



Study summary

Neuravena® acutely improves performance in the Stroop Color-Word Test in older adults

Background

Oats in various preparations have been traditionally known for their physical and psychological fortifying properties. Neuravena® is an extract from a proprietary variety of the green oat herb (*Avena sativa* L.) developed as a cognitive booster using a bioassay-guided approach. Preclinical and clinical research has shown its efficacy and safety on cognitive function. It combines two different mechanisms improving mental health, as shown: Neuravena® has clinically significant inhibitory effects on monoamine oxidase B (MAO-B) and phosphodiesterase 4 (PDE 4). Single doses of Neuravena® influence positively electrical brain activity consistently with enhanced mental alertness as observed by EEG measures in healthy humans. Aim of the this study was to assess the effects of oral Neuravena® on concentration and alertness, using the Stroop Color-Word test in older adults with below average cognitive function.

Study design

This double-blind, randomized, crossover study compared the effects of 1600 mg of Neuravena® to placebo in capsules on the cognitive responses to the Stroop Color-Word test. 185 volunteers aged 50 years or more were screened by the DemTect test, a screening tool to identify mild cognitive impairment (MCI) and early signs of dementia. Participants with below-average cognitive performance but without suspected dementia (DemTect score 9 - 12) as well as appropriate cognitive performance (DemTect score 13 - 16) were included in the study.

Participants attended the clinic on 3 occasions, with a one-week washout between each session, conducted on the same day of the week at the same time. On each visit, resting supine blood pressure was measured before ingestion of 0,

or 1600 mg of Neuravena® in random order. 1-2 hours later, resting supine measure of blood pressure was repeated, then the Stroop Color Word test was performed.

Time	Arrival at clinic	0 h	1 - 2 hours later
Procedure	Seated rest (45 min)	Ingestion of supplement: placebo, or Neuravena® in random order	Stroop Color-Word test: trial 1: word-reading trial 2: color-naming

Table 1: Study procedures at each participants' visit

This test is a valid and reliable cognitive test broadly used in neuropsychology. It is designed to assess focused attention and the ability to suppress task-irrelevant, habitual responses. In this test, participants are asked to name the colors of the words printed on a sheet with different inks that they actually name, without reading the words. Most people tend to say the name the word represents, because the word-reading task is easier than the task of naming the color of the ink.

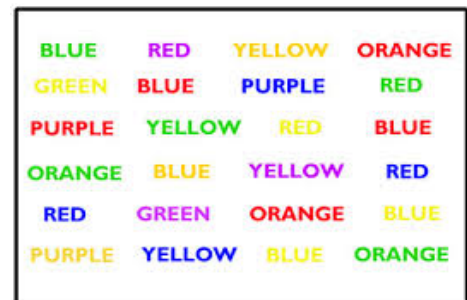


Figure 1: Stroop Color-Word test sheet: the task consists in naming the color of the ink

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The test consisted of two consequent trials: in the first trial, participants had to read the written word as fast as possible, while in the second trial, they were asked to name the ink color instead. A Stroop interference score was calculated using the ratio of the time taken to name colors divided by the time taken to read words. It reflects the increase in time necessary to perform the more effortful task (e.g. color-naming) compared to that necessary to perform the basic task (word reading).

Numbers of corrected and uncorrected errors for each trial were also recorded.

Results

36 subjects completed the trial, 22 females and 14 males with a mean age of 67 ± 8.6 years, and a mean DemTect score of 14 ± 2 .

Stroop interference score

Those who were suspected to have probable MCI, performed significantly better on the Stroop test (lower interference scores represent better performance) after taking the 1600 mg dose of supplement than after taking placebo (Fig. 2).

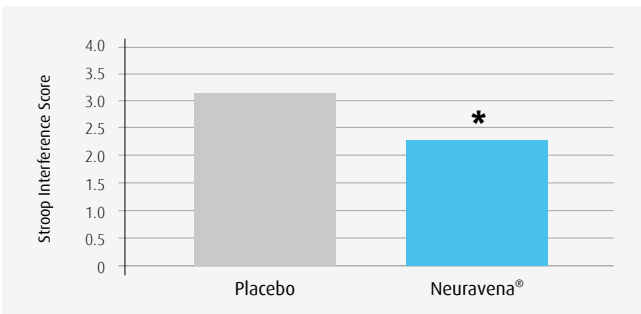


Figure 2: Stroop interference score for placebo and 1600 mg Neuravena® in participants with below-average cognitive performance. * Statistically significant difference ($p < 0.05$)

The Stroop interference score reflects the ability to inhibit task-irrelevant information (in the test, the easiest word reading task) and therefore promote attention and concentration while performing a task (naming the ink color of the written color words). Therefore, good performance on this task, reflected in lower interference scores, represents high levels of attention, concentration and task focus. Neuravena® acutely enhanced these abilities, among those with lower cognitive status.

Number of errors

1600 mg of Neuravena® reduced the number of errors made during the color-naming trial in all participants, regardless of their cognitive status.

The number of errors made during the color naming trial of the Stroop test reflects failures to inhibit task-irrelevant information. As such, this measure represents failures in attention, concentration and task focus.

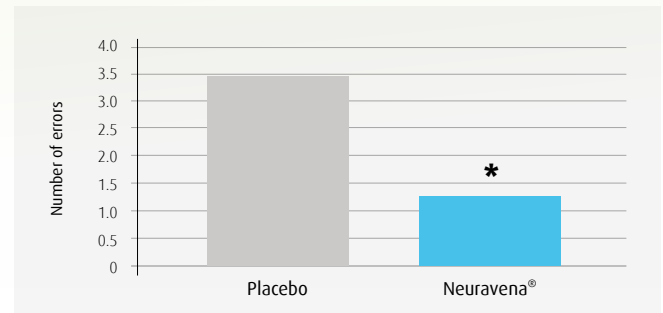


Figure 3: Stroop errors on color-naming trial for placebo and Neuravena® in all participants. * Statistically significant difference from placebo ($p < 0.05$).

Summary

This study demonstrated that acute supplementation with Neuravena® could significantly improve the response to the Stroop Color-Word test in people with lower cognitive status. It provides evidence of the benefits on improved attention, concentration, and the ability to maintain task focus in older adults with differing levels of cognitive status.

These findings support the first indicative results in animals in which Neuravena® improved learning due to enhanced alertness and improved stress response in rats and in humans. It also complements the evidence on its cognitive benefits provided from other human trials.

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