

Nanomedicine. 2014 Aug;10(6):1353-63. doi: 10.1016/j.nano.2014.03.015. Epub 2014 Apr 2.

## **Pomegranate seed oil nanoemulsions for the prevention and treatment of neurodegenerative diseases: the case of genetic CJD.**

Mizrahi M1, Friedman-Levi Y1, Larush L2, Frid K1, Binyamin O1, Dori D1, Fainstein N1, Ovadia H1, Ben-Hur T1, Magdassi S2, Gabizon R3.

Author information

Abstract

Neurodegenerative diseases generate the accumulation of specific misfolded proteins, such as PrP(Sc) prions or A-beta in Alzheimer's diseases, and share common pathological features, like neuronal death and oxidative damage. To test whether reduced oxidation alters disease manifestation, we treated TgMHu2ME199K mice, modeling for genetic prion disease, with Nano-PSO, a nanodroplet formulation of pomegranate seed oil (PSO). PSO comprises large concentrations of a unique polyunsaturated fatty acid, Punicic acid, among the strongest natural antioxidants. Nano-PSO significantly delayed disease presentation when administered to asymptomatic TgMHu2ME199K mice and postponed disease aggravation in already sick mice. Analysis of brain samples revealed that Nano-PSO treatment did not decrease PrP(Sc) accumulation, but rather reduced lipid oxidation and neuronal loss, indicating a strong neuroprotective effect. We propose that Nano-PSO and alike formulations may be both beneficial and safe enough to be administered for long years to subjects at risk or to those already affected by neurodegenerative conditions.

FROM THE CLINICAL EDITOR:

This team of authors report that a nanoformulation of pomegranate seed oil, containing high levels of a strong antioxidant, can delay disease onset in a mouse model of genetic prion diseases, and the formulation also indicates a direct neuroprotective effect.

Copyright © 2014 Elsevier Inc. All rights reserved.

KEYWORDS:

Nanoparticles; Neurodegeneration; Oxidation; PSO; Prion