

# Otitis Media and Nutrition Therapy

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# Objectives

- Recognize when improving a patient's diet will improve clinical response to therapy
- Better clinical outcomes



# Baby Brain

- 100 billion unconnected neurons
- Sensory rich experiences change the physical structure of the brain (increasing connections by up to 25%)
- Brain pruning just before birth



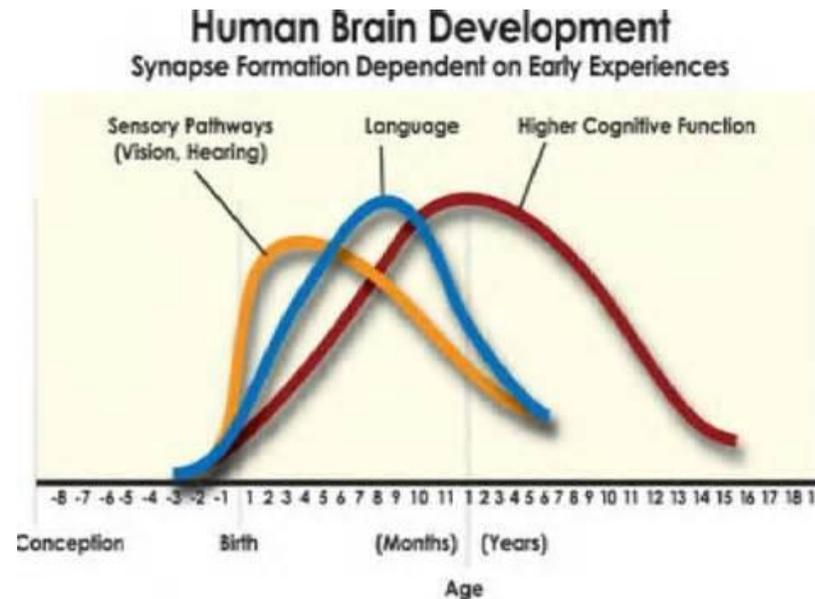
# Developmental Timelines

- Brain functions evolve and develop at different rates and different times
- Each function has a window for optimal development

→ Syntax and a second language are most easily acquired before age 6



→ Foundations for auditory processing are laid down by age 3



# Learning Physically Changes The Brain

- Hebb Model (“neurons that fire together, wire together”)
- Developed in 1970’s
- When two neighboring neurons are triggered at the same time on several occasions, the cells and synapses between them change chemically
- The connection can become so strong that they fire simultaneously instead of in sequence
- Association helps to tie new information into existing pathways (established pathways help strengthen weak signals)



# Long Term Potentiation (LTP)

- A process where synapses become increasingly sensitive so that a steady level of presynaptic stimulation is converted to post-synaptic output
- Pathways can be strengthened or weakened
- Brain shapes itself (by forming electrochemical pathways) according to the activities



## 5 Signs that Nutrition Issues May Be Interfering with Therapy

- 50% or more of the diet is processed grains, packaged foods and/or snack foods that easily melt with saliva
- Patient prefers drinking to chewing or eating
- Parents refer to child as a picky eater
- Child is frequently sick
- Diagnosed with reflux or has a history of colic

# How Ear Infections Affect Development

- “An association between recurrent otitis media in infancy and later hyperactivity,” Hagerman, R.J. & Falkenstein, A.R., Clinical Pediatrics, May 1987, 253-257.
- “Brief Report: Ear infections in autistic and normal children,” Konstantareas, M.M & Homatidis, S., J. of Autism and Dev. Dis., 17 (4), 1987, 585-593.
  - Found lower-functioning children had earlier onset of ear infections than peers.
  - Noted more ear infections in children with autism vs. other children.
- “Otitis media in early childhood and patterns of intellectual development and later academic performance,” Roberts, J.E., et al, J of Ped. Psych., 19(3), 1994, 347-367.
  - Discovered that children with early ear infections were more distracted according to teachers’ ratings.
- “ Behavior and developmental effects of otitis media with effusion into the teens,” Bennett, K.E. et al, Arch. Dis Child, 85(2), 2001, 91-95.
  - Behavior problems and reading issues still present in early teens of those with early ear infections.

