

Staying Healthy with Immune Boosting & Anti-inflammatory Foods

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Objectives for Talk

- Describe a healthy immune system
- Define the immune response
- Explore the major nutrients that support a healthy immune system
- Explore the minerals that support a healthy immune system
- Explore herbs and spices that support a healthy immune system
- Putting it all together to support a healthy immune system
- Recipes to support a healthy immune system

The Importance of a Healthy Immune System

- The immune system is responsible for fighting foreign invaders in the body, like pathogenic bacteria and viruses, and also destroy cells within the body when they become cancerous.



- Poor nutrition results in increased infections, slow healing from injury and infections, and increases susceptibility to symptoms and complications from immune system dysfunction.
- Studies shows that immune function often decreases with age, and recent research suggests this decrease is also related to nutrition and may be slowed or even stopped by maintaining healthy nutrition.

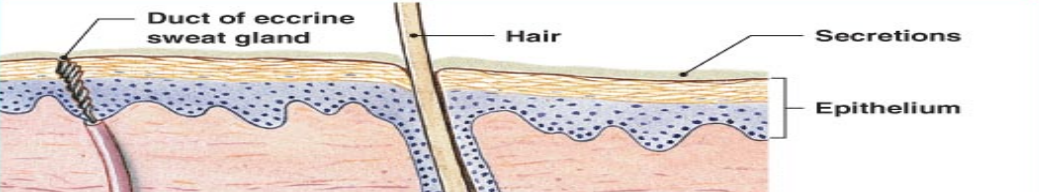

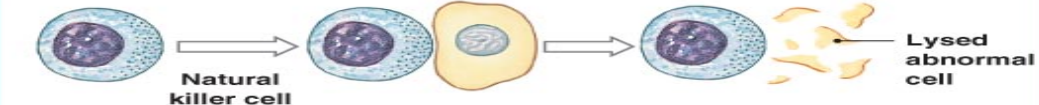

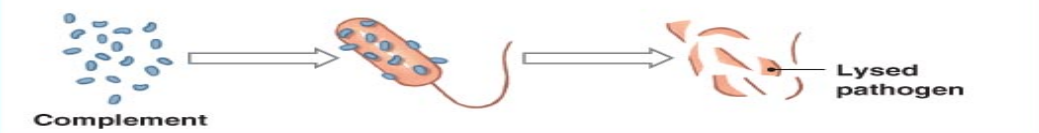


What is the immune system?

The ability to fight infection, illness, and disease

Immune System has two lines of defense called

non-specific
(innate)
immunity

specific
(adaptive)
immunity

<p>PHYSICAL BARRIERS Prevent approach of and deny access to pathogens</p>	
<p>PHAGOCYTES Remove debris and pathogens</p>	
<p>IMMUNOLOGICAL SURVEILLANCE Destroys abnormal cells</p>	
<p>INTERFERONS Increase resistance of cells to viral infection; slow the spread of disease</p>	 <p>Interferons released by activated lymphocytes, macrophages, or virus-infected cells</p>
<p>COMPLEMENT SYSTEM Attacks and breaks down cell walls; attracts phagocytes; stimulates inflammation</p>	 <p>Lysed pathogen</p>
<p>INFLAMMATORY RESPONSE Multiple effects</p>	 <p>Mast cell</p> <ol style="list-style-type: none"> 1. Blood flow increased 2. Phagocytes activated 3. Capillary permeability increased 4. Complement activated 5. Clotting reaction walls off region 6. Regional temperature increased 7. Specific defenses activated
<p>FEVER Mobilizes defenses; accelerates repairs; inhibits pathogens</p>	 <p>Body temperature rises above 37.2°C in response to pyrogens</p>

