L’effetto barriera della flora batterica intestinale-

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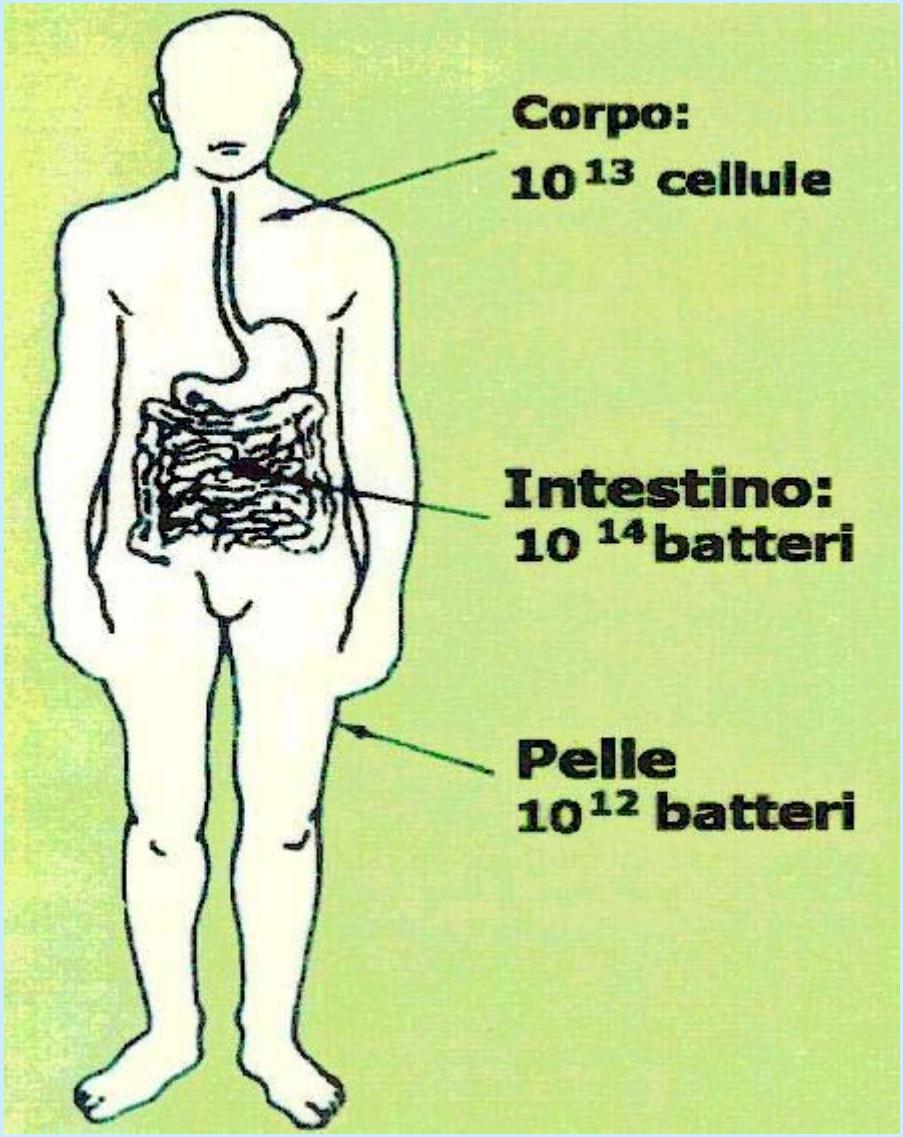
Piacenza

