eidisine™ is a natural and healthy food supplement that makes you smarter

eidisine is easily added to any food- or beverage product and gives a temporary boost of cognitive functions, including memory

by adding eidisine to your food- or beverage product you can market and sell it as a healthy intelligence booster

the functions of eidisine are scientifically proven and patent pending

please contact us for licensing info or any other questions

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Definition of Cognition

Eidisine is scientifically proven to temporary boost cognitive functions in healthy individuals. To understand the magnitude of this discovery we would like to define the abilities included within the definition of cognition.

“Cognition”, “cognitive function” and “cognitive performance” are interchangeable and refer to a range of cognitive domains such as:

- **Pre-attentive and attentive information processing**
  including processes with both intrinsic and extrinsic stimuli

- **Attentional capacity**
  the process of selectively concentrating on one aspect of the environment while ignoring other stimuli

- **Memory**
  encoding, storage, retrieval

- **Short-term memory**
  memory that involves recall of information for a relatively short time

- **Long-term memory**

- **Working memory**
  temporarily storing and manipulating information

- **Reasoning**
  cognitive process of looking for reasons for beliefs, conclusions, actions or feelings

- **Executive functions**
  dealing with novelty, planning and implementation, monitoring performance, vigilance, inhibition of task irrelevant information
  = a conscious intellectual act

- **Intellectual capacity**

However, it should be understood by the person skilled in the art that the list of cognitive functions and/or cognitive performances mentioned above does not exclude other forms of cognitive functions.
Eidisine™ as a Cognitive Enhancer

This document describes a number of common tests on cognitive functions and brain activity indicating and proving the cognition enhancing effects of eidisine in healthy individuals.

About eidisine

Eidisine has very good oral bioavailability and brain penetration. Eidisine supplementation has been tried as treatment for some diseases, and the only reported adverse effects in humans are transient gastrointestinal problems in a few patients. Based on published studies, long-term addition of eidisine to the daily diet is safe. In short-term human studies very high doses have been tried and again the only reported adverse effects were abdominal cramps and transient diarrhea that resolved as the dose was decreased. Our recent studies, as presented below, also indicates positive effects from using eidisine as a cognition enhancer.

Eidisine increases brain activity

The target group for eidisine is normal functioning healthy humans. We have recently completed a small proof of concept study on the target group using SD-BERA (SensoDetect Brainstem Evoked Response Audiometry, a method which is an objective measure of how the brain processes auditory stimuli, such as pre-attentive filtering, [www.sensodetect.com/sd-bera](http://www.sensodetect.com/sd-bera)).

The results from this study demonstrate that eidisine

- changes brain activity compared to placebo controlled individuals
- that these changes in brain activity can be associated with a pro-cognitive potential

In our study 100% of our test subjects had a significantly smaller forward masking effect and an increased activity in thalamus with eidisine than with placebo. The forward masking effect has been shown to be altered with age (Walton et al 1999) and thus these preliminary results might support a facilitating effect of eidisine. Thalamic activity has recently been shown to correlate to neural networks underlying perceptual recognition decisions, an early cognitive building block (Ploran et al 2007). The enhancing effect of thalamic activity of eidisine in two of three subjects in this material might support a potentially pro-cognitive aspect of the substance.

These results give a strong indication that eidisine changes brain activity in healthy individuals. In combination with previous research (see below) and experience the results measured indicate positive effects in relation to cognition enhancing performances.

A clinical study using a wider test battery aiming at EFSA health claims is currently in preparation.
Clinical study on patients with schizophrenia
A clinical study performed on patients with schizophrenia indicates that adjunctive treatment with eidisine for four weeks is tolerated well and have beneficial effects on symptom severity and cognitive deficits. The study demonstrated a significant change of the brain’s information processing capacity under eidisine use. The brain activity was measured using SD-BERA and the patients were also examined through interviews and various cognitive tests. These findings demonstrate that eidisine induce a physiological change in the human brain.

Animal studies
A number of common studies used for measuring cognitive functions have been performed on rodents. The results from these studies are known to be well transferable to humans. These studies are described below.

Eidisine improves pre-attentive information processing
One way to elucidate how substances affect our cognitive function is to measure how the brain processes information. Pre-attentive information processing is thought to be important for selective and efficient processing of sensory information and for coherent cognitive operations, and thus for memory and cognitive functions.

Pre-attentive information processing can be assessed by using the prepulse inhibition (PPI) of acoustic startle response model. The results demonstrate that administration of eidisine improves normal cognitive functions, measured by how the brain filters information pre-attentively in the PPI model (Figure 1A and 1B). Administration of eidisine enhances cognitive performance directly and these improvements persist if eidisine is continuously administrated. However, when administration is interrupted the cognitive performance goes back to baseline.

![Figure 1A - Eidisine improves pre-attentive information processing.](image)

*Figure 1A – Eidisine improves pre-attentive information processing.*
*The results demonstrate a significant effect of eidisine treatment (F(1, 44)=94.9; P<0.05). Eidisine dose 1 and 2 improve the PPI response in a dose related manner, while the highest dose, dose 3, did not affect PPI significantly.*
**Eidisine improves non-associative learning**

The model used to measure non-associative learning was habituation of acoustic startle response. Habituation refers to the decrease in response to repeated presentation of identical stimuli and the model used for this test is also translational in nature. Since habituation is a measure of how the brain filters out irrelevant stimuli and focuses selectively on important stimuli, it is thought to be a prerequisite for other forms of learning and cognitive functions. Eidisine increased the capacity to screen out irrelevant stimuli and thus demonstrated an improved learning (Figure 2).

![Figure 2 - Eidisine improves non-associative learning](image)

**Figure 2 – Eidisine improves non-associative learning**

The effects of acute administration of eidisine dose 2 on the habituation of the acoustic startle response are shown. Eidisine significantly (unpaired t-test, t=2.099, df=22, p<0.05) improves the brain capacity to filter out irrelevant information.
Eidisine improves learning and memory formation

One widely used learning and memory task is the novel object recognition test. Some of the benefits with this model are that it is well characterized and not based on reward or punishment. The object recognition test is a valid and translational model to investigate the effects of different substances on memory. Administration of eidisine increased object recognition compared to control treatment. (Figure 3). This demonstrates that administration of eidisine improves cognitive performance from a natural and non-pathological non-deficiency baseline.

![Graph showing discrimination index comparison between Saline and Eidisine, dose 2](image)

**Figure 3 – Eidisine improves learning and memory formation**

*During the recognition session mice that have been administrated eidisine dose 2 spent significantly more time exploring the novel object compare to saline treated mice, as demonstrated by the discrimination index during the recognition session (unpaired t-test, t=2.580, df=34, p<0.05).*


Young JW, Powell SB, Risbrough V, Marston HM, Geyer MA. (2009)
Using the MATRICS to guide development of a preclinical cognitive test battery for research in schizophrenia. Pharmacol Ther. May;122(2):150-202.