



Link tra alimenti, dieta e microbioma intestinale

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Quali
microrganismi
sono presenti?

MICROBIOTA
(batteri,
lieviti,virus)



METAGENOMA

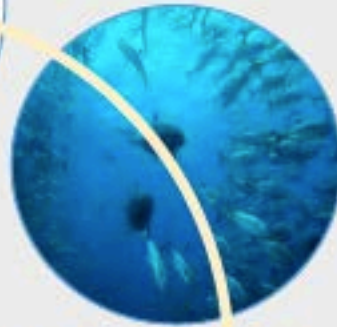
Quali attività
stanno
svolgendo?

MICROBIOMA

Human health

Food

Marine research



Microbiome

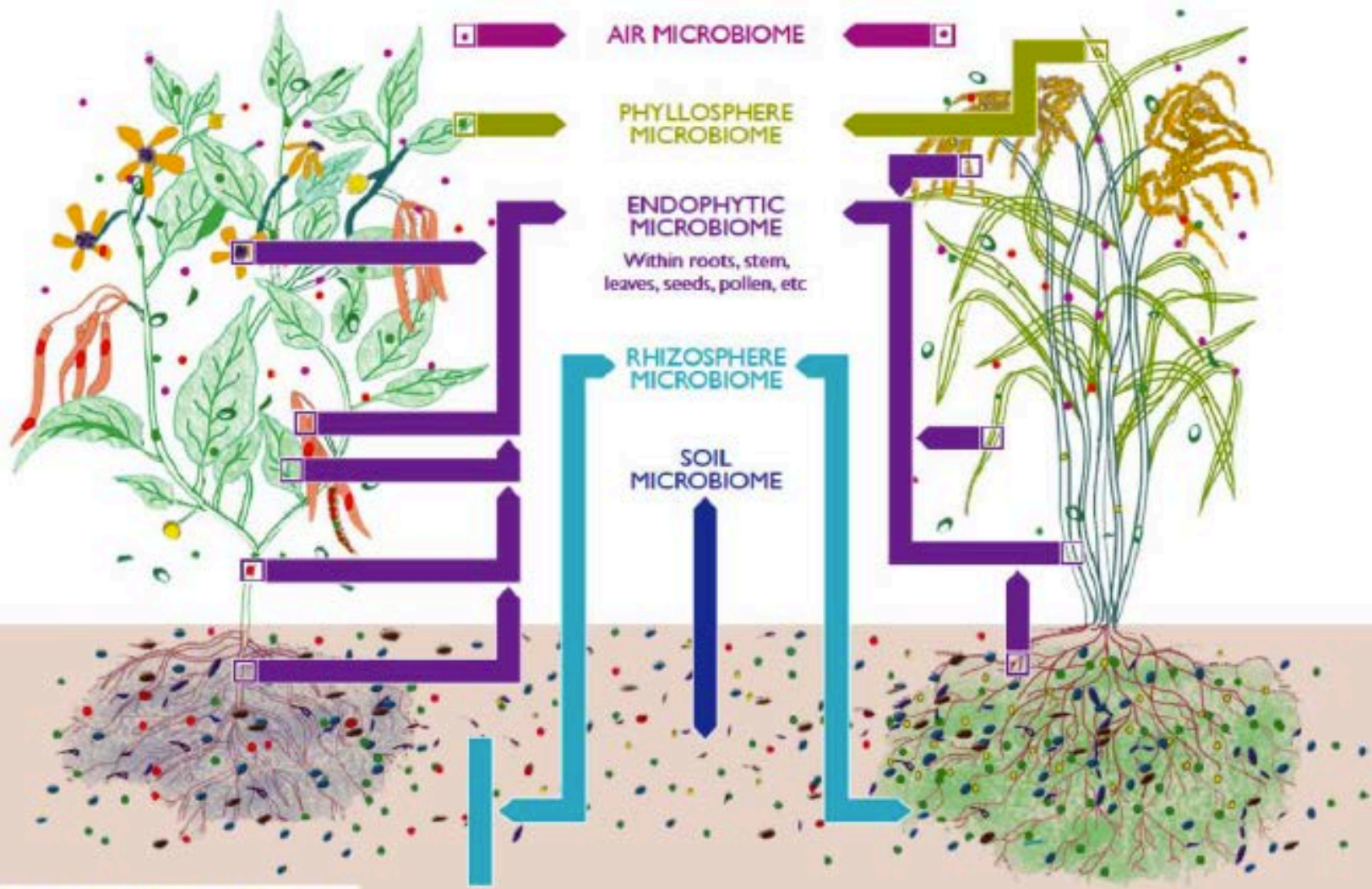


Cattle farming



Natural resources

Agriculture



AIR MICROBIOME

PHYLLOSHERE MICROBIOME

ENDOPHYTIC MICROBIOME
Within roots, stem, leaves, seeds, pollen, etc

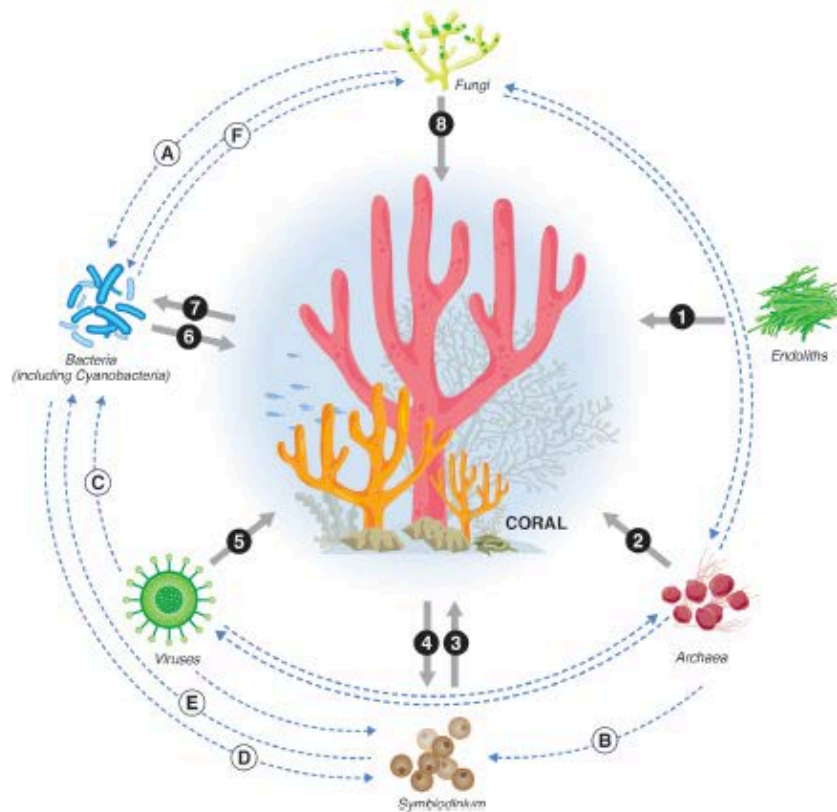
RHIZOSPHERE MICROBIOME

SOIL MICROBIOME

Plant Microbiome

EXAMPLES OF POSSIBLE ROLES AND RELATIONSHIPS BETWEEN CORALS AND THEIR SYMBIONTS

- 1 Photosynthate transference.
- 2 Nitrogen cycling.
- 3 Main carbon source supplier and production of DMSP that might play a role as antioxidant and on bacterial population control. Protection against UV.
- 4 Provides shelter and protection and role in the nutrient cycles.
- 5 Gene transfer. Natural phage therapy by removing bacterial pathogens and controlling algal blooms.
- 6 Nutrient cycling, such as S, C and N. Biological control of pathogens. DMSP degradation. Influence settlement and metamorphosis of coral larvae. Modulate coral microbiome?
- 7 Shelter, protection, source of nutrients.
- 8 Antimicrobial activity, may play a role related to biomineralization, protection of skeletogenic cells and protection against UV. May be involved in C and N cycle.



