Neuronutraceuticals modulate Transglutaminase 2 overexpression as a marker of neuroinflammation in mouse and human cells.

Nicola Gaetano Gatta [1], Andrea Parente [1], Francesca Guida [2], Sabatino Maione [2,3] and Vittorio Gentile [1]*

Departments of [1]Precision Medicine and [2]Experimental Medicine; University of Campania "L. Vanvitelli", via de Crecchio 7, 80138 Naples, Italy; [3]IRCSS, Neuromed, 86077 Pozzilli (IS), Italy.

*Correspondence: vittorio.gentile@unicampania.it

Abstract (300 word limit)

Background: Tissue type 2 Transglutaminase (TG2, E.C. 2.3.2,13) is reported to be involved in phagocytosis of apoptotic cells in mouse microglial BV2 cells and peripheral macrophages. In this study, by using Lipopolysaccharide (LPS)- or Amyloid-β 1-42 (Aβ 1-42) peptide-stimulated mouse microglial cells BV2 or human THP-1 cells, we examined the effects of different neuronutraceutical compounds, such as Curcumin (Cu) and N-Palmitoylethanolamine (PEA), known for their anti-inflammatory activity, on TG2 and several inflammatory or neuroprotective biomarkers expressions. Methods: Mouse BV2 or human THP-1 cells were treated with LPS or Aβ1-42 in presence of Curcumin or PEA, in order to evaluate the expression of TG2 and other inflammatory or neuroprotective markers by RealTime PCR and Western Blot analyses. Results: Curcumin and PEA were capable to reduce TG2 expression in mouse BV2 or human THP-1 cells during co-treatment with LPS or Aβ 1-42. Conclusions: The results show a role for TG2 as an important marker of neuroinflammation and suggest a possible use of Curcumin and PEA, in order to reduce LPS- or Aβ1-42-induced TG2 overexpression in mouse BV2 or human THP-1 cells.

Image

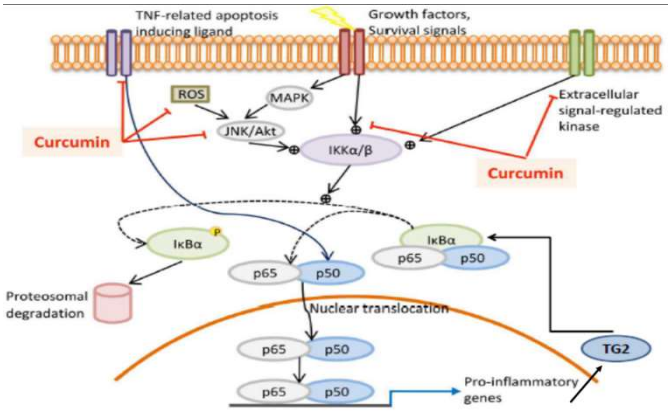


FIGURE 1: Schematic representation of the molecular mechanism of the possible anti-inflammatory effect of Curcumin through the action on NF-kB signaling at various levels and the possible role of TG2 in neuro-inflammation.

Recent Publications (minimum 5)

1. Folk J. E.. Transglutaminases. Annu Rev Biochem 1980, 49, 517-531.
2. Lorand L. and Conrad S. M.: Transglutaminases. Mol Cell Biol 1984, 58, 9-35.
3. Gatta N.G., Cammarota G., Iannaccone M., Serretiello E., and Gentile V.. Curcumin (Diferulolylmethane) reduces transglutaminase 2 overexpression induced by retinoic acid in human nervous cell lines. Neuroimmunomodulation 2016, 23, 188-193.
4. Gatta N.G. and Gentile V.. Physiopatholgical roles of the human Transglutaminase 2, the "Tissue" Transglutaminase, and its possible involvement in Neurodegenerative Diseases. Scholars' Press, 2019.
5. Gatta N.G., Parente A., Guida F., Maione S. and Gentile V.. Neuronutraceuticals modulate Transglutaminase 2 overexpression Lipopolysac-charide- or Amyloid–β 1-42 peptide-induced as a marker of neuroinflammation in mouse microglial cells. Applied Sciences 2021, 11, 5718-5729.

Biography (150 word limit)

Dr. Gentile is a recognized expert in the transglutaminase research area and has a strong background in the molecular biology and biochemical aspects of the transglutaminase (TG) enzymes expression, activity and function. His work has been focused to the tissue TG (TG2) characterization in normal and pathological cellular events (cell growth and differentiation, adhesion, apoptosis, neurodegeneration) by biochemical and molecular biology studies. Currently dr. Gentile works as associate professor at the University of Campania "Luigi Vanvitelli".

Email:
vittorio.gentile@unicampania.it

Notes/Comments:

Presenting author details
Full name: Vittorio Gentile
Contact number: 0039-81-5665870
Mail id: vittorio.gentile@unicampania.it
Category: Oral presentation