

Speed your recovery from
Long Covid or Long Vax via

The Autophagy Protocol

v 3.4 8/09/2023 Thomas Bunker PhD

DISCLAIMER

This is not medical advice and I am not a medical doctor. This protocol is what helped me and some others in this group. Occasionally, I fine-tune the protocol based on what seems to be working the best. Advice offered or implied is based on what seemed to speed recovery for a small number of individuals. If you have medical issues or specific questions about how this protocol might affect them you should contact your doctor or other medical professional. While I strive to provide accurate information, be aware that information contained herein could be incorrect or dated.

CAUTION: If you have DIABETES, you are at increased risk for ketoacidosis while fasting or eating a low carb diet.

Tom's Autophagy Protocol

In brief, what should I do?

Weeks 1,2, 3

Cut out all added sugars, flour, and rice. Eat more vegetables and start making steel-cut oats with blueberries for breakfast with a hard-boiled egg. Try to get 75% of your calories from plants.

Only eat in a 9 hour window each day. Ideally, eat only between say 8 am and 5 pm. Do not skip breakfast. Drink tea instead of coffee. If you want a sweetener use Monk Fruit extract. Stay on this diet until recovered.

Week 4

Try a **1 day water fast** (night – day – night.) So, do not eat for about 36 hours. Dissolve ½ teaspoon Morton Lite Salt in a glass of water and drink that twice a day for electrolytes. You may have a flare-up during the fast, or more likely after refeeding that may last for perhaps 12, 24 or 36 hours. I call this an antiviral herx or “Verx.” Allow 6 days for recovery and rest.

Week 5

Try **one of the supplement options** listed below to induce the deep-cleaning of Autophagy then rest the remainder of the week. Alternate methods:

- 500-600 mg of **Resveratrol** taken mid-morning for **two consecutive days**
- 1 tsp of **Cod Liver Oil** (Wild Icelandic or Arctic-D). **Take only for a single day** as the verx will likely occur on the 2nd and 3rd day. Take about mid-morning.
- 400 - 600 mg of **Alpha Lipoic Acid** taken mid-morning for **2 consecutive days**.

Week 6

Do a **1 or 2 day water fast** (night – day – night) of about 36 hours or 60 hours. Dissolve ½ teaspoon Morton Lite salt in a glass of water and drink that twice a day for electrolytes. Also take 400 mg of Magnesium Glycinate each day. Allow 5-6 days for recovery and rest.

Week 7

Again, use **one of the options** listed below to induce the deep-cleaning of Autophagy then rest the remainder of the week. Vary or rotate the supplements you use to induce autophagy.

- 500-600 mg of **Resveratrol** taken mid-morning for **two consecutive days**
- 1 tsp of **Cod Liver Oil** (Wild Icelandic or Arctic-D). **Take only for a single day** as the verx will likely occur on the 2nd and 3rd day. Take about mid-morning.
- 400 – 600 mg of **Alpha Lipoic Acid** taken mid-morning for **2 consecutive days**.

And beyond

If you are seeing definite improvements, **rest for 1-2 weeks and then repeat Weeks 4-7.**

Water fast, alternate autophagy method, water fast, alternate autophagy method, rest 2 weeks.

If you are not seeing improvements, can you improve your diet? Have you cut out all alcohol? Did you review your medications and supplements per Appendix A? Do you have too much stress in your life? Are you pacing yourself each day? Are you avoiding all strenuous exercise?

Keys to Recovery

In the big picture of Recovery from long covid I believe the most important factors are:

- #1 Breakdown a percentage of viral proteins in our cells. To do this **induce cellular housecleaning (e.g. autophagy) ONLY one or two days per week**. Autophagy “primes” or enhances our antiviral immune responses. This schedule allows 5-6 days a week for flare-ups, cellular rebuilding, and rest.
- #2 **Avoid "extra" supplements** that constantly stress your cells and may interfere with periodic strong autophagy. Taking high amounts of autophagy supplements (see Appendix A) on a daily basis might actually suppress antiviral immune responses.
- #3 Daily time restricted eating - **choose an 8 to 10 hour window in which to eat your meals**.
- #4 **Follow a no added sugar, no processed carb diet** and eat lots of beans, nuts, and vegetables. Avoid all breads, white rice, and alcohol. In general, try to avoid fried foods and processed foods. Cook your own food!
- #5 **Avoid all strenuous exercise** and major emotional stressors. **Pace yourself**. Avoiding relapses is key.

