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CONTROL OF ANTLER OSSIFICATION AND NECK MUSCLE HYPERTROPHY BY TESTOSTERONE. IS INSULIN-LIKE GROWTH FACTOR-I (IGF-I) INVOLVED ?

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In deer, antlers and the expansion/regression of *M. splenius* are secondary sexual characteristics which show dramatic changes in association with seasonal levels of plasma testosterone (1). This study was undertaken to examine the type I IGF receptor populations in antlers during normal growth, and the effect of stimulation by testosterone on receptor populations in both the antler and *M. splenius*.

Fallow deer antlers from seven animals were collected on days 20 to 100 of growth after casting of old antlers. Nine additional bucks were treated with a synthetic testosterone preparation after 50 days of new antler growth and the antlers collected after days 1 - 10 of treatment. The same bucks underwent biopsy of the *M. splenius* after 1 - 10 weeks of testosterone treatment. Cryosections from all samples were used for ^{125}I-IGF-I binding studies by autoradiography, and macroautoradiographs were analysed using computer densitometry.

In the antler, specific binding of ^{125}I-IGF-I increased throughout development in the cartilaginous zone, with a marked increase during ossification (80 - 100 days). With testosterone treatment, specific binding for ^{125}I-IGF-I increased after 10 days (60 days of growth), equivalent to 80-100 days of normal antler growth. In the *M. splenius*, densitometric analysis did not demonstrate specific ^{125}I-IGF-I binding, despite hypertrophy of the muscle being noted throughout the treatment period.

These results indicate that testosterone treatment has effects on antler growth and ossification which are associated with changes in ^{125}I-IGF-I binding. In the *M. splenius*, testosterone stimulated hypertrophy was apparent but no binding sites for ^{125}I-IGF-I were detected. Possibly the effects of testosterone are mediated through different hormonal systems in these two tissues.

1. Asher G W, Peterson A J and Bass J J (1989) *Journal of Reproduction and Fertility* 85:657-665