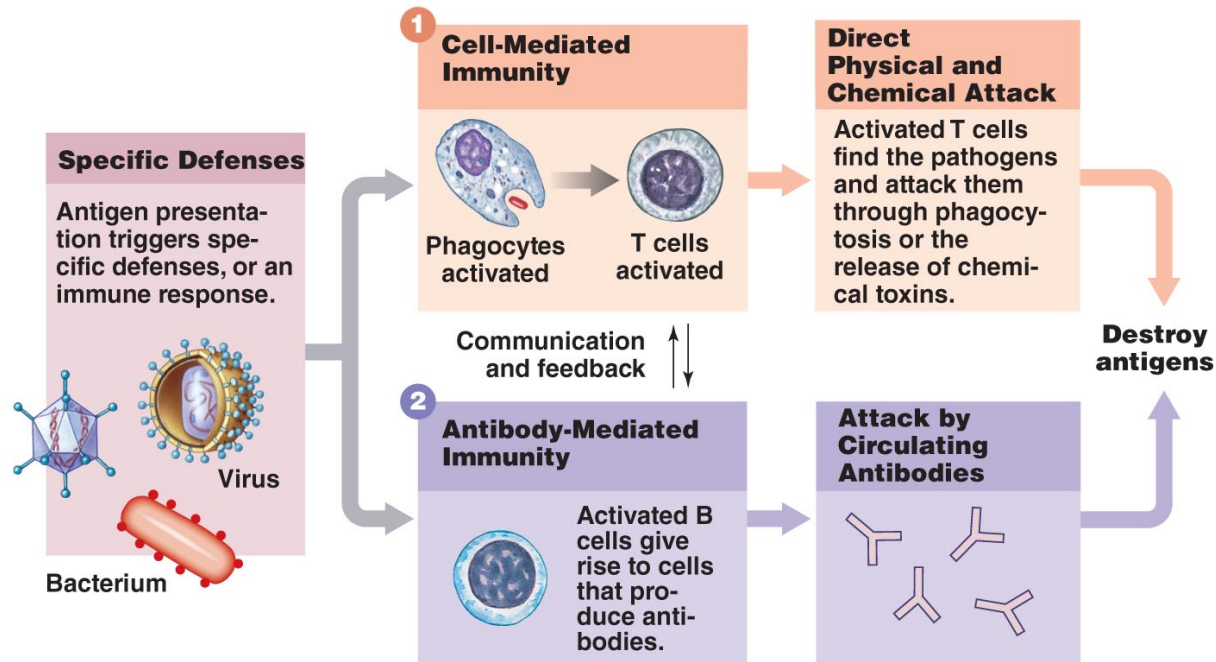
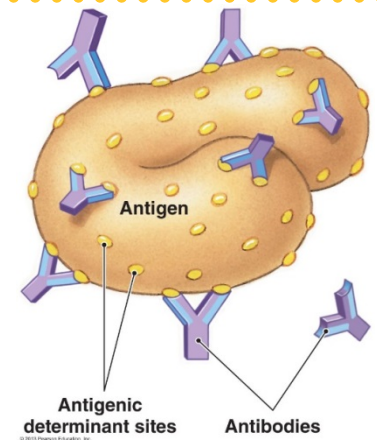
What is the immune system?

What is Specific about it? It's all about "Flying Flags"

