

THE USE OF PROTEOMICS TO DETERMINE THE AGE OF INCISION WOUNDS FOR FORENSIC PURPOSES

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Determining the age of a wound is an important part of the forensic investigation. In cases where there are multiple stab wounds, it can allow investigators to determine the order in which the wounds occurred. It can also be used to determine the survival time of a victim, after wounding. Forensic pathologists generally rely on microscopic investigation of stained histological sections for features such as the inflammatory cell infiltrate to gain an estimation of wound age. However, these traditional techniques have limited accuracy and little application in early wounds before a cellular reaction occurs. This study aims to use proteomics to either provide a method for determining the age of acute wounds, or to identify proteins that may be used as markers of wound age.

Three centimetre incision wounds were created on the backs of rats. These wounds were allowed to heal for specific time periods (giving wounds of known age) before the rats were euthanased and the wounds excised. Wounds of the following ages were created: 5, 15, 30 and 60 minutes, 3, 6, 12 and 24 hours and 2, 5, 7 and 12 days. The samples were solubilised in a solution containing Urea, Thiourea, CHAPS, DTT, TBP and carrier ampholytes and the proteins were separated using 2D gel electrophoresis. The gels were then analysed using PDQuest and the protein spots were identified using the Voyager MALDI-TOF MS.

The major proteins have been identified on the normal gels (from unwounded samples) to create protein maps in which the wound gels can be compared. Any proteins that either appear on the wound gels that are not on the normal gels, or that are up regulated in wound gels will then be identified as possible markers of wound age.