

Antioxidant Status in Plasma and Red Blood Cells and Urine Cotinine Level in Smoking Girl Students in high School

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Cigarette smoke contains a large number of oxidants, which leads to the hypothesis that many adverse effects of smoking result from oxidative damage. Free radical generation would increase in smokers, which results in smoke-related antioxidant capacity would decrease in smokers. Evidence that smokers are subjected to oxidative stress includes the findings that smokers have lower concentrations of antioxidants than do nonsmokers. Even under the exposure to smoking in young ages, smoke-related adverse effect would be more harmful than in adult ages. In the present study, the relations between smoking and both plasma and red blood cell concentrations of indexes of antioxidant defenses were tested in girl students in high school consisting of smokers and nonsmokers. Urine cotinine level was also tested with the relation to the antioxidant indexes. Sixty eight girl students in high school were selected for this study: Among them, 22 were smokers and 46 were non-smokers. Zn Cu intakes were estimated by food record method. Plasma and red blood cells were obtained and 24-hours urine was collected. The enzymes-catalase, glutathione peroxidase(GPX), superoxide dismutase (SOD)-in plasma and red blood cells were measured as antioxidant indexes. Urine cotinine level was measured, also. Plasma Zn and Cu were analyzed by atomic absorption spectrophotometer. Student's *t* test was used for differences between the smoking and non-smoking and Pearson correlation coefficients for the relations between various factors. Even through the intake of Zn and Cu were higher in smoking group, plasma Zn and Cu concentration were higher in non-smoking group without statistical significance. Plasma SOD was higher in non-smoking (14613.2 ± 1470.5 _____) than in smoking (8717.3 ± 1107.2 _____) ($p < 0.05$). The concentration of plasma catalase and GPX and SOD in red blood cells were higher in non-smoking than in smoking without statistical significance. The relations between the smoking and both the concentration of catalase and GPX in red blood cells were not significantly different. Urine cotinine level was higher in smoking (36.5 ± 5.1 _____) than in non-smoking (10.2 ± 1.17 _____) ($p < 0.001$). Plasma Cu and GPX were significantly correlated with plasma Zn and SOD, respectively ($p < 0.01$). Urine cotinine level was negatively correlated with plasma GPX, SOD and catalase in red blood cells ($p < 0.05$). The data

show that smoking decreased plasma GPX and SOD concentrations smoking girl students in high school. This results suggest that the antioxidant capacity would be decreased in smoking girl students who, in turn, susceptible to be in oxidative damage than in non-smoking.