

The Effects of Ellagic Acid on Rat Lungs Induced Tobacco Smoke

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Abstract : The toxic effects of tobacco smoke exposure have been detected in numerous studies. Ellagic acid (EA), (2,3,7,8-tetrahydroxy [1]-benzopyranol [5,4,3-cde] benzopyran 5,10-dione), a natural phenolic lactone compound, is found in various plant species including pomegranate, grape, strawberries, blackberries and raspberries. Similar to the other effective antioxidants, EA can safely interact with the free radicals and reduces oxidative stress through the phenolic ring and hydroxyl components in its structure. The aim of the present study was to examine the protective effects of ellagic acid against oxidative damage on lung tissues of rats induced by tobacco smoke. Twenty-four male adult (8 weeks old) Sprague-Dawley rats were divided randomly into 4 equal groups: group I (Control), group II (Tobacco smoke), group III (Tobacco smoke + corn oil) and group IV (Tobacco smoke + ellagic acid). The rats in group II, III and IV, were exposed to tobacco smoke 1 hour twice a day for 12 weeks. In addition to tobacco smoke exposure, 12 mg/kg ellagic acid (dissolved in corn oil), was applied to the rats in group IV by oral gavage. Equal amount of corn oil used in solving ellagic acid was applied to the rats by oral gavage in group III. At the end of the experimental period, rats were decapitated. Lung tissues and blood samples were taken. The lung slides were stained by H&E and Masson's Trichrome methods. Also, galactin-3 stain was applied. Biochemical analyzes were performed. Vascular congestion and inflammatory cell infiltration in pulmonary interstitium, thickness in interalveolar septum, cytoplasmic vacuolation in some macrophages and galactin-3 positive cells were observed in histological examination of tobacco smoke group. In addition to these findings, hemorrhage in pulmonary interstitium and bronchial lumen was detected in tobacco smoke + corn oil group. Reduced vascular congestion and hemorrhage in pulmoner interstitium and rarely thickness in interalveolar septum were shown in tobacco smoke + EA group. Compared to group-I, group-II GSH level was decreased and MDA level was increased significantly. Nevertheless group-IV GSH level was higher and MDA level was lower than group-II. The results indicate that ellagic acid could protect the lung tissue from the tobacco smoke harmful effects.

Keywords : ellagic acid, lung, rat, tobacco smoke

Conference Title : ICAVST 2017 : International Conference on Advanced Veterinary Science and Technology

Conference Location : Amsterdam, Netherlands

Conference Dates : December 04-05, 2017