

Using Japanese quail to study endocrinology-based host-microbe interactions

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Video Byte

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Abstract

In poultry, environmental stress can cause changes in the microbiome of the gastrointestinal tract that are associated with increased disease susceptibility. One route by which environmental stress can affect the microbiome is through neuroendocrine-driven host-microbiome interactions in the gut, a field of study called Microbial Endocrinology. Unfortunately, few studies have examined neuroendocrine changes in the avian gut following stress and how this may associate with the microbiome. A recent study uses a new microbial endocrinology-based framework to better understand the neuroendocrine interactions behind the avian host-microbiome relationship. Microbial endocrinology lies at the intersection of microbiology and neurobiology, seeking to uncover how microbes and host biology affect each other through bi-directional neuroendocrine interactions. Using Japanese quail bred to diverge in corticosterone response to environmental stress, researchers evaluated changes in their microbiomes and their gut neurochemistry. They found that the high- and low-corticosterone groups had divergent cecal microbial community structure accompanied by differences in tissue neurochemical concentrations and gut morphology. These results demonstrate that the tissue neurochemical concentrations in the avian gut may be related to the cecal microbiome and highlight the potential of the Japanese quail as a novel model for further examining microbial endocrinology-based mechanisms of host-microbe interactions in poultry.