LEARNING OBJECTIVES

Explain “healthy eating” in general

Review nutrition abnormalities in chronic disease

Describe the dietary interventions and supplements related to myositis.
INTRODUCTION

- We are what we are “thanks to” our genes and environment.

- Still at risk for:
  - Diabetes
  - Heart Disease
  - Cancer
  - Alzheimer’s

- We can control our risk for developing other chronic diseases
“IT’S NOT ROCKET SCIENCE”

- Eat nutritious foods
- Include balance, moderation and variety into your diet
- Be mindful of portion sizes
- Enjoy your meals
- Involve yourself in meal prep
DIETARY CONSIDERATIONS: CARBOHYDRATES

Carbohydrates with a low glycemic load and high in fiber, protein, vitamins and minerals offer the most nutrition.

**Choose:** Whole grains, whole wheat products, brown rice, oatmeal, fruits, vegetables, beans, sweet potatoes, squash, whole fruits and vegetables, and legumes.

**Avoid:** white breads, pasta, white rice, cookies, cakes, pastries, dried fruits, fruit juices, white potatoes, corn and soda.
DIETARY CONSIDERATIONS: CARBOHYDRATES

- Include balance, moderation and variety in carbohydrate intake to maximize nutrient intake.
- “Eat The Rainbow”
- Juicing vs Smoothies vs Whole Fruit...which is better?
- “Fight the White”: make at least half your grains “whole”
  - Brown Rice, quinoa, 100% whole wheat
DIETARY CONSIDERATIONS: CARBOHYDRATES

Avoid: High Fructose Corn Syrup (HFCS)
- Long-term effects similar to alcohol due to its metabolism in the liver
- May increase risk for nonalcoholic fatty liver disease (NAFLD)

Avoid: Soda and Diet Soda
- Regular soda contains HFCS
- Diet soda contains artificial sweeteners that can destroy gut microbiome.
- BOTH contain phosphoric acid which can destroy bones.
DIETARY CONSIDERATIONS: PROTEIN

Studies have shown that people who follow the Mediterranean Diet and a plant-based vegetarian diet have the lowest risk of chronic disease.

✔ Choose: lean meats (chicken, turkey, pork), fish, beans, nuts, tofu, low fat dairy, eggs

❌ Avoid: red meat, “fatty” meats (bacon, sausage), fried meats
## NUTRITION CONSIDERATIONS: PROTEIN

<table>
<thead>
<tr>
<th>Food:</th>
<th>Grams Protein:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cup greek yogurt</td>
<td>23g</td>
</tr>
<tr>
<td>½ cup cottage cheese</td>
<td>14g</td>
</tr>
<tr>
<td>1 slice cheese</td>
<td>8g</td>
</tr>
<tr>
<td>1 egg</td>
<td>6g</td>
</tr>
<tr>
<td>1 cup 2% milk</td>
<td>8g</td>
</tr>
<tr>
<td>3 oz chicken breast</td>
<td>24g</td>
</tr>
<tr>
<td>1 cup beans</td>
<td>20g</td>
</tr>
<tr>
<td>2 Tb peanut butter</td>
<td>8g</td>
</tr>
<tr>
<td>3 oz tofu</td>
<td>12g</td>
</tr>
</tbody>
</table>
DIETARY CONSIDERATIONS: FAT

✓ Choose:

Monounsaturated fatty acids (MUFAs):
• Found in foods and oils.
• Found to improve cholesterol levels and decrease risk for cardiovascular disease and type 2 diabetes.
• Mostly liquid at room temperature.
• Food sources: olive oil, almonds, cashews, pecans, canola oil, avocado, nut butters, olives, peanut oil.
Dietary Considerations: Fat

Polyunsaturated fatty acids (PUFAs):
• Found in plant-based foods and oils.
• Decreases cholesterol levels and decreases risk for cardiovascular disease and type 2 diabetes.
• Mostly liquid at room temperature
• Food Sources: walnuts, sunflower seeds, flax seeds, soybean oil, safflower oil.
DIETARY CONSIDERATIONS: FAT

