

# What is Oxidative Stress?

**The understanding of UCDs has increased and new treatments and optimal management are improving the outcomes of children and adults with UCD. While we have been largely focused on preventing high ammonia levels, we also have to be aware of the effects of the disorder on long-term health. By recognizing these factors, we may be able to improve the overall and long-term health of those affected by UCD. Researchers are now turning attention to the role of nutrition, oxidative stress and cytokine response in UCD.**

## The war against free radicals

Oxidative stress is the damage caused to a cell through a normal oxidation process happening all the time in our bodies. However, when something disturbs the balance of this process, the result is often toxic.

Free oxygen radicals are created during the normal oxidation process. Free radicals are missing a simple electron and are in search of another molecule that they can combine with to become "whole." In their quest, they fire charges that damage other cells and structures around them. Imagine an iron pipe lying on the ground. After years of exposure to the environment, rain and sun, it begins to rust. The rust is caused by oxidation and free radicals.

In our bodies, this "rusting" is the aging process. The more free radicals your body contains, the more damage potentially occurs. Compare the skin of a 5-year-old to that of a 90-year-old. The difference you can see is the destructive effect of free radicals on skin cells.

But oxidative stress doesn't just happen on the outside. Even though our bodies do an amazing job of neutralizing them in a normal, low-toxin setting, increased and prolonged exposure to free radicals causes a faster build-up of "rust" or disease in our bodies. In fact, it is the cause of many diseases, including heart disease, cancer, arthritis, diabetes, autoimmune and neurodegenerative diseases like Alzheimer's.

Common triggers for increased free radicals in the body are environmental/air pollution, cigarette smoking, excess stress, medications, excessive exercise and increased exposure to sunlight. In UCD, metabolic imbalances as well as nutritional deficiencies increase oxidative stress, triggering a cascade of free radicals and potential for cell damage.

## The heroic role of antioxidants

One of the keys to reducing the amount of free radicals in your system is antioxidants. Antioxidants give up the missing electron to the free radicals. Antioxidants neutralize the free radicals and enable the body to excrete them safely before they can cause harm.

Our bodies already make several different types of antioxidants all on their own. In UCDs, we may need to provide the body with supplemental antioxidants as increased protection in the war against free radicals. Antioxidants may provide a preventive and therapeutic advantage in reducing the effects of free radicals.

## Eat your colors

Many healthy foods provide a natural source of antioxidants. Getting these foods into UCD kids – notoriously picky eaters – may be a challenge, but there are many foods to choose from. They can be eaten raw, cooked or blended into smoothies.

An important first step in adding antioxidants to the diet is meeting with your metabolic dietician to develop a plan to help you incorporate them into your UCD diet plan.

### Powerful Antioxidants

Blueberries	Spinach
Pomegranate (juice)	Kale
Cranberries	Red peppers
Artichokes (cooked)	<b>Phytochemicals</b>
Blackberries,	Allicin - found in garlic
Prunes	and onions
Raspberries	Anthocyanins – deep
Strawberries	colored berries
Black plums	Lycopene - tomatoes
Mangos	Lutein – dark green leafy
Pecans	vegetables like spinach
Broccoli	and kale
Tomatoes	