
NUTRITION
In IBD
MAKING HEALTHY CHOICES
CCFA
CROHN'S & COLITIS
FOUNDATION OF AMERICA

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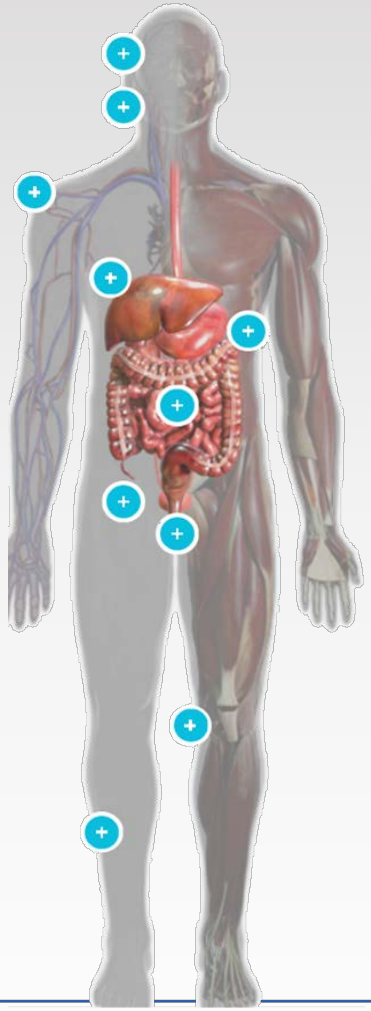
Today's Objectives

- ✓ Describe importance of diet and nutrition in inflammatory bowel diseases (IBD)
- ✓ Review data on the role of diet in IBD
- ✓ Review general healthy eating principles, and suggestions for diet during a flare
- ✓ Discuss eating outside your home at holidays and gatherings

How can IBD affect digestion?

Crohn's Disease

- Inflamed small intestine; less able to fully digest/ absorb nutrients
- Incompletely digested foods travel through colon (may cause diarrhea)



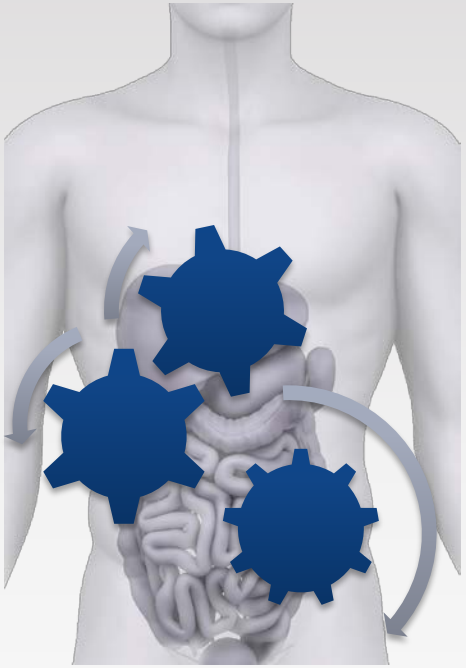
Ulcerative colitis

- Small intestine works normally
- Inflamed colon causes urgency; does not reabsorb water (diarrhea)

Good Nutrition in Your Diet is Essential

Proper **diet** may…

- ✓ Improve symptoms
- ✓ Enable healing
- ✓ Sense of control



Good **nutrition** is key to:

- ✓ More effective medications
- ✓ Healing, immunity, and energy levels
- ✓ Preventing/ minimizing gastrointestinal symptoms
- ✓ Normalizing bowel function

- IBD is not related to food *allergy* but symptoms may be worsened by food *intolerance*
- Diet should be *individualized*

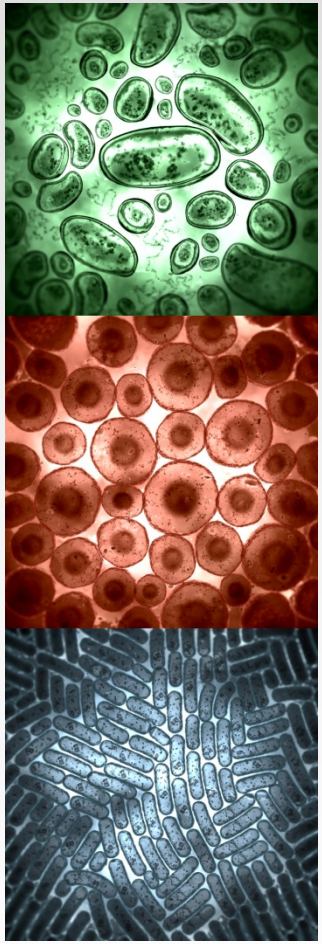
Host- Microbial Mutualism in the Gut

Host benefits to bacteria

- Provides a unique niche
- Intestinal mucus provides a source of nutrition

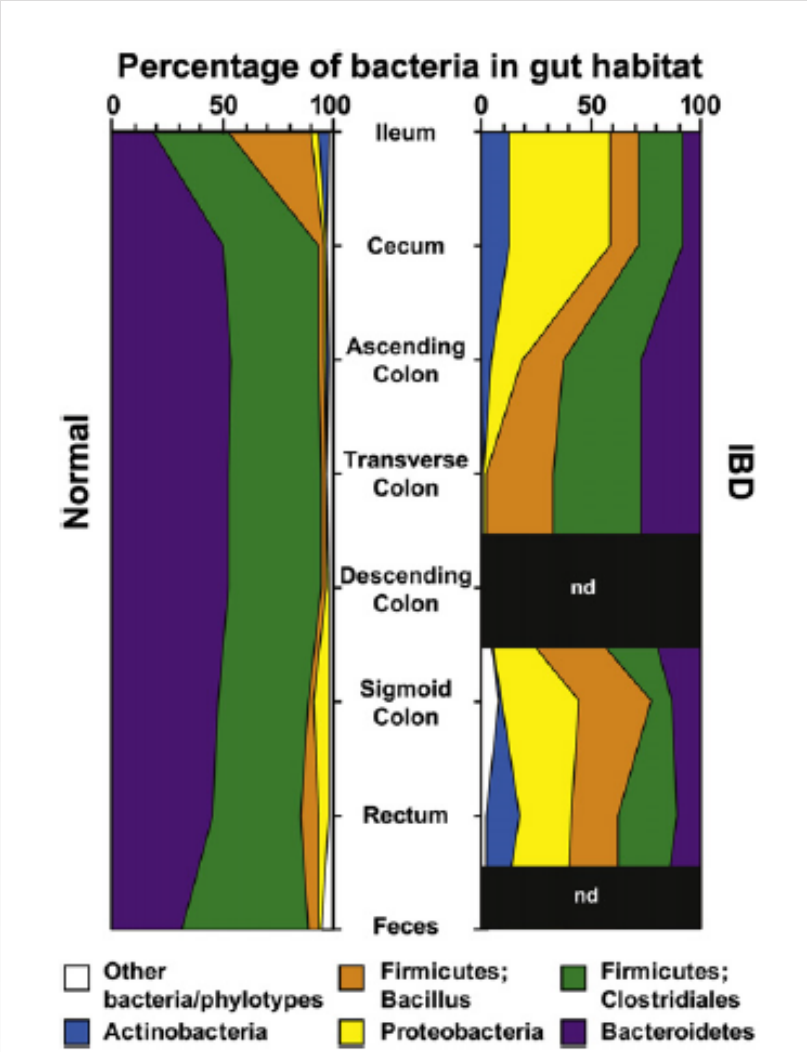
Bacteria benefits the host

- Fermentation of indigestible carbohydrates and the production of SCFAs
- Biotransformation
- Urease activity participates in nitrogen balance
- Synthesis of certain vitamins
- Metabolize drugs
- Education of the mucosal immune system