EXAMPLES OF POSSIBLE RELATIONSHIPS AMONGST CORAL SYMBIONTS	A	B	C	D	E	F
	Availability of C and S source through DMSP catabolism.	Availability of N source.	Transfer of beneficial genes.	Availability of N source.	Provides C and S source through DMSP production	Nutrients exchange

FIGURE 1 | Possible roles and relationships between corals and their symbionts and symbiotic microbial groups. It is important to highlight that these mechanisms and interactions are some examples of potential BMC mechanisms. Other BMC roles still to be discovered are likely to be important targets in future investigations.

Beneficial Microorganisms for Corals (BMC): Proposed Mechanisms for Coral Health and Resilience

Raquel S. Peixoto^{1,2}, Phillipe M. Rosado^{1,2}, Deborah Catharine de Assis Leite¹, Alexandre S. Rosado^{1,2} and David G. Bourne^{3,4}*



kombucha



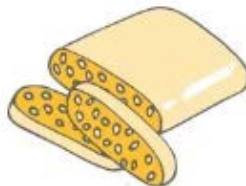
sauerkraut



dairy products



miso soup



soy tempe



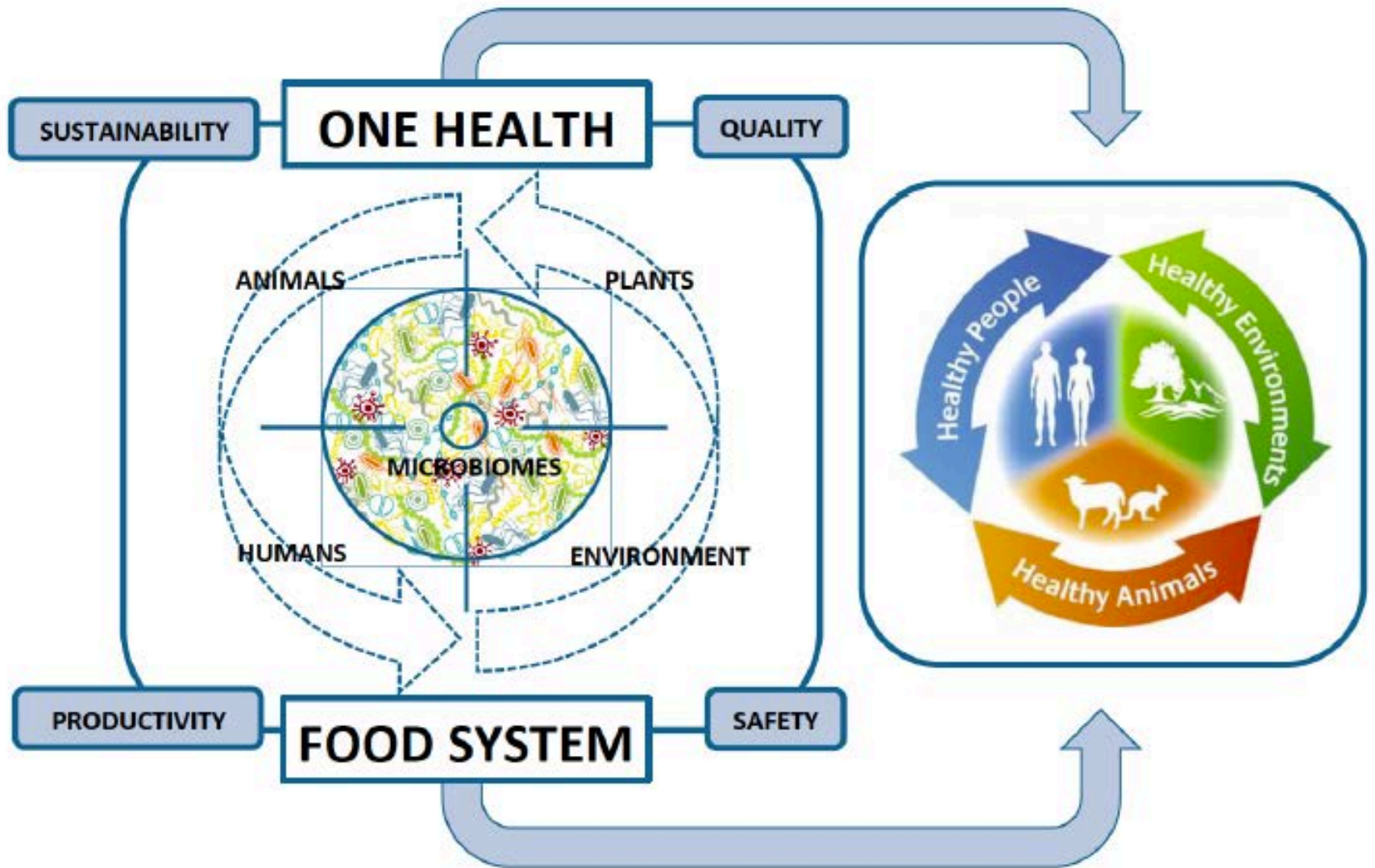
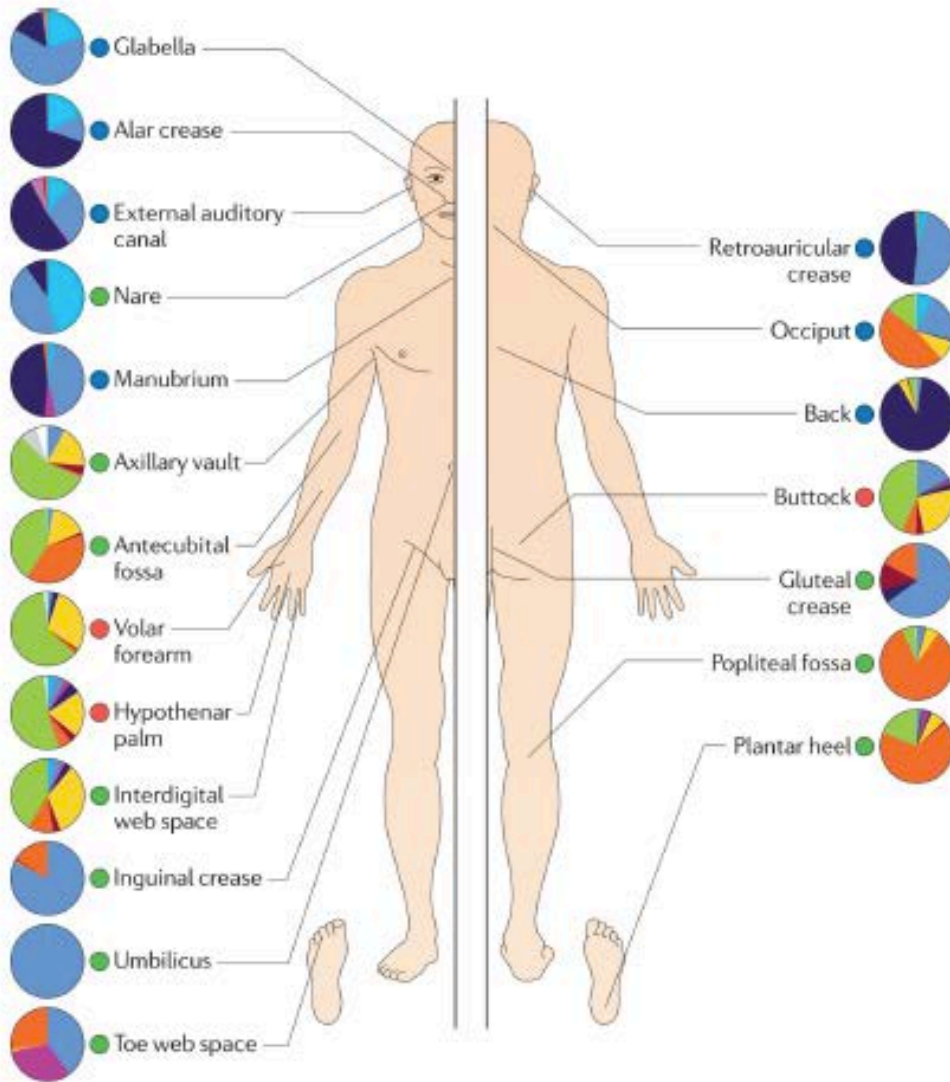
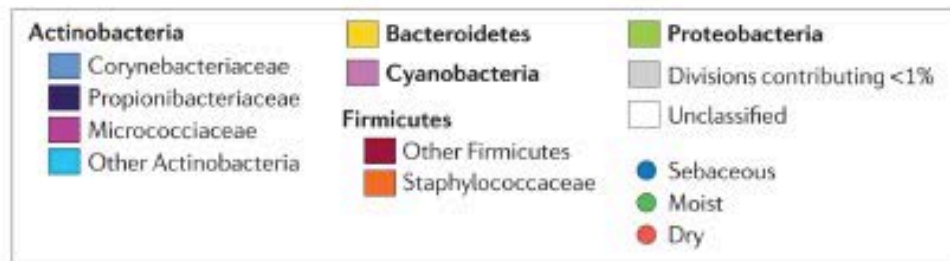


