Food as Information to the Genes

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Oxidative Stress

“... additional evidence of increased oxidative stress in MDD”

(Stefanescu & Ciobica, 2012)

Epigenetics

Antioxidants

- Plant Flavonoids
- Vitamin A (beta-carotene)
- Vitamin C
- Vitamin E
- Zinc
- Selenium
- Chromium
- Glutathione (NAC)
- Melatonin
- Cinnamon, oregano, rosemary, turmeric, black pepper, cloves, garlic, paprika
Inflammation

(Messay, Lim, & Marsland, 2012) (Rawdin, et al. 2013)

Fatty Acids & Inflammation

Omega-6
Omega-3

No processed oils
Wild game
Seeds
Fish

Pro-inflammatory
Anti-inflammatory

Historical Balance of PUFA Omega-6:Omega-3 Ratio

Standard America Diet Balance of PUFA Omega-6:Omega-3 Ratio circa 2012

Fatty Acids & Inflammation

Omega-6
Omega-3

corn oil
safflower
soy oil
flax
fish

Pro-inflammatory

• High refined starches and sugars
• High saturated and trans-fats
• High red and processed meats
• High fried foods

Anti-inflammatory

• Low Omega-3 fats
• Low natural antioxidants
• Low fiber from fruits, vegetable and whole grains

[Loepez-Garcia, et al., 2004 Nurses Health Study]

Plant Flavonoids
• Find and eliminate food sensitivities
  – Wheat, dairy, corn, soy, eggs, nuts

Magnesium
Ginger
Curcumin (turmeric, curry)
Shiitake Mushrooms
Green Tea

Stress, Food & Inflammation

Diet

• Autonomic nervous systemic activity
• Oxidative stress
• NF-κB activation
• Metabolic responses to food

Stress/
Negative emotions

(Kiecolt-Glaser, 2010)
Glycemic Control

- 976 homebound older adults
- Positive association between high GI and GL
- Depression in 34% of sample
- Those with depression had higher rates of CVD
- No difference in rate of diabetes, total carbohydrate intake, BMI, glucose

Mwamburi et al., 2011

Glycemic Index & Load

- 976 homebound older adults
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Biochemistry

- Genes
- Substrate
- Specific Enzyme & Cofactors
- Product
- Vitamins & Minerals

Synthesis of Neurotransmitters

- Stress
- Methylation
- Inadequate nutrition
- Tryptophan
- Dopamine
- Serotonin
- Norepinephrine
- Melatonin
- Glutamate
- GABA

Magnesium

- Inverse association between magnesium intake and depression


Association between magnesium intake and depression and anxiety in community-dwelling adults: the Hordaland Health Study (Jacka et al., 2009)
Nutrient Facts

**Magnesium**
- Intracellular
- Needed for 300 biochemical reactions
- Maintains normal muscle and nerve function
- Maintains healthy immune system
- Helps regulate blood sugar

**Folate**
- Depleted with alcohol & tobacco use
- Gl conditions affect absorption
- MTTHFR polymorphism (12.14%) slows conversion to L-methylfolate
- GI function affects absorption
- Hematological and neurological deficits with deficiency
- Body stores for 5-7 years

**B 12**
- Metformin
- Phenobarbital
- Phenyltoin
- H2 Blockers
- PPIs

**Zinc**
- Lost in processing grains
- Decreased in profuse sweating or chronic diarrhea
- Too much zinc reduces folate, calcium, copper and iron absorption – and vice versa

Nutrients in Food

**Magnesium**
- Green veggies
- Beans & Legumes
- Nuts & Seeds
- Whole Grains
- Chocolate

**Folate**
- Leafy greens
- Beans & Legumes
- Fortified foods

**B 12**
- Animal products
- Fermented foods

**Zinc**
- Shellfish & Oysters
- Red meat & Poultry
- Beans & Legumes
- Nuts & Seeds
- Whole grains
- Dairy

Nutrient Depletion

**Magnesium**
- PPIs ***
- Lasix & HCTZ
- Corticosteroid
- Digezin
- Estrogens and BCPs
- Prograf

**Folate**
- Anticonvulsants (Depakote, Tegretol, phenytoin)
- Estrogens and BCPs
- Metformin
- Methotrexate
- Bactrim

**B 12**
- Metformin
- Phenobarbital
- Phenyltoin
- H2 Blockers
- PPIs

**Zinc**
- Penicillamine
- Thiazide diuretics

Vitamin D

Serum vitamin D concentrations are related to depression in young adult US population: the Third National Health and Nutrition Examination Survey

- n=7970 (OR = 1.85; P = 0.021) for having current depressive episodes in persons with serum vitamin D ≤ 50 nmol/L
- 20% deficient (<50 nmol/L)
- 30% were moderately vitamin D deficient (50-75 nmol/L)

Association of Western and Traditional Diets With Depression and Anxiety in Women (Jacka, et al., 2010)

1. Western Diet was associated with higher GHQ-12 scores (screen for non-psychotic psychiatric disorders)
2. Traditional Diet was associated with lower odds for depression, dysthymia and anxiety.
3. Modern Diet had no observed association with depressive or anxiety disorders
4. Higher diet quality scores were associated with lower GHQ-12 scores and lower odds for depressive disorders

Dietary Patterns

**Whole Foods**
- vegetables
- fruit
- fish

**Processed Foods**
- sweetened desserts, chocolates, fried food, processed meat, pies, refined grains, high-fat dairy and condiments

Dietary pattern and depressive symptoms in middle age (Akbaraly et al., 2009)

1. Participants in the highest third of the whole food pattern had lower odds of depression than those in the lowest third
2. High consumption of processed food was associated with an increased odds of depression
Dietary Patterns

Dr. Weil's Anti-Inflammatory Version of Mediterranean Diet Pattern

Recommendations

Nutrition

Mediterranean-Style Low Glycemic

Consider Nutrient Depletion

Dietary Supplements

Multivitamin/mineral, omega-3, Vit D

Implement

Self, Family, Community, Society

References


