

## Effects of Rivastigmine plus Selegiline [(-)Deprenyl] on Brain Enzymes, Antioxidant Status and Learning Performance of Aged Rats

A.C. Sideris<sup>1</sup>, St.Tsakiris<sup>2</sup>, I. Messari<sup>1</sup>, C.I. Liakou<sup>1</sup> and H. Carageorgiou<sup>1</sup>

Departments of <sup>1</sup>Experimental Pharmacology and <sup>2</sup>Experimental Physiology, Medical School, Athens University, Athens, Greece

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### INTRODUCTION

The aim of this study was to investigate the effects of Rivastigmine, a known cholinesterase inhibitor, in combination with Selegiline (deprenyl), an irreversible inhibitor of MAO-B, on a) brain AChE, (Na<sup>+</sup>, K<sup>+</sup>-Mg<sup>++</sup>)-ATPase activities; b) Total antioxidant status (TAS); c) learning performance, and to evaluate possible correlation between biochemical and behavioral findings after subchronic drug administration in aged male rats.

### MATERIAL AND METHODS

Rivastigmine (R) was administered (0.3 mg/kg rat/day i.p.), Selegiline (S) (0.25 mg/kg rat/day i.m.) and Rivastigmine + Selegiline (R+S) (0.3mg/kg rat/day i.p. + 0.25mg/kg rat/day i.m.). The drugs were administered for 36 consecutive days.

Learning parameters were tested through a passive avoidance procedure taking place in an Ugo-Basile automated shuttle box device and an object recognition test.

Enzyme activities and TAS were evaluated spectrophotometrically in brain homogenates of decapitated animals.

### RESULTS

TAS was significantly lower in aged compared to adult rats. No TAS change was observed after R or R+S administration. Selegiline reversed aged rats TAS value to the adults' one.

Rivastigmine alone or with S reduced AChE activity (-20%), while S increased AChE activity.

(Na<sup>+</sup>,K<sup>+</sup>)-ATPase activity was increased in groups of R, R+S and S, in comparison to the control groups, while Mg<sup>++</sup>ATPase activity was increased in R and R+S groups.

In the object recognition test R seems to improve cognitive performance, while in the combination the improvement was not significant. In the passive

avoidance test no significant improvement in performance was observed.

It is concluded that: Rivastigmine alone does not affect TAS, decreases AChE activity and increases (Na<sup>+</sup>, K<sup>+</sup>)-ATPase and Mg<sup>++</sup>-ATPase activity of rat brain. The drug also improves cognitive performance.

Selegiline alone decreases free radical production and increases AChE activity and (Na<sup>+</sup>, K<sup>+</sup>-Mg<sup>++</sup>)-ATPase activities, improving cognitive performance as well.

In the combination R seems to cancel S action on TAS and AChE activity, while has additive effect on (Na<sup>+</sup>, K<sup>+</sup>)-ATPase activity. In the case of Mg<sup>++</sup>ATPase S seems to reduce R activity. No statistically significant difference was observed in the cognitive performance.

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