



ISLAB
Indonesian Society for Lactic Acid Bacteria and Gut Microbiota

SERTIFIKAT



diberikan kepada

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atas partisipasinya sebagai

PEMBICARA

dalam acara

"Probiotic and Gut Microbiota Day"

diselenggarakan oleh Indonesian Society for Lactic Acid Bacteria and Gut Microbiota (ISLAB-GM)

Kamis, 6 September 2018

Fakultas Teknologi Pertanian

Universitas Gadjah Mada

Chairperson of ISLAB-GM

Prof. Dr. Ir. Endang Sutriswati Rahayu

Ketua Panitia

Dr. Ir. Tyas Utami, M.Sc

PROBIOTIK: ASPEK EKOLOGIS DAN DAMPAK FUNGSIONAL

(Probiotic: ecological view and functionality)



I NENGAH SUJAYA

**SCHOOL OF PUBLIC HEALTH
UDAYANA UNIVERSITY
BALI INDONESIA**

Every one of us is a "superorganism".

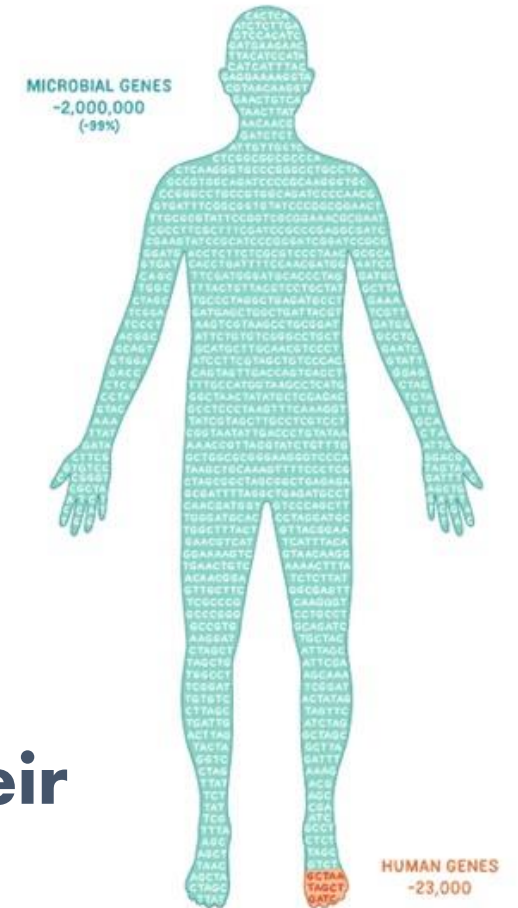
Microbes inhabit all parts of our body (**MICROBIOME**)



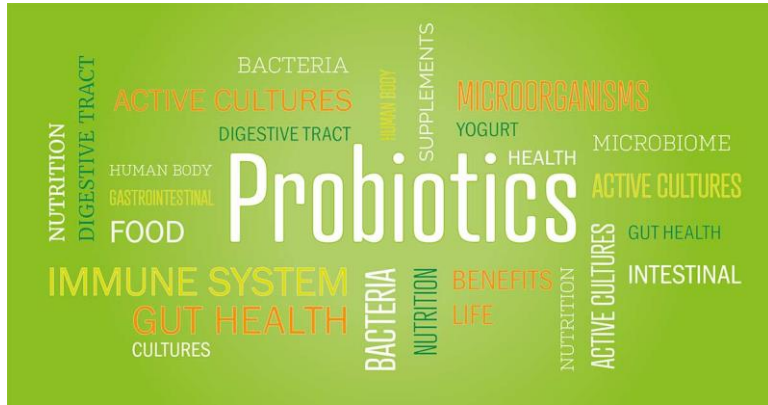
Our microbiome makes us so special

- Microbiome : **3.300,000** genes
- Human genome : **22,000** genes
- Human individuals share **99.9% similarity**
- Microbiome can be **80-90% different**

There are enormous interest in their modulation to improve health



Gut Microbiome Engineering (modulation)

