

Appetitive and consummatory behaviours in relation to attractive feed rewards and their dopaminergic control: A window to understand positive emotions in fowl

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Studies on appetitive and consummatory behaviours and their dopaminergic control may help to understand how to induce positive emotional states in hens. One objective of this study was to identify behavioural indicators of emotional states during cue-induced anticipation and during the following access to rewards. The second objective was to investigate the role of the dopaminergic system in controlling appetitive behaviours in different fowl breeds. Laying hens (LSL; n=20) and red junglefowl (RJF; n=26) were hatched and reared together, and housed pairwise in litter floor pens and fed *ad libitum*. Hens were trained to associate a cue (CS; red light flash) with a reward (US; mealworms). Then, hens were treated with saline or Haloperidol (HAL) and after 30 min. exposed to the CS. The US was delivered after a 25 sec CS-US interval. Frequency of litter peck, litter scratch, behavioural transitions and locomotor activity (foraging behaviours) were observed 10 min before CS and 10 min after US delivery. Frequency of head movements and behavioural transitions (anticipatory behaviours) were observed during the CS-US interval. Foraging behaviours were analysed with non-parametric statistics. Anticipatory behaviours were analysed with a repeated measures mixed model ANOVA. Both breeds responded to reward delivery with increased frequency of foraging behaviours (LSL: $p=0.0137$, RJF: $p=0.0007$), and showed a high frequency of cue-induced anticipatory behaviours in the CS-US interval (RJF: 17.6 ± 2.2 , LSL: 26.3 ± 3.4). RJF showed less foraging behaviours after reward delivery ($p=0.017$), and a lower frequency of anticipatory behaviours in the CS-US interval ($p=0.021$), indicating that the domestication process has altered the threshold for expressing reward-related appetitive behaviours in fowl. Studies of reward-processes in different breeds of fowl may thus not be directly comparable. Selection on production characteristics may have resulted in higher dopaminergic sensitivity for food reward. HAL suppressed anticipatory behaviours ($p<0.0001$) and foraging behaviours ($p=0.0425$) after reward, which suggests a role of dopaminergic brain reward systems in appetitive processes in fowl. The possibility to elicit appetitive behaviours and access to attractive feed rewards could be a means to induce a positive emotional state in laying hens and, thereby, improve animal welfare.