Sanford Health

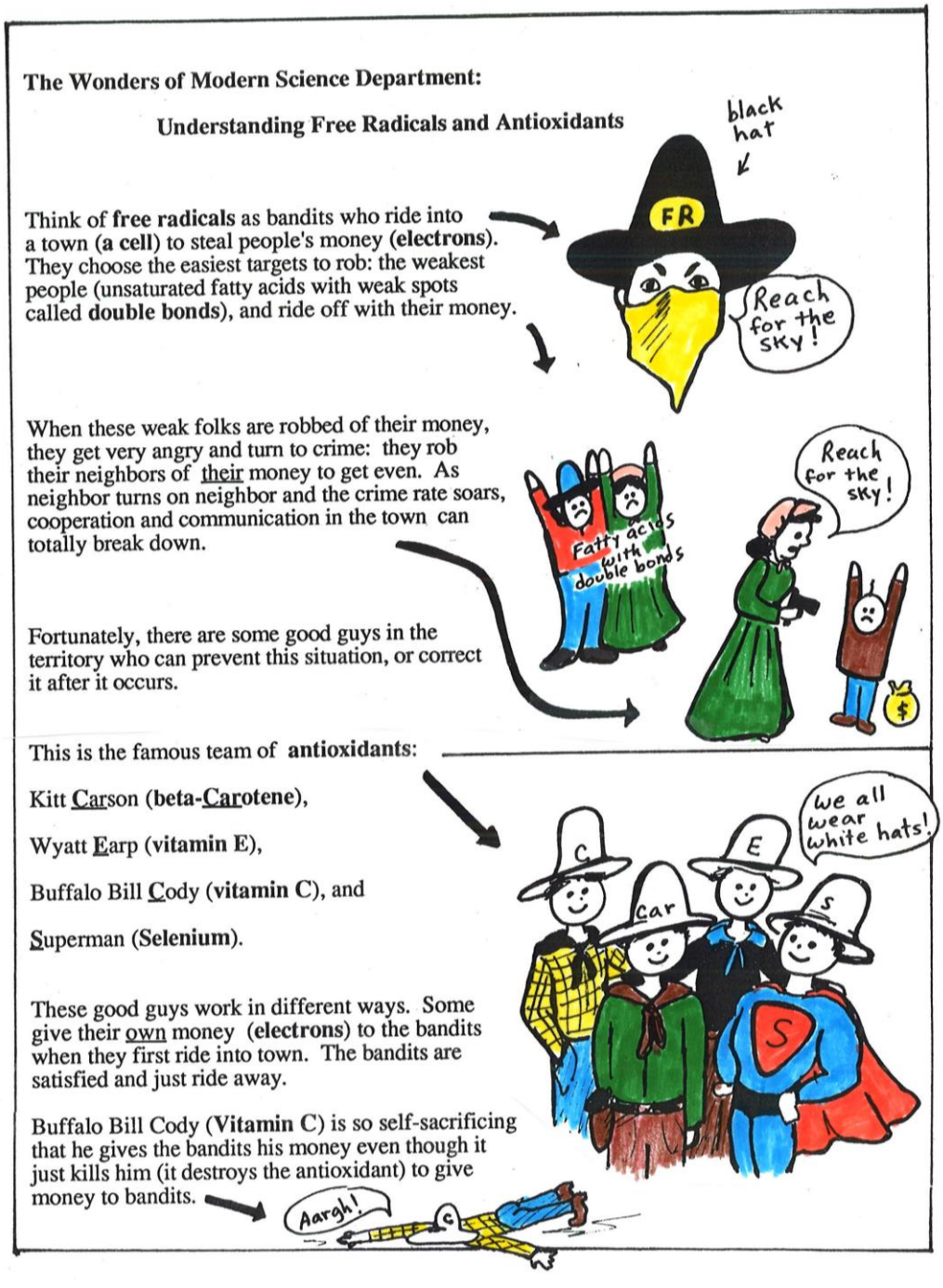
Aunt Cathy's Guide to:

Free Radicals and Antioxidants Cartoons

(**Antique Art from C. Breedon, 1990**:
"Study Guide to Accompany J.E. Brown's
The Science of Human Nutrition")

Aunt Cathy

Cathy Breedon PhD, RD, CSP, FADA
Prenatal/Pediatric Nutrition Specialist
Clinical and Metabolic Nutrition Specialist
Sanford Health (formerly MeritCare)
and UND School of Medicine
Fargo, North Dakota



Wyatt Earp (**Vitamin E**) is more hardy, and he is not himself destroyed when he gives money to the bandits. He continues to give money to new gangs of bandits that come along, in order to keep on protecting the town.

