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mRNA Vaccines Clinical Trials With Against Infectious Diseases

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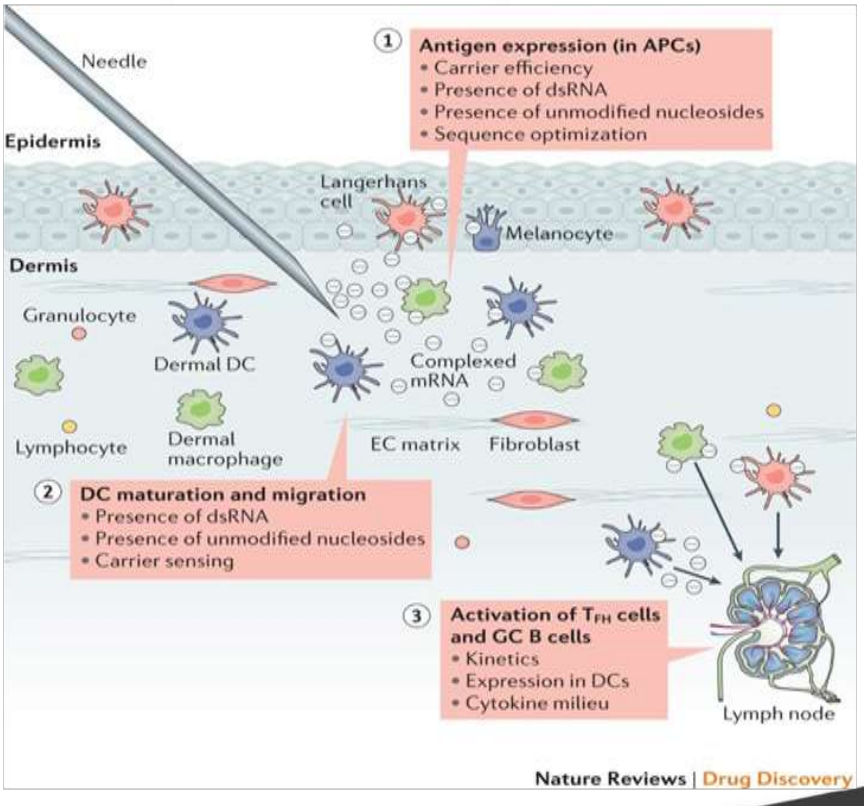

Food as a Remedy for Allergy

SANJAY AGRAWAL

INTRODUCTION

Allergy constitutes a major public health issue due to its high and increasing prevalence. The current therapeutic approaches (allergen avoidance, antihistamines, mast cell stabilizers, corticosteroids and immunotherapy) do not address the underlying pathology and also produce a number of side effects, hence there is a need for other effective and safe treatment options.

Apart from fulfilling hunger and providing nutrition, food has the potential to enhance the overall health and well-being of human beings. Many active compounds found in different food items play a vital role in preventing chronic diseases, improving immunity, and preventing infections. One important strategy to augment good health is increased consumption of fruits, vegetables, and whole grains which reduce the risk of various chronic diseases and cancer.

Recent research has suggested that certain foods can help fight allergies by controlling underlying inflammation. Fruits and vegetables are rich sources of nutrients and compounds with antioxidant, anti-allergic and anti-inflammatory properties (Ref.1). A recent systematic review suggested an overall reduced risk of asthma in adults and children with higher intakes of fruits and vegetables (Ref.2). Several observational studies in adults have shown a negative association between various asthma prevalence outcomes, and intake of apples, citrus fruits, tomatoes or leafy vegetables (Ref.3).

A brief summary of major food items that have been found to be beneficial in different types of allergies is as follows.

FOODS TO CONSUME

1. FOODS RICH IN VITAMIN C

Vitamin C is a small, water-soluble antioxidant molecule derived from glucose and is found mainly in fruits and vegetables, especially citrus fruits (Ref.4). Vitamin C is used in treatment of various disorders associated with oxidative stress, inflammation and immune dysregulation. (Ref.5).

In a recent study, 40 patients suffering from allergic rhinitis were treated with vitamin C or placebo for 18 months. This study reported that vitamin C effectively relieved sneezing, lacrimation, itching and malaise (Ref.6).

Major dietary sources of vitamin C include citrus fruits, tomatoes, pineapple, kiwi and amla. Tomatoes in addition contain an antioxidant called lycopene, which has been shown to have many beneficial actions. While pineapple also contains bromelain, an enzyme with anti-inflammatory action.

