Culinary Institute of America

Culinary Intensive Workshop Day 4

Culinary Institute of America

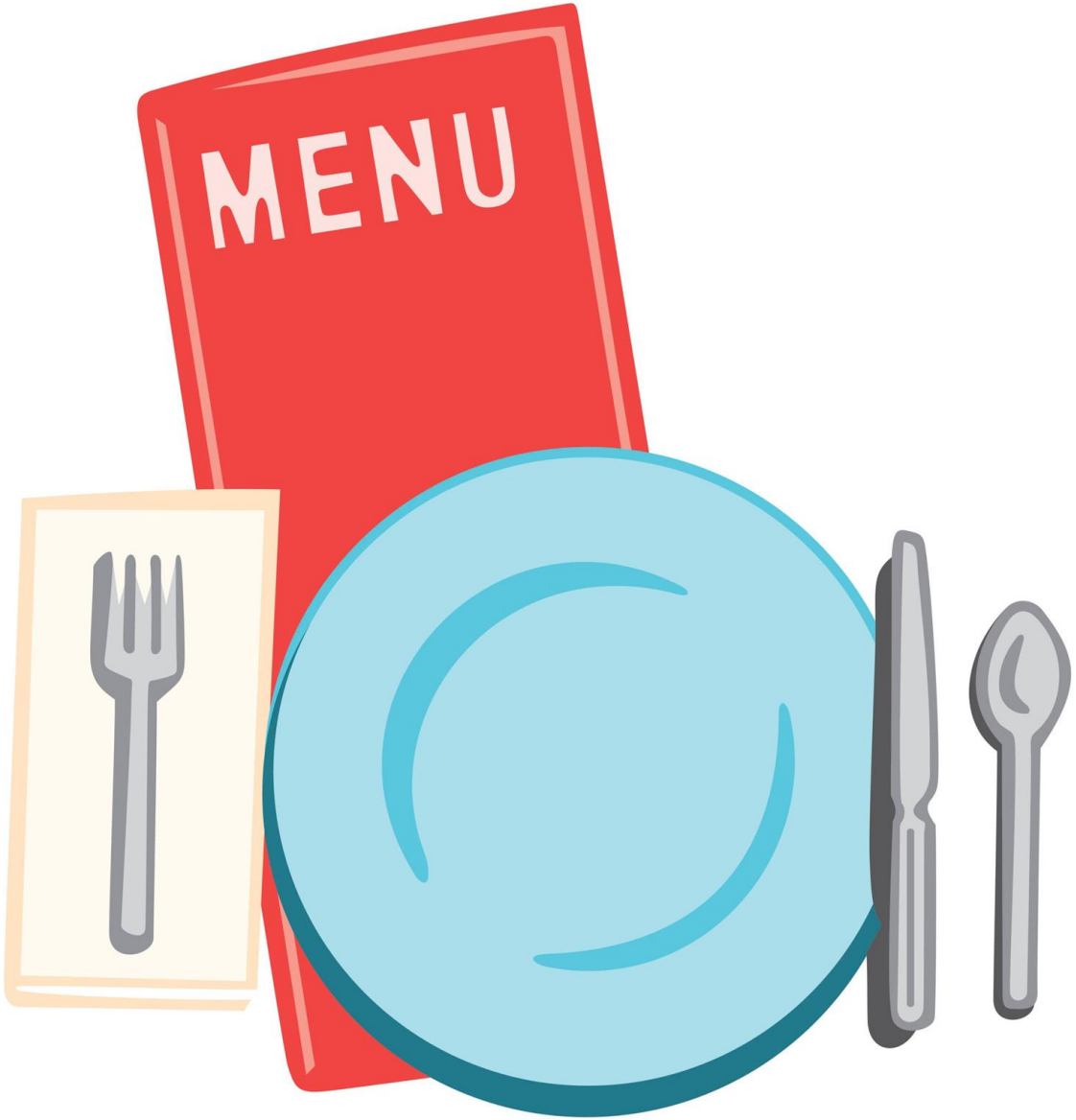
TEACHING KITCHEN COLLABORATIVE

Day 4

FUNCTIONAL INGREDIENTS AND THE GUT MICROBIOME: FERMENTED FOODS, MUSHROOMS, SEAWEED, ANTI-INFLAMMATORY AND IMMUNE BOOSTING FOODS BLUE ZONES DIET, BEVERAGES

