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CEREBELLAR PERTURBATIONS OF COMBINATION ANTIRETROVIRAL THERAPY (CART): CAN BIOFLAVONOIDS HELP?

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ABSTRACT

Long term usage of combination anti-retroviral therapy (cART) has been associated with neurological disorders as a result of varying toxicities. This study was therefore designed to investigate the therapeutic potential of selected flavonoids (Naringenin and Quercetin) on cART-induced cerebellar disorders. Seventy Wistar rats were divided into seven groups as control, Naringenin (50 mg/kg), Quercetin (50 mg/kg), 24 mg/kg cART (Efavirenz + Lamivudine + Tenofovir regimen), 24 mg/kg cART + 50 mg/kg Naringenin, 24 mg/kg cART + 50 mg/kg Quercetin and 1% v/v dimethyl sulphoxide (DMSO) groups. The animals were euthanized on the 57th day, processed for oxidative stress markers, and basic histology. Results showed that the Purkinje cells were very distinct in groups that received cART with Naringenin, and cART with Quercetin, whereas the animals that received cART alone showed neurodegenerative changes in the Purkinje cells. Likewise, the malondialdehyde (MDA) levels increased significantly ($p < 0.0001$) in animals that received cART alone compared to control. There was also a concomitant significant decrease in the superoxide dismutase ($p < 0.05$), and catalase ($p < 0.05$) in cART treated group compared to control. Animals that received both cART and bioflavonoids had marked increase in antioxidant enzymes and decrease in MDA levels compared to cART treated group. Results of this study demonstrate that Naringenin and Quercetin have therapeutic benefits by potentiating the activities of antioxidant enzymes which prevents the onset/deleterious impact of reactive oxygen species on the cerebellum of the Wistar rat.

Key words: *cART, Naringenin, Quercetin, Neurodegeneration, Oxidative Stress*

INTRODUCTION

Human immunodeficiency virus (HIV) was discovered in the early 1980's and since then has infected millions of persons worldwide. All HIV-infected persons are at risk of illness and death from different infections as a result of the immune suppression manifestations of acquired immune defiency syndrome (AIDS) (Maartens et al. 2014). Antiretroviral therapies are geared towards reducing HIV replication and destruction of the immune system with progression to AIDS. A variety of pharmacologic agents have been developed to treat HIV infection (Klatt 2003).

The combination antiretroviral therapy (cART) which was introduced in 1996 has drastically reduced the morbidity and mortality associated with the HIV infection (Ramana et al. 2013), by maintaining viral load below detection levels, thus preventing the onset

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