Autophagy is a basic cellular housecleaning process that happens in every cell in our bodies. There is normally a low level of evening/nightly autophagy. Periodic autophagy is a way for our cells to clear out virus particles, viral protein aggregates, recycle damaged mitochondria, down-regulate inflammatory signaling and improve cellular health. The SARS-CoV-2 virus produces proteins that inhibit cellular autophagy in infected cells. Blocking autophagy helps the virus to hide from our immune system by preventing the presentation of viral fragments on the cell surface. I believe that we can enhance our antiviral immune responses by periodically triggering moderate/strong autophagy.

Choose two consecutive days each week to fast or otherwise induce autophagy. For example, every Sat and Sun or every Mon and Tue. Then each week select one way to induce AUTOPHAGY.

Fasting is a proven way to induce autophagy but do not try a 1.5 day fast until you are strong enough. To fast efficiently, do not eat anything after supper. The next day, dissolve **1/2 teaspoon** of **Morton Lite Salt** in a warm glass of water for a cheap and effective electrolyte solution. Drink two glasses a day when fasting and take 200 mg of Magnesium Glycinate twice a day. Begin eating again the morning with a lighter breakfast. Initially do a night-day-night (1.5 day) fast. If that goes well, try to do similar 1 or 2 day water fasts weekly for a month or bi-weekly over 2.5 months. Ketosis is mild on day 1, moderate on day 2, and strong on day 3.

If you are too weak to fast or do not have any extra weight to lose then you can instead take **600 mg Resveratrol** at noon two consecutive days per week. This induces moderate evening autophagy roughly comparable to fasting. There are also many alternative ways to induce autophagy (See Appendix C). For example, you may want to rotate Water Fasts, Resveratrol, Alpha Lipoic Acid and Fish Oil for your weekly autophagy methods.

Phase I - How to get started Diet and Time-restricted Eating

Just concentrate on diet and time-restricted eating for at least 2 to 3 weeks. This alone may improve or get rid of some of your symptoms.

a) Choose a window for time-restricted eating

I think most long-haulers should start with changes to their diet and limit their eating to an 8 to 10 hr window per day. *The optimum eating window is likely earlier in the day... like 7 am to 4 pm.* But if it fits your schedule better 10 am to 6 pm is fine. Some women find that an 8 hr eating window causes evening symptoms flare-ups, in that case increase to a 10 hr eating window as our aim is to **ONLY** induce moderate or strong autophagy one or two days each week. Doing this gives our bodies 5-6 days a week for cellular rebuilding, tissue restoration and normal cellular functions.

b) Cut out all foods with added sugars and processed carbs

Especially breads, baked goods and sugary drinks. Avoid fried foods. Eliminate wheat flour, white rice, and alcohol. Eat lots of colorful vegetables. Cook your own meals as much as possible. Substitute tea for coffee. See Appendix B for "What can I eat?" Start with a salad or vegetables for every meal.

c) Review your medications and supplements

Not everyone experiences the antiviral herx or what I call a "verx". Perhaps because they have other supplements or medicines that are interfering with the induction of strong autophagy. Or perhaps because the supplements or medicines are suppressing the antiviral immune response. As much as possible, *eliminate all supplements other than those recommended in the autophagy protocol.* Try the autophagy protocol exactly as written for 10 weeks to see if you are one of the many long-hauler the experiences an obvious decrease in symptoms. Unfortunately, not everyone sees a decrease in their symptoms. There is a lot of individual variation.

See the list of foods, medications, and supplements to avoid in Appendix A.

e) Pace yourself and avoid moderate and strenuous exercise

When you are tired, rest. Try a daily 20 min rest with an airline eye mask. Walking is helpful if you feel up to it but do not push yourself. Better to go slow than to overdo it. Avoid all strenuous exercise. Be very cautious with moderate exercise. Many recovering long haulers trigger relapses by hiking too far, jogging, or lifting weights.

Phase II - Periodic Fasting or other Autophagy: 1 to 2 days per week

After 3 to 4 weeks of eating in an 8 to 10 hour window you may be ready for your first fast. However, the severity of your long covid symptoms must also be considered. If you are mostly bed or couch bound you may not be strong enough to successfully do a water fast. Also, some long-haulers that have may see gradual improvements with just the time-restricted eating. Those fortunate long-haulers may not need to do any fasting.