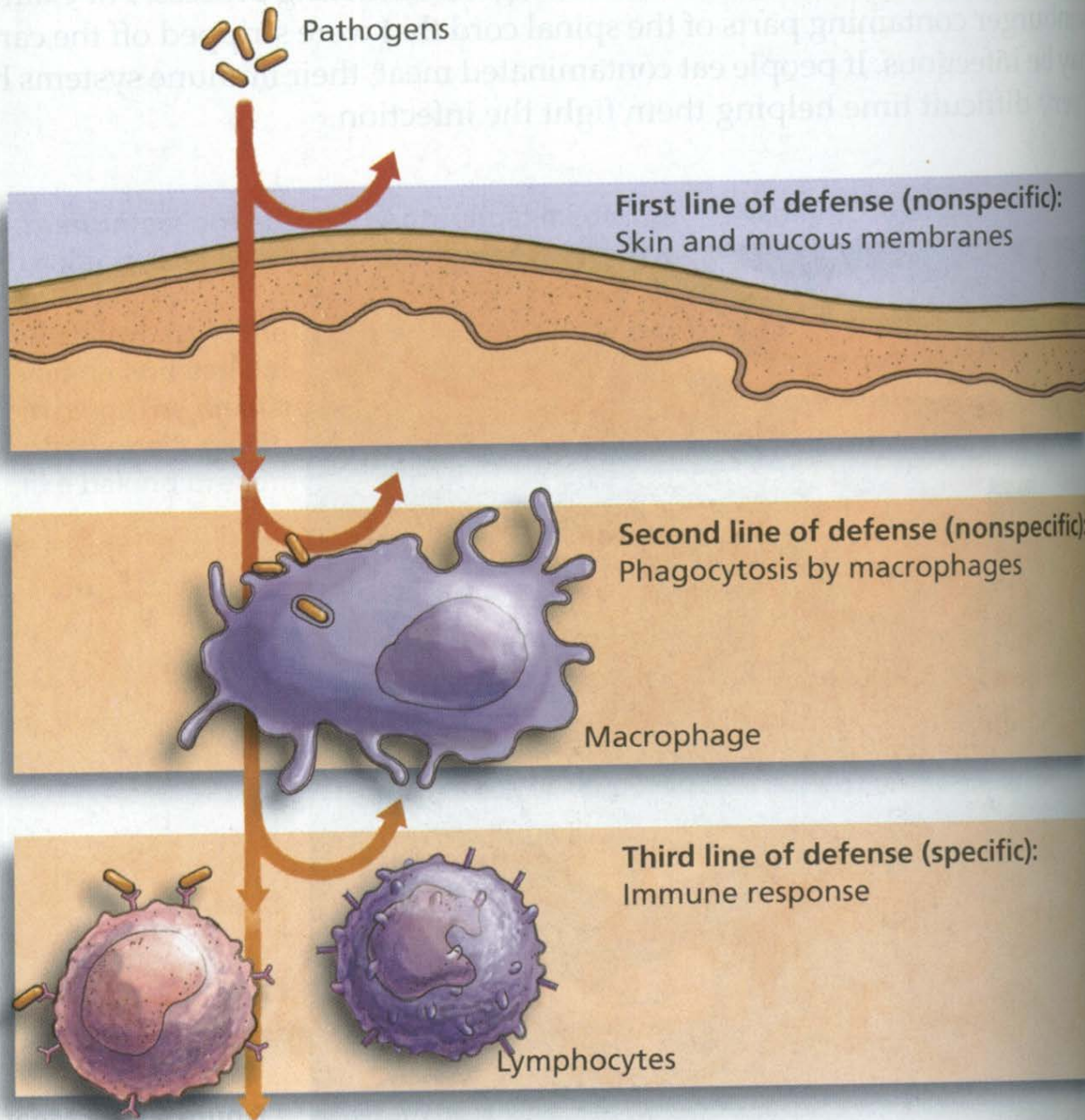
Antigen and Antibodies

Antigen = foreign protein (of virus/bacteria/cell)

Antibody = receptor for foreign protein ("Eat Me Flag" for macrophages)



Lines of Defense

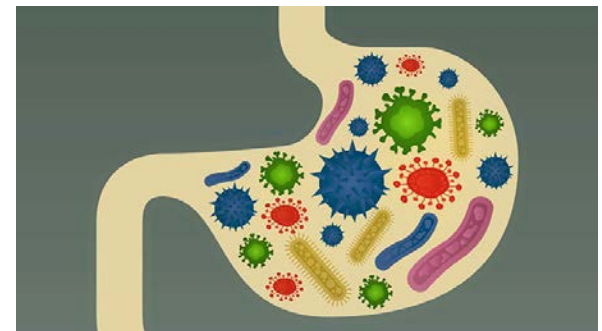


Innate immunity:
7 lines of defense

Adaptive immunity: B and T cells

Gastrointestinal Barrier and the Immune System

- The gastrointestinal tract has approximately 150 x more surface area than your skin.
- It contains the largest number of immune cells of your whole body, constituting approximately 60% of your entire immune system.
- It comes into contact with the largest amount and number of different molecules and organisms of any organ in your whole body.
- Regulates the absorption of nutrients while keeping out damaging molecules and pathogenic organisms.