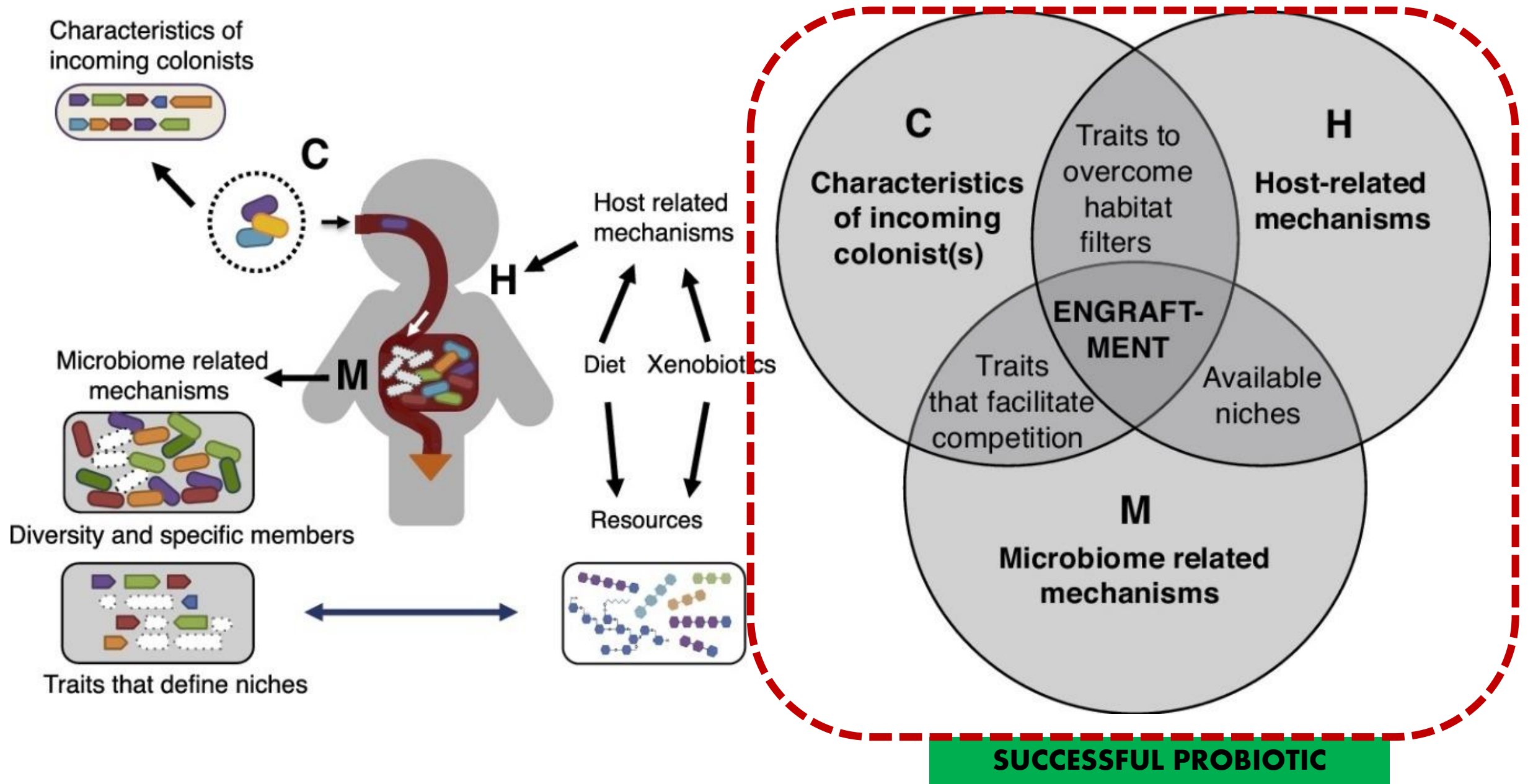


Approaches:

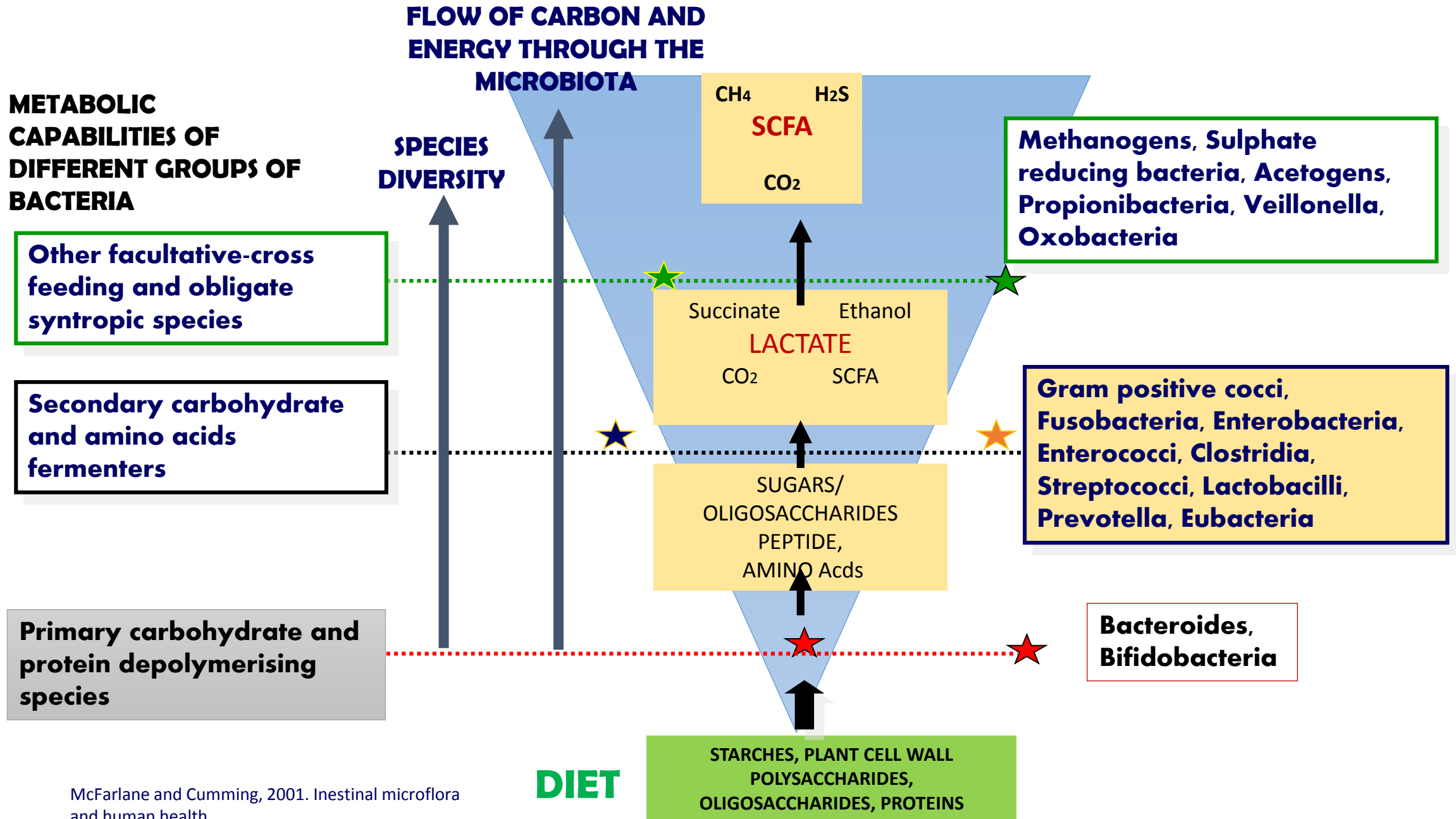
- Improve life style and diet
(What you eat is what you are)
- Introducing live microorganism (single, define-mixture (Probiotic) or even through unidentified mixed-bacterial community/ Fecal Microbial Transplantation (FMT)
- Modulation of endogenous bacteria in GI through specific food component (Prebiotic)

Probiotics: live microorganisms that, when administered in adequate amounts, confer a health benefit on the host (WHO)

Prebiotic: a substrate that is selectively utilized by host microorganisms and confers a health benefit (International Scientific Association for Probiotics and Prebiotics (ISAPP))



ROLE OF GM IN DEPOLYMERISATION OF COMPLEX MOLECULES



Sharing vision:
Probiotic for Indonesian

Modulation of Gut Microbiota by
Probiotic *Weissella confusa* F213

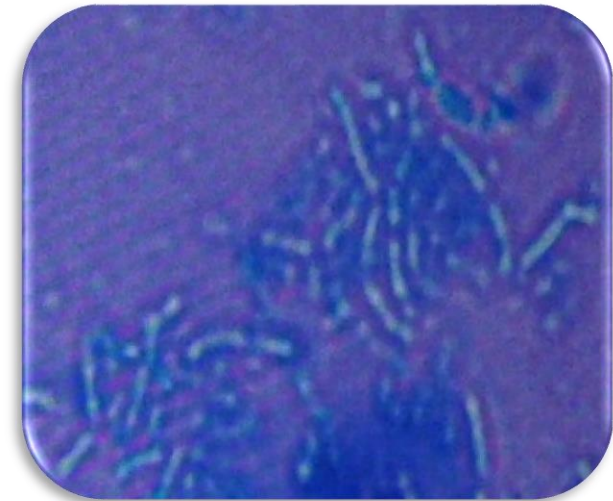
Selection of Probiotic strains

- Origin
- Well indentified (16S rDNA seq.)
- Resistant to GI environment (pH, bile, enzymes)
- Safety (didn't modify primary cholic acid to secondary cholic acid)
- Functionality (deconjugate bile salt)
- Applied preparation technology

Lactobacillus sp. F213 (LbF213)

Weissella confusa F213 (WCF213) by
16S rDNA seq.