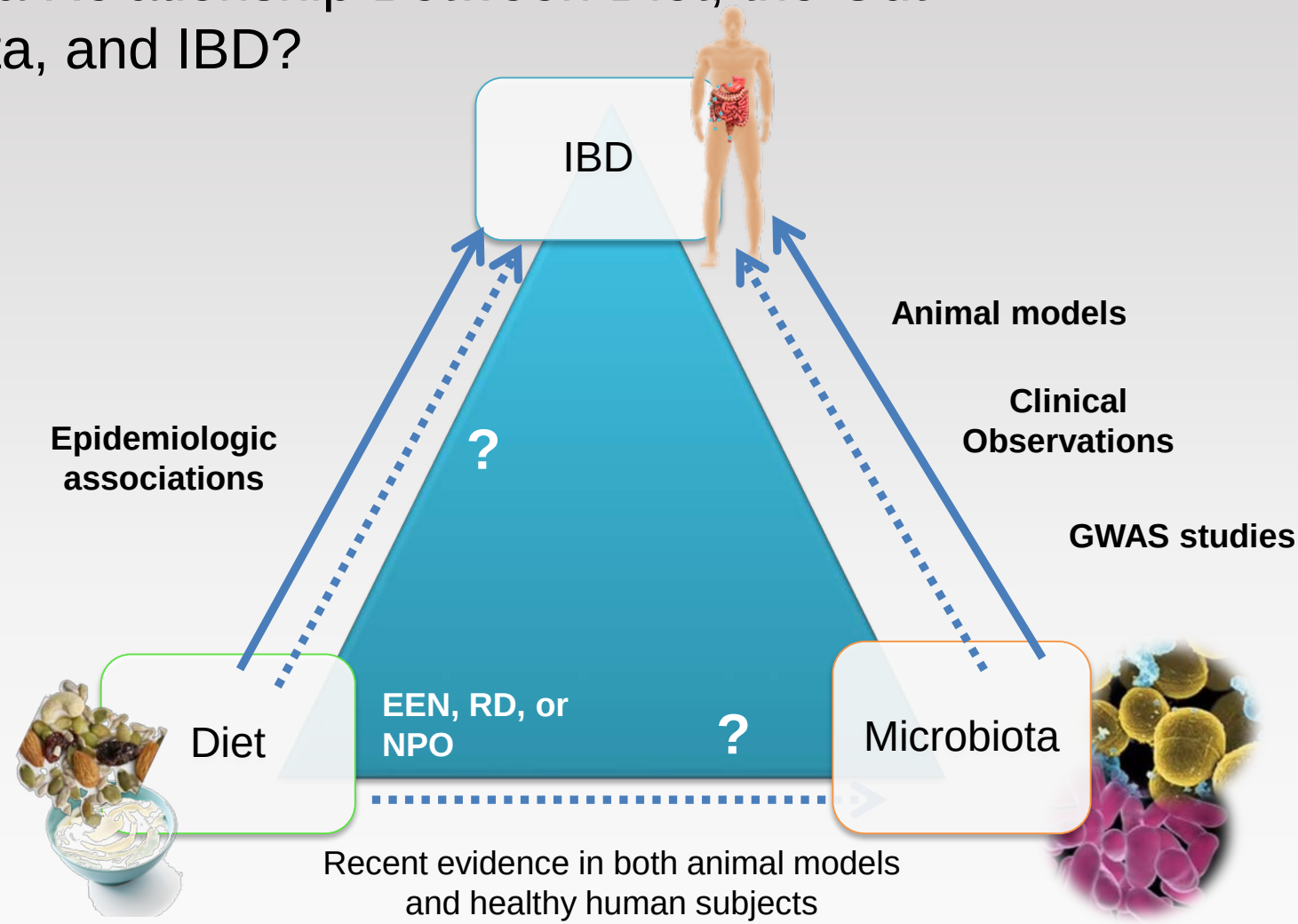
Wu, Gary. Presentation: Diet, the Gut Microbiome, and the Metabolome in IBD: Potential Therapeutic Targets and Vision for the Future.

balance of Gut Microbiota in IBD (Dysbios



Peterson et al. *Cell Host & Microbe*. 2008;3:417-427.

Is There a Relationship Between Diet, the Gut Microbiota, and IBD?

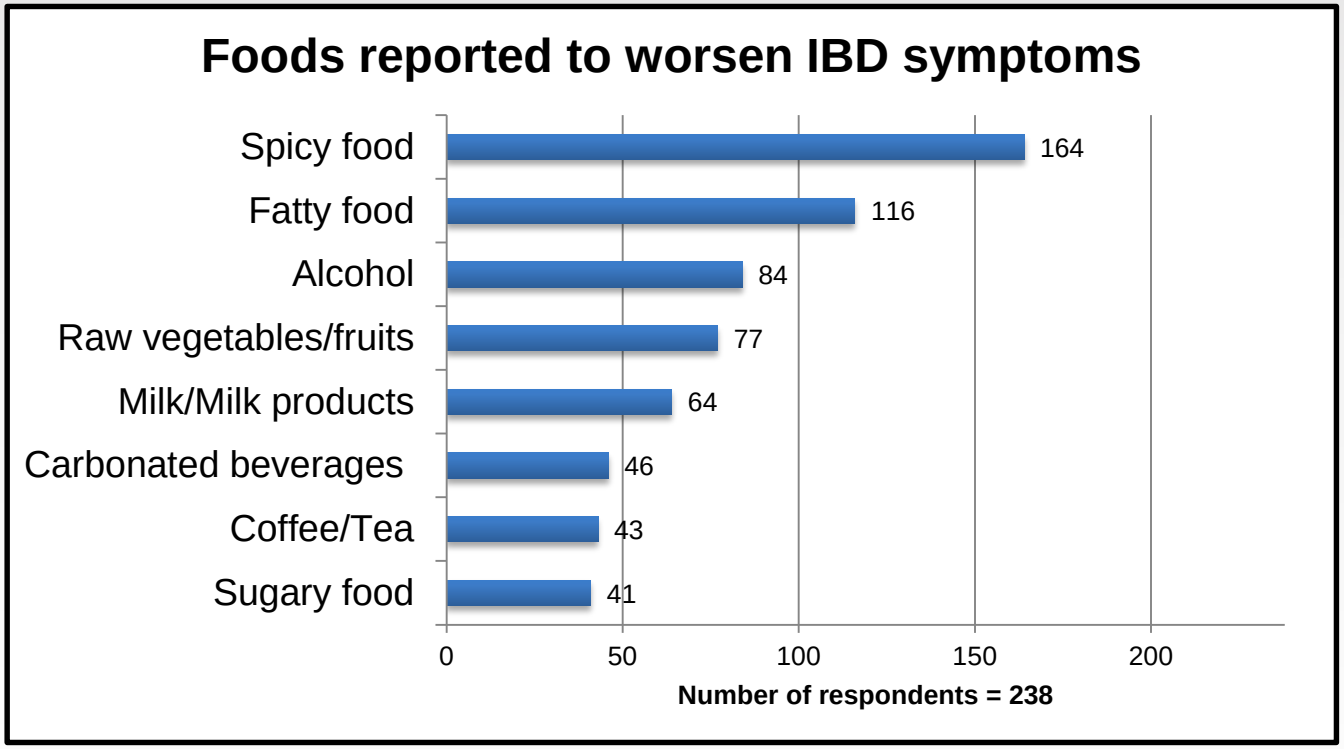


Source: Adapted from Albenberg et al. Current Opinion Gastro. 2012.

