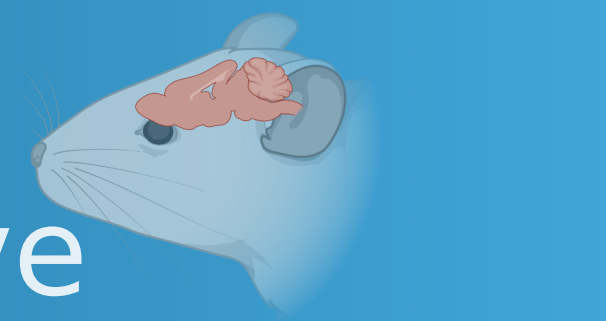


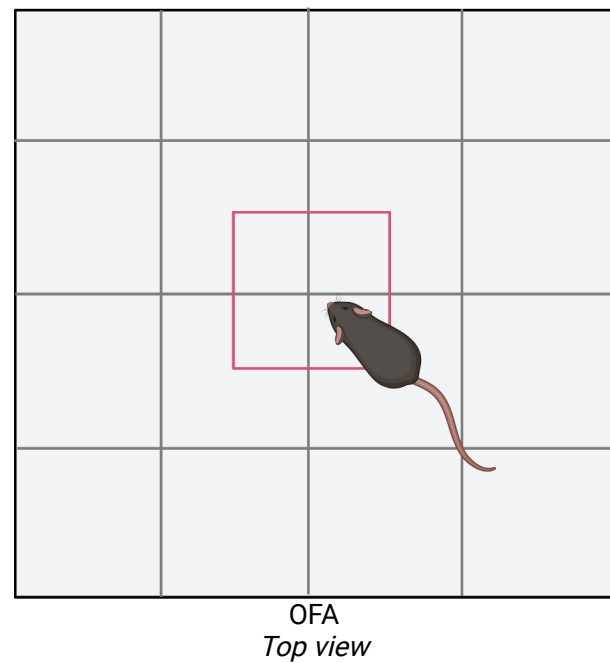
Exploratory behaviour of mice from a neurodevelopment perspective



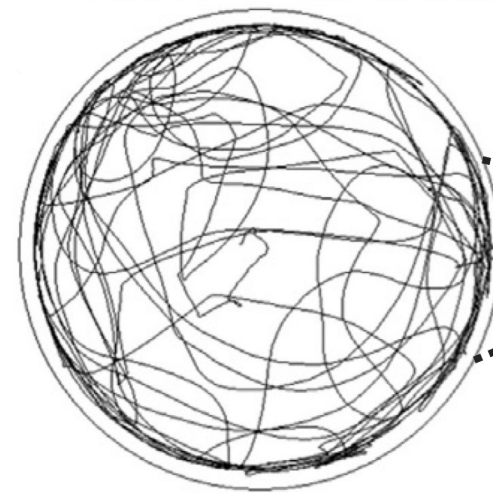
Exploratory behaviour is defined as acts or postures that facilitate the collection of information about unfamiliar territories and includes behaviours such as rearing, locomotion, sitting rearing, grooming etc. (see right)^{3,7}.



Exploratory Behaviour: How is it studied?

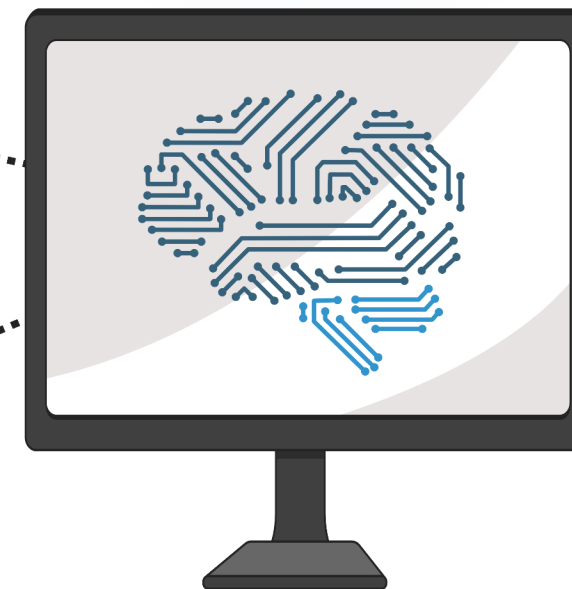


The Open Field Analysis (OFA) is a widely used method to analyze mouse exploratory behaviour. In an OFA, mice are placed in a novel open environment and their behaviour is recorded through a tracking system. Several components of mice exploratory behaviour are studied in the OFA such as total locomotion, immobility and type of behaviour performed^{6,8}.



