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Polymorphisms GDF9 and FSHR Genes and its Association with Litter Size in Egyptian Goat Breeds

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Abstract

Phenotypic evaluation and culling of candidate animals for traits by applying traditional animal breeding are usually costly tasks which require considerable time to be carried out. Molecular genetics as an alternative method enables animal breeders to select eligible animals for the desirable trait(s) at their earlier ages. Selection based upon markers could result in increasing accuracy as well as selection response of animals. This research was performed for screening polymorphism of growth differentiation factor 9 (GDF9) and follicle stimulating hormone receptor (FSHR) in two goat breeds Zaraibi and Baladi of Egypt. Both breeds are more prolific than other goat breeds found in the country. To find molecular markers to associate with litter size, animals were selected based on single birth (SB) and multiple births (MB) history. Forty samples were collected from each breed. In Baladi goat breed, polymorphic restriction pattern indicate presence of one band with 710 bp among all SB does, and three bands with 710, 600 and 100 bp for MB does. In Zaraibi goats, polymorphic restriction pattern indicate presence of one band with 700 bp among all SB does and two bands with 600 and 100 bp for MB does. These results showed the presence of polymorphic of GDF9 in Baladi goat and monomorphic of GDF9 in Zaraibi MB does. The mutations in the GDF9 gene associate with fecundity were identified only in investigated MB Egyptian goat breeds. On the other hand, the restriction enzyme which was used in PCR-RFLP did not identify any FSH β gene mutation in exon 1. Alignment of the tested alleles with *Capra hircus* GDF9 sequence from gene bank showed transition in multiple birth does from CCGAGG to GTTCAT and from TT to AG in regions from 52 to 57 and from 61 to 62, respectively. On the other hand, only one transition occurred in FSHB sequence gene from CTGTT to ACAA in region from 31 to 35. The study indicates possibilities of using these markers for selection for high prolificacy in Egyptian goats.

Keywords: GDF9, goat, FSHR, PCR-RFLP, prolificacy