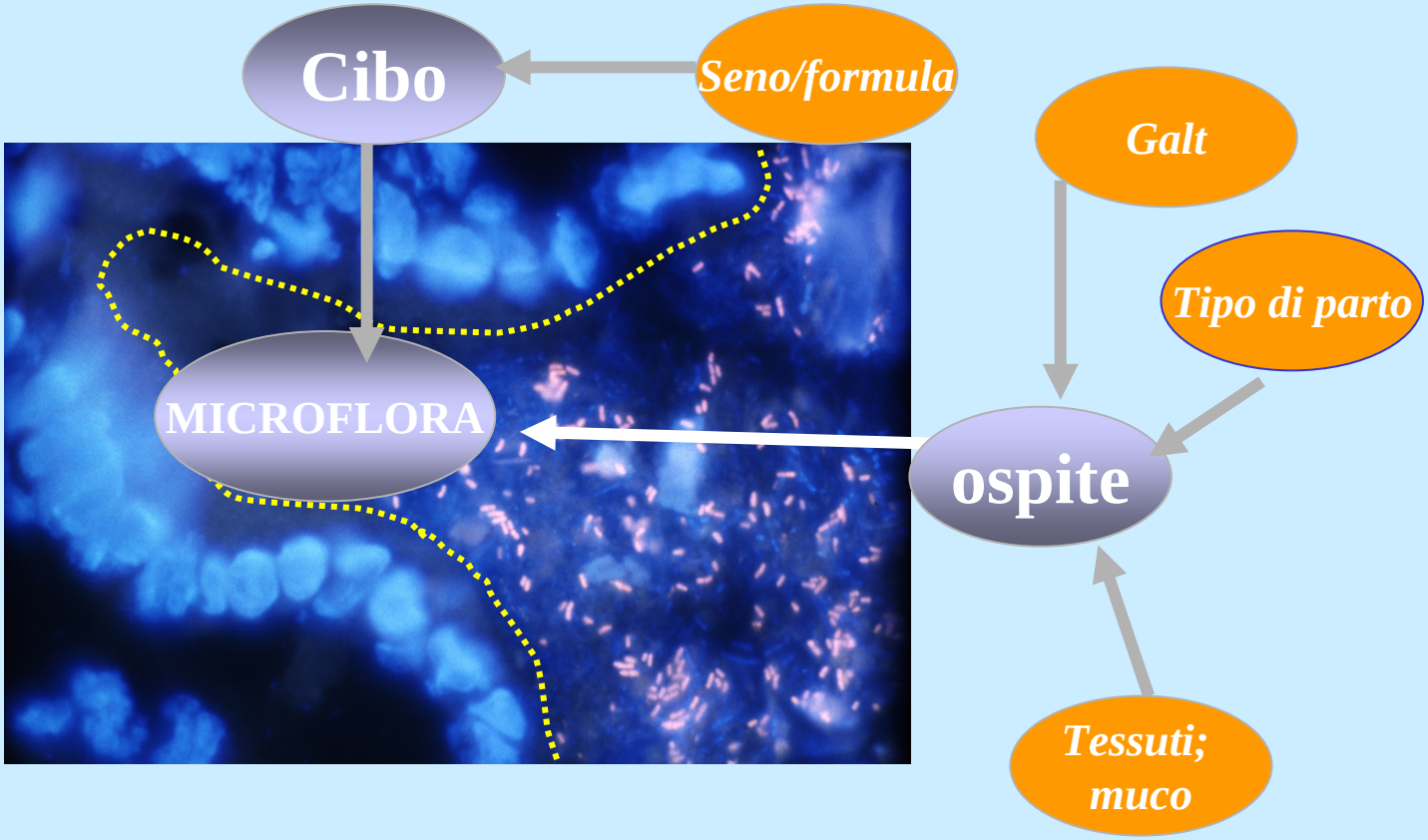

Corpo:
10 13 cellule
Intestino:
10 14 batteri
Pelle
10 12 batteri

Microflora del neonato…

Dal deserto…

alla jungla

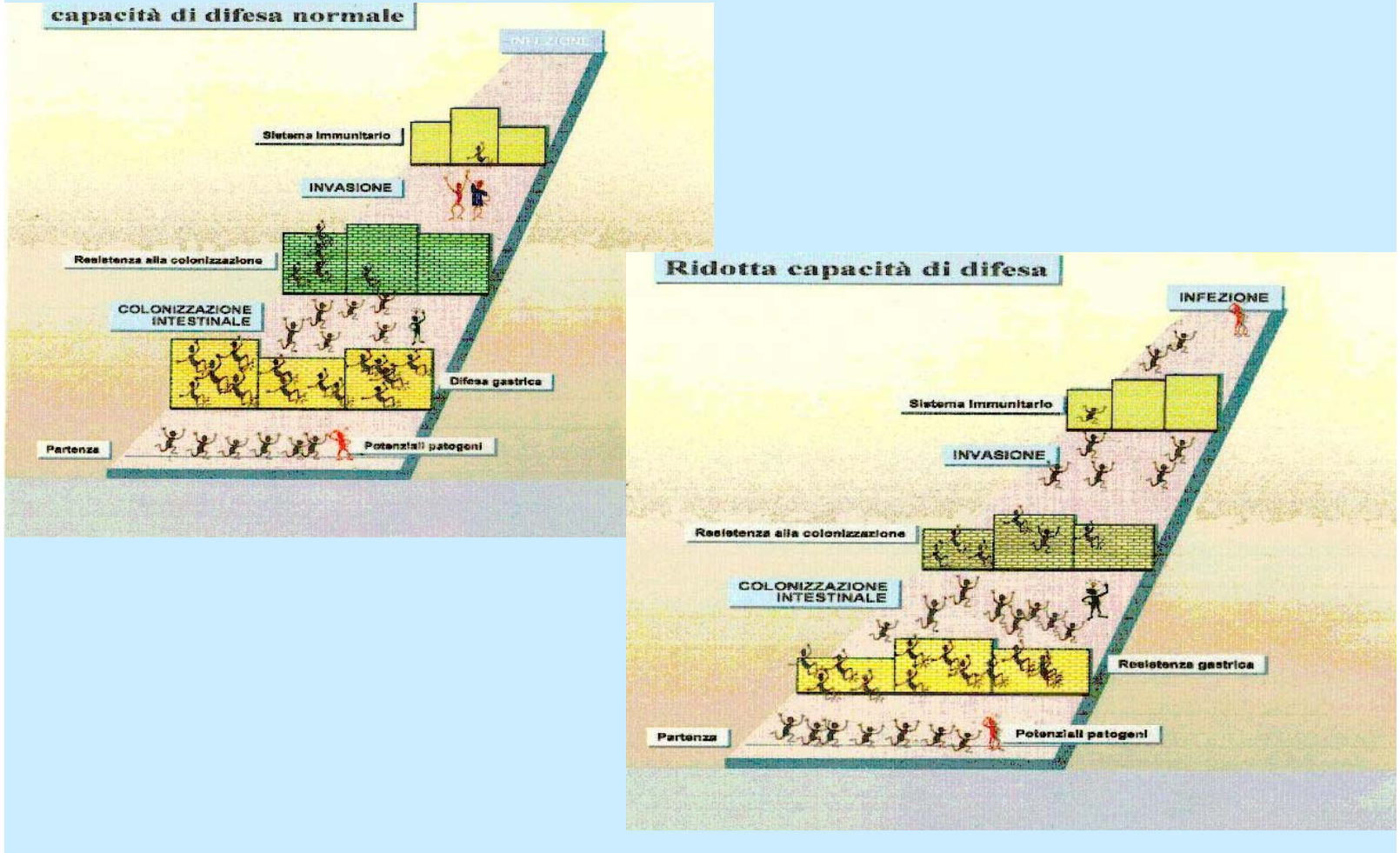
“Driving forces”



logN/g di batteri nel tratto intestinale

	Uomo	Ratto	Suini	Topo	Conigli