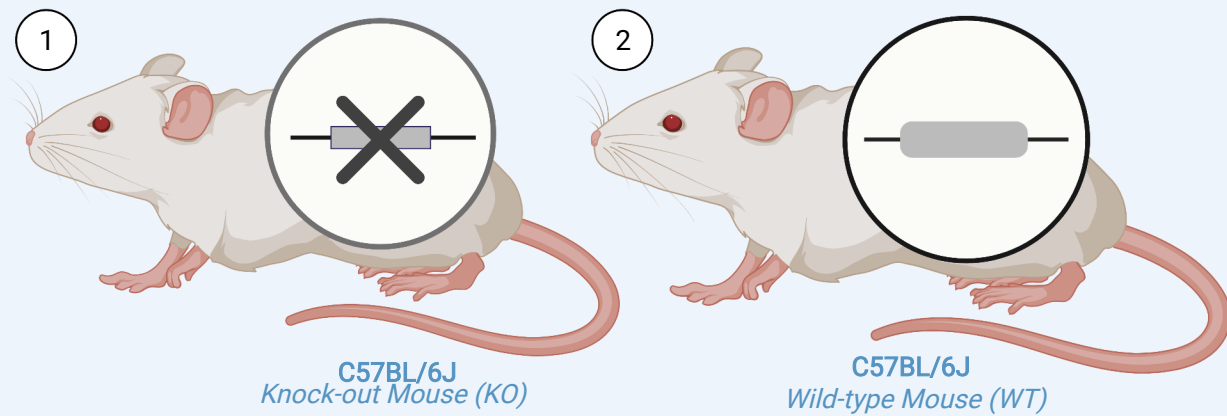
OFA mouse tracking schematic⁵.

Data Analysis



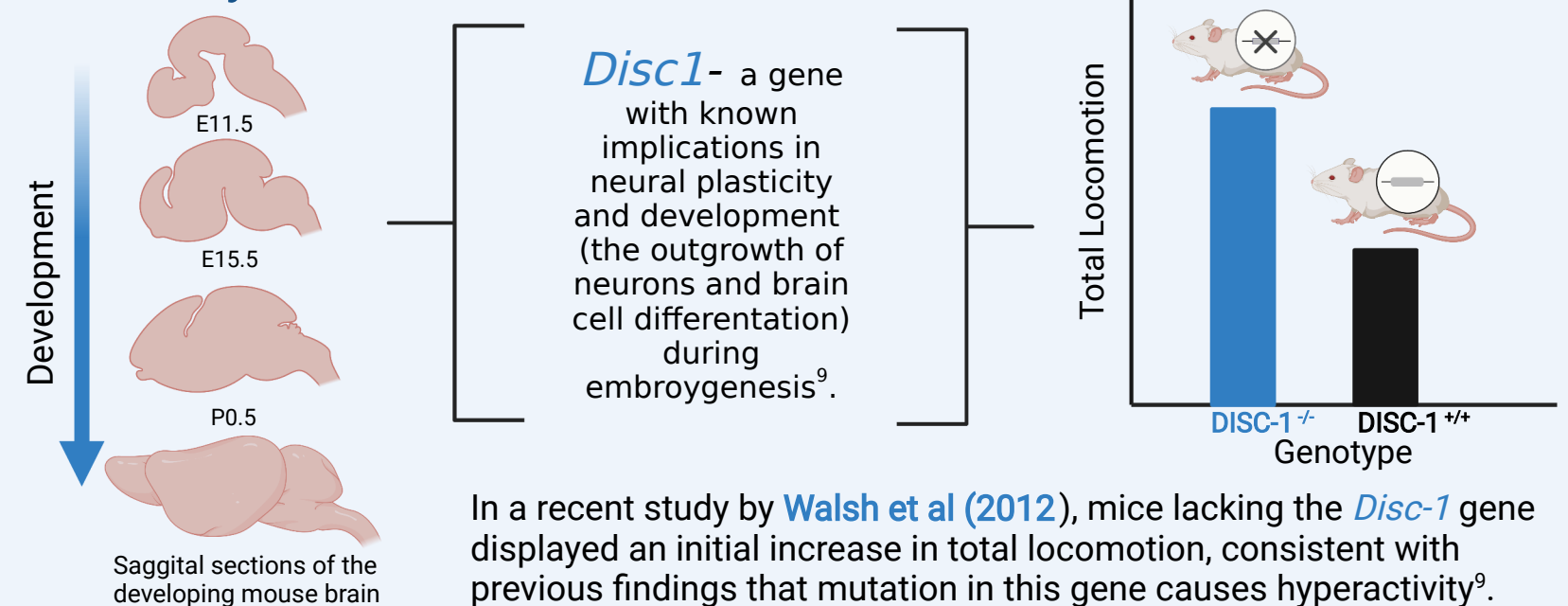
Upon analyzing tracking data inferences on mouse brain development can be made i.e., if substructures involved in spatial learning/memory are properly developed implicating mouse exploration⁵.

