A neuronal activity marker c-fos reveals higher activity in septum of chicks exposed to animacy motion cues

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The septal nuclei are an evolutionarily well-conserved part of the limbic system, present in all vertebrate groups. Functionally the septum is known to be involved in many important aspects of social behaviour and is usually considered as a key node of the social behaviour network. The detection of animate creatures is fundamental for survival and social interaction in animal species. Simple shapes moving in a self-propelled fashion (implying the presence of an internal energy source to the moving object), are spontaneously perceived as animated and engage attention since infancy. Autonomous changes in speed are one of the cues associated with animacy perception. In a previous study, we were able to demonstrate that newly hatched visually naïve chicks prefer a simple object that changes its speed (accelerating and decelerating) to an identical object that moves at constant speed, suggesting that these mechanisms are predisposed and active at birth. No studies so far have investigated septal involvement in the detection of animacy. To study the neuronal basis of this phenomenon, we exposed two groups of visually naïve chicks to either one of the two stimuli and visualized brain activity by an immunohistochemical staining of the immediate early gene product c-Fos. Preliminary results suggest a differential involvement of the right septum between the two groups. Notably, lateral septum showed higher activation in subjects exposed to speed changes rather than to constant motion, implying the involvement of this higher order social brain area in processing of elementary visual cues to animacy. We also measured activity in the intermediate medial mesopallium (IMM, an area involved in filial imprinting in chicks). However, IMM did not show any difference between the two groups, suggesting that the type of the motion does not affect activity in this area and that the difference found in septum is region specific.