Day Overview

9-10	Lecture in PDR
10:15-11	Demo
11-1:30	Production
1:30	Lunch From Production
2-2:15	Re-set kitchen
2:15-2:30	Wrap up

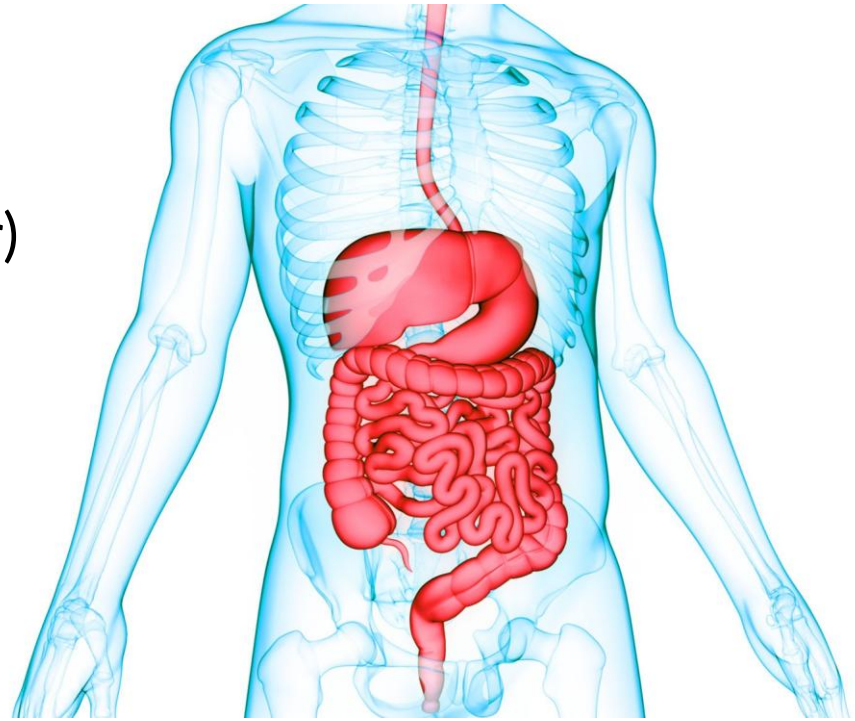


Lecture Overview

- The Gut Microbiome
  - Gut-brain axis
  - Probiotics – Fermented Foods
    - Soy, yogurt, kombucha
  - Prebiotics – Fiber & Starch
  - Complications
- Food Labeling
- Phytonutrients
  - Herbs & Spices
- Highlight on Mushrooms

Gut Basics

- Majority of nutrients get absorbed in the intestines
- Inflammation of physical lining of intestines can impact absorption
- Gut Microbiota = millions of bacteria that live inside the digestive tract in the intestines
  - Microbes help the body with undigested foods (fiber)
  - Important to healthy body
  - Lack of diversity associated with chronic disease
- Diets high in refined starches, sugars, and saturated fats reduce microbial diversity and may foster pro-inflammatory bacterial species



Which of these affect the gut microbiome?

A. Diet overall
B. Ultra processed foods
C. Fiber rich foods
D. Leafy greens
E. Yogurt and other fermented foods
F. Physical activity
G. Sleep
H. Stress
I. Brushing your teeth

