

An Emerging Health Crisis Exposed by the COVID Pandemic

By Dr. Charles Bens

In 2019 Dr. Mark Hyman was testifying to the US Senate's Health Committee with his colleagues Dr. Dean Ornish, Dr. Mehmet Oz and Dr. Andrew Weil. At the conclusion of the session Dr. Hyman summarized the group's testimony with this very telling quote:

"You will never solve the current healthcare crisis if you just continue to do the wrong things better".

Dr. Hyman was pointing to the fact that allopathic medicine treats the symptoms of chronic disease while functional medicine treats the root cause of the disease. There are over 40,000 clinical studies that support the conclusion that functional medicine is safer, more effective and less costly than allopathic medicine, and yet very little movement in that direction has occurred in recent years. Dr. David Eddy confirmed this problem with his report on the lack of effectiveness of allopathic medicine published in *BusinessWeek Magazine* in 2005 in an article entitled "Medical Guesswork". This article pointed to the fact that conventional medicine only has good evidence to support 20-25% of everything they do. The rest is "Medical Guesswork", which is becoming costlier and often causes additional health problems with dangerous side-effects. The past ten months of experience have only exacerbated this already bad situation. The lack of adequate treatment protocols for the COVID-19 virus has pushed the healthcare system to the breaking point. The following headlines help to illustrate the severity of this healthcare crisis.

"Profit over people, cost over care: America's broken healthcare exposed by virus".
The Guardian- Amanda Holpuch

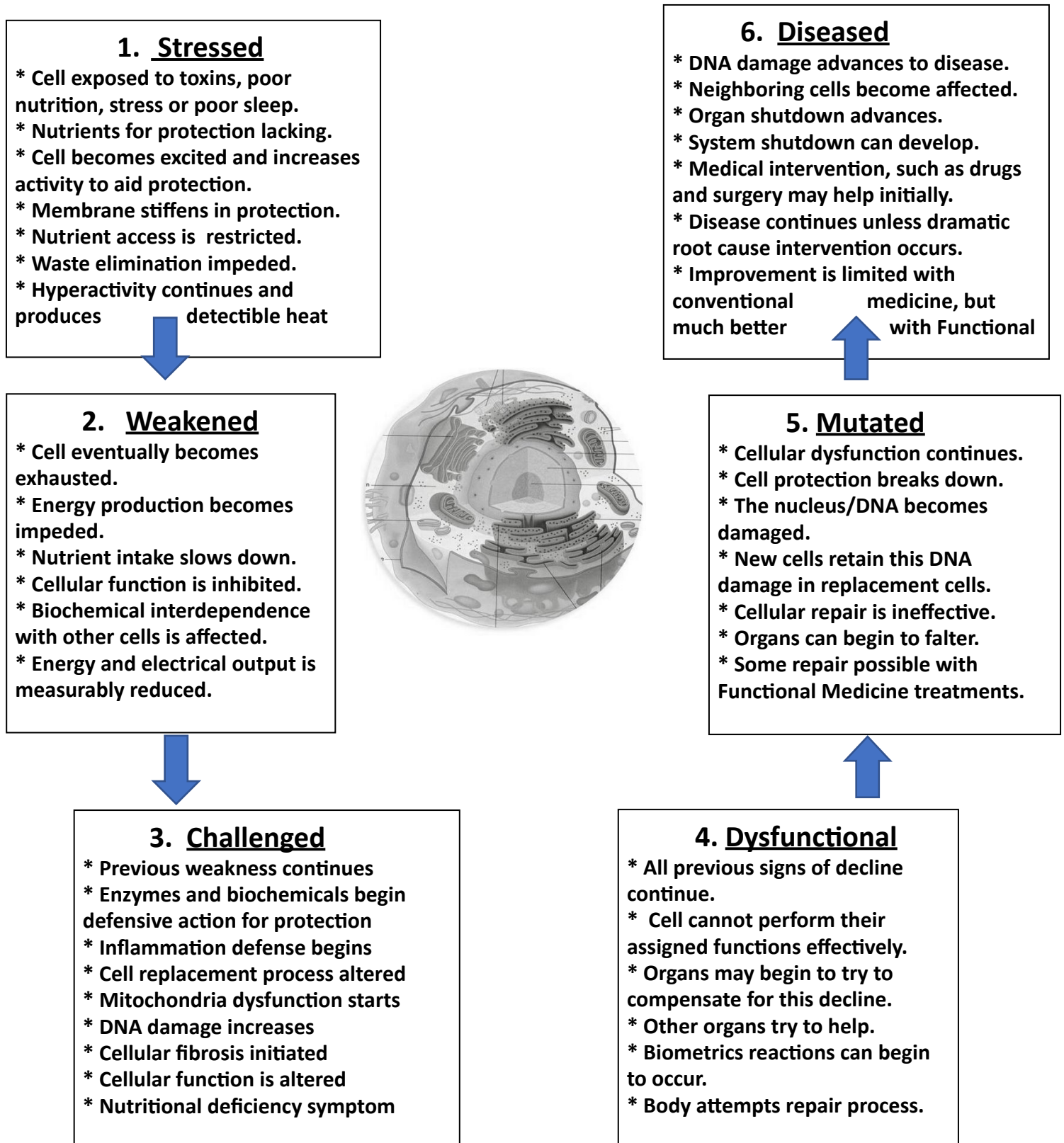
"Only 12 percent of American adults are metabolically healthy, study finds".
University of North Carolina

