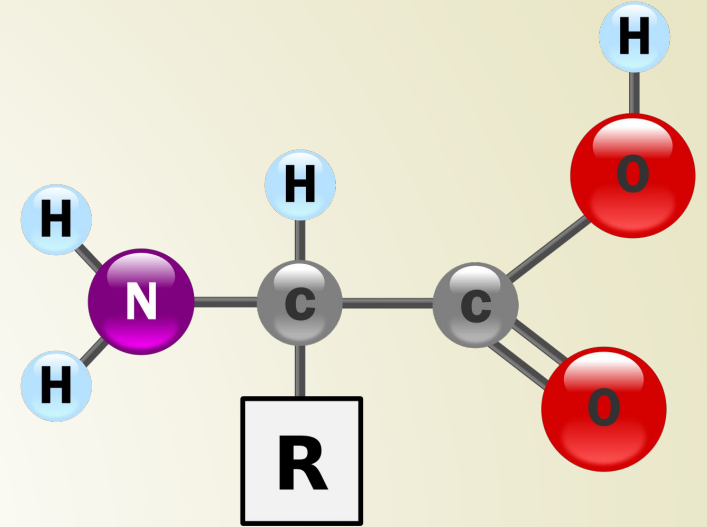




# Anti-inflammatory Diet: Protein

# What is protein?

- ▶ Part of every cell in the body
- ▶ Helps repair damage, build tissue, fight infection, are messengers among cells, hormones, . . .
- ▶ Amino acids (AA) are the building blocks of protein
  - ▶ 5 AA are *non-essential* (alanine, asparagine, aspartic acid, glutamic acid, serine); we can get them from food or make them ourselves
  - ▶ 6 AA are *conditionally essential* (arginine, cysteine, glutamine, glycine, proline, tyrosine); we can make these when we are healthy, but not when we are malnourished
  - ▶ 9 AA are *essential* (histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, valine); we cannot make them, so **must get them from food**



# Where do we get protein?

- ▶ Animal and plant foods have protein
- ▶ Animal foods contain all of the essential AA; this is why they are thought to be so important, but . . .
- ▶ Plant foods contain essential AA, but not all of them within each plant; therefore, when eating a variety of plant foods we can get all of the essential AA we need
  - ▶ interestingly, South Americans and Native North Americans have been using corn and beans together – providing a complete set of essential AA – for centuries!)
- ▶ A big question for non-meat eaters is – where do you get your protein? How do you get enough protein?
- ▶ The recommendation for obtaining all essential amino acids has changed:
  - ▶ Old: Combine foods to make a meal that will provide all amino acids:  
Legume + grain, nut/seed + legume, nut/seed + grain
  - ▶ New: Eating a variety of foods throughout the day will provide all amino acids:  
Oatmeal for breakfast + green beans with dinner
  - ▶ Quinoa, buckwheat, and soybeans are “complete” proteins

# How much protein do we need?

- ▶ 0.36 grams per pound of body weight per day (example: a person weighing 180# would need  $180 \times 0.36 = 64.8$  grams protein per day), but generally 46 to 52 grams per day is enough
- ▶ Pregnant women, burn victims, surgical patients, and some others need more protein than this
- ▶ Children need less
- ▶ Many people think they need a lot of protein, but the above recommendation is easy to get. Most people actually eat far more protein than they need.

# What might that look like?

- ▶ ½ cup of oats – 9 g
  - ▶ 1 cup almond milk – 1 g
  - ▶ 1 slice whole grain toast – 3.5 g
  - ▶ 1 tablespoon peanut butter – 4 g
- 17.5 g for breakfast
- ▶ ½ cup quinoa – 12 g
  - ▶ ½ cup lentils – 26.5 g
  - ▶ ½ cup variety dark greens – 6 g
  - ▶ ½ cup tomatoes – 2.5 g
- 47 g for lunch
- ▶ 3 oz salmon, cooked with dry heat – 19 g
  - ▶ ½ cup green beans – 3.5 g
  - ▶ ½ cup wild rice – 10 g
- 32.5 g for dinner

Total for the day: 97 grams

Best, for health reasons, sources of protein (best to worst):

