



## Is it fair to hope that patients with Type 1 Diabetes (*autoimmune*) may be spared by the infection of Covid-19?



### ABSTRACT

The CoV-19 infection appears to be unusual among patients with type 1 Diabetes Mellitus, although they are considered a fragile population. We think that this in part due to the peculiar immune condition that leads to the destruction of the Beta cells.

The Coronavirus (Covid-19) infection is spreading rapidly throughout the planet, but, unexpectedly, patients with Type 1 Diabetes seem to have a mild form of the disease even if they represent a fragile population. Due to the shortage of coronavirus tests on the asymptomatic patients the true rate of infection of type 1 diabetic patients is not well known. What is more significant is the absent mortality rate among these persons and, to our knowledge, the absence of patients with serious consequences. In a transversal observation made in Alghero, Sardinia, one of the “red counties” of Italy and one with the greatest concentrations of type 1 diabetics in the world, there is just 1 case reported, easily healed. This has been recently confirmed by the ISPAD [1]. But what could be the explanation for this strange phenomenon? Traditionally [2], the human immunity to foreign antigens depends critically on the balance of the Th1 and Th2 immunity.

The Th1 immunity is mostly proinflammatory, mediated by T-lymphocytes and modulated by IL-6 and Interferon Gamma among the other molecules, and its mode of action is against pathogens that require internalization, like is the case of the Coronavirus [3]. The Th1 immunity is prevalent in the younger age, and this may at least in part explain the milder course of this viral disease in the youth versus Th2 immunity mediated by B-Lymphocytes and antibodies [4].

Type 1 diabetes has a Th1 autoimmunity pathogenesis, as in Hashimoto's Thyroiditis or Coeliac disease, which frequently coexist [3]. It has been demonstrated that the “*insulinitis*” of Type 1 diabetes is due to a tip of the immunity towards Th1, unrestrained by the Th2 which is mainly anti-inflammatory [5].

We are putting forward the hypothesis that the milder course of the Covid-19 disease in Type 1 diabetics maybe in part explained by an imbalance of Th1 vs Th2 immunity. Because there are ways to move this balance in a direction or the other this may offer a pathway to treatment. Finally, we think that data collection on the prevalence of Covid-19 infection in all Th1 mediated autoimmune diseases should be encouraged.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.mehy.2020.109795>.

### References

- [1] [https://www.medscape.com/viewarticle/927567?nlid=134689\\_3044&src=WNL\\_mdplsnews\\_200327\\_mscpedi\\_diab&uac=75759MY&spon=22&impID=2326416&faf=1](https://www.medscape.com/viewarticle/927567?nlid=134689_3044&src=WNL_mdplsnews_200327_mscpedi_diab&uac=75759MY&spon=22&impID=2326416&faf=1).
- [2] Romagnani S. Th1 and Th2 in human diseases. *Clin Immunol Immunopathol* 1996;80:225–35.
- [3] Shi Y, Wang Y, Shao C, Huang J, Gan J, Huang X, et al. Covid-19 infection: the perspectives on immune responses. *Cell Death Differ* 2020;23. <https://doi.org/10.1038/s41418-020-0530-3>.
- [4] Fallahi P, Ferrari SM, Ragusa F, Ruffilli I, Elia G, Paparo SR, Antonelli A. Th1 chemokines in autoimmune endocrine disorders. *J Clin Endocrinol Metab* 2020;105(4). <https://doi.org/10.1210/clinem/dgz289>. pii: dgz289. PubMed PMID: 31863667.
- [5] Chen J, Lau YF, Lamirande EW, et al. Cellular immune responses to severe acute respiratory syndrome coronavirus (SARS-CoV) infection in senescent BALB/c mice: CD4+ T cells are important in control of SARS-CoV infection. *J Virol* 2010;84(3):1289–301.

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