For the rest of us, start with a night-day-night fast (1.5 days), for example stop eating Friday evening, just drink water on Saturday and have 2 glasses of salt water during your day of fasting. Then begin eating on Sunday morning with a small breakfast of say an egg, a piece of fruit, and some steamed vegetables. The fast triggers strong autophagy, typically in the evening. For 33% of long haulers this results in increased long covid symptoms - often for 4 to 8 hours. Interestingly, 50% of long-haulers experience their increased symptoms only *after* they resume eating the next day. Most long-haulers feel better once their body is fasting as it is a strongly anti-inflammatory

state and many immune cells retreat to the bone marrow. **CAUTION:** 10% of long-haulers have a major flare-up of their symptoms after their first short fast. Old symptoms can reappear and existing symptoms can get worse for one, two, or even 3 days. Be patient, and know that your immune system is taking appropriate action against the virally infected cells that the fast has “made visible” via autophagy.

Once your 1.5 day fast goes well, some long-haulers choose to try 2 full days of not eating. In theory, this causes maximum evening and nighttime autophagy. The second day of your fast may be especially beneficial as lipid droplets within your cells are tapped for energy reserves and associated viral particles may also be degraded. If you are concerned about your weight going too low, then a good alternative method appears to be 600 mg Resveratrol. For people weighing more than 200 lb. use 900 mg of Resveratrol. It is good to alternate 2.5 days of fasting one weekend with Resveratrol the next weekend. This is also your chance to try alternative methods of inducing autophagy such as Omega 3 Fish Oil, Alpha Lipoic Acid, Acetyl-L-Carnitine and Metformin. Curiously, only about 75% of long-haulers feel increased long covid symptoms and the accompanying edgy/jittery feeling. Typically, this can be a slightly worse headache, worse head pressure, worse gut ache, increased heart rate etc. Curiously, it is not necessary to “feel” a symptom flare-up or “verx” to see gradual improvements in your symptoms.

Expectations

Some people respond very well to the autophagy protocol and have symptoms begin to disappear at the rate of one per week. Others unfortunately, do not seem to respond at all. On average, the respondents of the Autophagy Protocol’s 2021 weekly symptom survey saw **FIVE symptoms completely go away in the first sixteen weeks** of following the autophagy protocol. Because autophagy is less and less effective at clearing the last bits of viral debris, it may be easier to get to 85-90% recovered than it is to get to 100% recovered. A fortunate few will recover with just the time-restricted eating and a clean diet. A lucky few long-haulers may fully recover following the 1-2 day a week autophagy regimen. However, the majority will plateau at 75 to 90% of normal function. For a cure, I believe that we await the development of new combination antiviral therapies for SARS-CoV-2. Another RNA virus caused disease, Hepatitis C, is curable with combination antivirals taken for 90 or 180 days. In the meantime, we want to stay as healthy as possible.

The End Game

Once you are to no long covid symptoms... YEAH! ... AND you no longer feel long covid symptoms during fasting or other autophagy induction your level of virus/viral debris is very low. **DO NOT ASSUME** that you can now do strenuous exercise or start drinking alcohol or eating sweet treats. **This virus is very sneaky and very persistent.** It will take advantage of any opportunity. **DO NOT** give it an opening. I have talked to several long-haulers that thought they were fully recovered... YET they suffered a long covid relapse after a night out drinking, a run, or an episode of emotional stress. Unfortunately, this can happen after 4 weeks, 8 weeks, or even 12 weeks. Please err on the side of caution, do not underestimate this virus!

Disclaimer – Please do not misconstrue any of this as medical advice. I am not a doctor. This is based on my personal experiences and my attempt to connect the dots in an intelligent way. This is a long way from a scientific double-blinded placebo controlled clinical trial! Nothing is proven yet. Especially be careful if you are having heart complications, vision issues or bad neuropathy. Consider your situation carefully and **review your plans with a doctor** before starting any supplement or fasting regime.

Diet

Please follow a strict no added sugars, no processed carb diet. This means no bread, no wheat flour, no baked goods, no candy, few fried foods and avoid processed foods. The Autophagy Protocol restricts foods that spike your blood sugar. This means avoiding foods that have a high glycemic load and high glycemic index. Avoid all foods with more than 5 or 6 g of sugars. This means no bananas, dates, figs, raisins, or prunes.

Other fruits such as apples and kiwis are good to eat. Avoid wheat flour, white rice, potatoes, and other starchy foods that are rapidly digested. Boiled and cooled sweet potatoes and squash are good. Quinoa and steel-cut oats are fine. Some meat and fish are fine, but avoid highly processed meats. Do try to avoid eating meat every day. *Strive to have at least half your plate at each meal covered with vegetables.* Hearty soups are great with lots of beans, split peas, and vegetables. Salads with walnuts, feta cheese and no sugar vinaigrette dressing are good.

