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# Neuroprotective evaluation of extract of ginger (*Zingiber officinale*) root in MPTP-induced toxicity in different brain areas male mouse C57/BL/6 models

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Parkinson's disease is a progressive disorder of the nervous system that affects motor function in basal ganglia. The aim of this study was to examine the effects of ginger extract on neuroinflammatory-induced damage of dopaminergic (DA) neurons in Parkinson's disease (PD) mouse C57/BL/6 models. Animals were injected intraperitoneally (IP) with a total cumulative dose of 150 mg/kg MPTP. The levels of dopamine were determined by HPLC. Chronic exposure to neurotoxins increase α-synuclein (αS) aggregation concomitant with upregulation of miR-155 and downregulation of miR-7 and -153 and increase in intracellular reactive oxygen species (ROS). Seven days after the last MPTP injection, behavioral testings were performed. The levels of TNF-α, COX-2 and iNO and miR-7, miR-153, miR-155 were analyzed both in Substantia nigra pars compacta (SNpc) and globus pallidus (GP) by real time PCR.

**Results:** Here we show that Ginger extract can alleviate αS-induced toxicity, downregulate miR-155, and upregulate miR-7 and miR-153, reduce ROS levels and protect cells against apoptosis. It significantly increased the level of dopamine in GP and striatum and suppressed TNF-α and NO levels. In C57/BL mice, treatment with Ginger extract reversed MPTP-induced changes in motor coordination and bradykinesia. Moreover, Ginger extract significantly inhibited the MPTP-induced microglial activation and increases in the levels of TNF-α, NO, iNOS, and COX-2 in both SNpc and GP. It upregulated the level of miR-153 and miR-7 indicating a protective effect.

**Conclusion:** Our results may indicate that miR155 has a possible central role in the inflammatory response to αS and αS-related neurodegeneration. These effects are at least in part due to a direct role of miR-155 on the microglial response to αS. Our findings implicate miR-155, miR-153 and miR-7 are potential therapeutic targets for regulating the inflammatory response in PD. Ginger extract exerts neuroprotective effects on DA neurons in *in vivo* PD model.

## Biography

Ahmad Bassiouny has completed his PhD in Medical Sciences from University of Nebraska Medical Center, USA and postdoctoral studies from Max-Plank Institute, Germany. He is a full professor of Molecular Therapeutics & Immunology. He is the contact person of International ISIS Master in Neuroscience and Biotechnology with Bordeaux University, France. He was the PI of GESP Grant with Professor Detlef Gabel, University of Bremen, Germany. April 2011-April 2013. He was also the principal investigator of national grant from STDF project # 513 and Co-PI of STDF project ID: 4237: "Study on possible APE1-mediated molecular mechanism(s) implication in neuroinflammation". He has been chosen to be included in the special 30th Pearl Anniversary Edition of Who's Who in the World, 2013.

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