

Heart Rate Variability Parameters in Selected Laying Hen Lines Indicate a Genetic Correlation between Feather Pecking and Stress Susceptibility

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In the present study we used laying hen lines specifically selected on feather pecking behaviour (high (HFP), low (LFP) and their unselected control line). We determined parameters of heart rate variability (HRV) to elucidate the relative activation of the sympathetic and parasympathetic nervous systems during stressful situations. We hypothesized that HFP would show stronger sympathetic stress reactivity compared to LFP and that LFP would show higher parasympathetic reactivity relative to HFP. Sixteen hens from each of the three lines were tested. Segments of 2 min were extracted from electrocardiograms recorded by radio-transmitter implants, in undisturbed conditions (basal), during manual restraint and during social stress. Parameters of HRV did not differ between lines at rest, but during stress (both restraint and social) the HFP line showed significantly higher sympathetic activity, as indicated by a higher HR and lower HRV parameters than the LFP line with the control line in between. The significant reduction in parasympathetic activity, as recorded by a reduction in high frequency power and lower RMSSD during stress indicates a lack of adaptive functioning in the HFP line in contrast to the LFP line. This reaction pattern clearly support the hypothesis, that genetic selection for higher levels of feather pecking increase the susceptibility to stress whereas selection against feather pecking reduces this susceptibility. This is the first experimental results to show this connection between selection on feather pecking behaviour and stress susceptibility using HRV data.