If you suspect that you may have developed an intolerance to histamine, eliminate all high histamine foods (e.g., avocado, tomatoes, spinach, walnuts) from your diet for a couple of weeks. Then slowly add back high-histamine foods one at a time to test for reactions.

Supplements

Supplements are a relatively minor part of the Autophagy Protocol but they may aid recovery. The schedule below assumes fasting or other autophagy methods on Sat and Sun.

Take with your 1st meal M-F or as noted:

- **Vit D** 2000 IU to 4000 IU - Promotes autophagy and healthy immune responses - even if you are only 20 years old!

- **Vit K2** as MK7 100 mcg - To prevent Calcium bone loss with high Vit D Note Vit K2 is included in some multivitamins.
- 1 g **Lysine** At the beginning of every meal and anytime you eat nuts. This seemed to improve my gut health and my stools. It may reduce viral replication by lowering the cellular Arginine/Lysine ratio
- ½ or 1 tablet of Centrum minis Immune **multivitamin** We want to avoid excess folate (Vitamin B9) so get most of your vitamins from a healthy diet.
- 200 mg **Magnesium** Glycinate
- 50 mg **Vitamin B3** as Niacinamide (or Niacin) to boost cellular NAD+. This dose is not enough to induce autophagy. Take mid-morning or at noon for best sleep.
- 750 - 1000 mg **NAC**. It is a good mucolytic and boosts glutathione; our cell's main antioxidant. NAC makes it harder to induce autophagy so **Take only Mon. - Thurs.** If you do not tolerate NAC, liposomal Glutathione or S-Acetyl-L-Glutathione are alternatives.
- **low dose aspirin** (75 or 81 mg) once daily to discourage platelet activation and the formation of blood clots. Discontinue if your gums are bleeding or you get nosebleeds
- **Optional for fatigue:** Super **B Complex** (Igenus) 1 tablet (1/2 dose) Try taking for one month only.
- **Optional for MCAS:** 400-500 mg **Quercetin**. To minimize activation of Mast Cells and block histamine release. May also help take cells out of a pro-viral growth mode. **Take only Tue - Fri.** Avoid Quercetin Phytosome as the dosing is

different. More accurately, aim for 3.3 mg per lb or 7 mg per kg

- **DAO** may also be helpful when taken before meals to degrade histamine in foods. Try this if you are experiencing hives and rashes.
- **Optional for MCAS symptoms:** H1 antihistamines. Try one at a time for a week or two until you find one you like. **Caution on H2 antihistamines** as they may lower antiviral responses.
- **Optional for cardiovascular health:** 5-10 mg of a **statin** or 3-6 mg of Monacolin K via **Red Yeast Rice** (about 300 mg or ½ capsule of Pure Naturals brand). Statins reduce the formation of cellular lipid droplets which may be important for SARS-CoV-2 replication. Higher doses flare-up my symptoms.

It is fine to take any medicines when doing a one-, two- or three-day water fast. But do stop most vitamins and supplements. Especially stop Quercetin and NAC.

Beware of brain fog! Get a day-of-the-week double pill box to help organize your supplements.

My cautious approach to dosing

“Too strong” autophagy in my opinion is often indicated by increased Long Covid symptoms for several days. It may interfere with your sleep. You may get 4 hours of sleep instead of a normal 7-8 hrs. It may also cause a **deep fatigue** the next day or two; similar to the fatigue of PEM. It might cause **brown urine** the next day. It is not clear if these things are a direct result of autophagy. More likely, these effects are a result of strong antiviral immune responses triggered by autophagy.

I believe that we want enough cell stress to trigger moderate autophagy, but we want to do so in a relatively gently manner. The periodic nature of the dosing should allow our cells and tissues time

to rebuild and repair. While the regulation of autophagy is complex, daily strong autophagy likely inhibits cell growth and replication. This may suppress aspects of your normal immune responses. **So please be careful to not stress your cells daily.** Allow time for normal functioning of our cellular “factories.”

Finally, I think we should avoid stressing our cells on a daily basis. Many autophagy inducers short-circuit our mitochondria leading to increased Reactive Oxygen Species (ROS). ROS damage cellular proteins, lipids, and DNA. If this overwhelms the ability of the cell to repair the damage... this kind of damage may lead to the formation of “aged” senescent cells. Senescent cells are a hallmark of aging and are pro-inflammatory. Clinical trials with Fisetin given just on days 0,1 and days 8,9 are underway to look at reducing senescent cells in elderly people. This could also potentially reduce inflammation in those with long covid.

