WESTERN SYDNEY
UNIVERSITY

Nanoscale Organisation
and Dynamics Group

Bruises – Moving on to MRI

A/Prof Neil Langlois
Forensic Science SA
University of Adelaide, SA

Abstract Bruises are created by blunt force trauma on the skin resulting in rupture of blood vessels releasing blood, which contains haemoglobin, into the tissue. Haemoglobin comprises a porphyrin ring containing iron in a ferrous (2+) state that can reversibly combine with oxygen. The blood in a bruise is initially oxygenated, but will become deoxygenated, particularly in the post-mortem situation. In the living victim, there is an inflammatory reaction to the trauma resulting in break down of haemoglobin. The porphyrin ring is split to biliverdin, which is then converted to bilirubin. The iron is released, oxidised (to Fe^{3+}) and taken up by ferritin, which is then polymerised into hemosiderin. In addition, some of the haemoglobin may transform to methaemoglobin (in which the iron is oxidised).

The age of a bruise can be an important forensic issue as it can prove or refute an assault took place at a given time. Studies that have observed the colour changes in bruises have determined that development of a yellow colour indicates a bruise is not recent. Spectrophotometry has been utilised in an attempt to improve accuracy with reported success. However, this method is limited by the penetration of light into the skin, which restricts its use to bruises that are visible. As blood can move due to the effects of gravity and travel along planes of least resistance the site a bruise appears may not represent the initial site of trauma. Thus, the visible component may be 'younger' than the injury site that will contain the maximal region of inflammatory reaction resulting in blood degradation representative of the true age of the bruise. This problem could be approached by obtaining a biopsy sample of the area of the bruise to assess under the microscope. However, in a living victim this would convert a closed injury into an open one with potential for scarring and infection. Magnetic resonance imaging is proposed as a non-invasive method to study bruises to determine their age.

Profile A/Prof Neil Langlois qualified as a doctor at the University of Cambridge, UK, but always wanted to be a forensic pathologist. During his training he was introduced to the problem of ageing of bruises by his honours supervisor, Prof Austin Gresham, which lead to a study while working in an accident and emergency department. Having moved to Australia he started his consultant career at the Westmead Department of Forensic Pathology, continuing his research on bruises, including collaboration with the University of Western Sydney (as it was then). Now in Adelaide he is supervising projects at the University of Adelaide and Flinders University as well as collaborating with Monash University and the Victorian Institute of Forensic Medicine to investigate bruises.

Staff and students at all levels are welcome to attend.

Venue and Time:
This talk will be held on Wednesday 14 September at 2 pm at the Campbelltown Campus in Building 21, Lecture Theatre 5 (CA.21.G.03).

Enquiries:
Prof. William S. Price
Ext. 0404 830 398
e-mail: w.price@westernsydney.edu.au