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Is Quercetin genotoxic or anti-genotoxic in the presence of divalent metals?

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Some of the natural antioxidants such as quercetin exhibit pro-oxidant effects in the presence of divalent metal ions including Iron (Fe (II)), Copper (Cu (II)), Zinc (Zn (II)), and etc. On the other hand, these metals can induce oxidative DNA damage that subsequently results in several health disorders. In recent years, consumption of natural based antioxidants have been increased, therefore the existence of metal ions in the body (either from endogenous or exogenous sources) may neutralize the antioxidant effects of these compounds and even in some circumstances it might convert the antioxidant into the pro-oxidant effects and subsequently cellular damage. Accordingly, it is necessary to determine the behavior of these substances, namely protection or damage in the presence of divalent metals. The aim of this study was to evaluate the probable genotoxicity or anti-genotoxicity effects of Quercetin in the presence of metal ions using come assay in the NIH 3T3 cell line. The genotoxic activity of quercetin (2.5, 5, 10, 25, 50, 100 and 200 μM) alone and in combination with divalent metal ions (50 μM) in NIH 3T3 cells was evaluated by Comet assay. The treated cells were incubated at 37°C for 1hour. The damage severity was measured by scoring the cells following calculating of % DNA in Tail using comet score software. The results showed that quercetin at tested concentrations showed negligible DNA damage (1.3-2 % DNA in tail), however divalent metals including Iron, Copper, and Zinc (50 μM) exhibited significant genotoxicity (31-33 % DNA in tail). According to the results, Quercetin at concentrations of 10 to 100 μM (**p0.01) could protect the cells against DNA damage induced by metals. This study showed that Quercetin at some concentrations has the protective effect against oxidative DNA damage, however further studies, *in vitro* and *in vivo* are needed to evaluate the exact properties and behaviors of this compound.

Biography

Fatemeh Soltani got her PhD in pharmaceutical biotechnology from Mashhad University of Medical Sciences, Iran in 2013. As her PhD thesis, she worked on some recombinant fusion peptides as gene delivery vectors. During her PhD, she was involved in several projects other than her thesis which allowed her to gain experience in various practical techniques such as genotoxicity, cytotoxicity, gene cloning, protein expression, protein purification, fusion protein design, nanoparticle formation, characterization and etc. In addition, she spent a seven-month sabbatical in 2010 at the University of Queensland in Australia. During that period, she worked on the synthesis of lipid-peptide core nanoparticles by using solid phase peptide synthesis (SPPS) methods. At the moment she is an assistant professor in the Department of Biotechnology, School of Pharmacy, Mashhad University of Medical Sciences, Iran.

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