

Presentation of Research Paper on 5-ALA by Hiroshima University to *Nutrition*, a U.S. Scientific Journal

— Results of Clinical Research on Relationship between 5-ALA and Blood Glucose Levels Announced —

The SBI Group is engaged in research and development of pharmaceuticals, health foods and cosmetics using 5-aminolevulinic acid (“5-ALA”) at SBI Pharmaceuticals Co., Ltd. (Head office: Minato-ku, Tokyo; Representative Director and CEO: Yoshitaka Kitao; “SBI Pharmaceuticals”), a subsidiary of SBI Holdings, Inc. (SBIH). We are pleased to inform you that a research group of Hiroshima University presented the results of clinical research on the relationship between 5-ALA and blood glucose levels to *Nutrition*, a U.S. scientific journal, as follows.

* SBI Pharmaceuticals only provided 5-ALA to this research. This research was planned, implemented and turned into a paper solely by Hiroshima University.

Journal carrying the paper: ***Nutrition***

Title: 5-aminolevulinic acid, a precursor of heme, reduces both fasting and postprandial glucose levels in mildly hyperglycemic subjects

Summary: In this research, mildly hyperglycemic subjects were randomly assigned to four groups receiving either (i) one of three kinds of food, each of which combined 5-ALA and sodium ferrous citrate (SFC) in a different volume ratio, or (ii) a placebo that contained neither 5-ALA nor SFC. Then indicators related to glucose metabolism were measured over a 12-week period. The results showed the fasting glucose level, serum glycoalbumin and 2h-oral glucose tolerance test levels in the group that took in a high dosage of 5-ALA and SFC respectively decreased more than those in the group that received the placebo. In particular, in the glucose tolerance test, the closer the test results of a subject before the intake of test food were to diabetes, the greater the degree of improvement of the subject was. No side effects worthy of special mention appeared during the test.

Quotation: Higashikawa, F., Noda, M., Awaya, T., Tanaka, T., and Sugiyama, M., *Nutrition* 29, 1030-1036 (2013)
© Elsevier Inc.

Based on these results, the researchers of Hiroshima University conclude that “using a combination of 5-ALA and iron could be a novel approach to prevent people with a high risk of diabetes from developing diabetes.” In addition, they point out the possibility that 5-ALA lowers the blood glucose levels through a mechanism different from that of existing diabetes remedies, and say there are high expectations for research on treatments combining



5-ALA and existing medicines.

SBI Pharmaceuticals will continue to explore various possibilities of utilizing 5-ALA and conduct R&D on it, hoping to contribute to the health of as many people as possible in the world.

For further information, please contact:

SBI Pharmaceuticals Co., Ltd.: Corporate Planning Dept., Tel: +81 3 6229 0095