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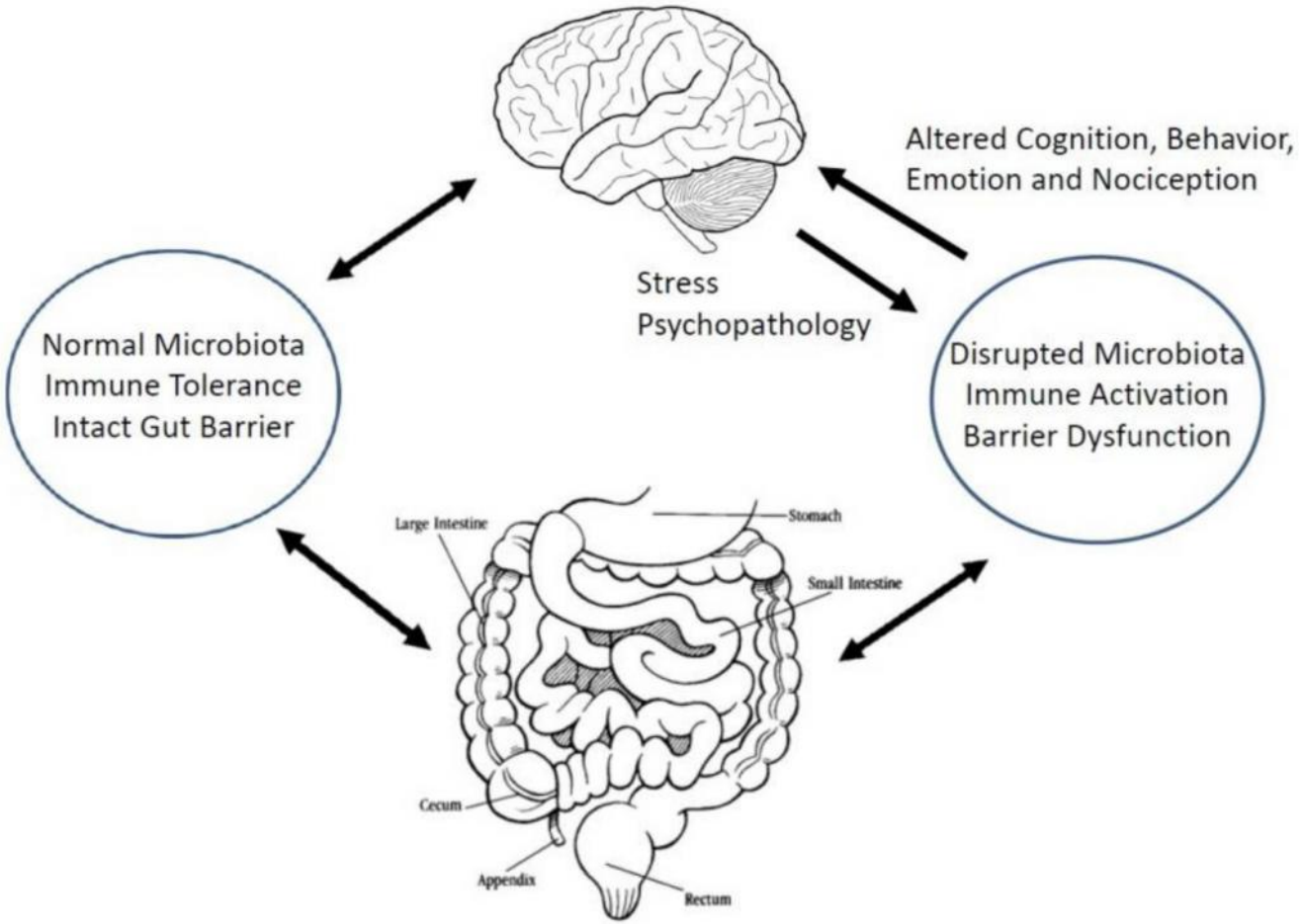
ALL OF THEM

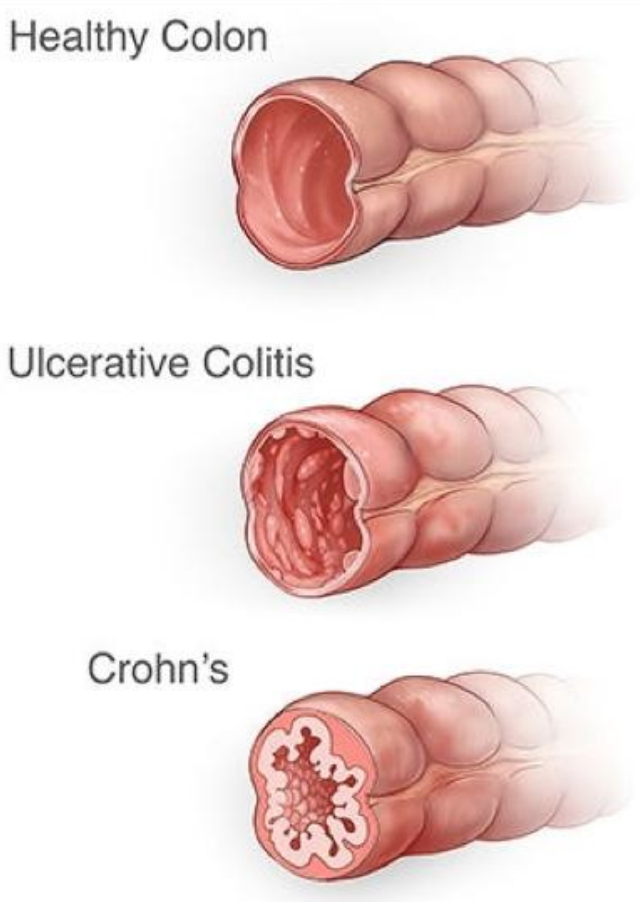
Gut-Brain Axis

bidirectional communication between the central and the enteric nervous system, linking emotional and cognitive centers of the brain with peripheral intestinal functions



