The CDC and FDA warn against consuming raw dairy during pregnancy.
**Nutrition and Gene Expression**

- Gene expression (Epigenetics)
  - Whether a gene is turned “on” or “off” (rather than changes to the DNA sequence) - regulated through DNA methylation
  - Nutrients can affect DNA methylation: zinc, methionine, betaine, choline, folate, B12
- Good nutrition during pregnancy and throughout life can change gene expression for the positive.
- Poor nutrition and toxins can affect it negatively

- Agouti mice study
  - “Methyl supplements increase the level of DNA methylation in the agouti LTR and change the phenotype of offspring in the healthy, longer-lived direction. This shows that methyl supplements have strong effects on DNA methylation and phenotype and are likely to affect long-term health.”

---

**A Healthy Diet**

- Whole foods
- Unprocessed
- Organic
- Locally grown
- Fermented foods rich in probiotics
- Grass-fed/pastured meat and eggs
- Good fats
- Free of food intolerances

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Food Additives
Unhealthy Ingredients to Avoid

Ingredients to Avoid | Sources
--- | ---
Artificial colors/flavors and preservatives | candy, cereal, ‘kids’ foods
MSG (hydrolyzed protein, yeast extracts) | broth, bullion, soup, meat-flavored foods
Pesticides | non-organic produce and meat
Aspartame and other artificial sweeteners | sodas and other foods
High fructose corn syrup | sodas, jelly, candy
Trans fats | partially hydrogenated oil, commercial margarine, mayonnaise, peanut butter
Sodium nitrite | bacon, hotdogs, lunch meat

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Food additives can cause: Hyperactivity*, inattentiveness, aggression, irritability, headaches/pain, trigger asthma, can be addictive

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Pesticides

• “Suspected chronic effects from exposure to certain pesticides include birth defects, toxicity to a fetus, production of benign or malignant tumors, genetic changes, blood disorders, nerve disorders, endocrine disruption, and reproduction effects. The chronic toxicity of a pesticide is more difficult than acute toxicity to determine through laboratory analysis.”

---

Penn State: College of Agricultural Sciences
Dirty Dozen

1. Celery
2. Peaches
3. Strawberries
4. Apples
5. Blueberries
6. Nectarines
7. Bell Peppers
8. Spinach
9. Cherries
10. Kale/Collard Greens
11. Potatoes
12. Grapes (Imported)

Buy organic!

Clean Fifteen

1. Onions
2. Avocado
3. Sweet Corn
4. Pineapple
5. Mangos
6. Sweet Peas
7. Asparagus
8. Kiwi Cabbage
9. Eggplant
10. Cantaloupe
11. Watermelon
12. Grapefruit
13. Sweet
14. Potato
15. Honeydew Melon
Protein

- Important for fertility and pregnancy
- Builds baby
- Protein (essential amino acids) building blocks for:
  - Muscle and tissue growth and repair, neurotransmitters, immune responses, enzymes, detoxification
- Use for the growth and repair needs of the mother
- Animal and plant-based protein

Grass-fed/Pastured Animal Protein/Fats

<table>
<thead>
<tr>
<th>Grass-fed/pastured</th>
<th>Conventional</th>
</tr>
</thead>
</table>
| • Higher omega 3  
  (2-4x more, eggs 10x more*) | • Unhealthy animals-poor food |
| • Rich in DHA (brain development) | • Inflammatory grains-create inflammatory food |
| • Rich in Vitamin A, D, E, K  
  – 4x the vitamin E*  
  – 2x the vitamin A | • Low Vitamins A&D and others |
| • Higher in CLA | • Higher in fats & cholesterol-particularly bad fats |
| • Higher in Tryptophan (sleep and mood) | • Higher in arachidonic acid (inflammatory) |

---Organic is not necessarily grass-fed

Plant-Based Protein

- Beans and lentils
- Nuts/seeds
- Quinoa: contains 50% more protein than other grains
- Combine beans, nuts, and grains daily to complete essential amino acids
- Spirulina
- Protein powder: Rice, pea, or hemp
- Avoid: soy