2. FOODS RICH IN OMEGA-3-FATTY ACIDS

Omega-3-fatty acids (alpha-linolenic acid [ALA], eicosapentaenoic acid [EPA], and docosahexaenoic acid [DHA]) are classified as essential fatty acids.

Omega-3 FA and its metabolites have several beneficial actions including anti-hypertensive, lipid-lowering, anti-inflammatory and anti-allergy (Ref.7).

Experimental studies have shown that Flaxseed oil, which contains high amounts of ALA, ameliorates egg-derived ovalbumin (OVA)-induced food allergy (Ref.8). and pollen-derived antigen-induced allergic conjunctivitis (Ref.9).

Clinical trials using fish oil supplementation during pregnancy and lactation revealed that maternal intake of fish oil resulted in higher levels of omega-3 fatty acids in the offspring, along with anti-inflammatory changes in immunological parameters (cytokine production, lipid mediator release, and cellular populations). These studies also suggested that fish oil supplementation reduced the prevalence and severity of atopic dermatitis and food sensitization in the first year of life, and that these beneficial effects might persist until adolescence, with a reduced incidence of eczema, hay fever and asthma (Ref.10). In addition, many reports investigating the effect of fish intake during infancy or childhood have suggested its protective role in allergic outcomes. (Ref.11).

In a clinical trial, 48 children with atopic dermatitis were randomly allocated to receive either 250 mg twice daily eicosapentaenoic acid (EPA) (n = 24) or placebo (n = 24) for 4 weeks. The absolute improvement in the SCORing Atopic Dermatitis (SCORAD) index and the necessity to use topical corticosteroids was evaluated. The results showed significant favorable effects of EPA on the SCORAD scale and with regard to the necessity for corticosteroid administration. The study concluded that EPA supplementation is a well-tolerated and effective add-on strategy for reducing the severity of atopic dermatitis in children (Ref.12). Another recent study reported that omega-3-fatty acid supplementation reduces airway inflammation in adult athletes (Ref.13).

Rich dietary sources of omega-3-fatty acids are cold water fish, flax seeds, chia seeds and nuts.

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3. FOODS RICH IN QUERCETIN

Quercetin is a naturally occurring polyphenol flavonoid. It has antioxidant, anti-inflammatory and immunomodulatory actions. It produces anti-allergic action by inhibiting the production of histamine and inflammatory cytokines. In vitro and in-vivo studies have demonstrated beneficial effects of quercetin in asthma, allergic rhinitis and allergic dermatitis.(Ref.14).

Foods rich in quercetin are excellent additions to your diet, as they provide a natural source of this beneficial compound. Dietary sources of quercetin include onions, cabbage, apples, berries, tea, tomatoes, grapes, Brassica vegetables, and shallots, as well as many nuts, seeds.

Here are some examples of foods that are particularly rich in quercetin:

- Onions: Onions, particularly red and yellow varieties, are among the top food sources of quercetin. They can be consumed raw in salads, sautéed in various dishes, or added to soups and stews.
- Apples: Apples, especially their skins, are a good source of quercetin. Enjoy them as a healthy snack or incorporate them into salads, smoothies, or baked goods.
- Berries: Various berries such as cranberries, blueberries, blackberries, and raspberries contain quercetin. These fruits can be eaten fresh, added to yogurt or oatmeal, or used in smoothies and desserts.
- Cabbage: Cabbage, including both green and red varieties, is a cruciferous vegetable rich in quercetin. It can be used in salads, stir-fries, soups, or fermented as sauerkraut.
- Tea: Both green and black teas contain quercetin, along with other beneficial compounds. Enjoy a cup of tea as a refreshing and healthy beverage option.
- Tomatoes: Tomatoes, particularly the skin, contain quercetin. They can be included in salads, sandwiches, sauces, or enjoyed as a snack.
- Grapes: Grapes, especially the red and purple varieties, are a good source of quercetin. Eat them fresh as a snack or use them in salads, smoothies, or desserts.
- Brassica vegetables: Vegetables like broccoli, kale, Brussels sprouts, and cauliflower are rich in quercetin. Incorporate these nutritious vegetables into your meals by steaming, roasting, or adding them to stir-fries.
- Shallots: Shallots, a type of onion, have a milder flavor and are also a good source of quercetin. Use them in various recipes for added taste and nutritional benefits.
- Nuts and seeds: Many nuts and seeds, including almonds, pistachios, walnuts, and flaxseeds, contain quercetin. They can be enjoyed as a snack or added to salads, smoothies, or baked goods.