Lactobacillus confusus (former name)



Effect of WCF213 on GM

Administration of WCF213

- Altere profile of GM (more diverse)
- Promote the growth of other bacteria

OUT COME WCF213

- Modify GI micro-environment
- Enhance fecal profile
- More convenience during defaecation

WCF213

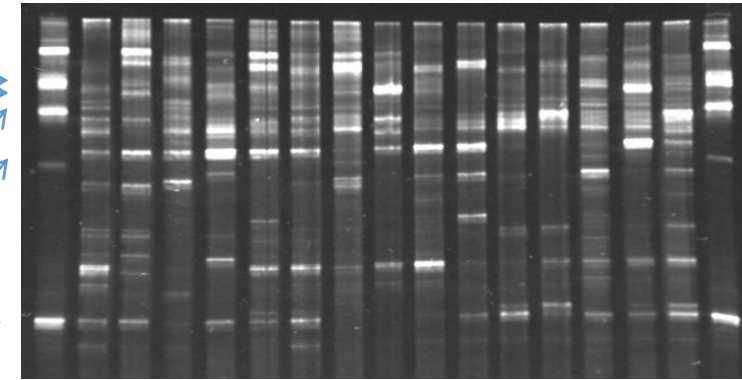
Bact. fragilis

L. acidophilus

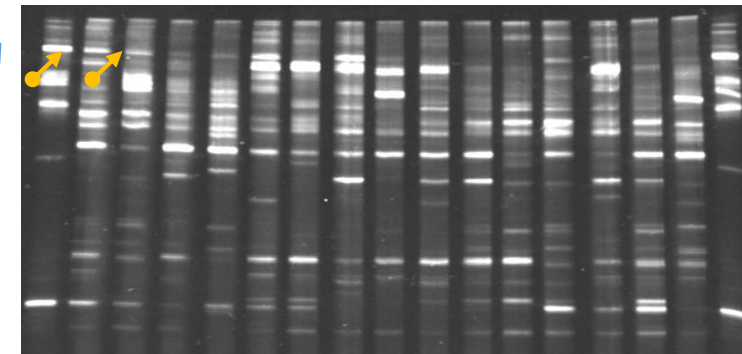
Bif. breve

E. coli

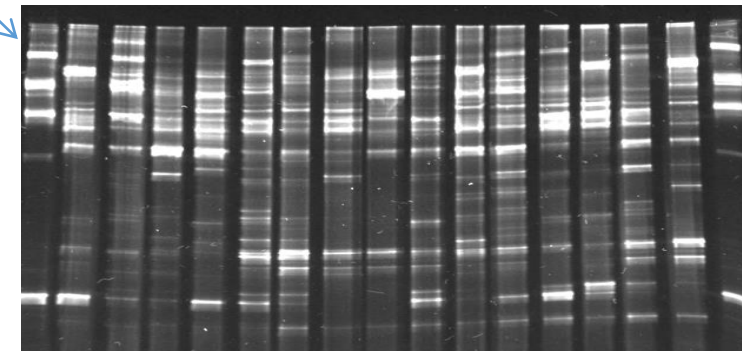
R. productus



A. Day-1



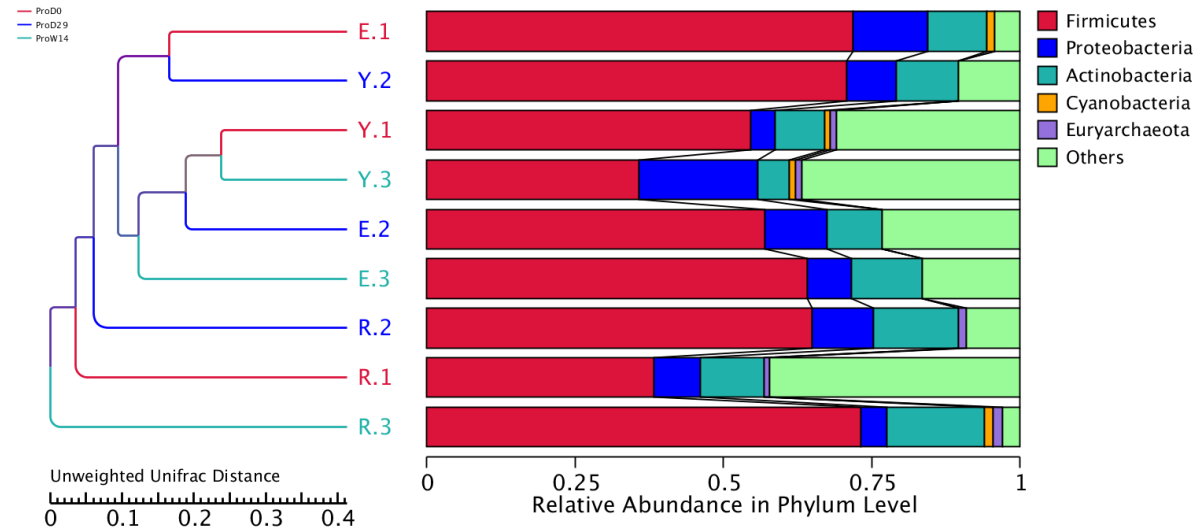
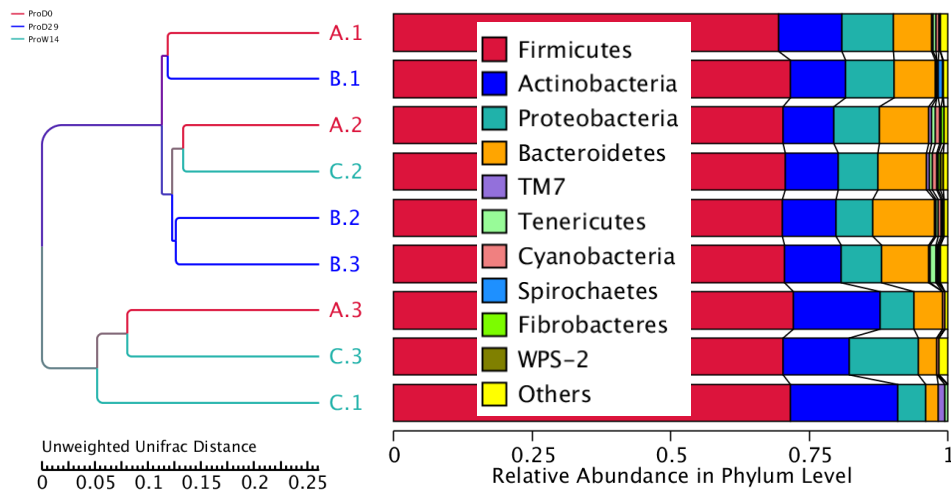
B. Day-28



