

AGE-ASSOCIATED EXPRESSION OF VDR AND VIT D METABOLIZING ENZYMES IN MALE REPRODUCTIVE TRACT AND SPERM OF SHEEP

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Introduction

The cellular response to Vitamin D (Vit D) is complex and depends not only on Vitamin D receptor (VDR) but also on activity of Vit D-metabolizing enzyme (CYP2R1, CYP27A1, CYP27B1, and CYP24A1). To enhance our knowledge of Vit D function in male reproduction, this study evaluated the expression of VDR and Vit D-metabolizing enzymes in the ram reproductive tract at different ages and in spermatozoa.

Materials and Methods

15 Hu sheep were divided into three groups (3 M, 9 M and 24 M). The epididymis and testes were collected for qRT-PCR, WB and IHC analysis. The cauda epididymis and fresh ejaculate spermatozoa were collected from 24 Hu sheep for IF, qRT-PCR and WB analysis. Sperm motility was detected by CASA and divided into high- ($\geq 80\%$) and low-motility ($\leq 50\%$) group.

Results and Discussion

VDR and Vit D-metabolizing enzymes were found to be expressed in the ram testes, epididymis, and mature spermatozoa suggests that Vit D might play key roles in spermatogenesis and sperm maturation. VDR and CYP24A1 were mainly concentrated in the mid-piece of ejaculated or cauda epididymis spermatozoa or both. Moreover, VDR and CYP24A1 expression was higher in high- than in low-motility sperm, which suggests that VDR and CYP24A1 can serve as biomarkers of semen quality. Lastly, the marked higher VDR and CYP27B1 expression levels in ejaculated than in cauda epididymis spermatozoa, which suggests that Vit D may be necessary for the motility of spermatozoa. These findings provide further compelling evidences of the pivotal role of Vit D in male reproductive functions, which could suggest the influence of Vit D on the efficiency of sheep fertility. However, the underlying mechanisms have not been completely clarified; therefore, further investigation is required to elucidate the functions of Vit D₃ in reproduction.