**Omega-3 fatty acids:**
- This is a type of polyunsaturated fat
- Very beneficial for the heart as it shows to decrease risk of coronary heart disease.
- Found in plant- and animal-based foods.
- Food Sources: salmon, tuna, trout, flaxseeds, canola oil, flaxseed oil, walnuts, sunflower seeds.
NUTRITION CONSIDERATIONS: OMEGA-3 & OMEGA-6

- Our society has an imbalance of omega-6 and omega-3 fatty acids which is a major factor for heart disease.
- Omega-3: Anti-inflammatory
- Omega-6 (in excess): Pro-inflammatory
- Ideal balance would be a 1:1 ratio. The average American diet is currently a 10:1-15:1 ratio of Omega-6 to Omega 3.
NUTRITION CONSIDERATIONS: OMEGA-3

- Alpha-linolenic acid (ALA): essential fatty acid. Flaxseed, canola oil, walnuts, enriched eggs
- Eicosapentaenoic acid (EPA): fish, fish oil, marine sources
- Docosahexaenoic acid (DHA): fish, fish oil, enriched eggs
- Body can convert ALA to EPA to DHA
DIETARY CONSIDERATIONS: OMEGA-3

- Eating oily, wild caught fish 1-3 times a week may be enough. Examples: salmon, mackerel, sardines.
- Can supplement with distilled fish or krill oil; 2-3 grams per day
- Avoid if on blood thinners or upcoming surgery.
DIETARY CONSIDERATIONS: OMEGA-6

Omega-6:
- Linoleic acid (LA):
- Essential fatty acid
- Needed in smaller amounts
- Food Sources: safflower oil, sunflower oil, grapeseed oil, soybean oil, corn oil
DIETARY CONSIDERATIONS: FATS

Avoid:

Saturated fat: mainly comes from animal sources of food. Raises LDL ("bad") cholesterol levels.

- Butter
- Cream
- Full-fat milk
- Cheese
- Beef
- pork (sausage, bacon)
- Processed meats (salami, deli meat)
- Skin on chicken
DIETARY CONSIDERATIONS: FATS

Avoid:

- Trans fat: made through the hydrogenation of vegetable oils. Increases LDL cholesterol and lowers HDL ("good") cholesterol.
- Doughnuts
- Cookies
- Muffins
- Pies
- Cakes
- Baked goods made with shortening
# NUTRITION CONSIDERATIONS: COOKING OIL

<table>
<thead>
<tr>
<th>Oils:</th>
<th>Smoke Point:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avocado Oil</td>
<td>570 F</td>
</tr>
<tr>
<td>Olive Oil (extra light)</td>
<td>468 F</td>
</tr>
<tr>
<td>Refined Canola Oil</td>
<td>400 F</td>
</tr>
<tr>
<td>Coconut Oil (refined)</td>
<td>400 F</td>
</tr>
<tr>
<td>Olive Oil (virgin)</td>
<td>395 F</td>
</tr>
<tr>
<td>Olive Oil (extra virgin)</td>
<td>375 F</td>
</tr>
</tbody>
</table>
PORTION CONSIDERATIONS

- **Fruits:** 2 whole fruits per day
- **Vegetables:** 2-3 1-cup servings
- **Starches:** Depends on body weight, age, height. Make at least ½ your grains whole!
- **Protein:** 0.8-1 gm/kg/day
  - Example: 150 pound (70 kg) person should have ~55g protein per day.
  - Aim for 15-20g protein per meal
- **Fat:** Depends on body weight, age, height. *Rule of thumb: include a source of healthy fats at each meal.
THE ANTI-INFLAMMATORY DIET