Avoid Soy

- Not good substitute for dairy or protein
- Very difficult to digest
- Irritate the gastrointestinal tract
- Blocks absorption - calcium, magnesium, iron, copper and especially zinc - due to phytic acid and oxalates
- Blocks thyroid function
- Endocrine disruption in the reproductive hormones of both males and females

**Soy sources:** tofu, soy protein, miso, tempeh, soy milk, soy cheese or ice cream, soy sauce, tamari, soy oil

**Hidden soy:** lecithin, vitamin E
Fats

<table>
<thead>
<tr>
<th>Omega 3</th>
<th>Omega 6</th>
<th>Omega 9</th>
<th>Saturated Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish oil or cod liver oil</td>
<td>Borage oil (GLA)</td>
<td>Olive oil</td>
<td>Coconut oil</td>
</tr>
<tr>
<td>Flax seed oil</td>
<td>Evening primrose oil (GLA)</td>
<td>Avocado</td>
<td>Palm/Red Palm oil</td>
</tr>
<tr>
<td>DHA and EPA supplements</td>
<td>Black currant oil (GLA)</td>
<td>Nuts/seeds</td>
<td>Animal fats – ghee/dairy, lard, bacon</td>
</tr>
<tr>
<td></td>
<td>Hemp seeds/oil (GLA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nuts/seeds and their oil</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Avoid** Vegetable oil: canola, safflower, corn, soy oils

Get 30-40% of calories from fat

- Breast milk is 53% fat & 25% saturated fat
- Brain development and brain function
- Hormone balance and mood
- Omega 3s (very helpful with depression, hyperactivity, and inflammation)
- Formation/fluidity of cell membrane
- Creating energy in cell and helps burns fat

Saturated Fat

**Vital Roles of Saturated Fat**

- **Brain:** Saturated fats are important for brain development
- **Bones:** Saturated fats help the body put calcium in the bones
- **Liver:** Saturated fats protect the liver from poisons
- **Lungs:** Can’t function without saturated fats—protects against asthma
- **Immune System:** Enhanced by saturated fats—fights infection
- **Essential Fatty Acids:** Work together with saturated fats

**Coconut Oil:**

- Contains many antifungal and antiviral components
- Anti-inflammatory effects
- More easily digested and absorbed
- Used immediately to create energy
- Enhances absorption of minerals

**Plant and animal saturated fat**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coconut</td>
<td>Meat/fat</td>
</tr>
<tr>
<td>Palm</td>
<td>Eggs</td>
</tr>
<tr>
<td>Macadamia</td>
<td>Butter</td>
</tr>
</tbody>
</table>
Uses of Cholesterol

- Brain development and function
- Aids digestion
- Builds strong bones and muscles
- Repairs damaged tissue
- Building block for hormones
- Regulates blood sugar
- Protects against infectious diseases
- Cholesterol is an activator for oxytocin receptors in the brain

Putting it all Together: Cholesterol

**Cholesterol is not enemy we hear it is**
- Dr. Harlan Krumholz, Cardio. Med at Yale found *old people with low cholesterol died twice as often* from a heart attack as old people with high cholesterol.1

**Artery damage -**
- From food containing oxidized fat and oxidized cholesterol

**Oxidized cholesterol**
- Oxidized cholesterol shown to be atherogenic in studies.2
- Powdered milk, dried egg products, dried meat, cheeses, protein powder
- Processed foods containing them: cake and bread mixes, crackers
- Low fat and nonfat milk containing milk solids

**Dietary Intervention**
- Consume/don’t avoid cholesterol in natural foods like eggs, meat, butter/ghee
- Increase fiber to bind cholesterol and keep it in check
- Avoid consumption of oxidized cholesterol foods - processed/powdered foods
- Increase antioxidants in the diet
- Avoid oxidizing fats - avoid high heat cooking of unsaturated fat

---

1. Krumholz HR and others. Lack of association between cholesterol and coronary heart disease mortality and morbidity and all-cause mortality in persons older than 70 years. Journal of the American Medical Association 272, 1335-1340, 1995

Carbohydrates

- Carbohydrates provide energy
- Carbohydrates are important - and quality is essential.
- Add complex carbohydrates: vegetables, fresh fruit, whole grains, starchy vegetables
- Reduce refined carbohydrates: flour products (bread, crackers, chips), cookies, pasta and reduce sugar
  - Too many can create difficulty in managing pregnancy blood sugar balance
  - Can cause spikes and crashes in energy - contributing to fatigue and poor cognitive performance
  - Contribute to blood sugar imbalances
  - Feed yeast overgrowth and other microbial imbalance

Soaking “seeds” – easy to do

Grains, nuts, seeds, beans

- Increases digestibility
- Reduces inflammatory response
- Breaks down phytic acid and oxalates
- Fermenting grains breaks down lectins

Grains - Soak in water for 8-24 hours with 2 TBSP lemon juice or vinegar. Drain and cook with fresh water.

