Circulating Insulin-like Peptide 3 and Testosterone Concentrations in Saanen Bucks during Sexual Development

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Abstract

Insulin-like peptide 3 (INSL3) and testosterone are known as hormones of testicular origin and play an essential role in male sexual development. The present study attempted to: (1) quantify circulating INSL3 and testosterone concentrations. (2) examine the association between each hormone concentration and body parameters (body weight, height at withers and scrotal measurements) of Saanen bucks during sexual development. The blood samples were taken from normal male Saanen goats (n=41) at three distinct age groups, i.e., below 06 months (group I; n=11), between 06 – 12 months (group II; n=14) and above 12 months (group III; n=16). Along with body weight, height at withers and scrotal circumferences were collected. Serum INSL3 and extracted testosterone were measured using competitive ELISA. The detection ranges of INSL3 and testosterone assays were 0.08 to 80 ng/mL and 0.01 to 40 ng/mL, respectively. The intra and inter-assay coefficients of variations were 7.7% (n=4) and 11.7% (n=2) for INSL3 and 9.9% (n=6) and 14.9% (n=2) for testosterone. Serum INSL3 concentrations varied from 3.66 ± 0.41 to 13.76 ± 1.63 ng/mL in Saanen goats and concentrations increased ($p<0.01$) from group I (3.66 ± 0.41 ng/mL) to group II (11.84 ± 1.18 ng/mL). However, there was no difference ($P > 0.01$) between group II and III. Testosterone concentrations ranged from 0.13 ± 0.03 to 0.28 ± 0.08 ng/mL and there was no difference ($p<0.01$) among three age groups. Serum INSL3 and testosterone concentrations were positively correlated ($r=0.46$; $p<0.05$). A strong positive correlation was observed between INSL3 and scrotal circumference ($r=0.74$; $p<0.05$). Furthermore, INSL3 was positively correlated with body weight ($r=0.68$; $p<0.05$) and height at withers ($r=0.35$, $p<0.05$). Testosterone showed relatively low correlations with scrotal circumference ($r=0.37$; $p<0.05$), body weight ($r=0.63$; $p<0.05$) and height at withers ($r=0.22$; $p<0.05$). In conclusion, the dynamics of INSL3 seemed to be more consistent with the development of Saanen goats and showed a strong correlation with scrotal development. Circulating INSL3 demonstrates a potential as a testicular biomarker for the sexual development in Saanen goats.

Keywords: Enzyme immunoassay, INSL3, Saanen, Sexual development, Testosterone

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