Chronic and Acute COVID-19: The Biologic Underpinnings and the Functional Medicine Approach

- Joel M. Evans, MD
- Co-Director, Institute for Functional Medicine Course on COVID-19
- Director, The Center for Functional Medicine, Stamford, CT
What is Functional Medicine?
Functional Medicine utilizes an individualized, patient-centered, science-based approach that identifies the underlying causes of disease and promotes optimal wellness.
The Functional Medicine Model

...utilizes a detailed understanding of each patient’s genetic, biochemical, and lifestyle factors and leverages that data to direct personalized treatment plans that lead to improved patient outcomes.
The Functional Medicine Model

...utilizes a detailed understanding of each patient’s genetic, biochemical, and lifestyle factors and leverages that data to direct personalized treatment plans that lead to improved patient outcomes.

The genetic landscape seems to play a pivotal role in COVID-19 dynamics. We need to embrace and evaluate patients’ genome analyses to provide a better understanding of disease phenotype and severe disease high-risk identification and personalize COVID-19 treatment.
The quest to find genes that drive severe COVID

What’s emerged are genetic variants strongly associated with developing COVID-19 and becoming gravely ill.

People with a variant of chromosome 3 are 2x as likely to be hospitalized with COVID-19.

These tests aren’t yet reliable, but they could be motivation for higher-risk people to get vaccinated. “It might get a few people over the edge who are worried [about vaccination],” adds Genetic Technologies biostatistician Gillian Dite.
Integrated network analysis reveals new genes suggesting COVID-19 chronic effects and treatment

We identified a new set of genes associated with SARS-CoV-2 host response.

Functional analysis reveals possible long-term systemic effects of the infection, such as vascular remodeling and fibrosis.

Finally, we identified potentially relevant drugs to improve the host response to the virus.
Figure 3 Pathway enrichment for each biological system (in vitro and in vivo), ...
Why is Understanding genetics important?

• It allows us to test in order to identify at risk individuals.
• It allows us to understand underlying mechanisms of disease in order to design:
  – Medications
  – Lifestyle interventions (all are important)
    • For you, this IHS audience: EFA’s, Glycocalyx, NO, NAC, Curcumin
A multi-valent vaccine in development is based on genetics

• Long-term immunity to coronaviruses likely stems from T cell activity.

• They selected immunoprevalent SARS-CoV-2-derived T cell epitopes in HLA-genotyped individuals with different ethnicities.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8261158/
A multi-valent vaccine in development is based on genetics

- Nine peptides derived from the four major structural proteins of SARS-CoV-2 were selected and included in a peptide vaccine candidate to recapitulate the broad virus-specific T cell responses observed in natural infection.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8261158/
A multi-valent vaccine in development is based on genetics

- Computational extrapolation of this relationship to a cohort of 16,000 HLA-genotyped individuals with 16 different ethnicities suggest that PolyPEPI-SCoV-2 vaccination will likely elicit multi-antigenic T cell responses in 98% of individuals, independent of ethnicity.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8261158/
The Functional Medicine Model

...utilizes a detailed understanding of each patient’s genetic, biochemical, and lifestyle factors and leverages that data to direct personalized treatment plans that lead to improved patient outcomes.

Biochemistry

• The role of co-morbidities (from CDC) and Biochemistry
  – Cancer
  – Chronic kidney disease
  – COPD (chronic obstructive pulmonary disease)
  – Immunocompromised state from solid organ transplant
  – Obesity (BMI >30)
  – Serious heart conditions (heart failure, coronary artery disease, cardiomyopathies)
  – Sickle cell disease
  – Type 2 diabetes mellitus

The Genetics Align with The Biochemistry (July 2021)

Risk factors for long COVID: analyses of 10 longitudinal studies and electronic health records in the UK

Poor pre-pandemic mental health (1.46x)
Poor general health (1.62x)
Asthma (1.32x)
Overweight or obesity (1.25x)

All Associated with higher risk of long COVID.

https://www.medrxiv.org/content/10.1101/2021.06.24.21259277v2.full-text  Preprint July 10, 2021
Biochemistry

- The following biochemical imbalances, seen in these chronic diseases, must inform our clinical decisions for prevention and treatment for both acute and chronic Covid-19.
  - Mitochondrial function and oxidative stress
  - Hyperglycemia
  - Inflammation
  - Immune system function
The Functional Medicine Model

...utilizes a detailed understanding of each patient’s genetic, biochemical, and lifestyle factors and leverages that data to direct personalized treatment plans that lead to improved patient outcomes.

