Acta Pharmaceutica Turcica
XLII (1) (15-16) 2000

SEX DIFFERENCES IN PLASMA AND LIVER LIPID PEROXIDE AND LIVER GLUTATHIONE LEVELS IN WISTAR RATS

WISTAR SIÇANLARDA PLAZMA VE KARACİĞER LİPİD PEROKSİT VE KARACİĞER GLUTATYON DÜZEYLERİNDE CİNSİYET FARKI

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Normal levels of plasma and liver lipid peroxides in male and female rats were compared and it was seen that there were no significant differences. Normal levels of liver glutathione in females were lower than males.

Erkek ve dişi sıçanlarda plazma ve karaciğer lipid peroksitlerin normal düzeyleri karşılaştırılmış ve anlamlı bir fark bulunamamıştır. Karaciğer glutatyonunun normal düzeyleri, dişilerde erkeklerden daha düşüktür.

Keywords : *Lipid peroxidation; Glutathione; Sex difference*

Anahtar kelimeler: *Lipid peroksidasyonu; Glutatyon; Cinsiyet farkı*

Introduction

Lipid peroxidation is one the most important results of free radicals and was studied by many workers as it is the metabolism of lipids through pathways involving intermadiate formation of lipid peroxides, hydroperoxides and endoperoxides. Peroxidation of unsaturated fatty acids in the biological membranes is important because peroxidative decomposition of membrane phospholipids has devastating biological consequences (1,2). The occurence of lipid peroxidation in biological membranes causes impairment of membrane functioning, decreased fluidity, inactivation of membrane-bound receptors and enzymes and increased nonspecific permeability to ions such as Ca^{+2}(2,3). Lipid peroxidation has been suggested to be responsible for numerous biological and toxic effects such as cellular aging, cancer (4), some phases of atherosclerosis, neuronal ceroid lipofuscinosis, intermittent claudication, oxygen toxicity and liver injury caused by different toxins(5).

Glutathione (GSH) is one of the antioxidant defenses that exists in cells and tissues to prevent formation and limit the effects of free radicals. GSH is the most important intracellular thiol and is the only thiol that can prevent lipid peroxidation(6).

Since lipid peroxidation is related to many diseases, we think that lipid peroxide levels will be used in the clinical laboratories in the future and studies dealing with the subject of sex differences will help these values to be routinely used in laboratories.

Materials and Methods

Thiobarbituric acid was purchased from E. Merck. Wistar rats (obtained from Experimental Research and Animal Laboratory Unit, Faculty of Medicine, University of Marmara, İstanbul) weighing 200-250 g were used in this study. They were housed under controlled conditions of light (12 hours dark/light circle).

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Table 1. Sex differences in plasma and liver lipid peroxide and liver glutathione levels (Mean±SD) in wistar rats (n=12).

Parameters	Male Rats	Female Rats
Plasma lipid peroxide (nmol MDA/ml plasma)	4.13±0.96	3.52±0.95
Liver lipid peroxide (nmol MDA/g wet wt)	242.67±41.09	317.35±179.77
Liver glutathione (μmol GSH/g wet wt)	3.53±1.98	1.48±1.39*

MDA: Malondialdehyde, *p<0.001

"Male Rats" and "Female Rats" groups were formed. The animals were fasted 20 hours before the experiments. They were decapitated and livers were rapidly removed, washed in 0.9% NaCl. and homogenized in ice-cold 0.15 M KCl (10%w/v) (7). Lipid peroxide levels in liver and plasma were measured by thiobarbituric acid (TBA) test (5,8). Liver glutathione levels were measured by the method of Ellman (9).

Results and Discussion

Marinkovic and Zuyderhoudt (10), reported that normal levels of plasma lipid peroxides of mice were higher in males than females. In another study carried out with Fischer 344 rats(11), it was seen that liver lipid perioxide levels expressed as thiobarbituric acid reactive substances (TBARS) in females in "Young Adulthood" and "Middle Age" groups were higher than males in those groups. In our study carried out with Wistar rats, it was observed that there were no significant differences between the plasma or liver lipid peroxide levels of either male or female animals and that liver glutathione levels of females were significantly lower than males (Table 1). In the study mentioned above (11), the authors reported that there were no significant differences between the liver GSH levels of either sex rats.

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Accepted: 07.07.1999