C. WO-day 7

Profile of GM determined using DGGE

Probiotic WCF₂₁₃ Alters Human Gut Microbiota

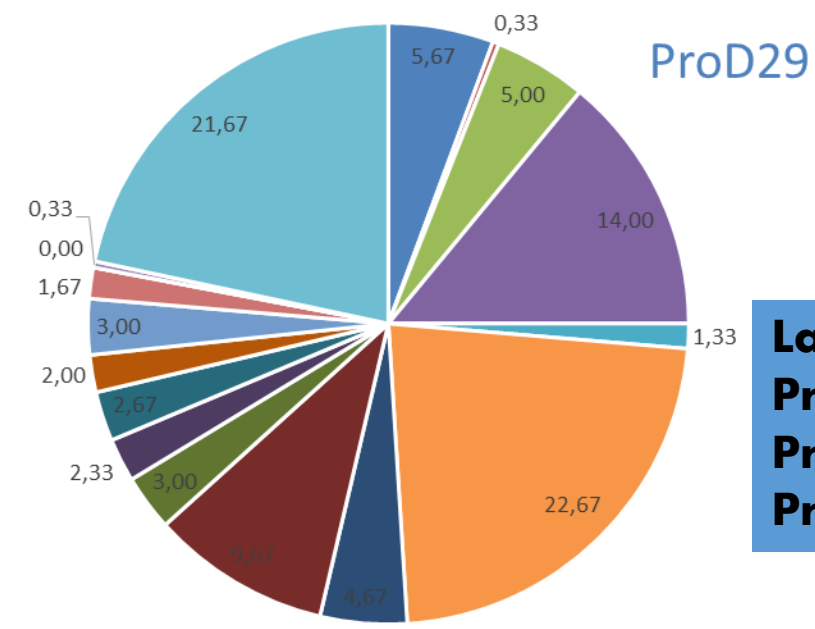
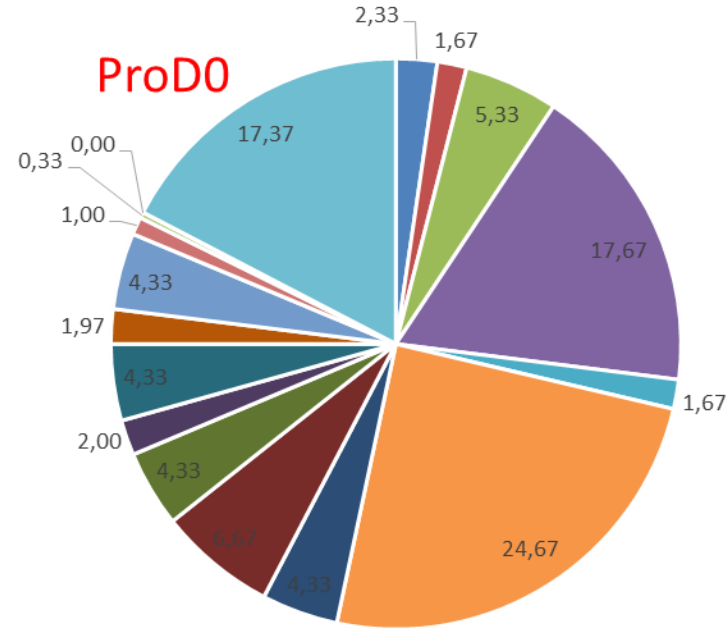


ProD0
ProD29
ProW14

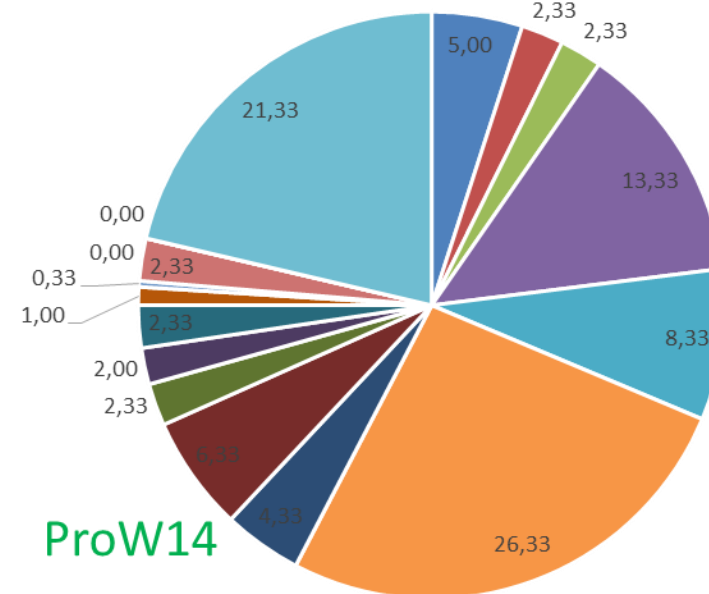
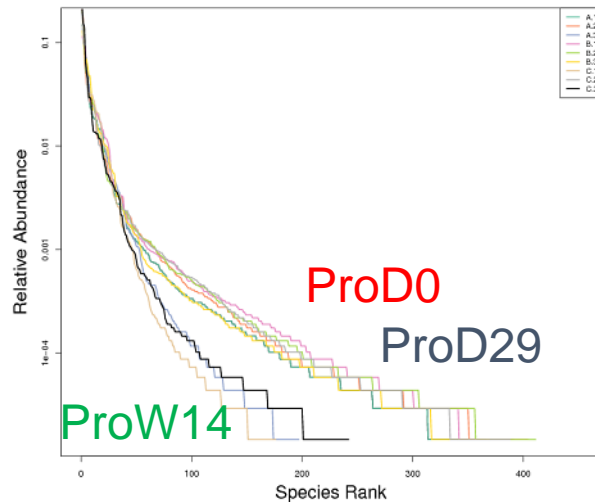
Unweight UPGMA

