

Nutrition & Children's Health

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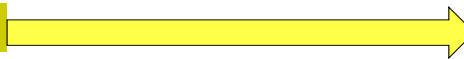
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Nutrition for Life!



What starts here



Lasts a Lifetime!

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Nutrition for Life!

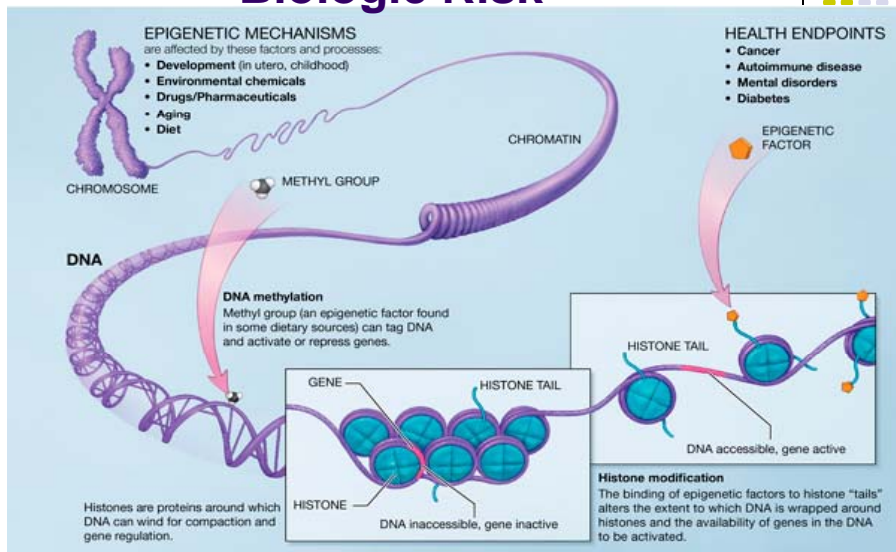


- Nutritional exposures influence lifelong risk for disease
- Good nutrition promotes:
 - Brain development
 - Growth
 - Immune function



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Nutritional Exposures Change Biologic Risk



<http://nihroadmap.nih.gov/epigenomics/epigeneticmechanisms.asp>

Essential Micronutrients



- Iron Learning, memory, behavior
- Zinc Immune function
- Folate Neurologic development, learning
- Iodine Thyroid function, learning
- B12 Neurologic function, DNA synthesis
- Vitamin A Vision, immune status
- Calcium Bone formation, cardiac function
- Thiamin Neurologic, cardiac function
- Vitamin C Brain function, energy
- Vitamin D Calcium absorption, immune status

Fruits and Vegetables: Benefits



- Vitamins
 - Vitamin C
 - Vitamin E
 - Niacin
 - Vitamin B6
 - Thiamine
 - Folate / folic acid
 - Riboflavin
- Minerals
 - Potassium
 - Selenium
 - Iron
 - Zinc
 - Copper
 - Iodine
 - Magnesium
 - Chromium
- Phytochemicals
 - Carotenoids
 - Fiber