Complications Related to Gut Microbiome

- Diseases:
  - IBS / Crohns / Irritable Bowel Syndrome
  - Cause inflammation of gut lining
- Lifestyle factors that have negative effects:
  - Poor sleep
  - Stress
  - Diet made of high sugars
- Antibiotics - kill all bacterias (good and bad)
- Medications (proton pump inhibitors, NSAIDs, etc)
- Pesticides - harm intestine wall, can lead to leaky gut



FODMAPs

- Group of short-chain sugar molecules
- Poorly absorbed in small intestine
- Can cause gas, bloating, pain, diarrhea, and constipation in sensitive people

- (Fermentable Oligosaccharides, Disaccharides, Monosaccharides, And Polyols)
  - Fermentable: **Gut bacteria ferment them, producing gas**
  - Oligo-saccharides: Found in wheat, onions, garlic, and legumes
  - Di-saccharides: Lactose in dairy
  - Mono-saccharides: Fructose in fruits, honey, and high-fructose corn syrup
  - Polyols: Found in stone fruits (like apples, pears) and some sweeteners (like xylitol)

FOOD	VEGETABLES	FRUITS	PROTEINS	FATS	STARCHES, CEREALS & GRAINS
LOW	 lettuce, carrot, cucumber	 strawberries, pineapples, grapes	 chicken, eggs, tofu	 oils, butter, peanuts	 potatoes, tortilla chips, popcorn
HIGH	 garlic, beans, onion	 blackberries, watermelon, peaches	 sausage, battered fish, breaded meats	 almonds, avocado, pistachio	 beans, gluten-based bread, muffins

How to Improve Microbiome

Prebiotics or Fiber is essential

- Fiber and Resistant Starch feed “good” bacteria

Probiotics or Fermented foods can increase total number + diversity of microbes

- Fermented drinks: Yogurt, kombucha, kefir (yogurt-like drink)
- Fermented veggies include
  - Kimchi (Korean pickled vegetables)
  - Sauerkraut
  - Pickles (usually not)- look for “naturally fermented” on labels
- Fermented soy: Tempeh

Prebiotics: Fiber & Resistant Starches

- Microbes eat these and ferment them
- Produce short-chain fatty acids (butyrate, acetate, and propionate)
- Improves gut barrier function
- Reduces inflammation
- Helps enhance diverse microbiome: enhancing insulin sensitivity, blood sugar control, immunity, and feelings of fullness,
- Adding too much too quickly can cause gas while microbes adapt
- Reminder: resistant starch sources include:
  - unripe bananas, legumes, whole grains, cooked/cooled potatoes and rice
- Sources of fiber (vegetables, etc) must be unheated

Probiotics

- Can come from fermented food or supplements
    - Food is best:
    - Yogurt
    - Kombucha
    - Kefir
    - Tempeh
- Supplements can be useful as a “medicated dose”
    - Best to obtain from whole food sources

- Consider the other ingredients to the food
    - “Probiotic” beverages with high sugar and artificial flavors

What are Fermented Foods

- Fermenting food is a type of preservation process
  - Different from pickling foods
- Slow process, uses salty brine
  - Pickling uses vinegar (kills bacterias)
- Needs to be kept cool, in refrigerator
  - Heat kills bacterias
- Results in growth of active cultures of good bacteria strains

