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The Anatomy and Histomorphology of the Uropygial Gland in New Zealand Endemic Species

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Abstract

Considering that there are more than 10,000 species of birds on earth, and that the uropygial gland is the most prominent integument gland in this vertebrate group, it is puzzling that little is known about its morphology and function. The current hypotheses for the function of the uropygial gland can be placed into four groups: 1) feather maintenance; 2) water-proofing; 3) intraspecific communication/health; and 4) defence against predators and/or parasites. Several studies have examined these hypotheses, although no general function for the uropygial gland has been established.

This thesis aimed at reducing the gap in knowledge of the uropygial gland by investigating New Zealand birds. The purpose of this study was to examine the anatomical and histological structure of the uropygial gland in New Zealand birds and to investigate the defence hypothesis as a function of the gland specifically in brown kiwi (*Apteryx mantelli*).

Anatomical and histological analyses of the uropygial glands from brown kiwi, great spotted kiwi (*Apteryx haastii*), hihi (*Notiomystis cincta*), New Zealand bellbirds (*Anthornis melanura*), tui (*Prosthemadera novaeseelandiae*), and saddleback (*Philesturnus carunculatus*) were carried out. The anatomy and histology of all glands were compared both within family and order and to those available from other species worldwide. The defence hypothesis function of the uropygial gland was investigated using the tick species *Ixodes anatis* from the skin of brown kiwi.

This study revealed a range of uropygial gland characteristics in the kiwi, hihi, New Zealand bellbird, tui, and saddleback that were not known to previously exist in other species. For example kiwi uropygial glands were found to possess eight primary sinuses. Comparison of the New Zealand passerines revealed that bellbirds possess the largest gland in relation to body size out of the four species. The uropygial secretion of brown kiwi may play a role

in parasite repellence as both males and female ticks were deterred from the secretion. Based on histomorphology I suggest that rather than a single function, the gland may have species/group functions. However, this hypothesis still remains enigmatic due to the lack of birds studied to date.

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