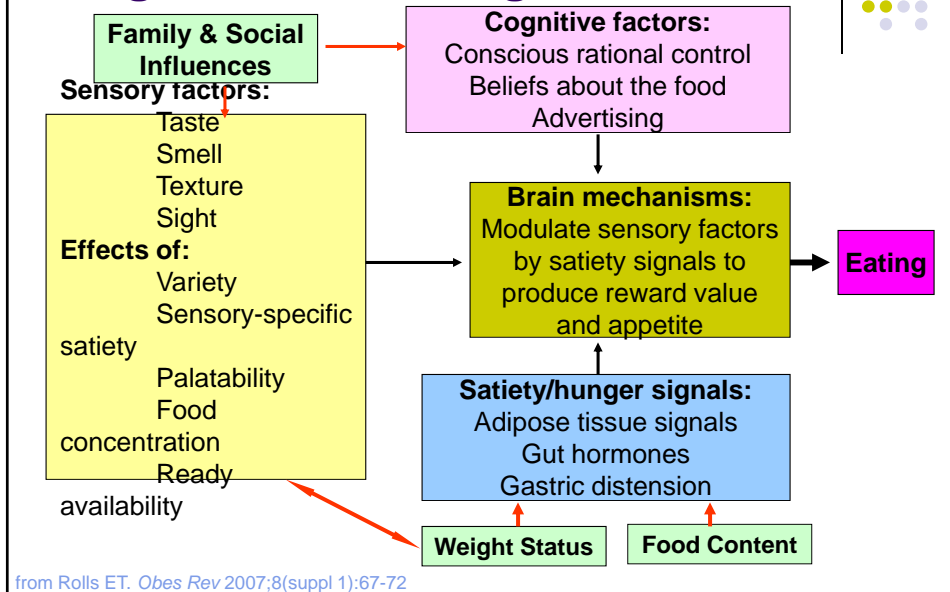


The Good Guys: Antioxidants



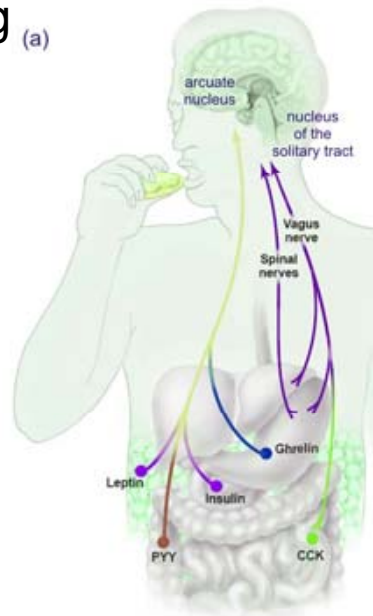
| Vitamins | | Minerals | |
|-------------------------|--|----------|--|
| Antioxidants | Food sources | | Food sources |
| Vitamin C | Citrus fruits; other fruits & leafy vegetables | Selenium | Grains, seafood, muscle meats, fortified cereals, mushrooms, asparagus, spinach |
| Vitamin E | Vegetable oils, nuts, whole grains, green leafy, avocado | Zinc | Shellfish, red meat, nuts, legumes |
| Carotenoids (Vitamin A) | orange foods, greens, green veggies, tomatoes | Copper | Organ meats, shellfish, nuts, seeds, whole grain, wheat bran, mushrooms, potatoes, greens |
| Indirect effects | | Iron | <i>Non-heme</i> : fortified cereal, plants, dairy products, meats <i>Heme</i> : meat, fish, poultry |
| Vitamin B6 | Fortified cereal, banana, fish, poultry, greens | | |
| Riboflavin (B2) | Fortified cereal, broccoli greens, mushrooms, asparagus, lentils | | |

Regulation of Eating



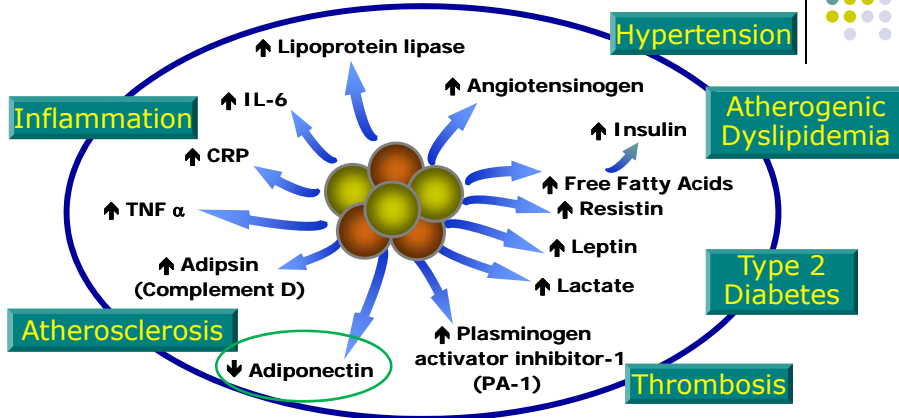
Brain Signaling of Eating (a)

- I'm full
 - PYY (peptide YY)
 - Insulin
 - Leptin
 - CCK (cholecystokinin)
- I'm hungry
 - Ghrelin



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Fat is VERY Metabolically Active



CRP = C-reactive protein; IL-6 = interleukin-6; TNF α = tumor necrosis factor-alpha

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Slide Source
Lipids Online Slide Library
www.lipidsonline.org

Child Factors Associated with Higher Weight

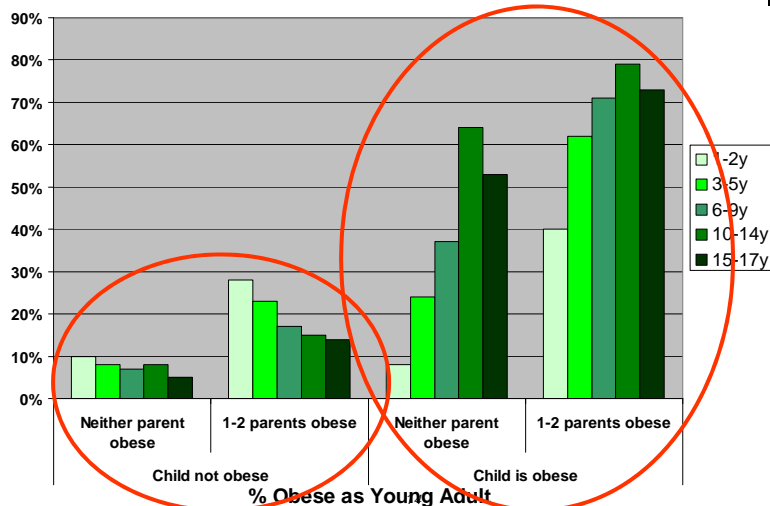


- Rapid rate of eating
- High food-cue responsiveness
- More focused on food
- More impulsive when making food choices
- More motivated for immediate rewards, such as good taste
- Low satiety responsiveness (don't feel full)
- Presence of these traits does not guarantee expression
 - Child traits provide a risk
 - Environmental influences, such as parenting practices, turn these behaviors on or off

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Early Obesity and Parental Obesity

Obesity as Young Adult by Child & Parent Obesity



Whitaker et al, *N Engl J Med* 1997;869-73

Lasting Tips for Healthy Eating



- Health habits developed early last for a lifetime.
- Modeling of healthy eating by parents and peers influences child eating patterns.
- Provide an array of healthy options at home and school.