Figure 1. *The One Health framework offers a new integrated view of how microbiomes contribute to human, animal and plant health.*



MICROBIOTA DELLA PELLE



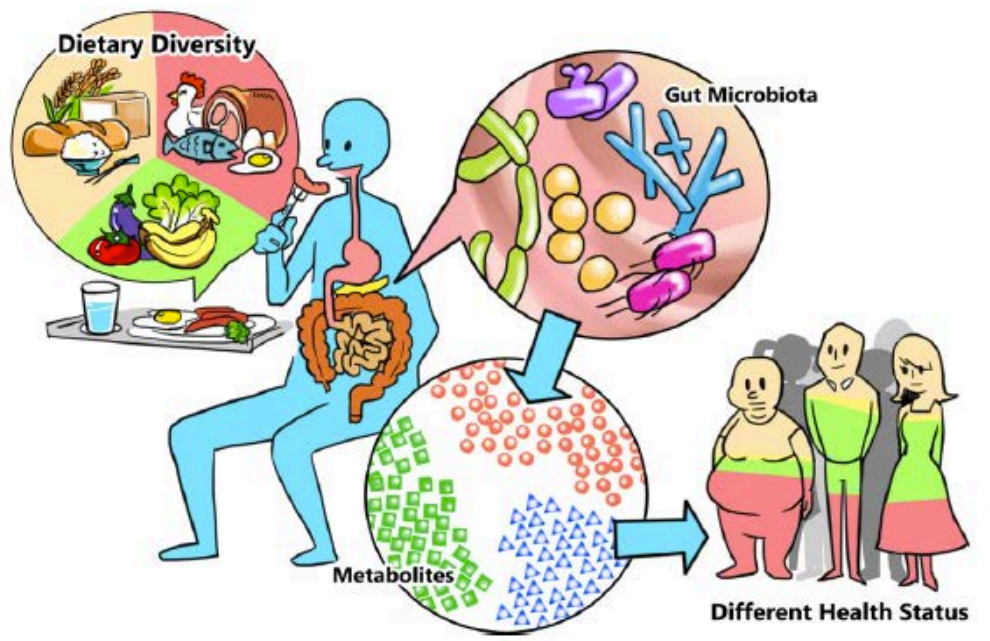
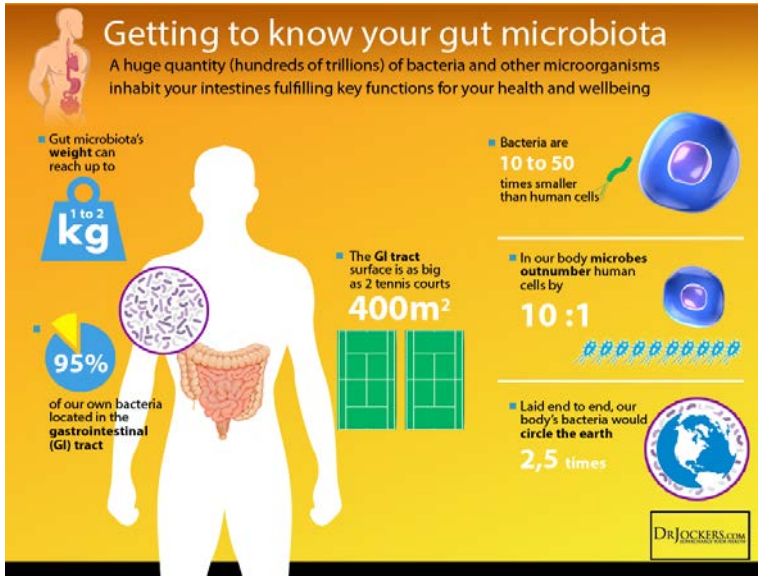
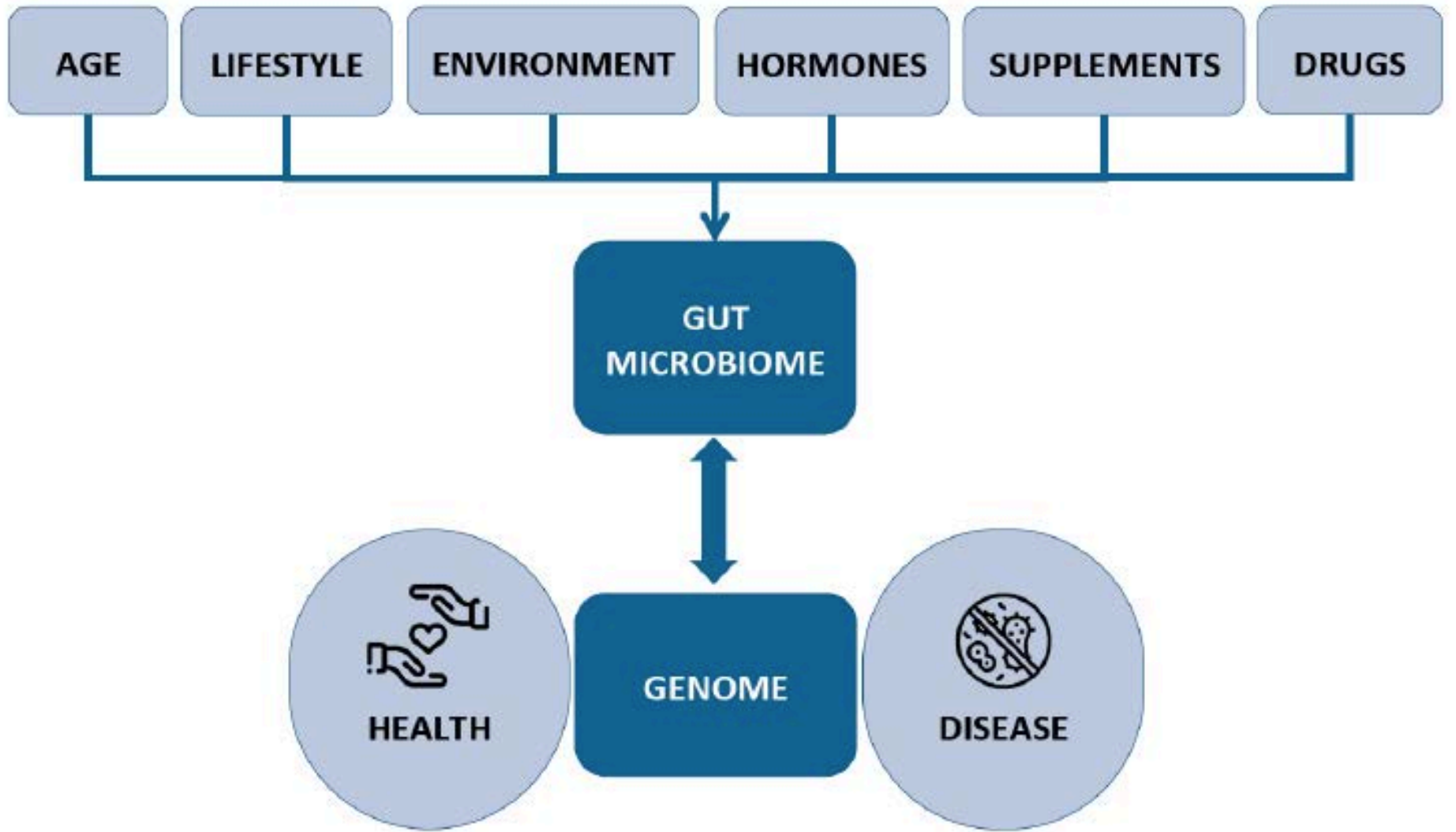



FIG 1 The gut microbiome-metabolomic-human health axis.



