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Effect of overexpressing ace-miR-14-y on target gene expression and weights of Apis cerana worker larva and gut

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Abstract miRNAs play a central part in modulating diverse life activities such as gene expression, development, and immunity. Apis cerana is a bee species of great importance widely used in beekeeping practice in many parts of Asian continent, with remarkable ecological and economical value. In this study, the molecular validation of ace-miR-14-y in the larval gut of A. cerana worker was performed, followed by prediction and annotation of target mRNAs, further, overexpression of ace-miR-14-y was conducted to investigate its regulatory role in target gene expression and weights of larval individual and gut were utilized to confirm the expression and sequence of ace-miR-14-y. Relevant bioinformatic software was used to predict and analyze the target genes of ace-miR-14-y. Overexpression of ace-miR-14-y in the larval gut was performed by feeding mimic, followed by examination of the effect of overexpression and the relative expression level of target genes after overexpression. Electronic balance was employed to weigh the larval individual and gut. The results of Stem-loop RT-PCR and Sanger sequencing suggested that ace-miR-14-y was expressed in the A. cerana worker larval gut. Bioinformatics analysis showed that ace-miR-14-y targeted a total of 265 genes, involving 33 GO terms like metabolic process and cellular component as well as 180 KEGG pathways such as Hippo signaling pathway and endocytosis. As compared with that in the mimic-NC group, the expression level of ace-miR-14-y was significantly up-regulated in the 5-day-old larval gut in the mimic-miR-14 group. After overexpression of ace-miR-14-y, the significant down-regulation of target genes Wg and AP-1 were detected. Additionally, the weights of larval individual and gut were significantly increased after ace-miR-14-y overexpression.ace-miR-14-y, as a potential regulator,may control the weights of A. cerana worker larval individual and gut by negative regulation of the expression of Wg and AP-1.