



Natural Supplements and Diabetes

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Alternative Medicine and Diabetes

- Diabetes Care 2002
 - Medical Expenditure Survey
 - 21,000 people nationwide
- Diabetes = independent predictor
 - 80% of diabetics use CAM vs. only 5% without
- Diabetics 1.6X more likely to use CAM
 - Age >65 years
 - More education (above high school)



CAM and Diabetes

- Diabetics use:
 - Nutrition
 - Natural Supplements
 - Herbs
 - Spiritual healing, meditation
 - Massage



Important Points

- Ask about natural medicine
- Learn about the more commonly used supplements
- Refer to someone with expertise
- Most people use *in combination* with meds



Case 1

- Ms. Wilson is a 50 yo female with Type II diabetes for 2 years on metformin. Her HbA1C is 7.6. She read on the internet that chromium, banaba, and cinnamon might lower her HbA1C. What do you say?



Cinnamon

- 2 species
 - *C. zeylanicum* ("true")
 - *C. cassia* (DM)
 - Bark and flower
 - Polyphenols phosphorylate insulin receptor
 - Increases insulin sensitivity; increase glucose uptake
 - Stimulate insulin release



Cinnamon

- May help Type II diabetics
 - Diabetes Care 2003
 - DB RCT 60 pts using cin 1, 3 or 6 g for 40 days
 - All doses had same net result
 - Drop fasting glucose 18-29%
 - Drop total chol. 12-26%
 - Drop LDL 7 – 27%
 - Drop Trig 23-30%
 - Effect on glucose lasted during 20 day washout



Cinnamon

- Dose: 1 – 6g/day
 - 1 tsp = 4.75 g
- May take 2 months to work at lower doses; Higher dose works faster
- C. cassia most common (Chinese cinnamon)
- Safe



Chromium

- Essential trace mineral
 - No accurate test other than empiric trial to check deficiency
 - TPN pts found to have DM
- Experimental models
 - Peptide chromodulin
 - Potentiates insulin on receptors (tyrosine kinase)
 - Improves glucose tolerance, lower glucose level
 - Unclear if affects lipids/ body composition in metabolic syndrome



Chromium

- Glucose and lipid control: controversial
 - Am J Clin Nutr 2002 meta analysis
 - 618 pts in 15 trials
 - Inconclusive for diabetics; no benefit in healthy
 - Int J Nutr Vit Res 2004
 - 78 elderly pts benefit in 3 weeks
 - Drop 1% on HbA1C, and 20 mg/dL on Tot chol and Trig



Chromium

- Not effective in all diabetics (40-80%)
- May depend on underlying deficiency
- Higher dose may be more effective and faster
- No benefit for IGT
 - Diabetes Care 2005



Chromium

- Dose: 200 mcg/day
- Chromium picolinate
 - Polynicotinate not better absorbed (LFTS)
- Side Effects
 - Insomnia, HA, irritable (some at 200 mcg)
 - Above 600 mcg, ?risk anemia, hepatic, renal (ATN)



Banaba (Crepe myrtle)

- Traditional use for DM (leaf tea)
- Grows in India, Phillipines, S.E. Asia
- Very popular with pts
- In vitro/animals
 - Extract insulin-like effect
 - Activates insulin receptors
 - Lowers blood glucose



Banaba

- Little data – only one small study
 - J Ethnopharmacology 2003 (10 pts)
- Well tolerated
- Dose: unknown
 - ?Glucosol (1% corosolic acid) 32 or 48 mg/d
 - Tea



Case 1

- Ms. Wilson
 - Cinnamon may work
 - Use C. cassia (Chinese cinnamon) 1 tsp/day
 - Chromium not clear: 1 month trial best way to know
 - ?Safety at higher doses (>600 mcg/day)
 - Banaba – popular, data limited
 - Long traditional use for DM



Case 2

- Mr. Fox is a 60yo male who has had Type I diabetes for 14 years. His neuropathy bugs him: he has pain, burning and numbness in his feet. He wants to know if alpha lipoic acid helps. What do you say?



