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Polyphenols regulate signaling cascades in neuronal cells in cultures

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Abstract

Polyphenols, such as curcumin, stevia, genistein and resveratrol, have been demonstrated to be effective to promotion anti-oxidant and anti-inflammatory properties. We report that polyphenols induce cell shrinkage, chromatin condensation, DNA fragmentation, and cytochrome C induction, characteristics of apoptosis, in neurons and astrocytes in primary culture after induction with Alzheimer's diasease. Many cellular and biochemical effects of polyphenols in mouse transgenic APP/Preseniline cells have been reported, such as inhibition of protein kinase C (PKC) activity induced by phorbol 12-myristate 13-acetate treatment, inhibition of tyrosine protein kinase activity, and inhibition of arachidonic acid (AA) metabolism. Our data indicate that phenolic compounds can trigger signal transduction pathways linked to apoptosis, such as caspases, p53, and bcl-2 genes. This programmed-cell death may be considered actually one of the important targets in a preventive approach against Alzheimer's disease. How flavonoids do regulate and control the intracellular signaling cascades considered as relevant targets in neurodegenerative preventive approach remains to be elucidated. The results suggest that in neural cells, blocking the cellular signal transduction might trigger the induction of apoptosis and also polyphenols can regulate signaling cascades to stop conversion of a normal cell to an affected one by compounds in Alzheimer's disease.

Biography

Frank Albert Bisbal MD, PH.D was born in Valencia, Spain. He obtained a degree in Information Sciences in the Cardenal Herrara University – CEU, becoming specialized in biomedical research. He finished his academic formation at the University of Milan (Italy) being a resident pupil for one year. Afterwards he extended to Medicine studies at the Faculty of Medicine and Odontology from the University of Valencia in which he currently forms part of a research team in the Physiology Department together with Dr Soraya Valles. His initial research field centered on pathologies such as Cancer and Alzheimer thus in the last few years he has dedicated his research to pathologies associated with War Medicine. He is author of numerous publications in relation to Military Health Care becoming an expert in the socio-sanitary assistance in the Armed Forces; he has extrapolated this discipline to the academic field by the foundation of the I Master in Military Health Care and Catastrophes, being the worldwide pioneer. The Master is offered at the Faculty of Medicine of University of Valencia which he coordinates together with PhD Dr Valles. He has various publications which are declared to be of "Military and Health care Interest" and is a member of the Working Commission in Military Health Care from the Ministry of Defense in the Spanish Government.

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