GrowBaby®

3RD TRIMESTER
WEEKS 28-40+

@growbabyhealth

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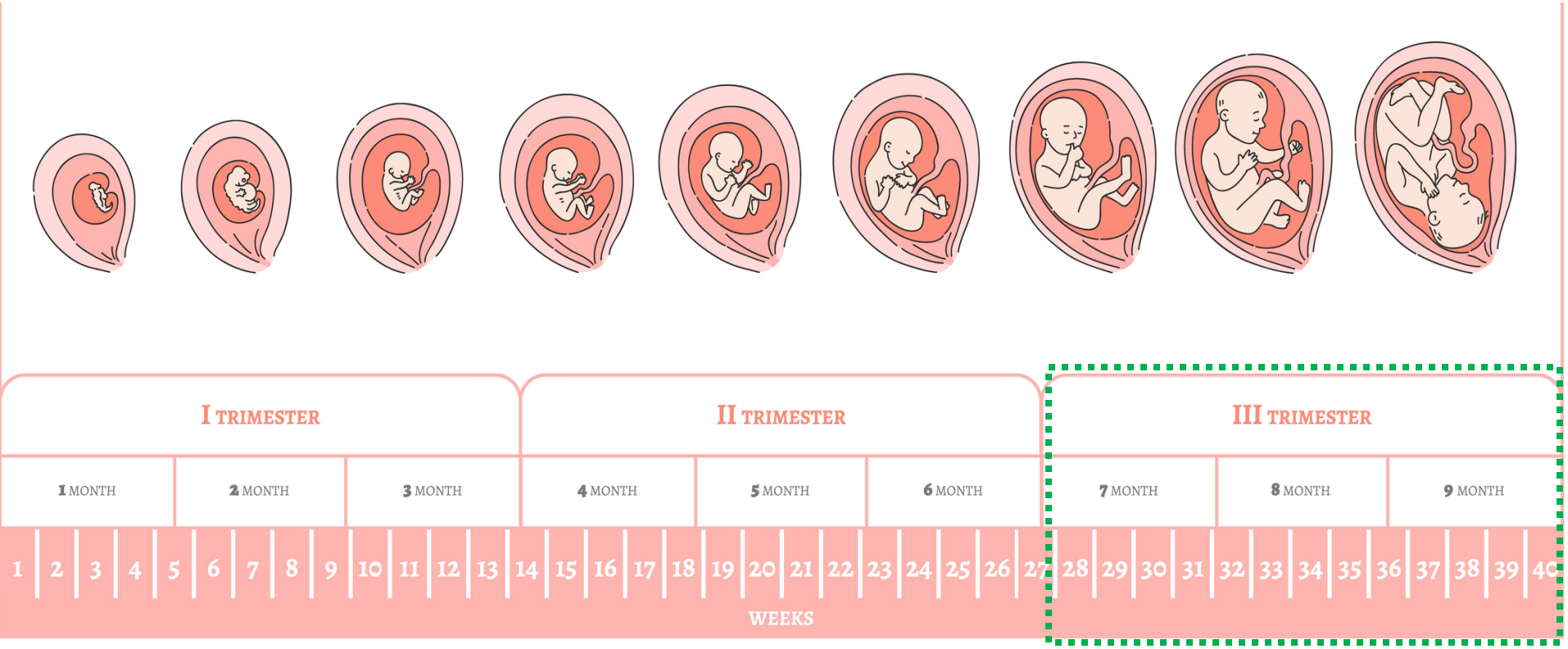

WEEK 27: **Eyelids open** and **sensitivity to light** develops

WEEK 29: Three of the six layers of cerebral cortex have formed – **Brain growth!**

WEEK 31: **Pituitary gland releases** insulin and **growth hormone**

WEEK 35: **Lungs produce surfactant** allowing the alveoli to expand and collapse more easily for **baby's first breaths**

WEEKS 39-40: **Liver is mature** enough to take over all the metabolic functions that the placenta took care of in utero.

IMPORTANT MACRONUTRIENTS FOR 3RD TRIMESTER

Protein

- Quality
- Combination plant/animal protein

Fats

- Omega-3 fatty acids
- Variety of healthy fats

Carbohydrate

- Rainbow of fruits/veggies
- Unrefined-high fiber-complex

IMPORTANT MICRONUTRIENTS FOR 3RD TRIMESTER

Vitamins

- B2, B6, Folate, B12 & Choline
- Vitamin A, C, D, K

Minerals

- Iron, Copper, Zinc
- Magnesium, Selenium & Iodine

Phytonutrients

- Rainbow of fruits/veggies
- Prebiotic fibers for probiotic support

HYDRATION

Quality:

Clear, no added salt / sugar

Electrolyte focus:

Ca++, Cl-, Mg+, K+, Na+

Amount:

Pregnant: ½ body weight (lbs) in fluid ounces

Breastfeeding: Full body weight (lbs) in fluid ounces

Biomarker:

Urine is clear and odorless

PROTEIN-FATS-CARBOHYDRATES

Protein (P)

Carnitine-decreases risk of gestational diabetes and fatigue[1]

Arginine-dietary intake in 3rd trimester associated with 51% reduction in PTB before 34 weeks, also associated with SGA[2]

Fats (F)

Omega 3 Fatty Acids (O3)- decreases risk of PTB, is associated with less depressive symptoms, and reduces prenatal stress and cortisol levels. O3 supplementation in women with GDM has beneficial effect on insulin resistance[3-7].

