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Is It Possible to Reduce Personal Risk of Infection and Complication from Viral Exposures?

Essential Conversation in The Age of COVID-19

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What is a Coronavirus?

- SARS-CoV
- MERS
- SARS-CoV2 —> The disease COVID-19
- Coronaviruses (mild) cause 15-30% of respiratory infections in humans.

Who Is Most At Risk?

- People with Immunocompromise (immune suppressive drugs, cancer, etc.)
- Insulin Resistance/ Type 2 diabetes
- Hypertension
- Cardiovascular Disease
- Added complication by advanced age (60+)

- What about the “young and healthy” very sick?
- Nutrient deficiencies.
- Subclinical insulin resistance
- Autoimmunity and other underlying chronic illness.
- ???? - there are still many unknowns

What is a Coronavirus?

- "CoVs are positive-stranded RNA viruses with a crown-like appearance under an electron microscope (*coronam* is the Latin term for crown) due to the presence of spike glycoproteins on the envelope."

https://www.ncbi.nlm.nih.gov/books/NBK554776/

What is a Coronavirus?

- "SARS-CoV-2 belongs to the betaCoVs category. It has round or elliptic and often pleomorphic form, and a diameter of approximately 60–140 nm. **Like other CoVs, it is sensitive to ultraviolet rays and heat.**

- Furthermore, these viruses can be effectively inactivated by lipid solvents including ether (75%), ethanol, chlorine-containing disinfectant, peroxyacetic acid and chloroform except for chlorhexidine.

- Chan et al. have proven that the genome of the new HCoV, isolated from a cluster-patient with atypical pneumonia after visiting Wuhan, had 82% nucleotide identity with that of human SARS-CoV. For this reason, the new virus was called SARS-CoV-2."

https://www.ncbi.nlm.nih.gov/books/NBK554776/

What is a Coronavirus?

- “Its single-stranded RNA genome contains 29891 nucleotides, encoding for 9860 amino acids. Although its origins are not entirely understood, these genomic analyses suggest that SARS-CoV-2 probably evolved from a strain found in bats. The potential amplifying mammalian host, intermediate between bats and humans, is, however, not known. Since the mutation in the original strain could have directly triggered virulence towards humans, it is not certain that this intermediary exists.”

https://www.ncbi.nlm.nih.gov/books/NBK554776/

Nutrition and Lifestyle Medicine to Lower Risk of Complications from SARS-CoV2

- Viruses can’t replate on their own - they have to use human cells for their replication.

- **Using natural support to reduce:**
- The ability of the virus to enter the cell.
- The ability of the virus to replicate.
- Resilience, and not over-reaction of the immune system.
- Support for immune and overall health.

How SARS-CoV2 Causes Problems…

- Enters the cell via the ACE2 receptor.
- NLRP3 Inflammasome: Key to the induction of the acute ARDS

NLRP3 Inflammasome Associated Diseases

- **NLRP3 inflammasome activation is linked with the development of many diseases, especially age-associated ailments for example various metabolic syndromes and metabolic disorders** including gout, atherosclerosis, Alzheimer's disease, and type II diabetes.

- NLRP3 inflammasome is involved in experimental autoimmune encephalomyelitis (EAE) in animal models and multiple sclerosis (MS) in humans.
- Inappropriate NLRP3 inflammasome activation is also implicated in Crohn's disease, inflammatory bowel disease (IBD), and ulcerative colitis.

https://www.frontiersin.org/articles/10.3389/fimmu.2019.02538/full

NLRP3 Inflammasome Associated Diseases

- NLRP3 inflammasome is also linked with various cancers, such as colon cancer, breast cancer, melanoma, hepatitis C virus-associated hepatocellular carcinoma, and gastrointestinal cancers.

- In addition to NLRP3 activation anomalies, there are also NLRP3 genetic abnormalities collectively termed as cryopyrin-associated periodic syndromes (CAPS) - a rare genetic disease.

https://www.frontiersin.org/articles/10.3389/fimmu.2019.02538/full

Melatonin and Antioxidants

- Modulates the NLRP3 inflammasome.
- For example, “Melatonin attenuates airway inflammation via SIRT1 dependent inhibition of NLRP3 inflammasome and IL-1β in rats with COPD.”

