

New findings may advance iron-rich, cadmium-free crops

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With news reports of toxic, cadmium-tainted rice in China, a new study describes a protein that transports metals in certain plants and holds promise for developing iron-rich but cadmium-free crops.

Iron and cadmium are both found in soil and are interchangeably taken up by [iron](#) transporters in plants. Pollution and heavy fertilizer use have increased soil cadmium levels in China, for example. In humans, cadmium can damage internal organs and cause cancer. At the same time, iron is an essential nutrient for plants and humans. Iron deficiency affects 30 percent of the world's population, particularly in developing countries.

The Cornell-led study, published in *The Plant Cell*, describes an important role of a protein that transports nutrients – OPT3 – in maintaining balance of the essential micronutrient iron in Arabidopsis, small plants related to cabbage and mustard that are used as models for studying plant biology.

OPT3 function in plants was previously unknown. The new work finds that OPT3 transports iron and is involved in signaling iron concentrations – from leaves to roots – to regulate how much iron from the soil is needed by the plant. This function allows the plant to partition cadmium away from the edible portions of [plants](#), including seeds (grain).

"One would hope that this transporter can be used to produce iron-

fortified rice and other [grain crops](#) one day," said Olena Vatamaniuk, associate professor of crop and soil sciences, and the paper's senior author. "Our work suggests that manipulation of the expression of OPT3 can provide promising avenues for targeted biofortification strategies directed at increasing iron density, while omitting cadmium, in the edible portions of crops."

Provided by Cornell University

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