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Antimutagenic and antioxidant activity of novel 4-substituted Phenyl-2, 2'-bichalcophenes and aza-analogues

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Evaluation of the potential mutagenic/antimutagenic activities of newly synthesized compounds by Ames assay has been of great interest for the development of novel therapeutic compounds for many diseases including cancer. Ten novel bichalcophenes with in vitro and in vivo broad spectrum activities against various microbial strains were investigated for their cytotoxic, antioxidant, mutagenic, and antimutagenic potential in *Salmonella* reverse mutation assay system against sodium azide (NaN_3) and benzo[a]pyrene (B[a]P). At nontoxic concentrations that did not affect the viability of *Salmonella*, all bichalcophenes alone or in combination with NaN_3 (1 μg/plate) or B[a]P (20 μM) with S9 mix were not mutagenic. The bichalcophenes significantly reduced NaN3- and B[a]P-induced mutagenicity under pre- and co-exposure conditions in a concentration-independent manner. However, the antimutagenic activity of bichalcophenes against B[a]P varied depending on the exposure regimen, bichalcophenes were more effective under pre-exposure conditions. The effective antimutagenic bichalcophenes showed a high antioxidant activity that could promote the DNA repair system. Bichalcophenes are least likely to interfere with the microsomal bioactivation of B[a]P. Monocationic bichalcophene derivatives were superior antimutagenic agents than the corresponding mononitriles against both mutagens investigated possibly due to the higher nucleophilic centers they have which could bind and protect the bacteria DNA. Based on the results of the present investigation, monocationic compounds (1, 2, 4, and 5B) will be selected for further time consuming and costly chemoprevention / chemoprotection studies in animal models.

Biography

El-Sayed has completed his Ph.D. at the age of 31 years from Utah University and postdoctoral studies from Utah University College of Pharmacy. He is now an associate professor of toxicology at King Faisal University (KSA) and Ain Shams University (Egypt). He has published more than 21 papers in reputed journals and serving as an editorial board member in more than 15 international journals.