Probiotic WCF₂₁₃ Alters Human Gut Microbiota

- Lactobacillus
- Streptococcus
- Bifidobacterium
- Collinsella
- Escherichia
- Blautia
- Caprococcus
- Ruminococcus
- Roseburia
- Dorea
- Faecalibacterium
- Ruminococcus
- SMB53
- Clostridium
- Butyricoccus
- Oscillospora
- Unidentified

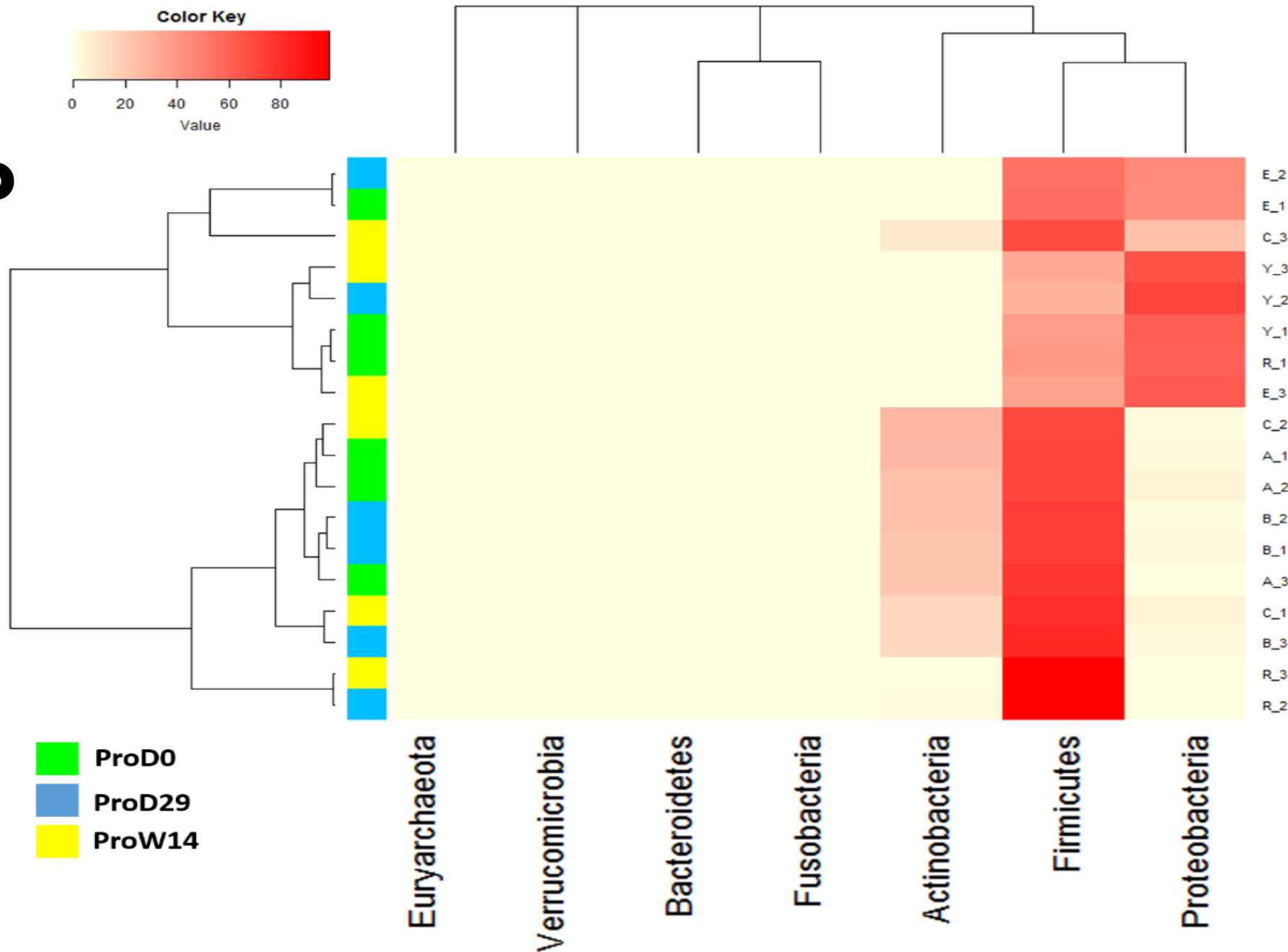


Lactobacillus
ProDO : 2,33
ProD29 : 5,67
ProW14 : 5,00

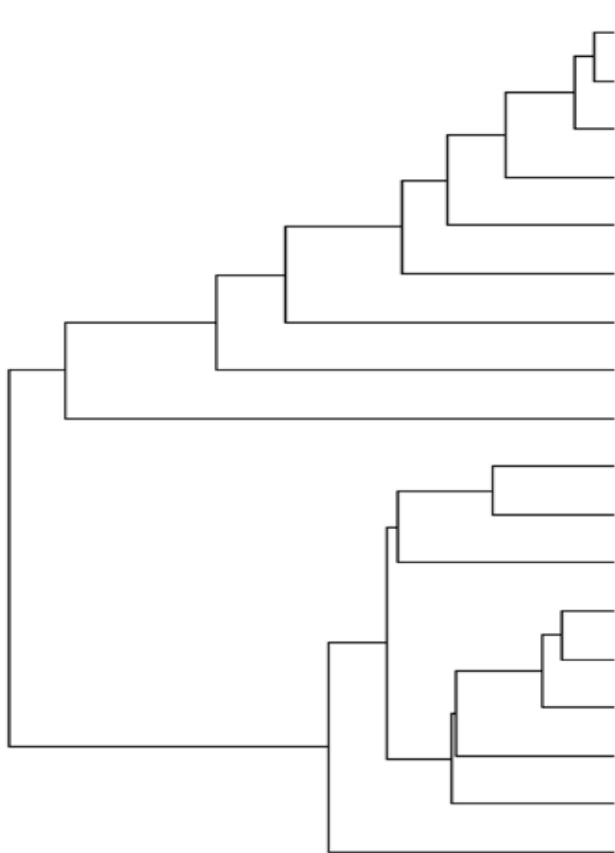
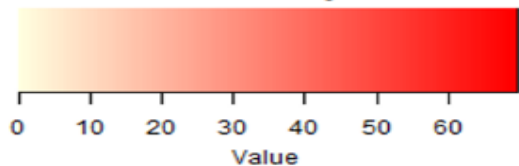