Carbohydrates (C)

Fiber-decreases risk of GDM, PIH[8-10]

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3RD TRIMESTER FOOD PLAN
LOW GLYCEMIC INDEX

FATS & OILS — DAILY

Minimally refined, cold-pressed, organic, non-GMO

2 tbsp	**Avocado**	1 tsp	Oils, salad: almond, flaxseed, grapeseed, olive (extra virgin), rice bran,
1 tsp	Butter (2t whipped)		
1 sq	Chocolate, dark[A]		
2 tbsp	Coco (cann		
1 1/2 tbsp	Coco (Can		
1 tbsp	Ghee		
1 tbsp	May (unsw		

[A] 70% OR HIG

1 SERVING =

NUTS & S

6	Alm
2	Braz
6	Cash
1 tbsp	**Chia**
3 tbsp	Coco (unsw
2 tbsp	**Flax**
5	Haze
1 tbsp	Hem
6	Mixe

1 SERVING =

PROTEIN

Lean, grass

ANIMAL PRO

1 oz	Chee
1/4 c	Cotta
2/3 c	Egg s
1	**Egg**
1 oz	Feta
1 oz	Fish: **herr** **salm** snap *Disc
1 oz	Shell **lobs** scall
1 oz	Meat **lamb, pork, venison,** other wild game

grams/scoop (1 protein serving = 7g) Egg, hemp, pea, rice, soy, **whey**

1 OZ SERVING = 35-75 CALORIES, 7 G PRO

FLUIDS (NO SUGAR/SODIUM ADDED) — DAILY

8 oz	Water, Sparkling Water, Coconut Water, Herbal Tea

LEGUMES — DAILY

3/4 c	Bean soups	1/2 c	Edamame (cooked)
1/2 c	Black soy beans (cooked)	1/3 c	Hummus or other bean dips
1/2 c	**Dried beans, lentils, peas (cooked)**	1/2 c	**Green peas (cooked)**

1 SERVING = 110 CALORIES, 15 G CARBS, 7 G PRO

Echinacea
Fennel
Fenugreek
Lavender
Rosemary
Tarragon
Thyme
**Discuss dosing, form & frequency*
Nutritional Yeast
Pepper (black)
Turmeric

Dirty Dozen (Buy Organic): celery, hot peppers, kale, spinach, tomatoes

Clean Fifteen (Ok Coventional): asparagus, broccoli, cabbage, cauliflower, eggplant, mushrooms, onions

VEGETABLES (STARCHY) — DAILY

1/2 c	Acorn squash, cubed	1/2 md	**Potato** (purple, red, **sweet,** yellow)
1 c	**Beets, cubed**	1/2 c	Potatoes, mashed
1 c	Butternut squash, cubed	1/2 c	Root veg.: Jerusalem artichoke, parsnip, rutabega
1 c	Celery root, cubed		
1/2 c	Corn/Cob (1/2)		

AILY

peaches,

AILY

1/2 c	Muesli (no added sugar)	***Oats***
1/3 c	Pasta	***Quinoa***[GF]
1/2 c	Pita	*Rice*[GF] *(all types)*
1/2 c	Quinoa, cooked[GF]	*Semolina*
1/3 c	Rice[GF]: basmati, black, brown, purple, red, wild	*Sorghum*[GF]
1	Tortilla, 6" (whole wheat/grain rice, corn)	***Spelt***
1/4 c	Wheat germ	*Teff*[GF]
		Whole Wheat

1 SERVING = 75-110 CALORIES, 15 G CARBS

[GF]=GLUTEN FREE

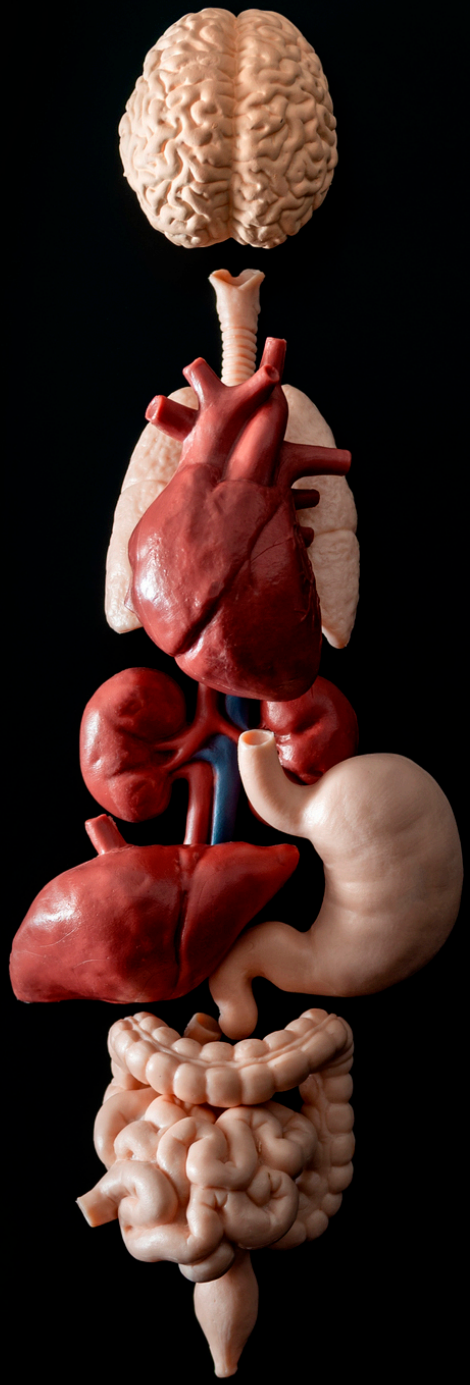
Let's Calculate Protein (yes, again!)

1. Weight (how's your weight gain?)
2. Weight in lbs/2.2 = Kilograms
3. Kilograms X 1.2-1.5 Grams = TOTAL grams daily

Current recommendations: 70-100 grams/daily in pregnancy

“The brain we develop reflects the life we lead.”