4. FOODS RICH IN PROBIOTICS

Studies suggest that intestinal microbiota may modulate immunologic and inflammatory systemic responses and, thus, influence development of sensitization and allergy. Probiotics have been proposed to modulate immune responses and have been advocated as therapeutic and preventive interventions for allergic diseases. (Ref.15).

Allergic disorders are associated with a shift of the Th1/Th2 cytokine balance towards a Th2 response. This leads to activation of Th2 cytokines and the release of interleukin-4 (IL-4), IL-5, and IL-13 as well as IgE production. Probiotics can potentially modulate the toll-like receptors and the proteoglycan recognition proteins of enterocytes, leading to activation of dendritic cells and a Th1 response. The resulting stimulation of Th1 cytokines can suppress Th2 responses (Ref.16). Studies suggest that probiotic use in children with atopic dermatitis results in enhancement of IFN-production and decreased IgE and antigen-induced TN F-, IL-5, and IL-10 secretion (Ref.17). The effect of probiotics on preventing atopic dermatitis has been demonstrated in randomized studies from Finland, where Lactobacillus GG or placebo was given to pregnant women with a strong family history of eczema, allergic rhinitis or asthma, and to their infants for the first six months after delivery. The frequency of developing atopic dermatitis in the offspring was significantly reduced by 2, 4, and 7 years, by 50%, 44%, and 36% respectively (Ref.18).

Yogurt and fermented milk products are natural sources of probiotics.

5. TURMERIC

Curcumin, also called diferuloylmethane, is the main natural polyphenol found in the rhizome of Curcuma longa (turmeric). Curcumin has strong anti-oxidative and anti-inflammatory activities. Curcumin also inhibits inflammatory cytokines, such as interleukins (ILs), chemokines, as well as inflammatory enzymes, such as cyclooxygenase-2 (COX-2), inducible nitric oxide synthase (iNOS) and others molecules as cyclinD1 (Ref.19). Few studies have shown the protective role of curcumin in bronchial asthma.

Here is more information on using turmeric as a food-based remedy for allergies:

1. Anti-inflammatory properties: Turmeric contains an active compound called curcumin, which exhibits strong anti-inflammatory effects. Allergies often involve an inflammatory response in the body, and curcumin's anti-inflammatory properties may help alleviate allergy symptoms.
2. Modulation of the immune response: Curcumin has been shown to modulate the immune response by inhibiting the production of inflammatory cytokines, such as interleukins (ILs) and chemokines. By reducing the release of these immune signaling molecules, turmeric may help regulate the immune response associated with allergic reactions.
3. Antioxidant activity: Curcumin is a potent antioxidant, protecting cells from damage caused by

free radicals. Oxidative stress contributes to inflammatory processes, and by neutralizing free radicals, curcumin may help alleviate inflammation associated with allergies.

4. Potential relief for respiratory symptoms: While more research is needed, some studies suggest that turmeric may relieve respiratory symptoms associated with allergies, such as asthma and allergic rhinitis. Curcumin's anti-inflammatory and antioxidant properties may help reduce airway inflammation and improve respiratory function.
5. Ways to incorporate turmeric into your diet: To incorporate turmeric into your diet as a remedy for allergies, you can:

    ● Use turmeric powder in cooking: Turmeric powder is a common spice in various cuisines. It can be added to curries, soups, stews, rice dishes, roasted vegetables, and salad dressings.

    ● Make turmeric tea: Brew a cup of turmeric tea by adding 1 teaspoon of turmeric powder to a cup of hot water. You can enhance the flavor and absorption of curcumin by adding a pinch of black pepper and a source of healthy fat, such as coconut oil.

    ● Golden milk: Golden milk is a traditional beverage that combines turmeric with milk (dairy or plant-based) and other spices like ginger, cinnamon, and honey. This soothing drink can be enjoyed before bed or as a warming tonic during the day.

    ● Turmeric smoothies: Add a teaspoon of turmeric powder or a fresh turmeric root to your smoothies for an added health boost.

It's important to note that while turmeric is generally safe for consumption, some individuals may experience digestive discomfort or allergic reactions to turmeric. If you have any underlying health conditions or are taking medications, it's advisable to consult with a healthcare professional before significantly increasing your turmeric consumption.