Heat map analysis

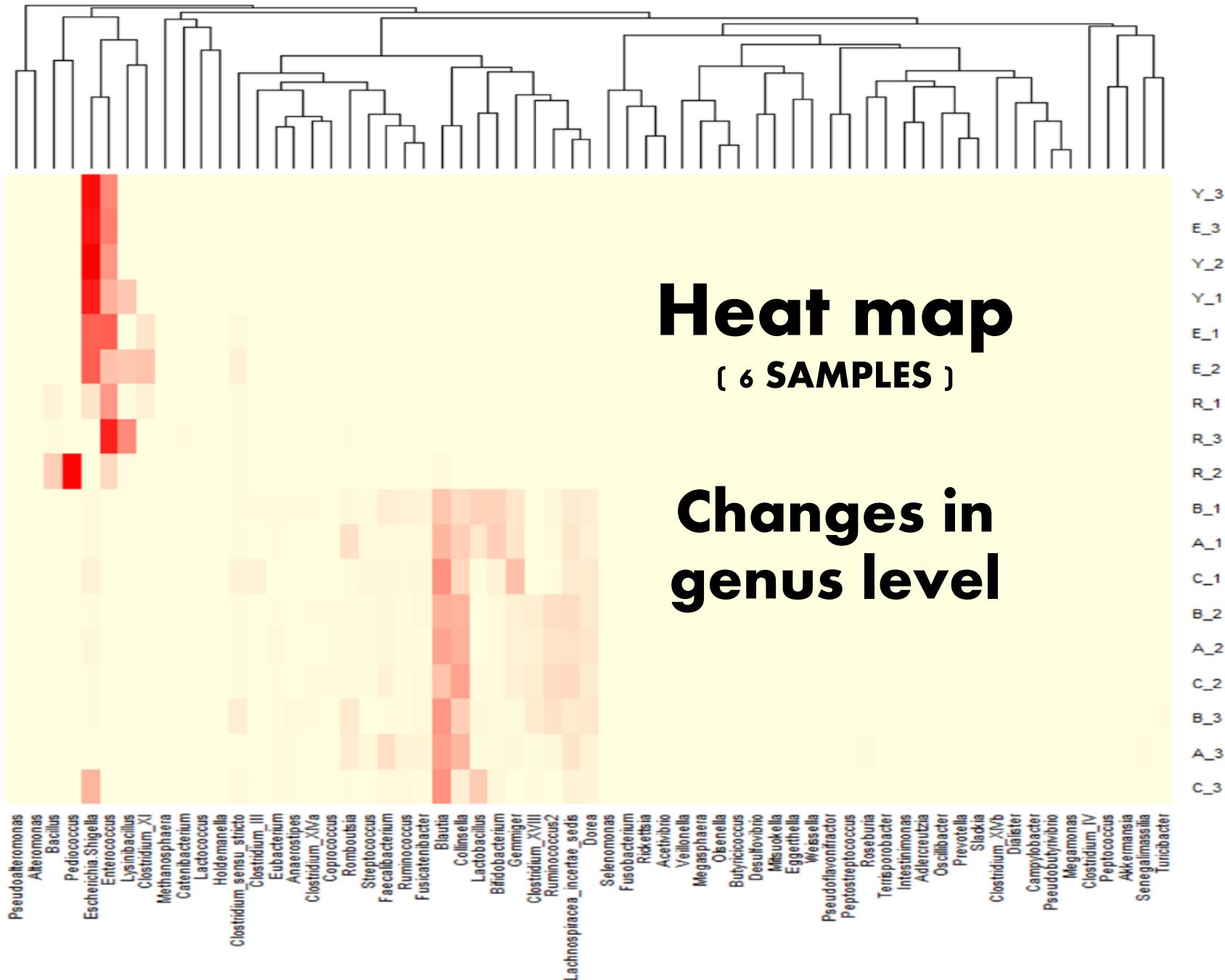
(n=6 SAMPLES)
Cluster due to
administration
of WCF₂₁₃



Color Key

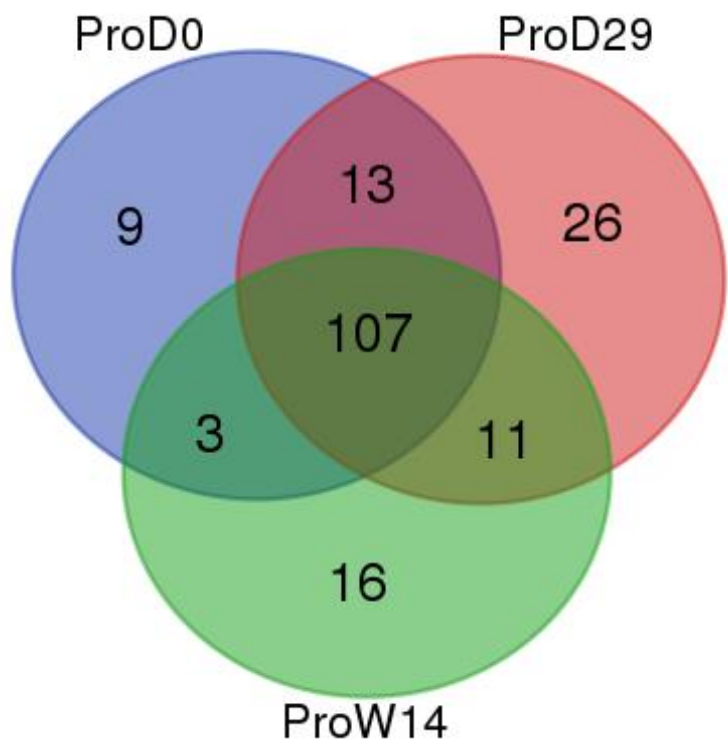


- ProD0
- ProD29
- ProW14



WCF₂₁₃ Modulates GM

(n=6 human subjects)