Nuts - Soak in water (with or w/o salt) for 7-12 hours. Drain and refrigerate, use to make nut milk, or drain and dehydrate (eat or make nut butter)

Beans - Soak in water for 8-24 hours with hearty pinch of baking soda. Drain and cook with fresh water.
Vitamins & Minerals in Class Manual

Why **Food** is Important

**Why not just take supplements?**

- Plants contain phytonutrients often not found in supplements
- Food contains cofactors for aiding absorption of nutrients
  - **Cofactors include:** vitamins, minerals, trace mineral activators, enzymes, co-enzymes, chlorophyll, lipids, essential fatty acids, fiber, carotenoids, antioxidants, flavonoids, pigments, amino acids
  - Oranges contain bioflavonoids and over one hundred other cofactors
- Fermented foods contain probiotic bacteria
  - Beneficial bacteria are alive and thriving and contain their own food supply. Fermentation increases nutrient content and availability of nutrients in food. Live enzymes. Support pH. May colonize better.
- Fresh: enzymes and intact nutrients.
  - Raw vegetables and fresh juices contain enzymes and more nutrients.

*Supplementation is good too, and often essential for therapeutic doses & needs, but doesn’t take the place of healthy food. Both are important!*

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Blood Sugar & Pregnancy

- For fertility, balanced blood sugar is essential.
  - High insulin can interfere with the development of follicles, resulting in challenges with ovulation and reduced fertility.
- During pregnancy, health of the mother and fetus, particularly during the third trimester and during labor.
  - Gestational diabetes screening - third trimester
- Postpartum imbalanced blood sugar can effect milk production, as well as the energy of the mother.

Common signs of low blood sugar

- Crave a lift in energy and mood from sweets or alcohol, but experience drop after eating
- Dizzy, weak, or headachy
- Nervous, jittery, irritable
- Heart palpitations, rapid pulse
- Frequent thirst
- Night sweats (not menopausal or niacin related)
- Often feel stressed, overwhelmed
- Decreased libido
Sugar

- Feed yeast
- Depress the immune system
- Contribute to inflammation
- Cane sugar: common food sensitivity and uses chemical processing
- Refined sugar such as table sugar (white cane sugar) is devoid of nutrients/minerals that help process the sugar
- Refined sugar: “sugar” (bleached white cane sugar). Sugar in the Raw (white sugar with molasses added back), agave nectar
- Natural, less-refined sugar (more minerals and less refinement): Raw honey, Maple syrup (grade B), sucanat, fruit, blackstrap molasses,
- 4-5 grams per serving (1 teaspoon “sugars”) = 2 oz fruit juice, 2 tsp dried fruit, 1 TBSP ketchup

Glycemic Load

<table>
<thead>
<tr>
<th>Low GI</th>
<th>Med GI</th>
<th>High GI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low GI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apples/pears (6,38)</td>
<td>Beets (5,64)</td>
<td>Popcorn (8,72)</td>
</tr>
<tr>
<td>Carrots (3,47)</td>
<td>Cantaloupe (4,65)</td>
<td>Watermelon (4,72)</td>
</tr>
<tr>
<td>Chick peas (8,28)</td>
<td>Pineapple (7,59)</td>
<td>Whole wheat flour bread (9,71)</td>
</tr>
<tr>
<td>Grapes (8,46)</td>
<td>Sucrose (table sugar) (7,68)</td>
<td></td>
</tr>
<tr>
<td>Peaches (5,42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanuts (1,14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red lentils (5,26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweet corn (9,54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Med GI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple/orange juice (11,40)</td>
<td>Life cereal (16,66)</td>
<td>Cheerios (15,74)</td>
</tr>
<tr>
<td>Bananas (12,52)</td>
<td>New potatoes (12,57)</td>
<td>Shredded wheat (15,75)</td>
</tr>
<tr>
<td>Buckwheat (16,54)</td>
<td>Wild rice (18,57)</td>
<td>White wheat flour bread (11,70)</td>
</tr>
<tr>
<td>Navy beans (12,38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearled barley (11,25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sourdough wheat bread (15,54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High GI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linguine (23,52)</td>
<td>Couscous (23,65)</td>
<td>Baked Russet potatoes (26,85)</td>
</tr>
<tr>
<td>Macaroni (23,47)</td>
<td>Sweet potatoes (27,61)</td>
<td>Cornflakes (21,81)</td>
</tr>
<tr>
<td>Spaghetti (20,42)</td>
<td>White rice (23,64)</td>
<td></td>
</tr>
</tbody>
</table>
Pregnancy Diet

