Plant Studies Reveal How, Where Seeds Store Iron（图）

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[摘要] November 2, 2006.- Biologists have learned where and how some plant seeds store iron, a valuable discovery for scientists working to improve the iron content of plants. Their research helps address the worldwide problem of iron deficiency and malnutrition in humans.
[关键词] Biologists;plant seeds

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Biologists have learned where and how some plant seeds store iron, a valuable discovery for scientists working to improve the iron content of plants. Their research helps address the worldwide problem of plant seeds deficiency and malnutrition in humans.

The team found that iron is stored in the developing vascular system of the seed of Arabidopsis, a model plant used in research. In particular, iron is stored in the vacuole, a plant cell's central storage site. The researchers also learned this localization depends on a protein called VIT1, known to transport iron into the vacuole.

"Iron deficiency is the most common human nutritional disorder in the world today, afflicting more than 3 billion people worldwide," said Mary-Lou Guerinot, a biologist at Dartmouth College in N.H. and the principal investigator on the study. "Most of these people rely on plants for their dietary iron, but plants are not high in iron, and the limited availability of iron in the soil can limit plant growth. Our study suggests that iron storage in the vacuole is a pro

-rich seeds would benefit both human health and agricultural productivity."

The findings were published online in the Nov. 2, 2006, ScienceExpress, the advance publication site for the journal Science.

The researchers combined traditional mutant analysis (turning on and off the VIT1 protein) with a powerful X-

ray imaging technique to create a map of where iron is localized in the seed. Guerinot was surprised by the finding because most studies on iron storage focus on another protein called ferritin.

"This project is a wonderful example of the power of using new combinations of tools--in this case, genetics and high-resolution 3-dimensional X-

ray fluorescence imaging--

to understand gene function," said Jane Silverthorne, a program director in NSF's Division of Biological Infrastructure, which funded the research. "The discovery that iron localizes in specific parts of a seed opens the possibility of developing seed crops such as grains and beans with increased content of this important nutrient."

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