Protein and the Immune System

- Studies have shown that deficiency of high-quality protein can result in depletion of immune cells, inability of the body to make antibodies, and other immune-related problems.
- High-quality, complete proteins are found from many sources:
 - eggs, fish, and shellfish, tofu, tempeh and quinoa
- Many vegetables and grains are also excellent sources of many of the immune-stimulating amino acids
 - Broccoli, brown rice, nut butters, mushrooms, nuts and seeds



Omega-3 Fatty Acids and the Immune System

- Diets low in omega-3 fatty acids are associated with chronic inflammatory conditions and autoimmune diseases.



- In order to achieve a more beneficial ratio of omega-3 fatty acids in your body, it is important to decrease the amount of omega-6 fatty acids in your diet, while increasing the amount of omega-3 fatty acids.

- Reduce your consumption of conventionally raised meats and dairy products, and refined foods



- Increase consumption of wild-caught cold-water fish like salmon, tuna, mackerel and sardines, ground flaxseeds, walnuts, pumpkin seeds leafy green vegetables, and grass fed meats and dairy.

Fiber and the Immune System

- Whole, fresh fruits and vegetables, promote a healthy gastrointestinal system.
- They are fermented by the friendly bacteria in your colon to short-chain fatty acids (SCFAs), which are used as a fuel by gastrointestinal tract cells.
- Fiber also promotes the removal of toxins that can adversely affect your gastrointestinal tract cells and supports healthy digestive function overall.



B vitamins for a Healthy Immune System

- [Vitamin B5](#) (pantothenic acid) promotes the production and release of antibodies from B-cells, and deficiency of vitamin B5 results in reduced levels of circulating antibodies.
- [Folic Acid](#) deficiency leads to a decrease in T-cells and supports production of red blood cells which carry oxygen around the body.
- [Vitamin B6](#) deficiency consistently impairs T-cell functioning and results in a decrease in blood lymphocyte counts.
- [Vitamins B1](#) (thiamin) and [B2](#) (riboflavin) are important in normal antibody response.
- [Vitamin B12](#) appears to inhibit phagocytic cells and possibly T-cell function.

Excellent Sources of B Vitamins

- Whole grains, vegetables and fruits can serve as excellent sources of at least some of these vitamins
 - in particular, Romaine lettuce is a rich source of vitamins B1, B2, C, and folate.
 - Spinach is an excellent source of folate, vitamin B6 and vitamin C.
 - Cauliflower is an excellent source of vitamin C, folate, vitamin B6, and pantothenic acid.
 - Crimini mushrooms are an excellent source of vitamin B2, niacin, and pantothenic acid.
 - Red bell peppers are an excellent source of vitamin B6.
 - Excellent sources of vitamin B12 include sardines, salmon, tuna, cod, lamb, scallops, shrimp, and beef.



Vitamin C for a Healthy Immune System

- Supports a decrease in the length of time and severity of symptoms associated with upper respiratory viral infections, promote phagocytic cell functions, and support healthy T-cell function.
- Provides antioxidant activity to support healing at sites of inflammation.



Excellent Sources of **Vitamin C**

- Citrus fruit
- Broccoli
- Kale
- Bok choy
- Beet greens
- Collard greens
- Swiss chard
- Asparagus



Vitamins A, E, K for a Healthy Immune System

- Vitamin A deficiency has been shown to impair antibody function and T-cell activity.
- Vitamin E is an important antioxidant and supports a healthy inflammatory response. A important component of all cell membranes and promotes healthy cellular functioning overall.
- Vitamin K supports a healthy blood-clotting ability in your body, and this is necessary for seclusion of areas of infections and injury in the healing process.



Excellent Sources for Vitamins - A, E, K

Vitamins A & E

- Turnip greens
- Swiss chard, and mustard greens
- Pro-vitamin A carotenoids
 - Leafy greens
 - Carrots
 - Sweet potatoes
 - Winter squash
 - Asparagus
 - Bok choy

Vitamin K

- Cauliflower
- Green vegetables such as spinach and asparagus.



