INTEREST OF PREBIOTICS

FEEDING THE HEALTHY BACTERIA FOR A BETTER INTESTINAL ECOSYSTEM

In 1995, Gibson and Roberfroid coined the concept of **prebiotics** in these words: "*Non digestible oligosaccharides in general and fructo-oligosaccharides in particular, are prebiotics. They have been shown to stimulate the growth of endogenous bifidobacteria*" [1]. Two key properties of short chain fructo-oligosaccharides which lead to physiological functions are indigestibility in the small intestine and fermentability in the colon. They are converted into short chain fatty acids (SCFAs) by intestinal bacteria, especially by bifidobacteria, and these SCFAs largely feed the colonocytes [2].

The best dietary prebiotics sources are artichokes (especially Jerusalem artichokes), onions and leeks (in fact the whole *Allium* family), asparagus, salsify, and chicory - the latter representing by far the dominant source for commercialized prebiotics. Fructo-oligosaccharides are characterized by a smaller degree of polymerization (less than 10) whereas inulin - mostly extracted from chicory (*Cichorium intybus*) - covers as much as 60 degrees of polymerization. Most of scientific research has been performed with inulin, hydrolyzed or not, even though other types of prebiotics exist, such as lactulose.

Interest of prebiotics for supporting the **immune system** has been extensively published: their immune-enhancing effects [3] apply to all age categories, from infants [4] to elderly patients affected by *Clostridium difficile* [5]. Besides, more and more evidence is accumulating in favor of a powerful protective effect towards colon cancer, and the involved mechanisms include the reduction of exposure to risk factors as well as the suppression of tumor cell survival [6]. Regarding **colitis**, the studies show how prebiotics improve the gut mucosal barrier and modulate the microflora, thus they could help in the prevention of inflammatory bowel diseases [ÎBD] [7]. "*This novel therapeutic strategy appears to decrease Crohn's disease activity in a small open label trial*" [8]. Besides, very encouraging results have been obtained in ulcerative colitis [9, 10].

Relieving **constipation** represents a considerable practical application for prebiotics, both due to their safety and efficacy [2]. In another field, they improve the absorption of several minerals, mostly calcium [11] and magnesium [12], which positively affects **bone mineralization** especially during pubertal growth [13]. Another field where prebiotics deserve our clinical interest is relieving liver steatosis [14], including a significant decrease of serum transaminases justifying the use of prebiotics "*in the management of* **liver diseases** *associated with abnormal lipid accumulation in humans*" [15].

Perhaps the major interest for prebiotics lies in their capacity to promote **satiety** and decrease absorption of macronutrients, thus helping to prevent **obesity** [16]. Besides, "*dietary fiber intake may modulate parameters associated with the control of the metabolic syndrome, namely food intake (and body weight), glycemia and insulinemia, blood lipids and blood pressure*" [17]. Prebiotics decrease the mean daily energy intake mainly through the modulation of gastrointestinal peptides, an array of hormones that control our appetite and satiation; they boost the secretion of glucagon-like peptide-1 (GLP-1) and of peptide YY (PYY) - two major satiety promoting peptides released by the colon - whereas they reduce the production of ghrelin, an orexigenic (triggering appetite) stomach-secreted peptide [18]. The first human pilot studies available justify recommending prebiotic supplements in the management of food intake in overweight and obese patients [19].

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