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Expression of proteins within the nogo receptor complex are altered in the dorsolateral prefrontal cortex in schizophrenia

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Abstract

EXPRESSION OF PROTEINS WITHIN THE NOGO RECEPTOR COMPLEX ARE ALTERED IN THE DORSOLATERAL PREFRONTAL CORTEX IN SCHIZOPHRENIA

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Purpose: Schizophrenia is a severe neuropsychiatric disorder with an elusive aetiology, thought to result from abnormal brain development. Nogo is an oligodendrocyte bound molecule that signals by binding to its receptor NgR, located on axonal membranes that interacts with its co-receptors p75 or TROY and Lingo-1. Nogo signalling is responsible for CNS myelin regulation and neurite outgrowth during neurodevelopment, and plasticity in the mature brain. This study examined NgR, p75, TROY and Lingo-1 protein levels within the human dorsolateral prefrontal cortex (DLPFC) in schizophrenia.

Methods: Human DLPFC matched case control samples (n=37/group) from the NSW Brain Bank Network were used to assess NgR, p75, TROY and Lingo-1 protein levels by immunoblotting.

Results: NgR protein expression was significantly decreased by 16% ($p < 0.001$) and Lingo-1 protein expression was significantly increased by 12% ($p = 0.006$) in the DLPFC of schizophrenia subjects. Interestingly, neither the third receptor in this trimolecular receptor complex p75, nor its homolog TROY, showed any significant difference in levels of protein expression in schizophrenia subjects compared to controls ($p = 0.146$ and $p = 0.500$ respectively). There was a significant correlation between the protein levels of NgR and Lingo-1 ($r = -0.276$, $p = 0.017$); between Lingo-1 and p75 ($r = 0.263$; $p = 0.023$) and between NgR and TROY ($r = 0.329$; $p = 0.004$).

Conclusion: This study shows strong evidence for the involvement of NgR/p75/Lingo-1 or NgR/TROY/Lingo-1 complex in schizophrenia, however further studies are required in order to investigate the implications of these proteomic alterations to the aetiology and symptomatology of schizophrenia.