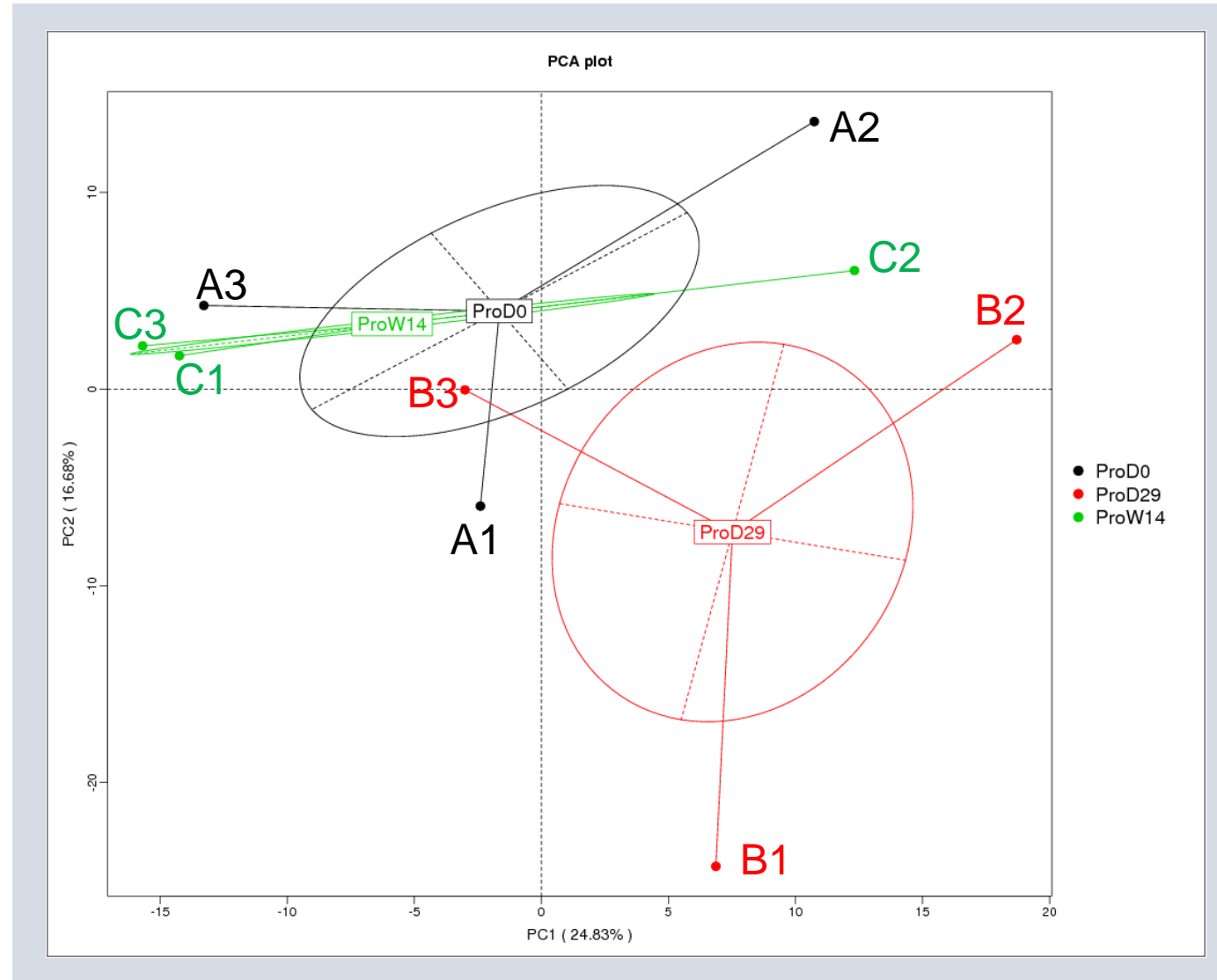


Chenges of GM diversity

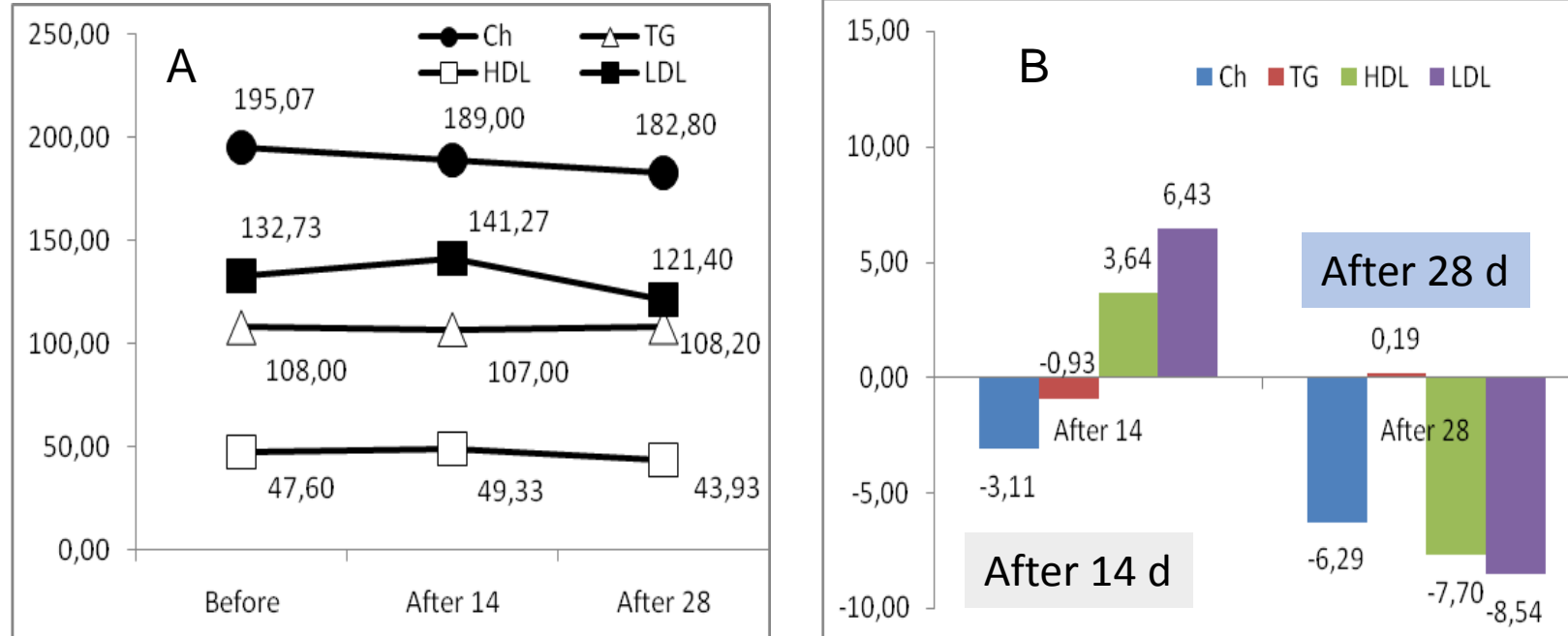
Do	D29	W14
9	26	16
13	13	3
3	11	11
107	107	107
132	157	137
	25+	20 -