Relevance of Genetics in Mouse Exploratory Behaviour



Both KO and WT mice are subjected to an OFA whereby, the results for both lines of mice are scrutinized to determine if genetic underpinnings of mouse exploratory behaviour are apparent².

Case Study

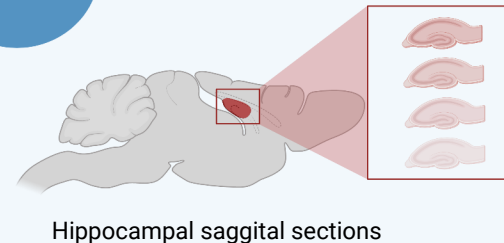
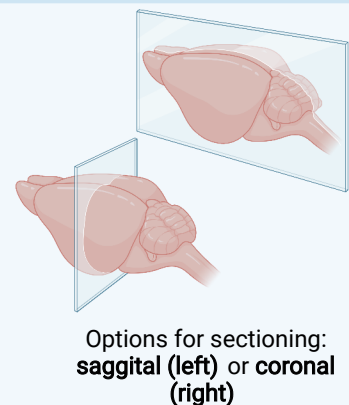
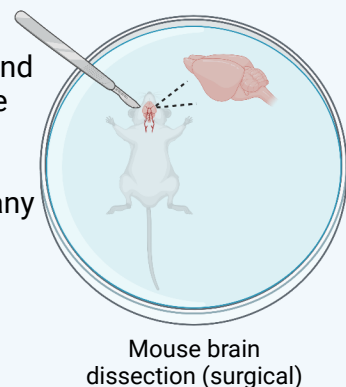


The Brain and Exploratory Behaviour

Since the discovery of the OFA and the analysis of mouse exploration, many neuroanatomical structures have been associated to, and implicated in this behaviour.



Following an OFA, researchers will dissect and section the brains of mice to analyze changes in neuroanatomy and morphometry. Indeed, many have noted a correlation between exploratory performance and neurological structure^{1,-8}.

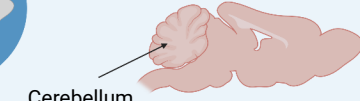


Hippocampal Mossy Fibers

Upon sectioning, several studies have revealed that the hippocampal mossy fibers are implicated in mouse exploratory activity. Moreover, mice that display more exploratory behaviours in the open-field had an upwards of 3x larger mossy fibers^{4,7}.



Cerebellar Cortex



In a study by Caston et al (1998), mice that had undergone a cerebellectomy (removed cerebellar cortex), had significantly reduced exploration compared to WT mice. These results show that in addition to locomotor activities, the cerebellum has a role in mouse exploratory behaviour¹.

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