Resources for the Autophagy Protocol

Facebook group:

Long Covid – Improve via Fasting / Autophagy
<https://www.facebook.com/groups/2559838777474649/>

Website: Recover from long covid

https://recoverfromlongcovid.com/?page_id=273

Patient led research:

Observational Study of Periodic Autophagy to treat Long COVID

https://recoverfromlongcovid.com/?page_id=350

Track your Long Covid or Long Vax symptoms:

Have a calculator handy to add your symptom severity scores for 30 of the most common symptoms.

<https://forms.gle/39rsuTUjV38woM9q9>

Appendix A

Supplements, foods, and medications that likely interfere with the Autophagy Protocol

Health supplements to avoid except as specified for an autophagy method:

Fish oils, Omega 3s, Krill Oil, Cod liver Oil, Astaxanthin, MCT Oil >1 Tbsp, Coconut Oil, powdered coconut oil, PEA, PQQ, Taurine. Take no more than 30 mg of Zinc daily as higher doses may trigger autophagy. High amounts of CoQ10 (200 mg as Ubiquinol) and L-Carnitine >300 mg may also trigger autophagy. Arginine, Leucine, Methionine, Serine and Glutamine are all pro-growth amino acids so avoid those. D-Ribose and Uridine are RNA building block precursors so avoid those also.

Herbal supplements to avoid taking on a daily basis as they are likely autophagy inducers:

Many herbal and spice extracts have compounds known to induce autophagy, so **PLEASE avoid ALL additional supplements** including:

Tumeric/Cucurmin, Luteolin, Lions Mane, Reishi Mushrooms, St. Johns Wort, Wormwood, Knotweed or Resveratrol, Licorice root, Boswellic acids, Moringa oleifera, Epigallocatechin-3-Gallate (EGCG), Pterostilbene, French Marine Bark extract or Pycnogenol, Diindolylmethane (DIM), Ashwaganda, Rhodiola, Schisandrin, Bromelain, Sulphoraphane, Oregano oil, Rosemary Oil, MACA, Ginko biloba, Danshen or Red sage, Spirulina, Stinging Nettle, Gota Kola, Black Seed Oil, Apigenin, Berberine, etc., etc., etc.

Longevity supplements to avoid taking daily as they are autophagy inducers:

ResveraCel, NMN, Nicotinamide Riboside (NR), Niacin or Niacinamide (more than 100 mg), Spermidine, Fisetin, Resveratrol, etc.

Medicines to avoid or limit:

Inducers of autophagy:

Statins such as Fenofibrate and Atorvastatin

Atorvastatin at 5-10 mg/daily may be helpful but avoid higher doses as it strongly induces autophagy at 20 - 40 mg/ day.

Metformin If you are on Metformin for diabetes, you are likely experiencing autophagy on a daily basis. Rapamycin (Sirolimus) at 2mg and above. **Ivermectin** at 0.3 or 0.4 mg/ kg, especially avoid taking Ivermectin daily as it has a plasma half-life of 18 hrs and can persist in tissues for 6 days. Pantoprazole (aka Protonix), Valcyclovir and Memantine. Carbamazepine, Doxycycline, Ivabradine, Methylene Blue, the dye used for CT Scans with contrast, Sulodexide, Pregabalin (Lyrica), Montelukast (Singular).

Blockers of autophagy:

Colchicine, hydroxychloroquine, quinone, amitriptyline, nortriptyline, the beta blocker **Propranolol**. The antibiotic **Azithromycin**. The tricyclic antidepressant Anafranil (generic **clomipramine**).

Blockers of the Ubiquitin-Proteasome System:

Proton Pump Inhibitors (PPIs) such as lansoprazole (Prevacid), omeprazole (Prilosec), pantoprazole (Protonix), rabeprazole (AcipHex), and esomeprazole (Nexium) as these may block degradation of damaged proteins.