Clinical Relevance of Diet and IBD

Patients with IBD frequently identify dietary components that cause increased symptoms (lactose, gluten, etc.) and up to 75% follow restricted diets based on subjective intolerance and perceived worsening of disease

Adapted from Limdi et al. Inflamm Bowel Dis. 2015



CCFA Partners Study

- **Diet: no consistent patterns**
  - Patients reported fruits and non-leafy vegetables were most likely to make symptoms better
  - Fruits and non-leafy vegetables most likely to worsen their symptoms
  - Reported symptoms may be from food intolerances rather than inflammation from IBD

Diet is Associated with New Onset IBD

- High dietary intakes of total fats, PUFAs, omega-6 and meat were associated with an increased risk of CD and UC
- High fiber and fruit intakes were associated with decreased CD risk
- High vegetable intake was associated with decreased UC risk.

Hou JK et al. American Journal of Gastro 2011;106:563-73.

Dietary Factors and UC

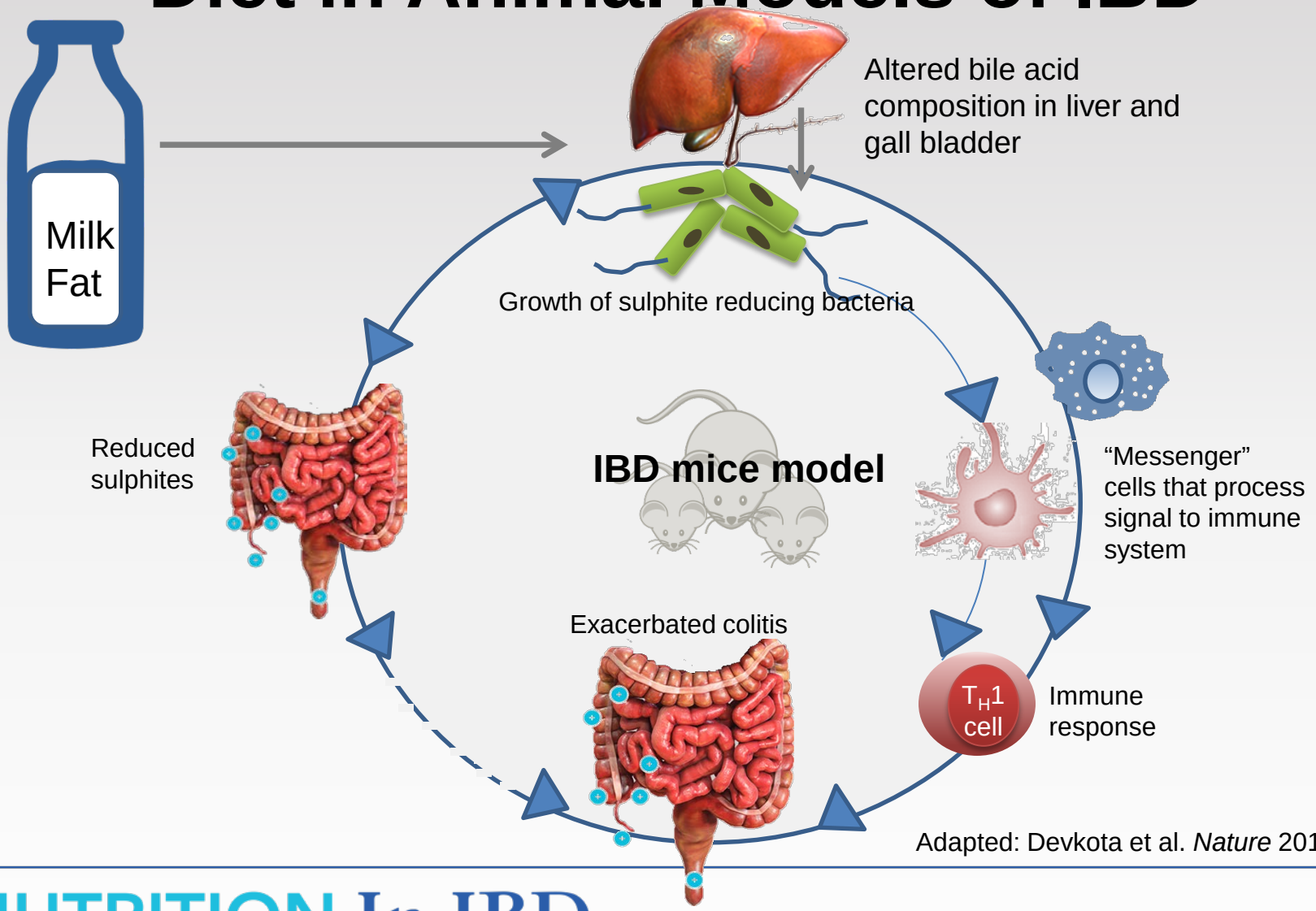
- Study of 191 patients with UC in remission
- Followed over 1 year
- 52% of patients relapsed during this time period
- Consumption of meat, particularly red and processed meat increased the likelihood of relapse

Jowett et al. *Gut*. 2004.

What Do Research Studies say about Diet, Nutrition and IBD?

