



Pathology/Biology Section - 2016

H16 Interactions Between Microbes and Larvae on a Human Corpse

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After attending this presentation, attendees will better understand the interactions between bacteria and insects that are present on the skin of a dead human body.

This presentation will impact the forensic science community by providing information on the two major entities (bacteria and insects) in corpse decomposition, which can be used in the postmortem interval evaluation.

After death, bacteria within the cadaver play an important role in its decomposition. At the same time, when necrophagous insects are present, they actively participate in the body degradation. The postmortem interval determination can be based on the study of necrophagous insects on the body, and studies of the cadaver's microbiota had shown promising results in this area of research. Interactions between specific bacteria and Calliphoridae larvae have been described in studies about maggot debridement therapy, but there are few data on interactions between those two entities in a forensic approach. This study seeks to specify the interactions between bacteria and Calliphoridae larvae, which are found on the skin surface of dead human bodies.

Methods: Two different protocols were performed. The first consisted of sampling larvae on human corpses and extracting their Excretion/Secretion (ES) fluids. Bacterial isolation and identification were performed on the ES using cultural methods, completed by mass spectroscopy for identification. During the second protocol, sterile *Lucilia sericata* larvae were confronted with three bacterial strains — *Wohlfahrtiimonas chitinoclastica*, *Providencia rettgeri*, and *Proteus vulgaris* — (selected in the first protocol) in monobacterial-inoculated petri dishes. Statistical tests were performed on the size and survival of the larvae.

Results: ES fluids were sampled from two different bodies (these experiments are still in progress), with polymicrobial contamination associating bacteria from the intestinal microbiota, the larval microbiota, or the environment. Concerning the interactions between bacteria and larvae, significant differences (KW=11,226, p=0,009) were observed for the larval average sizes depending on their confrontation to different bacterial strains and the control.

Discussion: The bacterial genera or species identified in the ES of larvae sampled on the skin came primarily from intestinal microbiota; however, the association with bacteria coming from the environment or the larval microbiota is in favor of the existence of ecosystems localized in specific areas of the cadaver. Data gained from this research will allow a better appreciation of the human corpse microbiota when colonized by insects, as well as their interactions and could be taken into account when interpreting postmortem interval, which is a major issue in forensic investigations.

Taphonomy, Postmortem Microbiology, Forensic Entomology