Zinc for a Healthy Immune System

- Deficiency can result in profound suppression of T-cell function.
- However, an excess of zinc has also shown negative effects on immune function and can inhibit the *phagocytic cells* (*macrophages* and *neutrophils*)
 - maintaining adequate but not excessive levels of zinc is important.
- This is one reason food is such an excellent source of obtaining nutrition versus supplementation

Food contains a balanced variety of micronutrients whereas supplementation with individual nutrients can lead to too much of some and not enough of others.

Excellent Sources of Zinc

- Spinach
- Asparagus
- Shiitake mushrooms and crimini mushrooms
- Sesame seeds
- Pumpkin seeds
- Garbanzo beans
- Lentils
- Cashews
- Quinoa



Minerals to Support Immune System

- Copper deficiency is associated with an increase in infections and may impair development of immune cells such as T-cells and the phagocytic cells



- Iron deficiency results in impaired response to antibodies, and defective phagocytic cell functioning.



Excellent Sources of Copper and Iron

Copper

- Sesame seeds
- Cashews
- Soybeans
- Mushrooms
- Beet greens
- Spinach
- Asparagus
- Swiss chard, mustard greens, kale
- Summer squash



Iron

- Spinach
- Swiss chard
- Cumin
- Turmeric
- Beet greens
- Collard greens
- Bok choy
- Asparagus
- Leeks
- Romaine lettuce

Herbs to Support Immune System

- Cinnamon
 - Anti-inflammatory – stimulates the production of digestive enzymes
 - Cinnamaldehyde an active compound reduces inflammation, in addition cinnamon contains salicylate (found in aspirin) which reduces pain and promotes heart health by helping to prevent blood clots



- Garlic
 - Anti-inflammatory – contains a number of sulfur compounds, including allicin, that helps to prevent free radical damage to linings of blood vessels, limiting inflammation.



Herbs to Support Immune System

- Ginger
 - Anti-inflammatory
 - Known as a digestive aid to soothe tummy aches



- Turmeric
 - Anti-inflammatory
 - Anticancer
 - May limit the impact of upper GI diseases such as Irritable bowel syndrome



Are there foods that are bad for the immune system?

- Processed foods may be problematic for your immune function.
 - Toxic metals such as cadmium, lead and mercury are immunosuppressive.
- Food additives can also have untoward effects on the nutrient content of the food.
 - Some preservatives can negatively effect the gastrointestinal lining.
- Trans fats
 - Studies have shown that consumption of trans fats are pro inflammatory, leading to chronic diseases such as cardiovascular disease (CVD) and type 2 diabetes.
 - 2% increase in energy intake from trans fats was associated with a 25% increased risk of CVD and 31% increase in CVD mortality.



How to Support a Healthy Immune System

- Consume adequate protein and healthy fats.
- Maintain a healthy balance between omega-3 and omega-6 fatty acids. Studies indicate a ratio of omega-3 to omega-6 fats of 1:4 is health-promoting.
- Provide micronutrients and phytonutrients that support healthy immune function.
- Decrease intake of allergens and toxins.
- Maintain healthy weight and cholesterol levels.
- Basing your diet on nutrient-dense foods, is one way to decrease calorie consumption while consuming optimal levels of micronutrients and immune-supporting phytonutrients.
- Eat the Rainbow of Color!!!



Recipes



The Emerald City Salad

This salad has many immune boosting vegetables and herbs and spices. It is filled with color and is a great addition to any holiday party.

Prep Time: 1 hour and 15 minutes

Makes 6 to 8 servings

2 ½ cups water or stock	½ red or yellow pepper, diced
1 tablespoon butter	½ cup chopped red cabbage
1 teaspoon salt, divided	½ cup chopped Italian parsley
1 cup wild rice (black, ½ - inch long)	2 cups very finely chopped dark, leafy greens (6 to 7 leaves of chard, kale, or collards)
¼ cup lemon juice	Salt and lemon to taste
¼ cup olive oil	Pecorino or Gorgonzola cheese, for garnish (optional)
1 clove garlic, minced	
½ cup chopped fennel bulb, core removed	

Bring water to a boil. Add butter, ½ teaspoon of the salt, and rice. Bring to a boil again, cover, lower heat, and simmer 60 to 65 minutes. Make sure all of the water is absorbed by tipping the pan to one side to check for pooled liquid.