Cavità orale	**7-8**	**7-8**	**7-8**	**7-8**	**7-8**
Stomaco	**<3**	**7**	**6-7**	**7**	**4**
Digiuno	**<3**	**7**	**8**	**7**	**4**
Ileo	**5**	**8**	**10**	**8**	**8**
Colon	**11**	**11**	**11**	**11**	**11**

La microflora ha un effetto barriera



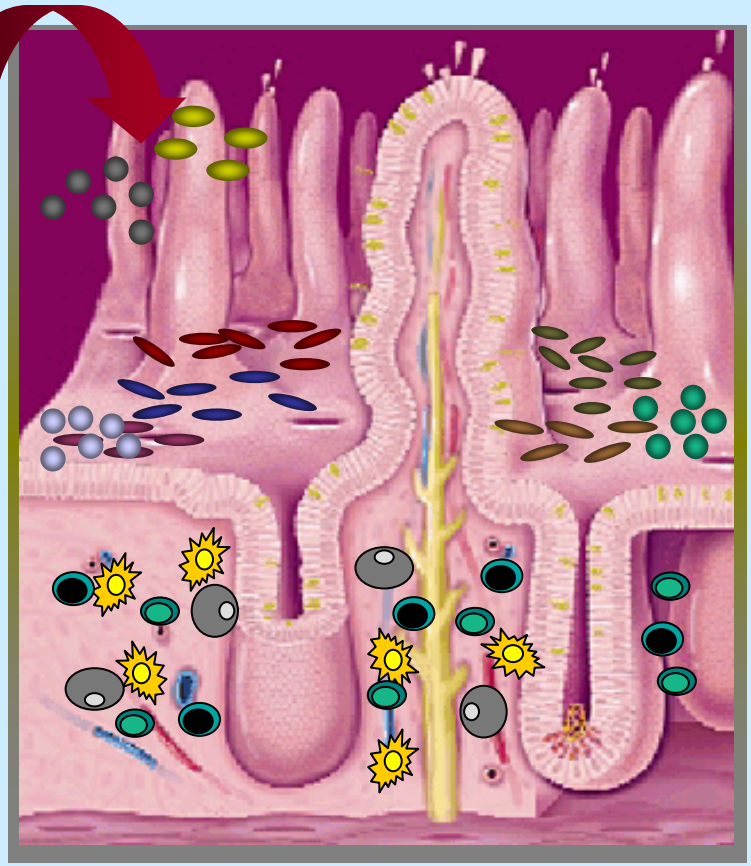
Competizione fisica (adesione-probiotici)