"If Americans were healthier, we could have been better prepared for this pandemic".
Stanford University Medical School

To make matters worse, 60 Minutes reported on November 22, 2020 with many COVID patients are continuing to experience serious symptoms and the medical community has no solutions. In fact, there is speculation that many of these COVID "long haulers" may end up with terminate damage to their lungs, brains, kidneys, intestines, hearts and blood vessels. If allopathic medicine has no solution perhaps functional medicine can find the root cause of this cellular damage and find natural strategies to address them. The following article explores the possibilities for such a solution and you will learn there are some very promising treatment options that can be combined into a COVID cellular repair protocol. The initial step in this

examination of possible solutions should consider that cellular damage usually occurs in six distinct stages. This helps to explain how cellular healing is possible.

The six stages of cellular deterioration





Most chronic illness is diagnosed at stage four of this six step disease development process with blood tests that identify high cholesterol, high glucose or high levels of liver enzymes. What nutritional scientists and integrative doctors have found is that most chronic illness actually begins five to ten years before stage four, when cells become stressed. My first experience with this stressed cellular state involved my use of Electro Dermal Screening, which measures the activity of mitochondria in each organ. This stress was clearly present when people drank alcohol, took a prescription medication, were exposed to a toxin or did not eat a healthy diet. These cellular assaults often accumulate to the point where a specific group of cells become weakened and eventually challenged. This has been validated with tests such as the 8-OHdG test for DNA damage, the GlycoMark test for high blood sugar, the C-reactive protein test for inflammation and thermography for the detection of cells that are in the process of developing new blood vessels. Thermography can find 200 cells in a woman's breast with an elevated heat level 8-10 years before a mammogram can see 4 billion cells in a tumor. The GlycoMark test can identify high blood sugar 5-7 years before the A1c test is elevated.

Some cellular assaults occur more quickly such as the toxic impact of mercury, which can begin to cause Alzheimer type symptoms within weeks of exposure, and now the same accelerated cellular assault can be seen in the experience of many COVID-19 "long haulers". This virus is causing serious damage to several organs in the body of people infected with this virus with the potential for this damage to result in chronic illnesses that may result in permanent organ damage, and even death. A solution to this problem is needed sooner rather than later.

The COVID-19 Cellular Repair Program

Several studies have now confirmed that people who become infected with the COVID-19 virus often experience some cellular damage, including people who are asymptomatic. This damage has been shown to occur in tissues in the lungs, the kidneys, the liver, the heart, the brain, the throat, the intestines and nerve cells. This damage is sometimes noticeable due to difficulty smelling, tasting, headaches and difficulty breathing. However, in some cases this damage is not measurable or noticeable. Since the experience with this virus is so new in the world of viral infections, we cannot be certain about how much damage has been done or how long it may take the body to repair this damage by itself. Therefore, it is prudent to assume

that damage has occurred and that precautions to repair this damage, with proven cellular repair protocols, should be used. The following suggestions are offered based on the science of cellular repair from damage occurring in other situations such as athletic injuries, disease damage, toxin damage, stress and premature aging.