Lifestyle Factors That Matter for both Acute and Chronic Covid-19.

- Non-restorative sleep
- Sedentarism
- Obesity
- Gut Health
- SDH
- Nutrition
- Stress
- Loneliness and isolation
- Smoking
- Implicit Bias
Lifestyle Factors That Matter for both Acute and Chronic Covid-19 are also associated with:

• Mitochondrial function and oxidative stress
• Hyperglycemia
• Inflammation
• Immune system function
Therefore, genetics, overall health, biochemical imbalances and lifestyle are all interrelated when it comes to Acute and Chronic Covid.
The Functional Medicine Model

...utilizes a detailed understanding of each patient’s genetic, biochemical, and lifestyle factors and leverages that data to direct personalized treatment plans that lead to improved patient outcomes.

Pre-emptive improvement of biochemical imbalances (inflammation, oxidative stress, mitochondrial function, immune function) and lifestyle factors have plausible utility in favorably modulating the resistance to infection, and the clinical course of Acute and Chronic COVID-19.
Acute COVID-19:
What we know now: Prevention
Make people healthier

Modifiable Risk Factors for SARS-CoV-2
Michelle Simon, PhD, ND; Joseph Pizzorno, ND, Editor in Chief; Joseph Katzinger, ND
Integrative Medicine • Vol. 20, No. 5 • October 2021
<table>
<thead>
<tr>
<th>Modifiable Factor</th>
<th>Infection</th>
<th>Severe Disease</th>
<th>Death</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the 4 major US cardiometabolic risk factors (total obesity [body mass index $\geq 30 \text{ kg/m}^2$], diabetes mellitus, hypertension, and heart failure)</td>
<td>OR</td>
<td>% Protection</td>
<td>OR</td>
<td>% Protection</td>
</tr>
<tr>
<td>Normal weight (OR for obesity)</td>
<td>2.73a</td>
<td>63%</td>
<td>3.81</td>
<td>74%</td>
</tr>
<tr>
<td>Normal blood sugar (OR for diabetes or elevated FBG levels)</td>
<td></td>
<td></td>
<td>1.55</td>
<td>35%</td>
</tr>
<tr>
<td>Healthy Vitamin D (OR for low levels)</td>
<td></td>
<td></td>
<td>3.87</td>
<td>74%</td>
</tr>
<tr>
<td>Healthy $\Omega-3$ fatty acid levels</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pescatarian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOT high protein (a high protein diet was associated with elevated risk)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin D supplementation</td>
<td>0.27</td>
<td>73%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quercetin supplementation (not blinded or controlled)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)The odds ratio shown is comparing obesity with non-obesity

\(^b\)((1 - 1/OR) \times 100)
## Risk Reduction - Summary

<table>
<thead>
<tr>
<th>Health Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absence of DM, HTN, Obesity, CHF¹</td>
</tr>
<tr>
<td>Normal body weight²</td>
</tr>
<tr>
<td>Normal blood sugar³</td>
</tr>
<tr>
<td>Vitamin C⁴</td>
</tr>
<tr>
<td>Vitamin D⁵</td>
</tr>
<tr>
<td>Omega-3 fatty acids⁶</td>
</tr>
<tr>
<td>Curcumin⁷</td>
</tr>
<tr>
<td>Quercetin⁸</td>
</tr>
<tr>
<td>Diet⁹</td>
</tr>
</tbody>
</table>

See References: Risk Reduction with Health Factors
References: Risk Reduction with Health Factors


Acute COVID-19:

What we know now: Treatment
Vitamin D
• Hypothesis (May 2020):
• **Perspective:** improving vitamin D status in the management of COVID-19
  
