• www.aapainmanage.org
• Oct 19-22\textsuperscript{nd}, 2017 San Diego
Nutrition in Pain Management

14th Annual Natural Supplements Conference
## Faculty Disclosure

<table>
<thead>
<tr>
<th>Affiliation</th>
<th>Company</th>
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</thead>
<tbody>
<tr>
<td>Royalties/Honoraria</td>
<td>Oxford University Press (Integrative Pain Management Textbook)</td>
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<td>Lippincott (HERBAL Guide Book)</td>
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<td>Elsevier (PracticeUpdate.com)</td>
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<td>Consultant</td>
<td>American Specialty Health</td>
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<tr>
<td></td>
<td>Thorne</td>
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<td>Metagenics</td>
</tr>
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Pre-Meeting Special Sessions

Eating for Healing: Evidence-Based Nutrition, Supplements, and Lifestyle Choices for Pain Patients (6 credits)

- Robert Bonakdar, MD
- Nancy Cotter MD
- Bryan A. White PhD
- Vic Sierpina, MD

AAPM / AIPM Conference
San Antonio September, 2016

www.aapainmanage.org
Oct 19-22nd, 2017 San Diego
Schedule

• Introduction: *Why We Need to Talk Nutrition to Those in Pain?*

• The Role of Functional Nutritional Testing and their role in promoting an Anti-inflammatory Diet  Nancy Cotter MD

• How Does the American Diet Cause Inflammation & Pain? Results of Human Trials Paul J. Mills, PhD

• Role of Microbiome and DNA testing in Pain Management (Interstitial Cystitis / Pelvic Pain) Bryan A. White PhD
Nutritional Support:

• Role of Supplements in the Nutrition Armamentarium (Arthritis) Vic Sierpina, MD
• Headache/Nerve pain
• IBS Vic Sierpina MD
• Low Back Pain Nancy Cotter MD
• Nutrition in Pain Hot Topics, including:
  – Future Microbiome, Nutrition near Surgery..
  – Q/A
Objectives

1. Discuss how nutrition is viewed in pain management as compared to other chronic disease / metabolic states
2. Review how to optimally view nutrition
3. Discuss the research and implementation for nutritional strategies for pain mgmt
Why We Need to Talk Nutrition to Those in Pain?

Robert A. Bonakdar, MD FAAFP
Director of Pain Management
Scripps Center for Integrative Medicine

Assistant Clinical Professor (Voluntary)
University of California,
San Diego, School of Medicine
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**Elsevier**  
(\textit{PracticeUpdate.com}) |
| Consultant        | **McNeil Consumer Health**  
**Thorne**  
**Metagenics**   |
Overview Why We Need to Talk Nutrition to Those in Pain?

• Assess the current use & discussion of nutrition in pain management
• Review HOW diet can impact pain
• Provide examples of HOW TO POSITIVELY influence pain
  – Practical alternative to the Standard Alternative Diet (SAD) for pain
• Lead into in-depth discussion by our panelists
“Let food be thy medicine …”

Mark Lucock ends his review of the science of folic acid by quoting Hippocrates: “Let food be thy medicine and medicine be thy food” (p 211). Although many patients are convinced of the importance of food in both causing and relieving their problems, many doctors’ knowledge of nutrition is rudimentary. Most feel much more comfortable with drugs than foods, and the “food as medicine” philosophy of Hippocrates has been largely neglected.
Bell RF. Food and pain: Should we be more interested in what our patients eat? Pain. 2007 May;129(1-2):5-7.

The State of the Plate

Diet → Pain

The State of the Plate...
A P I E T H A T S ’ S H A R D T O S W A L L O W

U.S. FOOD CONSUMPTION AS A % OF CALORIES

PLANT FOOD:
Vegetables, Fruits, Legumes, Nuts & Seeds, Whole Grains
Fiber is found only in plant foods.

NOTE: Up to half of this category may be processed, for example almonds in candy bars, apples in apple pies or spinach in frozen spinach souffle, and of course these would not be healthy choices. The focus should be on whole unprocessed vegetables, fruits, legumes, nuts and seeds and whole grains.

ANIMAL FOOD:
Meat, Dairy, Eggs, Fish, Seafood
Cholesterol is found only in animal foods. Animal foods are the PRIMARY source of saturated fat.

GUIDE TO HEALTHY EATING:
Much easier to understand than the USDA Food Pyramid, with no food industry influence.