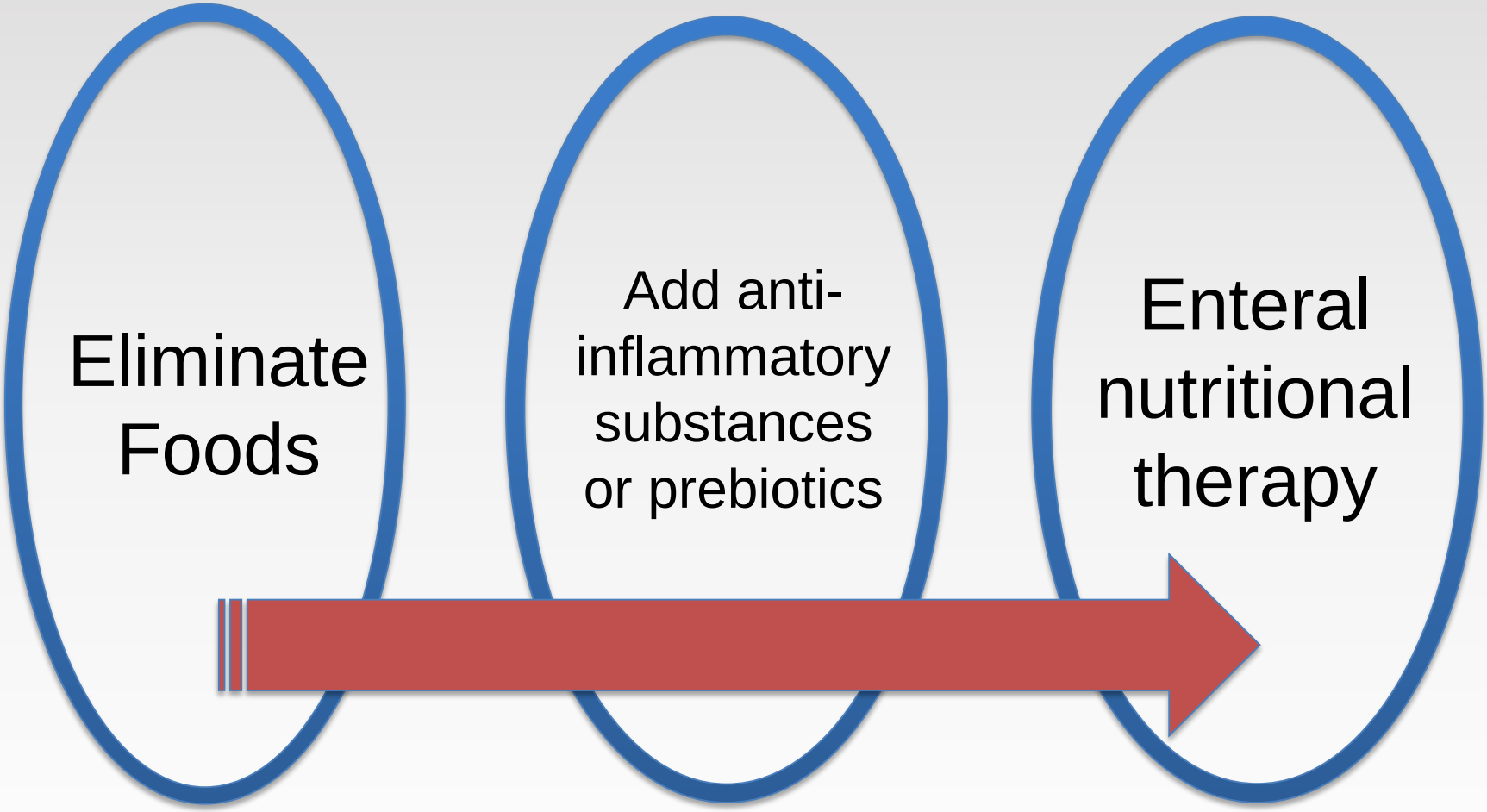
- Limited studies
- Most are small, with anecdotal outcomes
- Diet may have impact (example enteral nutritional therapy), but research needs to show ***how***
  - Effects on immune system?
  - Changes in gut bacteria?

Diet in Animal Models of IBD



Adapted: Devkota et al. *Nature* 2012;487:104

Diet studies in humans with IBD



Enteral Nutritional Therapy For Crohn's Disease (CD)

- A therapy which has been used for almost 4 decades
- Involves the use of a specific enteral formula as nutritional **therapy**
- Formula most often administered through an NG tube
- Exclusive (100% of calories) for a defined period of time versus…
- Partial (80-90% of calories) with the remainder of calories from normal food

Whitten et al. Journal of Digestive Diseases. 2012.

EN Therapy: Traditional Protocol

Induction

- Exclusive enteral nutrition with an elemental, semi-elemental, or polymeric formula
- Duration 4-12 weeks
- Oral or NG tube

Maintenance

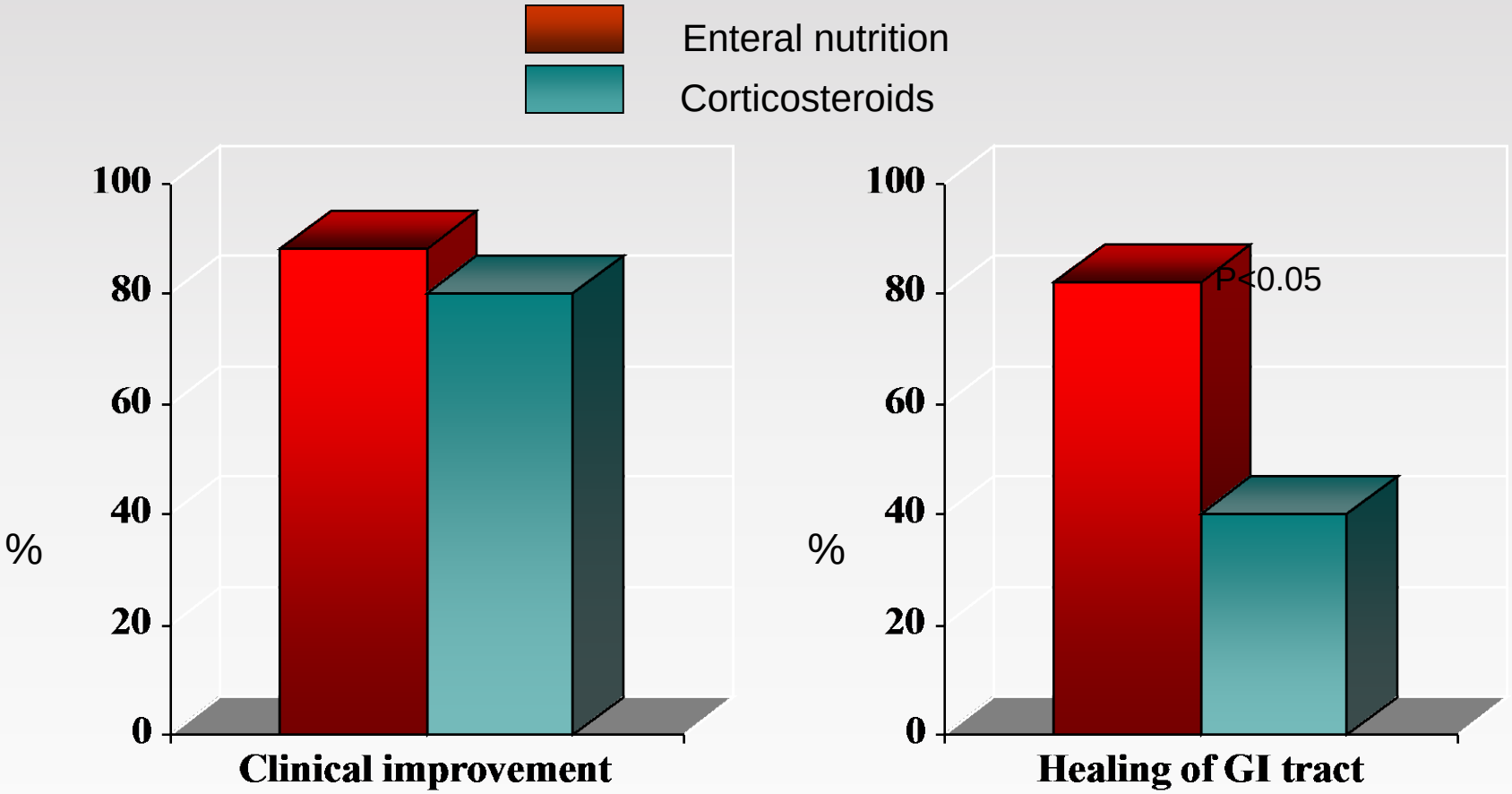
- Repeated 4 week cycles of exclusive enteral nutrition every 3-4 months **OR**
- Transition to medical therapy with an immunomodulator (6-mp, azathioprine, methotrexate)

Polymeric Diet Alone vs. Steroids for Active Pediatric CD (Induction Therapy)

- Methods (n=37)
  - Prospective 10 week randomized controlled open-label trial
  - Newly diagnosed children receive:
    - polymeric formula (n=18) or steroids (n=19)
  - Primary outcomes at 10 weeks
    - Clinical remission (PCDAI≤10)
    - Mucosal healing
      - Decrease in both endoscopic and histologic scores by > 50% when compared to baseline

