

Parkinson's Disease, Rheumatic Diseases and Fibromyalgia can be Secondary to a Subclinical Parasitic Infections? The IL-17A and Possible Sanitary Implications

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Diseases mediated by antibodies may be secondary to viral [1-3], bacterial [4-6] and parasitic infestations [7-9]. The formation of antibodies, and therefore also of autoantibodies, occur in B-lymphocytes [10-12] whose activity is modulated by the lymphocytes T helper [13-15] and according the composition of the gut micro flora [16-18]. In lasting years, many articles have clarified the importance of the micro biome and how it may be a possible biological signature for some diseases [19-21].

The perspective of our group is that infestations of protozoans like the giardia exhibit a clinical impact much greater than that actually is recognized. It infect mammals, reptiles and birds [22-24] and may have importance for etiology to several - if not all - rheumatologic diseases, once much frequently, these different diseases share not only some symptoms, but also eventually, the same immunological markers [25-27].

Giardiasis, one of the more common protozoa infecting humans, is a neglected and underdiagnosed condition [28,29] perhaps because it may be asymptomatic or because the gut dysfunctions, when present, can be confounded with any other gut clinical conditions [30-32]. The prevalence of giardia in a region is inversely proportional to the basic sanitary treatment of the water and sewers, so that even after adequate treatment with vermifuge, many times the reinfection is almost unavoidable [33-35]; the transmission in humans occurs by fecal oral transmission via

consume of infected water, contaminated baths, recreational water exposure or through the sexual contact. Moreover, added to the fact that the symptomatology can substantially be affected by the amount of fiber and fat in diet [36-38], giardia may not be easily detected in feces, sometimes needing of enzymatic immune assays for more accuracy [39-41]. Adding, despite in Europe and developed countries giardiasis be sometimes classified like a diarrhea of voyagers, 50% of the cases are domestically acquired [42,43] so that giardia can be a powerful hidden enemy interfering substantially on the immunity against virus of hosts low symptomatic. This conjecture is corroborated by the fact that the mucosa associated invariant T cells, MAIT cells, are great secretors of the IL-17A. The IL-17A is a pleiotropic pro-inflammatory antimicrobial cytokine responsible by increases of IgA into the lumen small gut and essential for the immunological response against viruses, and protozoan like leishmaniosis and giardiasis [44-46].

Therefore, the chronic giardia infection - through IL-17A increasing - could interfere or be the cause, or to get worse, the clinical evolution of diseases like: fibromyalgia [47] psoriasis [48], epidermolysis bullous [49], systemic lupus [50], rheumatoid arthritis [51] and even Parkinson disease [52,53]. The idea here exposed is basically anchored in the fact that IL-17A, which help to the body to efficiently overcome gut parasitic infections, also it is accepted and recognized such linked to several, if not all, autoimmune diseases. It is possible that epidemic viruses also could be strongly influenced by silent infections of protozoans once a specific ratio Tc-17/Th-17 cells is key for adequate immune response in viral inflammations [54]. West Nile virus, adenovirus and on vaccinia virus infection, IL-17 plays a positive role in

antiviral immune responses. However, in the case of Theiler's murine encephalomyelitis virus, Coxsackie virus, dengue virus, HBV, HCV and gamma herpes virus infection, IL-17 can promote and exacerbate virus-induced illnesses. In addition, during influenza virus, HSV, RSV, SIV and HIV infection, IL-17 can play both protective and pathogenic roles. Several agents that can down regulate IL-17 activities can effectively suppress certain types of viral infections and limit tissue pathology. IL-17A administration, for example, alleviate lung inflammation of bronchiolitis in animal model [54]. Therefore, the employment of chloroquine or hydroxychloroquine could be effective for seriously ill cases of covid-19, not only by direct activity against virus [55], but also by killing hidden protozoans [56-58], which could interfere with IL-17A levels.

Despite all enthusiasm that we try to instill, in Luca's family as in Miss Gaga, patients with bullous epidermolysis and rheumatoid arthritis respectively, we must warn that the thoughts above exposed are elusive and speculative, needing obviously, of experimentation scientific. Therefore, diary administration of fibers and probiotics (oat) [59] added to, usually neglected, annual prophylactic treatment of wide spectrum of possible parasites - necessarily covering giardia, amoeba and worms - can be an interesting approach, not only for rheumatoid patients, but for everyone those who live in endemic areas, even in the face of negative stool tests. Finally, we remember that the difficulty on eradicate worms and protozoan are not linked to resistance mechanisms, but linked to reinfection. This letter obviously have not the pretension of to cure diseases, but only to offer a new and revolutionary perspective of a topic that actually imposes himself by the relevance.

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