Competizione nutrizionale (prebiotici)

Inibizione (probiotici)

Intestinal ecosystem

Flora transiente



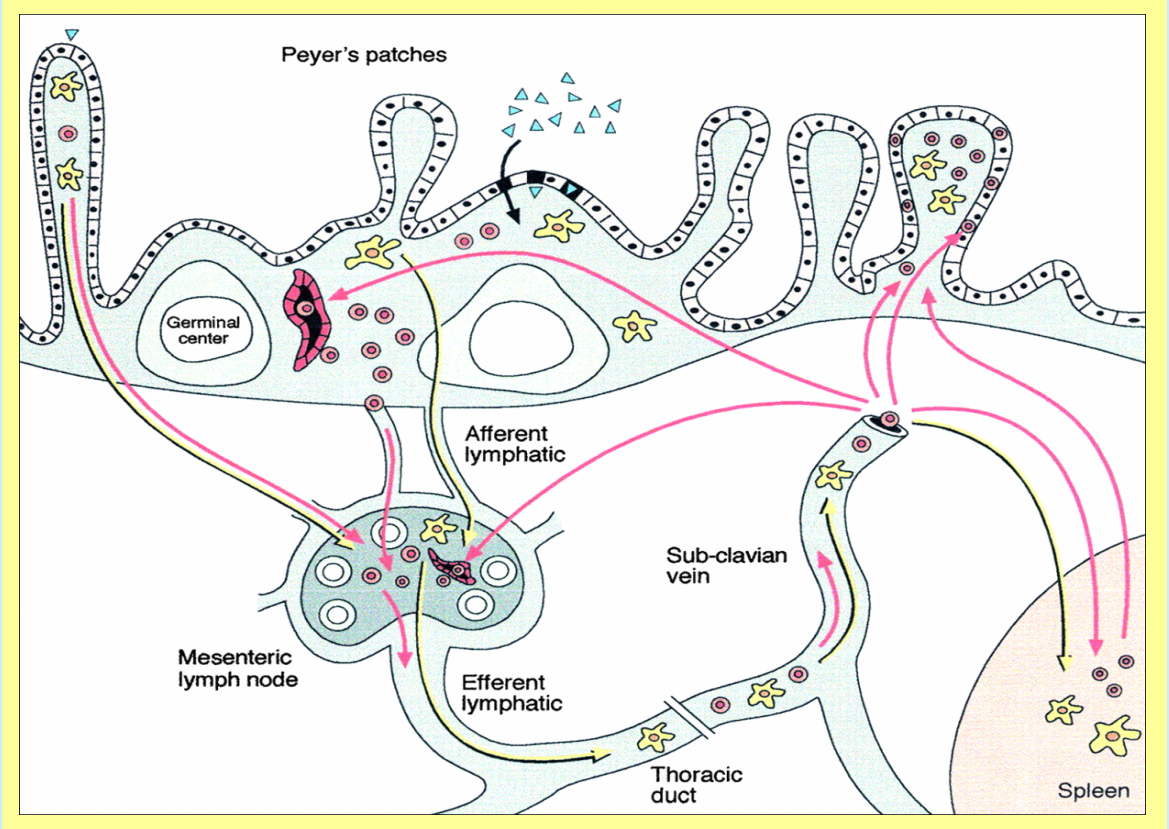
Cellule del S.I.

- Macrophages
- Dendritic cells
- B-lymphocytes
- T-lymphocytes

Flora residente

- *Bacteroides*
- *Bifidobacterium*
- *Clostridium*
- *Escherichia coli*
- *Enterococcus*
- *Lactobacillus*

Induzione della risposta immune



CLINICAL AND DIAGNOSTIC LABORATORY IMMUNOLOGY, Mar. 2001, p. 320–324 Vol. 8, No. 2
1071-412X/01/$04.00+0 DOI: 10.1128/CDLI.8.2.320–324.2001

Association of *Lactobacillus* spp. with Peyer's Patches in Mice

LAURA PLANT AND PATRICIA CONWAY*

School of Microbiology and Immunology, University of New South Wales, Sydney, Australia, 2052

