

June 29, 2021

## New Research Suggests Citicoline Aids in Memory Function

- Published clinical trial demonstrated improved overall memory performance in healthy elderly populations when given citicoline.
- The findings suggest that regular consumption of citicoline may be safe and potentially beneficial against memory loss due to aging.
- Citicoline is naturally-occurring substance in the body that helps maintain cell membranes in brain and nerve cells.

**TOKYO, Tuesday June 29, 2021** – The Kirin Central Research Institute of Kirin Holdings, Company, Ltd., (Kirin Holdings), announces that its proprietary citicoline\*<sup>1</sup> ingredient may improve composite memory, specifically episodic memory according to a clinical study. The study was published in Oxford Academics' *The Journal of Nutrition* on May 12, 2021.

Citicoline is a naturally-occurring substance in the body that helps maintain cell membranes in brain and nerve cells. The study was conducted using Citicoline manufactured by Kirin Holdings subsidiary Kyowa Hakko Bio Co., Ltd. (Kyowa Hakko Bio).

\*1 These statements have not been evaluated by the United States' Food and Drug Administration nor Japan's Ministry of Health, Labor, and Welfare. In Japan, citicoline is not permitted for use in food and beverages. This substance is not intended to diagnose, treat, cure or prevent any disease.

### ● How the Study Was Conducted

The study, titled aimed to investigate the effects of citicoline on memory in healthy elderly populations with age-associated memory impairment (AAMI). A total of 100 healthy men and women between ages 50 and 85 were evaluated as a part of this randomized, double-blind, placebo-controlled trial\*<sup>2</sup> during an intervention period of twelve weeks. Participants were randomized to receive either a 500 mg/d dosage of citicoline or a placebo, with memory functions assessed at baseline and at the end of the intervention using standardized computerized tests.

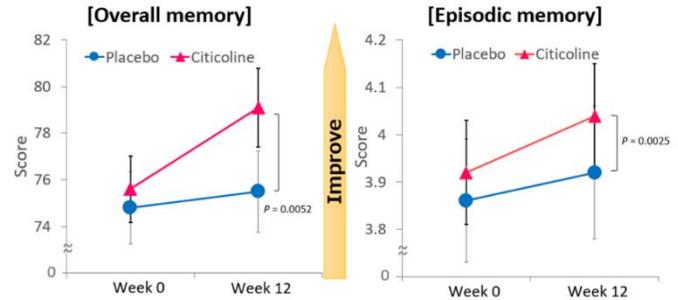
This study was conducted in United States where citicoline is approved for food ingredients. Between-group analysis indicated that the changes from baseline scores were statistically significantly different between test groups for Paired Associates, which was the outcome for episodic memory, and Composite Memory which was the outcome for overall memory, whereby the citicoline group demonstrated greater improvements in these tests compared with the placebo group. We did not observe any serious adverse events following daily consumption of citicoline for 12 weeks during the study.

\*2 A testing methodology used in clinical trials in which participants are randomly divided into groups to receive the placebo or the actual active ingredient, and which group is which is unknown until the trial is completed.

## ● Conclusions

The study concluded that dietary supplementation of citicoline for 12-weeks improved overall memory performance, especially episodic memory, in healthy older males and females with AAMI. The findings suggest that regular consumption of citicoline may be safe and potentially beneficial against memory loss due to aging.”

One of the study’s researchers, Dr. Eri Nakazaki, Ph.D., Lead Researcher at the Kirin Central Research Institute, explains: “Citicoline increases an important substance in the brain called phosphatidylcholine that supports healthy brain function. Citicoline is also especially vital to brain health. [The data from this analysis](#) is very encouraging that regular consumption, 500mg/day of citicoline may be safe and potentially beneficial against memory loss due to aging.



Data shown are unadjusted means ± SEMs for each test group. The P value shows between-group difference (vs. placebo) for the raw change score using ANCOVA with Bonferroni correction for multiple comparisons. The raw change was calculated as the difference in scores at baseline to the end of the test period for each participant.



## ● Future developments

Citicoline was launched by Kyowa Hakko Bio in the United States in the early 1990’s, and is now globally featured in over 200 products as an ingredient in health foods and beverages. It is also used as an ingredient of pharmaceuticals. Especially in the United States and EU, Citicoline is used in supplements that support increased cognitive function<sup>\*3</sup>.

In the future, through Citicoline, Kyowa Hakko Bio aims to support brain health in society and to contribute to solving social issues related to the health and well-being around the world.

<sup>\*3</sup>: Uses of citicoline are designated by the laws and regulations in each country; so the use of citicoline in pharmaceuticals or food products varies in each country or region.

## ● KIRIN Brain Research

Japan’s average life expectancy has been increasing and the country has entered a super-aged society in which one in four people is elderly.<sup>\*4</sup> Given that an estimated one in five elderly people will suffer from dementia in 2025,<sup>\*5</sup> the extend of healthy life expectancy is a social issue.

The Kirin Group understands that the joys and concerns in a daily life are intimately associated with brain activity, and thus launched KIRIN Brain Research to develop the new solutions mainly in health science to promote brain health and create joy.

KIRIN Brain Research based on Kirin’s distinct technology and ways of thinking contributes to promote brain health in an effort to help resolve social issues and will create a society conducive to psychologically prosperous living, where everyone has confidence and ambition and feels free to experience their emotions.



Kirin Brain Research Logo

<sup>\*4</sup> Cabinet Office, White Paper on the Aging Society FY 2020

<sup>\*5</sup> Grants-in-Aid for Scientific Research, MHLW Special Research Project, Research on Future Trends in the Prevalence of Dementia among Elderly People in Japan, 2014, Report on General & Specialized Research, 2015

Joy brings us together



# News Release

## Overview:

1. Title of study: Citicoline and Memory Function in Healthy Older Adults: A Randomized, Double-Blind, Placebo-Controlled Clinical Trial
2. Presented by: Eri Nakazaki, Eunice Mah, Kristen Sanoshy, Danielle Citrolo, Fumiko Watanabe

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## About Kirin Holdings

Kirin Holdings Company, Limited is an international company that operates in the Food & Beverages domain (Food & Beverages businesses), Pharmaceuticals domain (Pharmaceuticals businesses), and Health Science domain (Health Science business), both in Japan and across the globe.

Kirin Holdings can trace its roots to Japan Brewery which was established in 1885. Japan Brewery became Kirin Brewery in 1907. Since then, the company expanded its business with fermentation and biotechnology as its core technologies, and entered the pharmaceutical business in the 1980s, all of which continue to be global growth centers. In 2007, Kirin Holdings was established as a pure holding company and is currently focusing on boosting its Health Science domain.

Under the [Kirin Group Vision 2027](#) (KV 2027), a long-term management plan launched in 2019, the Kirin Group aims to become “A global leader in CSV\*, creating value across our world of Food & Beverages to Pharmaceuticals.” Going forward, the Kirin Group will continue to leverage its strengths to create both social and economic value through its businesses, with the aim of achieving sustainable growth in corporate value.

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