



## Pathology Biology Section – 2007

### G78 Pig-Mentation: Postmortem Iris Color Change in the Eyes of *Sus Scrofa*

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After attending this presentation, attendees will learn that iris color of a deceased individual is not reliable for identification, and will have an appreciation of the implications of this phenomenon within the context of victim identification, particularly in mass fatality incidents.

This presentation will impact the forensic community and/or humanity by demonstrating the protocol for victim description, particularly in mass fatality incidents, should be modified in order to account for the taphonomic phenomenon of eye color change.

Eye color is one of the physical characteristics recorded in a missing person report and in a victim identification report. Software programs are employed, by law enforcement and disaster management agencies, to compare the two sets of data, searching for potential matches and eliminating individuals if the data are inconsistent.

A thorough review of the literature revealed that postmortem iris color change is mentioned in only two forensic pathology texts, by the same author. A study on the preservation of contact lenses using the eyes of *Sus scrofa* (domestic pig) also mentions the phenomenon of blue eyes changing to brown after death.

While experienced forensic pathologists should be familiar with the phenomenon of postmortem iris color change, it is not common knowledge among death investigators. Victim identification forms and disaster victim identification software currently in use in the United Kingdom, Canada and internationally contain a field for eye color. Moreover, recording eye color is standard routine in the external examination in an autopsy.

In order to determine whether Knight's references (2004 and 1997) are anecdotal and/or whether Jackson (2001) observed an anomaly, a controlled experiment of postmortem changes to isolated *Sus scrofa* eyes was carried out. The eyes (n=137) were observed for three days postmortem at three different temperatures. In addition, a *Sus scrofa* head with *heterochromia iridium* (two different colored eyes) was obtained in order to observe decompositional changes of eyes *in situ*.

All isolated blue eyes in the experiment, at room temperature and higher, changed to brown/black within 48 hours. The *in situ* blue eye, at room temperature, turned brown/black within 72 hours. In fact, the *in situ* blue eye was indistinguishable from the *in situ* brown eye, and the change occurred prior to decomposition of the eye itself.

Blue eyes kept at a cool temperature exhibited signs of iris color change, but all of the eyes were still recognizably blue after 72 hours.

Drying of the sclerae in isolated eyes also occurred, the result being that the entire globe turned black concomitantly with the iris color. The sclerae of the *in situ* eyes with open lids, however, remained white and fresh-looking, and the blue eye changed to brown/black within 72 hours.

The possible role of the vitreous humour, which also turned black postmortem, is explored. The quantity of free melanin granules in the vitreous increases with postmortem interval. This is likely a result of the degradation of melanocytes in the retinal and choroids layers of the posterior chamber, in a process driven by autolysis. Further histological studies are required, including quantified melanin granule counts of vitreous humor samples using scanning electron microscopy.

Most importantly, further studies are required on human eyes to explore the reliability of this phenomenon and the conditions driving it. If postmortem iris color change occurs consistently in humans, then this taphonomic artifact will have to be taken into account when recording eye color in victim identification reports. This is particularly relevant in cases of mass fatalities, when victims may be exposed to the elements for up to several days, and a discrepancy such as eye color in antemortem and postmortem data may delay identification when processed by disaster victim identification software.

**Iris Color Change, Postmortem, Taphonomy**