# Why babies are prone to ear infections

- Spend more time prone
- Have not developed blow, suck, swallow
- Anatomical area is small, easily clogged
- Immature immune system



# Hearing vs. Listening

- Auditory processing turns sounds into usable information
- Hearing means the sounds registered
- Listening means they were remembered, organized and generated a related response



# Post Traumatic Ear Infection Syndrome

- The ear infections resolve but the effects on auditory development are long lasting
- Auditory processing deficits
- Distractibility
- ADHD
- Trouble Learning Math
- Prioritizing/Decision Making
- Language and Motor Delays



# The Obesity-Ear Infection Link

- Research found infections may lead to taste impairment and increasing risk to obesity
- Middle ear infections can damage the chorda tympani (nerve that carries taste information from front of tongue to brain)
- Those with a history of moderate to severe ear infections were 62% more likely to be obese
- Also a link between tonsillectomies and obesity. Six to 11 year olds who had tonsils removed were 40% more likely to be obese
- Other studies suggest taste damage limits enjoyment of flavors but intensifies ability to experience other sensations , such as texture.

*Data presented at American Psychological Association meeting, Aug. 2008 by Dr. Linda Bartoshuk (University of Florida researcher)*

# Allergies and Ear Infections

“Role of food allergy in serous otitis media,” Nsouli, T.M., et al, Annals of Allergy, 73(3), 1994, 215-219.

Found an allergy elimination diet ameliorated ear fluid in 86% of children and it returned in 94% when food reintroduced.

“Otitis media and its relation to allergic rhinitis,” Fireman, P., Allergy Asthma Proc., 18(3), 1997, 135-43.

Suggests allergies may contribute to chronic otitis media.

“Cow’s mild allergy is associated with recurrent otitis media during childhood,” Juntti, H., et al, Acta Otolaryngol, 119(8), 1999, 867-73.

Children with cow’s milk allergy in infancy had significantly more recurrent otitis media later.



# Allergies vs. Reactions

- Mediated by histamine



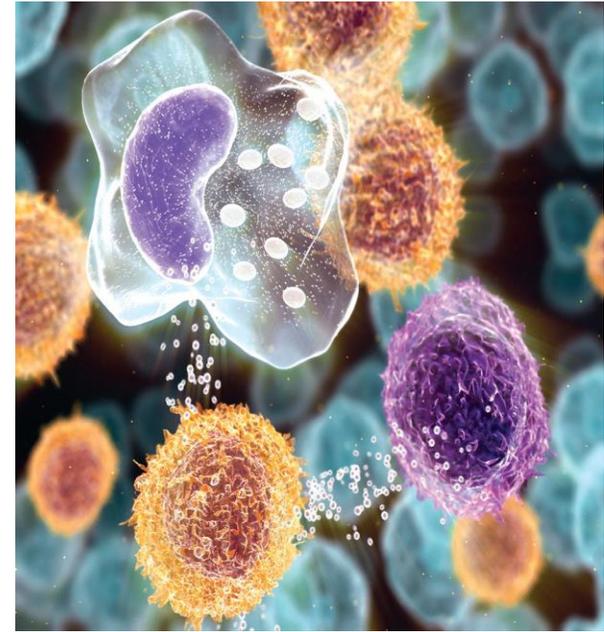
- Reactions within 2 hours
  - Involves itching and swelling
  - IgE levels high in the blood
  - Tested with scratch or RAST blood test
- Can be hours or days later
  - Wide variety of symptoms including headaches, stomach aches, mood changes, fuzzy thinking
  - Mediated by a variety of known and unknown reactions
  - Best test is elimination

# How the Immune System Talks to the Nervous System

- Cells in the nervous system have receptor sites for messenger molecules (cytokines) reacting to antigens
- IgE (or traditional allergy) reactions represent half or less of possible reactions
- Individual responses depend on genetic tendencies, nutritional status and other factors

# Cytokines

- Signaling proteins/glycoproteins that help cellular communication
- Secreted by immune cells (like T-helper cells) when they encounter a pathogen/allergen to recruit more cells and increase immune response
- Bind to cell surface receptors
- Can up/down regulate genes
- Names like IFN- $\gamma$ , TGF- $\beta$ , IL-4, IL10



