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Mapping Brain Connections: The Role of Relaxin 3/RXFP3 system in Behavior and Functionality

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Understanding connections in the brain at one major neurotransmitter level provides us with detailed information from the molecular scale to behaviour and functionality.

The Relaxin 3/RXFP3 system plays an important role in the modulation of emotional and behavioural actions, such as arousal, regulation of appetite, sociability, stress, anxiety, memory, sleep, and circadian rhythms. The major source of the relaxin 3 peptide is the nucleus incertus (NI), a pontine structure located near the fourth ventricle. The NI projects throughout the brain, and one of the most important connections is the septohippocampal pathway.

Methods used in research that aims to map these pathways involve antero- and retrograde viruses (AAV) or fluorodyes. They are respectively used during stereotactic operations. For example, AAVs contribute to the expression of fluorescent proteins such as YFP, GFP, or mCherry, which can later be imaged in a fluorescent microscope. Specific antibodies can also be used to identify precise types of neurons.

Understanding the relevance and course of the relaxin 3/RXFP3 pathways, as well as the placement of fibres containing this neuropeptide or the RXPF3 receptor, contributes to behavioural research, confirming its significance in social behaviour, depression, and further pathology in Alzheimer's disease

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