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Insertion/deletion variants within the *IGF2BP2* gene identified in reported genome-wide selective sweep analysis reveal a correlation with goat litter size

Keywords: goat, *IGF2BP2*, litter size, indel, MAS

Research Summary

- The primary aims of the study were to verify the relationship between indels in *IGF2BP2* and Shaanbei white cashmere (SBWC) goat litter sizes and to select the favorable alleles. We also wanted to lay a foundation for the application of MAS in goat breeding, to improve the economic efficiency of the goat livestock industry.



MAS
- SNP (Single nucleotide polymorphism)
- InDel (Insertion/Deletion)
- CNV(Copy number variation)

Marker-assisted selection (MAS), which is characterized as an alternative selection of DNA mutations, is not affected by the microenvironment. In addition, compared with traditional breeding techniques, MAS is a more accurate, efficient and convenient genetic selection method

Innovation points

The InDel locus of *IGF2BP2* gene in goats was screened and verified, and the correlation and function of *IGF2BP2* gene with lambing traits of goats were determined, so as to provide a theoretical basis for improving economic traits and breeding new varieties of goats.

◆ **In this study, the mRNA expression level of *IGF2BP2* was found to be significantly higher in a single-lamb group than in a multi-lamb group. Insertions/deletions (indels) within the goat *IGF2BP2* gene, including P4-Ins-13bp and P5-Del-12bp, were verified in 918 Shaanbei white cashmere (SBWC) female goats.**

◆ **Analysis using the Chi-square (χ^2) test showed that the genotype ($\chi^2 = 14.479$, $P = 0.006$) and allelotype ($\chi^2 = 5.228$, $P = 0.022$) distribution of P4-Ins-13bp was significantly different between the single-lamb and multi-lamb groups.**

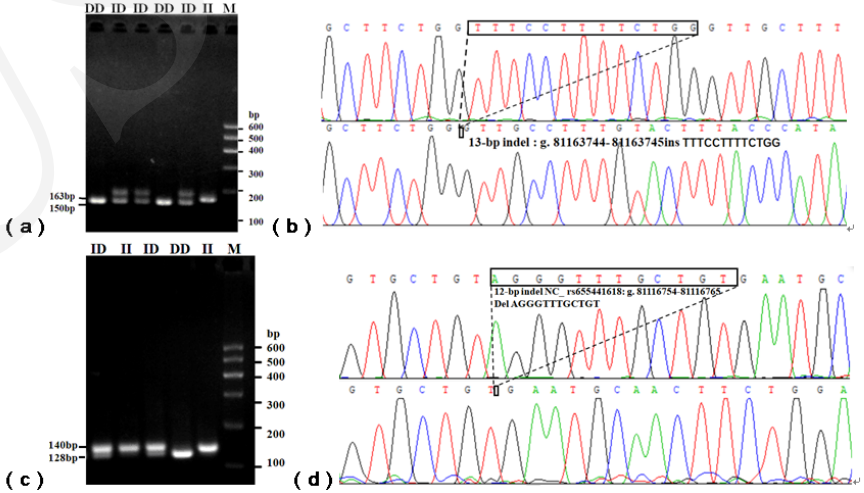

Fig 3

Innovation points



◆ **Correlation analysis demonstrated that P4-Ins-13bp was significantly associated with goat litter size (*P* = 0.022), and individual goats with the deletion/deletion (DD) genotype produced more litters than other goats**

◆**The JASPAR online database predicted that the binding of TFs GATA-binding factor 2 (GATA2) [MA0036.3] and Forkhead box L1 (FOXL1) [MA0033.2] might bind to the P4-Ins-13bp and P5-Del-12bp insertion sequences in the *IGF2BP2*, respectively**



Fig 7

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