

Letter to the editor

## Reflections Cadmium (Cd) in the News: Refocusing on Proactive Responses

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### Abstract

News reports of cadmium-contaminated electric car chargers have brought the issue of cadmium toxicity to the forefront of the news cycle recently. The following are some reflections on this topic with a focus on proactive responses.

### Cadmium

Long-term Cadmium (Cd) exposure is associated with kidney injury, infertility, preeclampsia, birth defects, osteoporosis, frailty, neurological conditions, diabetes, cardiovascular disease, and cancer [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11,12] These effects may be due to epigenetic dysregulation, possible dysregulation of transposable elements, inflammation, oxidative stress, and more [12,13,14,15]. Cd has a very long half-life in the body, enabling accumulation over time [14]. Exposure to Cd can come about by various routes. These routes may include: occupational exposures (laboratories, manufacturing, welding, and mining), smoking, contaminated consumer products, and contaminated food stuffs [1,16,17,18,19] The issue of Cd-contaminated electric car chargers has been in the news recently, bringing the issue of Cd toxicity to the forefront of the news cycle [20].

### Proactive Responses

#### Reducing the Levels of Cd in the Diet

One of the sources of Cd exposure is from food crops grown in Cd-laden soils [1,21,22,23,24]. It has been speculated that certain varieties of plants have evolved the tendency to hyperaccumulate heavy metals as a way to protect against disease, reduce the populations of herbivores that feed on them or deter herbivores from feeding [25,26]. There are several ways to target the problem of Cd contamination of crops. The first approach is to reducing the amount of cadmium entering the ecosystem [21,22]. This involves both limiting Cd discharge from various sources of industrial pollution and limiting the amount of Cd that is allowed in fertilizers. The second approach would be to remove Cd from the soil with

phytoremediation. [24] The third approach would be to breed food crops that have less of a tendency to bioaccumulate heavy metals.

#### Could a Phytochemical-Rich Diet Help Reduce Cd Toxicity?

Phytochemical-rich diets –that include fruits, berries, herbs, spices, nuts, and olive oil –help promote various aspects of health and wellbeing [27,28,29,30,31,32]. Could a phytochemical-rich diet also attenuate the toxic effects of Cd? Recent studies hint that a diet rich in phytochemicals might reduce the toxicity of Cd [33, 34, 35]. These findings may be due to various possible combinations of antioxidant effects, anti-inflammatory effects, epigenetic maintenance, and / or other mechanisms [33,34,35,36]. In addition, a healthy diet could provide the psychological benefit of offering a proactive coping response for individuals who might otherwise feel a low sense of control when ruminating on previous Cd exposure in the context of the long half-life of Cd in the body [37].

#### Educate the Public about Cd

Individuals need to be not only educated about the dangers of heavy metal pollutants, such as Cd, but also about proactive measures that they can take to regain some measure of control. Education needs to include information about becoming politically active on issues involving heavy metal pollution, increasing awareness about workplace dangers and safety

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measures, smoking cessation, sharing product recall information, learning more about the health benefits of a phytochemical-rich diet, and inspiring the next generation of public health scientists.

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