

Protective effect of *Undaria pinnatifida* sporophyll extract on iron induced cytotoxicity and oxidative stress in PC12 neuronal cells

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Abstract

The abnormal accumulation of iron in the brain has previously been proposed to be responsible for the neurodegenerative diseases through the oxidative damage to neuronal cells. Therefore, it seems practically meaningful to search for novel active substances protecting neurons against the iron-induced oxidative neurotoxicity *in vitro*. For this purpose, the aqueous extract was prepared from a sporophyll of brown seaweed *Undaria pinnatifida*, called "MEKABU" in Japanese, and the protective effect of MEKABU extract against the iron-induced damage to PC12 cells was examined. The extract prevented the iron-induced oxidative damage, but not the azide-induced hypoxic damage to the cells. Further studies indicated that MEKABU extract showed the radical scavenging and antioxidant activities, which might contribute to its protective effect against the iron-induced cytotoxicity. These observations suggest that MEKABU extract may contain novel substance(s) protecting neuronal cells against the iron-induced toxicity.

Keywords: Brown seaweed, Iron-induced cell death, PC12 cells, Antioxidant; *Undaria pinnatifida*

Introduction

The transition metals, such as iron, copper, and zinc, are generally known as an essential biometals required for maintaining the integrity of physiological functions, and the fundamental roles of these metals in various metabolic processes have been exhaustively studied. Particularly, iron is one of the most principal biometals involved in many critical functions for life, and hence the biochemical iron homeostasis is strictly regulated through