

Novel Alpha-Synuclein Oligomers Formed with the Aminochrome-Glutathione Conjugate Are Not Neurotoxic

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© 2018, Springer Science+Business Media, LLC, part of Springer Nature. Aminochrome induces neurotoxic alpha-synuclein oligomer formation relevant to the etiology of Parkinson's disease.

Oxidative stress produces aminochrome from dopamine, but conjugation with glutathione catalyzed by glutathione transferase M2-2 significantly decreases aminochrome-induced toxicity and alpha-synuclein oligomer formation. Notably, in the presence of the aminochrome-glutathione conjugate, previously unknown species of alpha-synuclein oligomers are formed. These aminochrome-glutathione oligomers of alpha-synuclein differ from formerly characterized oligomers and (i) have high molecular weight, and are stable and SDS-resistant, as determined by the Western blot method, (ii) show positive NBT-quinone-protein staining, which indicates the formation of alpha-synuclein adducts containing aminochrome. Furthermore, aminochrome-glutathione alpha-synuclein oligomers (iii) have distinctive shape and size, as determin