  – Lung inflammation and fibrosis occur due to the release of pro-inflammatory cytokines, interleukin (IL)-1B and IL-18 by activated macrophages and type 1 T helper (Th1) immune cells
  
  – Vitamin D has immunomodulatory, anti-inflammatory, antifibrotic and antioxidant actions. Expression of inflammatory cytokine [e.g., IL-1α, IL-1β, tumor necrosis factor-α] was inhibited by vitamin D and insufficiency was associated with overexpression of Th1 cytokines

  » [https://www.nature.com/articles/s41430-020-0661-0?fbclid=IwAR3yo41dvfU1HWVX_Y6z7iXFNL3X2C06A5gIfC4LcNmXzCA48A7ViMAf7N8](https://www.nature.com/articles/s41430-020-0661-0?fbclid=IwAR3yo41dvfU1HWVX_Y6z7iXFNL3X2C06A5gIfC4LcNmXzCA48A7ViMAf7N8)
• Study (May 2021)
• Impact of daily high dose oral vitamin D therapy on the inflammatory markers in patients with COVID-19 disease
  – VD group received Pulse D therapy (targeted daily supplementation of 60,000 IUs of vitamin D for 8 or 10 days)
  – Vitamin D level has increased from $16 \pm 6 \text{ ng/ml}$ to $89 \pm 32 \text{ ng/ml}$ after Pulse D therapy in VD group
  – Therapeutic improvement in vitamin D to 80–100 ng/ml has significantly reduced the inflammatory markers associated with COVID-19 without any side effects.

» https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8138022/
Quercetin
# Quercetin and Resistance to COVID-19

<table>
<thead>
<tr>
<th>Quercetin</th>
<th>Infect</th>
<th>Severe</th>
<th>LongC</th>
<th>Death</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 mg liposomal</td>
<td>0.32</td>
<td></td>
<td></td>
<td>0 vs 3</td>
<td>Not blinded or formal control, Prospective</td>
</tr>
</tbody>
</table>

Quercetin Impairs SARS-CoV2

Study Design

30 day, prospective study
152 COVID-19 outpatients
  Half standard of care only
  Half standard of care plus quercetin
  500 mg bid liposomal quercetin
  400 mg total quercetin/day
  Open label
This is a Preliminary Study

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dr. Di Pierro</strong></td>
<td>Not published in major journal</td>
</tr>
<tr>
<td><strong>Prospective study</strong></td>
<td>Di Pierro member of Scientific Board of Pharmextracta</td>
</tr>
<tr>
<td><strong>Adequate enrollment numbers</strong></td>
<td><strong>Open label</strong></td>
</tr>
</tbody>
</table>

Di Pierro, et al. Possible Therapeutic Effects of Adjuvant Quercetin Supplementation Against Early-Stage COVID-19 Infection: A Prospective, Randomized, Controlled, and Open-Label Study Int J Gen Med 2021:14 2359–2366
### Outcomes: All Patients

<table>
<thead>
<tr>
<th>Measure</th>
<th>Control</th>
<th>Intervention</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalized</td>
<td>28.9%</td>
<td>9.2%</td>
<td>0.002</td>
</tr>
<tr>
<td>Days of hospitalization</td>
<td>6.77</td>
<td>1.57</td>
<td>0.001</td>
</tr>
<tr>
<td>Needed O₂</td>
<td>19.7%</td>
<td>1.3%</td>
<td>0.01</td>
</tr>
<tr>
<td>Admitted to ICU</td>
<td>10.5%</td>
<td>0.0%</td>
<td>0.02</td>
</tr>
<tr>
<td>Deaths</td>
<td>3.0%</td>
<td>0.0%</td>
<td>0.04</td>
</tr>
</tbody>
</table>

No reported serious adverse events

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Di Pierro, et al. Possible Therapeutic Effects of Adjuvant Quercetin Supplementation Against Early-Stage COVID-19 Infection: A Prospective, Randomized, Controlled, and Open-Label Study Int J Gen Med 2021:14 2359–2366
Outcomes: Only Those with No Co-Morbidities