1. **CoEnzyme Q10-** This enzyme helps to improve energy production in the mitochondria of our cells and has a proven track record in the repair of cells in the kidneys, liver, heart and brain. It also helps to protect the nucleus of cells, which is one of the most vulnerable and important cellular repair areas in the body. Most chronic illness and premature aging is caused by damage to the DNA in the nucleus of our cells. **(Possible dosage 100-200 mg/day as Ubiquinol in soft gel form).**
2. **Curcumin-** It is very difficult to achieve effective cellular repair if there is inflammation in the body. Curcumin has major anti-inflammatory and anti-oxidant properties and is also known to help in the repair of damaged tissue, such as cartilage. Curcumin also boosts brain-derived neurotrophic factor, which has improved brain function in brain related illnesses such as dementia and Alzheimer's. **(Possible dosage 500-750 mg/day in formula with BCM-95- in soft gel form).**
3. **Vitamin C-** Vitamin C is a powerful anti-oxidant, that also helps to produce connective tissue in the body, such as collagen. Vitamin C also has a proven track record of helping cells to accelerate the healing process in diseases such as heart disease, cancer and viral infections, as well as helping to keep pathogens under control. Vitamin C helps to strengthen white blood cells, which are crucial to immune function in our body. **(Possible dosage 2,000-4,000 mg/day taken 500 mg every three to four hours).**
4. **Vitamin E-** Vitamin E is particularly effective in protecting cell membranes due to its strong anti-oxidant properties. It has a proven track record in the treatment of heart disease, vascular disease and fatty liver disease. By repairing damaged cell membranes vitamin E ensures that cellular repair inside the cells can be done effectively since the membrane regulates both the intake of nutrients and the removal of waste from every cell in the body. **(200-400 IU/day as mixed tocopherols in soft gel form).**
5. **Zinc-** Zinc has strong anti-oxidant properties, but this is just one of its many important functions in the cellular repair and replacement process. Zinc picolinate can repair a damaged stomach lining in 30 days. Zinc plays an important role in the cell replication process by also helping with the production of growth hormones and assisting the DNA synthesis process. **(30-40 mg/day-ensure 15 to one ration zinc and copper).**
6. **Vitamin B-** All of the B vitamins are important, but in terms of cellular repair and replacement a few of the B vitamins go to the top of the list. Vitamin B6, B12 and folate are methylators, which means they are needed to help convert amino acids into

hormones, neurotransmitters and other important biochemicals. Vitamin B1, in the form of benfothiamine, is able to help rebuild the myelin sheath (outer lining) of our nerves. As a co-factor in many cellular functions vitamin B is crucial to all of the cells in key organs such as the brain, heart, liver, kidneys, blood vessels and intestines. As part of the cellular repair process it is important to consume a vitamin B complex and also take additional amounts of vitamin B1 as benfothiamine, B6, B12 and folate. **(B-Complex plus extra B6, B12 and folate-look for a homocysteine formula and benfothiamine).**

7. **Vitamin D3-** Vitamin D3 plays many roles in cellular health as an anti-oxidant and anti-viral regulator. More importantly vitamin D3 is the body's master genetic control agent. Vitamin D3 regulates hundreds of genetic on and off switches for the protection and repair of our cells. The strength of vitamin D3 can be illustrated by the power it has prevent cancer at the cellular level, as well as play a major role in the repair of cancer damaged cells as part of cancer treatment programs. It is also vital to the development of healthy bones and teeth. Finally, vitamin D3 plays a major role in helping our cells to communicate with one another to improve our cellular protection and regeneration processes. **(Possible dosage 4,000-6,000 IU/day- in liquid or soft gel form).**
8. **Molecular hydrogen-** Molecular hydrogen (H₂) is the smallest molecule capable of easily penetrating every cell, including cells in the brain. This is very important because H₂ helps to increase oxygen delivery to our cells and ensure a balance is maintained in the release of protective cytokines to fight infections. Supplementation with H₂ has been shown to improve cellular function in the nervous system, the cardiovascular system, the digestive system, the respiratory system, the urinary system, the reproductive system and the brain. **(Possible dosage 2 tablets daily in 10 ounces of water from Quicksilver or Allergy Research Group, drink quickly).**
9. **Specialized Pro-resolving Mediators (SPM)-** SPM is highly concentrated fish oil. Due to its high concentration of lipid mediators, 18-HEPE and 17-HDHA, SPM is able to remodel damaged tissue and return it to normal healthy function. This allows cells to return to a state of balance in order to carry out their functions and responsibilities. SPM can also stimulate enzymatic reactions, which are important to the destruction and removal of pathogens, such as bacteria, fungus and viral infections. Due to these functions, SPM can reduce pain and inflammation as well as help to return cells to their normal healthy function. **(Possible dosage two soft gel capsules daily in split doses).**
10. **Nicotinamide Adenine Dinucleotide (NAD)-** NAD is a molecule in the niacin (vitamin B3) family of nutrients that plays a key role in the cellular aging process. Its role is as a coenzyme, or helper molecule, in many biological processes. As our cells go through the normal cell-replacement process, there are a few checkpoints in this cycle where everything must be perfectly aligned to allow for a good new cell to be produced. NAD

plays a key role in insuring that all cellular systems are working efficiently in this replacement cycle. If nutrition, sleep, stress, toxins and exercise are all at optimal levels, then having good NAD levels provides the insurance for excellent cellular replacement. This replacement process also occurs when cells have been damaged as is the case with the cells of COVID-19 patients. **(Possible dosage 5 mg/day).**

11.Modified Citrus Pectin (MCP)- MCP plays a key role in tissue remodeling, which is vital to the repair of damaged tissues after a heart attack, a stroke or a COVID-19 viral infection. There are several benefits to the consumption of MCP in supplement form:

- Removal of heavy metals from the body.
- Removal of harmful plaque in the arteries.
- Helps reverse cellular deterioration, which leads to cancer and heart disease.
- Improves kidney function via the reduction of fibroids and inflammatory cells.
- Inhibits the development and growth of cancer cells.