# Falling Apart in the Spring

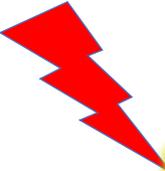
- Stimulant prescriptions highest in spring
- 2/3 kids with ADD/PDD deteriorate in spring
- Half the kids who regressed did not have traditional nasal symptoms
- Cytokines have receptor sites on immune and nervous system cell membranes



# Pasteurization Theory

- Heat changes casein protein making it harder to breakdown
- Pasteurization destroys enzymes, lowers vitamin content (C, B12, B6), kills good bacteria
- Raw milk legal in 28 of 50 states
- 2007 study (University of Basel, Switzerland) found less asthma, pollen and food allergies in children consuming raw milk
- For more info: A Campaign for Real Milk: [www.realmilk.com](http://www.realmilk.com)





# Dairy Components

- Casein (80% of protein)- intolerance can trigger constipation, rashes, immune reactions (such as ear infections or frequent illness), reflux, fuzzy thinking
- Whey- less complicated protein  
better tolerated
- Lactose (milk sugar)- intolerance causes stomach pain/cramps, loose stools

# Cow's Milk vs. Goat Milk



- Beta casein A1 protein
- Higher in calcium
- 5x more vitamin B12
- 10x more folate
- Guernsey cows have 80% beta casein A2 (vs. 15% in Holstein and 40% in Jersey cow milks)

- Mostly Beta casein A2 protein
- Casein composition closer to human milk
- Fat and protein are easier to digest
- Less calcium than cow's milk
- Low in folate
- Lactose similar

# 'Milk' Alternatives

**Cow's Milk (1 percent) 102 kcal**

**8.2 gr protein, 2.4 gr fat, 31% DV calcium**

- **Coconut Milk (unsweetened)- 40 to 80 kcal**

**0 gr protein, 4.5-5 gr fat, 10-30% DV calcium**

- **Rice Milk (unsweetened)-90 to 130 kcal**

**1 gr protein, 2 to 2.5 gr fat, 30% DV calcium**

- **Almond Milk (unsweetened)- 30 to 50 kcal**

**1 gr protein, 2 to 2.5 gr fat, 30-45% DV calcium**

- **Hemp Milk- 70-140 kcal**

**2-3 gr protein, 5 to 7 gr fat, 30-50% DV calcium**



# The Trouble with Soy

- Protein is structurally similar to casein in milk creating a high cross sensitivity
- Soybeans contain goitrogens (chemicals that block synthesis of thyroid hormone)
- Soy contains isoflavones which influence hormone development at high levels. In 2003 British Dietetic Assoc. issued a statement warning parents to avoid soy formula for the first 6 months to prevent hormone imbalances and avoid allergy sensitization.
- Excess soy may impede sexual maturation in boys and accelerate sexual maturation of girls.



For more info see: [The Whole Soy Story](#) by Kaayla Daniel, New Trends Publishing, 2007.

# Milk Intolerance in Infants

- Blood in stools
- Frequent ear infections
- Colic/diarrhea
- Rashes/eczema
- Severe diaper rash
- Frequent spitting up



# Formulas for Highly Sensitive Infants

- **Hydrolyzed formulas**

Nutramigen (Mead Johnson)- Hydrolyzed casein, corn syrup, soy oil

Alimentum (Ross Labs)- Hydrolyzed casein, sucrose, soy oil

- **Synthetic amino acid formulas**

Neocate (Nutricia)-corn syrup (54%), MCT, canola oil

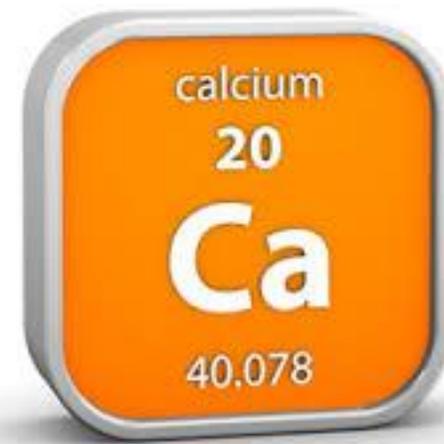
Elecare (Abbott)-corn syrup (55%), MCT, soy oil



