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Rhythms in the brain help give a sense of location, study shows

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Research at the University of Edinburgh tracked electrical signals in the part of the brain linked to spatial awareness.

The study could help us understand how, if we know a room, we can go into it with our eyes shut and find our way around. This is closely related to the way we map out how to get from one place to another

Scientists found that brain cells, which code location through increases in electrical activity, do not do so by talking directly to each other. Instead, they can only send each other signals through cells that are known to reduce electrical activity.

This is unexpected as cells that reduce electrical signalling are often thought to simply supress brain activity.

The research also looked at electrical rhythms or waves of brain activity. Previous studies have found that spatial awareness is linked to not only the number and strength of electrical signals but also where on the electrical wave they occur.

The research shows that the indirect communication between nerve cells that are involved in spatial awareness also helps to explain how these electrical waves are generated.

This finding is surprising because its suggests that the same cellular mechanisms allow our brains to work out our location and generate

rhythmic waves of activity.

Spatial awareness and the brain's electrical rhythms are known to be affected in conditions such as schizophrenia and Alzheimer's disease, so the scientists' work could help research in these areas.

The study, funded by the Biotechnology and Biological Research Council, is published in the journal *Neuron*. It looked at connections between nerve cells in the brain needed for spatial awareness in mice and then used computer modelling to recreate patterns of neural activity found in the brain.

Matt Nolan, of the University of Edinburgh's Centre for Integrative Physiology, said: "Rhythms in brain activity are very mysterious and the research helps shed some light on this area as well as helping us understand how our brains code spatial information. It is particularly interesting that cells thought to encode location do not signal to each other directly but do so through intermediary cells. This is somewhat like members of a team not talking to each other, but instead sending messages via members of an opposing side."

Provided by University of Edinburgh