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Cissus quadrangularis prevented the ovariectomy induced oxidative stress in the femur of adult albino rats

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ABSTRACT

The increasing evidence suggesting the role of free radicals in bone resorption and bone loss prompted us to explore whether the consumption of antioxidant rich medicinal plant *C. quadrangularis* modifies antioxidant status in ovariectomized rats.

Methods: Twenty four female adult rats, 90 days old showing regular estrous cycles were used for the present study. The animals were divided into two groups. The Group-1 rats (n = 6) were sham operated and Group-II rats were bilaterally ovariectomized (n = 18) and treated with *C. quadrangularis* for sixty days (100 mg/ kg body weight and 250 mg/kg body weight). After sixty days, the rats were killed, femora were dissected out, minced and homogenized in Tris-HCl buffer (pH 7.4) and the supernatant was collected and used for biochemical assays.

Results: Ovariectomy registered a decrease ($p<0.05$) in the activities of SOD, GPx, GST, ALP, collagen content and increased ($p<0.05$) the activities of TRAP and lipid peroxidation. Simultaneous administration of *C. quadrangularis* maintained the enzyme activities in ovariectomized rats.

Conclusion: C. quadrangularis, a natural herb may be used to treat the estrogen deficiency/menopause onset and ovariectomy induced oxidative stress.

1. Introduction

Rapid postmenopausal bone loss is characterized by decrease in trabecular density and deterioration of bone architecture leading to osteoporosis [1–4]. Estrogen deficiency has been identified as causal factor for post-menopausal bone loss [5–7]. Ovariectomized rat is a useful model to simulate the estrogen deficient, post-menopausal human osteoporosis. This model exhibits a progressive loss of bone matrix through a process that is similar to what occurs during post-menopausal osteoporosis [8]. Treatment strategies for osteoporosis mainly focus on slowing down or stopping the mineral loss thereby preventing bone fractures. Many therapeutic agents like estrogen, selective estrogen receptor modulators raloxifen, bisphosphonates and calcitonin have been developed to treat osteoporosis but each one of them are associated with side effects such as hypercalcemia, hypercalciurea, increased risk of endometrial cancer and hot flushes [9–11]. Therefore treatment strategy requires less or no side effects to cure or prevent osteoporosis. The ideal drug to prevent and treat osteoporosis should increase the activity of osteoblast and suppress the activity of osteoclasts, without any side effects.

Earlier studies suggested that oxidative stress is involved in bone pathogenesis [12] including osteoporosis, bone tumour

Abbreviations: BMD, Bone Mineral Density; OVX, Ovariectomy; SOD, Superoxide Dismutase; CAT, Catalase; GPx, Glutathione Peroxidase; GST, Glutathione S: Transferase; H_2O_2, Hydrogen Peroxide; MDA, Malondialdehyde; ROS, Reactive Oxygen Species; RAW, Mouse leukaemic monocyte macrophage cell line; ICI 182, 780, 7α,17β-[9-[(4,4,5,5,5- Pentafluoropentyl)sulfinyl]nonyl]estra-1,3,5(10)-triene-3,17-diol; TRAP, Tartrate Resistant Acid Phosphatase; ALP, Alkaline Phosphatase; RANKL, Receptor Activator of Nuclear Factor-κB.

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