Front of Package Labeling

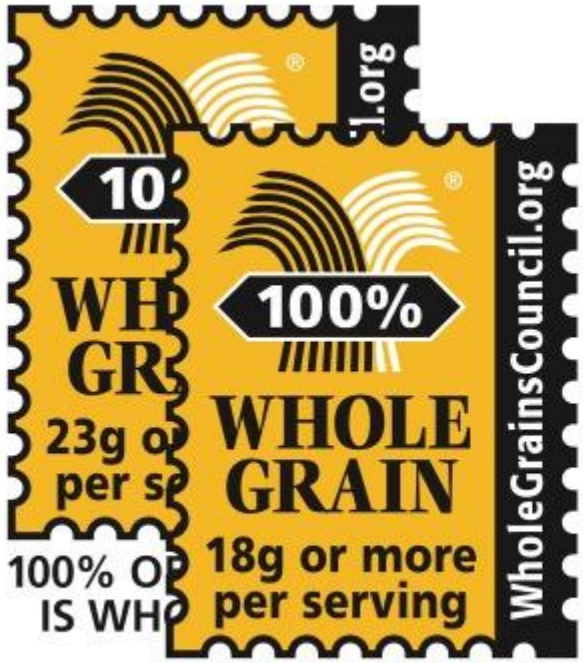
FDA & USDA regulate food label claims

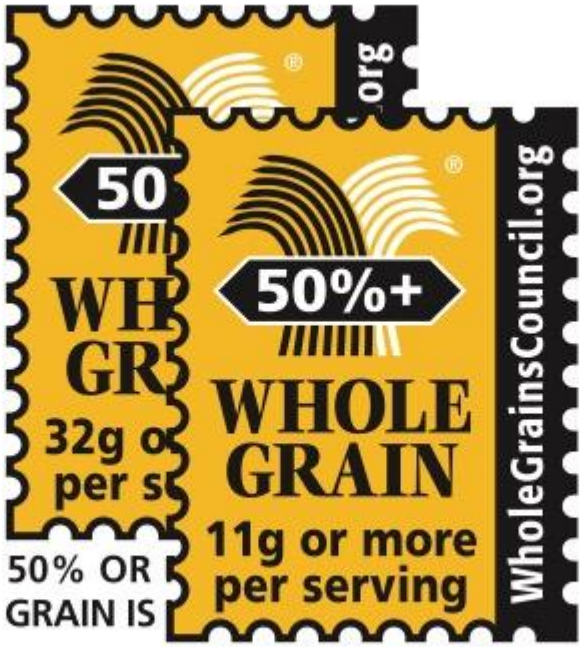
Specific rules and requirements

Helpful but isolated messaging

Read ingredient list

Read nutrition facts





THE 100% STAMP	THE 50%+ STAMP	THE BASIC STAMP
For products where ALL of the grain is whole grain.	For products where at least 50% of the grain is whole grain.	For products that contain a significant amount of whole grain, but which contain primarily refined grain.*
Minimum requirement: 16g (16 grams) whole grain per serving. (a full serving of whole grain)	Minimum requirement: 8g (8 grams) whole grain per serving. (one half serving of whole grain)	Minimum requirement: 8g (8 grams) whole grain per serving. (one half serving of whole grain)

"Organic" Foods

- **"100% Organic"** = all ingredients and processing aids are certified organic
- **"Organic"** = at least 95% ingredients are organic
  - remaining 5% from approved list
- **"Made with Organic Ingredients"** = at least 70% ingredients organic
  - USDA seal cannot be used
- Strict regulations set by USDA
- Prohibit use of synthetic pesticides, fertilizers, GMOs, antibiotics, and growth hormones
- Organic livestock must be raised on organic feed, have access to the outdoors, and be managed without routine antibiotics or synthetic hormones
- Expensive to get certified
  - Many small farmers cannot afford the process - inquire with your farmer or at farm stand to find out what they use on their products

Environmental Working Group

- Updated every year

- Based on residue levels of pesticide contamination and pesticide toxicity
- Prepared the way common person would (remove peel, wash under cold water, etc.)
- Link between consumption of fruits and vegetables with greater pesticide contamination to higher levels of pesticides in the body

Dirty Dozen

1. Spinach
2. Strawberries
3. Kale, collard & mustard greens
4. Grapes
5. Peaches
6. Cherries
7. Nectarines
8. Pears
9. Apples
10. Blackberries (new in 2025)
11. Blueberries
12. Potatoes (new in 2025)

Clean 15

1. Pineapple
2. Sweet corn (fresh & frozen)
3. Avocados
4. Papaya
5. Onions
6. Sweet peas (frozen)
7. Asparagus
8. Cabbage
9. Watermelon
10. Cauliflower
11. Bananas
12. Mangoes
13. Carrots
14. Mushrooms
15. Kiwi

Phytonutrients

- “Non-essential” - no known negative impact from not consuming
- Over 25,000 identified
- Found only in plant-sources
  - Herbs, spices, teas, fruits and veggies
- “Antioxidant” properties
- Positive correlation between diets high in these nutrients

