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Radiation and Alzheimer's disease (AD)

Brain insult in the early human life may set abnormal developmental events into motion leading to the development of different neurological and neuropsychological disorders. Recent systematic review of bibliographic databases from PubMed, EMBASE, Cochrane Library and Web of Science suggests that occupational exposure to extremely low frequency magnetic fields may increase the risk of Alzheimer's disease (AD). Low-dose irradiation induces neural signaling pathways with a high degree of concordance in their transcriptional response in the mouse brain tissue in the aging human brain, and in brain tissue from patients with Alzheimer's disease. It suggests that the molecular response of the mouse brain after low-dose irradiation involves the down-regulation of neural pathways associated with cognitive dysfunctions that are also down-regulated in normal human aging and Alzheimer's disease. In the United States, analysis of AD death rates versus radon background radiation and total background radiation suggested that ionizing radiation was a risk factor for AD. In this presentation, I will review current progress on low dose radiation effect on the development of AD. Pre- and post-natal irradiation on the hippocampal neuropathology, cognitive impairment and relevant

molecular mechanisms will also be summarised. Our study on the acute irradiation (at postnatal day 3, 10 and 21) induced impairment of neurogenesis, neuropsychological and miRNA changes will be discussed in the last part of my presentation.

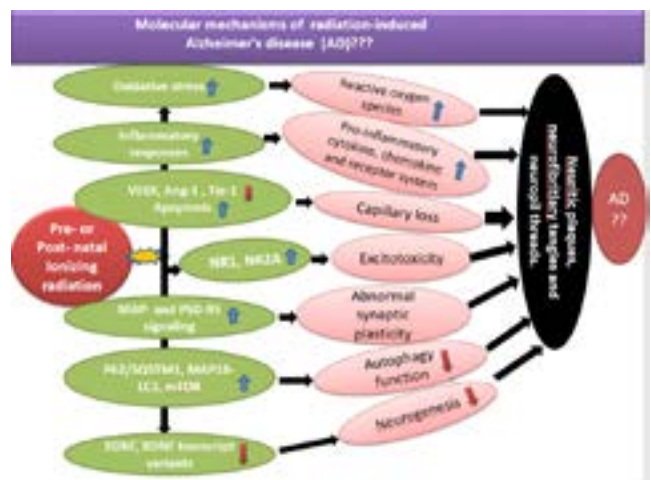


Fig. 1: Molecular mechanism of radiation-induced neurocognitive impairment

Biography

Feng Ru Tang received his MD degree from Medical School of Xi'an Jiao University, P.R. China and PhD degrees in Neuroscience from National University of Singapore, Singapore. He is a Senior Research Scientist at the Singapore Nuclear Research and Safety Initiative in National University of Singapore. His research work focusses on neuropathophysiology in animal models of human neurological and neuropsychological disorders. Currently, he is working on early life radiation exposure-induced impairment of neurogenesis and cognitive deficit. He has edited two books and published more than 70 papers in international refereed neuroscience journals.

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