- Minimize sugar and refined grains. Focus on “whole grains”.
- Include sources of lean/low fat animal proteins. Limit red meat, fried meats, “fatty” meats.
- Increase fruit and vegetable intake.
- Include legumes, nuts, seeds, herbs and spices.
- Limit alcohol and caffeine.
- Introduce fermented foods, probiotics, prebiotics and fiber rich foods.
- Increase omega 3 and monounsaturated fats. Limit omega 6, trans, and saturated fats.
<table>
<thead>
<tr>
<th>Anti-Inflammatory Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D</td>
</tr>
<tr>
<td>Fish oil/Omega 3</td>
</tr>
<tr>
<td>Dark Chocolate (85%)</td>
</tr>
<tr>
<td>Turmeric</td>
</tr>
<tr>
<td>Ginger</td>
</tr>
<tr>
<td>Garlic</td>
</tr>
<tr>
<td>Red chili peppers</td>
</tr>
<tr>
<td>Pomegranate</td>
</tr>
<tr>
<td>Onion</td>
</tr>
<tr>
<td>Basil</td>
</tr>
<tr>
<td>Rosemary</td>
</tr>
<tr>
<td>Cumin</td>
</tr>
<tr>
<td>Pineapple</td>
</tr>
<tr>
<td>Fennel</td>
</tr>
<tr>
<td>Cruciferous vegetables: broccoli, cauliflower, cabbage, Brussels sprouts</td>
</tr>
</tbody>
</table>
THE ANTI-INFLAMMATORY DIET

In a 2007 study, Rose Mary Istre found those with myositis who followed an Anti-Inflammatory Diet over 12 weeks had improved:

- Grip, arm and leg strength measurements
- Ease of routine activities
- Severity of depression
ANTI-OXIDANTS

❖ Protect the body from free radicals, substances that can cause chronic diseases (heart disease, cancer).

❖ Include Vitamins (A, C, E) and minerals (selenium, calcium).

❖ Choose whole foods over supplements. Supplements may not be as effective and could even cause more harm.
ANTI-OXIDANTS

• Herbs and Spices
• Berries
• Red wine (1, 5 ounce glass per day)
• Purple grapes
• Green and black tea

• Citrus Fruits
• Legumes
• Nuts and seeds
• Dark Chocolate
MISCELLANEOUS CONSIDERATIONS: CAFFEINE

- Limit intake to 8-16 ounces per day. Increased amounts have been shown to be pro-inflammatory.

- Caffeinated beverages:
  - Coffee
  - Green or Black Tea
  - Energy Drinks
  - Diet or Regular Soda
MISCELLANEOUS CONSIDERATIONS: ALCOHOL

- General recommendations
  - 1 drink per day for women
  - 2 drinks per day for men.

- Consult with your doctor if on medications.

- Serving sizes:
  - 12 ounces beer
  - 5 ounces of wine
  - 1 shot hard liquor

Consult with your doctor if on medications.
MISCELLANEOUS CONSIDERATIONS: SALT

- High levels of sodium intake has been linked to increased inflammatory markers and autoimmune diseases.
- Limit the amount of pre-packaged and canned foods.
- Look for “low sodium” and “no added salt”.

- **Recommended intake:**
  - 1200mg – 1500mg
  - 1 tsp of table salt has 2,325mg sodium
  - McDonald’s Big Breakfast with Hotcakes: 2,260mg sodium
EXAMPLE MEAL PLAN

Breakfast:
• 1 cup coffee with 1 TB creamer and 1 tsp sugar
• Oatmeal topped with ¾ cup blueberries and ¼ cup walnuts

Snack
• 1 apple
• 2 TB Almond Butter

Lunch
• Turkey and avocado sandwich on whole grain bread

Snack
• ½ cup low fat Greek yogurt with 2 tsp honey and flax seeds

Dinner
• 4 ounces salmon with ½ cup brown rice and 1 cup steamed mixed vegetables

Dessert: 1 piece dark chocolate
HUMAN GUT MICROBIOME

- Gut bacteria and yeast play a role in immune function and regulation of inflammation
- 100 trillion bacteria and yeast cells in the human gut
- Bacteria genes outnumber human genes by 100 fold
HUMAN GUT MICROBIOME

- Dysbiosis: Imbalance in gut bacteria; plays a major role in inflammation and chronic disease

- Observed increase in autoimmune disease in those with decrease in beneficial bacteria.