Common Categories

- **Carotenoids (**6 common types): beneficial for eye health and immune health.
  - **lutein and zeaxanthin**— are found in the retina; can decrease risk of macular degeneration by 43%
- **Flavonoids:** protect against cancer and cardiovascular disease; decrease inflammation
  - contribute to healthy cell communication
- **Ellagic acid:** reduces cancer risk, lowers cholesterol, antioxidant and anti-inflammatory properties
  - highest levels of ellagic acid are in raspberries
- **Glucosinolates:** help regulate inflammation, metabolic function, stress responses, prevent cancer and eliminate toxins
  - Found predominantly in cruciferous vegetables (broccoli, bok choy, cauliflower, brussels sprouts)

Phytonutrients & Food Colors: Eat the Rainbow

Color groups have distinct phytonutrients that exert unique physiological effects:

- **Red-hued foods** (e.g., tomatoes, strawberries, watermelon)
  - Rich in **lycopene** and **anthocyanins**
    - Antioxidant, anti-inflammatory, and cardioprotective properties

- **Green vegetables** (e.g., broccoli, kale, spinach)
  - Bioactive compounds such as **sulforaphane** and **chlorophyll**
    - Support hepatic detoxification pathways, hormonal regulation, and oxidative stress mitigation

- **Orange produce** (e.g., carrots, sweet potatoes, butternut squash)
  - Sources of **beta-carotene/provitamin A carotenoid**
    - Enhances immune function, visual acuity, and epithelial tissue integrity

Herbs and Spices

Herbs: leaves and stems

Spices: roots, seeds, bark or fruit

- **Potent sources of phytonutrients**
  - Curcumin in turmeric, gingerols in ginger, and capsaicinoids in chili peppers
    - Help regulate inflammatory pathways and oxidative stress
  - Organosulfur compounds in garlic and onions
    - Enhance vascular and immune function
  - Polyphenols in rosemary, thyme, and oregano
    - Protect against free radical damage

- Some combinations amplify benefits:
  - Piperine in black pepper improves curcumin absorption
  - Cooking herbs in oil boosts uptake of fat-soluble antioxidants like carotenoids

Fresh vs Dried Herbs

- Fresh herbs offer slightly more vitamins and phytonutrients
- Dried concentrates minerals
- Fresh offers more flavor - can make up by adding more dried
- Shelf life of fresh is short
- Dried is more cost-effective than buying fresh
- Growing herbs at home is most cost effective, easy/regular access, enhances flavors

Soybeans

Soy (tofu, tempeh, miso, soy milk, etc)

Complete protein (35-38% total cal from protein)

Polyunsaturated fat (40% fat)

- One of few plant sources of omega 3 (linoleic acid)

Good amount of fiber (8g per serving)

Other nutrients: calcium, iron, zinc, and B vitamins (folacin, niacin, and B6)

Some soy products are fermented (tempeh) - contribute to gut health

Soy & Estrogen

- Isoflavones = plant estrogens
  - Primary isoflavone = genistein, only found in soy foods
  - Modulating effect—can mildly mimic estrogen in low-estrogen environments or block stronger estrogen activity when levels are high
    - 1/100,000 x strength human estrogen
- Moderate soy intake shown to be safe for most people
  - May offer health benefits
    - reduced risk of heart disease, improved cholesterol levels, and relief from menopausal symptoms
  - Evidence indicates soy does not increase cancer risk - may be protective
  - Choosing whole soy foods over highly processed soy supplements or protein isolates recommended
    - Soy foods provide isoflavones in non-toxin levels
    - Whole soy foods contain other suspected anti-cancer properties

Perimenopausal / Menopausal Foods

- Hormonal fluctuations
  - Decreasing estrogen
  - Increasing progesterone
- Protein needs increase
  - Muscle mass starts to decline
  - Amino acids needed for hormone synthesis

- Foods reported to be helpful for women in peri/menopausal states:
  - Foods containing **phytoestrogens**: Soy, flax seeds, sesame seeds, legumes and nuts
    - Help hormonal balance
  - **Cruciferous Vegetables**: Broccoli, cauliflower, Brussels sprouts, and kale
    - Contain compounds that help balance estrogen metabolism
  - **Whole Grains:** Oats, quinoa, and barley support overall hormonal health.
  - **Seaweed:** contain iodine, support thyroid and hormonal health
  - **Leafy greens:** calcium and magnesium for bone health, combat inflammation, support gut health
  - **Mushrooms:** supporting hormonal balance, energy, and cognitive function