Alpha Lipoic Acid

- Water and fat soluble antioxidant
 - Regenerates vit.C, E, glutathione
- Used for energy (ATP) production
- Experimental diabetes models
 - Increase blood flow to neurons
 - Increase glucose uptake in nerves
 - Improves conduction velocity



Alpha Lipoic Acid

- Glucose control
 - 4 short RCT suggest might help
 - Improve insulin sensitivity & markers of glucose uptake (pyruvate, lactate)
 - No long term trials looking at HbA1c



Alpha Lipoic Acid

- Periph. Neuropathy
 - Improves sx: pain, numbness, pricking
 - Improves neurologic deficit/disability scales
 - 5 RCT positive
 - Diabetes Med 2004 – meta analysis
 - 4 RCT with 1258 pts; 24 % better after 3 wks
 - Both subjective sx and touch/pin prick
 - Diabetes Care 1999
 - DB multicenter RCT 509 pts for 7 months
 - Free Rad Res 1999 – 2 yrs



Alpha Lipoic Acid

- Dose: 600-1200 mg/day
- Takes at least 3 -5 weeks to work
- Quality important
 - Freezer tightly capped
- Side Effects:
 - Rash, allergy
 - Not in thiamine deficiency
 - Approved in Germany for neuropathy



Case 2

- I would tell Mr. Fox
 - Probably works for the symptoms and for some objective measures (pin prick, touch)
 - Studies suggest about 24% improvement
 - Try a good brand, keep in freezer tightly capped
 - Need high dose (lower doesn't work)
 - Try for at least 5 weeks before evaluate
 - Not in alcoholics; take an MVI



Case 3

- Mr. Smith is a 40 yo Type II diabetic with CAD. He had a heart attack 3 years ago, and he is on Lipitor for high cholesterol. His LDL is still too high at 120. His daughter told him to use red rice yeast and policosanol. What do you say?

Red Rice Yeast

- *Monascus purpureus*
- Mechanism of action
 - Mevinic acids (0.2% lovastatin)
 - Sterols (beta sitosterol etc)
 - Monounsaturated fatty acids, isoflavones





Red Rice Yeast

Am J clin Nutr 1999

- DB RCT 83 pts on step one diet with hyperlipidemia
- 2.4 g/d of red rice yeast for 12 weeks
- Drop in total by 16.1%, LDL 22%
- No change on HDL, Trig

AHA 1999

- DB RCT 187 pts with hyperlipidemia
- Drop in total by 16%, LDL by 21% and Trig by 24%
- HDL increased by 14%

Chin J Exp Ther Prep Chin Med 1995

- 324 pts on low fat diet with hyperlipidemia
- 1.2 g/d of red rice yeast for 8 weeks
- Drop total by 23%, Trig by 36.5; HDL increased by 19.6%

Red Rice Yeast

- Dose
 - 1.2 to 2.4 g/day (tid dosing)
- Side effects
 - Food for thousands of years
 - GI upset
 - ?LFTS, ?Rhabdomyolysis
- Cost
 - \$20-30/month vs about \$120 - 300/month



Policosanol

- Mechanism
 - Wax from sugar cane
 - Inhibits cholesterol synthesis
 - Inhibits platelet aggregation similar to 100 mg Aspirin
 - Increases LDL breakdown



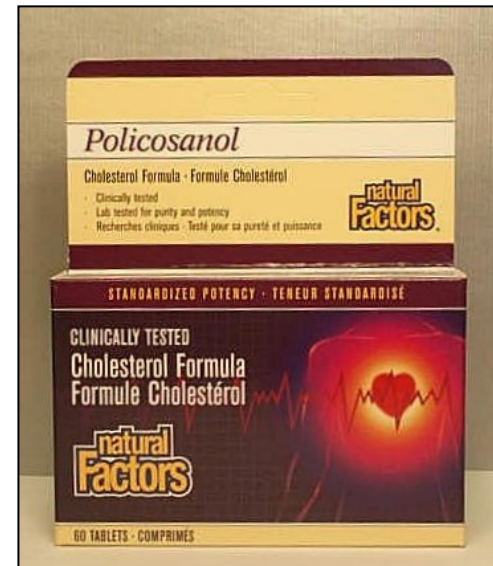


Policosanol

- Int J Clin Pharm 1995
 - DB RCT 69 pts with hyperlipidemia
 - 10 mg/day policosanol for 2 yrs
 - Drop total by 18%, LDL by 25%; Up HDL 21%
- Diabetes Care
 - DB RCT 29 pts with NIDDM & hyperlipidemia on low fat diet
 - 10 mg/day for 12 weeks
 - Drop total by 17%, LDL by 21%; Up HDL by 11%
 - No change in glycemic control

