Imsil-gun, Jeollabuk-do 55918, South Korea; [4]Sunchang Research Institute of Health and Longevity, 427-128 Indok-ro, Ingye-myeon, Sunchang-gun, Jeollabuk-do 56015, South Korea

**Introduction:** Stress is a state that threatens homeostasis andcauses a variety of psychological, physiological as well as pathologicaldisorders and these contribute to stress responses including neuronal,endocrine, and immune reactions, which could lead to interference of hostdefenses. *Cornus officinalis* Sieb.(CO) has been used as a food and medicinal plant. Pharmacological studies havedemonstrated that CO possesses antioxidant and anti-inflammatory effects. This study was to investigate the anti-stress roleof CO and fermentedCO (FCO) on immobilized stress in rats.

**Materials and Methods:** The rats were orally administrated with CO (100 mg/kg)and FCO extract (100 mg/kg) 1 h before immobilization treated 2 h per day for14 days. To measure the effects of CO on antioxidant activities, we detectedtotal phenolic and flavonoids contents of CO and FCO. And then the anti-stressrole of CO and FCO extract in rats was assessed by malondialdehyde (MDA), nitric oxide (NO) and enzyme-linked immunosorbent assay (ELISA).

**Results:** The total phenol and flavonoid contents of CO andFCO extract were 12.45 mg GAE/g and 112.95 mg QE/g, 15.79 mg GAE/g and 120.99mg QE/g, respectively. Immobilized-induced oxidative stress was markedlymitigated via inhibition of MDA, NO in serum leveland MDA in the hippocampus. Moreover, CO and FCO notably decreasedcorticosterone, β-endorphinand increased serotonin in serum level,respectively.

**Conclusions:** Our findings revealed the anti-stress effects ofCO and FCO on immobilized stress could operate by decreasing oxidative stress,controlling stress-related hormones (corticosterone, β-endorphin, and serotonin)in the serum. CO and particularly, FCO have shown potential as a phytomedicineagainst immobilized stress.

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## Patterns of antioxidant and apoptotic gene expressions in the testes between normal aged male mice and hyperthermic scrotal mice for the establishment of andropause animal models

**Soo-Young Yoon*, Sol-Ji Choi, Jae-Pung Han, Lee-Wha Gwon, Beon-Jun Lee, Young-Won Yun, Sang-Yoon Nam**

College of Veterinary Medicine, Chungbuk National University, Cheongju 28644, Republic of Korea

**Introduction:** Andropause in aging men causes sperm dysfunction, decreased fertility, genetic defects, decreased exercise and cognitive abilities. [1]. Among these symptoms, lowering of reproductive capacity can be induced by damage to the testis applying heat to the scrotum of the mouse [2]. Thus, in this study, we tried to find similarities between old male mice and scrotal heat stress model by making a difference in the time of heat application to construct a menopausal model similar to the real men who change with age. Through these analyses, the value of the research model was investigated by comparing the group difference and overall trend in the heat stress model with the same part of the old mice.

**Materials and Methods:** In the water bath filled with distilled water at 42°C, 9-week-old ICR mice were anesthetized by intraperitoneal injection and applied heat to the scrotum for 5, 10, 15 and 20 minutes, for each. After one week, autopsy was performed. The testes of all over groups (6, 10, 15 months old mice and scrotal heat stress model) were stored. Then the expression levels of Bax, Bcl-xL, Sod1, and TNF-α mRNAs were measured by quantitative real-time PCR. Body weight, water and food intake of 8-15 months old mice and heat stress model were measured weekly.

**Results:** 10-week-old ICR mice without heating were the control group. The expression level of Bcl-xL and Sod1 were declined in the whole group, but that of Bax was increased. TNF-α level was increased as compared with the control level. As mice aged, food intake and body weight increased but water intake decreased. And scrotal heat stress group showed the similar results to aged mice groups with increasing heat.

**Conclusions:** Scrotal heat stress group showed same tendency with old mice in gene expression, food intake and body weight change. And then, in heat stress groups, gradual differences in those parameters appeared depending on the time of heat application. So, the difference of actual aging can be implemented by experiment that applied heating time for andropause animal models.

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## Single-factor-encoding mRNA mediate direct lineage reprogramming of human umbilical cord blood-derived mesenchymal stem cells into neural stem cells

**Bo-Eun Kim, Soon Won Choi, Ji-Hee Shin, Myoung Geun Kook, Kyung-Sun Kang**