



Study Suggests How the Brain Keeps Time



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By Amy Norton

NEW YORK (Reuters Health) - Scientists have zeroed in on the brain regions that govern the body's sense of timing — a finding that could lead to new ways to track the effectiveness of treatments for Parkinson's disease, Huntington's disease and other conditions marked by problems in timing perception.

While it is known people have an innate sense of timing that allows split-second decisions — such as deciding whether there is enough time to beat a yellow light — the brain's timekeeping “centers” have been unclear.

Now new research suggests that structures deep in the brain, called the basal ganglia, work in concert with the parietal lobe to keep time. The discovery could help scientists' understanding of the defective time perception seen in patients with diseases such as Parkinson's, according to researchers led by Dr. Stephen M. Rao of the Medical College of Wisconsin in Milwaukee.

Rao and his colleagues report their findings in the March issue of *Nature Neuroscience*. In the study, the researchers monitored brain activity in 17 healthy volunteers as they listened to various tones. In one test, the volunteers had to gauge the amount of time that passed between hearing two quickly presented tones. In another test, they were asked to estimate differences in pitch between the tones.

Rao's team found that the basal ganglia and right parietal cortex were uniquely activated during the test of timing perception. The basal ganglia helps coordinate movement, and the structures are known to be involved in the movement disorders Parkinson's and Huntington's, Rao noted in an interview with Reuters Health. These progressive diseases are also marked by problems in timing, such as slower reaction times.

In addition, Rao said, some research suggests the basal ganglia are involved in attention-deficit/hyperactivity disorder (ADHD). Time perception problems are less clear in ADHD, but he noted, the disorder does involve “hyperkinetic” movement.

Knowing which brain regions are involved in normal time perception may allow doctors to monitor the effectiveness of treatments for Parkinson's, ADHD and other disorders, according to Rao. Instead of just observing how drugs affect behavior, doctors could “peer into the brain” to see what changes are occurring, he explained.

Rao's team is currently using brain imaging to monitor the effects of Ritalin on time perception in individuals with ADHD.

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