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### **Cross-correlation analysis of temporal interactions suggests functional cooperation between the suprageniculate nucleus of the posterior thalamus and the caudate nucleus**

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Recent morphological and physiological experiments demonstrated a strong relationship between the suprageniculate nucleus (Sg) of the posterior thalamus and the input structure of the basal ganglia, the caudate nucleus (CN). Accordingly, in this study we aimed at investigating whether there is a real functional relationship between the Sg and CN. We performed simultaneous extracellular, single-cell recordings from the Sg and CN in adult, anaesthetized cats stimulated with stationary and moving random dot kinematograms. Cross-correlation between the spiking of the simultaneously recorded Sg and CN neurons was analyzed. In order to detect significant cross-correlation we used the shuffle and jittering resampling methods. We recorded 138 visually active neurons with stable spontaneous activity from the Sg and 142 from the CN. Of the simultaneously registered 288 pairs, 10 (3.5%) showed significant functional cooperation as demonstrated by the cross-correlation analysis. The majority of the correlational peaks were found at timelags not exceeding 10 ms, while in some cases the peak was exactly at 0 ms. These results provide the first evidence for the existence of a functional cooperation between the Sg and CN. We propose that either a monosynaptic direct connection might exist between these structures or a common input comprising of parallel pathways affects their activity and synchronizes them.