Eat LESS from the animal and processed food groups and MORE whole foods from the plant food group.

In general, food from the animal and processed food group contribute to disease, while WHOLE foods from the plant group contribute to good health.


New York Coalition for Healthy School Food * www.healthychoolfood.org

Special thanks to Joel Fuhrman, MD, author of Disease Proof Your Child: Feeding Kids Right * Graphics by MichelleLanda.com
Research shows typical American diet can worsen chronic pain

16 December 2015, by Katherine Shonesy

- TWD = Total Western Diet
- exposure to poor diet quality resulted in altered acute nociceptive sensitivity, systemic inflammation, and persistent pain…

### SAD

<table>
<thead>
<tr>
<th>SAD</th>
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<tbody>
<tr>
<td><strong>Low Fruits/Vegetables</strong></td>
</tr>
<tr>
<td><strong>Lo Fiber / Lo pre/probiotics &gt; lo diversity</strong></td>
</tr>
<tr>
<td><strong>Hi processed (refined)</strong></td>
</tr>
<tr>
<td><strong>Hi additives / preservatives (allergens)</strong></td>
</tr>
<tr>
<td><strong>Inflammatory Fats / Glycation products</strong></td>
</tr>
<tr>
<td><strong>Mindlessly</strong></td>
</tr>
<tr>
<td><strong>Super Sized</strong>: Hi calorie / Hi glycemic</td>
</tr>
<tr>
<td><strong>Mindlessly</strong>: Prepared and consumed</td>
</tr>
<tr>
<td><strong>Eating on the GO! / Fast food</strong></td>
</tr>
<tr>
<td><strong>Hi caffeine / Hi ETOH</strong></td>
</tr>
<tr>
<td><strong>Deficiency Prone</strong></td>
</tr>
</tbody>
</table>
Diet ➔ Inflammation ➔ Pain
• Significant associations between... systemic inflammation (CRP) and LBP

• Specifically, those with ↑ CRP levels have nearly twice the odds of reporting LBP

• ↑ hsCRP associated with
• ↑ levels of pain intensity or
• ↑ pain interference
Diet → Inflammation → Pain
<table>
<thead>
<tr>
<th>Microbiome</th>
<th>Immune</th>
<th>Genetic</th>
<th>Deficiency</th>
<th>Anti-Oxidant / Mitochondrial</th>
<th>Obesity</th>
</tr>
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<tbody>
<tr>
<td>Inflammation</td>
<td></td>
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</tbody>
</table>
Impact of lifestyle and diet on gut bacterial communities across geographically and culturally diverse human populations

Westernization

- Prevotellaceae
- Treponema
- Clostridiaceae
- Vitamins
- Amino acids
- Virulence

Traditional

- Carbohydrates
- Xenobiotics

Industrialized

BaAka pygmies
Rainforest hunter-gatherers

Bantu
Agricultural

US Americans
Western diet

Gomez et al./Cell Reports 2016
Westernization is associated with a loss of microbial diversity including organisms able to ferment fiber-rich dietary components.

“westernized diet shifted microbiota structure within 1 day”
• Patients with CPP have significantly less gut microbiome diversity.

• IBS: dysbiosis ... characterised by a reduction in species of Bifidobacteria ... associated with worse symptom profile.
Diamine Oxidase (DO)

- 25% of population low in DO
- ~87% of HA sufferers

Mast cell secretion

HISTAMINE

Central nervous system

Heart

Vasodilatation

Neurotransmitter release

Regulation of hematopoiesis

H1, H2, H3, H4

cGMP, cAMP

Gastrointestinal system

Cardiovascular system

Skin

Respiratory tract

Uterus

Gastric acid secretion

Smooth muscle constriction

Endothelial permeability

Mucous secretion

Stimulation of nociceptive nerve fibres

Tachycardia, arrhythmias

H1, H1/2

Pruritus

Flush

Urticaria

Vertigo

Hypotonia, Hypertension

Anaphylaxia

Arrhythmia

Dysmenorrhea

Concentration of the nose, rhinorrhea, sneezing

Bronchoconstriction, dyspnea

Stomach ache, cramps

Meteorism

Contribution to the regulation of body temperature, food intake, locomotion, learning, memory

Leukocytes
• Immune reaction can affect the brain and cause microglial hypersensitivity and central sensitization

• …this may result from persistent activation of mast cells and neurogenic inflammation
Epigenetics and the Transition from Acute to Chronic Pain

