

## Study summary

### Effects of Neuravena® on the brain: a first human clinical study

#### Objective

Wild green oat extracts are suggested to have a beneficial effect on mental fitness, and to improve performance under pressured situations. Examples of such performance are concentration, learning, alertness. For Neuravena®, similar benefits were observed in *in-vitro* trials as well as in rat trials. Underlying study is a randomized, double-blind, placebo- controlled cross-over clinical study to confirm the effects of Neuravena® on mental performance in humans. This was done through quantitative analysis of electrical brain activity in human volunteers.

#### Study design

Twenty healthy men and women, aged  $46.5 \pm 8.2$  years, ingested one single dose of 2500 mg Neuravena®, or placebo at the start of the trial. During 4 hours, their brain activity signals were recorded using a standardized set of electrodes. Measuring the different frequency ranges within several regions gives an indication of physiological effects that take place in brains. Each measured frequency characterizes a different transmitter system in the brain, which in combination with its location in turn shows which part of brain functioning is stimulated (e.g. cognitive function). In addition, brain activity was also measured while subjects were exposed to mental pressure in the form of a concentration test.

#### Results

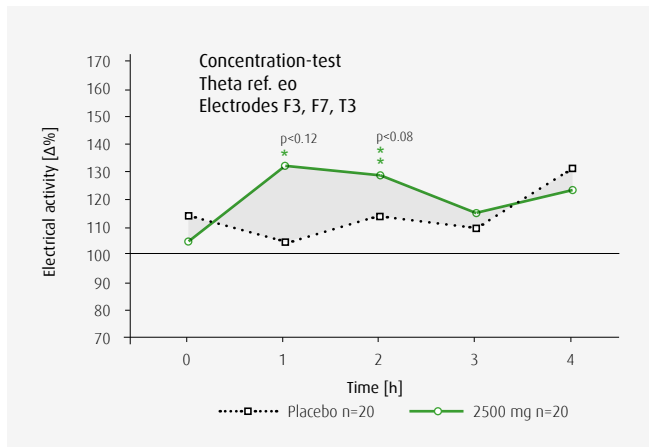
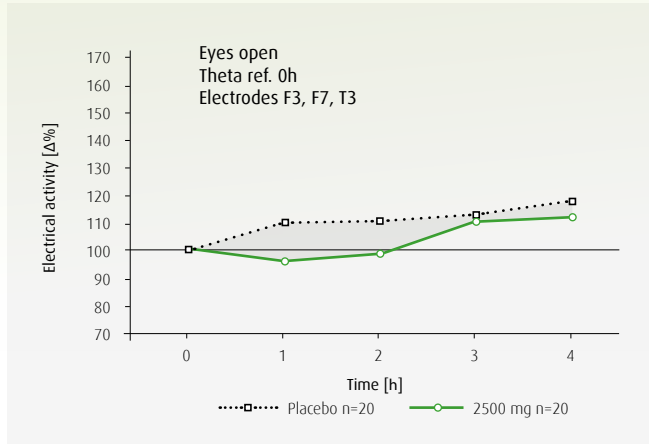
Neuravena® was found to significantly change the basic brain activity. Results showed a significant decrease of delta and theta wave activity as well as an increase in alpha2 wave activity.



Figure 1: Effect of Neuravena® (green) compared to placebo for delta waves. Theta waves show similar results, data not shown.

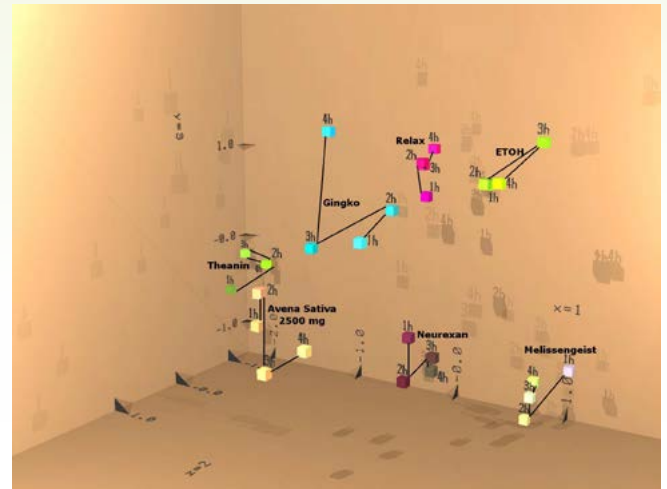


The results of the concentration test showed that Neuravena® reduces basic brain activity in the brain regions closely connected to mental performance (Fig. 2 top). During mental performance, this baseline decrease can then lead to a higher cognitive function related activity (Fig. 2 bottom).



**Figure 2:** Effect of Neuravena® (green) compared to placebo for theta waves. Delta waves show similar results, data not shown.

Mathematical analysis showed a unique profile for Neuravena® based on color and position of the measurement values.



**Figure 3:** Classification of different herbal preparations and Neuravena® using discriminant analysis.

### Conclusion

The findings of this clinical trial confirm the positive effects of Neuravena on cognitive function. The above mentioned changes in delta, theta and alpha2 waves are related to stimulating properties. Furthermore, brain activity was positively influenced during mental stress. The intake of Neuravena® helps increase overall mental fitness in an individual's daily life. Moreover, it has been shown to help improve cognitive function (concentration, learning, alertness) under pressure.

### Reference

Dimpfel, W *et al* (2011). Ingested oat herb extract (Avena sativa) changes EEG spectral frequencies in healthy subjects. *J Altern Compl Med* vol 17 (5)

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