

FURTHER OBSERVATIONS ON IGF-1 AND IGF-2 RECEPTORS IN THE ANTLER TIP

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Previous receptor studies have shown that antler tissues bind IGF-1 and IGF-2 but not GH (1,2). This indicates that IGF action is essentially endocrine and generates interest in the nature of the receptors in each histological zone, and their possible function.

Red deer antler tips in the growing phase were removed 60 days after the recommencement of growth and subjected to autoradiographical studies. Cryosections were incubated with ^{125}I -oIGF-1 or ^{125}I -oIGF-2, with or without $1\ \mu\text{g/ml}$ IGF-1, $1\ \mu\text{g/ml}$ IGF-2, $10\ \text{ng/ml}$ insulin or $10\ \mu\text{g/ml}$ insulin. Sections were fixed, exposed against X-ray film, then gamma counted for affinity studies and Scatchard analysis, or exposed to photosensitive emulsion for radiographic grain counting and statistical analysis. Specific binding of radiolabelled hormone to receptors was calculated as the difference between total and non-specific binding, and the ability of unlabelled competing hormones to reduce specific binding was determined by the difference between total and residual binding. Sections were stained with toluidine blue to detect acid mucopolysaccharides as an indicator of chondroblast maturation.

^{125}I -IGF-1 showed highest specific binding in the chondroblast zone to a receptor demonstrating binding characteristics of the type 1 IGF receptor. The lowest specific binding of ^{125}I -IGF-1 was to prechondroblasts. Affinity studies for each histological zone of the antler showed that the epidermis and dermis bound IGF-1 with a different pattern of affinity to the cartilaginous zones. ^{125}I -IGF-2 showed highest specific binding to prechondroblasts in the reserve mesenchyme and perichondrium, to a receptor demonstrating binding characteristics of the type 2 IGF receptor. IGF-1 receptors were most dense in the chondroblast zone to areas of high concentrations of acid mucopolysaccharides. IGF-2 receptors were most dense in areas of cell proliferation.

These findings provide little support for IGF-1 being a mitotic factor in antler growth. It appears that IGF-2 may have a role in hyperplasia in the antler. The presence of type 1 receptors in the chondroblast zone implicates IGF-1 involvement in cartilage formation through matrixogenesis. The role of IGF-1 in the epidermis and dermis is not clear, and IGF-1 binding is possibly not predominantly to a type 1 IGF receptor.

1. Elliott *et al.* (1990) Proceedings of the New Zealand Society of Endocrinology, Abstract 5
2. Ambler *et al.* (1990) Proceedings of the New Zealand Society of Endocrinology, Abstract 4