Combine lemon juice, olive oil, garlic, and remaining ½ teaspoon of salt in a large serving bowl. Add fennel, red pepper, cabbage, parsley, and greens and toss thoroughly.

Once the rice is fully cooked, cool until it ceases steaming but is still warm, then place it on top of the dressed vegetables. When the rice cools to room temperature, toss it with the vegetables. Taste the salad and adjust seasonings; some extra salt and/or lemon may be required. Garnish with cheese, if desired

Quinoa with Edamame, Ginger and Lime

High quality protein from quinoa and edamame help to support a healthy immune system while ginger is a strong anti inflammatory herb and lime is rich in vitamin C. Together this dish is rich in protein and phytonutrients and will be a great addition to any holiday meal.

Prep Time: 15 minutes **Cook Time:** 20 minutes

Makes 6 servings

2 ½ cups broth	2 scallions, white and green parts, finely chopped
½ teaspoon salt	2 tablespoons chopped fresh mint
1 ½ cups red or white quinoa, rinsed well in cold water and drained	2 tablespoons chopped fresh cilantro, basil or parsley
1 teaspoon grated fresh ginger	2 tablespoons olive oil
Pinch of cayenne	2 tablespoons freshly squeezed lemon juice
1 cup fresh or frozen edamame, mixed with a spritz of lime juice and a pinch of salt	2 tablespoons freshly squeezed lime juice
½ cup finely diced red bell pepper	1 tablespoon freshly grated lemon zest
	1 tablespoon grated lime zest

Put the broth and ¼ teaspoon of the salt in a large saucepan and bring to a boil over high heat. Stir in the quinoa. Decrease the heat to low, cover, and cook for 15 to 20 minutes, until the water is absorbed.

Remove from the heat. Add the ginger, cayenne, and remaining ¼ teaspoon of salt and fluff with a fork until well combined. Transfer the quinoa to a bowl and let cool to room temperature.

Add the edamame, red bell pepper, scallions, mint, cilantro, olive oil, lemon juice, lime juice, lemon zest, and lime zest and stir until well combined. If needed add a pinch or two of salt, a squeeze of lemon or lime juice, or a dash of olive oil.

Adapted from The Longevity Kitchen by Rebecca Katz

Golden Roasted Cauliflower

Cauliflower is part of the cruciferous vegetable family and is known for its anticancer properties. This combined with turmeric, a well known anti-inflammatory spice is well suited for any holiday meal. The golden color from the turmeric will make guests feel the warmth of the season.

Prep Time: 10 minutes **Cook Time:** 35 minutes

Makes 4 servings

2 ½ to 3 pounds cauliflower, cut
into 1 ½ - inch florets
2 tablespoons olive oil
1 tablespoon minced garlic
½ teaspoon salt
½ teaspoon turmeric
½ teaspoon ground cumin
¼ teaspoon ground coriander
¼ teaspoon freshly ground black
pepper
1 teaspoon freshly squeezed
lemon juice
1 tablespoon finely chopped fresh
parsley or cilantro

Position a rack in the middle of the oven and preheat the oven to 425°F. Line a rimmed baking sheet with parchment paper.

Put the cauliflower, olive oil, garlic, salt, turmeric, cumin, coriander, and pepper in a large bowl and toss until the cauliflower is evenly coated. Transfer to the lined baking sheet and spread in an even layer. Bake for 25-35 minutes, until the cauliflower is golden and tender. Transfer to a bowl, add the lemon juice and parsley, and toss to combine.

Spiced Almond Macaroon Buttons

This version of the French macaron will surely delight guests with a variety of pallets. This version uses cinnamon a well known anti-inflammatory spice along with other soothing spices and some protein from the almonds.