-Dalai Lama

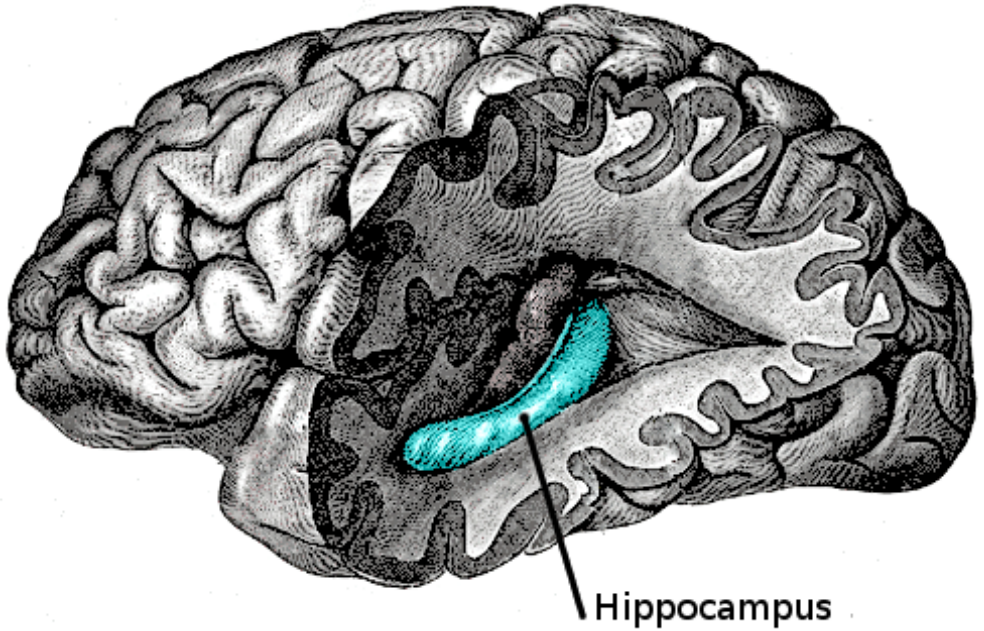


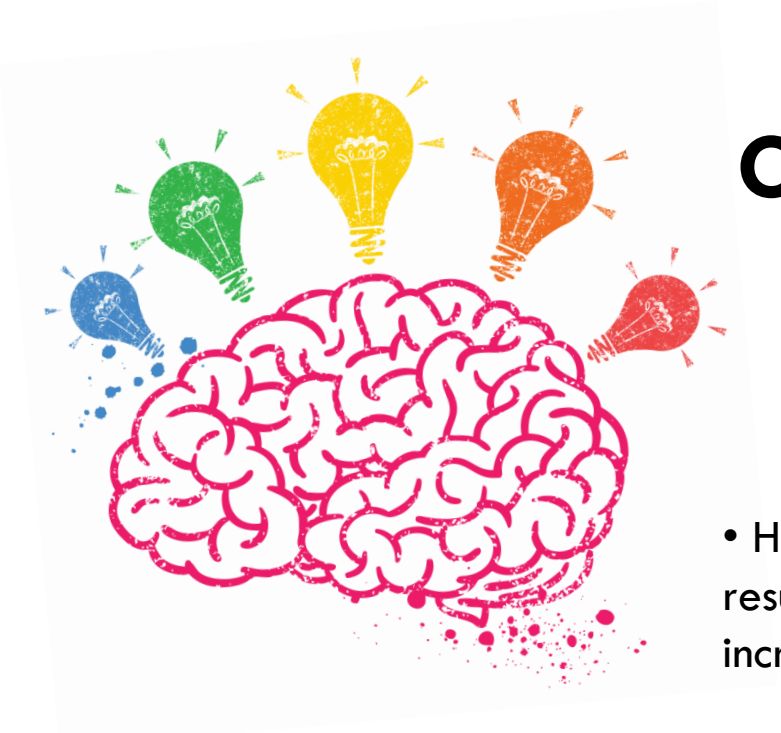
Brain Power

The fetal brain will expand rapidly in the third trimester. In fact, did you know that your baby's head circumference will increase from around 11 inches or 28 centimeters to 15 inches or 38 centimeters from week 27-40 (36% increase)? **There is a 260% increase in brain growth in the 3rd trimester alone**! Your baby's brain will continue to grow until 2 years of age.

Some important nutrients for fetal brain development include:

1. Protein
2. Omega 3 Fatty Acids
3. Iron
4. Zinc
5. Copper
6. Selenium
7. Iodine
8. Choline
9. Folate
10. Vitamin A
11. Vitamin D