Twin A: Early Epigenome A → Environment A → Late Epigenome A → No Pain

Twin B: Early Epigenome B → Environment B → Late Epigenome B → Pain

Folate Methionine Betaine Choline
Serum concentration of magnesium as an independent risk factor in migraine attacks: a matched case-control study and review of the literature

**Odds of migraine** 35.3X when magnesium was below normal

**Low Magnesium migraine** ↑ CRP

**Magnesium Deficiency**

**Pain (migraine)**

**Inflammation**

NLRP3 Inflammasome Is Activated in Fibromyalgia: The Effect of Coenzyme Q₁₀

CDC study: Americans' bellies are expanding fast

BY LINDSEY TANNER - AP MEDICAL WRITER
09/16/2014 10:05 PM | Updated: 09/16/2014 10:05 PM

Obesity-related pain: Time for a new approach that targets systemic inflammation

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Inflammation
Diet → Pain
Diet → Inflammation → Pain
## S.A.D to GLAD

<table>
<thead>
<tr>
<th>SAD</th>
<th>GLAD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Fruits/Vegetables</strong></td>
<td><strong>Hi Polyphenol / Hi Micronutrient diet</strong></td>
</tr>
<tr>
<td><strong>Lo Fiber / Lo pre/probiotics &gt; lo diversity</strong></td>
<td><strong>Hi fiber Hi pre/probiotics → Hi Diversity</strong></td>
</tr>
<tr>
<td><strong>Hi processed (refined)</strong></td>
<td><strong>Fresh / minimally processed</strong></td>
</tr>
<tr>
<td><strong>Hi additives / preservatives (allergens)</strong></td>
<td><strong>Lo additives / preservatives</strong></td>
</tr>
<tr>
<td><strong>Inflammatory Fats / Glycation products</strong></td>
<td><strong>Healthy Fats / Healthy preparation</strong></td>
</tr>
<tr>
<td><strong>Mindlessly</strong></td>
<td><strong>Mindfully</strong></td>
</tr>
<tr>
<td><strong>Super Sized: Hi calorie / Hi glycemic</strong></td>
<td><strong>Sized: Lo GI / GL Diet</strong></td>
</tr>
<tr>
<td><strong>Mindlessly: Prepared and consumed</strong></td>
<td><strong>Mindfully Prepared and Consumed</strong></td>
</tr>
<tr>
<td><strong>Eating on the GO! / Fast food</strong></td>
<td><strong>Little to none</strong></td>
</tr>
<tr>
<td><strong>Hi caffeine / Hi ETOH</strong></td>
<td><strong>Individualized nutrients: Vitamin D, Omega-3, Probiotic, Coq10</strong></td>
</tr>
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Pain & Food

• back pain correlates with activity in ventral striatum (VS) & medial prefrontal cortex (mPFC)

• VS and mPFC also known to mediate the palatability & hedonic value of food

Mindful Eating & Portion Control

• Higher amounts of food, especially high fat & carbs (typically unhealthy) at the detriment of other foods

• How has your diet changes since you started having (when you are in) pain?
Mindful Eating & Rate of Eating Ready Set… EAT!

- What we know: Faster eating, especially in obese → ↑ calories → ↑ inflamm. (GL)
- Faster eating (<15 min to complete meal) associated with ↑ interleukin-1β IL-6 even after accounting for caloric intake & BMI
- Faster eating ↑ odds ratios for high glucose and low HDL-cholesterol levels in males, even after adjusting for BMI


Eating rate is associated with cardiometabolic risk factors in Korean adults
Lee, K.S. et al. Nutrition, Metabolism and Cardiovascular Diseases, Volume 23, Issue 7, 635 - 641
## Polyphenols