Policosanol

- Dose – 10mg/day (bid)
- Side Effects
 - Like low dose ASA
 - GI/migraines
 - No effect on PT/PTT





Case 3

- Mr. Smith

- Red rice yeast: good data

- My experience: drops Total cholesterol and LDL, without changing HDL
 - If no change, try switching brands

- Policosanol: data positive, but my experience does not confirm



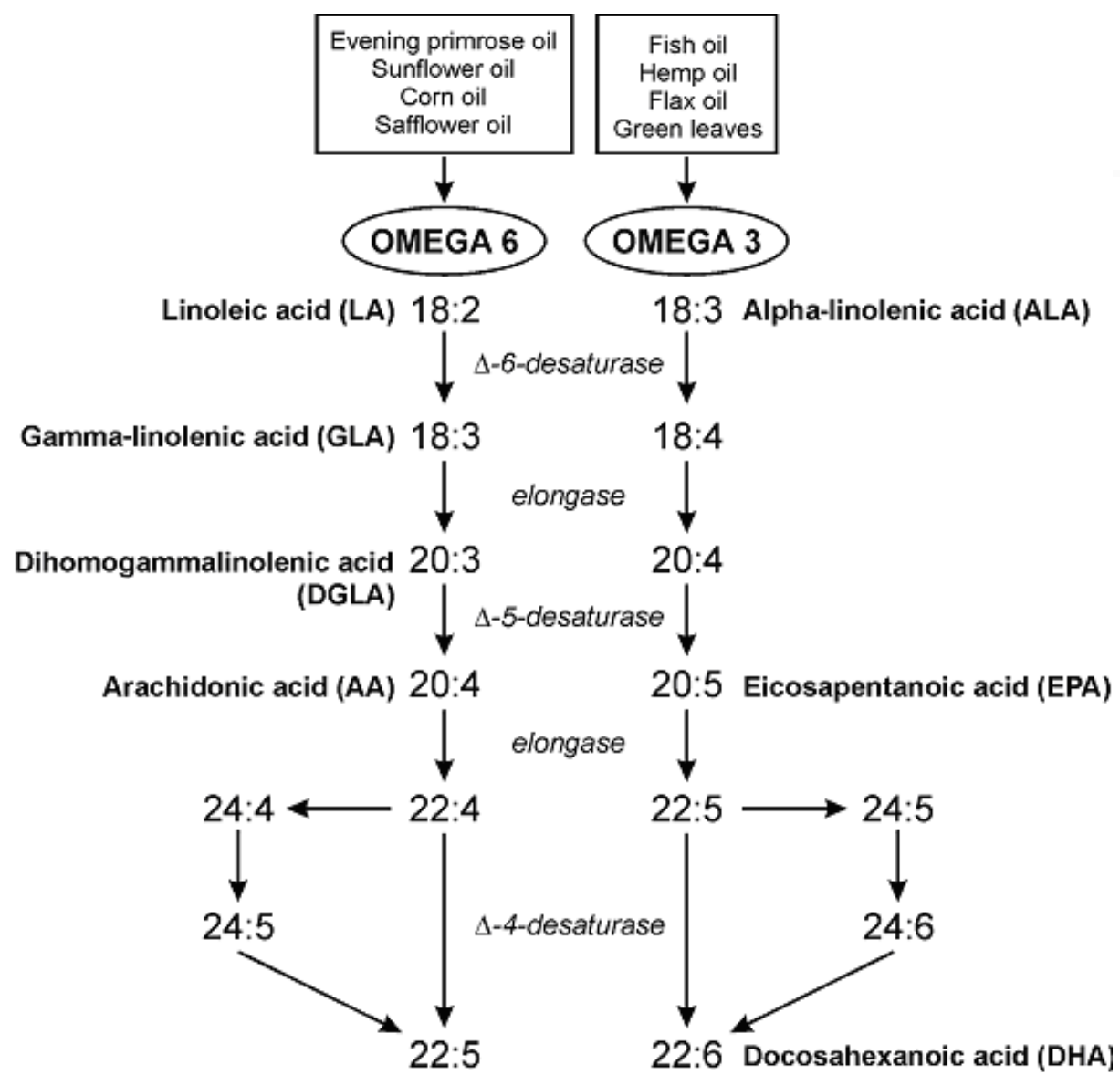
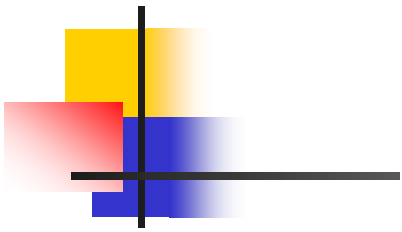
Case 4

