Efficacy of medication and nutritional supplements for inflammatory diseases: a comparative analysis

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Abstract

Statement of Problem

The increasing burden of inflammatory diseases like COVID-19 requires systemic, long-term anti-inflammatory interventions. In addition to existing pharmaceutical treatments, natural supplementals such as melatonin, vitamin D3, and curcumin may offer effective anti-inflammatory treatments without the negative complications of medication.

Methodology

Effect sizes and known negative complications were compiled for anti-inflammatory interventions, including: meloxicam, tocilizumab, melatonin, vitamin d3, and curcumin. Effect sizes were computed through standardized mean differences and calculated by the effect of the intervention on a list of the inflammatory biomarkers most affected by COVID-19. Effect sizes were compared across pharmaceutical and supplemental interventions, with negative complications indexed across all interventions.

Findings

The pharmaceutical interventions produced large effect sizes for a limited number of biomarkers, with moderate to serious negative complications. The supplemental interventions produced a wide range of effect sizes, from small to large, across a very wide spectrum of biomarkers, with few to no negative complications.

Conclusion & Significance

Both pharmaceutical and supplemental interventions reduced some inflammation, but the broader array of biomarkers affected and significantly fewer number of negative complications suggest supplemental interventions could be more advantageous for persistent use. This is relevant in consideration of the inflammatory burden of long-COVID. Supplemental anti-inflammatory interventions should be considered for adjunct, long-term treatment of chronic inflammatory diseases.

Images

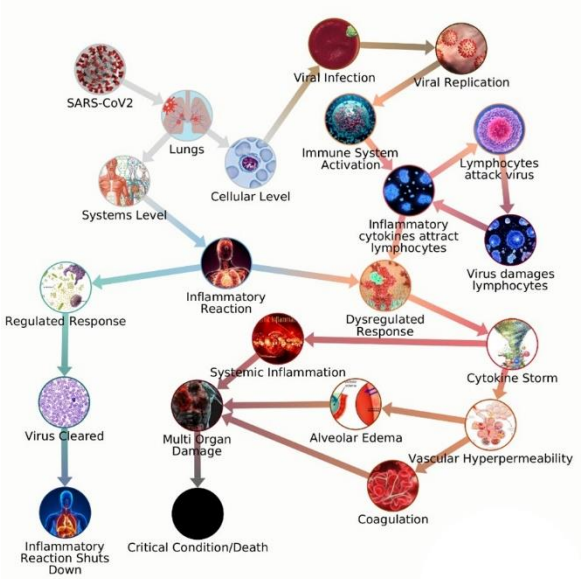


Figure 1. Path of systemic inflammatory dysregulation as typified in SARS-CoV2. Interrupting the dysregulated response requires regulation of inflammatory biomarkers, as this paper examines via different interventions.

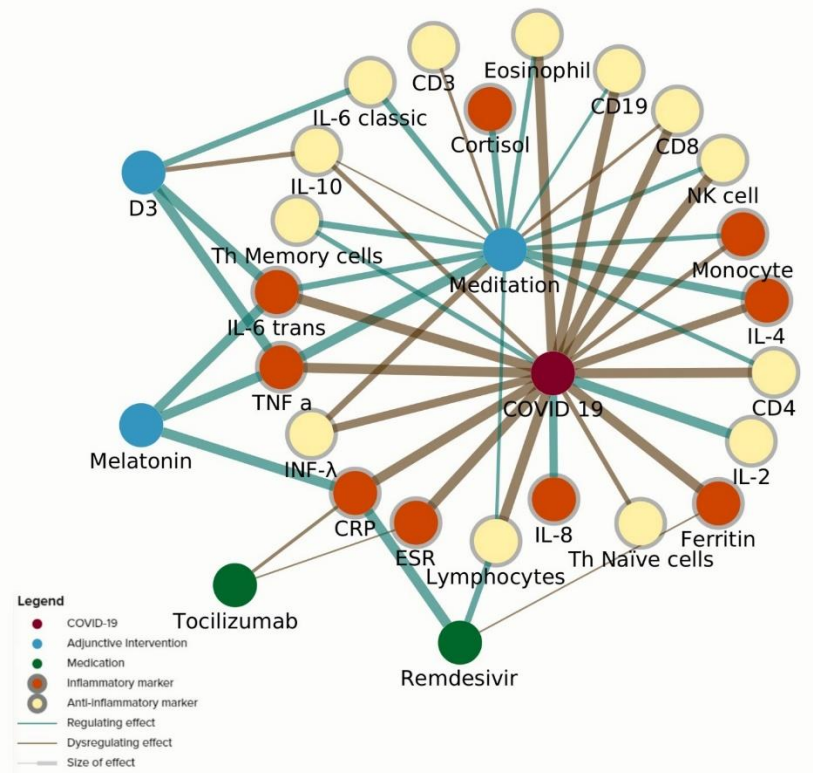


Figure 2. data point map of catalysts, inflammatory markers, and effect size of connection. Color of the circles identifies whether an inflammatory marker, anti-inflammatory marker, adjunct intervention, medication, or COVID-19 is being referenced. Blue connecting lines indicate a regulating effect from the catalyst to the marker. Brown connecting lines indicate a regulating effect from the catalyst to the marker. The thickness of the connecting line represents the relative effect size of the catalyst on the marker.

Recent Publications

1. Bushell, W., Castle, R., Williams, M. A., Brouwer, K. C., Tanzi, R. E., Chopra, D., & Mills, P. J. (2020). Meditation and Yoga Practices as Potential Adjunctive Treatment of SARS-CoV-2 Infection and COVID-19: A Brief Overview of Key Subjects. The Journal of Alternative and Complementary Medicine, 26(7), 547–556. https://doi.org/10.1089/acm.2020.0177
2. Castle, R., Bushell, W. C., Mills, P. J., Williams, M. A., Chopra, D., & Rindfleisch, J. A. (2021). Global Correlations Between Chronic Inflammation and Violent Incidents: Potential Behavioral Consequences of Inflammatory Illnesses Across Socio-Demographic Levels. International Journal of General Medicine, 14, 6677–6691. https://doi.org/10.2147/IJGM.S324367
3. Castle, R. D., Williams, M. A., Bushell, W. C., Rindfleisch, J. A., Peterson, C. T., Marzolf, J., Brouwer, K., & Mills, P. J. (2021). Implications for Systemic Approaches to COVID-19: Effect Sizes of Remdesivir, Tocilizumab, Melatonin, Vitamin D3, and Meditation. Journal of Inflammation Research, 14, 4859–4876. https://doi.org/10.2147/JIR.S323356
4. Hecht M, Marzolf J, Castle RD, (2022). Financing whole-person health. Global Advances in Health & Medicine, 11, *Special Issue pending*
5. Castle RD, Greenfield RH, Marzolf J (2022). Network analysis of employee wellness program factors and efficacy. The Lancet Public Health, 8, *submitted pending peer-review*

Biography

Director of the Science Division at the Whole Health Institute. Previously co-founded integrative sciences archive and data analysis agency with Deepak Chopra, MD. Works gathering research, managing projects, and analyzing information to improve public health via interdisciplinary implementation and a Whole Health perspective. Has published multidisciplinary research in systems theory, the medical efficacy of integrative treatments, and the bio-behavioral effects of chronic inflammation.

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