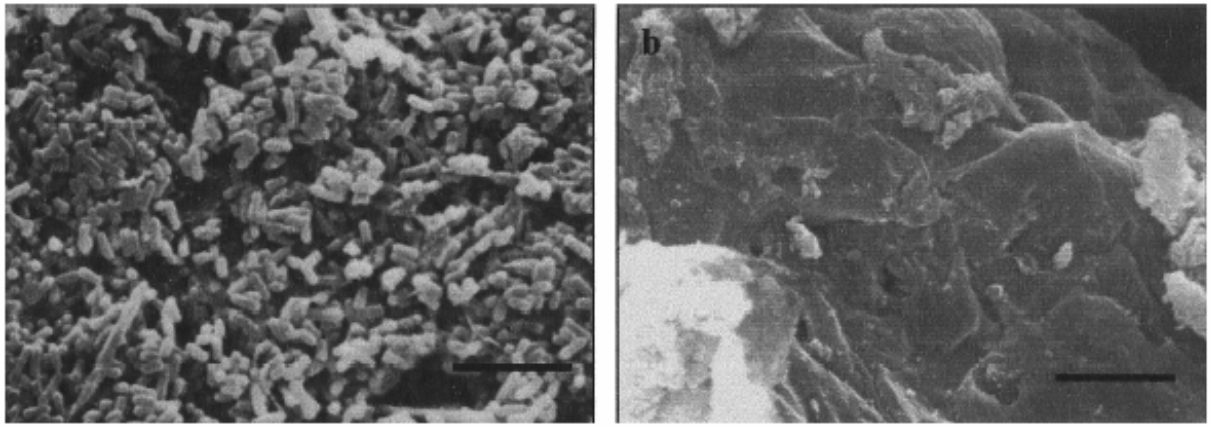


FIG. 1. Scanning electron micrograph of mouse tissue after incubation in *L. fermentum* KLD cell suspension. (a) Typical aggregates of *L. fermentum* KLD-like cells on the FAE of the Peyer's patch; (b) absence of cells on nonlymphoid villous intestine. Bars, 10 μm.

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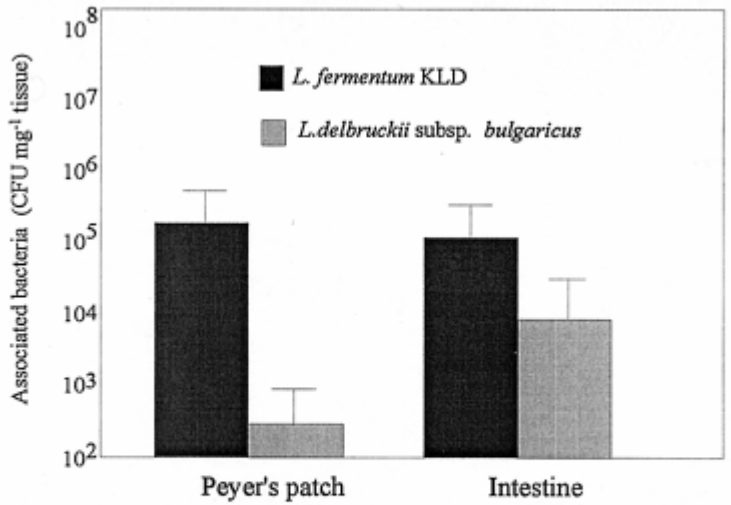


FIG. 4. Association of *L. fermentum* and *L. delbruckii* subsp. *bulgaricus* with the Peyer's patches and nonlymphoid villous intestine 2 h following administration of an oral dose of 10^9 viable *Lactobacillus* cells. Results are expressed as numbers of CFU per milligram (wet weight) of tissue (n = 35 per treatment) as the mean value. Error bars indicate standard deviations.

