The Effects of Ginkgo Leaf Extract on Serum NO in Male Rats

Tavakoli P*, Ahmadi R, and Mahdavi E

Abstract—Ginkgo is a genus of highly unusual non-flowering plants which has definite effects on improvement of cardiovascular system. This study was exerted to determine the effects of hydroalcoholic extract of ginkgo on serum levels of NO in male rats. In this study, male Wistar rats were randomly divided into control, normal saline receiving, ginkgo extract (100 mg/kg/body weight) receiving animals of 5 rats in each group. Ginkgo extract was daily injected intraperitoneally for 7 days. Blood samples were collected using cardiac puncture method serum NO level was measured using spectrophotometry method. Data were statistically analyzed and compared between groups using ANOVA. Serum NO level was not significantly changed in normal saline receiving rats compared with control animals, however, serum NO level was significantly increased in ginkgo extract receiving animals compared to control rats.

Keywords—Ginkgo, NO, Rat.

I. INTRODUCTION

GINKGO (Ginkgo biloba) is one of the oldest living tree species. It is also tops in scientific studies and in purchases. In Europe and the United States, ginkgo supplements are among the best-selling herbal medications. Ginkgo is a herb that contains terpenoids, polyphenols, phenolic allyl [1],[2], carbohydrates, aglycones, quercetin, kaempferol [3], mineral salts and various amino acids [4].

Ginkgo has a long history of being used in traditional medicine. Using ginkgo for asthma and bronchitis was described in 2600 BC. It is often used for memory disorders including Alzheimer’s disease and dementia [5]. It also used to treat blood disorders and improve memory, and it's best known today as way to potentially keep the memory sharp [6].

Ginkgo also used for conditions that seem to be due to reduced blood flow in the brain, especially in older people. [7],[8]. Some people use ginkgo to treat sexual performance problems. It is sometimes used to reverse the sexual performance problems [9].

Nitric Oxide is a crucial signaling molecule involved in many physiological and pathological processes [10]. Nitric oxide is rapidly oxidized to nitrite and/or nitrate by oxygen. The half-life of nitric oxide in biological matrix is very short, ranging from less than 1 second in the presence of hemoglobin to 30 seconds[11]-[13]. Studies show that humans with atherosclerosis, diabetes, or hypertension often show impaired NO pathways[14]. Studies also indicate that nitric oxide has a role in regulation of vascular tone[15].

Although Chinese herbal medicine has used ginkgo leaf and seed for thousands of years, modern research has focused on the standardized Ginkgo biloba extract made from the dried green leaves. In this regard, this study was exerted to determine the effects of ginkgo leaf extract on serum levels of NO in male rats.

II. MATERIAL AND METHODS

A. Study Population

Adult male Wistar rats weighting 190±10 grams were purchased and raised in our colony from an original stock of Pasteur institute(Tehran, Iran). The temperature was at 20-25°C and animals kept under a schedule of 12h light:12h darkness (light on at: 8:00 a.m.) with free access to water and standard laboratory chow. Care taken to examine the animals for general pathological symptoms. Food was withheld for 12-14h before operation or death. In all experiments, attention was paid to the regulation of local authorities for handling laboratory animals and the Ethical Guidelines in working with rats.

B. Protocol of Study

In this study, male Wistar rats were randomly divided into control, normal saline receiving, ginkgo extract (100 mg/kg/body weight) receiving animals of 5 rats in each group. Ginkgo leaf extract was daily injected intraperitoneally for 7 days. Blood samples were collected using cardiac puncture method. Following serum collection, serum NO levels were measured by spectrophotometry method.

C. Statistical Analysis

All results are presented as mean±SD. The significance of differences between groups was determined by student’s t and Chi-square test. The SPSS software (version 11) was used for all computer analyses. The differences were significant when α<0.01.

III. RESULTS

Table I indicates serum NO level in control and normal saline or ginkgo extract receiving male Wistar rats.
IV. DISCUSSION

According to our study, ginkgo leaf extract can increase serum levels of NO in male rats. Studies show that ginkgo extract administration can decreases blood pressure and mediates strong antithrombotic and antioxidant effects [16] which are certainly accompanied by influences on NO system. The increasing effects of ginkgo on NO serum level may come from the effects of ginkgo components - in particular allicin and flavonoids. Allicin is an angiotensin II inhibitor and has anti-oxidation and inflammatory inhibition [18] which most likely affects on NO system. Ginkgo also can lower blood pressure in patients with hypertension [8],[16],[19]. Since NO system has a considerable role in regulating the hypertensive conditions [20],[21], it is suggested that ginkgo effects on blood pressure is mediated by increased serum NO level.

V. CONCLUSION

As administration of ginkgo extract plays a significant role in increasing of serum NO levels, it is most likely to consider that some effects of ginkgo on body physiology or chemistry is mediated by changes in serum NO level.

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REFERENCES


