Studies shed light on how to reduce the amount of toxins in plant-derived foods

September 12 2012

A number of environmental toxins pose considerable health threats to humans, and the heavy metal cadmium (Cd) ranks high on the list. Most of us are exposed to it through plant-derived foods such as grains and vegetables. Now, new research offers ways in which investigators can reduce the amount of Cd found in the food we eat, according to a review published online September 12th in the Cell Press journal *Trends in Plant Science*.

"Cadmium is virtually everywhere in the environment, and it is taken up into the human body and bioaccumulates for decades in the kidney," says first author Dr. Stephan Clemens, of the department of plant physiology at the University of Bayreuth, in Germany. Cd exposure may lead to kidney dysfunction, osteoporosis, cancer, cardiovascular disease, and other serious health conditions. Because there is no safe level of cadmium exposure, there is an urgent need for lowering its intake.

Most Cd enters the body through plant-derived foods because plants can efficiently take up Cd from the soil. "We need to further develop molecular understanding of the mechanisms that lead to plant Cd uptake for the reduction of Cd levels in food. Fortunately, our knowledge is growing," says Dr. Clemens.

In their recent review, Dr. Clemens and his colleagues examined studies investigating how Cd accumulates in certain plants, and they used the information to determine how we might develop low Cd accumulating crops. "Through excellent basic rice molecular biology and genetics

research, we have in the past couple of years learned a lot about why one rice plant accumulates more Cd in the grain than another rice plant even when they are grown on the same field," he explains. "This knowledge can now be used for targeted and efficient breeding to develop cultivars that retain their favorable characteristics but transport less Cd to the grain." He adds that we should also make an effort to better understand Cd accumulation in other crop plants such as wheat and potato. The authors note that, to their knowledge, breeding for low Cd accumulation is not common practice, but it should be possible because there is such variation in Cd uptake by different varieties of rice, wheat, and other plants, and because research has identified genes that can be used as markers to select specific varieties to breed.

It would of course be best to get rid of Cd in the environment, "but it will take a long time to achieve this; in the meantime we need other solutions," says Dr. Clemens.

More information: Clemens et. al.: "Plant science: the key to preventing slow cadmium poisoning." dx.doi.org/10.1016/j.tplants.2012.08.003

Provided by Cell Press