**Anti-oxidant / Anti-inflammatory**

<table>
<thead>
<tr>
<th>Food</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>Provide polyphenols</td>
</tr>
<tr>
<td>Blackberries</td>
<td>High levels of anthocyanins</td>
</tr>
<tr>
<td>Black tea</td>
<td>Theaflavins</td>
</tr>
<tr>
<td>Blueberries</td>
<td>High levels of anthocyanins</td>
</tr>
<tr>
<td>Broccoli</td>
<td>A range of health-giving polyphenols</td>
</tr>
<tr>
<td>Cereal bran</td>
<td>High in fibre and phenolic acids</td>
</tr>
<tr>
<td>Cherries</td>
<td>Contain antioxidant anthocyanins</td>
</tr>
<tr>
<td>Cherry tomatoes</td>
<td>High levels of quercatin</td>
</tr>
<tr>
<td>Coffee</td>
<td>Phenolic acids</td>
</tr>
<tr>
<td>Cranberries</td>
<td>Procyanadnin, which can prevent infections</td>
</tr>
<tr>
<td>Dark chocolate</td>
<td>Cocoa contains epicatechin</td>
</tr>
<tr>
<td>Green tea</td>
<td>Polyphenols</td>
</tr>
<tr>
<td>Oranges</td>
<td>Contain hesperedin, which aids a healthy heart</td>
</tr>
<tr>
<td>Peaches</td>
<td>Contain epicatechin and phenolic acids</td>
</tr>
<tr>
<td>Plums</td>
<td>Similar role to peaches</td>
</tr>
<tr>
<td>Raspberries</td>
<td>Contain anthocyanins</td>
</tr>
<tr>
<td>Red grapes</td>
<td>Anthocyanins and phenolic acids</td>
</tr>
<tr>
<td>Red onions</td>
<td>High levels of cancer-fighting quercatin</td>
</tr>
<tr>
<td>Spinach</td>
<td>Polyphenols</td>
</tr>
<tr>
<td>Strawberries</td>
<td>Contain anthocyanins and ellagic acid</td>
</tr>
</tbody>
</table>

[www.EWG.org](http://www.EWG.org)

• **diallyl disulphide**, a compound found in garlic and other alliums, represses the expression of matrix-degrading proteases, providing a potential mechanism of action.
Kaempferol, a dietary flavonoid, ameliorates acute inflammatory and nociceptive symptoms in gastritis, pancreatitis, and abdominal pain.

- **Kaempferol (KF) is the most abundant polyphenol in tea, fruits, vegetables, and beans.**
low-GL diets influence two critical mechanisms linked to adverse health outcomes: inflammation and synthesis of adipose-derived peptides.

low-GL diet decreased serum hs-CRP concentrations and tended to increase serum adiponectin concentrations.
• While plasma kynurenate was ~40% higher after the LGL diet compared with the HGL diet, its precursor, tryptophan, was not appreciably altered.
Kynurenic and Quinolonic Acids Bind to NMDA Receptors

- KYNA is NMDA receptor antagonist
- QUIN is NMDA receptor agonist

Quinolinic acid, the inescapable neurotoxin

<table>
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</tr>
<tr>
<td>Obesity</td>
</tr>
</tbody>
</table>
Foods can have deleterious effects for patients with IBD. …

• certain nutrients can reduce intestinal inflammation
Dietary intervention impact on gut microbial gene richness

• low glycemic index carbohydrates & soluble fiber (increased consumption of fruits and vegetable) … associated with high bacterial richness.

A Diet Low in FODMAPs Reduces Symptoms of Irritable Bowel Syndrome

• Shift in microbiota occurs within 1 day …
A low fermentable oligo-di-mono saccharides and polyols (FODMAP) diet reduced pain and improved daily life in fibromyalgia patients

- 4 mo. on FODMAP
- 70% had IBS symptoms
- Significant ($p < 0.01$) declines in scores in VAS, FSQ, and RFIQ scores, in all domains measured.
- 50% reduction in IBS symptoms
## Symptoms of Non-celiac Gluten Sensitivity.

<table>
<thead>
<tr>
<th>Category</th>
<th>Symptom</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intestinal</strong></td>
<td>Abdominal pain</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>Diarrhea</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>Nausea</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight loss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bloating, flatulence</td>
<td></td>
</tr>
<tr>
<td><strong>Cutaneous</strong></td>
<td>Erythema</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>Eczema</td>
<td></td>
</tr>
<tr>
<td><strong>General</strong></td>
<td>Headache</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Bone and joint pain</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Muscle contractures</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Numbness of hands and feet</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Chronic tiredness</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Behavioral</strong></td>
<td>Attention deficit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depression</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>Hyperactivity</td>
<td></td>
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</tbody>
</table>
FMS occurs in 20 - 32% of those IBS
IBS 32-70% of those with FMS
LE 16% of those IBS, and 56% IBS+FMS
GFD: + Marsh stage 1 group: 26 to 29% ↓ in the TPs, FIQ, HAQ and VAS scales
27% in the SF-36 scores
Marsh stage 0 group: the GFD ~ 3% improvement
• 24 wks of GF or 1500 cal/day diet
• Both diets associated with similar beneficial outcomes in reducing gluten sensitivity symptoms and FMS
• Sig drop in FIQ:
  – 54% of GFD group; 37.5% HCD group.
• *However, despite its specificity, GFD was not superior to HCD in reducing the number of gluten sensitivity symptoms or secondary outcomes.*
Venturing into an elimination diet...