Omega 3 Fatty Acids are

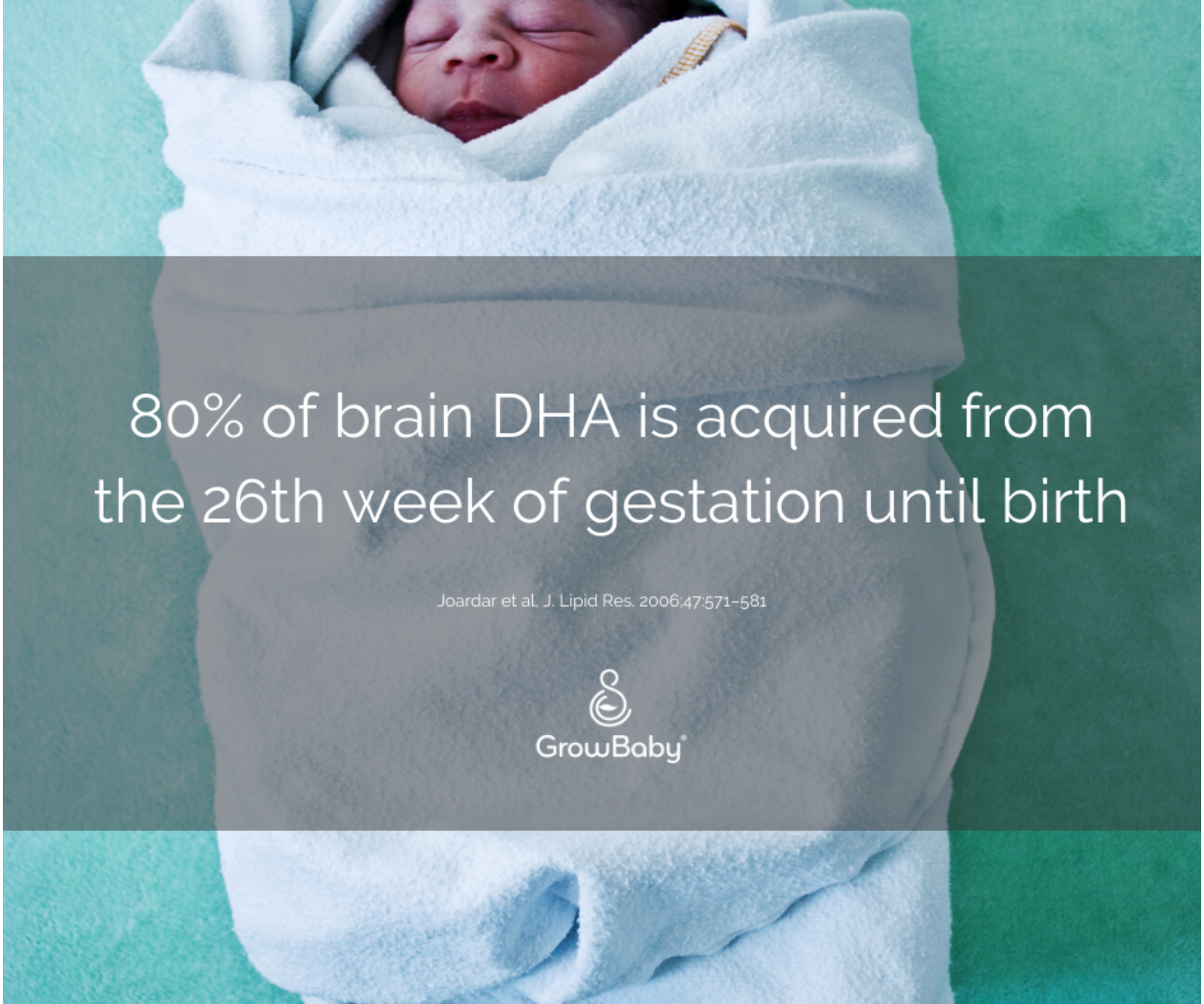
Brain Food

• Higher dietary intakes of DHA during pregnancy result in higher maternal-to-fetal transfer of DHA increasing cognitive and behavioral development.

•Reduce the risk of a preterm baby and increase birth weight by consuming both plant and animal sources of DHA and EPA!

•Omega 3 Fatty Acids contribute to higher visual recognition memory and higher scores of verbal intelligence

•Want to decrease the risk of allergies and eczema in your baby? Enjoy Omega 3 Rich Foods!


80% of brain DHA is acquired from the 26th week of gestation until birth
Joardar et al. J. Lipid Res. 2006;47:571–581
GrowBaby®

IRON

Iron has a significant role in myelination, or the production of myelin sheaths. **Myelin sheaths surround and protect nerve cells** and allow nerves to communicate.

Iron is also necessary to ensure oxygenation, and for the synthesis of neurotransmitters. **Iron deficiency is found in children with attention-deficit/hyperactivity disorder.**

Iron concentrations in the umbilical artery are critical during the development of the fetus, and in relation with the IQ in the child. **Infantile anemia with its associated iron deficiency is linked to slower cognitive development.**

IRON RICH FOODS

HEME IRON – per 3 ½ oz

1. Beef Liver
2. Beef
3. Clams
4. Pork
5. Eggs
6. Lamb

NON-HEME IRON – per 3 ½ oz

1. Kelp
2. Brewer's Yeast
3. Blackstrap Molasses
4. Pumpkin & Squash Seeds
5. Sunflower Seeds
6. Millet
7. Parsley
8. Almonds
9. Dried Prunes

ZINC

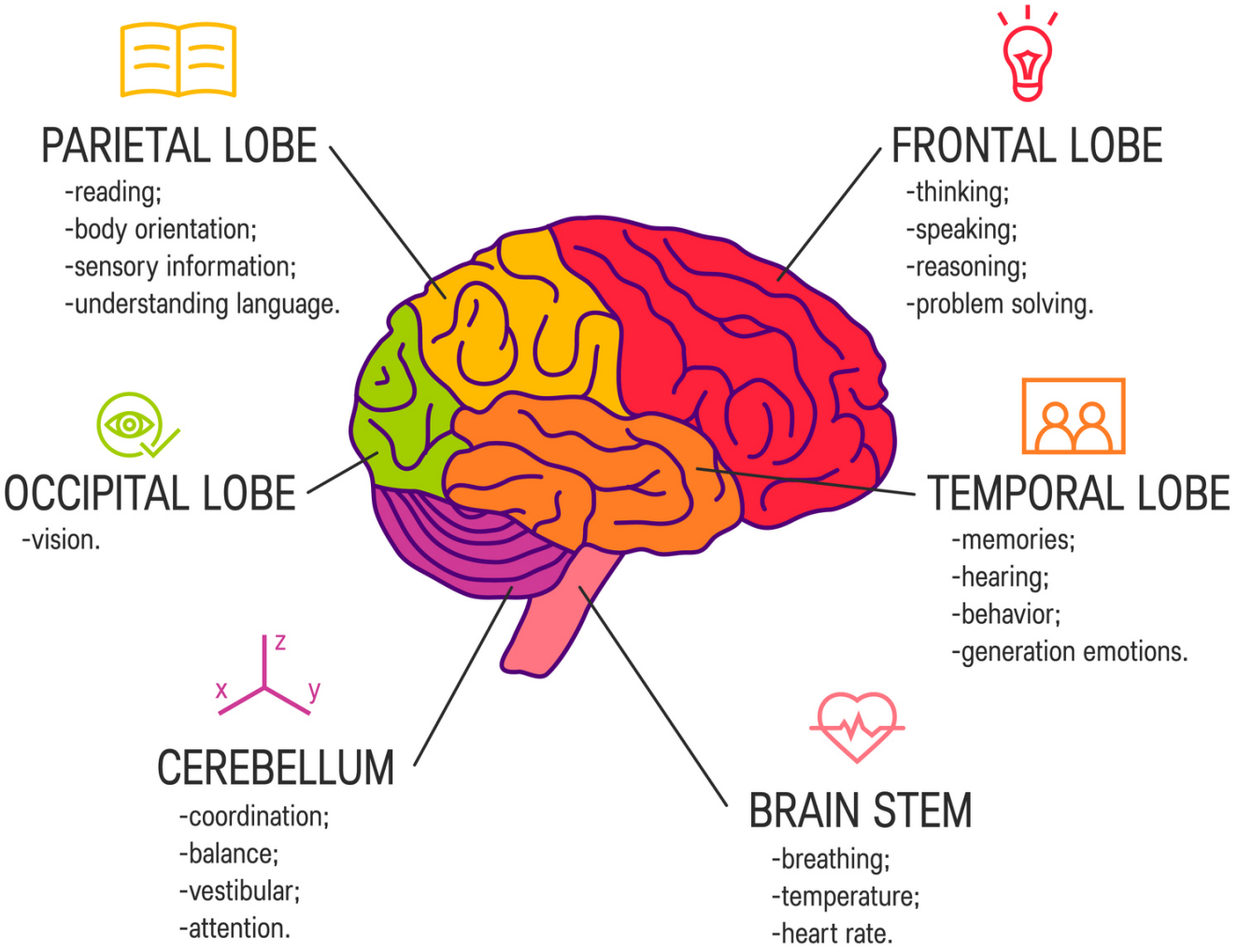
Zinc-containing neurons are responsible for connecting the cerebral cortex and limbic system of our brains!