- Lots of antioxidants: vitamin C, D, Quercitin, nitric oxide, etc. —> suppress the NLRP3 inflammasome.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6678949/

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6615259/

https://www.ncbi.nlm.nih.gov/pubmed/29990691

Nitric Oxide

- **Nitric Oxide suppresses the NLRP3 inflammasome**
- Wim Hoff and other breath work
  - https://www.youtube.com/watch?v=HwLzAdriec0
  - https://youtu.be/nzCaZQqAs9I

- High Nitrate Veggies: Celery, Watercress, Lettuce, Beets, Spinach, Arugula
- Add Antioxidants: **Vitamin C, E, Polyphenols, Glutathione (NAC)**
- Exercise (moderate - 60% of max regularly, ok to exercise more intensely if already trained up to that level.)
- Sunlight
- Avoid acid reducing medications, avoid use of mouthwash

https://www.ncbi.nlm.nih.gov/pubmed/26110868

Vaccine or Drug for Viral Therapy
What are the Limitations?

- This is ideal because it's simple to understand.
- Vaccine or Drug X for X infection/ illness.
- Consider how people like to know "What is the best diet for endometriosis?" vs. "What is the best diet for my individual optimal health/ resilience?"
- We are trained to think in diagnosis codes, and therapies for specific invaders/ diagnoses.
- **This situation is forcing a perspective shift to "host resilience."**

Nutrition and Lifestyle Medicine Build Personal Resilience to Viral Infection Severity

- Reduce Exposure
- Nutrition
- Exercise
- Stress/ Support
- Sleep
- Environmental Exposures
- Medications and Health Comorbidities

Create a Body Where Cancer/ Diabetes/ CV Disease/ Viruses Can't Thrive

- The More Lifestyle Diseases you have the worse your outcomes…
- Smoking/ Vaping (vs Fresh Air/ Exercise)
- Insulin Resistance (vs. blood sugar balance)
- Athlerosclerosis (vs. nourished vessels and healthy blood pressure)

Reduce Exposure

- Aerosols? Dropplets? Oh my?
- Physical Distancing
- Masks (N95 for more likely exposures)
- gowns, gloves, face shields, etc.

https://www.vox.com/2020/4/7/21212663/coronavirus-airborne-covid-19-pandemic-podcast

Nutrition: Food

- This is FOUNDATIONAL. (And, exactly the same as what we always do.)
- **Absorption of a wide variety of both micro and macronutrients.**
- **Protein:**
- Grams of protein/ kg of body weight:
  - Sedentary adult: .88
  - Average active adult: 1.1 - 1.65
  - Adult competitive athlete: 1.32-1.98
  - Growing teen athlete: 1.98 - 2.2

Inflammation Mastery, Vasquez, 207

Nutrition: Food

- This is FOUNDATIONAL. (And, exactly the same as what we always do.)
- **Macronutrients:**
  - Avoid sugar/ high processed carbohydrates —> immune suppression
  - Plenty of vegetables, fiber, fermented foods
  - Quality fats: avocado, olive oil, olives, nuts, seeds, coconut oil, etc.

Nutrition: Food

- This is FOUNDATIONAL. (And, exactly the same as what we always do.)
- High antioxidant, polyphenol, mineral
- Vitamins A, D, E, K, C
- Zinc, Selenium, Potassium

Nutrition: SPMs and Mucosal Inflammation

- Special pro resolving mediators and mucosal lining.
- Resolve inflammation at mucosal linings, especially of the lung.
- “SPMs are produced by enzymatic conversion of **essential dietary fatty acids**. Of interest, several epidemiological studies indicate that diets rich in **omega-3 fatty acids** are inversely related to the prevalence of inflammatory diseases. In addition, omega-3 fatty acid consumption during pregnancy can protect children from asthmatic symptoms and respiratory infections. The beneficial effects of these essential omega-3 fatty acids have been attributed in part to their enzymatic conversion to SPMs.”