Probiotic WCF₂₁₃ shifts GM

Temporal effect of
WCF₂₁₃ on GM



WCbF₂₁₃ alters lipid profiles

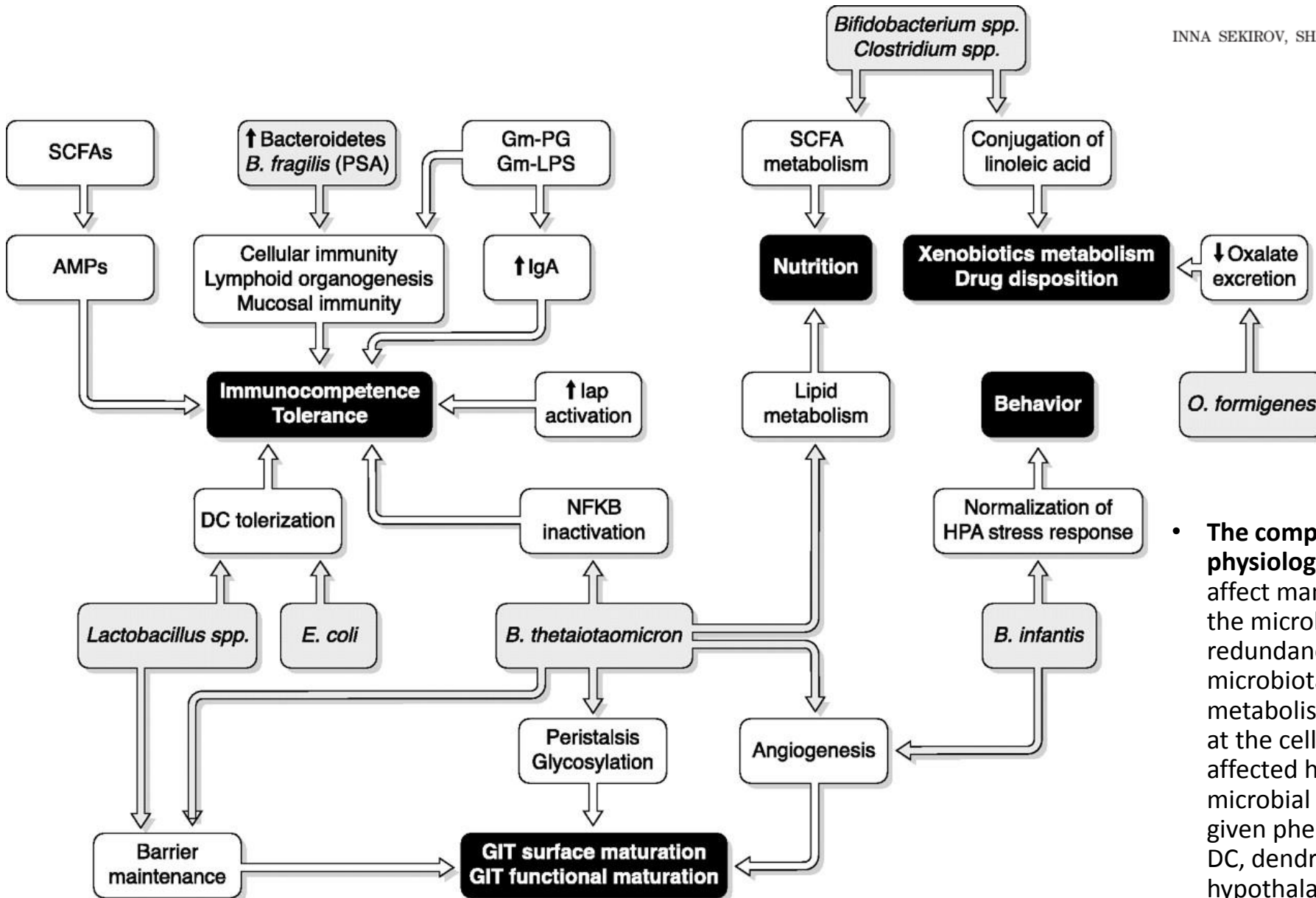


Changes of Lipid Profile of Human Subjects After Administration of WCF213 (A); Concentration of lipids (%) (B); changes (%). (n=15).

Can probiotic/prebiotic regulating the activities of intestinal bacteria benefit health?

- Microflora of the large intestine complete digestion through fermentation, protect against pathogenic bacteria and stimulate development of the immune system
- **Probiotics and prebiotics in the diet can modify the composition and some metabolic activities of the microflora**
- Probiotics are generally the live micro-organisms in foods such as yoghurts; they survive passage through the gut and temporarily bring the benefits of the normal gut flora
- Probiotics have been used to treat or prevent diarrhoea and to improve symptoms in lactose intolerance Prebiotics are non-digestible oligosaccharides that can stimulate selectively the growth of probiotic-like bacteria normally present in the gut
- Many claims for the potential health benefits of prebiotics remain unproved

Physiol Rev 90: 859–904, 2010;
doi:10.1152/physrev.00045.2009.



- **The complex web of gut microbiota contributions to host physiology.** Different gut microbiota components can affect many aspects of normal host development, while the microbiota as a whole often exhibits functional redundancy. In gray are shown members of the microbiota, with their components or products of their metabolism. In white are shown their effects on the host at the cellular or organ level. Black ellipses represent the affected host phenotypes. Only some examples of microbial members/components contributing to any given phenotype are shown. AMP, antimicrobial peptides; DC, dendritic cells; Gm–, Gram negative; HPA, hypothalamus-pituitary-adrenal; lap, intestinal alkaline phosphatase; PG, peptidoglycan; PSA, polysaccharide A.

REMARKS

Ecological factor should carefully considered in selecting of novel-probiotic

Probiotic modify GM and likely individual dependent.

Activity of GM provide enormous health promoting effects.

Acknowledgements





Thank you