Foods to avoid as they induce autophagy

Olive Oil more than 1-2 teaspoons (5 -10 ml)

Broccoli sprouts

>1/4 fresh pineapple

> 1/2 oz 85% Dark Chocolate

> 1/8 Cup red lentils

> 20 Cherries

>1/2 C Pumpkin Seeds

>1/2 clove garlic

> 2 cloves

Some fermented foods such as Kefir

Other foods that may induce autophagy

Avoid juicing or eating significant quantities of: Parsley, Celery, Watermelon, Ginger
Many spices... including Saffron, Nutmeg and Cinnamon

Other treatment modalities that may induce autophagy:

Acupuncture and cupping

HBOT – hyperbaric oxygen chamber therapy

NAD+ or Vit C IVs and patches

Ozone treatments

HELP Apheresis

InfraRed Saunas

Cryotherapy

Appendix B What can I eat?

The most important thing is to NOT eat for 14-16 hours of each day. Typically, that means skipping breakfast or skipping dinner. Personally, I prefer to skip dinner and eat between 7 am and 4 pm each day. This puts our bodies into a semi-fasted state for at least half of each day and slows down our cellular metabolism. Slowing our metabolism likely means less viral replication.

Keeping our cells out of the growth mode is key to fighting our long-haul infections. The virus wants 'full-speed ahead' cell metabolism so it can create the maximum number of new virions. To slow our metabolism it is important to avoid sugars and refined carbohydrates. Basically, anything that promotes growth is good for the virus. By avoiding sugars, we avoid spikes in insulin and insulin-like growth factor, hormones that promote cell growth and proliferation. Also, avoid big meals, snacking and excess protein as these promote cell growth. The latest diet research suggests that a "plant-based" diet where you get about 75% of your calories from plants is best.

Foods to avoid and healthy substitutes:

Pop or Soda with added sugars

Candy

Fruit Juices

As much as possible, limit all alcoholic beverages.

Especially avoid sweetened drinks.

Instead drink green or black tea or water

Wheat breads, tortillas, buns and crackers

Pastries, pies, donuts and cookies

Fried foods such as French fries, fried chicken and fried fish

Corn chips, potato chips and tortilla chips

Instead snack on baby carrots and sliced vegetables dipped in hummus

Boxed breakfast cereals

Instant flavored oatmeal packets

Instead prepare steel cut oats (½ cup oats in 1 cup boiling water, let sit 20 min).

Hard boiled eggs or vegetable omelets in moderation.

Watermelon and ripe bananas

Instead eat avocados, apples and kiwi fruits

Raisins, dried prunes, and dried apricots

Instead eat fresh nectarines, peaches and oranges

Hotdogs, cold-cuts and other processed meats in sandwiches

Instead eat pork tenderloin, lean cuts of beef and lower fat hamburger

Also try natural peanut butter on Wasa Lite rye-crisps

Big steaks and grilled chicken

Instead roast or boil your chicken or beef and add the cooked meats into vegetable stews and soups. Use barley or quinoa or riced cauliflower instead of pasta.

Burritos and tortillas

Instead make a "taco salad" without the wheat tortilla.

Sweetened Yogurt or Custard

Instead buy unsweetened Greek yogurt and add your own berries or add a dollop to your steel-cut oats.

So, what can I eat?

The short answer is anything with a lower glycemic index and lower glycemic load.

<https://lpi.oregonstate.edu/mic/food-beverages/glycemic-index-glycemic-load>

For example, let's compare eating rice to eating quinoa.

- Quinoa has a glycemic index of 53 and a glycemic load of 13.
- Rice has a glycemic index of 73 and a glycemic load of 30.

Quinoa has a much lower glycemic index and glycemic load (GL) so it is the better choice. It also wins nutritionally since it has all the essential amino acids. I would say that some quinoa with steamed vegetables is very healthy, but it is at the

upper limit of what is acceptable when trying to limit SARS-CoV-2 replication in your cells. While most fruits are OK in season, bananas are above the cutoff point with a glycemic index of 62 and a glycemic load of 11 for a very small *banana* to 22 for a very large *banana*. So, OK to eat **half a banana** now and then, but not an entire banana. It is better to eat quinoa and bananas with other lower glycemic load foods such as nuts and whole vegetables.

A **boiled sweet potato** has a low GI of 44 and a medium **GL** of 11. But if baked for 45 minutes, the same sweet potato has a GI of 94 and a **GL** of 42, both extremely high. Baking has essentially turned the sweet potato into candy. **Non-starchy vegetables, most whole fresh fruits, beans and legumes, whole grains and nuts** are low to moderate GL and they are packed with vitamins, minerals, and phytochemicals. **Wasa light rye crispbreads** are a good bread substitute. Also **pumpnickel bread** has the lowest GL of any bread at 7.

