Matteo Santoro, J Alzheimers Dis Parkinsonism 2016, 6:6(Suppl)
http://dx.doi.org/10.4172/2161-0460.C1.024



# Parkinson's disease and movement disorders-inhibition of high mobility group box 1 (HMGB1) as a neuroprotective treatment in the MPTP mouse model of Parkinson's disease

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**Background:** High-mobility group box 1 (HMGB1) is a nuclear and cytosolic protein that is released during tissue damage from immune and non-immune cells – including microglia and neurons. HMGB1 is implicated in the progression of numerous chronic inflammatory and autoimmune diseases. There is increasing evidence from *in vitro* studies that HMGB1 may link the two main pathophysiological components of Parkinson's disease (PD), i.e. progressive dopaminergic cell degeneration and chronic neuroinflammation both of which underlie the mechanistic basis of PD progression.

**Materials & Methods:** Pharmacological trials - Male mice C57BL6J ten weeks old were randomly divided in four experimental groups (n=5 per group). i) saline control group, ii) MPTP treated groups (sub-acute regimen 30 mg/kg of MPTP intraperitoneally (i.p.) once a day for five consecutive days), iii) MPTP treated group plus i.p. dose of 50mg/kg glycyrrhizin, iv) MPTP treated group plus i.p. dose of 200 ug HMGB1 neutralizing antibody. HMGB1 nuclear translocation was assessed in mice and human brain tissue via co-immunolocalization in three different nigral cell populations: tyrosine hydroxylase (TH) positive neurons, microglia and astrocytes. Western blotting was performed on protein samples extracted from ventral midbrain.

**Results:** In a mouse model of PD induced by sub-acute administration of 1-methyl-4-phenyl-1, 2, 3, 6-tetrahydropyridine (MPTP) the small natural molecule glycyrrhizin, a component from liquorice root which can directly bind to HMGB1, both suppressed MPTP-induced HMGB1 and RAGE upregulation while reducing MPTP-induced dopaminergic cell death in a dose dependent manner.

**Conclusion:** HMGB1 serves as a powerful bridge between progressive dopaminergic neurodegeneration and chronic neuroinflammation in a model of PD, and suggest that HMGB1 is a suitable target for neuroprotective trials in PD.

## Biography

Matteo Santoro was born in 1988 in south of Italy. He is currently working on Parkinson's disease and investigating the role or a protein called HMGB1 in the pathophysiology of the disease. During his PhD Matteo Santoro has received four different prizes for best PhD student poster presentation and talks at different conferences within and outside the University of Aberdeen. He successfully co-authored two peer reviewed research articles on Parkinson's disease. The latest publication has seen him the main contributor of the study. He is currently working as PhD student on the behavioural characterization of three different MPTP mouse models of Parkinson's disease and investigating the role of acquired and innate immune system in Parkinson's disease.

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