Mushrooms

- Source of **Vitamin D**, phosphorous, potassium, copper, selenium, B vitamins
- Promotes healthy gut bacteria
- Promotes immune health
- May help lower cholesterol
- May lower your risk of some cancers
  - Naturally low in sodium but still savory
  - **Umami flavor/texture**
    - Great texture substitute for red meat

Popular "Healthy" Diets

Paleo - emphasize meat, fish, fruits, vegetables, nuts, and seeds

- eliminating grains, legumes, dairy, and processed foods
- may support short-term weight loss and improved glucose control,
- exclusion of major food groups can pose nutrient challenges if not carefully managed

Ketogenic - high-fat, very low-carbohydrate designed to shift body into ketosis
(metabolic state in where fat is used as the primary energy source)

- Originally developed to treat epilepsy
- Studies show that keto can promote short-term weight reduction and improved blood sugar control
- Long-term safety and sustainability remain debated
- Restrictive nature can make adherence difficult
- May limit intake of important nutrients found in whole grains and certain fruits

Popular "Healthy" Diets

Dean Ornish - very low-fat, whole-foods, plant-based eating

- Focusing on fruits, vegetables, whole grains, and legumes
- Eliminate meat, poultry, fish, and high-fat dairy
- Significantly restrict fat to under 10% daily calories
- Broader program includes stress management, exercise, and social support

Vegan - no animal products; bi-products (eggs, dairy); or created with (ie sugar with bone char)

- Adventist health studies indicate many positive health outcomes correlated to vegan diets
  - Focus on whole foods such as nuts, whole grains, fruits and vegetables
- Many UPFs qualify and marketed as "vegan"
- Can be unhealthy and missing nutrients if not including variety of whole foods
- B12 needed in supplements or fortified foods (only comes from animal products)

Mediterranean Diet

- Emphasizing whole, plant-based foods:
  - Fruits, vegetables, whole grains, beans, nuts
- Olive oil as the main fat source
- Moderate fish/poultry/dairy
- Moderate wine consumption
- Very limited red meat and sweets

- Community/social engagement is the base

- Shown in many studies to correlate with:
  - Longevity
  - Heart health
  - Reduced incidence of chronic disease (diabetes) and cognitive decline

Blue Zones Project®

Well-being improvement initiative - designed to make healthy choices easier

- Based on principles identified during 20-year worldwide longevity study
  - Regions of the world with most centenarians (100+y/o)
- Encourage sustainable changes in built environment, building environments and social networks

By **helping people live longer and better through behavior change**:

- Communities can lower healthcare costs & improve productivity
- **Enjoy a higher quality of life**

5 original blue zones regions:

- Loma Linda, California; Okinawa, Japan; Nicoya, Costa Rica; Sardinia, Italy; and Ikaria, Greece

The Power 9® nine specific traits that lead to longer, healthier, happier lives

1. **Move Naturally**: Find ways to move more! You will burn calories without thinking about it
2. **The 80% Rule:** Eat mindfully and stop when 80% full
3. **Downshift:** Reverse disease by finding a stress-relieving strategy that works for you
4. **Belong:** Belong to a faith-based community and attend services regularly to add up to 14 years to your life
5. **Purpose:** Wake up with purpose each day and add up to seven years to your life
6. **Plant Slant:** Put more fruits and vegetables on your plate
7. **Right Tribe:** Surround yourself with people who support positive behaviors – and who support you
8. **Wine @ 5:** If you have a healthy relationship with alcohol, enjoy a glass of wine with good friends each day
9. **Loved Ones First**: Invest in time with family and add up to six years to your life

Meal Time Behaviors

- **Distracted eating** - in front of screens (TV, ipad, phone, computer)

- **Intuitive eating** - attention on internal cues of hunger, fullness, and satisfaction
  - can improve psychological well-being and reduce overeating

- **Mindful eating** - encourage awareness of the taste, texture, and satisfaction of food, in addition to hunger and fullness cues
  - can help with weight control, emotional well-being, and improved digestion

- **Intermittent fasting** - alternates periods of fasting and eating, popular versions include alternate-day fasting, 5:2 method, and time-restricted feeding
  - Some research supports weight loss and improved insulin sensitivity
  - May not be suitable for everyone— long-term data limited

Mindful Eating Activity

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Any Questions?