in fatty acid content however this was determined to be a result of the different rates of formation of each species. The results suggested that the fundamental composition of adipocere is similar regardless of the species on which it formed. There was no evidence to suggest that the chemical composition of adipocere is species-dependent. This conclusion highlights the difficulty associated with determining the species origin of adipocere, whilst also demonstrating the caution, which must be taken when attempting to link adipocere fragments to human remains.

Further studies are presently on-going to determine the feasibility of extracting DNA from adipocere. Extraction of DNA may provide the necessary information for determining species origin, as well as providing further evidentiary value in human identification. This presentation will impact the forensic community and/or humanity by discussing the value of adipocere as evidence and the limits associated with confirming its human origin in cases of homicide or human rights issues.

Adipocere, Species Origin, Characterization

 ** Presenting Author*