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MicroRNAs modulation-A potential Neuroprotective strategy for Parkinson's therapy

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Parkinson's disease is the second most common neurodegenerative disorder and is characterized by the loss of nigrostriatal neurons. MicroRNAs (miRNAs) are noncoding RNAs that regulate cellular mRNA content. Considering that one single miRNA regulates hundreds of target genes by RNA interference (RNAi), a dysregulated expression of miRNAs may cause critical pathological consequences. Indeed, aberrantly expressed miRNAs can play a critical role in neurological disorders, as well as in Parkinson's disease. Therefore, controlling microRNA levels with synthetic oligonucleotides might protect dopaminergic neurons in models of Parkinson's disease. In this regard, our previous work revealed that microRNA-targeted oligonucleotides induced significant improvement in the viability of SH-SY5Y cells exposed to rotenone, suggesting a neuroprotective role to miRNA modulation. In the present study, we investigated if controlling microRNA expression would protect striatal neurons of rotenone-injured rats. We injected oligonucleotides structured in Neuromag® nanoparticles by stereotaxic surgery in the right lateral ventricle. Two days after surgery, animals received ten daily I.P. injections of rotenone. Fluorescence microscopy showed that nanoparticles successfully transfected the oligonucleotides into striatal neurons. Furthermore, the transfection produced a significant silencing in microRNA's expression in the area. Altogether, our results suggest that microRNAs are a potential target for Parkinson's therapy and therefore miRNAs modulation is a promising strategy to reduce the vulnerability of dopaminergic neurons to rotenone insult.

Speaker Biography

Camila H.H. is a biologist who graduated in the University of Brasília and is currently concluding her Master's degree in the same university. She has been studying Parkinson's disease for more than six years and has already contributed to Parkinson's research with her published articles. She has also worked with international research groups and attended meetings in the area of study. Finally, she intends to continue in this field in her Ph.D.

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