6. GINGER

Ginger and its extracts are known for their anti-inflammatory and analgesic effects. An animal study showed ginger suppresses production of cytokines that cause mast cell activation. Ginger is a versatile root used for centuries for its culinary and medicinal properties. Regarding allergies, ginger is known for its potential anti-inflammatory and anti-allergic effects. Here is more information on using ginger as a food remedy for allergies:

● Anti-inflammatory properties: Allergic reactions involve an inflammatory response in the body. Ginger contains compounds called gingerols and gingerdiones, which have been shown to possess anti-inflammatory properties. By reducing inflammation, ginger may help alleviate the symptoms of allergies.

● Mast cell inhibition: Allergies activate mast cells, which release histamine and other inflammatory compounds. Ginger has been found to inhibit mast cell activation, potentially reducing the release of histamine and mitigating allergic reactions.

● Anti-allergic effects: Ginger has been studied for its potential anti-allergic effects, particularly in allergic rhinitis. A study compared the efficacy of ginger extract to loratadine (an antihistamine) in treating allergic rhinitis symptoms. Both groups showed significant improvements in nasal symptoms, with no significant difference between ginger extract and loratadine. Ginger extract was also found to have fewer side effects compared to loratadine.

● How to use ginger: Ginger can be incorporated into your diet in various ways. For its distinctive flavor and potential health benefits, fresh ginger root can be added to meals, such as stir-fries, soups, and curries. You can also brew ginger tea by steeping fresh ginger slices in hot water. Ginger can be grated or juiced and added to smoothies or used in salad dressings and marinades.

● Precautions: While ginger is generally safe for most people, it's essential to exercise caution if you have specific health conditions or are taking certain medications. Consult with a healthcare professional before consuming large amounts of ginger or taking ginger supplements, especially if you are on blood-thinning medications or have gallstones.

A study was designed to assess efficacy and safety of ginger extract in comparison with loratadine in allergic rhinitis (AR). AR patients were treated with ginger extract 500 mg (n = 40) or with loratadine 10 mg (n = 40) for 3 and 6 weeks. The results showed both ginger extract and loratadine treated groups significantly decreased TNSS scores but there was no significant difference between the two groups. The treatment with ginger extract was as safe as loratadine as shown by renal and liver function tests. The study concluded that ginger extract is as good as loratadine in improving nasal symptoms and quality of life in AR patients. However, ginger extract caused less side effects especially, drowsiness, fatigue, dizziness and constipation. Hence ginger extract could be used as alternative treatment for patients with AR.(Ref.20).

7. HONEY

Honey is well known for its biological, physiological, and pharmacological activities. The

major bioactive components of honey are glucose, fructose, flavonoid, polyphenols, and organic acids (Ref.21). Honey is known to have antioxidant, antimicrobial, antiviral, anti-inflammatory, antifungal, wound healing, and cardioprotective activities (Ref.22).

- Allergy Relief Claims: The theory behind using honey for allergies is based on the concept of immunotherapy. It is believed that consuming local honey, which contains trace amounts of pollen from the area, may help desensitize the body to the allergens present in the environment. However, it's important to note that the scientific evidence supporting this claim is limited.

- Anti-Inflammatory and Antioxidant Properties: Honey has been found to possess anti-inflammatory and antioxidant properties. These properties may help reduce inflammation and alleviate allergy symptoms, such as nasal congestion and irritation.

- Potential Symptom Relief: Some anecdotal evidence suggests that consuming honey can relieve allergy symptoms like sneezing, itching, and watery eyes. However, individual responses can vary, and more research is needed to confirm these effects.

- Choosing the Right Honey: When considering honey for its potential allergy-relieving properties, opting for raw, unprocessed honey is often recommended. Raw honey is minimally processed and retains more natural compounds, including pollen, enzymes, and antioxidants. Some believe that local honey, sourced from bees in your area may provide better allergy relief due to exposure to local allergens. However, it's important to note that the pollen levels in honey are typically low and may not significantly impact allergies.

- Caution for Infants: Honey should not be given to infants under one year of age. It can contain Clostridium botulinum spores, a bacterium that can cause infant botulism, a severe illness.

If you enjoy honey, incorporating it into your diet can provide potential general health benefits. However, its direct impact on allergies may vary from person to person, and it should not be considered a primary treatment for allergy relief.

