The outermost cuticle of hair structure functions as a protective scales layer, where the scales overlap and arrange in the direction of hair root towards the hair tip. These scales form a unique pattern with distinctive characteristics and it is useful for forensic scientists in identification of animal species during an investigation of hair samples (1,2). Hair samples of four species from Felidae family were observed using scanning electron microscope, i.e. bengal tiger (Panthera tigris tigris), gir lion (Panthera leo), leopard cat (Prionailurus bengalensis) and sumatra tiger (Panthera tigris sumatrae). No cleaning procedure was employed to ensure the appearance of the hair samples is in its original condition. In Felidae family, hair cuticular pattern of all species showed regular wave pattern, transversal hair cuticular orientation with smooth cuticular dorsal margin (Fig 1) except gir lion (Fig 2), which possesses rippled cuticular dorsal margin. Statistical analysis showed that there is significant mean difference of average scale layer difference measured four species of animal chosen, bengal tiger showed significant higher average scale layer difference as compared to sumatra tiger and leopard cat. We found that gir lion could be identified through its rippled cuticular dorsal margin while scale layer difference need to be measured in order to distinguish between bengal tiger, sumatra tiger and leopard cat. We also found out that cuticular scales pattern and other related characteristics could still be observed clearly even though the samples did not undergo any significant cleaning procedure. This study showed that the examination of cuticular morphology of hair samples combined with measurements are conclusive enough to draw solid identification up to between different subspecies animal level (3, 4). As compared to other group such as the deer group, no such difference could be observed.

References


Acknowledgement: The authors acknowledged the contribution from National Zoo of Malaysia,
Fig. 1: Hair of Bengal Tiger

Fig. 2: Hair of Gir Lion