

Hello CUW-SOP students!

This month's wellness email is focused on Body: nutrition. Nutrition is a fundamental component of health and appropriate nutrition is essential to preventing and treating disease.

Below are several recent, literature based publications about a variety of topics, especially those highlighting lesser-known areas of nutrition and newer developments in dietary science. If you'd like to discuss further or are interested in additional resources, please feel free to contact Mike Wright at michael.wright2@cuw.edu.

### **Carbohydrates:**

A massive category of foods, carbohydrates are the subject of much debate. Some sources state that daily human requirements for carbohydrates range from at least 130 grams per day, while others state they aren't necessary in the diet at all, and that gluconeogenesis in the liver can produce all the glucose needed for normal metabolic functions.

Ultimately, moderation is probably the best strategy with a focus on obtaining this macronutrient from whole, rather than refined sources.

Whole food sources of carbohydrates include vegetables, fruit, *some* grains, and *some* dairy (in the form of lactose). "Refined" carbohydrates refers to glucose obtained from sugar cane, sugar beets, or corn in the form of corn syrup. This is essentially table sugar or "added sugar" on a food label. Sugar provides no nutritional value, stimulates a strong insulin response, and has been implicated in inflammation:

**Comparison with ancestral diets suggests dense acellular carbohydrates promote an inflammatory microbiota, and may be the primary dietary cause of leptin resistance and obesity**

<https://pubmed.ncbi.nlm.nih.gov/22826636/>

**Carbohydrate nutrition and inflammatory disease mortality in older adults**

<https://pubmed.ncbi.nlm.nih.gov/20573797/>

**High-glycemic index carbohydrate increases nuclear factor-kappaB activation in mononuclear cells of young, lean healthy subjects**

<https://pubmed.ncbi.nlm.nih.gov/18469238/>

### **Vegetables**

There are numerous categories of vegetable matter included in this category. Not all vegetables are created equal, and the vegetables we eat today aren't the same ones our grandparents ate.

**Changes in USDA food composition data for 43 garden crops, 1950 to 1999**

<https://pubmed.ncbi.nlm.nih.gov/15637215/>

Because producers generally prioritize yield and resistance to pests versus nutritional value, soil depletion and declining nutrient content of farmed foods has become a problem. The best way to avoid this is to purchase from local farmers (not mass producers) or a home garden. If using grocery-bought vegetables, try to use them immediately instead of freezing or canning, as more nutrients are depleted the longer they're stored.

Furthermore, it's important to realize that not everything that comes out of the ground is a "vegetable" although they're commonly categorized that way. The following table loosely organizes some common plant matter products. Starchy foods are generally less nutrient dense than "green leafy" or cruciferous vegetables, which are also higher in fiber and water content, making them generally more filling and less calorie dense.

<b>Cruciferous (mustards)</b>	<b>Root Vegetables (starches)</b>	<b>Starchy non-root vegetables</b>	<b>Fungus/other</b>
Broccoli	Potato	Peas	Mushrooms (various)
Asparagus	Sweet Potato	Corn	
Sprouts	Yam	Peppers (bell)	
Collard greens (kale)	Carrot		
Spinach	Onion		

A general rule of thumb is to eat vegetables that you like, because you'll probably eat more of them, and to eat vegetables you tolerate (don't cause gas, bloating, constipation, brain fog, or lethargy). Try to find foods that are sourced sustainably and as close to natural conditions as possible.

### **Fruit:**

The colloquialism is always, “eat your fruit and vegetables” but it really should be “eat your vegetables and fruit”. Historically, vegetables were in much higher supply than fruit, unless you lived in a tropical climate where a small variety of fruit would be available year-round. Even then, they were not cultivated in mass quantities as they are today, and were likely treated more like dessert than a dietary staple.

That's not to say you should be *afraid* of fruit, but it's important to keep it in dietary context. Although this is from a “natural” source, it is a generally high calorie, high carbohydrate food, and sugar is sugar. The key here is moderation: fruit can be part of a healthy diet, but anything can be overdone! Although a whole food, fruits may not be as nutrient dense as previously thought, as discussed earlier. Citrus fruit (oranges, clementine's, pineapple, etc) are generally the sweetest commonly consumed fruits.

### **Cellular Antioxidant Activity of Common Fruits**

<https://pubs.acs.org/doi/abs/10.1021/jf801381y>

Berries (raspberry, blackberry, blueberry, etc), with the exception of strawberries, contain fewer sugars and more nutrients per serving. They are also one of the highest anti-oxidant foods available, making for a good addition to a whole-foods diet.

### **Carbohydrates and cognitive function**

<https://pubmed.ncbi.nlm.nih.gov/29851417/>

Bottom line: *refined* or processed carbohydrates (cereal grains like modern wheat, most packaged snack foods, and bakery-type goods like pastries/ice cream) appear to have deleterious effects on general health and cognitive function —something to keep in mind when reaching for a mid-study snack!

Better sources of carbohydrate-containing foods are responsibly sourced fruit and vegetables. Grain based foods that fit this category might include sprouted wheat breads, and most fermented products like kimchi or sauerkraut. Young children and adolescents, who are often targets of processed food marketing, should be especially mindful of their choices.

### **Fats:**

There are three types of dietary fats routinely consumed by humans: saturated, unsaturated, and dietary cholesterol.

Dietary cholesterol was originally thought to be a primary driver of heart disease, but this hypothesis has fallen out of favor, and appears to have little impact on blood lipids.

**Saturated fats** are so named because all of the carbon-carbon bonds in the aliphatic chain are single bonds to either another carbon or a hydrogen, making them relatively flat. These are solid at room temperature (butter, coconut and palm oil, bacon and duck fat, etc). Saturated fats are stable at high temperatures and unlikely to oxidize because of their lack of double bonds.