Borrelli O, et al. *Clin. Gastroenterol. Hepatol.*; 2006

Polymeric Diet Alone vs. Steroids for Active Pediatric CD (Induction Therapy)



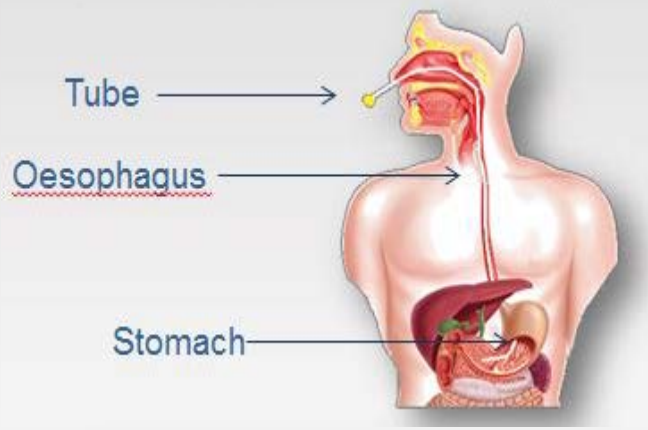
Borrelli O, et al. *Clin. Gastroenterol. Hepatol.*; 2006

Medical Foods

- “A food which is formulated to be consumed or administered enterally under the supervision of a physician and which is intended for the specific dietary management of a disease or condition for which distinctive nutritional requirements, based on recognized scientific principles, are established by medical evaluation.”
- Examples
  - Enteral formulas (EnteraGam, _____)
- Multiple products available that can be tailored to the individual needs of the patient (number of calories, type of protein, type and amount of fat)
- Can be administered as a supplement or as the majority or entirety of a patient’s calories (replace whole food) for enteral nutritional therapy for CD

Is There a Special Diet for IBD?

- **NO**, THERE ARE NO SPECIAL DIETS FOR IBD (Exception: Enteral Nutritional Therapy for Crohn's disease)
  - However, dietary modifications may help with symptoms
- Several diets advertised specifically for managing IBD
- Most have not been proven scientifically and benefits have not been seen in formal studies
- Talk to your doctor about your questions



Can a Semi-vegetarian Diet Prevent Relapse of Crohn's Disease?

- Adult patients with Crohn's disease
- In medically or surgically induced remission
- Only treated with 5-ASA after remission achieved
- All were prescribed semi-vegetarian diet

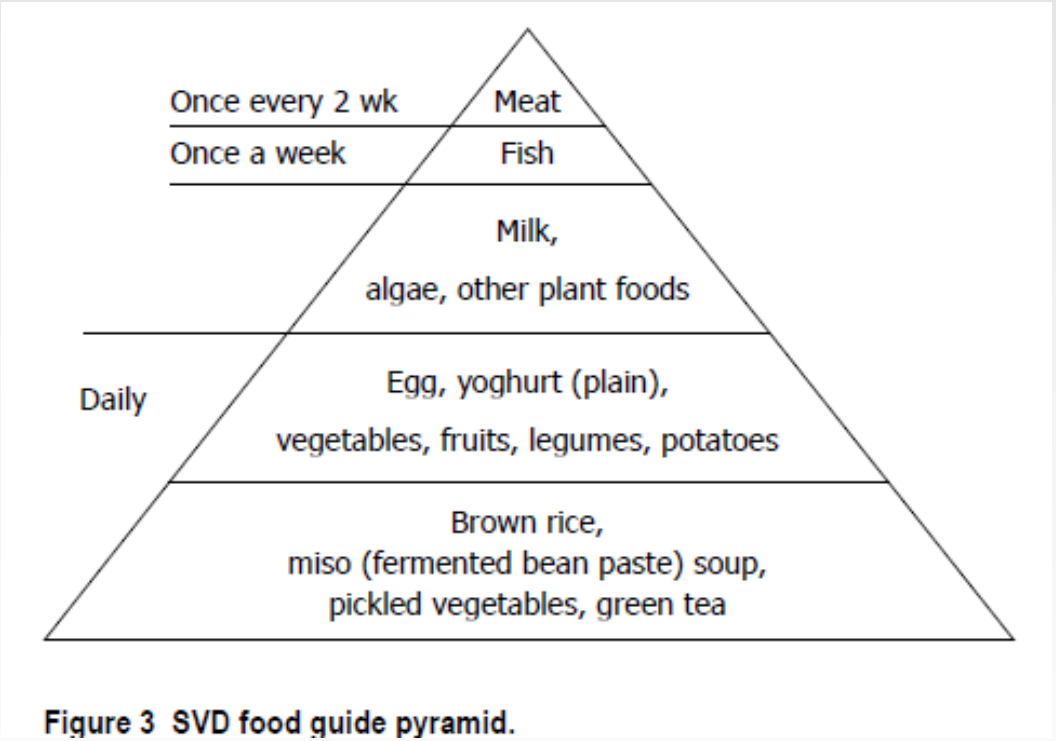
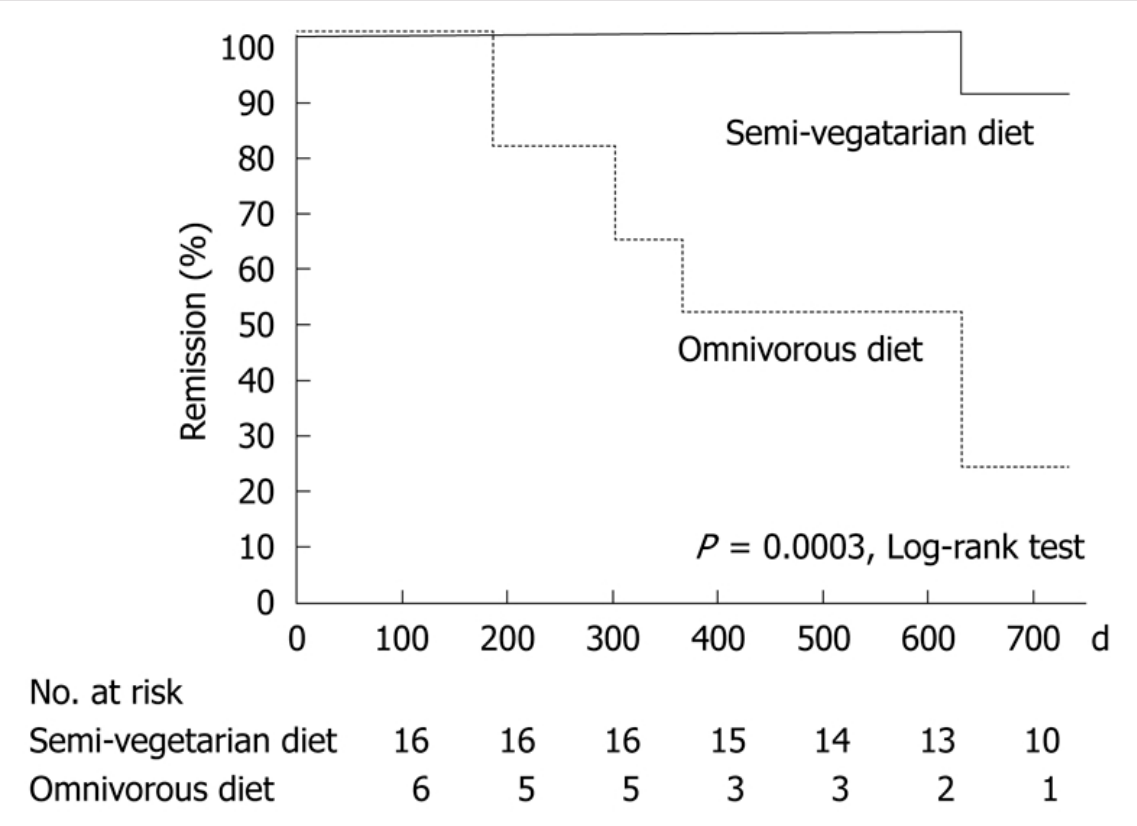


Figure 3 SVD food guide pyramid.