What is the cerebral cortex and what does it do?

- The cerebral cortex or cerebrum is the largest part of a mammal's brain. It is divided into 4 different lobes. Each lobe is responsible for a very specific function.

What is the limbic system and what does it do?

- The limbic system is a complex system of nerves and networks in the brain, involving several areas near the edge of the cortex concerned with instinct and mood. It controls the basic emotions of fear, pleasure, anger and drives hunger, sex, dominance, and care of offspring.


PARIETAL LOBE
-reading;
-body orientation;
-sensory information;
-understanding language.
FRONTAL LOBE
-thinking;
-speaking;
-reasoning;
-problem solving.
OCCIPITAL LOBE
-vision.
TEMPORAL LOBE
-memories;
-hearing;
-behavior;
-generation emotions.
z
x
y
CEREBELLUM
-coordination;
-balance;
-vestibular;
-attention.
BRAIN STEM
-breathing;
-temperature;
-heart rate.

ZINC (ZN) - >10% OF HUMAN GENOME CODES FOR ZINC-CONTAINING PROTEINS

- **Deficiency rate: 37%-85% (1st & 3rd Trimester)**
- Low serum levels associated with preeclampsia and GDM[10]
- Zinc supplementation reduces the risk of spontaneous preterm birth[10]
- Diet is the main factor that determines zinc status[12]
- Key role player in the production of prolactin – ½ of the Milk Ejection Reflex (MER) equation alongside oxytocin - breastmilk production
- Zinc absorption is limited by phytate - compounds found in whole grains, legumes and nuts/seeds – but still good sources of zinc

Osredkar J, sustar N (2011) Copper and Zinc, Biological Role and Significance of Copper/Zinc Imbalance. J Clinic Toxicol S3:001 doi 10.472/2161-0495. S3-001

Stone LP, Stone PM, Rydbom EA, et al. Customized nutritional enhancement for pregnant women appears to lower incidence of certain common maternal and neonatal complications: an observational study. *Glob Adv Health Med.* 2014;3(6):50–55. doi:10.7453/gahmj.2014.053

ZINC-RICH FOODS

1. Oysters
2. Pumpkin seeds
3. Sesame seeds
4. Beef
5. Game meats
6. Lamb
7. Shiitake Mushrooms
8. Crab
9. Turkey
10. Pork

COPPER

Copper is an essential mineral for development in areas of the brain that are **connected to memory and learning.**

Tiny amounts of copper, within certain enzymes in the brain, also help form key neurotransmitters that allow brain cells to "talk" to one another. It **preserves your nerves' myelin sheaths—a** layer that protects the axon or nerve fiber of your neurons.

Helps your body utilize iron

✓Imbalanced Zinc : Copper Ratio is associated with Postpartum Depression.

◎Optimal Plasma/Serum ratio 1 : 0.70

Osredkar J, sustar N (2011) Copper and Zinc, Biological Role and Significance of Copper/Zinc Imbalance. J Clinic Toxicol S3:001 doi 10.472/2161-0495. S3-001

COPPER-RICH FOODS

1. Crimini Mushrooms
2. Swiss Chard
3. Spinach
4. Sesame Seeds
5. Kale
6. Summer Squash
7. Asparagus
8. Eggplant
9. Cashews
10. Tomatoes

SELENIUM

Selenium is an essentially trace mineral that **prevents cellular damage.**

Helps **convert the thyroid hormones** inactive T4 to active T3 and helps to regulate the amount of T3 made.

Significantly **decreased** Edinburgh Postnatal **Depression** Scale score in pregnant women who received 100 mcg selenium daily from the first trimester until post partum.

Mokhber et al, Effect of supplementation with selenium on postpartum depression: a randomized double-blind placebo-controlled trial. J Matern Fetal Neonatal Med. 2011 Jan;24(1):104-8. doi: 10.3109/14767058.2010.482598. Epub 2010 Jun 8.

SELENIUM-RICH FOODS

1. Brazil Nuts
2. Crimini Mushrooms
3. Cod
4. Shiitake Mushrooms
5. Shrimp
6. Tuna
7. Calf's Liver
8. Sardines
9. Salmon
10. Mustard Seeds
11. Eggs
12. Turkey

IODINE – ESTIMATED WORLDWIDE DEFICIENCY – 30%

Iodine is required for the synthesis of thyroid hormones, T3 and T4. These same hormones are **required for brain development.**

Iodine can **help prevent brain damage** and mental retardation.

