

## Study of cellular DNA breakage by flavonoids and other polyphenols in the presence of Cu (II)

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Flavonoids belong to the polyphenol family and can be visualized as two benzene rings which are joined together with a short three carbon chain. Free radicals cause cellular and DNA damage in our body and consequently induce age-related diseases such as dementia and cancer. Studies in our laboratory have shown that several of the proposed biological antioxidants like tannic acid and flavonoids are themselves capable of generating oxygen free radicals (pro-oxidants), either alone or in the presence of transition metal ions. Earlier we have proposed that an important anticancer mechanism of plant polyphenols and flavonoids may involve mobilization of endogenous copper ions, possibly chromatin bound copper and the consequent pro-oxidant action. Using a cellular system of lymphocytes isolated from human peripheral blood and comet assay, we have shown that flavonoids and other plant polyphenols are able to mobilize nuclear copper in human lymphocytes leading to degradation of cellular DNA. Further, incubation of lymphocytes with neocuproine (a cell membrane permeable copper chelator) inhibited DNA degradation in intact lymphocytes. Bathocuproine, which is unable to permeate through the cell membrane, did not cause such inhibition. This study has further shown that polyphenols are able to degrade DNA in cell nuclei and that such DNA degradation is inhibited by neocuproine as well as bathocuproine (both of which are able to permeate the nuclear pore complex), suggesting that nuclear copper is mobilized in this reaction. Pre-incubation of lymphocyte nuclei with polyphenols indicates that it is capable of traversing the nuclear membrane.

### Biography

Hussain Arif has completed his master's degree from Department of Biochemistry, AMU, and is now pursuing Ph.D. program under the supervision of Prof. S. M. Hadi (Prof. Emeritus). He has attended and presented posters in many national and international conferences.

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