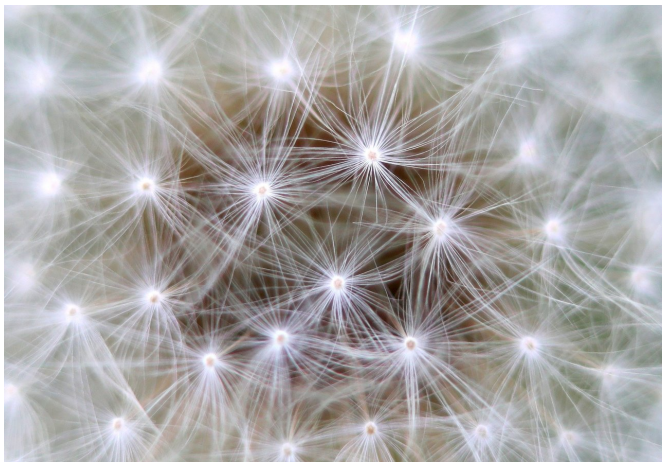
Breakthrough as molecules shown to 'air-kiss' when brain neurons attract each other

26 November 2018, by Martin Herrema



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All brain cells 'air-kiss' before they come together to form a final synaptic relationship, new research by University scientists has revealed.

The breakthrough study reveals that molecular signalling within the brain operates in a very different way to previously thought, with cells now found to use the same pair of molecules for both distant and close contacts.

The research, by a team led by Professor Yuri Ushkaryov of the University's Medway School of Pharmacy, may lead to a much better understanding of how neurons send messages to distant parts of the brain or other organs in the body, such as muscle cells.

It has previously been shown that brain neurons secrete 'attractive' or 'repulsive' molecules that diffuse away to allow neurons to grow towards or away from each other and thus organise connections.

These are the 'messenger' molecules. It was thought that once neurons come close to each other, different molecules on the surface of cells facilitate recognition and adhesion.

But the study found that a neuronal cell-surface receptor that normally brings about adhesion could break away and travel some distance to another cell. Finding another neuron, it then tells it to grow towards the cell that released the message.

The postsynaptic cell sends its presynaptic partner an 'air-kiss," before the two fuse in a final, 'eternal kiss' synapse.

Professor Ushkaryov said: "Our breakthrough was to find that these brain cells use the same pair of duplicitous molecules for both distant and close contacts. This is exciting because it will have implications for our understanding of how neurons send axons to distant part of the brain or to other organs such as muscles."

The research, titled "Proteolytically released Lass/teneurin-2 induces axonal attraction by interacting with latrophilin-1 on axonal growth cones," is published in the journal *eLife*.

More information: Nickolai V Vysokov et al. Proteolytically released Lasso/teneurin-2 induces axonal attraction by interacting with latrophilin-1 on axonal growth cones, *eLife* (2018). DOI: 10.7554/eLife.37935

Provided by University of Kent