<table>
<thead>
<tr>
<th>Measure</th>
<th>Control</th>
<th>Intervention</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalized</td>
<td>22.4%</td>
<td>8.5%</td>
<td>0.08</td>
</tr>
<tr>
<td>Days of hospitalization</td>
<td>5.14</td>
<td>1.25</td>
<td>0.01</td>
</tr>
<tr>
<td>Needed O₂</td>
<td>12.9%</td>
<td>0</td>
<td>0.005</td>
</tr>
<tr>
<td>Admitted to ICU</td>
<td>6.5%</td>
<td>0</td>
<td>0.05</td>
</tr>
<tr>
<td>Deaths</td>
<td>6.5%</td>
<td>0</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Di Pierro, et al. Possible Therapeutic Effects of Adjuvant Quercetin Supplementation Against Early-Stage COVID-19 Infection: A Prospective, Randomized, Controlled, and Open-Label Study Int J Gen Med 2021:14 2359–2366
Clinical Takeaways

Preliminary study

Quercetin shown to be safe in many studies

Liposomal quercetin is a logical adjunct to standard of care

Recommendations:
1. All patients should be advised to consume foods rich in flavonoids
2. All patients at risk should be prescribed 500 mg/d of liposomal quercetin
## Dosing Recommendations

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Recommended Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc (acetate, citrate, picolinate, or glycinate orally, Zinc gluconate as lozenge)</td>
<td>30-60 mg daily, in divided doses</td>
</tr>
<tr>
<td>Elderberry (17% anthocyanosides)</td>
<td>500 mg po qd (up to 12 weeks)</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>5,000 IU po qd</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>Up to 10,000-25,000 IU/d</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>1-3 grams po qd</td>
</tr>
<tr>
<td>N-acetylcysteine</td>
<td>1-3 grams po qd</td>
</tr>
<tr>
<td>Quercetin</td>
<td>Regular: 1 gm po bid; phytosome: 500 mg, bid (up to 12 weeks)</td>
</tr>
<tr>
<td>Epigallocatechin gallate (EGCG)</td>
<td>4 cups green tea daily or 225 mg po qd</td>
</tr>
<tr>
<td>Curcumin</td>
<td>500-1,000 mg po bid (of absorption-enhanced curcumin)</td>
</tr>
<tr>
<td>Melatonin</td>
<td>5-20 mg qd</td>
</tr>
<tr>
<td>Resveratrol</td>
<td>100-150 mg po qd</td>
</tr>
</tbody>
</table>

Pre-exposure: What to address

- Reduce Viral Exposure Load
- Comorbidities Obesity
- Inflammation Oxidative Stress Hyperglycemia Furin
- Immune System Resistance Resilience
- High Prevalence Environment?

Patient

Immune System

Environment
Pre-exposure: What to address

Reduce Viral Exposure Load

- Mask
- Wash Hands
- Distancing
- Eye protection? “Essential workers protocol”

Per CDC guidelines

Comorbidities

- Obesity

Lifestyle Factors

- Sleep
- Exercise
- Nutrition
- Stress
- Relationships

Gut Health

Individualize Comorbidities

Inflammation

- Oxidative stress
- Mitochondropathy
- Hyperglycemia
- Furin*

Lifestyle Factors

Gut Health

EGCG*

Curcumin

Astragalus

Quercetin

Resveratrol

NAC* / GSH

Berberine*

Andrographis*

Melatonin

*Elevated Furin:

- Hypertension
- Diabetes
- CVD
- Hyperinsulinemia
- Hypertriglyceridemia
- Obesity
- Autoimmunity
- Dementia

Immune System

Environment
Pre-exposure: What to address

**Immune System**
- Inflammation
- Oxidative stress
- Mitochondropathy
- Hyperglycemia
- Furin*

**Lifestyle Factors**
- Sleep
- Exercise
- Nutrition
- Stress
- Relationships

**Gut Health**
- Consider low dose: EGCG*, Curcumin, Astragalus, Quercetin, Resveratrol, NAC* / GSH, Berberine*, Andrographis*