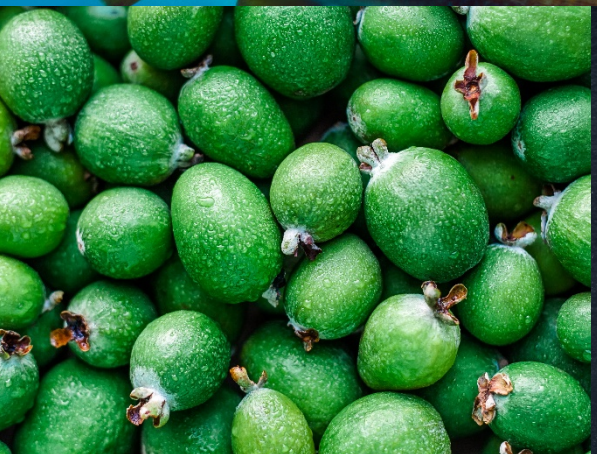
Chronic iodine deficiency negatively affects intelligence

Elizabeth L Prado, Kathryn G Dewey, *Nutrition and brain development in early life*, Nutrition Reviews, Vol. 72(4):267–284, doi:10.1111/nure.12102

IODINE RICH FOODS:

Cod, sea bass, haddock, perch, squid, kelp and other sea vegetables, feijoa (South American fruit), persimmon, yogurt & dairy, eggs, iodized salt



CHOLINE

- Helps **make cells function normally,** especially the brain, liver, and central nervous system
- May **help prevent neural tube defects -** Women with concurrent high intakes of B6, B12, choline, and methionine and moderate intake of betaine had approximately half the risk of an NTD-affected pregnancy.
- Helps develop the **hippocampus, an area of the brain** that continues to produce nerve cells and helps with memory throughout life

★Over **30% of your body's methylation** goes into **making choline**

Wu et al, Early second trimester maternal plasma choline and betaine are related to measures of early cognitive development in term infants. PLoS One. 2012;7(8):e43448. doi: 10.1371/journal.pone.0043448. Epub 2012 Aug 20.
Petersen et al, One-Carbon Cofactor Intake and Risk of Neural Tube Defects Among Women Who Meet Folic Acid Recommendations: A Multicenter Case-Control Study. Am J Epidemiol. 2019 Jun 1;188(6):1136-1143. doi: 10.1093/aje/kwz040.

CHOLINE-RICH FOODS

1. Eggs
2. Cod
3. Shrimp
4. Navy Beans
5. Salmon
6. Brussels Sprouts
7. Broccoli
8. Pinto Beans
9. Kidney Beans
10. Cauliflower
11. Asparagus
12. Spinach
13. Green Peas












METHYLATION SUPPORT

METHYLATION CO-FACTORS FOR BRAIN DEVELOPMENT

FATS / MINERALS

- Omega-3 DHA: cold-water fish, fish oil
- Zinc: Oysters

VITAMINS

- B vitamins are important for brain development-play a role in carbohydrate metabolism (the brain's primary energy source), membrane structure and function and synapse formation.
- Choline: Eggs
- Vitamin B1: Pork
- Vitamin B2: Eggs
- Vitamin B3: Peanuts
- Vitamin B6: Pistachios
- Methylfolate: Chickpeas
- Vitamin B12: Seafood

VITAMIN A – WHAT ABOUT GENETICS?

Retinoic acid, the vitamin A metabolite, is involved with fundamental aspects in the development of the central nervous system, like:

1. **Neuron growth**, specifically axon outgrowth—Did you know that neurons are the largest cells in the body by both volume and surface area?
2. **Migration of the neural crest**--a group of cells that develop into a variety of tissues, including spinal and autonomic ganglia (nerves that connect the central nervous system to their target organs), connective tissue around the brain and spinal cord, and parts of the facial bones.
3. Beta-carotene is converted by β-carotene 15,15′-monoxygenase (BCMO1 gene) in the intestine into retinol—60% of us have this gene…what does that mean?

BETA-CAROTENE RICH FOODS

VITAMIN D & THE BRAIN

- Clinical studies suggest that vitamin D **deficiency may lead to an increased risk of disease of the central nervous system (CNS), particularly schizophrenia and multiple sclerosis.**
- May play a role in decreased risk of postpartum depression
- Vitamin D dosing at 5000 IUs in pregnancy and1000 IUs for first 3 years of life decreased risk of autism in children whose mothers previously had a child with an autism diagnosis.

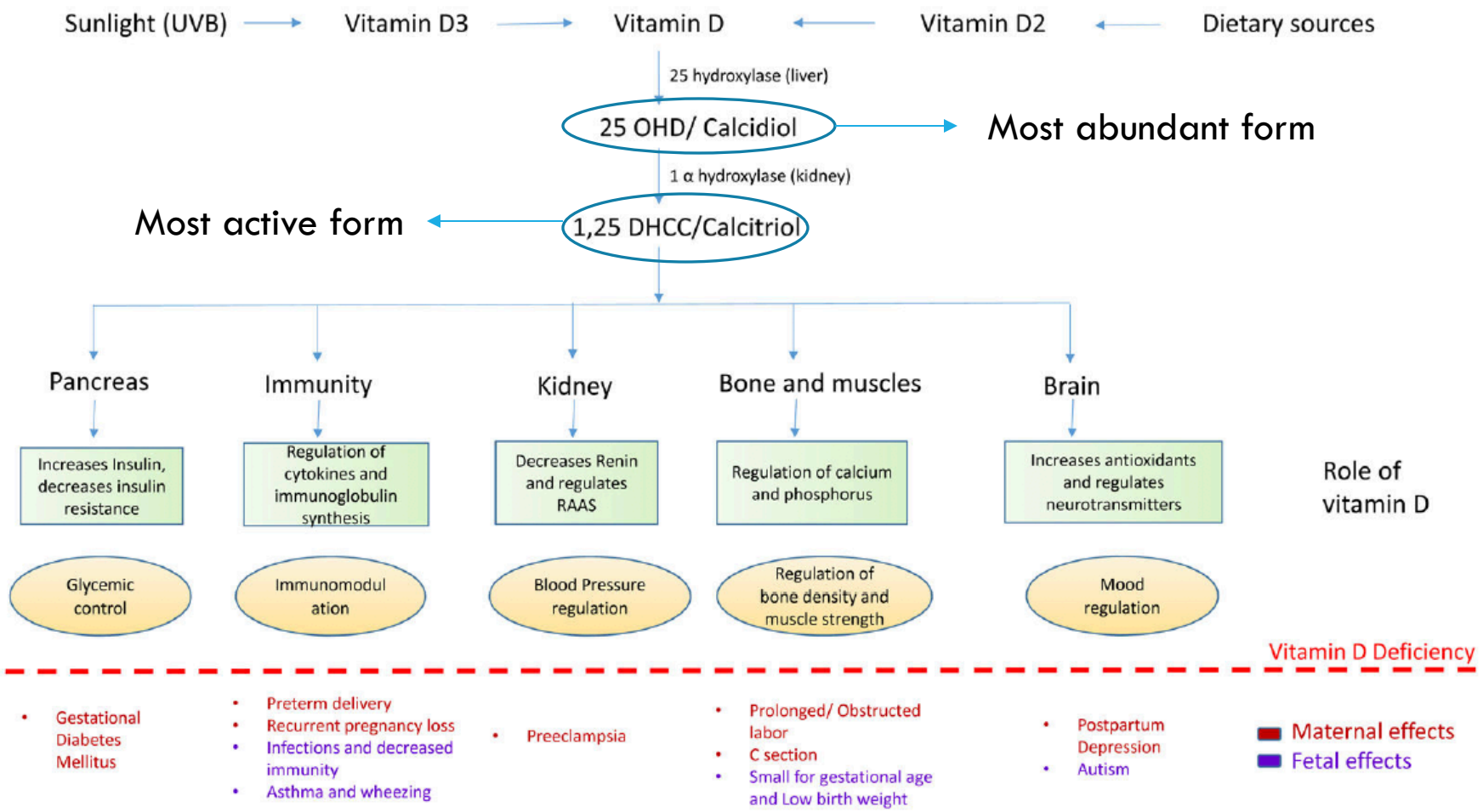
Wrzosek et al, Vitamin D and the central nervous system, Department of Pharmacogenomics, Medical University of Warsaw, Żwirki i Wigury 61, PL 02-091 Warszawa, Poland, 2013

