Team finds how midbrain map continuously updates visuospatial memory

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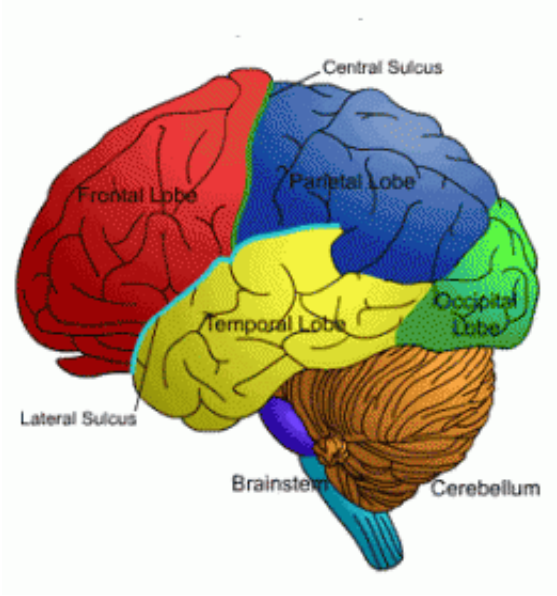

Brain diagram. Credit: dwp.gov.uk

On the upcoming Super Bowl Sunday, a lot of us will be playing arm-chair quarterback. After the snap, we might use our eyes to track a wide receiver as he runs toward an opening, all the while remembering the location of the star running back in case he breaks through on a rushing play. This natural ability to track one moving player but be ready to quickly look back toward another one sounds simple.

But the science behind it is not so simple.

In a groundbreaking study, York university researchers have discovered how a map in the midbrain remembers the location of visual targets even as the eyes follow another object.

"As the eyes move, activity related to the remembered target travels across the 'visual' cells in the midbrain superior colliculus, constantly keeping track of its location relative to the direction the eyes are currently pointed," explains Professor J. Douglas Crawford, Canada Research Chair in Visuomotor Neuroscience in the Faculty of Health. "In our football example, when it's time to aim an eye movement and then make a pass toward the open receiver, the visual memory is transferred to motor cells which then produce a burst of activity."

In a study conducted in Crawford's lab led by postdoctoral fellow Suryadeep Dash, the researchers have discovered a new physiological system that continuously updates the remembered location of visual targets. The finding also suggests that continuous updating of signals could emerge in other visuomotor areas of the brain.

"We expect that continuous updating signals also emerge in other visuomotor areas of the brain. Most of those areas have only been tested during sudden jumps in eye position called saccades, but have not been tested during behaviors that involve continuous eye motion, notes Crawford, adding, "Studying this system might help us understand how we remember where things are during other continuous motion behaviors such as walking, driving or general navigation."

The study titled 'Continuous updating of visuospatial memory in superior colliculus during slow eye movements' was published today in *Current Biology*.

Provided by York University