**Mucosal**
- Consider low dose: Vit A, C, D, E, B6, B12, Folate, Fe, Zn, Cu, Se
- Consider: LD heparin nasal spr.

**Innate**
- Consider low dose: Vit A, C, D, NAC, EGCG, Astragalus, Quercetin, Resveratrol, *Mushrooms, B glucans, Elderberry, Echinacea*

**Reduce Viral Exposure Load**
- Mask
- Wash Hands
- Distancing
- Eye protection? “Essential workers protocol”

**Comorbidities**
- Obesity

**Environment**

**Lifestyle Factors**
- Sleep
- Exercise
- Nutrition
- Stress
- Relationships

**Individualize Comorbidities**

**Per CDC guidelines**
Pre-exposure: What to address

Reduce Viral Exposure Load
- Mask
- Wash Hands
- Distancing
- Eye protection? “Essential workers protocol”
- Per CDC guidelines

Comorbidities
- Obesity
- Lifestyle Factors
  - Sleep
  - Exercise
  - Nutrition
  - Stress
  - Relationships
- See Unit 11
- Gut Health
- See “Intro to FM”
- Individualize Comorbidities

Inflammation
- Oxidative stress
- Mitochondropathy
- Hyperglycemia
- Furin*

Immune System
- Resistance
- Resilience
- Mucosal
- Consider low dose: Vit A,C,D,E,B6,B12, Folate, Fe, Zn, Cu, Se
- Innate
- Consider: Strep. salivarius
- LD heparin nasal spr.

Environment
- Consider adding: Melatonin, Elderberry, Leeks & lectins, Nettles (tea/sup)
- If not already taking, strongly consider these:
  - Vit A,C,D, NAC, EGCG
  - Astragalus, Quercetin, Resveratrol, Mushrooms, B glucans, Elderberry, Echinacea

Gut Health
- EGCG*
- Curcumin
- Astragalus
- Quercetin
- Resveratrol
- NAC* / GSH
- Berberine*
- Andrographis*
- Melatonin

Individualize Comorbidities
Post-exposure: Not symptomatic

If not already taking, consider adding:

- Melatonin
- Elderberry
- Resveratrol
- Curcumin
- Quercetin
- EGCG
- Leeks
- Nettles

If already taking, increase to high dose range
Post-exposure:

Discontinue Echinacea

If not already taking, add; If already taking, increase to high dose range:

- Resveratrol
- Curcumin
- Quercetin
- EGCG
- Leeks – Nettles

Add melatonin: If already taking, increase to 10 – 20 mg qhs
Key Clinical Takeaways for Mitigating SARS-CoV-2 Infection

This free resource details the specific interventions that you can put into practice right now at this stage of the pandemic to mitigate COVID-19 risk for all your patients.

Available now at

https://ifm.org/covid-19
Long Covid
Chronic Covid
Post Acute Sequelae of SARS-C0V-2
PASC
PASC: The Basics

• The NIH published “Trying to Make Sense of Long Covid Syndrome” on January 19, 2021\(^1\) (11 months after recognizing acute COVID-19)

• Definition: collection of symptoms during or following a confirmed or suspected case of COVID-19 and which continue for more than 28 days\(^2\)

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PASC: The Basics

- 3700 international patients, mostly white females between 30 and 60 living in U.S.
- >50% never SOUGHT hospital care, only 8% admitted
- Approximately 60% had symptoms > 6 months


PASC: The Basics

• Most common symptoms: fatigue, post-exertional malaise, cognitive dysfunction.

• Triggers were exercise, mental activity or stress (remember this for therapeutics...go gently)


PASC: The Basics

• A study in Lancet in January 2021 showed that 6 months after symptom onset, more than 75% of hospitalized patients in Wuhan reported at least one symptom.

• Fatigue, muscle weakness, sleep difficulties, anxiety, and depression were common.

PASC: The Basics

• >50% had significant persistent lung abnormalities, more common in those who’d been more severely ill.¹

• Pre-print study from the UK:
  – 70% of hospitalized did not feel fully recovered at 6 months²

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• **Symptoms and Functional Impairment Assessed 8 Months After Mild COVID-19 Among Health Care Workers**

  - Approximately 80% of all hospitalized patients with COVID-19 report persistent symptoms after several months.
  - 26% reported at least 1 moderate to severe symptom lasting for at least 2 months.
  - 15% at least 1 moderate to severe symptom lasting for at least 8 months.
  - The most common moderate to severe symptoms lasting for at least 2 months were anosmia, fatigue, loss of taste on the tongue, and dyspnea.