Chiba M, et al. *World J Gastroenterol* 2010

Can a semi-vegetarian diet prevent relapse of Crohn's disease?



Chiba M, et al. World Journal of Gastroenterology 2010;16 (20):2484-95

Partial EN + anti-inflammatory diet

- Sigall-Boneh and colleagues recently found that a combination of partial enteral nutritional therapy and a restricted diet could induce remission and mucosal healing in 70% of patients

Gluten

Dairy products

Gluten-free baked goods

Animal fat

Processed meats

Products containing emulsifiers

Canned goods

All packaged foods

Sigall-Boneh et al. *Inflamm Bowel Dis*. 2014.

Dietary Fiber: Helpful or Harmful?

- Efficacy of dietary fiber was first investigated over 30 years ago
  - Beneficial effects on GI tract function
  - Production of the fiber metabolites short chain fatty acids (butyrate in particular)
- Still today, most IBD patients are advised to reduce fiber consumption
- Systematic review of RCT's by Wedlake and colleagues in 2014 showed no effect of supplementation of dietary fiber in 12 studies on CD, possible weak effect in UC in 3/10 studies
- Importantly, no evidence that fiber intake should be restricted!

Wedlake et al. Inflamm Bowel Dis 2014.

Curcumin and UC

- 50 adult patients with active mild-to-moderate
- Active disease on mesalamine and no response to mesalamine dose adjustment (oral + topical) randomized to receive curcumin capsules (3g/day) or placebo
- Primary outcome: rates of clinical remission and response by clinical disease activity index (SCCAI) at week 4

Lang et al. *Clin Gastro and Hep*. 2015.

Probiotics

What and How	Live microorganisms that may improve th versus bad bacteria, Examples: • E. Coli Nissle 1917 • Lactobacillus	 • Bifidobacterium longum • VSL#3
Studies for application in IBD	**Lactobacillus GG (LGG) in Crohn's**[26] 2002: 45 patients, no benefit 2005: 75 patients, no benefit 2006: 98 patients, no benefit	**Examples in ulcerative colitis**[26] 2004: E. Coli Nissle 1917, 327 patients, benefit 2006: Lactobacillus GG, 187 patients, no benefit 2009: Bifidobacterium longum, 120 patients, benefit
	2009 Study; VSL#3 in UC[27] • 147 patients; Improvement in clinical activity	**2010 Study; VSL#3 in UC**[28] • 144 patients; Improvement in clinical activity
Conclusions	• Promise for induction and maintenance of remission of Ulcerative colitis (less consistency for Crohn's disease) • More large randomized trials needed	

Research on Vitamin D

- Higher levels of Vitamin D are associated with a reduced risk of development of Crohn's disease
- Vitamin D deficiency is common in IBD and is independently associated with lower quality of life and greater disease activity in Crohn's disease
- In a small randomized trial, oral vitamin D replacement reduced the risk of relapse in Crohn's from 29% to 13% (p=0.06)

Ananthakrishnan JK, et al. *Gastroenterology.* 2012;106(4):563-573.
Ulitsky A, et al. *J Parenter Enteral Nutr*. 2011;35(3):308-316.
Jørgensen SP, et al. *Aliment Pharmacol Ther.* 2010;32(3):377-383.

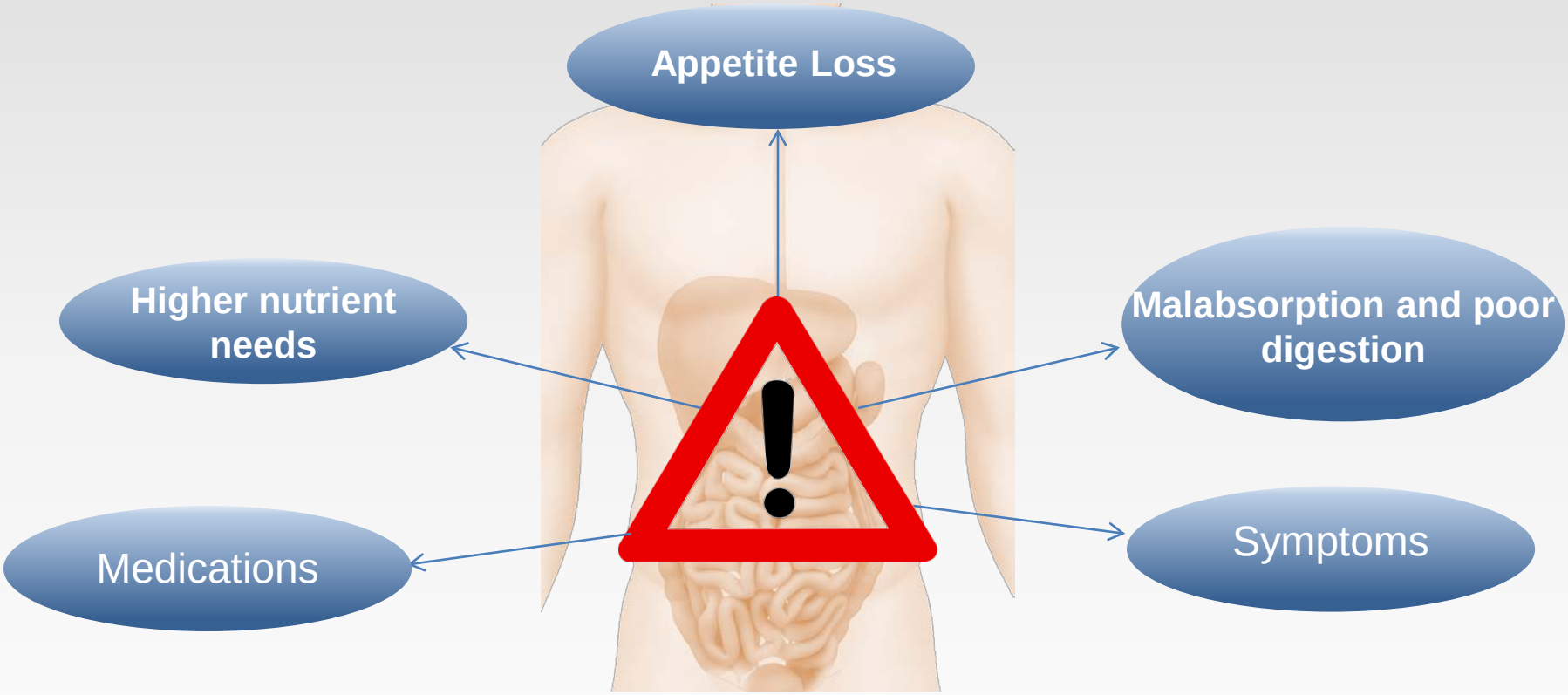
What do I tell my patients?

