

2nd International Conference and Exhibition on Pharmacognosy, Phytochemistry & Natural Products

August 25-27, 2014 DoubleTree by Hilton Beijing, China

Neurotrophic compounds of Javanese ginger, *Zingiber purpureum*

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Neurotrophins (NGF, BDNF etc.) are recognized as important regulatory substance in the nervous system. However, they cannot cross brain-blood barrier because of the properties of their high molecular polypeptides and are easily metabolized by peptidases under physiological conditions. To address this issue, considerable efforts have been made to find small molecules that mimic neurotrophic properties. Javanese ginger Bangle, *Zingiber purpureum*, has been used as a spice as well as an important component of traditional medicine “Jamu” in Indonesia. In the course of efforts to discover natural products with neurotrophic properties, it was found that the EtOH extract of the roots of Bangle (*Zingiber purpureum*) exhibited neuritogenesis activity in PC12 cells. Bioassay-guided fractionation resulted in the isolation of neurotrophic phenylbutenoid dimers 1 and 2, and a new compound 3. The structure of 3 was elucidated by analysis of spectroscopic data and comparing the NMR data with cussumunarin A. Compounds 1 and 2 were found not only to significantly induce neurite sprouting of PC12 cells, but also to increase the neurite length and number of neurites in primary cultured rat cortical neurons, and also showed protective activity against cell death caused by deprivation of serum. Furthermore, chronic treatment of these compounds enhanced hippocampal neurogenesis in dementia model OBX mice. These results suggest that compounds 1 and 2 have both neurotrophic effects and neurogenesis, and thus Bangle may be developed as a valuable functional food for potentially protecting neurodegenerative diseases such as Alzheimer disease.

Biography

Yoshiyasu Fukuyama has completed his PhD degree in Chemistry from Osaka City University and then spent three years as a Postdoctoral Fellow at Oregon State University. He moved to the Institute of Natural Products Chemistry at Otsuka Pharmaceutical Co. Ltd. He has been working as a Professor at Tokushima Bunri University since 1988, and now is Dean of the faculty of pharmaceutical sciences. He has published more than 220 papers in reputed journals and serving as an editorial board member of CPB. His current research interests focus on chemistry and biology of neurotrophic natural products. He is a recipient of Tokushima News Paper Award in 2006.

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