Probiotici e GALT

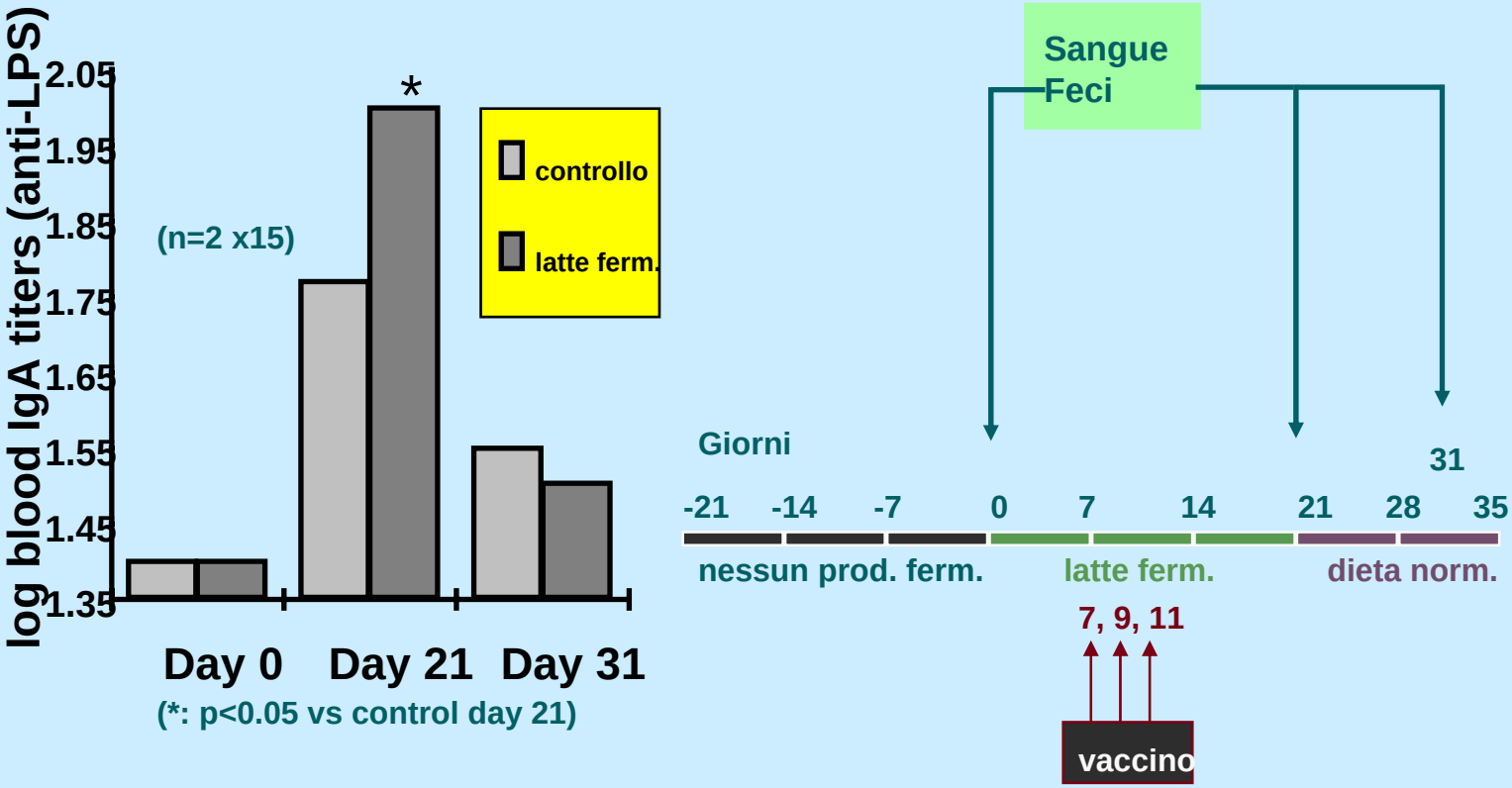
TABLE 2. Association of *Lactobacillus* strains with mouse Peyer's patches and nonlymphoid intestinal tissue

Strain	Peyer's patch association[a]	Nonlymphoid intestine association[a]
Lactobacillus sp. strain 003	−	−
Lactobacillus sp. strain 004	−	−
Lactobacillus sp. strain 005	++	+
Lactobacillus sp. strain 006	++	+
Lactobacillus sp. strain 008	−	+
L. fermentum KLD	++	−
L. acidophilus	+	−
L. fermentum LMN	−	−
L. fermentum 104S	+	−
Lactobacillus sp. strain HBL	+	++
L. paracasei 43338	++	++
L. salivarius 43321	−	−
L. paracasei 42319	+	+
Lactobacillus sp. strain 433121	−	−
L. bulgaricus	−	−
L. salivarius subsp. *salivarius*	+	−

[a] The association of *Lactobacillus* spp. to small intestinal tissue, as visualized by scanning electron microscopy: −, no association; +, low level at association (5 to 50 bacteria/field); ++, high level of association (>50 bacteria/field).

Plant e Conway,2001

IgA serica contro *Salmonella typhi* Ty21a a seguito di ingestione di latte fermentato contenente La1



Schiffrin et al, **(1995).** Immunomodulation of human blood cells following the ingestion of lactic acid bacteria. *J. Dairy Sci*. 78:491-497