Protein source (average)	Grams of Protein	Grams of Fiber	Calories	Grams of Fat
Beans (1/2 cup)	23	23	350	1.5
Lentils (1/2 cup)	27	23	345	1.1
Soy (if organic; 1/2 cup)	43	15	445	23
Peas (1/2 cup)	12.5	13	187	0.5
Whole grains (1/2 cup)	8-10	4-12	225-300	0.5-5
Nuts, seeds (1 Tbsp)	1.5	0.5	50	4
Fish (3 oz)*	20	0	100-175	1-10
Chicken (3 oz)* no skin	26	0	140	3
Pork (3 oz)*	24	0	140	4
Beef (3 oz)*	26	0	155	5
Egg (2, hardboiled)	12	0	150	10.5
Fast food cheeseburger	15	2	300	12

\* Cooked using no-fat-added cooking method



# Dairy: Conflicting evidence

- ▶ Easy way to get calcium, vitamin D, and protein
- ▶ The higher the fat content, the higher the saturated fat content; so choose dairy with lower fat content (recent studies show that unless you consume large amounts of milk, the fat content doesn't matter in terms of heart disease; but it's still saturated fat)
- ▶ Fermented dairy products, like yogurt, do have anti-inflammatory properties
- ▶ Casein – the main milk protein – has been linked to increased cancer risk when milk consumption is high
- ▶ Dairy from cows treated with antibiotics, medication, and high corn diets may increase inflammation due to higher levels of omega-6 fatty acids

Protein source (average)	Grams of Protein	Grams of Fiber	Calories	Grams of Fat
Yogurt (1 cup; plain, fat free)*	14	0	137	0.5
Greek yogurt (1 cup; 2% fat)*	22	0	170	4.5
Whole milk (1 cup)	8	0	145	8
2% milk (1 cup)	8	0	125	5
Skim/nonfat milk (1 cup)	9	0	90	0.5
Cheese (1 oz)	7	0	75-115	5-10

\* Do have anti-inflammatory properties



If you're still not convinced you can get enough protein without meat:



Derrick Morgan, NFL



Mac Danzig, Mixed Martial Arts



Meagan Duhamel,  
Figure Skating



Venus Williams, Tennis



Torre Washington,  
Bodybuilder

# How does meat cause inflammation?

- ▶ TMAO (trimethylamine oxide): produced in body by dietary carnitine; our gut bacteria break carnitine down into TMA, which is then converted by the liver into TMAO. The more carnitine you take in (found in abundance in animal meats), the more TMAO you create. This chemical is linked to cardiovascular disease, an inflammatory condition.
- ▶ AGEs (advanced glycation end products) – these are highly reactive chemicals found in foods and formed in the body. Blood levels of AGEs correlate with markers of inflammation (C-reactive protein, tumor necrosis factor alpha, vascular adhesion molecule-1, and the HOMA index [an indicator of insulin resistance]). To decrease these in diet when you do eat meat – cook with high moisture and use an acidic marinade like vinegar and lemon juice.
- ▶ Saturated fat – this type of fat (and trans fats) increase inflammation and oxidative stress, resulting in restriction of blood vessels (interesting study with college age, healthy young men and a fast food meal).



So – you don't have to give up meat, but choose lean meats, watch your portions, cook with moisture, and eat the meat meal with lots of fiber-containing side dishes! Veggies are still king!

And choose high protein plants to add protein on meatless main dish days.





# Cost Comparison

## Bean

- ▶ Pinto beans \$1.50/16 oz bag → 7 cups cooked beans
- ▶ 7 cups cooked beans = 14 x 1/2 cup servings
- ▶ \$0.10 per serving

## Meat

- ▶ Ground beef \$4.48/lb. → 12 oz cooked beef (3/4 lb.)
- ▶ 12 oz cooked beef = 3 x 4 oz servings or 4 x 3 oz servings
- ▶ \$1.49 per 4 oz serving
- ▶ \$1.12 per 3 oz serving



# Questions?

- ❖ Did your questions for today's topic get answered?
- ❖ What one thing might you do now that you've learned more about protein?
- ❖ What might be challenging to making a change in this area?





Thank you!