Hen miRNA regulates microbial methionine synthases to affect hydrogen sulfide production

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Video Byte

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Abstract

In laying hens, the cecal microbiota is important for digestion and metabolism. However, it also produces hydrogen sulfide gas, an odorous and harmful pollutant that is released in large amounts from poultry houses. Host microRNAs (miRNAs) can regulate the gut microbiota, but whether they affect hydrogen sulfide production in hens is unclear. To clarify this issue, a recent study analyzed the cecal content of two laying hen breeds, Hy-line Gray and Lohmann Pink, with naturally different hydrogen sulfide production. Differential expression of several microbial genes was related to the difference in hydrogen sulfide production between breeds, miRNA-containing exosomes were present in the cecal contents, and the differentially expressed host miRNA gga-miR-222a regulated two of the altered microbial genes encoding methionine synthases. During in vitro fermentation, gga-miR-222a upregulated the two methionine synthase genes. gga-miR-222a also increased methionine concentrations and decreased hydrogen sulfide production in vitro. Although further verification is needed, the findings suggest that certain miRNAs can be targeted to reduce the production of hydrogen sulfide in laying hens and to decrease the environmental pollution caused by release of this noxious gas from poultry houses.