# Who Needs Calcium?

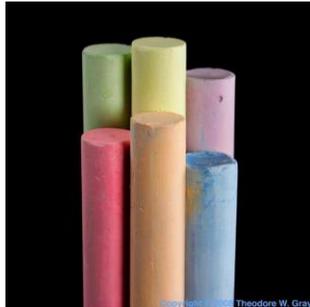
- People on dairy free diets or with reduced dairy intake
- About 2 out of 3 people because of inadequate intake (according to NHANES 2 survey)
- Women (less likely to have adequate intake than men)
- Individuals on a high protein diet
- Those with a high risk to bone loss

# Calcium Dosing



- Most people need at least 800-1000 mg of a well absorbed form (DV is higher)
- Can only absorb 500mg at one time so if taking more than 500mg, split the dose
- Works best with vitamin D and Magnesium

# Forms of Calcium



- Citrate- **best absorbed but acidic**
- Chelates (Malate, Aspartate, Lysinate)
- Hydroxyapatite or Calcium Phosphorus
  
- Carbonate- **least well absorbed but dense and inexpensive**

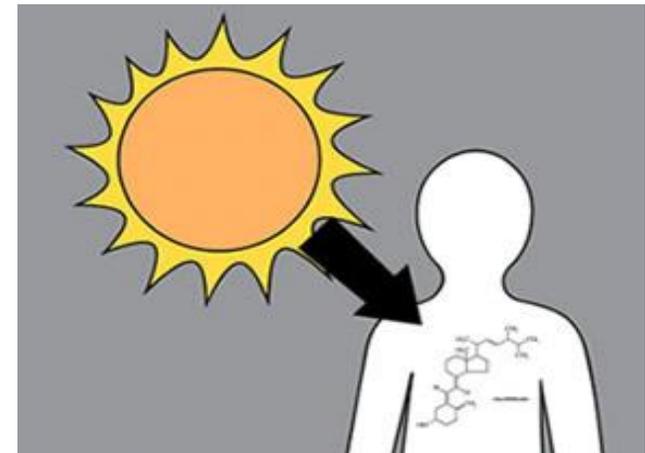
# Non-Pill Calcium Supplements

- Calcium fortified orange juice (calcium citrate) - one cup maximum (about 300mg)
- Chewables
  - Nutrition Now Adult Gummies (2 = 500mg)
  - Adora (chocolates with calcium, a little magnesium)
- Powder
  - Kirkman (1-800-245-8282) plain or flavored
  - Thorne Effervescent Calcium/Magnesium powder
- Liquids- may have too much magnesium for young children
  - Buried Treasure- Calcium Plus
  - Child Life- Liquid Calcium with Magnesium

# Vitamin D

- Activated vitamin D, calcitriol, is a potent neurosteroid hormone critical in mammalian brain development.
- >70% women and children low in vitamin D
- In rats, maternal vitamin D deficiency results in increased brain size and enlarged ventricles- abnormalities similar to children with autism.
- Autism is more common in those with dark skin where vitamin D deficiency is more common.
- Perfect number for Vitamin D, 25-OH , total = 50 ng/mL

JJ Cannell. Autism and Vitamin D. Medical Hypotheses, 2008: 1-17. [wadeandersonpt.com](http://wadeandersonpt.com)



# When To Refer to a Feeding Specialist

- Parents are not improving the child's diet despite other interventions
- Drooling or pica
- Frequent missed appointments due to illness
- History of sensory processing symptoms
- Articulation or speech delays
- Child is an unusually sloppy or slow eater



# Thank You!

"Her research is solid, her insights are excellent, and her advice is just what you need."  
—THE WASHINGTON POST

## CURE YOUR CHILD WITH FOOD



SOLUTIONS FOR

- ☑ Picky eating
- ☑ Reflux
- ☑ Stomachache
- ☑ Ear infections
- ☑ Failure to grow
- ☑ Constipation
- ☑ Rashes
- ☑ Sleeplessness
- ☑ Mood disorder
- ☑ ADHD and SPD
- ☑ Hyperactivity
- ☑ Dyspraxia (speech delays)
- ☑ and more

**The Hidden Connection  
Between Nutrition and  
Childhood Ailments**



**KELLY DORFMAN, MS, LND** Foreword by Richard E. Layton, MD,  
PEDIATRIC ALLERGY SPECIALIST

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