- Those with altered gut flora have slower metabolism, higher risk for obesity.
HUMAN GUT MICROBIOME

- Improving intestinal flora improves inflammation.
- Use of probiotics in mice: improved or prevented rheumatoid arthritis, multiple sclerosis, and type-1 diabetes.
- Will discuss probiotics towards the end of the lecture.
FEEDING THE GUT

- **Kefir:** fermented drinkable yogurt. Choose plain varieties.
- **Kombucha:** fermented beverage containing black tea and sugar
- **Sauerkraut:** fermented cabbage.
- **Pickles**
- **Tempeh:** fermented soybean product
- **Yogurt:** fermented dairy product. Choose plain varieties.
OBSTACLES TO DIETARY CHANGES

**Barriers:**
- Habits and cultural/religious considerations
- Access to fresh and healthy foods
- Ability to buy, prepare, and cook food
- Dysphagia (difficulty swallowing)
- Poor dentition

**Solutions:**
- Registered dietitians can provide nutritional options for special diets
- Occupational/speech therapy
- Grocery delivery and food preparation services
- Regular dental exams
CURRENT STUDIES: MUSCLE RECOVERY AND STRENGTH

- Adequate Protein Intake
- High intake of Omega-3s
- High intake of anti-oxidants
- Medium to high intake of good fats.
Increased BMI is associated with increased inflammation due to the effect of adipose (fat) cells on release of cells and mediators like cytokines.

Psoriasis severity, an autoimmune disease, improves with weight loss.

- Am J Clin Nutr August 2016 vol. 104; 259-265; others
CURRENT STUDIES

From the European Society of Cardiology Congress in Rome (August 2016), a leading Italian heart disease expert Professor Giovanni de Gaetano, MD PhD, discussed his group’s findings:

• Those who ate mainly a Mediterranean-type diet were 37% less likely to die during the study than those who were furthest from this dietary pattern.
• Statins are said to help reduce major heart problems by around 24%.
• Previously, cholesterol-lowering drugs such as statins were believed to be the most effective method of combating heart disease.
• Highlights the significance that diet has on health outcomes.
SUPPLEMENTS: CURCUMIN

- Active ingredient in turmeric
- Anti-inflammatory
- Poorly absorbed; needs to be combined with black pepper extract (Bioperine) to increase absorption.
- Possibly effective for:
  - High cholesterol
  - Osteoarthritis
  - Alzheimer’s
  - Cancer
SUPPLEMENTS: CURCUMIN

2007 study in mice: curcumin can reduce inflammation and production of creatine kinase associated with exercise-induced muscle damage.
• Davis J. Am J Physiol Integr Physiol 2007;292:R2168

2008 study in mice: enhanced muscle strength in mice with muscular dystrophy
• Pan Y. Mol Cells. 2008;25(4):531
SUPPLEMENTS: CURCUMIN

- Usually does not cause significant side effects
- Avoid if on blood thinners, if you have a bleeding disorder, prior to surgery, or if you are on anticoagulants.
- Avoid if acid reflux is present
- Dosage: 1500mg daily by mouth
SUPPLEMENTS: COENZYME Q10 (IN STATIN-INDUCED MYOPATHY)

❖ CoQ10 affects energy metabolism and acts like an anti-oxidant.

❖ Lowered CoQ10 levels have been found in some people with muscle diseases.

❖ Reduction in CoQ10 could cause abnormal mitochondrial dysfunction

❖ Statins lower CoQ10, but most studies have not shown that supplements increase levels
SUPPLEMENTS: COENZYME Q10

- However, data is conflicting for CoQ10’s use in myositis. (IIM)

- A small Slovenian study (50 pts) showed decreased muscle pain after 30 days with CoQ10 50 mg twice daily compared with placebo
  • Med Sci Monit. 2014 Nov 6;20:2183-8
SUPPLEMENTS: COENZYME Q10

“The present evidence does not support [CoQ10’s] supplementation in statin-induced myopathy.” Schaars and Stalenhoef, 2008
  • Current Opinion in Lipidology