Effetto barrierra nelle meta-analisi

BMJ VOLUME 324 8 giugno 2002

Importanza della dose

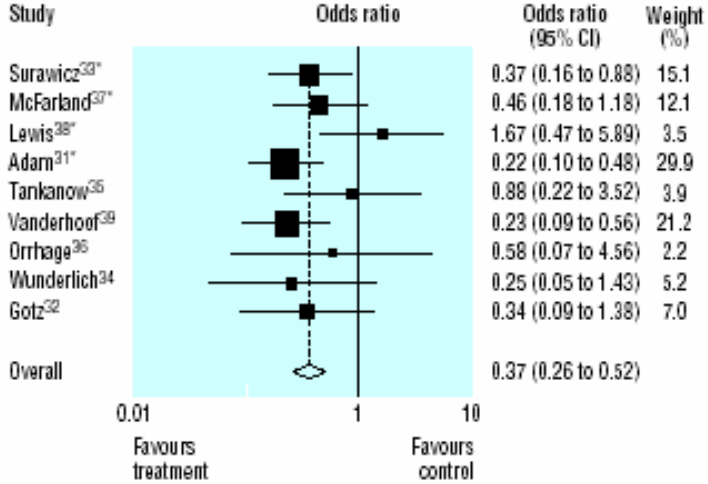
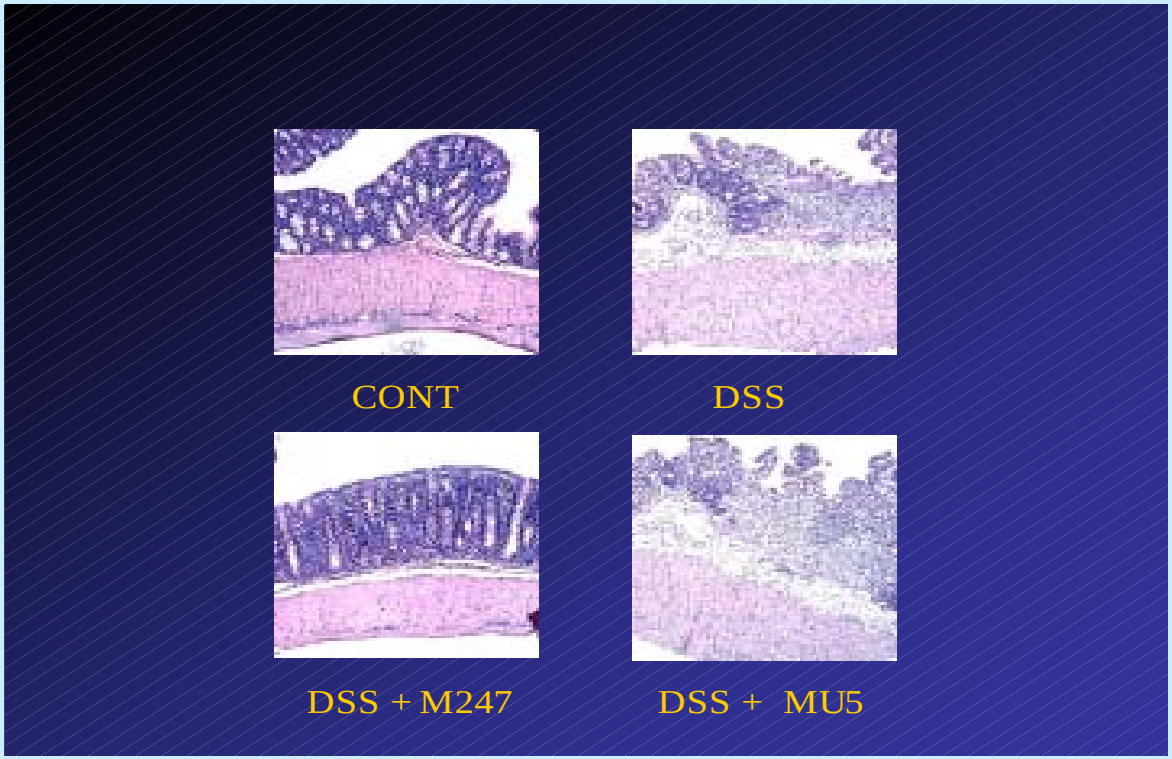


Fig 5 Plot of the log of odds ratios for the proportion of patients free of diarrhoea in treatment groups compared with control groups

Lack of effect of *L. crispatus* MU5 on DSS colitis
Importanza del ceppo



Bacterial ecology and allergy?

www.fems-microbiology.

Characterizing the composition of intestinal microflora as a prospective treatment target in infant allergic disease

Pirkka V. Kirjavainen [a,*], Effie Apostolou [a], Taina Arvola [c], Seppo J. Salminen [a], Glenn R. Gibson [d], Erika Isolauri [b]

FEMS Immunology and Medical Microbiology 32 (2001) 1–7

Bacterial ecology and allergy?