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6168922/

Nutrition: Vitamin C

- Be mindful of iron overload conditions.
- Avian coronavirus, and lower respiratory tract infections
- Blocks NLRP3 Inflammasome
- Weak antihistamine
- 1-2 grams, TID
- Foods high in Vitamin C: cherries, rose hips, peppers, guava, black currents, thyme, parsley, mustard greens, kale, Brussels sprouts, broccoli, papaya, strawberry, oranges, lemons

https://onlinelibrary.wiley.com/doi/10.1002/jmv.25707

https://www.ncbi.nlm.nih.gov/pubmed/28326454

Nutrition: Resveratrol

- ”In this study, we first demonstrated that resveratrol is a potent anti-MERS agent in vitro.”
- Foods high in resveratrol: pistachios, grapes, red and white wine, blueberries, cranberries, cocoa and dark chocolate

https://www.ncbi.nlm.nih.gov/pubmed/28193191

Nutrition: Selenium

- Found to be beneficial in Influenza virus, avian coronavirus; viral mutations (selenium deficient soils could be one reason this and other coronavirus mutated to be so dangerous to humans.)
- The antioxidant nature of selenium helps to prevent mutation.
- 200mcg daily. (Dose for viral infection up to 600mcg per day - short term)
- Food sources of selenium: Brazil nuts, 1 ounce (6–8 nuts), Tuna, Halibut, Sardines, Ham, Shrimp, Beef, Turkey, Liver, Chicken, Brown Rice, Egg, Oatmeal

https://onlinelibrary.wiley.com/doi/10.1002/jmv.25707

Nutrition: Zinc

- Intracelular zinc makes it more difficult for RNA viruses to replicate. (Need zinc + polyphenols for —> intracellular zinc.)
- 30-50mg + 2-4mg of copper

- Common deficiency of optimal levels.
- Foods high in Zinc: Meat, Shellfish, Legumes (less well absorbed due to phytates), Seeds (hemp seeds, flax seeds, pumpkin seeds), Nuts (cashews, pine nuts, almonds), Whole grains, Potatoes, Dark Chocolate

Nutrition: Polyphenols (top 20)

- Cloves, Peppermint, Star anise, Cocoa powder, Cocoa products, Mexican oregano, Celery seed, Black chokeberry, Dark chocolate, Flaxseed meal, Black elderberry, Chestnut, Sage, Rosemary, Spearmint, Thyme, Lowbush blueberry, Blackcurrant, Capers, Black olive, Highbush blueberry

https://www.ncbi.nlm.nih.gov/pubmed/?term=identification+of+the+100+richest+dietary+sources+of+polyphenols

Nutrition: Vitamin A

- Measles virus, human immunodeficiency virus, avian coronavirus
- High dose for acute infection - conflicting data
- Beef, Lamb Liver — 713% DV per serving
- Cod Liver Oil
- King Mackerel
- Salmon
- Bluefin Tuna
- Goose Liver Pate
- Goat Cheese
- Butter
- Egg and Other Cheeses

Nutrition: Vitamin D

- Bovine coronavirus

- Supplementation works best in people who are deficient.
  - 2000IU per day children
  - 4000IU per day adults (obese adults up to 10K IU)

- Sunlight!!!
- Fatty fish, beef liver, cheese, egg yolks

Nutrition: Vitamin D

- Vit D can upregulate ACE2 receptor, but might limit the complications - due to the hyper inflammatory response.
- Short Burts of VIT D at higher doses (25K-50K per day for up to 3 days to significantly control the inflammatory response in viral illnesses.)

Nutrition: Licorice

- Antiviral, Antiinflammatory
- Stopped SARS replication In Vitro
- Be careful if high blood pressure and/or hypokalemia

https://www.botanicalmedicine.org/licorice-root-antiviral-antimicrobial-antifungal/

Nutrition: NAC/ glutathione

- The Master Antioxidant!
- This is key to reducing the inflammation associated with SARS-CoV infection.