<https://extension.oregonstate.edu/sites/default/files/documents/1/glycemicindex.pdf>

Tom's long covid favorites –

Breakfast:

Steel-cut oats with blueberries I make this ahead of time with 3 C water and 1 C oats. I boil the water then add the oats and turn off the heat and let sit 20 min. This lightly cooks the steel-cut oats to lower the Glycemic Index and Glycemic Load (GL=9). I then cool and add frozen wild blueberries, and 1/2 tsp Inulin prebiotic fiber. Store in small containers for a quick, easy, healthy breakfast. I generally eat this with a hard-boiled egg to further lower the Glycemic Load of the entire breakfast. The blueberries are loaded with antioxidants.

Omelette with sliced green onion, mushrooms, diced bell pepper and diced tomato

Lunch/ Dinner

Tempeh with broccoli slaw steamed to soften the vegetables. Add some peanut butter and chili powder or other seasonings.

Fresh or canned salmon or sardines with some canola mayo and mustard and dill relish on a Wasa rye crisp with tomato slices.

Natural peanut butter with avocado or tomato slices on a rye crisp. Eat with some plain yogurt.

Salads with 1 tsp olive oil and balsamic vinegar and sunflower seeds with crumbled feta cheese.

Split pea soup with onions and carrots and a small amount of ham for flavoring.

Tofu with shredded cabbage, green onions, diced bell peppers, riced cauliflower and soy sauce.

Homemade chili with ground beef, onions, navy beans, black beans, diced tomatoes. Go light on the beef, heavy on the beans and tomatoes.

Chicken soup with carrots, celery, and broccoli - substituting riced cauliflower for noodles.

Cubed and boiled acorn or butternut squash.

Afternoon Snacks:

Whole small apple, Kiwi or Nectarine

Cauliflower or carrots or orange bell pepper slices and hummus

Greek yogurt (unsweetened) with added blueberries or raspberries or strawberries with added nuts

Feta Cheese or Mozzarella Cheese sticks

Cashews and Pistachios (but take w 1 g Lysine supplement)

Appendix C

Non-fasting methods to induce Autophagy*

Instead of fasting, continue your time-restricted eating and take a Supplement listed below:

- a) 600 mg 98% trans **Resveratrol**. Take mid-morning for evening autophagy. (Optionally, 300 mg Resveratrol with 500 mg Quercetin)
The verx starts about 5 pm into the evening
- c) **Omega 3 Fish Oil** or **Cod Liver Oil** with:
800 mg to 950 mg of combined DHA and EPA
(Or 1 tsp of Cod Liver Oil) Take at 10-11 am.
Symptom Flare-up or verx
may occur on day 2 and day 3.
- d) 400 to 600 mg of **Alpha Lipoic Acid**
Take mid-morning or with lunch
The verx starts within 2 hrs and lasts 8-9 hrs
- e) **Acetyl L Carnitine** 750 mg taken at noon

*Calibrated for a person that weighs 120 to 200 lbs. Adjust the dosage if you are less than 120 lbs or more than 200 lbs.

Different autophagy inducers stress our cells in different ways. This may lead to different “flavors” of autophagy. For this reason, it may be helpful to rotate several autophagy methods on a regular basis. For example:

- weekend 1: Fast night -> Day1 -> night
- weekend 2: Resveratrol
- weekend 3: Fast 2.5 days
- weekend 4: Cod Liver Oil
- weekend 5: Rest

Resveratrol is the best studied autophagy inducer and inhibits mTOR the master controller of cell growth and metabolism. It also extends lifespan of mice and triggers a reduction in liver lipids.

In basic research using human cell cultures, **omega 3 fatty acids** as in fish oil have been shown to induce lipophagy... the degradation of lipid droplets in lysosomes. In a human cell line, SARS-CoV-2 viral replication was blocked when lipid droplet formation was inhibited.

In fruit flies, **Alpha Lipoic Acid** has been shown to improve gut health via a beneficial effect on Intestinal Stem Cells. In rats ALA has been shown to have a multi-organ protective, anti-inflammatory effect in a model of bacterial blood infection (sepsis).

L - Carnitine is a natural amino acid that is important for mitochondrial function. It helps the body turn fat into energy. It is sometimes used for painful peripheral neuropathy.

Appendix D

Medications that could potentially aid recovery

Disclaimer: Discuss the use of any medication with your doctor or general practitioner. They do have potential side-effects and interactions with other drugs and supplements.

