Food phenolics, immunity and inflammation: paving the way towards novel functional interventions in Celiac Disease

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Latest researches estimate that approximately 1.4% of the world's population has celiac disease (CD). CD is a T-cell mediated enteropathy triggered by ingestion of gluten proteins from wheat, barley, and rye by genetically predisposed individuals carrying the HLA-DQ2/DQ8 haplotype. As with many other autoimmune conditions, CD has emerged as a major public health problem, whose incidence is considerably increasing over time (around 7.5% each year) so that nowadays it has an extensive epidemiological distribution, affecting almost all countries and ethnicities. Currently, the mainstay of treatment for CD depends on a strict life-long adherence to a gluten-free diet (GFD). Nonetheless, doubts still exist as to whether gluten exclusion completely restores the intestinal mucosa of CD patients or whether consequences of the previous strong immune response persist despite adherence to GFD.

Thoroughly researched for their health care potential in the prevention of several chronic diseases such as diabetes, cardiometabolic and neurodegenerative disorders, in the last few decades, little was still known regarding the biological significance and mechanisms of action of polyphenols in Celiac Disease (CD), for which the immunomodulatory function behind their therapeutical potential has never been explored before.

In view of such unknowns, herein, DQ8 transgenic mice and gluten-specific intestinal T-cell lines generated from biopsy specimens of HLA-DQ2 CD patients, were used to exploit the health-promoting properties and applicability of green tea catechins and grape seed procyanidins as an alternative strategy to block gluten toxicity, based on their ability to (1) ameliorate some of the most characteristic histological changes of gliadin-treated DQ8 mice, (2) to increase the intestinal nucleophilic tone of DQ8 mice by orchestrating an adaptive antioxidant response and (3) to modulate IFN-γ production by CD $CD4^+$ T cell lines.