Table 1
The presence of selected predominant gut genera in the fecal flora of atopic and healthy infants as assessed by FISH during exclusive breast-feeding and after cessation of breast-feeding

Bacterial group	Time of detection	Number of cells per gram of feces (the log mean[a] of each group with 95% CI in parentheses)					
		Healthy infants ($n=10$)	Atopic infants				
			All[b] ($n=15$)	GI symptoms during BF ($n=5$)	No GI symptoms during BF ($n=10$)	Positive CM challenge ($n=6$)	Negative CM challenge ($n=9$)
Bifidobacteria	During BF	**10.18 (9.73–10.47)**	9.71 (8.89–10.53)	**9.43 (8.73–10.13)**[c,d]	**10.19 (9.72–10.67)**	10.00 (8.97–11.02)	9.52 (8.15–10.89)
	After BF	9.40 (9.03–9.78)[e]	8.92 (8.41–9.43)[e]				
Bacteroides	During BF	**6.99 (5.37–8.60)**	8.23 (7.11–9.34)	7.96 (5.56–10.36)	8.36 (6.82–9.90)	**9.57 (7.59–11.54)**[d]	7.70 (6.07–9.33)
	After BF	8.02 (6.78–9.26)	8.27 (7.60–8.94)				
Lactobacilli/ enterococci	During BF	6.51 (4.46–8.55)	7.72 (6.84–8.59)	7.93 (7.26–8.60)	7.61 (6.23–8.99)	7.34 (4.81–9.87)	7.96 (7.38–8.55)
	After BF	6.47 (4.84–8.10)	7.33 (6.59–8.07)				
C. histolyticum	During BF	6.99 (5.88–8.11)	6.47 (5.29–7.65)	7.08 (5.64–8.53)	6.16 (4.39–7.93)	6.62 (5.16–8.08)	6.37 (4.38–8.36)
	After BF	7.46 (6.19–8.73)	6.95 (6.10–7.79)				
Total cell counts	During BF	**10.65 (10.44–10.87)**	**10.38 (10.21–10.55)**[d]	10.23 (9.85–10.61)	10.56 (10.29–10.83)	10.51 (10.28–10.73)	10.41 (10.05–10.77)
	After BF	10.22 (10.04–10.41)[e]	10.27 (10.12–10.41)				
Total IgE in serum (kU l^{-1})	During BF	ND	79 (10–46)	55 (13–43)	96 (0–48)	**113 (12–60)**[c]	**12 (0–19)**
SCORAD score	During BF	ND	27 (9–38)	29 (15–45)	25 (6–33)	**32 (18–44)**[c]	**17 (4–28)**

From ecology to applications?

Gut,2002

- **Aberrant composition of gut microbiota of allergic infants: a target of bifidobacterial therapy at weaning?**
- **P V Kirjavainen1, T Arvola2, S J Salminen1 and E Isolauri3**

Background: Recent data have outlined a relationship between the composition of the intestinal microflora and allergic inflammation, and demonstrated the competence of probiotics in downregulation of such inflammation.

- **Aims:** Our aims were to characterise the relationship between gut microbes and the extent of allergic sensitisation and to assess whether the efficacy of bifidobacterial supplementation in the treatment of allergy could relate to modulation of the intestinal microbiota.
- **Methods:** This randomised study included 21 infants with early onset atopic eczema of whom eight were intolerant (highly sensitised group (HSG)) and 13 tolerant (sensitised group (SG)) to extensively hydrolysed whey formula (EHF). In the SG, six were weaned to EHF without (placebo group (PG)) and seven to EHF with *Bifidobacterium lactis* Bb-12 supplementation (bifidobacteria treated group (BbG)). The faecal microflora of infants in the HSG was analysed only before weaning whereas in the SG the faecal microflora was analysed both before and after weaning.
- **Results:** Infants in the HSG had greater numbers of lactobacilli/enterococci than those in the SG. Serum total IgE concentration correlated directly with *Escherichia coli* counts in all infants and with bacteroides counts in the HSG, indicating that the presence of these bacteria is associated with the extent of atopic sensitisation. The effect of supplementation was characterised as a decrease in the numbers of *Escherichia coli* and protection against an increase in bacteroides numbers during weaning.
- **Conclusions:** These data indicate that bifidobacterial supplementation appears to modify the gut microbiota in a manner that may alleviate allergic inflammation. Further studies are needed to confirm this conclusion.

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Conclusions

The experts agreed that adequate scientific evidence exists to indicate that there is potential for the derivation of health benefits from consuming food containing probiotics. However, it was felt that additional research data are needed to confirm a number of these health benefits in humans, applying a systematic approach and following the guidelines for the assessment of probiotics suggested in this report. (FAO/WHO, 2001)