- Enteral nutritional therapy is an effective therapy for certain patients with IBD
- Other general messages (but not enough data to know for sure!)
  - Red meat in moderation
  - The typical “Western” diet is probably not good.
    - Emulsifiers, preservatives, long shelf life
  - Fiber may be beneficial (fruits, vegetables, whole grains)
  - Less restrictive exclusion diets may be future therapies
  - Maintenance of adequate vitamin D levels

Considering diet in Children with IBD

- Up to 25% of patients with IBD are diagnosed in the pediatric age group
- Children experience more nutritional complications of their disease including:
  - Growth failure
  - Delayed puberty
  - Osteoporosis
  - Anemia
  - Vitamin and mineral deficiencies
- Recommend:
  - Initial assessment by an RD who has experience with IBD patients and follow-up as needed
  - Close monitoring of height velocity, body mass index (BMI), and Tanner Stage (physical pubertal development) with referral to endocrinology if needed
  - Vitamin D monitoring and baseline bone density scan (DEXA)

Risk for Malnutrition



Cimperman, Lisa. Presentation: Nutrition and Inflammatory Bowel Disease: 2013.

Common Nutrient Deficiencies: Ulcerative Colitis

Nutrient	Risk for deficiency
Folate	Sulfasalazine use
Magnesium	Chronic Diarrhea
Iron	GI Bleeding
Potassium	Chronic diarrhea, vomiting and prednidone use

Cimperman, Lisa. Presentation: Nutrition and Inflammatory Bowel Disease: 2013.

Common Nutrient Deficiencies: Crohn's

Nutrient	Risk for deficiency
Vitamin B12	Inflammation or removal of the ileum
Folate	Sulfasalazine use; inflammation or removal of the jejunum and/or ileum
Vitamin A	Fat malabsorption; disease of the duodenum and/or upper jejunum
Magnesium	Inflammation or removal of large portions of the jejunum and ileum, fistula losses, chronic diarrhea
Zinc	Inflammation or removal of jejunum, diarrhea, fistula losses, prednisone use
Calcium	Avoidance of dairy foods, fat malabsorption, prednisone use, inflammation throughout the small intestine
Potassium	Chronic diarrhea, vomiting and prednisone use

Cimperman, Lisa. Presentation: Nutrition and Inflammatory Bowel Disease: 2013.

Food Sources that May Prevent Deficiencies

Nutrient	Food Sources
Vitamin B12	Meat, fish, eggs, dairy products and fortified breakfast cereals
Folate	Fortified cereals, breads and grains, dark leafy greens, avocados
Vitamin A	Yellow or orange fruits/vegetables, fortified milk, cheese, eggs, liver
Magnesium	Dark leafy greens, bananas, avocados, peas and beans, soy products, grains
Zinc	Fortified breakfast cereals, chicken, pork, yogurt
Calcium	Soy or dairy products
Potassium	Most fruits and vegetables – especially oranges, bananas, tomatoes

Cimperman, Lisa. Presentation: Nutrition and Inflammatory Bowel Disease: 2013.

Dietary Supplements

- Discuss all supplements with your doctor and/or dietitian
- Consider taking:
  - Daily multivitamin/mineral supplement
  - Calcium and vitamin D supplement
    - 500 mg elemental calcium 3x a day
    - 800 IU vitamin D daily
- You may also need:
  - Monthly B12 injections (if disease of the ileum)
  - And folate (with sulfasalazine use)

Practical Recommendations for a Healthy Diet

- **Calories**
  - Eat to maintain weight or
  - increase calories by 250-500 calories per day for weight gain
- **Protein**
  - Divide weight (in pounds) in half. Aim for that amount of protein (grams/day)
- **Fluids and Electrolytes**
  - Divide weight (in pounds) in half. Aim for this amount of fluid (ounces/day)
  - Increased needs with diarrhea or after exercise
  - Fluids with electrolytes (sodium, potassium) may be required as well

Whole Grains

- Grains are source of carbohydrates, your body's preferred energy source
- Also a source of fiber, several B vitamins (thiamin, riboflavin, niacin, and folate), and minerals (iron, magnesium, and selenium)
- Most adults need 6-8 ounces of grains per day
  - 1 ounce = 1 slice of bread, 1 cup of ready-to-eat cereal, or ½ cup of cooked rice, cooked pasta, or cooked cereal
- Look for whole grains as the first ingredient listed with at least 3 grams of fiber/serving

Fruits and Vegetables

- A diet rich in fruits and vegetables is associated with reduced risk for heart disease, diabetes, and obesity
- Sources of many nutrients such as fiber, potassium and magnesium, folate, and vitamins A and C
- Aim for 5-9 servings of fruits and vegetables per day
- 1 serving = ½ cup cooked vegetables or 1 cup raw
- Cooked and peeled may be better tolerated

"Take Charge," Crohn's & Colitis Foundation of America, Winter 2006
"Take Charge," Crohn's & Colitis Foundation of America. The Fruit Connection: How Sweet it is! Spring 2006

Sources of Calcium

- Calcium is important for bone health, reducing the risk of osteoporosis, and involved in muscle contraction
- Foods that contain calcium are also sources of vitamin D, phosphorus, potassium, protein
- Choose 3 servings per day
  - 1 serving = 1 cup of milk or yogurt
- Foods to include
  - Skim or 1% milk (lactose free if intolerant)
  - Other low-lactose options include most hard cheeses, yogurt, kefir, cottage cheese, ricotta cheese
  - Alternate milk options: soymilk, almond milk, rice milk

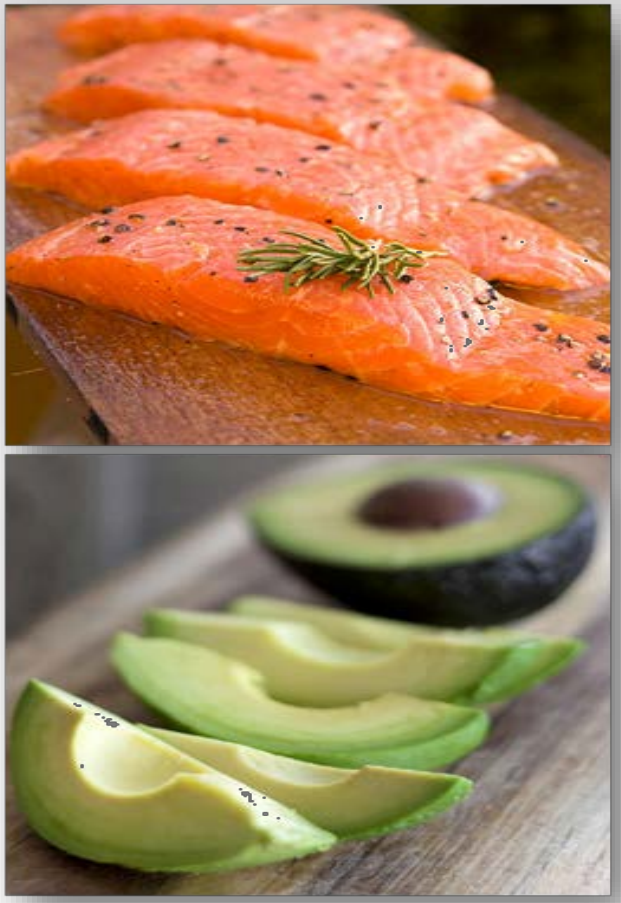
"Take Charge," Crohn's & Colitis Foundation of America. Eating Right: Strategic Nutrition for Healthy Bones. Spring 2007