<table>
<thead>
<tr>
<th>Foods suitable on a low-FODMAP diet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>fruit</strong></td>
</tr>
<tr>
<td>banana, blueberry, boysenberry, cantaloupe, cranberry, durian, grape, grapefruit, honeydew melon, kiwifruit, lemon, lime, mandarin, orange, passionfruit, pawpaw, raspberry, rhubarb, rockmelon, star anise, strawberry, tangelo</td>
</tr>
<tr>
<td>Note: if fruit is dried, eat in small quantities</td>
</tr>
<tr>
<td><strong>vegetables</strong></td>
</tr>
<tr>
<td>alfalfa, bamboo shoots, bean shoots, bok choy, carrot, celery, choko, choy sum, endive, ginger, green beans, lettuce, olives, parsnip, potato, pumpkin, red capsicum (bell pepper), silver beet, spinach, squash, swede, sweet potato, taro, tomato, turnip, yam, zucchini</td>
</tr>
<tr>
<td><strong>herbs</strong></td>
</tr>
<tr>
<td>basil, chili, coriander, ginger, lemongrass, marjoram, mint, oregano, parsley, rosemary, thyme</td>
</tr>
<tr>
<td><strong>grain foods</strong></td>
</tr>
<tr>
<td>cereals</td>
</tr>
<tr>
<td>gluten-free bread or cereal products</td>
</tr>
<tr>
<td>bread</td>
</tr>
<tr>
<td>100% spelt bread</td>
</tr>
<tr>
<td><strong>milk products</strong></td>
</tr>
<tr>
<td>milk</td>
</tr>
<tr>
<td>lactose-free milk*, oat milk*, rice milk*, soy milk*</td>
</tr>
<tr>
<td>check for additives</td>
</tr>
<tr>
<td><strong>other</strong></td>
</tr>
<tr>
<td>tofu</td>
</tr>
<tr>
<td>sweeteners</td>
</tr>
<tr>
<td>sugar (sucrose), glucose, artificial sweeteners not ending in 'ol'</td>
</tr>
<tr>
<td><strong>honey substitutes</strong></td>
</tr>
<tr>
<td>golden syrup*, maple syrup*, molasses, treacle</td>
</tr>
<tr>
<td>small quantities</td>
</tr>
<tr>
<td><strong>ice-cream substitutes</strong></td>
</tr>
<tr>
<td>gelati, sorbet</td>
</tr>
<tr>
<td><strong>butter substitutes</strong></td>
</tr>
<tr>
<td>olive oil</td>
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</tbody>
</table>
Individual Dietary Shifts

• Symptoms relief and ease of diet often translate into compliance
  – Patients with GI sx, HI GI diets…
• Consider allergy testing… not absolute
• Meal planning with nutritionist
• Watch the pendulum swing of foods…
• Big picture: reduced excess calories and eating mindfully is a big start
• Not a 100% cure
Anti-inflammatory effects of bifidobacteria by inhibition of LPS-induced NF-κB activation

Christian U Riedel, Franziska Riede, Reto Thach, Nils Scharf, Laetitia Czerny, Elisabeth Schirmer, Stephanie Blum
Probiotic supplementation improves inflammatory status in patients with rheumatoid arthritis

- RDBPCT N=46 subjects with RA
- 10(8) CFU of L. casei x 8 wk. vs placebo
- Well tolerated; Sig decreased DAS, TNF-α, IL-6, & IL-12 vs placebo
- Further studies are warranted to confirm these results, and such confirmation may lead to the introduction of probiotics as adjunctive therapy for this population.
Deficiency

Rapid Resolution of Chronic Back Pain with Magnesium Glycinate in a Pediatric Patient

Christine Lamontagne1*, John A Sewell2, Régis Vaillancourt2 and Cyrus Kuhzarani3,4

Magnesium supplementation, metabolic and inflammatory markers, and global genomic and proteomic profiling: a randomized, double-blind, controlled, crossover trial in overweight individuals1–3
Oxidative Stress Correlates with Headache Symptoms in Fibromyalgia: Coenzyme Q₁₀ Effect on Clinical Improvement