Should we be surprised?

“It is more typical than not that a virus infection leads to long-lasting symptoms in some fraction of individuals”

Akiko Iwasaki, PhD
Professor of Immunology
Yale School of Medicine

https://www.vox.com/22369734/long-hauler-covid-vaccine
Immune Health is critical

• National Institute for Health Research in U.K.
• 207 people + test compared with 45 healthy people
• Those with **no symptoms or a mild case**
  – Mounted a robust immune response
  – Produced T cells, B cells and antibodies in larger numbers
  – Rapidly returned to normal.

• There was no evidence in these patients of widespread inflammation that can lead to damage in multiple organs.

• National Institute for Health Research in U.K.
• 207 people + test compared with 45 healthy people
• Those **hospitalized** had an impaired (delayed) immune response, which led to:
  – Weakened attempt to fight the virus
  – Widespread inflammation from the time of symptom onset.
  – *This suggests those who develop severe disease have an abnormal inflammatory immune response even at the time of diagnosis*
  – This is exactly what we see in those with chronic disease, biochemical imbalances or sub-optimal lifestyle factors (JME)

The Immune Signature

• Evidence of inflammation (in severe cases) suggests immunopathology may be inevitable in some individuals, or that preventative intervention might be needed before symptom onset.

Severe COVID19 Infection: Common Immunologic Findings

- Impaired interferon signature (Type I & III)
- Neutrophilia – active deployment in large numbers
- Aberrant activation of monocytes/macrophages
- T cell depletion (esp CD4+ and CD8+)
- Depletion of NKT cells
- T cell exhaustion (positive for markers PD-1, Tim-3)
- Elevated pro-inflammatory cytokines and other mediators (bradykinin)

PASC: The Immune Signature

- Immune recovery is complex, with signatures characteristic of increased oxidative phosphorylation and reactive-oxygen species-associated inflammation.
- “These late immunometabolic inflammatory changes and unresolved immune cell defects, if persistent, may contribute to “long COVID”.
- This supports the FM approach just described to PREVENT long COVID (JME)

https://www.medrxiv.org/content/10.1101/2021.01.11.21262564.full.pdf
PASC: The Immune Signature

• Defective immune recovery might drive ongoing disease and contribute to long-term disease sequelae ("long COVID").
• This supports the FM approach just described (JME)

PASC: The Circulation (July 20, 2021)

- The persistent alterations of erythrocytes and neutrophils could be connected with long-term symptoms.
- 70% described chronic headache or neurological symptoms, 54% had concentration disorders, and 62% circulatory problems such as cold sweat and tachycardia.
- We hypothesize that the persisting changes of blood cell physical phenotypes could contribute to the long-term impairment of circulation and oxygen delivery linked with COVID-19.

Therefore, the FM approach to PASC involves:

– Reducing (resolving) Inflammation
– Optimizing mitochondrial efficiency
– Reducing ROS
– Normalizing Immune Signatures
– Improving cell membrane and microvascular health
– Ensuring Gut Health
  • Directly related to immune health and treats immune signature issues, local and systemic inflammation.
  • Improves absorption of nutrients
  • Many long haulers have GI Sx
• Address each patient’s unique vulnerabilities:
  – Co-Morbidities
  – Immune Health
  – Biochemical Imbalances
  – Lifestyle Factors
• Consider dietary, lifestyle, pharmaceutical, nutraceutical and botanical interventions where appropriate.
• Do all of this in a way that is culturally appropriate and free of implicit bias.
Conclusions

• Literature documenting the impact of lifestyle, inflammation, poor nutrition, oxidative stress, mitochondrial function, gut dysfunction, nutrient insufficiency and immune health and acute and chronic COVID 19 is clear.