A larger study (120 pts) showed no improvement in muscle pain, muscle strength or aerobic performance after 8 weeks of 600 mg daily
  • Atherosclerosis. 2015 Feb;238(2):329-35
SUPPLEMENTS: COENZYME Q10

- As we age, CoQ10's absorption, biosynthesis and conversion to ubiquinol decreases.
- Ubiquinol form is better absorbed and probably more effective.
- Interest in cardiac, neurologic and periodontal diseases

Dose:
- 150 mg daily of ubiquinol used in studies
- Avoid if on coumadin
SUPPLEMENTS: VITAMIN D

- Important for bone health and mental health (depression).

- Vitamin D levels are decreased by steroid use

- Studies have shown that patients with Dermatomyositis (DM), Polymyositis (PM), Rheumatoid Arthritis (RA), and Lupus (SLE) have been found to be deficient in Vitamin D.
SUPPLEMENTS: VITAMIN D

- Vitamin D supplementation in statin-induced myositis patients reversed symptoms in 87% of 150 patients studied
  - Glueck C. Current Med Res Opin 2011;27:1683

- Treatment for deficiency:
  - 2000 IU/day of vitamin D3 or 50,000 IU weekly vitamin D2

- Recheck level after 6 weeks of supplement
SUPPLEMENTS: FOLATE (FOLIC ACID, B9)

- Important to take if on methotrexate to avoid:
  - Decreased white blood cells, GI symptoms, hair loss, liver and lung toxicity

- Supplement as 1-2 mg daily (Rx)

- Unclear if should avoid on same day as methotrexate (possibly less effective)

- Need adequate vitamin B12 intake:
  - B12 deficiency is masked by taking folate
  - Good B12 sources: fish/shellfish, beef, eggs, nutritional yeast
SUPPLEMENTS: PROBIOTICS

- Studies are still trying to determine the best strains for different diseases
- Should have dosing in the billions to be effective
- Refrigeration prolongs life
- Caution in those with:
  - Severe immune-compromised states
  - Malignancy
  - Central venous catheters
  - Cardiac valve disease
  - Diabetes
SUPPLEMENTS: WHEY PROTEIN

- Has been looked into as dietary source of cysteine, needed for glutathione production, an important element in anti-oxidant defense

- Glutathione itself as an oral supplement is not well-absorbed

- This may be helpful for autoimmune disease and myopathies but data is very limited, mostly presumed

- Typical Dose: 20-30 grams daily. Higher intake may cause intestinal discomfort.
SUPPLEMENTS: GLUTAMINE

- Because it inhibits muscle wasting and preserves muscle protein, it may help myotonic muscular dystrophy

- Can raise methotrexate levels; no good data on myositis
SUPPLEMENTS: CREATINE

- Taken as a daily supplement to improve muscle strength and/or mass

- A 2013 Cochrane Database Systematic Review deemed it a worthwhile supplement with few side effects for those with DM and PM

- Most data was taken from a 2007 study done in the UK and Sweden where creatine was combined with exercise (Dr. Ingrid Lundberg was a co-author)
SUPPLEMENTS: CREATINE

- Dosage used in the 2007 study:
  - Start with 20 grams per day for 8 days (loading dose)
  - Continue with 3 grams per day (maintenance dose)

- Noted improved performance, ability to undertake high-intensity exercise and endurance work

- Effect maintained over 5 months
SUPPLEMENTS: CREATINE

❖ Safety: there were no side effects noted

❖ Previous concerns about renal (kidney) toxicity do not seem warranted, as long as there is no underlying renal disease

❖ Unfortunately, this does not seem to be effective for inclusion-body myositis (IBM) and possibly not for JDM
SUPPLEMENTS

- Vitamins C and E: no good data
- L-carnitine: no good data

Supplements that may do more harm than good:
  - Spirulina and blue-green algae: At least two patients with DM had a flare or onset of their disease after taking these
    - Lee A. Arch Dermatol 2004;140:723
    - Konno T. Rinsho Shinkeigaku 2011;51:330
  - Echinacea: has produced flares of lupus, including kidney-related complications

