

- Correspondence -

## The immunomodulatory effects of exercise against COVID-19

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Dear Editor,

I found the letter by Dixit titled “Can moderate intensity aerobic exercise be an effective and valuable therapy in preventing and controlling the pandemic of COVID-19?” [1] a narrowly focused article of contemporary interest. The author overviewed the plethoric evidence on the beneficial effects of exercise, particularly debating a modality of aerobic – moderate intensity exercise – for reducing the incidence of COVID-19. While the protection offered by exercise on immune functions is well-established (e.g. URTI), system responses are dependent on multiple factors which should be cautiously pondered in a context of a potential severe acute respiratory infection and limited mobility. Although the author advocated for a certain intensity, the line of demarcation between immunoprotection and immunodepression is thin and deserves a couple of complementary observations.

On a side, whatever form of physical activity should be pursued in order to contrast the deleterious effects of sedentary behaviors, on the other hand prolonged exercise may exacerbate the susceptibility to upper respiratory tract infections, even facilitating the direct penetration of the SARS-CoV-2 to the lower airways and the alveoli during a putative COVID-19 incubation [2]. Hyperventilation of an atypical runner may exacerbate the

pattern of breathing, with a potential inhalation of several agents, including the SARS-Cov-2 to deepest areas of the lungs. If infection occurs, the exercise-increased air flow could hypothetically expedite the virus diffusion to the lower airways and alveoli during the incubation period.

Second, a macro-level stress of a pandemic virus diffusion represents an unexpected social and economic burden, thus challenging mental health, inevitably. Therefore, there is a double hit on mental health conditions, given by the adjunctive offense of COVID-19 itself plus physical inactivity, with this latter possibly induced by the former one. Ultimately, immunological responses are upstream mediated by pre-existing physiological and psychological conditions.

There is a fine equilibrium within which all these factors are braided and need to be harnessed on a tailored basis, in order to maximize individual responses to the beneficial effects of exercise. The fascinating challenge will be whether we can capture the intimate mechanisms by which exercise comes to the forefront in the battle against pandemics like COVID-19.

### **Conflict of Interest**

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References

- [1] Dixit S. Can moderate intensity aerobic exercise be an effective and valuable therapy in preventing and controlling the pandemic of COVID-19? *Med Hypotheses* 2020;143:109854. <https://doi.org/10.1016/j.mehy.2020.109854>.
- [2] Matricardi PM, Negro RWD, Nisini R. The First, Comprehensive Immunological Model of COVID-19: Implications for Prevention, Diagnosis, and Public Health Measures. (Preprint) 2020.