—See IFM materials on COVID-19.

www.ifm.org/covid
Highlights of The IFM Supplement Protocol:

- Vit D titrate to normal levels
- NAC: 600-900 mg/d
- Curcumin: 500-1000 mg bid
- Fish Oil: 1000 mg of EPA/DHA
- Melatonin: 5-20 mg qhs (titrate to sleep)
- Antioxidant Support
- Gut Support with gut healing nutrients, prebiotics, probiotics
- Mushrooms
- B Vitamins
- Multi Vitamin
Addressing Mitochondrial Function

- Reduce ROS by reducing formation by improving health, reducing stress and increasing elimination with antioxidants.
- Modulate nitric oxide levels with arginine, citrulline, beets, pomegranate, dark leafy greens
- Address metabolomics like blood sugar
- Specific nutrients like glutathione, fish oil, ALA, carnitine
We don’t yet know about Omicron and PASC but there is reason to believe it will be less frequent and less severe
The FM Approach isn’t just about supplements or the bottom of the matrix...
Retelling the Patient’s Story

- Antecedents (Predisposing Factors—Genetic/Environmental)
- Triggering Events (Activators)
- Mediators/Perpetuators (Contributors)

Physiology and Function: Organizing the Patient’s Clinical Imbalances

- Assimilation (e.g., Digestion, Absorption, Microbiota/Respiration)
- Defense & Repair (e.g., Immune, Inflammation, Infection/Microbiota)
- Energy (e.g., Energy Regulation, Mitochondrial Function)
- Structural Integrity (e.g., from Subcellular Membranes to Musculoskeletal Structure)
- Communication (e.g., Endocrine, Neurotransmitters, Immune)
- Biotransformation & Elimination (e.g., Toxicity, Detoxification)
- Transport (e.g., Cardiovascular, Lymphatic System)
- Mental (e.g., cognitive function, perceptual patterns)
- Emotional (e.g., emotional regulation, grief, sadness, anger, etc.)
- Spiritual (e.g., meaning & purpose, relationship with something greater)

Modifiable Personal Lifestyle Factors

- Sleep & Relaxation
- Exercise & Movement
- Nutrition
- Stress
- Relationships

Name: ____________________________  Date: ____________________  CC: ____________________
Illness and Spiritual Beliefs

Clinician as Healer
Virtual humans help aspiring doctors learn empathy

Intuitive technologies are helping medical students learn to deliver bad news

Using a computer simulation for teaching communication skills: A blinded multi-site mixed methods randomization controlled trial

For more, including our webinars

Disclaimer:

This is **One** Way
This happens to be **MY** Way
This is **NOT** the only way
There are **Many** other ways
There are **Many** paths to the same destination
All faiths and many belief systems describe a “non-physical” part of our selves...
All faiths give us guidelines on how to behave while our the non-physical soul inhabits a physical body.
- **Christianity**
  - Doctrine of Justification by Faith
  - 10 Commandments

- **Judaism**
  - 613 Commandments

- **Islam**
  - Sunna (Rules of Life)

- **Hinduism**
  - Dharma

- **Buddhism**
  - Dhamma
It is my belief that addressing and acknowledging this concept helps us... physically and emotionally. Especially during this pandemic!
• It is our personality and societal programming that can prevent us from feeling, understanding, and believing in something greater than ourselves.

• Occasionally, we experience a moment of truth, of awakening, of understanding that connection. This comes through intuition, goose bumps and “ah ha’s”.
Acknowledging the concept of “a connection to something greater” requires us to think about it
Which is an important first step because...

We experience what we think!
That makes thoughts very powerful.

But we already have that understanding if we think about it...
Thoughts are powerful because...

Thoughts define our perception of our life and override the “facts” of our life.

– If our thoughts tell us we are not happy we are not happy no matter the circumstances
  • A child believing he is not great at sports when objectively he is.
  • If we have significant financial success, and greed and jealousy prevent us from being happy with all that we have.
Our *perception* of our life during the pandemic, the discord and disparities in our society, and the ferocity of weather events

**Determines how much stress we are under.**

Perceived stress is more important than actual stress.
Our *perception* of our life

- How stressed we feel we are impacts our physiology and ultimately our health.
  - The stress response isn’t good for health.
    - Sympathetic nervous system dominance
    - Adrenal stress and fatigue
    - Thyroid function
    - Brain function
    - CV and Gut health
    - *Immune function*
So Who Are We?

