Attention Orienting in the Neuroligin-3 Mouse Model of Autism

Shuting Li[1,2], Carlos May[2], Terence Pang[2], Anthony Hannan[2,3], Katherine Johnson[1,†], and Emma Burrows[2,†]

Introduction

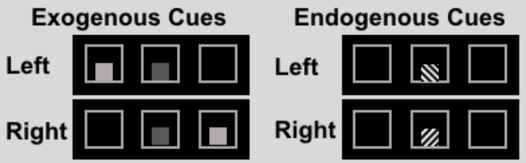
- The neural mechanisms underlying potential atypical attention orienting in autism remain unclear.
- Attention orienting can be divided into exogenous (stimulus-driven) and endogenous (goal-driven) orienting.
- We developed a mouse task based on the human Posner cueing task, which enables the investigation of neural mechanisms underlying attention orienting through genetic and pharmacological manipulations.

Aims

- To investigate attention orienting in mice with the ASD-associated R451C (arginine to cysteine residue 451 substitution) mutation in neuroligin-3 (NL3) using the newly developed mouse Posner task.
- To test the effects of atomoxetine (ATX), a norepinephrine-modulating medication, on these mice.

Methods

- 20 NL3 mice, 20 wild-type mice. Half in each task.
- Touchscreen chambers (Campden Instruments Ltd.)
- 4-month training and testing
- Cue validity: Exogenous task: 50%; Endogenous task: 80%



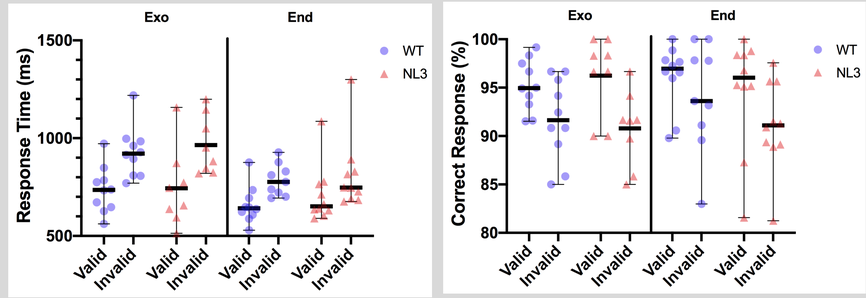
Mice with ASD-related genetic mutations showed **intact attention orienting** and better performance compared to wild-type mice after the administration of atomoxetine.

[1]School of Psychological Sciences, University of Melbourne, Parkville, VIC, Australia
[2] Florey Institute of Neuroscience and Mental Health, University of Melbourne, Parkville, VIC, Australia
[3] Department of Anatomy and Neuroscience, University of Melbourne, Parkville, Victoria, Australia
[†] Joint last authors

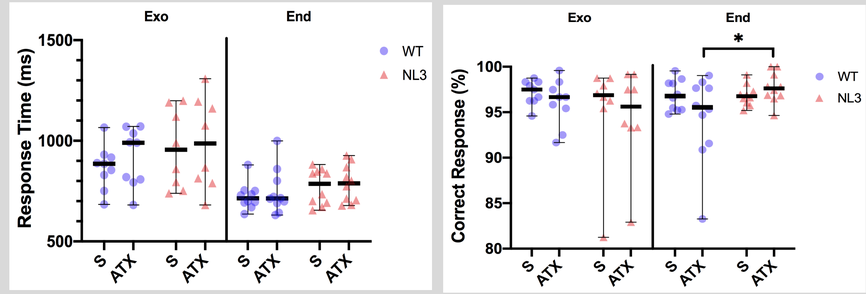
Contact Shuting Li: shutingl1@student.unimelb.edu.au

Results

- In the exogenous and endogenous tasks, both NL3 mice and WT mice responded more quickly and were more accurate in validly cued trials, compared with invalidly cued trials. This effect is consistent with results in the human Posner task.
- No significant difference in attention orienting (i.e., response time difference between valid and invalid trials) was found between NL3 mice and WT mice.
- In general, ATX increased response time (RT) and decreased accuracy. During the endogenous task, however, NL3 mice were more accurate compared to the WT mice after the administration of ATX.



RT and accuracy in the exogenous and endogenous task



Effects of ATX on RT and accuracy in the exogenous and endogenous task

Conclusions

- NL3 mice showed intact attention orienting during the Posner-style cueing task.
- ATX improved endogenous attention orienting only in NL3 mice.

Next step

- To examine the effects of other attention-modulating drugs on attention orienting using the current mouse model and task.