But if the the bandits have <u>already</u> robbed some weak folks, and the robbery pattern is in danger of spreading, "this looks like a job for Superman (**Selenium**)! " He voluntarily gives his money to the people who were robbed, so that they do not turn to crime and ultimately destroy the town.

Superman is powerful enough to fix up the town good as new, but he does not always know his own strength. In large amounts, <u>he</u> can be harmful, too.

Poetry Corner: "Antioxidant" Mnemonic:

Here are 4 antioxidants: Vitamin E,
Selenium, Carotene, Vitamin C.
They protect against damage
From radicals free.

"Vitamin C" Mnemonic:

Contributes electrons to Control oxidative damage.
Collagen (Connective tissue) formation requires it.
Could have a role in Colds and Cancer.
Changes the Charge on iron to improve absorption.
Close in molecular structure to gluCose.

Newer Stuff:

When this book was written (1990?!) these four were pretty much the only antioxidants that were in our radar. Now we know that there are other antioxidant substances that are even more potent at quenching free radicals and protecting against oxidative damage than these four guys.

"Phytochemicals"

The term phytochemical just means "chemicals in plants" so it takes in a lot of territory besides antioxidant activity. Some phytochemicals are not beneficial (… cocaine and poison sumac come right to mind.) But it turns out that all of the **plant pigments** (the actual coloring agents in the plants) have impressive beneficial antioxidant potential.

One of the first ones identified and studied was **lycopene** … the red color in tomatoes, red grapefruit and watermelon. **Its antioxidant potential is estimated to be about 200 times as potent as vitamin E.** That discovery rapidly led to the recognition of many other phytochemical pigments with tremendous ability to protect cells from oxidative damage.

Many of these are in the same chemical family as beta-Carotene, which is the orange pigment in carrots. Because beta-Carotene was one of the first to be identified, these plant pigments are collectively called "carotenoids" … which means "carotene-like."

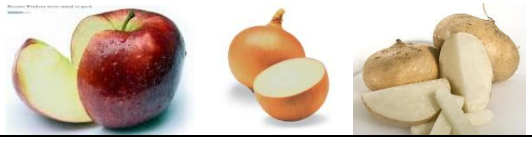
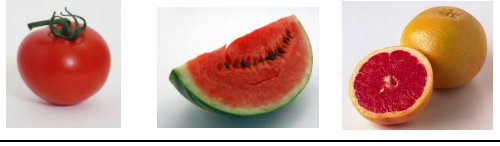
There are over 500 known carotenoids with potential health benefits, which is why you need to get started eating a big bunch of brightly colored fruits and vegetables. Many have been found to have a potentially protective role against a variety of common health problems such as cancer, heart disease, diabetes, MS, birth defects, and macular degeneration (a form of blindness.) Some of them act as protective "antioxidants," but they have many other benefits as well.

Eat the Rainbow!

Beta-carotene is also in green plants, but the green color chlorophyll hides the presence of yellow and orange pigments. That's one reason why green colored fruits and vegetables are such good foods … they are rich in several antioxidant substances.

A good example of yellow and orange color hidden under green is the turning of leaves from green to orange and red and gold. Those colors were always there, but they only can be seen when chlorophyll leaves town in the fall.

Here is a quick list of just a handful of the many phytochemical pigments studied that need to be in your lunchbox:

Phytochemical pigments	Color	Some food examples
Anthocyanin	**Reddish-blue**	
Beta-carotene	**Orange**	
Lutein and Chlorophyll	**Green**	
Flavones	**White**	
Lycopene	**Red**	
Zeaxanthin	**Yellow** **(and also hidden in all the green plants)**	

(FYI: There are many <u>other</u> potent antioxidant substances that are not plant pigments. Here are a few of those: Alpha lipoic acid, CoQ10 (Ubiquinone), and Carnitine)

Best Advice: Eat all the brightly colored fruits and vegetable you can get your hands on!