Coq10 able to improve energy production and reduce pain by >50%
Obesity and Pain Are Associated in the United States

Arthur A. Stone¹ and Joan E. Broderick¹

FIGURE 1: Odds ratios for “pain yesterday” for BMI classifications* by gender and age group¹⁶

FIGURE 2: Obesity-related pain: A proposed framework related to systemic inflammation

**Inflammatory mediators**
- Cytokines and adipokines (secreted by adipocytes)
  - IL-1, IL-6, IL-8
  - TNF-α
  - Leptin
  - Adiponectin
  - Resistin
- Acute-phase proteins
  - C-reactive protein
- Cardiometabolic mediators
  - Insulin
  - Glucose
  - Low-density lipoproteins
  - Triglycerides
  - Plasminogen activator inhibitor-1 (PAI-1)
- Deficiency states
  - Vitamin D
  - Testosterone

**Systemic Inflammation**

**Comorbid conditions**
- Depression
- Insomnia
- Sleep apnea
- Fatigue
- Physical deconditioning
- Mechanical overload
- Mal-alignment

**Baseline characteristics**
- Genetic predisposition
- Environmental factors:
  - Trauma
  - Stress
  - Diet
  - Activity
  - Family dynamics/coping

**Pain**

**Obesity*"
The IDEA Trial 18 Month randomized trial of 450 osteoarthritis subjects to: Diet Exercise or Combination

A 5% weight loss = 30% reduction in pain
24% improvement in function
Inhibitors of Microglial Neurotoxicity: Focus on Natural Products

Curcumin: a new paradigm and therapeutic opportunity for the treatment of osteoarthritis: curcumin for osteoarthritis management

Yves Henrotin¹,²*, Fabian Priem³ and Ali Mobasher⁴

Comparative evaluation of the pain-relieving properties of a lecithinized formulation of curcumin (Meriva®, nimesulide, and acetaminophen

A Randomized, Pilot Study to Assess the Efficacy and Safety of Curcumin in Patients with Active Rheumatoid Arthritis

• 8 RCTs
• These RCTs provide scientific evidence that supports the efficacy of turmeric extract (about 1000 mg/day of curcumin) in the treatment of arthritis.
Lipid Mediators and Pain Signaling

Unsaturated Fatty Acids and Pain

Hypothalamus

β-Endorphin

GPR40, GPR120

DHA

μ Opioid receptor

Cell membrane

Signal transduction

Antinociception
A protein-enriched low glycemic index diet with omega-3 polyunsaturated fatty acid supplementation exerts beneficial effects on metabolic control in type 2 diabetes

• …a protein enriched & low glycemic index diet supplemented with long-chain omega-3 PUFA in a real-life clinical setting improves glycemic control and also reduces waist circumference and silent inflammation…
Many of the anti-inflammatory effects of the MDP are linked to the intake of foods that are rich in PUFAs with a lower n-6 to n-3 fatty acid ratio and extra-virgin olive oil which, with its high content of MUFAs and non-fat micro-components such as phenolic compounds, has been found to have important anti-inflammatory effects ...
A pilot study of a Mediterranean-type diet intervention in female patients with rheumatoid arthritis living in areas of social deprivation in Glasgow

- 130 females with RA 6 week intervention
- Active = cooking classes: cnt: written info
- Sig. ↑ in fruit, vegetable, legume unsat. fat
- Significant benefit vs controls for
  - pain score at 3 and 6 months
  - early morning stiffness at 6 months
  - Health Assessment Questionnaire
- Cost effective
ANTI-INFLAMMATORY FOODS/FOOD COMPOUNDS*

- GARLIC
- FIBER
- CAROTENOIDs
- OMEGA-3 FATTY ACIDS
- TURMERIC
- FLAVONOIDS
- TEA
- GINGER
- MAGNESIUM

LIMIT

- Inflammatory foods
  - × Saturated fat
  - × Trans fat
  - × Cholesterol

THIS DEPARTMENT HAS WORKED

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DAYS WITHOUT DIET COKE
Conclusion

• Because Diet…
  – Should no longer be a question in pain mgmt
  – Can influence inflammation and pain
  – Shifts Microbiome
  – Improves Joint function
  – Reduces hyperalgesia / neuro-inflammation
  – Eliminates pain triggers
  – Reduces deficiency …. 
Why We Need to Talk Nutrition to Those in Pain!

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