8. GRAPE SEED EXTRACT

Grape Seed Proanthocyanidin Extract (GSPE) has been reported to have powerful antioxidant activity. Mice treated with GSPE showed significantly reduced airway hyper responsiveness, decreased inflammatory cells in the BAL fluid, reduced lung inflammation, and decreased IL-4, IL-5, IL-13, and eotaxin-1 expression in both acute and chronic asthma models.(Ref.23).

Research suggests that grape seed extract may have potential as a remedy for allergies due to its anti-inflammatory and antioxidant effects. Here's more information on its potential benefits:

- Anti-inflammatory properties: Allergic reactions involve an inflammatory response in the body. A grape seed extract has been found to possess anti-inflammatory properties, which may help reduce inflammation associated with allergic conditions.

- Antioxidant activity: Grape seed extract is rich in antioxidants, which help protect cells from damage caused by free radicals. Free radicals can contribute to inflammation and worsen allergic symptoms. By neutralizing free radicals, grape seed extract may help alleviate allergy symptoms.

- Immune system modulation: Grape seed extract modulates the immune system, potentially helping to balance immune responses. Allergies involve an overactive immune response to harmless substances. By modulating immune activity, grape seed extract may help reduce allergic reactions.

- Effects on allergic asthma: Some studies have investigated the effects of grape seed extract on allergic asthma, a condition characterized by airway inflammation and hypersensitivity. Research on animal models has shown that grape seed extract can reduce airway hyperresponsiveness and lung inflammation associated with allergic asthma.

It's important to note that while preliminary research suggests the potential benefits of grape seed extract for allergies, more studies are needed to understand its effectiveness and establish appropriate dosage recommendations fully.

If you are considering using grape seed extract or any other dietary supplement for allergies, it's essential to consult with a healthcare professional before starting. They can provide personalized advice based on your specific health condition and help you determine the appropriate dosage and potential interactions with other medications or supplements you may be taking.

9. MEDICINAL PLANTS

Medicinal plants such as Azadirachta indica(neem), Aloe vera, Tinospora cordifolia, black seed (Nigella Sativa) and others have anti-allergic activity. In a placebo controlled clinical trial, Tinospora cordifolia extract significantly decreased ($p < 0.00001$) symptoms of allergic rhinitis like sneezing, nasal discharge, nasal obstruction and nasal pruritus. Because of its high efficacy, excellent tolerability and absence of serious adverse reactions Tinospora cordifolia could be considered as

an alternative treatment for allergic rhinitis (Ref.24). Other medicinal plants such as luffa, nettle, neem, echinacea, chamomile and peppermint also have a beneficial role in allergic rhinitis.

FOODS TO AVOID

Individuals suffering from allergic disorders should avoid or limit following food items which are reported to promote inflammation in the body (Ref.25).

-Foods's high in trans-and omega-6 fats (processed and red meats; dairy; partially hydrogenated oils; corn, cottonseed, peanut, and soy oils)

- Refined carbohydrates (white breads, instant or white rice, rice and corn cereals, crackers, cookies, cake, etc.)

- Soda and packaged juices

- Common food allergens

CONCLUSION

Vegetables, fruits, honey, yogurt and certain medicinal plants are rich sources of different bio-active compounds having beneficial effects on human health.

Current scientific evidence suggests that regular consumption of food items rich in vitamin C, quercetin, omega-3-fatty acids and other anti-oxidant and anti-inflammatory compounds may help persons suffering from different types of allergies.

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Coffee consumption does not increase risk of atrial arrhythmias in healthy volunteers, although fast metabolizers may have more episodes of premature ventricular contraction, according to new research. On days they drank coffee, volunteers also took more steps but had a shorter sleep duration.

"Conventional wisdom says that coffee leads to arrhythmias, and m in fact, there are professional society guidelines that warn against caffeine consumption to avoid arrhythmias," said lead author Gregory M. Marcus, PhD. Of the University of California San Francisco, during his presentation of the data. "yet, there is a growing literature that this is hard to prove. We also know that coffee is associated with reductions in overall mortality. The reasons for that are unclear. But based on observational data, there is a lower risk of diabetes among coffee drinkers, and there is a question as to whether those who consume coffee might actually be motivated to perform more physical activity. Of course, this all needs to be weighed in the context of possible sleep disruption and all the adverse consequences that may result.

---------- **American Heart Association**