

Isolation and Characterization of Human DNA from Mosquitoes (Culicidae)

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In forensic cases of body violence and sexual assaults a number of biological stains have to be analyzed to identify the offender(s). Some stains are highly informative in this respect, e.g. semen stains in vaginal swab or underwear, victim's blood on clothing of the suspect or suspect's blood at the scene of the crime. Other stains, however, may not be deposited at the moment of the crime and are therefore irrelevant for jurisdiction. Even after prolonged storage, high molecular weight DNA can be prepared from specimens like cigarette butts, hair roots and dry blood or semen stains.

Considering this, we investigated whether mosquitoes present at the crime scene during an assault could be useful as "silent" witnesses of the event and help to identify individuals involved. Especially in southern or (sub) tropical countries, where mosquitoes are abundant throughout the year, these insects may be important stain carriers in addition to conventional ones. Human blood cells in their digestive tracts and, as a consequence, human genetic DNA is gradually degraded. Therefore, under certain circumstances mosquitoes may be useful to identify persons spending the preceding night(s) at the location.

We collected mosquitoes at daybreak, prepared DNA from the digestive fluid using standard methods with subsequent purification on Chroma spin-100 columns (Clontech). To monitor the amount and quality of the isolated human DNA and to determine from which person(s) the blood originated, we used commercial HLA-DQ α and D1S80 amplification kits (Perkin Elmer/Roche).

Here we present results which show that sufficiently high molecular weight human DNA can be isolated from mosquitoes killed at dawn or up to 26 hours later. Therefore, mosquitoes can be alternative stain carriers for the identification of persons who were present at the crime scene within a certain period of time.