- Ms. Snow is a 55 yo Type I diabetic who had an MI about 4 years ago. She is on Coumadin for Afib. She read that fish oil is good for people with heart attacks, and diabetes in a nutrition magazine. She wants your opinion. What do you say?



Fish Oil

- Two essential fats
 - Omega 6 (Linoleic acid) & Omega 3 (a linolenic acid)
 - Essential for cell membranes, PG function
- Paleolithic nutrition
- Cold water fish
 - Herring, kipper, mackerel, menhaden, pilchard, salmon, sardine, and trout
 - Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).



Membrane Phospholipids



**Physiological
Regulation Performed
by COX-1**



PGE₂	PGI₂	TXA₂
GI Protection	GI Protection Platelet Function Regulation of blood flow Kidney Function	Platelet function Regulation of blood flow

**Inflammatory
response by newly
expressed COX-2**

*Cox-2
Selective
NSAID's* →



PGE₂	PGI₂	TXA₂
Other Chemical Mediators		
Inflammation Pain Fever		

Fish Oil



- Antiinflammatory & antithrombotic
 - Decrease TXA2 – platelet aggregation and vasoconstriction
 - Increase Prostacyclin- vasodilation
- Essential for all cell membranes
 - Increase RBC deformity, decrease viscosity
 - Impt for brain development, immune fxn
- Antiarrythmic – regulate Ca and PG's
- Decrease synthesis and secretion of VLDL
- Increase hydrolysis of chylomicrons



Fish Oil

- **CAD**
 - **Primary prevention**
 - Epidemiologic studies (need RCT in high risk pts)
 - 1-2 servings/week drops death from CAD by 25%
 - **Secondary prevention**
 - 1 g/day w/in 3 months post MI for 1 year drops the risk of total cardiac events, non-fatal MI, and total cardiac mortality by 15%
 - **Lancet 1989**
 - 2033 pts: fish 2x/wk dropped death by 29% at 2yrs
 - **Cardiovasc Drugs Ther 1997** (122 pts)
 - **Lancet. 1999 (GISSI)**
 - DB RCT 11,324 patients post MI
 - 1 g fish oil vs vit E vs placebo for 3.5 years
 - Drop RR death, non-fatal myocardial infarction, and stroke by 15% with fish oil



Fish Oil

- **Hypertriglyceridemia** – drops by 20-50%
 - Dose dependent but not as good as Lopid
 - 15 studies used 4-6g/day
- **HTN**
 - 3 small DB RCT with slight drop in BP (5 mmHG)
- **DM**
 - 10 studies – no effect on glucose
 - Benefit via effects on CAD and triglycerides

Fish Oil

- Dose
 - 3g/day fish oil
- Side effects
 - Fishy taste
 - More than 3g/day: ?increased bleeding
 - Cod liver is high in vitamin A and D
 - Mercury?





Case 4

- Ms. Snow:
 - Avoid more than 3 g/day b/c she is on Coumadin
 - Lower dose of 1g/day probably safe
 - Data supports benefit post MI



Summary: Important Points

- Ask about natural medicine
- Learn about the more commonly used supplements
- Refer to someone with expertise
- Most people use *in combination* with meds



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