

Brown rice and cardiovascular protection

April 26 2010

Rice is generally thought to be a healthy addition to the diet because it is a source of fiber. However, not all rice is equally nutritious, and brown rice might have an advantage over white rice by offering protection from high blood pressure and atherosclerosis ("hardening of the arteries"), say researchers at the Cardiovascular Research Center and Department of Physiology at Temple University School of Medicine in Philadelphia.

New research by Satoru Eguchi, Associate Professor of Physiology, suggests that a component in a layer of tissue surrounding grains of [brown rice](#) may work against angiotensin II. Angiotensin II is an endocrine protein and a known culprit in the development of [high blood pressure](#) and atherosclerosis.

The findings are contained in a study conducted by Dr. Eguchi and his colleague at the Temple lab, Akira Takaguri. The research team is also composed of Hirotoishi Utsunomiya and Ryohei Kono of the Department of Pathology, School of Medicine, Wakayama Medical University, Wakayama, Japan; and Shin-ichi Akazawa, Department of Materials Engineering, Nagaoka National College of Technology, Nagaoka, Japan. Dr. Takaguri will present the team's findings at the annual 2010 Experimental Biology conference in Anaheim, CA on April 24-28. This presentation is sponsored by The American Physiological Society (APS).

Brown Rice and Angiotensin II

The subaleurone layer of Japanese rice, which is located between the white center of the grain and the brown fibrous outer layer, is rich in

oligosaccharides and dietary fibers, making it particularly nutritious. However, when brown rice is polished to make white rice, the subaleurone layer is stripped away and the rice loses some of its nutrients. The subaleurone layer can be preserved in half-milled (Haigamai) rice or incompletely-milled (Kinmemai) rice. These types of rice are popular in Japan because many people there believe they are healthier than white rice.

The Temple team and their colleagues at the Wakayama Medical University Department of Pathology and the Nagaoka National College of Technology Department of Materials Engineering in Japan sought to delve into the mysteries of the subaleurone layer and perhaps make a case for leaving it intact when rice is processed. Because angiotensin II is a perpetrator in such lethal cardiovascular diseases, the team chose to focus on learning whether the subaleurone layer could somehow inhibit the wayward protein before it wreaks havoc.

First, the team removed the subaleurone tissue from Kinmemai rice. Then they separated the tissue's components by exposing the tissue to extractions of various chemicals such as ethanol, methanol and ethyl acetate. The team then observed how the tissue affected cultures of vascular smooth muscle cells. Vascular smooth muscle cells are an integral part of blood vessel walls and are direct victims of high blood pressure and atherosclerosis.

During their analysis, the team found that subaleurone components that were selected by an ethyl acetate extraction inhibited [angiotensin II](#) activity in the cultured vascular smooth muscle cells. This suggests that the subaleurone layer of rice offers protection against high blood pressure and atherosclerosis. It could also help explain why fewer people die of cardiovascular disease in Japan, where most people eat at least one rice-based dish per day, than in the U.S., where rice is not a primary component of daily nutrition.

"Our research suggests that there is a potential ingredient in rice that may be a good starting point for looking into preventive medicine for cardiovascular diseases," said Dr. Eguchi. "We hope to present an additional health benefit of consuming half-milled or brown rice [as opposed to white rice] as part of a regular diet."

More information: The full meeting program can be viewed at <http://experimentalbiology.org/content/default.aspx>.

Provided by Federation of American Societies for Experimental Biology

Citation: Brown rice and cardiovascular protection (2010, April 26) retrieved 30 April 2024 from <https://medicalxpress.com/news/2010-04-brown-rice-cardiovascular.html>

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