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Characteristic of persistently active neurons in the human Medial Temporal Lobe during Working Memory maintenance

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Abstract

Working memory (WM) is an essential component of cognition, believed to be involved in several cognitive processes. Persistent neural activity (PNA) during WM maintenance has been widely reported. In this study we tested whether stimulus-selectivity constituted a predictor of increased PNA during WM maintenance. We performed single-cell recordings on medial temporal lobe (MTL) neurons and measured PNA during encoding and maintenance. We identified image-selective neurons, based on the observed firing rate (FR) elicited by exposure to different images. We compared the FR of such neurons during encoding and maintenance when the maintaining the preferred image in WM with the FR for maintenance of a non-preferred image. We observed PNA for both conditions, and measured a higher FR during maintenance of the preferred image. In alignment with the existing literature, the results of our analysis suggest that stimulus-selectivity is a potential predictor of PNA during WM maintenance.