Eyles D, Burne T, McGrath J, Queensland Centre for Mental Health Research, The Park Centre for Mental Health, Semin Cell Dev Biol. 2011 Aug;22(6):629-36. doi: 10.1016/j.semcdb.2011.05.004. E pub 2011 Jun 6, Vitamin D in fetal brain development, Wacol, QLD, Australia. eyles@uq.edu.au

Stubbs et al, Will vitamin D supplementation during pregnancy and early childhood reduce the recurrence rate of autism in newborn siblings? Med Hypotheses. 2016;88:74-8 {PubMed: 26880644]

Agarwal et al, Vitamin D and its impact on maternal-fetal outcomes in pregnancy: A critical review, Crit Rev Food Sci Nutr. 2018 March 24; 58(5): 755–769. doi:10.1080/10408398.2016.1220915.

VITAMIN D ACTIVATION VIA LIVER & KIDNEYS



Adapted Figure 2, Agarwal et al, Vitamin D and its impact on maternal-fetal outcomes in pregnancy: A critical review, Crit Rev Food Sci Nutr. 2018 March 24; 58(5): 755–769. doi:10.1080/10408398.2016.1220915.

VITAMIN D

- **Deficiency Rate:** Approximately 2 out of 3 pregnant women in the United States have suboptimal vitamin D status, with even higher prevalence reported among Black and Mexican-American women[7]
- Decreases risk of PIH , SGA[1-4]
- Comorbidities of pregnancy are strongly associated with vitamin D status[5]
  - PTB, GDM, PIH, Infection and Bacterial vaginosis
- 25(OH)D concentration in pregnant women are associated with an increased risk of their children for childhood asthma, wheeze, respiratory tract infections, allergic rhinitis, and eczema[6]

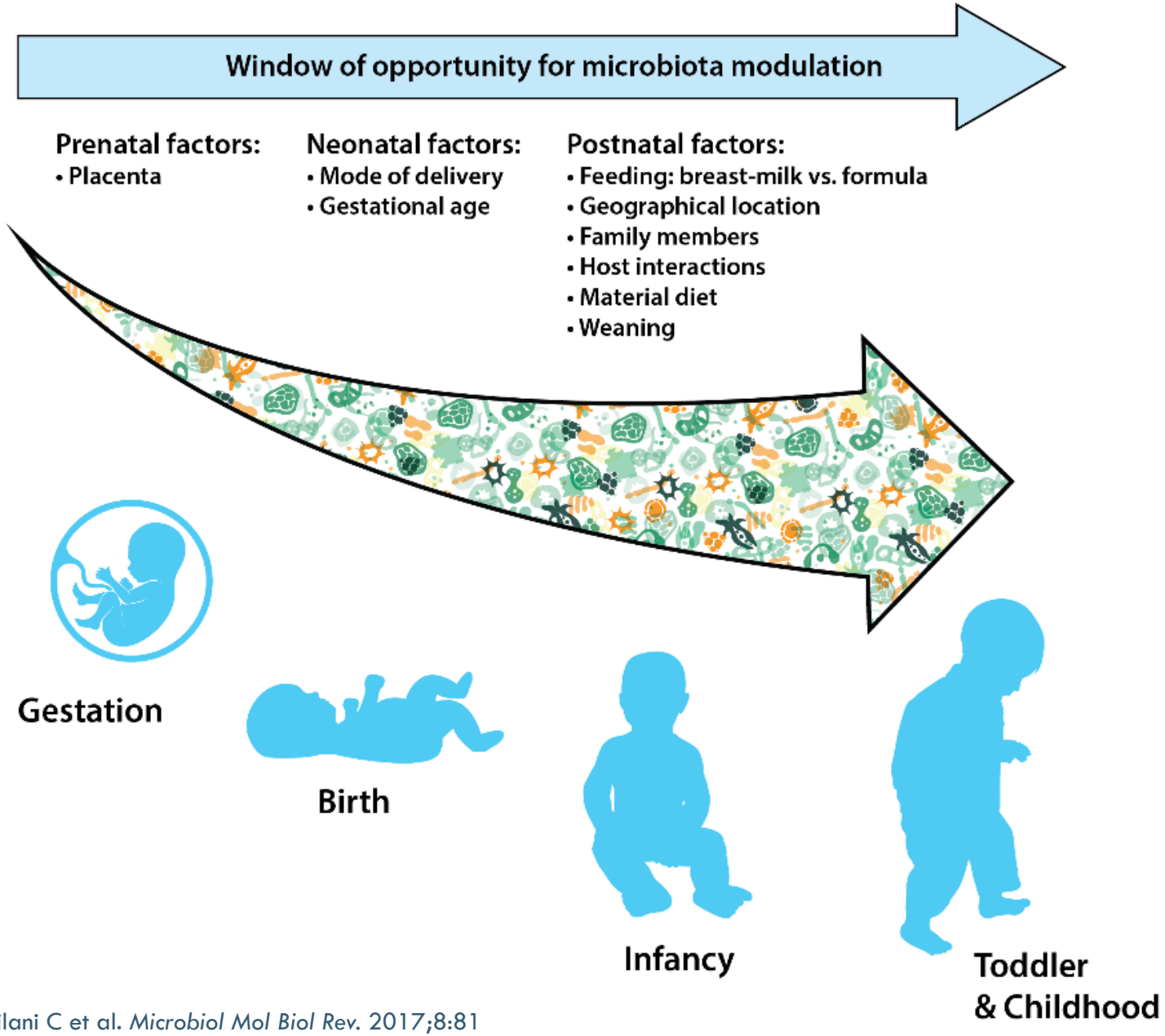
1: *J Nutr*. 2010 May; 140(5): 999–1006.
2: *J Res Med Sci*. 2017; 22: 107.
3: Cohen et al, *BJOG*. 2015;122:1313–1321.
4: Roth et al, *BMJ*. 2017 Nov 29; 359():j5237.
5: Wagner et al, *J Steroid Biochem Mol Biol*. 2013;136:313–320.
6: Pilz et al, *Int J Environ Res Public Health*. 2018;15(10):2241.
7: Looker AC et al. *Am J Clin Nutr*. 2008;88(6):1519–1527.