A non-denominational answer
Who we really are...

A combination of Soul and Personality

Soul:
Aspect of infinite consciousness, the spiritual self, the eternal part of you. It is complete and whole.
Who we really are...

A combination of Soul and Personality

Personality:
The role that your spiritual self assumes during a lifetime. This includes your temperament, gifts, and shortcomings
We can also look at this as:
The Soul is the higher self

Personality is the lower self
This is consistent with major religions:

- **Christianity**:
  - Higher self
  - Lower self described as “temptations of the world”

- **Judaism**
  - Higher Self is “Yetzer Ha Tov”
  - Lower Self is “Yetzer Ha Rah”

- **Islam**
  - 5 selves, including a Lower Self (an-nafs al-ammarah) and a perfected “Higher” self (an-nafs al-kamilah)

- **Hinduism and Buddhism**
  - Higher and Lower Self
It is the **personality** that makes us suffer through wishing that things would be different then they are.
Spiritual Growth

• Begins where we are.

• We must fully accept our current situation (responsibilities and experiences) as *a starting point*, and not overly ruminate over them.

• We then strive to reach perfection in performance of our duties (job, family responsibilities) before we can progress further. We must master the chores and unpleasantness of our earthly existence (cooking, cleaning, work, etc.) without drama.

• “When doing the dishes, do the dishes.”
Right Thought, Right Mind, Right Action

What we think determines what we feel.

What we feel determines how we act.

How we act determines whether we grow our higher or lower self, thus determining our spiritual growth.
“The bio-psycho-social (BPS) model of healthcare (must) be reaffirmed and an “S” be added for spiritual, recognizing that our patients have needs in all four of these domains.

Biomedical Reductionism Falls Short
An editorial by George Lundberg, M.D. (former editor of JAMA)
Medpage Today, March 22, 2011
Lies, cruelty and hate are emotions that hurt us spiritually and physically.

– Spiritually by preventing or slowing our spiritual growth (higher self).
– Physically by putting us into the stress response (sympathetic dominant state).
• **Stress** is an epigenetic modification.

• **Meditation and prayer** are epigenetic modifications.

• **Right thought, right mind, right action** are epigenetic modifications.

What we think and feel determines what molecules are released into our bodies.

The molecules in our bodies determine what we think and feel.
So it is a complicated web:

What we think and feel:
— Accelerates or impedes the rate of our spiritual growth.
— Determines the predominant state of our nervous system (sympathetic or parasympathetic).
— Determines the molecules traveling throughout our body.
— Is determined by our spiritual belief system..
A world view that helps us cope with the pandemic, societal division and disparities and severe weather.

Does NOT mean abandoning the task of trying to be a better citizen, work on your health and “accepting” whatever happens.

It means claiming one’s role as the steward of one’s thoughts, feelings, actions and health.
"I and my Father are One"

Gospels
“...The Lord our God, The Lord is One

The Shema
“He is Allah, the ONE
Surah 112:1
"We are what we think. All that we are arises with our thought.

The Buddha
• Our spiritual belief systems influence and shape our **responses to the stresses of life.**

• Our spiritual belief systems influence our **emotional state.**

• Our spiritual belief systems influence our **nervous system.**

• Our spiritual belief systems help determine the **molecules traveling throughout our body.**
This is bi-directional:

• The state of our nervous system determines how we think and feel.

• The molecules traveling throughout our body determine how we think and feel.

• Our spiritual belief system determines how we think and feel.
In Summary

• **The mind affects the body.**
  – Stress, anger, jealousy, etc. have harmful effects on the body (pro-inflammatory).
  – Peace, love, and contentment have beneficial effects on the body.
  – Helping to change the way we think improves our health.

• **The body affects the mind**
  – Chronic pain can lead to depression and anxiety.
  – Physical exercise can lead to endorphin release.
  – Lifestyle change improves mood.
Therefore, spirituality gives a perspective that improves the mind and the body in these stressful times.
Thank You