- "Development of novel antiviral reagents is of great importance for the control of virus spread. Here, Ag2S nanoclusters (NCs) were proved for the first time to possess highly efficient antiviral activity by using porcine epidemic diarrhea virus (PEDV) as a model of coronavirus. Analyses of virus titers showed that Ag2S NCs significantly suppressed the infection of PEDV by about 3 orders of magnitude at the noncytotoxic concentration at 12 h postinfection, which was further confirmed by the expression of viral proteins. Mechanism investigations indicated that Ag2S NCs treatment inhibits the synthesis of viral negative-strand RNA and viral budding. Ag2S NCs treatment was also found to positively regulate the generation of IFN-stimulating genes (ISGs) and the expression of proinflammation cytokines, which might prevent PEDV infection. This study suggest the novel underlying of Ag2S NCs as a promising therapeutic drug for coronavirus."

https://www.ncbi.nlm.nih.gov/pubmed/29337529

Nutrition: Peptide Therapy

- On the leading edge of functional medicine
- Thymosin Alpha 1 - children's thymuses are very active, decrease in adolescence.

- The **thymus** is a specialized primary lymphoid organ of the immune system. Within the thymus, T cells mature. T cells are critical to the adaptive immune system, where the body adapts specifically to foreign invaders. The thymus is composed of two identical lobes and is located in the anterior superior mediastinum, in front of the heart and behind the sternum. Each lobe of the thymus can be divided into a central medulla and a peripheral cortex which is surrounded by an outer capsule.

https://en.wikipedia.org/wiki/Thymus

Nutrition: All The Antioxidants

- Quercitin: 1 g BID (apples, onions, green peppers, red leaf lettuce, asparagus, broccoli, grapes, beans, black and green tea, dill, fennel leaf, oregano, chili pepper, and tomatoes)
- EGCG - green tea
- Resveratrol: 100-150mg daily
- Curcumin: 500mg - 1g daily (turmeric, curry)
- Etc.

High In Phytosterols

- In vitro - tie up the “lipid rafts” that bring the virus into the cell (“bad” cholesterol-lowering, reducing a key risk factor.)
- Foods high in phytosterols: Olive oils, nuts, seeds, whole grains, and legumes. and **legumes** are also good dietary sources of phytosterols.

Melatonin/ Sleep

- High melatonin (key antioxidant) in kids, could be one reason that they are affected less.
- 1mg - 20mg daily as needed, can help with sleep for 50% of people.
- Depends on what their sleep issue is. (See attached video of sleep support ideas.)

Liver

- Nettle tea
- Dandelion
- Bitter greens
- Hydrate with 60-80 ounces of water daily.

https://www.ncbi.nlm.nih.gov/pubmed/32170806

Good Gut Terrain

- Fiber
- Fermented Foods
- Probiotics
- There are ACE2 receptors in the gut as well.
- “Some patients with COVID-19 showed intestinal microbialdysbiosis with decreasedprobiotics such as *Lactobacillus* and *Bifidobacterium*.”

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6006794/#!po=20.4545

https://www.ncbi.nlm.nih.gov/pubmed/32096367

Herbs for Immune and Lung Support

- https://physicaenergetics.com/dv/products/Temple-Warrior-%252d-Lung..html
- https://www.healthconcerns.com/practitioner-item/8/41/Clear_Heat_Large_Out_of_Stock.html

- A huge database of products with evidence: https://www.datapunk.net/covid19/antivirals.pl
- https://theana.org/COVID-19

Consider The “Rehab” Need for Recovered COVID patients

- Begin to anticipate that people who have struggled with intense lung issues, and hematologic issues will need nutrition and PT/OT rehab.

Further Information Sources

- https://info.ifm.org/covid-19
- https://theana.org/COVID19/ANAProfessionalResources
- https://coronavirus.frontiersin.org/
- https://www.thelancet.com/journals/lancet/article/ PIIS0140-6736(20)30305-6/fulltext (Reducing mortality from 2019-nCoV: host-directed therapies should be an option)
- https://onlinelibrary.wiley.com/doi/full/10.1002/jmv.25707
- https://thepuristonline.com/2020/04/chris-cuomos-corona-protocol/
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4032839/#!po=4.68750
- http://www.apta.org/uploadedFiles/APTAorg/News_and_Publications/Latest_News/News_Items/2020/Physiotherapy_Guideline_COVID-19.pdf
- https://www.datapunk.net/covid19/corona_tracker.pl