MCP generally helps to ensure that cellular assaults are reduced, thus allowing damaged cells to be repaired in a more timely and effective manner. **(Possible dosage 10-15 grams daily, powder or chewable tablets, in split doses of 5 grams each).**

12.Pycnogenol- This supplement comes from French Pine Bark and has been shown to have protective capabilities in several cellular functions including the repair of brain cells after a stroke. It has also been shown to improve kidney flow and function, as well as help to reduce blood clots as an anticoagulant. This is important for COVID-19 patients since blood clots have been found in many parts of the body even after symptoms have been resolved. **(Possible dosage 50-100 mg/day).**

13.Berberine- This supplement activates the GLUT-4 molecule within each cell to improve the energy production in the cells mitochondria. This increased energy allows cells to optimize the cellular repair process. Berberine also plays a role in the DNA damage repair process. This has been shown to specifically improve damage control in the liver, the pancreas, the arteries and the heart. **(Possible dosage 500 mg with the morning meal and 500 mg with the evening meal).**

14.Magnesium- Magnesium is the transport agent that delivers glucose and oxygen into the cell to produce energy in the mitochondria. Deficiencies of magnesium have been known to contribute to heart attacks and a number of brain disorders, including depression, anxiety, ADD and ADHD. Magnesium is found in many foods, especially green vegetables, however exercise and cellular repair processes increase the need for this mineral. There are many forms of magnesium and the following doses are recommended:

- **Magnesium glycinate 400 mg with the morning meal. For body cells.**
- **Magnesium threonate 400 mg with the evening meal. For brain cells.**

15. Probiotics- These beneficial bacteria are crucial to the development of most nutrients in the intestines. They help to control pathogens that come into the body and they break down food for the nutrients they contain. Probiotics also help to initiate the development of anti-inflammatory and immune function molecules. These beneficial microbiotas can significantly influence molecular mechanisms and pathways that can influence both the prevention and resolution of numerous chronic illnesses, as well the epigenetic expressions that can determine our future health. **(Possible dosage: 20 billion live bacteria in a variety of strains at least 10-15 strains; in the morning before breakfast with some yogurt and blueberries for better assimilation).**

16. Olive Leaf Extract- Olives are one of the cornerstones of the Mediterranean Diet and have been helping people to be healthier for thousands of years. One of the primary functions of olive leaf extract is to prevent viral infections. However, it has also been shown to improve cardiovascular health, lower blood pressure and protect organs such as the pancreas, liver and the kidneys. Olive Leaf Extract has anti-inflammatory properties and has been proven to repair tissue damage related to kidney disease, upper respiratory illnesses, fatty liver disease and heart disease. **(Possible dosage is 500-1,000 mg/day in split doses of 250 mg each dose).**

17. Digestive enzymes- As we age our body makes less digestive enzymes, which are needed for the processing of food, metabolic functions and the delivery of nutrients to our cells. By the time we are fifty years old our bodies may be making up to 50% less digestive enzymes than when we were twenty years old. This is part of the body's programmed aging process. Most raw foods have sufficient enzymes to process the nutrients in them, however cooking foods destroys all enzymes. There are over 5,000 enzymes in the body responsible for many functions including the cellular repair and replacement process, as well as helping to kill germs, bacteria, viruses and other pathogens. **(Possible dosage: one capsule with each meal, especially cooked meals. Capsules should contain amylase, protease and lipase enzymes with a larger number of amylase because this is what comprises the majority of food being consumed).**

18. Omega-3 Fatty Acids- Omega-3 fatty acids are a primary anti-inflammatory nutrient with many proven benefits for the prevention and treatment of chronic illness. One of main benefits is the ability of Omega-3 fatty acids to soften cell membranes, which helps to improve the entry of nutrients and the removal of waste from the cells. Clinical studies have shown benefits to the following chronic illnesses.

