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Lithium effects on stem cells-still interesting through all these years

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Lithium (Li) salts have been widely used in psychiatry as mood stabilizing agents for 60 years. Li found in variable amounts in foods, especially grains, vegetables, and in some areas, the drinking water provides a significant source of the element. Therefore, dietary intake in humans depends on location, type of foods consumed, and fluid intake. Traces of Li have been detected in human organs and tissues, leading to speculation that the element was responsible for specific functions in the human body. It was not until the 20th century that studies performed in the 1970's and 1990's, primarily in rats and goats, maintained on Li-deficient diets demonstrated higher mortality, altered reproductive and behavioural abnormalities. Such deficiencies have not been detected in humans; however, studies performed on populations living in areas with low Li levels in water supplies have been associated with higher rates of suicides, homicides, and the arrests rate for drug abuse and other crimes. Li appears to play a significant role in early fetal development as evidenced by high Li levels during the early gestational period. Biochemically, the mechanism of Li action involves multi-factor and interconnected pathways with enzymes, hormones, vitamins, and growth and transforming factors. This body of evidence now appears sufficient to label Li as an essential element with the recommended RDA for a 70 kg adult of 1000 mg/day. Of extreme importance for the future is the growing body of evidence indicating Li can be used effectively for the treatment of acute brain injuries, e.g., ischemia and chronic neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, Tauopathies, and Huntington's disease. This conclusion is based upon evidence showing Li as important in neurogenesis as well as protecting neurons from neurotoxicity. Li influences stem cells, both neuronal and marrow derived, thus, the additional therapeutic implications for this element in clinical medicine to treat disorders associated with the faulty production of blood and nerve cells or as a tool to enhance blood stem cell mobilization for transplantation are needed.

Biography

Vincent S Gallicchio received his PhD in Hematology from New York University and his Diploma in Medicine from the University of Arad, Romania. He performed Postdoctoral studies at the University of Connecticut Medical Center and conducted his fellowship in Hematology from the Memorial Sloan Kettering Cancer Center. He has published more than 150 research articles in peer-reviewed journals on topics focused on Stem Cells and Hematology, seven books, many book chapters, and has been awarded eleven United States and one international patent for developmental therapeutics for AIDS and Cancer. He currently serves as a Director of Stem Cell Therapy for out-patient clinical use.

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