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Cell cycle arrest by black tea polyphenols: Akt, Wnt/β-catenin signaling and FOXO1 as major targets

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Various naturally occurring phytochemicals have been accounted for efficient anti-tumorigenic effects in different experimental systems. Tea polyphenols are such natural phytochemicals which have significant biological activities against human cancer cells. Deregulation of cell cycle kinetics and inhibition of apoptosis play determining roles in human malignancies. Objective of the present work was to find out the underlying molecular mechanism of cell cycle inhibition by black tea polyphenols theaflavins (TF) and thearubigins (TR) against human leukemic U937 and K562 cells where Akt is over-expressed. Both the polyphenols augmented various cell cycle regulatory proteins. Suppression of Akt signaling by TF and TR played a pivotal role in this process. Further inhibition of Wnt/ β-catenin signaling and increase of FOXO1 expression was linked with regulation of certain key components of the cell cycle machinery. TF and TR reduced Hsp90 expression, which also correlated with cell cycle arrest. Hsp90 inhibition was also associated with attenuation of Akt signaling and reduction of CDK2 level. Very precisely, blocking of p-Akt by TF and TR was interrelated with the diminution of its downstream targets like Wnt/β-catenin signaling, cyclinD1, p27 and FOXO1 amplification. These observations hypothesized that modulation of Akt signaling by TF and TR could influence a plausible multi targeted signaling network that might have caused cell cycle arrest. However more studies are still required to evaluate the precise action of these polyphenols in human leukemic U937 and K562 cells.

Biography

Babli Halder has completed her Ph.D. in 2008 from Jadavpur University, India and her research associateship from the Indian Institute of Chemical Biology. Now she is working as a postdoc at the Centre for Molecular and Cellular Biology, India. She has significant publications on cancer therapeutics. With profound experience on molecular cancer biology and experimental therapeutics, Dr. Halder is also an invited reviewer of DNA and Cell Biology and Genetic Testing and Molecular Biomarkers. She has majorly worked on anticancer effects of black tea polyphenols against human skin cancer and leukemia.

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