Scope of the work presented
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The health benefits of plant derived polyphenols including genistein, resveratrol, epigallocatechin-3gallate, delphinidin, caffeic acid, curcurmin, capsaicins, tannins and flavonoids have been attributed to their antioxidant effects. However, there is evidence in literature suggesting that antioxidant activity of such plant derived polyphenols may not fully account for their chemopreventive effects. Therefore, it is likely that other mechanisms may be responsible for the varied pharmacological properties. Most antioxidants of plant origin are redox (reduction-oxidation) agents, protecting against ROS generation in some cases and promoting radical generation in others (Herbert, 1996). Studies in this laboratory have shown that plant polyphenols behave as prooxidants in the presence of copper ions catalyzing DNA breakage through the generation of reactive oxygen species (Ahmad et al., 1992; Bhat & Hadi, 1994; Ahsan & Hadi, 1998; Ahmad et al., 2000; Azam et al., 2004; Ahmad et al., 2005). Copper is a major metal ion present in the nucleus and is also implicated in tumorigenesis and angiogenesis (Chevion et al., 1988). Oxidative DNA breakage by these compounds correlates with their apoptosis inducing capacity. Further, properties of polyphenols, such as binding and cleavage of DNA and the generation of ROS in the presence of transition metal ions are similar to those of some known anticancer drugs (Ehrenfeld et al., 1987). It is also known that serum, tissue and cellular copper levels are significantly elevated in a number of malignancies (Linder, 1991; Gupte and Mumper, 2008). Soy and legumes are known good sources of polyphenols genistein and biochanin A respectively. Induction of apoptosis by genistein as well as biochanin A has been shown in various human cancer cell lines and animal models (Barnes et al., 1995; Sarkar et al., 2003; Renea et al., 2002).

There is significant data in literature that points to the prooxidant rather than the antioxidant property of polyphenols as the mechanism of their anticancer properties. Taking into consideration our own observations and those of others we have proposed a mechanism according to which plant polyphenols mobilize...
endogenous copper in cancer cells leading to cytotoxic action through the generation of reactive oxygen species (Hadi et al., 2000; Hadi et al., 2007). Based on the above hypothesis, in the work presented here, I have attempted to elucidate the mechanism of action of plant derived polyphenolic compounds specially the isoflavones genistein and biochanin A.

Studies on chemopreventive and therapeutic plant-derived phytonutrients assume significance in view of the fact that such compounds exhibit negligible or low toxicity even at relatively higher concentrations. Further they may also act as lead compounds for the synthesis and development of novel anticancer drugs.