- Organic, local produce
- Grass-fed meats, eggs, and dairy
- Good quality fat come from grass-fed animals and dairy, eggs, fish and cod liver/fish oils, and plant-based fats such as coconut, avocado, and nuts/seeds
- Broths
- Fermented foods

Top Nutrition Boosters

- Vegetables
- Juicing
- Fermentations
- Grass-fed meat
- Broth and stock
**Juicing**

- Higher concentration of nutrients
  - Chlorophyll and phytonutrients
- Get nutrients without needing to eat/chew vegetables
- Most nutrients/enzymes available when consumed fresh
- Children that like liquids, juices and smoothies

<table>
<thead>
<tr>
<th>Start with</th>
<th>Add as you evolve taste</th>
<th>Go cautiously (high sugar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cucumber</td>
<td>Parsley, cilantro</td>
<td>Carrot</td>
</tr>
<tr>
<td>Celery</td>
<td>Kale or other greens</td>
<td>Beet</td>
</tr>
<tr>
<td>Fennel</td>
<td>Cabbage (ulcers)</td>
<td>Fruit: Apple, pear</td>
</tr>
<tr>
<td>Ginger</td>
<td>Cranberries</td>
<td></td>
</tr>
<tr>
<td>Lemon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green apples</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Add vegetable juice to smoothies. Add a bit of fruit to vegetable juice for flavor or added sweetness
- Add supplements to vegetable juice (instead of fruit juices)

**Preparation tip**

- Cucumber
- Celery
- Fennel
- Ginger
- Lemon
- Green apples
- Parsley, cilantro
- Kale or other greens
- Cabbage (ulcers)
- Cranberries
- Carrot
- Beet
- Fruit: Apple, pear

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**Fermented Foods – Rich in Probiotics**

Functions of good bacteria

- Regulate peristalsis and bowel movements
- Break down bacterial toxins
- Make vitamins needed and utilize: B1, B2, B3, B5, B6, B12, A and K
- Digest protein into amino acids (for use by the body)
- Produce antibiotics and antifungals
- Help breakdown sugars, lactose, and oxalates
- Support immune system and increase number of immune cells
- Balance intestinal pH
- Protect against environmental toxins: mercury, pesticides, pollution

Raw fermented foods contain billions (even trillions) of bacteria/serving!*

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Fermented Foods – Rich in Probiotics

Dairy-free:
• Raw sauerkraut
• Beverages (contain yeast that kills candida):
  • Kombucha
  • Coconut juice kefir
  • “Sodas” (hibiscus/rosehip tea with kefir starter)
• Nut milk yogurt

Dairy: Milk-based yogurt/kefir

Nutrient-dense Animal Foods

• Organic liver: iron, vitamin C, B12, folic acid, vitamin A
• Eggs, from pastured hens (if not sensitive): B12, vitamin A, B-vitamins, vitamin D, vitamin E, selenium, calcium, iodine, zinc, iron, choline
• Animal protein and fats (grass-fed): Vitamins A, D, and E, DHA, tryptophan

Use pastured/grass fed eggs, meat, and dairy (if consumed)
- Puree cooked meat (chicken breast) into pancakes
- Puree liver and add small amount to meatballs or meat patties
- Use ghee (or raw butter if tolerated)
- Add high quality eggs to pancakes, soft-boiled yolk to mashed banana/avocado, soak GF bread in egg for French toast
Homemade Bone & Vegetable Broths