- Cardiovascular disease
- Cancer of the breast, colon and prostate.
- Cognitive function including depression, ADHD, dementia and Alzheimer's.
- Inflammatory bowel disease
- Childhood allergies
- Cystic fibrosis

- Arthritis
- Macular degeneration

There are some cautions with the use of Omega-3 fatty acids including its impact on blood thinning medications. However, for the most part it is safe when used at appropriate dosages. **(Possible dosages 900 mg/day of EPA and 600 mg/day of DHA. Double or triple this dosage has been effective in several clinical trials, but should be monitored by a qualified health professional).**

In June of 2020 two super athletes that I know contacted me to say that they were experiencing severe symptoms and had tested positive of COVID-19. I forwarded this COVID-19 repair protocol for their consideration. They both indicated that they began to feel better in less than two days and got progressively better over a two week period. At the end of two weeks they both reported they felt completely recovered and were able to resume their athletic training programs at the highest level. The marathon runner reported that his training times had actually improved beyond his best previous times. Here is what he wrote to a doctor who was a fellow marathon runner and had told his story about being a COVID-19 “long hauler” to the Wall Street Journal.

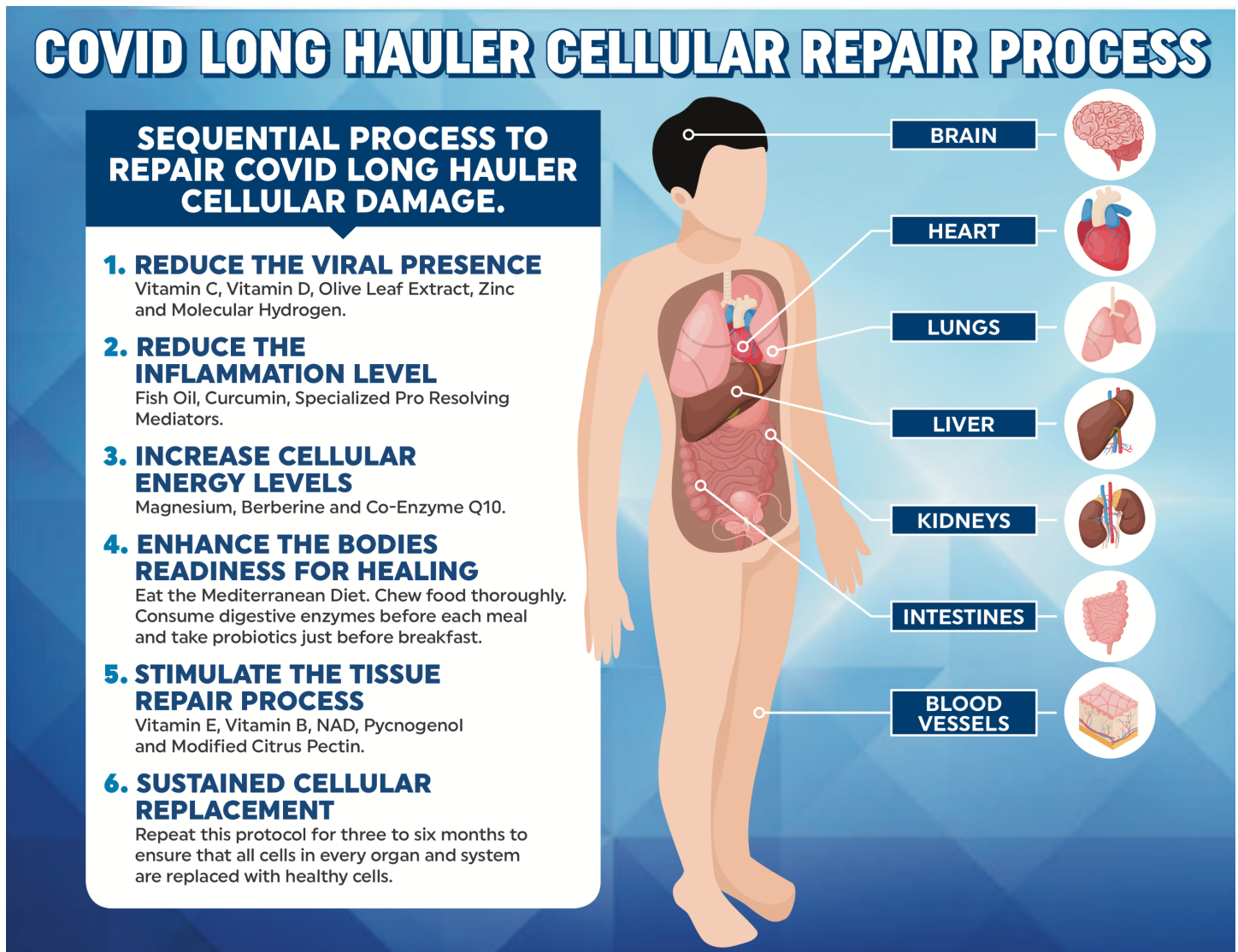
*Hello Dr. Weinstein. My name is Marc Wolff. I am from Sarasota, Florida and I read the article in the Wall Street Journal today. I'm not a doctor but I have run the New York City Marathon five times and I experienced COVID in June. After having it I too am a believer that this virus is the real deal! I had lingering symptoms that quite honestly scared the heck out of me. Finally, I reached out to Dr. Charles Bens, my nutritionist of 20 years, who helped me with his “COVID repair protocol”. Feel free to disregard this email if you want, but at the least I wanted to reach out to you and let you know and give you his email address. If you would like to contact him and mention my name. I now feel 100% and fantastic. I have used Dr. Bens for 20 years and lived a very healthy life as an avid runner. I wish you and all of your colleagues the best of luck and thank you for all you do. Sincerely, **Marc Wolff, CEO, Southern Trust Financial.***