Statins

Statins reduce the formation of cellular Lipid Droplets by inhibiting an enzyme early in the formation of cholesterol. Statins are also anti-inflammatory and reduce CRP and/or circulating pro-inflammatory cytokines levels in patients with hypercholesterolemia, diabetes mellitus and metabolic syndrome.

Atorvastatin 10 mg or Simvastatin 10 mg
Monacolin K 6 mg (via about 300 mg Red Yeast Rice)

Caution: Avoid higher doses on a daily basis as 40 mg Atorvastatin triggered strong sensations of autophagy for Tom.

SSRIs

A large analysis of medical record data showed that Covid-19 patients taking either of the SSRI medications below were 26% and 28% less likely to die.

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Fluvoxamine
Fluoxetine

To date, May 2022, there are no clinical trials studying potential efficacy of these for long covid.

Antihistamines

In addition to stabilizing Mast Cells, antihistamines may affect T Cells and have an anti-inflammatory effect.

Metformin

Meta-analysis of 19 studies showed that metformin is associated with **34% lower COVID-19 mortality**

Note: Tom had sensations of autophagy with 300 mg, 500 mg, and 1000 mg of Metformin. The autophagy would turn off and on for a few hours at a time during the day. Best to not combine Metformin with any other methods of autophagy.

SARS-CoV-2 antivirals

PAXLOVID™ is a SARS-CoV-2 *protease inhibitor* antiviral therapy, specifically designed to be administered orally. Approved for early COVID-19 infection as a single five-day course within 5 days of first symptoms. Avoid statins, antidepressants, and quercetin/resveratrol etc. when on Paxlovid.

Two clinical trials have been announced to study the safety and efficacy of 15 or 25 days of Paxlovid for Long Covid. One at Duke and one at Yale.

Medications that could potentially slow recovery

Any medication that blocks or suppresses aspects of antiviral immune responses.

Steroids – broad immune suppressant effects
Maraviroc – CCR5 antagonist
Low dose Naltrexone (LDN) – blocks TLR4 signals
H2 Antihistamines - decrease NK and CD8 T cells

Any medication that blocks or interferes with autophagy such as:

Colchicine, Hydroxychloroquine

Informed Consent

I acknowledge that the Autophagy Protocol is experimental. Daily time-restricted eating, periodic fasting, and other methods of inducing putative autophagy are not proven methods to treat long covid or any other medical condition. While the supplements in the protocol are generally recognized as safe, some may have warnings for use by children, pregnant women or for breast-feeding. Also, some supplements may have negative interactions with other medications. For example, Quercetin can slow the breakdown of certain medications via the liver cytochrome C450 pathway.

A few cautions from WebMD or SelfDecode this is NOT a complete list:

Resveratrol might change how quickly the liver breaks down these certain medications. This could change the effects and side effects of these medications. Resveratrol might slow blood clotting and increase the risk of bleeding in people with bleeding disorders.

Taking **alpha-lipoic acid** when there is a shortage of thiamine might cause serious health problems. If you drink a lot of alcohol and take alpha-lipoic acid, you should take a thiamine supplement. Alpha-lipoic acid might slow blood clotting. Taking alpha-lipoic acid along with medications that also slow blood clotting might increase the risk of bruising and bleeding.

Fisetin: Even at high doses, scientists found no evidence of side effects or toxicity in animal studies. Clinical studies, of course, are needed to confirm its safety in people.

Fish Oil: Some people who are allergic to seafood such as fish might also be allergic to fish oil supplements.

L – Carnitine. Talk to your doctor if you have a history of bipolar disease, neuropathy, hypothyroidism, or seizures. For most people, 1 gram or less per day is relatively safe and free from any serious side effects.

Lactobacillus plantarum 299v - a common probiotic found at lower levels in many fermented foods. From animal experiments it may be an immune modulator that stimulates antiviral host responses by triggering autophagy and INF-1 production. USE with CAUTION as just 5 billion cfu may trigger a multiple day flare-up.

Fasting: Fasting for a few days probably won't hurt most people who are healthy, provided they don't get dehydrated.

Your body needs vitamins, minerals, and other nutrients from food to stay healthy. If you don't get enough, you can have symptoms such as fatigue, dizziness, constipation, dehydration, and not being able to tolerate cold temperatures.

If you have diabetes **your blood sugar levels could go dangerously low** (this is called hypoglycemia). That's especially true if you take medication like insulin to control your diabetes.

Quercetin might make kidney problems worse. Don't use quercetin if you have kidney problems.

I have consulted with my medical provider about the advisability of fasting or using specific supplements to treat my medical symptoms.