



NUTRITION AND MYOSITIS

THE MYOSITIS ASSOCIATION ANNUAL CONFERENCE 2017

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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

Food:

- 1 cup greek yogurt
- 1/2 cup cottage cheese
- 1 slice cheese
- 1 egg
- 1 cup 2% milk
- 3 oz chicken breast
- 1 cup beans
- 2 Tb peanut butter
- 3 oz tofu

Grams Protein:

- 23g
- 14g
- 8g
- 6g
- 8g
- 24g
- 20g
- 8g
- 12g

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

Oils:	Smoke Point:
Avocado Oil	570 F
Olive Oil (extra light)	468 F
Refined Canola Oil	400 F
Coconut Oil (refined)	400 F
Olive Oil (virgin)	395 F
Olive Oil (extra virgin)	375 F

PORTION CONSIDERATIONS

- ❖ Fruits: 2 whole fruits per day
- ❖ Vegetables: 2-3 1-cup servings
- ❖ Starches: Depends on body weight, age, height. Make at least 1/2 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.

ANTI-INFLAMMATORY FOODS

- ❖ Vitamin D
- ❖ Fish oil/Omega 3
- ❖ Dark Chocolate (85%)
- ❖ Turmeric
- ❖ Ginger
- ❖ Garlic
- ❖ Red chili peppers
- ❖ Pomegranate
- ❖ Onion
- ❖ Basil
- ❖ Rosemary
- ❖ Cumin
- ❖ Pineapple
- ❖ Fennel
- ❖ Cruciferous vegetables:
broccoli, cauliflower, cabbage,
Brussels sprouts

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

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:
 - 1 200mg – 1 500mg
 - 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 $\frac{3}{4}$ cup blueberries and $\frac{1}{4}$ cup walnuts

Snack

- 1 apple
- 2 TB Almond Butter

Lunch

- Turkey and avocado sandwich on whole grain bread

- $\frac{1}{2}$ cup low fat Greek yogurt with 2 tsp honey and flax seeds

Snack

- 1 cup carrots
- $\frac{1}{4}$ cup hummus

Dinner

- 4 ounces salmon with $\frac{1}{2}$ 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.

CURRENT STUDIES: BMI AND CHRONIC DISEASE

- ❖ 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. (IM)
- ❖ 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)
 - Chung et al. *Arthr Rheum* 2007;57:694-702

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
 - Muscle Nerve. 2016 Jan;53(1):58-66

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.

SUPPLEMENTS: BIOTIN

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:
 - **PM:** *Lancet* 1976;2:317; *Clin Rheumatol* 1984;3:533-9; *J Rheumatol* 1996;23:782-3.
 - **DM/JDM:** *J Pediatr Gastroenterol Nutr* 1997;25:101-3; *J Rheumatol* 1999;26:1419-20; *Clin Exp Rheumatol* 2001;19:201-319, 757-8; *Can J Gastroenterol* 2006;20(6):433-435.
 - **IBM:** *Muscle Nerve*. 2005 Feb;31(2):260-5, 2007 Jan;35(1):49-54, 2007 Apr;35(4):443-50.

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 founds 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.

LECTINS

❖ 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://reference.medscape.com/drug-interactionchecker>

❖ <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