The effects of hydro-alcoholic extract of propolis on structural and developmental changes of rat's brain raphe nuclei following prenatal stress

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Abstract

Prenatal stress in rats results in structural alterations of brain that persist in adulthood. Most studies have focused on specific regions of brain that have been shown to be affected by PS both macroscopically and microscopically. Propolis extract has widely protective effects against oxidative stress and neuroprotective effects that it's because of antioxidant effects due to presence of flavenoids. This study was designed to evaluate the effect of hydro-alcoholic extract of propolis on structural and developmental changes of rat's dorsal raphe nuclei following prenatal chronic stress. Wistar pregnant female rats were restrained for 6 hours daily from day 12 to 20 of pregnancy. Therapeutic groups received hydro-alcoholic extract of propolis (50, 100 and 200 mg/kg) intraperitoneal about 30 minute prior to restraint stress. At the last day of ingestion (day of 21) the fetuses were removed and blood sample was collected from mother heart. After that, fetus's brain were removed and used for biochemical, histological and immunohistochemical studies. The results showed that propolis injection could suppress damages of prenatal restraint stress. The amount of brain tissue oxidative stress indices in animals under stress conditions contributed to received extract of propolis significantly decreased in comparison with animals that just were under stress conditions and increased total antioxidant capacity and elevated level of antioxidant enzymes such as glutathione peroxidase and superoxide dismutase was detected. Also propolis prevented reduction of dorsal raphe nuclei neuron numbers and changing in morphological Characteristics due to prenatal chronic stress. In immunohistochemical studies, propolis prevented of decreased serotonin and synaptophysin proteins Expression following prenatal chronic stress in dorsal raphe nuclei. These results provide evidence that propolis using antioxidant compositions such as polyphenoles and flavonoids prevents oxidative stress effects following prenatal restraint stress, and decrease their destroying effects in brain tissue.

Keywords: Dorsal raphe nuclei, Development, propolis, Restraint stress, Rat.