NOTE: Most agree data in this area is sparse.
Dr. Ruth Ann Vleugels is a dermatologist at Harvard and is on our Medical Advisory Board. In the past she has suggested biotin for hair loss in dermatomyositis, 10,000 mcg (10 mg) twice daily. This will not help the skin disease, unfortunately.
DIETARY INTERVENTIONS AND MYOSITIS

- Ketogenic Diet
- Gluten Free
- Lectins
KETOGENIC DIET

- Similar to Atkins diet (high fat, moderate protein, low carbs)
- Used mainly for children with extreme seizure disorders
- Preliminary data in mice that it may improve muscle performance in Alzheimer's (like IBM, associated with beta-amyloid deposits); also being studied in humans with various neuromuscular diseases
GLUTEN SENSITIVITY

- Association of myositis with gluten sensitivity described since at least 1976

- There have been reports of clinical improvement following a gluten-free diet in:
GLUTEN SENSITIVITY

- Not all patients will have positive antibodies

- Symptoms can range from none to:
  - Weight loss
  - Abdominal cramping
  - Bloating
  - Loose stools
  - Anemia
  - Evidence of bone loss
  - Vitamin E deficiency
**GLUTEN FREE**

Gluten Containing Foods:
- Wheat
- Rye
- Barley
- Bulgur
- Couscous
- Farina
- Graham Flour

Gluten Free Foods:
- Brown rice
- Quinoa
- Buckwheat
- Amaranth
- Sorghum
- Millet
- Tapioca
LECTINS

- Lectins are proteins found in certain vegetables, such as beans, grains and corn.

- Some propose that lectins can be pro-inflammatory and cause or worsen certain medical conditions, such as autoimmune diseases.

- This effect has not been proven yet with well-designed scientific studies.
Some may find removing high-lectin foods from their diet to be beneficial, but there are risks of missing key nutrients including fiber, vitamins, minerals, and anti-oxidants.

Food containing lectins:
- Beans
- Grains: barley, corn, rice, wheat
- Fruits and vegetables
SUMMARY

- Adopt an “Anti-Inflammatory Diet”
  - Fresh fruits and vegetables
  - Whole Grains
  - Lean Proteins
  - Healthy Fats
- Include fermented foods
- Include sources of anti-oxidant foods
- Limit caffeine, alcohol, and salt
- Consider supplements and probiotics
SUPPLEMENT SUMMARY

❖ For all, but especially DM and those with darkly pigmented skin or those avoiding sun:
  ❖ ✔ vitamin D level, aim for 40-50

❖ For anyone on methotrexate: take folic acid

❖ For PM, DM, IBM: consider gluten-free diet

❖ For IBM: consider modified Atkins

❖ For PM, DM: consider creatine

❖ Stay hopeful for more data on coenzyme Q10, whey and curcumin-piperine, but maybe worth a try
RESOURCES: GENERAL

- Center for Science in the Public Interest
  • www.cspinet.org

- American Society for Nutrition
  • www.nutrition.org

- Tufts University Health Letter
  • Healthletter.tufts.edu
RESOURCES: DRUG INTERACTIONS

- http://drugs.com/drug_interactions
- http://www.healthline.com/druginteractions
RESOURCES: SUPPLEMENTS

- Consumer Labs (small fee to join)
  - consumerlab.com

- Office of Dietary Supplements
  - ods.od.nih.gov

- Linus Pauling Institute
  - lpi.oregonstate.edu/infocenter

- National Center for Complementary and Alternative Medicine (NIH)
  - nccam.nih.gov
RESOURCES: BOOKS

- *Eat to Live* by Joel Fuhrman, MD
  (general healthy eating); drfuhrman.com
- *The Happiness Diet*, by Tyler Graham and Drew Ramsey, MD
- *Integrative Rheumatology* by Randy Horwitz, M.D. and David Muller, MD
- *Wheat Belly* by William Davis, MD (gluten sensitivity)
- *The Inside Tract* by Gerard Mullin, MD