



ROLE OF OTHER PREBIOTICS ON IMMUNITY

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OLIGOFRUCTOSE:

- The studies conducted with recognized prebiotic fibres (oligofructose) have shown increased lymphocyte and/or leucocyte numbers in GALT (Gaskins *et al.*, 1996; Pierre *et al.*, 1997; Field *et al.*, 1999) and peripheral blood (Kaufhold *et al.*, 2000).

PECTIN:

- More CD4⁺ T cells have been found in mesenteric lymph nodes in rats fed a diet containing 5% pectin, compared to less fermentable cellulose (Lim *et al.*, 1997).



LACTULOSE:

- Studies have documented that feeding lactulose is associated with increases in IgA secretion or IgA+ cells in GALT (Kudo et al. 1998; Kudo et al. 1999), a decrease in the CD4+/CD8+ ratio in the spleen (Kudo et al. 1998), and an increase in the phagocytic function of intraperitoneal macrophages (Nagendra & VenkatRao, 1994).
- Immunological effects have been observed after adding prebiotics such as FOS and lactulose to the diet, including increases in mucosal immunoglobulin production, mesenteric lymph nodes, Peyer's patches, and altered cytokine formation and lymphocyte numbers in the spleen and intestinal mucosa (Schley and Field, 2002).



The few studies that have examined the effects of prebiotic fibres on the immune system are reviewed in the Table:

REFERENCE	SUBJECTS	EXPERIMENTAL FIBRE DOSE	CONTROL DIET / FIBRE DOSE	IMMUNE EFFECT
Field et al., 1999	Adult mongrel dogs	Fermentable fibre mixture (beet pulp, Oligofructose, gum arabic), 8.7 g/kg	Cellulose, 8.3 g/kg	<ul style="list-style-type: none"> • ↑ CD8+ cells in Intra Epithelial Lymphocytes(IEL), PP and LP • ↑ CD4+ cells in MLN and peripheral blood. • ↑ T cell mitogen responses in MLN and IEL
Lim et al. 1997	Sprague-Dawley rats	Pectin, konjak mannan, or chitosan, 5 % w/w	cellulose, 5 % w/w	<ul style="list-style-type: none"> • ↓serum and MLN IgE (all fibres) • ↑serum IgA and IgG (pectin) • ↑MLN IgA and IgG (pectin, chitosan) • ↑CD4+ T cells in MLN (pectin) • ↑INF-γ in MLN (pectin)



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Pierre et al.1997	Min mice	Oligofructose (from sucrose), wheat bran, or resistant starch, 5-8 % w/w	Cellulose, 2 % w/w	<ul style="list-style-type: none"> • ↑ number of PP in small intestine (short-chain FOS)
Yamada et al., 1999	Sprague-Dawley rats	PHGG, guar gum, HM pectin, or glucomannan, 5 % w/w	cellulose, 5 % w/w	<ul style="list-style-type: none"> • ↑IgA in spleen and MLN (all fibres). • ↑ IgG in spleen (glucomannan, pectin) and MLN (all fibres). • ↑ serum IgA (guar gum, glucomannan, pectin) and IgM (glucomannan).
Yun et al., 1997	C57BL/6 mice (immunosuppressed)	Oat β-glucan, 3 mg every 48 hr	Diet not specified	<ul style="list-style-type: none"> • ↑non-specific and antigen-specific IgG in serum. • ↑ IFN-γ-and IL-4-secreting cells in spleen and MLN.

CONCLUSIO

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- Chemicals or food ingredients, selectively fermentable.
 - supports the beneficial bacteria.
 - Plays major role in immunity
- Mainly 2 types of prebiotic fulfill all the criteria.
- **Prebiotics** can be combined with **probiotics** to form **Synbiotics** which can be given as nutritional supplements to get **synergic effect**.

