Effects of Acorus Graminei Rhizoma Extract on Sociopsychological Stress in Mice

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ABSTRACT

Objectives : Stress is one of the deleterious factors for health, and many diseases are likely to be related to stress. The effects of Acorus Graminei Rhizoma extract were tested for the anti-sociopsychological stress action.

Methods : 250g of dried Acorus Graminei Rhizoma was extracted(AGE) with pure water and the total extractive was evaporated under reduced pressure to give 39.7g. ICR male mice(20±2g) were fed orally with the dose of 100mg/kg/day for five days. Mice were exposed to sociopsychological stress by restraining and seeing foot shock stressed mice for one hour for five days.

Results : AGE administered group showed a significant decrease of serum corticosterone secretion compared with control group. Noradrenaline secretions in the dorsal cortex of brain showed no change. Lipid peroxidation of the liver and serum of mice were tested by measuring malondialdehyde, but AGE administration showed no change.

Conclusion : Above results suggest that AGE can rid the sociopsychological stress by decreasing serum corticosterone secretion.

Key words : Acorus Graminei Rhizoma, Sociopsychological stress, Corticosterone, Noradrenaline, Lipid peroxidation.

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I. Introduction

It is well recognized that stress is one of the deleterious factors for health. Actually, many diseases or disorders such as hypertension, gastric ulcer, affective disorders, and hyperthermia are likely to be related to stress. It is also believed that chronic stress is more frequent and deleterious to human health than acute stress. In animal studies, it has been proposed that repeated stress exposure produces a useful model of depression in animals. This model has been used to mimic human abnormality of the hypothalamic–pituitary–adrenocortical system, i.e., elevated levels of glucocorticoids (GCs), and impairment of the sleep–wake cycle, which is a typical circadian rhythm parameter. As to the influence on the rhythmic activity of the brain, it has been suggested that chronic stress itself causes disturbances of the circadian rhythm in physiology, endocrinology, and behavior. Accordingly, an intimate relationship between chronic stress and circadian rhythm disturbance has been suggested. Furthermore, chronic stress exposures have also been reported to cause behavioral and physiological abnormalities, such as decreased food intake, decrease in some types of behavior, hyperthermia, and an elevation of plasma GCs. However, little information is available on the physiological and behavioral consequences following a long-term period after chronic stress exposure.

Recently, the communication box, developed by Ogawa and Kuwabara, has been introduced to study behavioral and physiological changes in rats or mice under physical or psychological stress. The psychological stress is generated by an exposure to emotional responses arising from physically stressed animals. In any case, these stress exposures cause behavioral and physiological changes in animals.

In the present study, the effects of Acorus Graminei Rhizoma (Acorus gramineus Soland.) extract (AGE) were tested for the anti-sociopsychological stress action. The root is antifungal, antibacterial, antirheumatic, antispasmodic, aromatic, cardiac, carminative, diaphoretic, febrifuge, sedative, stimulant, stomachic and tonic. It is also powdered and applied to bleeding gums. It is used internally in the treatment of digestive problems, depression and epilepsy. We examined whether AGE have anti-sociopsychological effects in mice following exposure to sociopsychological stress induced by the communication box.

II. Materials and methods

1. Animals

Adult male ICR mice at the body weight of 20±2g were obtained commercially (Daehan experimental animal, Korea) and used. All animals were housed under standard conditions of lights and controlled room temperature, and received food and water ad libitum. The stress exposures were carried out in a separate room.

2. Acorus Graminei Rhizoma extract (AGE) preparation

Acorus Graminei Rhizoma were purchased in the special herb market (Songseon Herb, Gwangju, Korea) and good samples carefully selected. To fractionate the aqueous extract, 250g of the dried herb of Acorus Graminei Rhizoma was boiled with 4500ml of pure water at 100°C for 2 hours. After filtration, the filtrate was evaporated under reduced pressure and then freeze-dried to yield the aqueous extract. And the total extractive powder was 39.7g. The extract stored in deep freezer when unused, and freshly diluted for experiment. Mice were fed orally with the dose of 100mg/kg/day for five days.

3. Chronic stress exposures

Stress was applied by the methods which