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Modulation of selenite cataract by dietary supplement of Broccoli in experimental animal models

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Objective: Oxidative stress remains the underlying factor in many cataracts. Selenite-induced cataract was worked upon as a model system for oxidative stress in rats. Naturally occurring compounds like flavonoids are known to exhibit antioxidant activity, and hence, might be of potential therapeutic value. In the present study, an attempt has been made to determine the efficacy of broccoli in modulating or preventing selenite-induced cataractogenesis.

Material and Methods: Twenty eight Wister rat pups were divided into four groups. Group one (n=6) received basal diet and served as control group. The rats in group two (n=8) were injected subcutaneously with sodium selenite (30μmol/kg body weight) to induce cataract and fed on basal diet. Group three (n=7) normal rat pups supplemented with 10% broccoli added to their basal diet. Group 4, selenite-induced cataract (n=7) also fed on 10% broccoli in their basal diet and served as treated group. Cataract was assessed one week later, and its density was graded by slit lamp biomicroscopy. The identification of individual phenolic compounds of the broccoli was performed. After the end of experiment (two months), all rats were fasted overnight. Blood samples were collected from the eye vein and then lenses were excised. All planned samples were prepared as will be described.

The levels of serum lipid profiles were determined. The levels and activity of catalase, superoxide dismutase, total antioxidant capacity, reduced glutathione, malondialdehyde and nitric oxide were assessed in the blood and lens. Fas ligand (FAS-L) as apoptotic marker was also assessed in the blood and lens.

Results: The ophthalmic examination revealed that, lenses in the control group was clear; but in selenite induced cataract group, all lenses developed complete dense opacification (grade 5), whereas mild opacification was observed in the group four (treated group). The development of cataract was reduced into 80% in the group supplemented with 10% broccoli.

Conclusion: The present data showing that broccoli delayed selenite-induced cataract formation by inhibiting lipid peroxidation, oxidative stress and act as anti-apoptotic agent that can delay progress of cataract formation.