Many anxious patients and readers have called or written in the last week to ask about the health threats of radiation from the nuclear reactor meltdown in Japan. Here are answers that address your radiation questions, relating to both the reactor meltdown and general exposure in everyday life.

Q: How much does the radiation from Japan affect us in the U.S.?

Radioactivity from Japan has little impact on people in the U.S. Thus far, the news is reporting that the four reactors in partial meltdown spewed radiation as high as 500 meters or 1,640 feet, according to John Beddington, U.K.'s Chief science officer. Compare with the Chernobyl blast, which sent radioactive particles 30,000 feet high for months. While its true that reports from last week stated that minute radiation was detected in Sacramento, the amount was extremely minor -- one-millionth of what people get from natural background radiation, and health officials have assured us that it posed no threats to residents on the west coast of the United States.

You should avoid foods grown or raised near the fallout zone. Spinach and dairy produced within Japan's radioactive zone were found to have vastly elevated radioactivity. Radioactivity was also found in Pacific waters, just off the northern coast, near the nuclear plant. For now it would be wise to avoid seafood from Japanese waters. Over time, this radioactivity should dissipate as the reactor is cooled and ceases to spew particle ash and dust. Other than avoiding potentially contaminated food, there should be no concern for residents of the American continent.

Q: What is radiation? Is all radiation bad for our health?

There is a lot of misinformation about radiation that I would like to attempt to clarify. First of all, we live with radiation all around us: the sun and stars, rocks, earth, and even our own bones emit natural background radiation. Radiation also comes from television, smoke detectors, and microwave ovens. There are two types of radiation: electromagnetic and particle radiation.

Electromagnetic (EM) waves range from low energy to high energy. Low energy EM includes electrical, infrared, visible light, and ultraviolet (UV). These, with the exception of UV are relatively harmless and are sometimes even therapeutic, such as the far infrared wave. At the high energy end of EM are the diagnostic x-rays like gamma rays. As these are more powerful,

exposure must be carefully monitored and limited. **Particle radiation**includes electron, proton, and neutron beams produced from splitting unstable atoms from the likes of plutonium and uranium -- as in a nuclear reactor or bomb. High exposure to these types of radiation can cause cancer, genetic defects, and death. For example, a 2009 New York Academy of Sciences report on the death toll in the European fallout zone of the Chernobyl accident indicated that from 1986 to 2005 one million people died from genetic damage caused by the radioactive fallout, and numerous people suffered from thyroid cancer and leukemia.

Q: How much radiation exposure comes from medical diagnostic tests?

The annual average of acceptable exposure from natural and equipment radiation is approximately 1 millisieverts or mSv. To put this data in context: If the average acceptable exposure for each person is 1 mSv per year -- which, for illustrative purposes, we'll say is equal to 1 truckload -- then a simple chest x-ray is about 0.03 truckload. Said another way, it will take about 33 chest x-rays for an individual to reach their yearly radiation allowance. While a chest x-ray leaves you open to a small amount of radiation, an upper GI x-ray is equal to about 3 truckloads, and a CT scan is about 4 truckloads. These numbers may sound alarming, but if you had a condition requiring diagnostic imaging, to avoid it would be foolish and could delay treatments that could potentially save your life.

Q: What are some natural ways to reduce radiation load in the body?

Start by consuming more chlorophyll-rich foods, such as seaweed, kelp, blue-green algae, spirulina, and chlorella. These plants contain rich minerals, such as iodine, that bind up the receptors site in your thyroid, so that any radioactive iodine you are exposed to will be unable to harm your thyroid. Also, these foods contain selenium and other potent antioxidants that prevent destructive free radical activity and cancerous growth, as well as chelating agents that bind to toxins and eliminate them from your body. Also, eat antioxidant-rich foods of every color, especially cherries, blueberries, pomegranates, yams, and sweet potatoes. The variety of antioxidants found in these foods help your body to mop up free radicals and toxins. Drink 6 to 8 glasses of filtered water every day.

On the supplement front, increase your intake of vitamin C, E, and D to help antioxidant actions within your body. You may also take alpha lipoic acid, a nutrient that protects cells from radiation damage. Herbs like dandelion, peppermint, and chrysanthemum help the body detoxify. Undergoing a medically supervised detox program, like the Tao of Wellness Detox

Retreat, can also support your body's cleansing function.

If you find yourself in the unlikely situation of excess radiation exposure, there are medically supervised chelation treatments using EDTA and other treatment methods.

I hope these answers help to clarify radiation's impact on your health and that you will use this information to live long, live strong and live happy.

-Dr. Mao