Prep Time: 15 minutes **Cook Time:** 15 minutes

Makes 20 macaroons

1 cup almond flour
3 tablespoons turbinado sugar
¼ teaspoon ground cinnamon
1/8 teaspoon ground allspice
Pinch of ground cardamom
1/8 teaspoon sea salt
¼ cup egg whites (about 2 large eggs)
¾ teaspoon almond extract
¼ teaspoon vanilla extract
20 whole almonds, or 1 cup slivered almonds, for decoration

Preheat the oven to 350°F. Line a baking sheet with parchment paper.

Put the almond flour, sugar, cinnamon, allspice, cardamom, and salt in a bowl and stir to combine.

Put the egg whites in a small bowl and beat lightly with a fork to make them easier to measure and pour. Add 3 tablespoons of the egg whites, the almond extract, and the vanilla to the almond mixture and stir with a spatula. The texture should be wet and soft, but stiff enough to form into a ball between wet hands. If the dough feels too stiff, add a bit more egg white.

Using wet palms and fingers, roll a scant teaspoonful of the dough into balls. Put them on the baking sheet, spacing them about 2 inches apart, and flatten slightly with damp finger. Press an almond or a few slivered almonds onto the top of each cookie. Bake for about 15 minutes, until the tops are dry and a very pale golden brown. Peek at the bottoms; they should be a golden brown. Immediately transfer to a wire rack and let cool before serving.

Questions??

Thanks for your time today!

I hope you have a safe and happy holiday season!



Images

Healthy gut: <https://thedolcediet.com/wp-content/uploads/2016/09/gut-bacteria.jpg>

Tofu: [https://thumbs-prod.si-cdn.com/TMj5l2JypbED-w9-aGcX-HyWyy4=/800x600/filters:no_upscale\(\)/https://public-media.smithsonianmag.com/filer/ba/32/ba32d1a8-425d-4c79-bc9b-1bd79397ea1d/tofu.jpg](https://thumbs-prod.si-cdn.com/TMj5l2JypbED-w9-aGcX-HyWyy4=/800x600/filters:no_upscale()/https://public-media.smithsonianmag.com/filer/ba/32/ba32d1a8-425d-4c79-bc9b-1bd79397ea1d/tofu.jpg)

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Legumes: https://i.ytimg.com/vi/WDV4rUN-O_4/maxresdefault.jpg

Flaxseeds: <http://www.snexportgroup.com/wp-content/gallery/flaxseed/Brown-Flax-Seeds-Main.jpg>

Salmon: <http://media-cdn.kateandkimi.com/media/catalog/product/cache/1/image/650x650/9df78eab33525d08d6e5fb8d27136e95/5/6/563048327953896754.jpg>

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Broccoli: <https://yournews.com/wp-content/uploads/2017/10/All-About-Broccoli-resized.jpg>

Fruit Poster: <https://i.pinimg.com/736x/1d/80/18/1d801889c1f0090ae722600d9d1b2fd9--kitchen-artwork-kitchen-posters.jpg>

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Cashews: http://v1.myevolve.co.uk/_includes/images/uploads/Kenkko/istockphoto_6290659-cashew-nuts.jpg

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Mushrooms: <https://www.bbcgoodfood.com/sites/default/files/guide/guide-image/2017/05/health-benefits-of-mushrooms-guide-700-350.jpg>

Asparagus: http://brightcove.vo.llnwd.net/v1/unsecured/media/1033249144001/201512/1736/1033249144001_4652165666001_4609820823001-vs.jpg?pubId=1033249144001

Cinnamon: http://cdn2.bigcommerce.com/server2000/ss30oz/product_images/uploaded_images/cinnamon-sticks.jpg

Garlic: <https://draxe.com/wp-content/uploads/2014/08/Raw-Garlic-Background.jpg>

Ginger: <http://www.naturallivingideas.com/wp-content/uploads/2016/02/ginger-600x399.jpg>

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Phytonutrients: <https://healthbeat.spectrumhealth.org/wp-content/uploads/2015/05/Rainbowmain.jpg>