Protein

- Protein is important nutrient for healing after surgery and building components of immune system
- One egg, an ounce of meat, 1 cup of milk = about 7 grams of protein
- Foods to include: lean meat, low fat dairy, eggs, beans, cheese, nuts/nut butters, vegetarian meat alternatives
- Try to include a source of protein at each meal

Unsaturated Fats

- **Omega 3 Fatty Acids**
  - Salmon
  - Tuna
  - Walnuts
  - Flaxseed oil
  - Fortified foods
- **Omega 3 fatty acid supplement**
  - EPA, DHA (1-3 grams)
- **Monounsaturated Fats**
  - Olive oil
  - Canola oil
  - Nut butters
  - Avocados



"Take Charge," Crohn's & Colitis Foundation of America. Eating Right: The Skinny on Fats, Summer 2006

Potential Problem Foods

- Foods with added soluble fiber
- Artificial sweeteners and sugar alcohols
- Dairy products
- High-fat, greasy foods
- Spicy foods
- Cruciferous vegetables like broccoli, cauliflower, cabbage

Cimperman, Lisa. Presentation: Nutrition and Inflammatory Bowel Disease: 2013.

Potential Foods to Include During or After a Flare

- Diluted juices
- Applesauce
- Canned fruit without added sugar
- Oatmeal, cream of wheat
- Plain chicken, turkey, or fish
- Cooked eggs or egg substitute
- Mashed potatoes, rice, or noodles
- White bread

Cimperman, Lisa. Presentation: Nutrition and Inflammatory Bowel Disease: 2013.

Examples of Popular Diets

Specific Carbohydrate Diet™ • Exclude starchy vegetables and grain	**Concerns**: restrictive, can eliminate dietary sources of short-chain fatty acids (SCFA)- preferred source of colon cells
Low FODMAP Diet **F** = Fermentable (Gas producing) **O** = Oligosaccharides (fuctans and galacto-oligosaccharides) **D** = Disaccharides (lactose) **M** = Monosaccharide; (fructose) **A** = and **P** = Polyols (sorbitol and mannitol)	**Concerns:** requires careful label reading; talk to a dietician for complete nutritional needs
Atkins™ • Emphasizes meat, eggs, cheese • Limits grains, fruits, vegetables, dairy products	**Concerns:** electrolyte abnormalities, dehydration, constipation; diets high in red meat associated with increased risk of colon and prostate cancer; low fiber associated with heart disease, stroke, diverticulitis, cancer

"Take Charge," Crohn's & Colitis Foundation of America. The Specific Carbohydrate Diet: Does it Work? Summer 2005.

Examples of Popular Diets

Paleo • Eliminates refined sugar, dairy, legumes, and grains • Allows meat, fish, poultry, fruits, and vegetables	**Concerns:** limits nutrient-dense foods like carrots, watermelon
South Beach Diet® • Limits disease-causing saturated fats	**Concerns:** limits nutrient-dense foods like carrots, watermelon, bananas, and pineapple; menus average ~1200 calories per day
Weight Watchers • Sound approach for weight loss • Focus on increasing nutrient-dense/low-calorie foods • Portion control	**Concerns:** Specific needs and intolerances of IBD patients not identified

Note on Popular Diets

- No specific diet has been proven to control symptoms of IBD
- Many options exist and are promoted on the internet but…
  - Few well-controlled published studies
  - Can be difficult and complicated to follow
  - Potentially risky – restrictions may lead to poor growth, poor healing, and/or nutrient deficiencies

Cimperman, Lisa. Presentation: Nutrition and Inflammatory Bowel Disease: 2013.

Restaurant Meals

- Check menus online and read descriptions carefully
- Ask for clarification of ingredients and don't be afraid to make special requests!
- Know your trigger foods
- Select restaurants and menu options you've enjoyed
- Keep snacks handy
- Watch for hidden fat
  - Sauces, crispy dishes
- Try steamed or broiled seafood, or grilled chicken
- Ask for sauces and salad dressing on the side
- Divide the food on your plate in half and eat slowly

Restaurant Meals

- Limit caffeinated beverages and alcohol
  - Can irritate the GI tract and move food through more quickly
- Alcohol interacts with many medications
  - Discuss potential interactions with your physician and pharmacist
- Choose water, sparkling water, unsweetened green tea, diluted juice

"Take Charge," Crohn's & Colitis Foundation of America. Drink to Your Health? Fall 2005.

Holidays and Celebrations

- Know your limits!
- Stick to your normal eating habits as much as possible
- Keep portions small; eat smaller, more frequent meals
- Keep track of new foods and symptoms
- Inform family and friends
- Bring a dish you know you can eat

"Take Charge," Crohn's & Colitis Foundation of America, 2006 Issue

Importance of a GI/Dietitian Team

- Work together to identify factors for nutrient loss and recommended replacement
- Optimized nutrition can improve healing, particularly after surgery
- Make healthy nutritional changes to complement medical therapies

IBD Management: Overall Picture

- IBD treated through a variety of treatment approaches
- Good nutrition does not replace conventional medical and surgical therapies for IBD
- Complementary approaches can help with symptom relief, but talk to your doctor before taking any alternative therapies

References

- Ananthakrishnan JK, et al. *Gastroenterology.* 2012;106(4):563-573.
- Cimperman, Lisa. Presentation: Nutrition and Inflammatory Bowel Disease: 2013.
- Cohen AB, et al. *Dig Dis Sci.* Aug 2012. Epub ahead of print.
- Hou JK, et al. *American Journal of Gastroenterology.* 2011;106:563-573.
- Jørgensen SP, et al. *Aliment Pharmacol Ther.* 2010;32(3):377-383.
- "Take Charge," Crohn's & Colitis Foundation of America. 2005-2013.
- Ulitsky A, et al. *J Parenter Enteral Nutr*. 2011;35(3):308-316.
- Wu, Gary. Presentation: Diet, the Gut Microbiome, and the Metabolome in IBD: Potential Therapeutic Targets and Vision for the Future.
- Zallot C, et al. *Inflamm Bowel Dis.* 2013;19(1):66-72.

Additional Resources

- Academy of Nutrition and Dietetics - www.eatright.org
  - "Find a Registered Dietitian"
  - "Public" link for nutrition and health information
- Other resources for nutrition information
  - General healthy eating - www.choosemyplate.gov
  - IBD-specific information - www.ccfa.org
  - Online tool and iPhone app for tracking diet - www.ccfa.org/gibuddy
- CCFA Bookstore for more information: http://www.ezpromostore.com/ccfaretail/bookstore
- Get your full course

QUESTIONS AND ANSWERS

CCFA Resources

- Irwin M. and Suzanne R. Rosenthal IBD Help Center
  M-F, 9:00 AM-5:00 PM ET
  - Phone: 1-888-694-8872
  - Email: info@ccfa.org
- Educational webcasts: www.ccfa.org/resources/webcasts.html
- Connect with other patients
  - CCFA Community website: www.ccfacommunity.org
  - Support groups and Power of Two (peer mentors):
  - www.ccfa.org/chapters
- GI Buddy: online tracking tool and mobile app www.ccfa.org/gibuddy
- Local educational events, visit: www.ccfa.org

CCFA Partners

- Registry of patient-reported outcomes
- Available for pediatric and adult patients

www.ccfapartners.org