

Effect of Age on Testosterone Response to a Single Injection of hCG in Male Alpacas

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In alpaca, age at puberty is variable and the factors regulating the pattern of puberty and sexual maturation are a subject of controversy. Plasma testosterone level is often used as an indicator of sexual maturity. Limited published information is available, and suggests that plasma testosterone concentration in 11-month-old is similar to those found in adult males. In order to better investigate sexual maturity in the male alpaca we have tested the response of male alpacas to a single injection of human chorionic gonadotropin (hCG). Our hypothesis is that hCG treatment will cause an increase in testosterone level that is correlated with animal age. The specific aim of the present study was to investigate the testicular tissue response to a single hCG injection by monitoring the serum testosterone concentration.

Eighty four (n=84) males ranging in age from 6 to 60 months were used in this study. Alpacas were grouped based on their ages into 15 groups. Each group had three to five male animals, kept in enclosures and receive ad libitum grass hay and water. Blood samples were collected from the jugular vein before treatment with hCG and 2 hours after intravenous administration of 3000 IU of hCG (Chorulon[®]). Blood samples were stored at 4 °C overnight to clot. After centrifugation at 3000 x g at 4 °C for 25 min., the serum was harvested and stored at -20°C until assayed for testosterone level by radioimmunoassay. The effect of age on basal testosterone level and response to hCG treatment was evaluated by Analysis of variance.

Basal serum testosterone concentrations were very low (<0.1ng/ml) until 9 months of age. Although basal serum testosterone concentrations increased steadily with age there was a significant variation amongst male within the same age group. Administration of 3000 IU of hCG, IV resulted in an average increase of 50% (P <0.05) in serum testosterone concentration after 2 hours. The percentage increase in serum testosterone in response to hCG stimulation varied from 51 to 81%. There was no correlation between the degree of response and age. However, the response to hCG injection presented a two modes of increase depending on the age of animals. The first mode occurred at ages 9 to 14 months and the second mode was observed between 22 and 36 months.

In conclusion, our results suggest that testicular growth and sensitivity to LH stimulation may be bimodal in the male alpaca with a rapid increase in growth and sensitivity between 9 and 14 months of age and a second phase of increased responsiveness after 21 months of ages. Histological and molecular studies are underway in order to determine the correlation between age, testosterone production and initiation of spermatogenesis. The large variation amongst males within each age group suggests that there may be some genetic factors involved in sexual development which merit investigation.