Note: hydrogenated or partially hydrogenated oils are solid at room temperature but are **not saturated fats** (margarine, Crisco, and most fats used in commercial/industrial/bakery products). These start as polyunsaturated fats and are subjected to high temperature and heat to selectively add back hydrogen atoms across double bonds, making them solid at room temperature, like butter. However, this process results in trans-fats which cannot be metabolized by humans. The US FDA requires trans fats to be listed on food labels, and has strict maximum amounts that can be added to foods.

### **The health effects of saturated fats - the role of whole foods and dietary patterns**

<https://pubmed.ncbi.nlm.nih.gov/32087567/>

Bottom line: discussing the merits and pitfalls of individual nutrients (macro and micro) is good, but when we make dinner, we aren't measuring X grams of protein, Y grams of fat, and Z grams of carb. Instead, we are making *food* and so we should talk about nutrition in terms of food and not in terms of the biochemical components which make them up. The Dietary Guidelines for Americans for 2020-2025 state that the consideration of *dietary patterns* and *whole foods* is a more appropriate way to evaluate the health of foods.

### **Saturated Fat: Part of a Healthy Diet**

<https://pubmed.ncbi.nlm.nih.gov/30084105/>

Bottom line: rates of saturated fat intake have dropped sharply over the past 40 years, yet the rates of obesity and metabolic disease continue to rise “paradoxically” to the current US dietary guidelines’ postulation that they would have decreased with decreased saturated fat intake.

“Numerous meta-analyses and systematic reviews of both the historical and current literature reveals that the diet-heart hypothesis was not, and still is not, supported by the evidence.”

However, the newest iteration of the 2020-2025 Dietary Guidelines for Americas continues to support limiting saturated fat and emphasizes the use of inexpensive vegetable/seed oils.

### **Saturated Fats and Health: A Reassessment and Proposal for Food-Based Recommendations: JACC State-of-the-Art Review**

<https://www.sciencedirect.com/science/article/pii/S0735109720356874>

Bottom line: This article from the Journal of the American College of Cardiology restates a similar message as before. The current evidence doesn't support limiting saturated fat in the diet *when that saturated fat comes from whole foods*. Eating real foods that humans have eaten for tens-of-thousands+ of years does not give cause for concern (free range eggs, grass fed butter and muscle meat, organ meats). It is the consumption of highly processed, packaged foods which the current evidence suggests to be deleterious to health. Please find the helpful graphic below!

## CENTRAL ILLUSTRATION: Shifting From Saturated Fatty Acid-Based to Food-Based Dietary Guidelines for Cardiovascular Health

Previous Advice: Restrict SFA intake to reduce risk of CVD

Current Evidence Base: Health effects of SFAs depend on the interacting effects from naturally occurring food components and from unhealthy compounds introduced by processing

Whole-Fat Dairy



Unprocessed Red Meat



Dark Chocolate



=  
Complex food matrix with high SFA content but also other nutrients and non-nutritive components (e.g. proteins, micronutrients, phospholipids, probiotics)

=  
No increased CVD or diabetes risk

New recommendations should emphasize food-based strategies that translate for the public into understandable, consistent, and robust recommendations for healthy dietary patterns

Astrup, A. et al. J Am Coll Cardiol. 2020;76(7):844-57.

**Unsaturated fats** contain double bonds between carbon atoms in the aliphatic chain, have fewer hydrogen bonds, and have a more “kinked” appearance, making them typically liquid at room temperature. There are two types of unsaturated fatty acids: monounsaturated (MUFA) (one double bond: olive oil, avocado oil) and polyunsaturated (PUFA) (vegetable/seed oils).

**Polyunsaturated fats** in the modern western diet are mostly produced from canola, cottonseed, corn, soybean, sunflower, safflower, and grapeseed... seeds! They are now ubiquitous in all restaurant, fast food, and packaged/processed foods, not to mention commonly used for household cooking and baking.

Omega 3 and omega 6 fatty acids are special kinds of PUFA’s which cannot be synthesized by the body and must be acquired in the diet. Wild caught salmon, free range eggs, many raw nuts and seeds, and grass fed butter are all excellent sources of these essential fatty acids.

See below for one American physician’s compilation of studies summarizing this topic.  
<https://drcate.com/pufa-project/#atherosclerosis>

Dietary fat research has come a long way since the 1930’s when the initial Diet-Heart hypothesis was proposed, and recommendations about what types of whole-foods fat to eat are changing. As scientists we should evaluate new ideas!

**Proteins:**

**Diets higher in animal and plant protein are associated with lower adiposity and do not appear to impair kidney function in US adults.**

<https://pubmed.ncbi.nlm.nih.gov/27465374/>

Bottom line: *high quality* protein is an essential part of selecting a whole food. A common myth about protein is that it will rot or putrefy in the gut when consumed in excess. Protein does not putrefy in the gut, although the optimal human intake for protein appears to be around 40% of daily caloric intake. Beyond that amount, unless you are vigorously active most days, the protein goes to waste and is mostly excreted or stored as body fat. Protein is the body's last source of energy and typically isn't burned for fuel under normal conditions.

Conventional sources of protein include lean fowl (chicken, turkey) but these are *so* high in protein that they can be easy to overeat on their own, so be mindful about just how much protein you're getting when you pick these foods. Plant sources of protein like nuts, beans, and lentils are also common choices, but be aware these foods contain large amounts of fiber, which can be difficult for some people to tolerate if not consumed routinely. Typically about 0.5g of protein per pound of lean muscle mass is recommended to maintain muscle and metabolic function. This can go up to 1 to 1.5g/pound if the individual is very active or does a lot of resistance training.

Most sources of protein are safe to consume in moderate quantities; however, be aware that protein powders are so highly refined that they are readily converted to body fat.