

Research report

Expression of aggressiveness modulates mesencephalic c-fos activation during a social interaction test in Japanese quail (*Coturnix japonica*)

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Abstract

It is well known that during a social conflict, interactions are dependent on the animal's propensity to behave aggressively as well as the behavior of the opponent. However, discriminating between these two confounding factors was difficult. Recently, a Social Interaction (SI) test using photocastrated males as non-aggressive stimuli was proposed as a useful tool to evaluate aggressiveness. The avian Intercollicular- Griseum centralis complex (comparable to mammalian periaqueductal gray) has been reported as a crucial node in the descending pathways that organize behavioral and autonomic aspects of defensive responses and aggressiveness. Herein, using the SI test, we evaluated whether mesencephalic areas are activated (expressed c-fos) when photostimulated adult males are confronted with non-responsive (non-aggressive) opponents. Furthermore, we also examined whether mesencephalic activation is related to male performance during the SI test (i.e., aggressive vs. non-aggressive males) in birds reared in enriched or in

standard environments. Five mesencephalic areas at two anatomic levels (intermediate and rostral) and locomotion during SI testing were studied. Aggressive males showed increased c-fos expression in all areas studied, and moved at faster speeds in comparison to their non-aggressive and control counterparts. Non-aggressive males and the test controls showed similar c-fos labeling. In general, rearing condition did not appear to influence c-fos expression nor behavior during the SI test. Findings suggest that mesencephalic activation is involved when males are actively expressing aggressive behaviors. This overall phenomenon is shown regardless of both the environmental stimuli provided during the birds' rearing and the potentially stressful stimuli during the SI trial.