Sequential process to repair COVID Long Hauler cellular damage.

This is the recommended sequence for the use of the COVID-19 Repair Protocol. These six steps were used by the two athletes mentioned.

- 1. Reduce the viral presence-** Vitamin C, Vitamin D, Olive Leaf Extract, Zinc and Molecular Hydrogen.
- 2. Reduce the inflammation level-** Fish oil, Curcumin, Specialized Pro-resolving Mediators.
- 3. Increase cellular energy levels-** Magnesium, Berberine and Co-Enzyme Q10.

4. **Enhance the body's readiness for healing-** Eat the Mediterranean Diet, chew food thoroughly, consume digestive enzymes before each meal and take probiotics just before breakfast.
5. **Stimulate the tissue repair process-** Vitamin E, Vitamin B, NAD Pycnogenol, Olive Leaf Extract and Modified Citrus Pectin.
6. **Sustained cellular replacement-** Repeat this protocol for three to six months to ensure that all cells in every organ and system are replaced with healthy cells.



Targeted Nutraceutical Therapeutics for COVID Recovery

General Nutritional Guideline

The optimum eating program for cellular repair and recovery is to eat according to the Mediterranean Diet. This has been proven by the Framingham Heart Study over 30 years with 125,000 participants. This involves eating Omega-3 rich fish, organic poultry, 6 or 7 vegetables, two low-sugar fruits such as apples and blueberries, nuts, seeds, healthy oils such as olive oil, and plenty of pure spring water with a high level of silica, such as Volvic or Fiji water.

Nutraceutical Guidelines (Dosages were provided earlier and recommended blood and urine ranges are on the next page)

Breakfast

- Probiotics
- Digestive enzymes
- Magnesium
- Berberine
- SPM
- Vitamin D3
- Vitamin C
- CoEnzyme Q10
- Omega-3 fatty acids
- Modified Citrus Pectin

Lunch

- Digestive enzymes
- Vitamin C
- Curcumin
- Molecular Hydrogen water
- NAD
- Vitamin E
- Modified Citrus Pectin
- Olive leaf extract

Dinner

- Enzymes
- Vitamin B complex
- Magnesium threonate
- Berberine
- SPM
- Vitamin C
- Vitamin D3
- CoEnzyme Q10
- Pycnogenol
- Omega-3

- Modified Citrus Pectin

The foods and the nutritional supplements included in this article allow the body to go through its normal cellular repair process. One of the key elements influencing the success of this approach to cellular healing, due to COVID cellular damage, is the timing of the introduction of this protocol. The sooner the repair program is initiated the sooner and more successful the repair and recovery process will be.

COVID Long Haulers Repair Program Measurement

Having a strong immune system is the number one factor in determining if someone will succumb to the coronavirus, cancer or any chronic illness. Not experiencing frequent colds and flu is one possible measure of this strength, but there are better and more scientific way to make this determination. Getting the best blood, urine and cellular energy tests will provide a much more accurate measure of the strength of any person's immune system. Here is a list of some of the best measurement tools for immune system analysis.

