

FULL TEXT LINKS



[ACS Chem Neurosci](#). 2021 Jul 21;12(14):2643-2660. doi: 10.1021/acchemneuro.1c00144.

Epub 2021 Jul 1.

Neuroprotective Effects of Trehalose and Sodium Butyrate on Preformed Fibrillar Form of α -Synuclein-Induced Rat Model of Parkinson's Disease

Violina Kakoty ¹, Sarathlal K C ¹, Sunil Kumar Dubey ², Chih-Hao Yang ³, Rajeev Taliyan ¹

Affiliations

PMID: 34197084 DOI: [10.1021/acchemneuro.1c00144](#)

Abstract

Therapeutic options for Parkinson's disease (PD) are limited to a symptomatic approach, making it a global threat. Targeting aggregated alpha-synuclein (α -syn) clearance is a gold standard for ameliorating PD pathology, bringing autophagy into the limelight. Expression of autophagy related genes are under the regulation by histone modifications, however, its relevance in PD is yet to be established. Here, preformed fibrillar form (PFF) of α -syn was used to induce PD in wistar rats, which were thereafter subjected to treatment with trehalose (tre, 4g/kg, orally), a potent autophagy inducer and sodium butyrate (SB, 300 mg/kg, orally), a pan histone deacetylase inhibitor alone as well as in combination. The combination treatment significantly reduced motor deficits as evidenced after rotarod, narrow beam walk, and open field tests. Novel object location and recognition tests were performed to govern cognitive abnormality associated with advanced stage PD, which was overcome by the combination treatment. Additionally, with the combination, the level of pro-inflammatory cytokines were significantly reduced, along with elevated levels of dopamine and histone H3 acetylation. Further, mRNA analysis revealed that levels of certain autophagy related genes and proteins implicated in PD pathogenesis significantly improved after administration of both tre and SB. Immunofluorescence and H&E staining in the substantia nigra region mirrored a potential improvement after treatment with both tre and SB. Therefore, outcomes of the present study were adequate to prove that combinatorial efficacy with tre and SB may prove to be a formidable insight into ameliorating PD exacerbated by PFF α -syn as compared to its individual efficacy.

Keywords: Parkinson's disease; autophagy; epigenetics; preformed fibrillar form of alpha-synuclein; sodium butyrate; trehalose.

[PubMed Disclaimer](#)

Related information

[MedGen](#)

[PubChem Compound \(MeSH Keyword\)](#)

LinkOut - more resources

Full Text Sources

[American Chemical Society](#)

Medical

[MedlinePlus Health Information](#)

Miscellaneous

[NCI CPTAC Assay Portal](#)