

Neuroprotective effects of *Cimicifuga racemosa* may be able to prevent age-related neurodegeneration

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Congress Abstract (/ejournals/abstract/10.1055/s-0033-1338225)

Age-related estrogen decline affects the aging process of the women brain and is accompanied by a progressive deterioration in cognition, attention, memory, emotional and behavioral state. The impact of menopause-induced complaints in women life is relevant since quality of life and work ability could be markedly affected. The aim of these investigations was to clarify whether the isopropanolic extract of *Cimicifuga racemosa* rhizoma (iCR) is able to affect brain function.

Changes in the expression of c-fos protein (marker of neuronal activity) in the hypothalamic nuclei were investigated in 4 groups of SD rat: Sham-operated group (Sham); ovariectomized (OVX) group, OVX treated with estrogen 0.8 mg/kg; OVX treated with isopropanolic extract of 60 mg of *Cimicifuga racemosa* per kg (corresponding to 7.7 mg/kg iCR extract on average). Positive c-fos cell densities (PCDs) were evaluated using immunohistochemical methods in several hypothalamic areas. After cold/warm stimulation, PCDs in hypothalamic nuclei of OVX rats was significantly/irregularly decreased, suggesting that estrogen decline impairs the adaptability of the hypothalamic neurons to temperature changes. Neuronal dysfunction was restored after treatment for 1 week with iCR or estrogen, resulting in similar PCD values than sham rats. ICR and estrogen showed to act on the neurons increasing excitability. This suggests the possible restoration of functional abnormalities, although both act through different mechanisms.

ICR (7.5 mg/kg) induced changes of spectral frequencies of rat brain electric activity when using the Tele-Stereo-EEG model. ICR caused a general attenuation of the spectral power within all frequency bands and all brain areas. Strongest effects were found in frontal cortex and in hippocampus. The decrease in α -2 waves (> 40%) suggests an increase in dopaminergic activity, while a decrease in α -1 and β -1 frequencies is in line with an increase in glutamatergic and serotonergic activity. Such changes on brain activity were compared to frequency pattern changes of a large number of synthetic drugs with known therapeutical use. This data were fed into a discriminant analysis and led to clustering of drugs with similar clinical indication. ICR exerts changes on brain activity similar to drugs used to treat Parkinson's disease (Selegiline), to influence mood and cognition (Ginkgo), to treat dementia (Tacrine) or to treat depression (Moclobemide).

In summary, these results suggest that iCR exerts neuroprotective effects by preventing the neurodegenerative effects of the estrogen decline. ICR might be, therefore, used as add on therapy in neurodegenerative disease and mood disorders.