1. **Omega 3/6 ratio-** This blood test measures the ratio of Omega 3 to Omega 6 fatty acids in the body. Omega 3 is anti-inflammatory while omega 6 is inflammatory. Too much Omega 6 means the body is vulnerable to illnesses such as cancer, flu response and other chronic illnesses. **Good ratio 2.1-3.1.**
2. **Vitamin D3-** Vitamin D3 controls hundreds more genetic predispositions than any other nutrient or drug. High levels in the blood are proven to dramatically reduce the risk of cancer and viral infections, including the Coronavirus. **Desired levels are 50-90 ng/mL.**
3. **Vitamin C-** Vitamin C is a powerful antioxidant with the proven ability to prevent and effectively treat many cancers, heart disease and many viruses, including the Coronavirus. **Good blood levels are 400 micromol/L.**
4. **Co-enzyme Q10-** CoQ10 increases energy production in the mitochondria of our cells, and provides antioxidant protection for the nucleus of our cells, which contains our DNA. Energy levels are crucial for organs such as the liver, brain, intestines, pancreas, kidneys, lungs and the heart. Diseases such as Parkinson's, cancer, kidney disease and heart disease have been effectively treated. **Good level 0.8-1.5 vng/mL.**
5. **C-reactive protein-** CRP is a good measure of inflammation in the body. Inflammation is caused by the presentence of toxins, too much fat in the body, poor nutrition and injuries. It is a warning sign for the development of heart disease, cancer, brain disease and much more. **Good level is less than 1mg/L.**

6. **8-OHgd**- This urine test measures the accumulated oxidative stress and DNA damage in our cells. DNA damage is caused by toxins, viruses and other pathogens. High 8-OHgd levels are an indication that the body is vulnerable to diseases such as cancer and heart disease. **Good levels for males 29.6+/-24.5 ng/mg and females 43.9+/- 42.1 ng/mg creatinine.**
7. **GGT test**- The Gamma-Glutamyl Transpeptidase Test is a measure of how well the liver is functioning. The liver is the body's primary detoxification organ. If it is not functioning properly something is wrong, and should be corrected. **Normal levels are 0-30 IU/L.**
8. **GlycoMark**- Excess sugar is serious health issue for many Americans. The best measure of sugar's presence and behavior in our body is the GlycoMark test. This test measures all aspects of sugar influence including after meal glucose spikes. **A safe level is 10-31 ug/mL.**
9. **Lymphocytes**- Lymphocytes represent up to 40% of the white blood cells in the body, and are crucial to the immune system defense mechanism. Levels increase in the presence of infections, including viral infections. Blood cancer and autoimmune diseases also cause levels of lymphocytes to increase. **Normal safe levels are 1000-3000/ml.**
10. **Homocysteine**- This test measures the levels of vitamin B6, B12 and folate in the body. These three nutrients are crucial to the development of hormones and neurotransmitters. Low levels lead to inflammation and the development of many chronic illnesses. **Best range 5.0-7.0 mmol/L.**
11. **RBC Magnesium**- Approximately eighty percent of the adult population is deficient in magnesium. Most magnesium tests only consider about one percent of the serum magnesium levels in the body. The RBC Magnesium test is superior because it actually measures about 40% of the total magnesium in our body. **The usual range is 4.2-6.8 mg/dL and the optimal level should be at least 6.0-6.5 mg/dL.**
12. **Galectin 3**- This molecule is found in our blood in small amounts. However, an elevation of this molecule can indicate the growing evidence of heart failure, inflammation, and cancer. Galectin 3 is found to be over-expressed on the surface of cancer cells, and actually helps cancer cells to stick to one another. It also circulates in the blood, indicating that cancers are attempting to spread or metastasize. This is also a good test to determine the development of heart disease. Because it can indicate the possibility of multiple diseases, it should not be used alone to measure the presence or the spread of cancer or heart disease. **The possible range is 3.2-94.6 ng/mL and ideal range is 11.7-17.8 ng/mL.** Anything above 18 ng/mL should be considered a possible movement of cells in the direction of chronic illness, especially heart disease or cancer.

