What is Oxidative Stress?

The M-LEEaD Center's Community Engagement Core (CEC) increases awareness and understanding of environmental impacts on human health.

Stakeholder Advocacy Board members include:

- Community Health and Social Services
- Detroit Health Department
- Detroit Hispanic Development Corporation
- Detroiters Working for Environmental Justice
- Eastside Community Network
- Ecology Center
- Henry Ford Health System
- Michigan Environmental Justice Coalition
- We the People of Detroit

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What happens when I take a breath?

With every breath we take, about 20% of what we inhale is oxygen. Oxygen is an essential molecule that moves from the air in our lungs to our red blood cells. Our red blood cells then deliver oxygen to every cell in our body. There, oxygen gives cells life by creating energy to support cell functions. This process is called oxidation, and we could not live without it. It is the same process that is responsible for a cut apple turning brown or copper eventually turning green.

The process of oxidation creates free radicals in our cells. A free radical is an atom with an odd or free electron. Too many free radicals can cause damage to cells.[1]

Common Sources of Free Radicals[1]	Common Sources of Antioxidants[2]
• Cigarette smoking • Air pollution • Radiation • UV light (sunlight) • Excessive alcohol/drug use	• Dark chocolate • Tea and coffee • Fruits and vegetables • Nuts (pecans and walnuts) • Spices (cinnamon, oregano) • Beans

What Causes Oxidative Stress?

Oxidative stress occurs when there is an imbalance in our cells due to either an increase in free radicals and/or a decrease in antioxidants.[1] Over time this disruption in the balance between free radicals and antioxidants can injure our tissues.[3] Consuming foods that are rich in anti-oxidants can inactivate free oxygen radicals and reduce the harmful effects of free radicals.[4]

Indoor and Outdoor Air Pollution Exposure

Most people are aware that smoking is bad for everyone's health. Fewer people know that one of the reasons why is oxidative stress. When people inhale smoke and other forms of air pollution, it creates free radicals that damage health.[3] [5]

Linkages to Health

Oxidative stress has been linked to a number of illnesses, including some forms of cancer, cardiovascular disease, obesity, diabetes, Alzheimer's disease, eye diseases, Lupus, and other illnesses. Many of these could be prevented with the proper balance of oxidative stress and antioxidant levels. [6] [8]

Current Research

There is still much to be understood about how to achieve the proper balance between oxidative stress and antioxidant levels. You can't see or feel the imbalance; the first warning may be when a disease condition occurs. Researchers in the Environmental Health Science Core Center of the University of Michigan are engaged in research to better understand how oxidative stress impacts, asthma, cardiovascular disease, preterm birth, aging, and Lupus. [7] [8] [9]

What Does this Mean for Me and My Community?

If you live, work or attend school in a place with high levels of outdoor (e.g. near a freeway or industrial pollution source) or indoor (e.g. tobacco smoke) air pollutants, or if you have high levels of stress in your life, you may be at a higher risk of oxidative stress and associated health effects. Here are some actions you can take to lower your risk, and the risk of others in your community with high levels of oxidative stress:

- Advocate for regulations that lower exposure to air pollutants from cars and trucks or from industrial sources;
- Work with others to promote access to healthy, affordable foods that are high in antioxidants;
- Advocate for regulations that improve indoor air quality, such as smoking bans in public places and indoor air filtration systems in schools and workplaces;
- Carpool, use public transit and walk or ride bikes when possible;
- Eat more antioxidant-rich foods such as nuts, berries and dark green leafy vegetables;
- Avoid cigarette smoke and other environmental pollutants.
- Exercise regularly.

Please see http://mleead.umich.edu/Coec_Fact_Sheets.php for the citations included in this factsheet.

The University of Michigan Lifestage Environmental Exposures and Disease Center (M-LEEaD) Community Engagement Core (CEC) promotes collaboration among UM environmental health researchers and communities to advance knowledge of environmental health issues that affect community members in Detroit and Southeast Michigan.
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