

## **Study shows Neumentix™ enhances new nerve cell growth in rat hippocampal cells**

**Body of evidence for the mechanisms of action behind the cognitive performance ingredient continues to grow**

San Diego, California – November 14, 2016 – Findings from a recent study show Kemin's proprietary, spearmint-based cognitive performance ingredient, Neumentix™ Phenolic Complex K110-42, enhances rates of neurogenesis at physiologically relevant concentrations in rat primary hippocampal cells.

The study, "The effects of a proprietary spearmint extract on neurogenesis in rat hippocampal neurons," was conducted at QPS in Grambach, Austria. Key findings on the novel mechanism of action were presented Saturday, November 12 at the Society for Neuroscience annual meeting, **Neuroscience 2016**, in San Diego.

"This study was designed to test our hypothesis that neurogenesis is a mechanism of action for the clinically observed working memory improvements associated with Neumentix supplementation," said Laura Wonderling, Ph.D., research and development director for the Human Nutrition and Health division of Kemin.

Primary hippocampal neurons were prepared from Sprague Dawley rats at embryonic day 18. The cells were treated with Neumentix at final concentrations of 10 nM, 100 nM, 1 µM, 100 µM rosmarinic acid (RA), vehicle or fibroblast growth factor (FGF) as a positive control, for a total of 48 hours.

At the 24-hour mark, Bromdesoxyuridine (BrdU) was used to label proliferating cells. At the 48-hour mark, samples were stained with NeuN to label neurons and BrdU, and then stained with 4',6-diamidino-2-phenylindole (DAPI) to label DNA.

Proliferating neurons (BrdU, NeuN and DAPI positive) and total number of neurons (NeuN and DAPI positive) were determined with digital imaging. Analysis showed the neurons responded differently to various concentrations of Neumentix. Cultures treated in the lowest dose group (10 nM RA) displayed statistically significantly greater levels of neurogenesis than vehicle treated cultures.

"The most effective concentration corresponds to levels detected in the plasma of human subjects two hours following oral supplementation with 900 mg Neumentix," said Wonderling. "This suggests the cognitive performance improvements observed in our previous clinical study could be due in part to Neumentix increasing rates of new neural growth in the hippocampus."

Aging, stress and/or sleep deprivation are suggested to decrease the rate of neurogenesis in the hippocampus, which may reduce cognitive performance in healthy adults.

"The hippocampus is tied to learning and memory and is the main area of the brain where neurogenesis, or new nerve growth, can occur," said Brenda Fonseca, global cognition technical manager for the Human Nutrition and Health division of Kemin. "It is very exciting to see a botanical ingredient demonstrate the potential to cause new nerve cell growth in this part of the brain."

Neurogenesis is just one of the four proposed mechanisms of action for Neumentix. Research suggests key polyphenolic molecules in Neumentix may act in the brain to reduce oxidative stress, protect neurons in the brain, increase neurotransmitter levels and promote new neural growth. These mechanisms of action may contribute to the clinically observed cognitive performance improvements.

Neuroscience 2016 continues through Wednesday, November 16 at the San Diego Convention Center. More than 30,000 attendees from nearly 80 countries will attend the event to learn emerging science and insights in the field of neuroscience, such as the neurogenesis study presented by Kemin.

For more information on Neumentix, please visit <https://www.kemin.com/en/north-america/products/neumentix>.

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