VITAMIN D2/D3 RICH FOODS

1. Cold-water fatty fish (D3)
2. Cod Liver Oil (D3)
3. Eggs (D3)
4. Fortified Milk (D3)
5. Fungus- mushrooms (D2)

Supplementation is often required. Pair with vitamin K2 to improve absorption.


When does your
baby first
experience flavors?



Adapted from: Milani C et al. *Microbiol Mol Biol Rev.* 2017;8:81
Used with Permission by Anu Desai, PhD

PROBIOTICS

Associated with decreased risk of:

- PIH[1]
- Placental inflammatory response[1]
- GDM[1]
- Postpartum depression and anxiety[3]
- Atopic dermatitis in infancy[4]
- Atopic eczema in infancy[5]

Also:

- Reduced early onset neonatal GBS infection[2]
- Lower rates of PTB[1]

1: Dunlop et al, *Adv Neonatal Care*. 2015 Dec: 15(6): 377-385
2: Ho M et al. *Taiwan J Obstet Gynecol*. 2016;55(4):515-8.
3: Slykerman RF et al. *EBioMedicine*. 2017;24:159-165.
4: Dotterud CK et al. *Br J Dermatol*. 2010; 163(3):616-23.
5: Kukkonen K et al. *J Allergy Clin Immunol*. 2007; 119(1):192-8.

Sleeplessness

>17-19 hrs of no sleep – BAC = 0.05% & 50% slower response rate

>19 of no sleep — BAC = 0.1%

Williamson AM, Feyer AM. Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occup Environ Med*. 2000;57(10):649–655. doi:10.1136/oem.57.10.649

Intuition Starts Here

- The electromagnetic field of the heart is 60X more powerful than that of the brain.[1]
- Heart frequency can transmit up to 3 feet.[1]
- A mother's brainwaves will synchronize to that of her baby's heartbeat when her attention turns toward her baby.[1]
- A mother's voice influences motor behaviors including heart rates and respiratory rates in their infant[2]

1: https://www.heartmath.org/articles-of-the-heart/science-of-the-heart/the-energetic-heart-is-unfolding/

2: Uchida MO, Arimitsu T, Yatabe K, Ikeda K, Takahashi T, Minagawa Y. Effect of mother's voice on neonatal respiratory activity and EEG delta amplitude. *Dev Psychobiol.* 2018;60(2):140–149. doi:10.1002/dev.21596

CURRENT STANDARD RECOMMENDATIONS FOR MODERATE MOVEMENT AND EXERCISE IN PREGNANCY:

150 MINUTES WEEKLY

COMMON S_X OF PREGNANCY	NUTRITION & LIFESTYLE	BIOACTIVES
INSOMNIA	Limit stimulants sugar/caffeine + support melatonin secretion during daytime	Magnesium
HEARTBURN	Limit antagonists: spicy, processed, gluten, dairy, sugar & focus on alkaline rich foods/fluid, positional sitting/laying/eating	
FATIGUE	Protein emphasis + adequate iron rich foods + sleep hygiene	Carnitine, Iron, B vitamins
CONSTIPATION	Adequate fiber + hydrating foods/fluid / kiwi fruit + phytonutrient intake + pre/probiotic rich foods	Magnesium

3

Nutritional Labor Prep	Dosing/Recommended Application
Red Raspberry Leaf Tea	Uterine tonic – 1 cup daily at 32 weeks
Epsom Salt Baths	Decreased edema – ½ cup baking soda + 1 cup Epsom salt, 2X weekly
Vitamin C	Skin elasticity – 2-3 grams buffered ascorbic acid (divided doses)
Vitamin D	Decreased C-section occurrence – optimize serum levels
Omega 3 Fatty Acids Probiotics – L. Rhamnoses & L. Reuteri	Decreased risk Preterm Birth – 600 mg DHA Reduce early onset GBS infection – 35-37 weeks

STAY TUNED! JOIN US FOR 4TH TRIMESTER

THANK YOU!