• Grass-fed/pastured chickens or beef bones
  – Add 2 Tablespoons of vinegar - increases the calcium and magnesium
• Vegetables, seaweed, greens, nettles
• Nutrient dense, easy to assimilate nutrients
  – trace minerals, amino acids, calcium, magnesium, potassium, iron

Prepare soups, stews, casseroles with stock
Cook grains, soups, and/or pasta in broths - nutrients will absorb into food

Dairy

• Whole Milk -Full Fat
• Conventional, Grass-fed vs. Organic
• Raw Dairy

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**Nutrition of Raw Dairy**

- Natural enzymes
- Vitamins C, B12, and B6
- Fat soluble vitamins A, D, E, K (as compared with grain-fed)
- Beneficial probiotics
- Enzymes such as lactase (to break down lactose) and phosphatase (to help with absorption of calcium)
- Butterfat: CLA (conjugated linoleic acid) and butyric acid
- Lactoferrin (helps iron absorb)

**Vitamin D**

- Fertility
- Health of the baby, deficiency associated with autism
- Sunscreen
- Latitude
- Testing (25-OH Vitamin D) - 50 or above is ideal
- 1,000-4,000 IU for pregnancy (Hollis and Wagner)
- 5,000 IU's for nursing women who are deficient in vitamin D (Sears)
Pregnancy Dietary Numbers

- Calories
  - During Pregnancy: An additional 350-450 calories: 2,300-3,200 cal.
  - During Lactation: An additional 200-500 over pregnancy: 2,600-3,500 cal.
- Fiber: 20-30 grams
- Protein: 75-100 g–increase this over time, about 10 g increase each trimester, Lactation: 65-90 g

Weight Gain during Pregnancy

Healthy Weight Gain
- 25 to 35 pounds during pregnancy
- A woman underweight before pregnancy will gain more, and one overweight will gain less.
Balanced Meal

- 15-25% protein
- 40-60% complex carbohydrate
- 30-40+% good fat

Power Foods

- Fermented foods
- Eggs (from pastured hens)
- Chicken & other bone stocks
- Leafy green vegetables
- Blackstrap molasses
- Fish (↑ omega 3, ↓ mercury)
- Nuts and seeds
  - Flax seeds and oil
  - Red meat
- Black-eyed peas and beans
- Nutritional yeast
- Organ meat (grass-fed only)
- Whole grains
- Fermented dairy (yogurt/kefir)
- Butter and dairy products from pastured cows and goats
Dietary Guidelines in Class Manual

First Trimester Nutrition

- Protein is important during all stages, especially the first trimester.
- Calories and protein will increase slightly during this time, increasing about 300 calories.
  - However, typically protein sources such as meat and eggs may not be as appealing.
  - If not, consider almond butter or other nut butter.
- Do your best to get the most nutrition possible, especially if you have morning sickness, but don’t worry too much if you are feeling sick and can’t eat the way you’d like.
- Standard weight gain is 2-5 pounds during the first trimester.
Second Trimester Nutrition

• Protein and calcium needs increase during the second trimester.
• Standard weight gain during this trimester is about 1 pound per week.

Third Trimester Nutrition

• It is most important to get good fats particularly omega-3 and DHA during the third trimester.
  – Cod liver oil is the most common way to get this, as well as other fish oils.
  – You can also get it from pastured eggs, DHA eggs, salmon, and small amounts in plant sources.
• Additionally, while it is always important to watch sugar intake, the third trimester is the most important time to be diligent about keeping sugar intake low.
• Standard weight gain during the third trimester is about 1 pound per week.
Basic Pregnancy Supplements

- Prenatal vitamin
  - Thorne Research
  - New Chapter
- Cod liver oil
  - 1-2 teaspoons of Nordic Naturals
  - ½ teaspoon Blue Ice Fermented Cod liver oil by Green Pasture
- Probiotics
  - Klaire Labs, Ther-biotic Complete, 1 capsule/day
- Optional:
  - High Vitamin X-Factor Butter oil, ½ teaspoon
  - Vitamin D, additional if needed over prenatal

Questions?

See you next week...