



Immunity Boosting Fall Delights

Nutrition Notes

Sarah Hreyo, MAS
UNC Nutrition Research Institute

Quiche with Greens and Mushrooms

- Eggs (Immunity Booster: Protein)

Specific amino acids found in protein are essential for T-cell function, which are cells that protect the body against pathogens¹.

- Kale (Immunity Boosters: Vitamins A and C)

Vitamin A assists with the health of your intestines and respiratory system¹.

Vitamin C helps stimulate the formation of antibodies¹.

- Mushrooms (Immunity Booster: Vitamin D)

Deficiency in Vitamin D is associated with increased autoimmunity as well as an increased susceptibility to infection².

Did you know? Vitamin D deficiency impedes good immune function and has been shown to contribute to the seasonal increase of viral respiratory infections, possibly including COVID-19. A combination of factors makes it likely that individuals are deficient in vitamin D: old age, obesity, dark skin tone, and common genetic variants. The risk is even greater for those living in high latitudes, where vitamin D deficiency is extremely common in winter and spring because of low levels of sunlight, according to a review article by **NRI Principal Investigator Martin Kohlmeier, MD, PhD**, published in *BMJ Nutrition, Prevention & Health*³.

“Rigorously remedying vitamin D deficiency, even for a few months during these seasons, would help reverse known health impacts that include decreased life expectancy and increased mortality. Slowing the spread of COVID-19 would be an important bonus,” says Kohlmeier. While the preventive potential of supplemental vitamin D should not be exaggerated and the dose kept within recommended ranges, preventing vitamin D deficiency should be a widely shared goal.

Salmon with Miso Ginger Glaze

- Salmon (Immunity Boosters: Protein, Vitamin D, and Omega-3 fatty acids)

Omega-3 fatty acids can help suppress inflammation, preventing harmful inflammatory reactions that activate too strongly⁴.

- Ginger (Immunity Booster: Gingerol)

Gingerol, the main bioactive compound in ginger, is responsible for many of its medicinal properties, including its anti-inflammatory and antioxidant effects⁵.

Did you know? Ginger is often regarded as a “superfood” due to its many proven health benefits. Researchers at the Mayo Clinic ⁶ are currently conducting a study to examine the effect of ginger on the gut microbiome (the complex community of bacteria, yeasts, and viruses living in our intestines) – hoping to demonstrate a powerful connection between diet and the microbiome.

In light of the current pandemic, other researchers have started to explore the possible links between gut microbiota and COVID-19. The role of the gut microbiota in influencing lung diseases is well known, as is the connection between respiratory virus infection and perturbations in the gut microbiota. Aside from diet, environmental factors and genetics can also play an important role in shaping gut microbiota, which can influence immunity. Improving gut microbiota through personalized nutrition and supplementation could serve as a way to reduce the impact of COVID-19 in at-risk populations⁷.

The NRI has multiple Principal Investigators who research the microbiome in their labs, including Katie Meyer, ScD, and Susan Sumner, PhD.

Golden Milk (Immunity Booster: Honey and Turmeric)

- **Raw Honey (Immunity Booster: Antioxidants)**

Raw honey contains antioxidants and has antibacterial/antimicrobial properties⁸.

- **Turmeric (Immunity Booster: Curcumin)**

Turmeric contains curcumin, which has been shown to be a potent immunomodulatory agent⁹.

Did you know? Turmeric contains a set of phytonutrients called curcuminoids, most notably curcumin which has been widely studied to investigate its anti-inflammatory properties. It is important to note, however, there is no strong research to support the use of curcumin to reduce inflammation. The amount of curcumin actually contained in turmeric isn't large and most studies looking at curcumin provide doses exceeding 1 gram daily. In order to ingest this amount, you'd have to rely on a supplement versus adding spices to everyday food items. Furthermore, curcumin is poorly absorbed by the body on its own, so it is commonly combined with piperine (a substance found in black pepper) to increase the absorption of curcumin^{10,11}.

Always consult your physician before taking any dietary supplement.

[1] UC Davis Health. 5 immune boosters to help keep you healthy amid COVID-19 outbreak. Available at <https://health.ucdavis.edu/good-food/blog/nutrients-to-help-prevent-illness.html>

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[3] Kohlmeier, M. Avoidance of vitamin D deficiency to slow the COVID-19 pandemic. Available at https://nutrition.bmj.com/content/early/2020/05/20/bmjnph-2020-000096?int_source=trendmd&int_medium=cpc&int_campaign=usage-042019

[4] Science Daily. Understanding how omega-3 dampens inflammatory reactions. Available at <https://www.sciencedaily.com/releases/2017/08/170823093831.htm>

[5] Healthline. 11 proven health benefits of ginger. Available at <https://www.healthline.com/nutrition/11-proven-benefits-of-ginger#section1>

[6] Mayo Clinic. Clinical trials. Available at <https://www.mayo.edu/research/clinical-trials/cls-20442902>

[7] Dhar, D and Mohanty, A. Gut microbiota and COVID-19- possible link and implications. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7217790/>

[8] Healthline. The top 6 raw honey benefits. Available at <https://www.healthline.com/health/food-nutrition/top-raw-honey-benefits>

[9] Jagetia, G and Aggarwal, B. “Spicing up” of the immune system by curcumin. Available at <https://pubmed.ncbi.nlm.nih.gov/17211725/>

[10] Shoba G, Joy D, Majeed M, Rajendra R, Srinivas PS. Influence of piperine on the pharmacokinetics of curcumin in animals and human volunteers. *Planta Med.* 1998; 64: 353-6.

[11] National Institutes of Health. National Center for Complementary and Integrative Health. Turmeric. Available at <https://nccih.nih.gov/health/turmeric/ataglance.htm>