13. **Oxygen test**– Circulating oxygen can be measured by a finger oxygen meter. Oxygen is crucial to the production of energy in the mitochondria when oxygen and glucose are combined. If oxygen levels are low, then the mitochondria do not produce enough energy and cells are not able to function properly. As the level of oxygen drops, the seriousness of the cellular challenge increases. Circulatory restriction is usually the primary cause of reduced oxygen levels. **(Finger meters use a 100-point scale and the desired level is from 96 to 100).**
14. **Electro Dermal Screening (EDS)**- EDS is a measurement of the energy generated in the mitochondria of our cells using acupuncture points that lead to every organ and system in the body. A Vol measurement scale of 1 to 100 determines if cells are stressed, normal or weakened. A score of 55 or above is a stressed organ or system, while a score of 45 or below is a weakened organ or system. Organs or systems that are stressed or weakened can provide an accurate early warning sign before changes are recognized in other diagnostic tools, including blood tests. This early warning time frame may be as much as five to ten years before other tests, which allows progressive health care practitioners an opportunity to utilize natural/non-invasive strategies. Doctors in Germany have been using this evaluation tool for decades with great success. By combining this tool, with some of the other early warning tests in this panel, it is possible that a very accurate health assessment can be provided, leading to a very safe, effective and less costly health care solution.
15. **Zinc/copper ratio**- The ratio of zinc to copper is more important than the serum concentration of either one of these minerals separately. One of the most common trace-metal imbalances is elevated copper and depressed zinc, which often leads to brain related challenges. When purchasing zinc in supplement form it is important to ensure a ratio of 15 mg of zinc to one mg of copper. **(In terms of blood tests the desirable ratio is between 0.70-1.00).**
16. **Curcumin**- It is very difficult to achieve effective cellular repair if there is inflammation in the body. Curcumin has major anti-inflammatory and anti-oxidant properties and is also known to help in the repair of damaged tissue. Curcumin also boosts brain-derived neurotrophic factor, which has improved brain function in brain related illnesses such as dementia and Alzheimer's. **(Blood test to use is the one for C-reactive protein that measures inflammation levels).**
17. **Nicotinamide Adenine Dinucleotide (NAD)**- NAD is a molecule in the niacin (vitamin B3) family of nutrients that plays a key role in the cellular aging process. Its role is as a coenzyme or helper molecule in many biological processes. As our cells go through the normal cell replacement process, there are a few checkpoints in this cycle where everything must be perfectly aligned to allow for a health new cell to be produced. NAD plays a key role in insuring that all cellular systems are working efficiently in this replacement cycle. If nutrition, sleep, stress, toxins and exercise are all at optimal levels,

then having good NAD levels provides the insurance for excellent cellular replacement. This replacement process also occurs when cells have been damaged as is the case with the cells of COVID-19 patients. **(Possible blood plasma level of vitamin B3 are 0.50-8.45 ug/mL)**

A final few words about exercise

Exercise plays a crucial role in the effective delivery of nutrients in the body, as well as the functional ability of cells to do their job. When people exercise, the insulin receptors on all cells increase in number and sensitivity. Insulin receptors are responsible for capturing the glucose and insulin traveling together in the blood stream to be taken into cells for energy production. When people do not exercise on a regular basis, these insulin receptors go to sleep and are not able to bring the glucose and insulin into cells. As a result, cells cannot do their jobs well enough and become stressed and weakened. This makes them vulnerable to pathogens such as the COVID-19 virus. This also causes sugar to continue circulating in the body causing oxidative stress and damage to blood vessels and key organs. As a final insult, this circulating sugar can enter the white blood cells, which are a key component of the immune system. This can happen because the white blood cells need vitamin C in them to be strong and do their job at fighting infections. If there is not enough vitamin C in the body, sugar can take its place because sugar and vitamin C have similar molecular structures. If this unfortunate exchange happens, the immune system can be weakened by as much as 75%. The bottom-line message is to ensure everyone gets 30-45 minutes of exercise every day and eats as little sugar as possible.

Caution: Please consult your healthcare practitioner regarding the use of any nutritional supplements to ensure they are safe and appropriate for your use.

Summary

This is a therapeutic cellular repair program aimed at improved health recovery for patients who have experienced the COVID-19 virus. They are presented, more or less, in sequential order based on importance, although all are valuable components of a cellular repair program. Other key factors include no added sugar beyond fruit, no alcohol, low levels of exercise, low stress, clean air, mineral water and a Mediterranean diet with no red meat.

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Written by: Dr. Charles Bens, Healthy at Work, Sarasota, Florida- July 12, 2020.
Updated December 2, 2020.

Peer reviews

"One of the best science based COVID protocols based on Functional Medicine I have seen. The ability to personalize COVID care for our patients based on diagnostic testing is ideal, and Charles Bens COVID protocol offers this ability. Working with an experienced practitioner to oversee care in light of an individual's clinical history is advised, but this offers a science based approach to reduce associated inflammation and assist organ repair, energy metabolism, and immunity to help individuals who want to prevent COVID, reduce damage due to COVID, and/or restore health after COVID. "

Ruth Lininger MD, MPH, Medical Director, Integrative Path, Chapel Hill, NC

"Dr. Bens has developed an excellent cellular repair and recovery protocol for a vast majority of COVID long hauler patients. This science-based strategy may need to be upgraded

for patients with a very weak immune system such as the cancer patients that I see every day. For these patient's I would recommend adding hydrogen oxygen inhalation, repurposed prescription medications, customized-compounded flavonoids and injectable peptides. These science-based components add additional organ repair capabilities in highly immune compromised patients".

Daniel Thomas, DO, MS, Integrative Oncologist, Mt. Dora, Fl.