Article | Published: 03 January 2018

Dietary trehalose enhances virulence of epidemic *Clostridium difficile*

J. Collins, C. Robinson, H. Danhof, C. W. Knetsch, H. C. van Leeuwen, T. D. Lawley, J. M. Auchtung
R. A. Britton 

Nature **553**, 291–294 (18 January 2018) | [Download Citation](#) 

nature > scientific reports > articles > article

Article | **OPEN** | Published: 19 October 2017

Gut microbiome alterations in Alzheimer's disease

Nicholas M. Vogt, Robert L. Kerby, [Kimberly A. Dill-McEanland](#), Sandra J. Harding, Andrew P. Merluzzi, Sterling C. Johnson, Cynthia M. Carlsson, Sanjay Asthana, Henrik Zetterberg, Kaj Blennow, Barbara B. Bendlin  & Federico E. Rey 



[Clin Psychopharmacol Neurosci](#). 2015 Dec; 13(3): 239–244.
Published online 2015 Dec 31. doi: [10.9758/cpn.2015.13.3.239](https://doi.org/10.9758/cpn.2015.13.3.239)

PMCID: PMC4662178

PMID: [26598580](#)

The Gut-Brain Axis: The Missing Link in Depression

[Alper Evrensel](#) and [Mehmet Emin Ceylan](#)

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[Allergy Asthma Clin Immunol](#). 2015; 11: 35.

PMCID: PMC4674907

Published online 2015 Dec 10. doi: [10.1186/s13223-015-0102-0](https://doi.org/10.1186/s13223-015-0102-0)

PMID: [26664362](#)

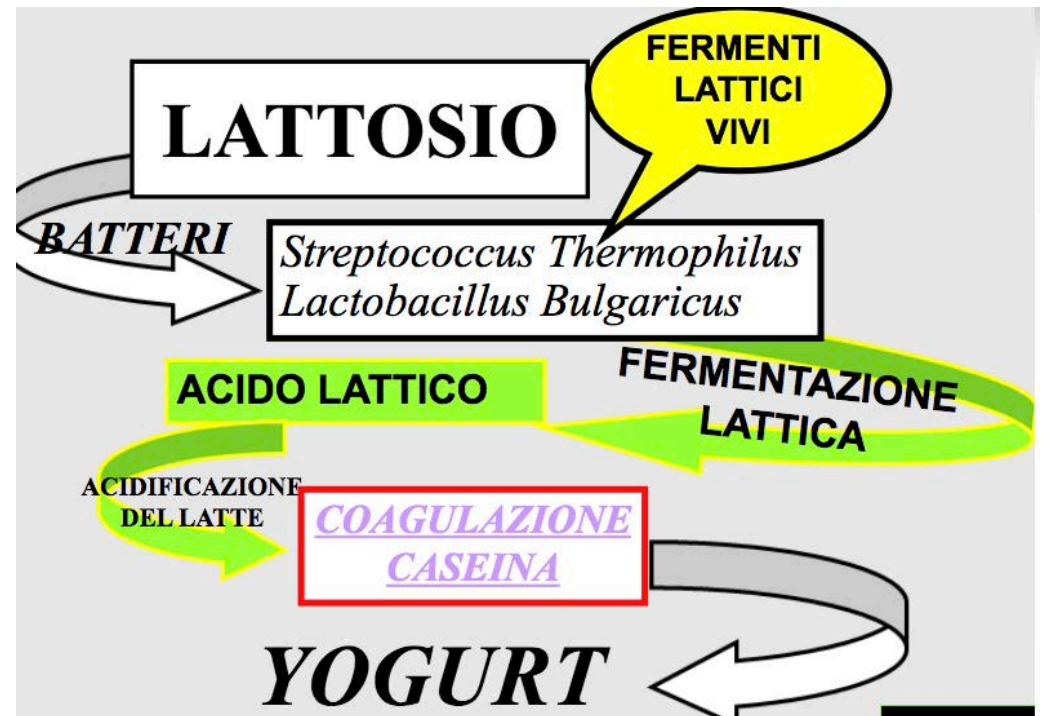
The human microbiome, asthma, and allergy

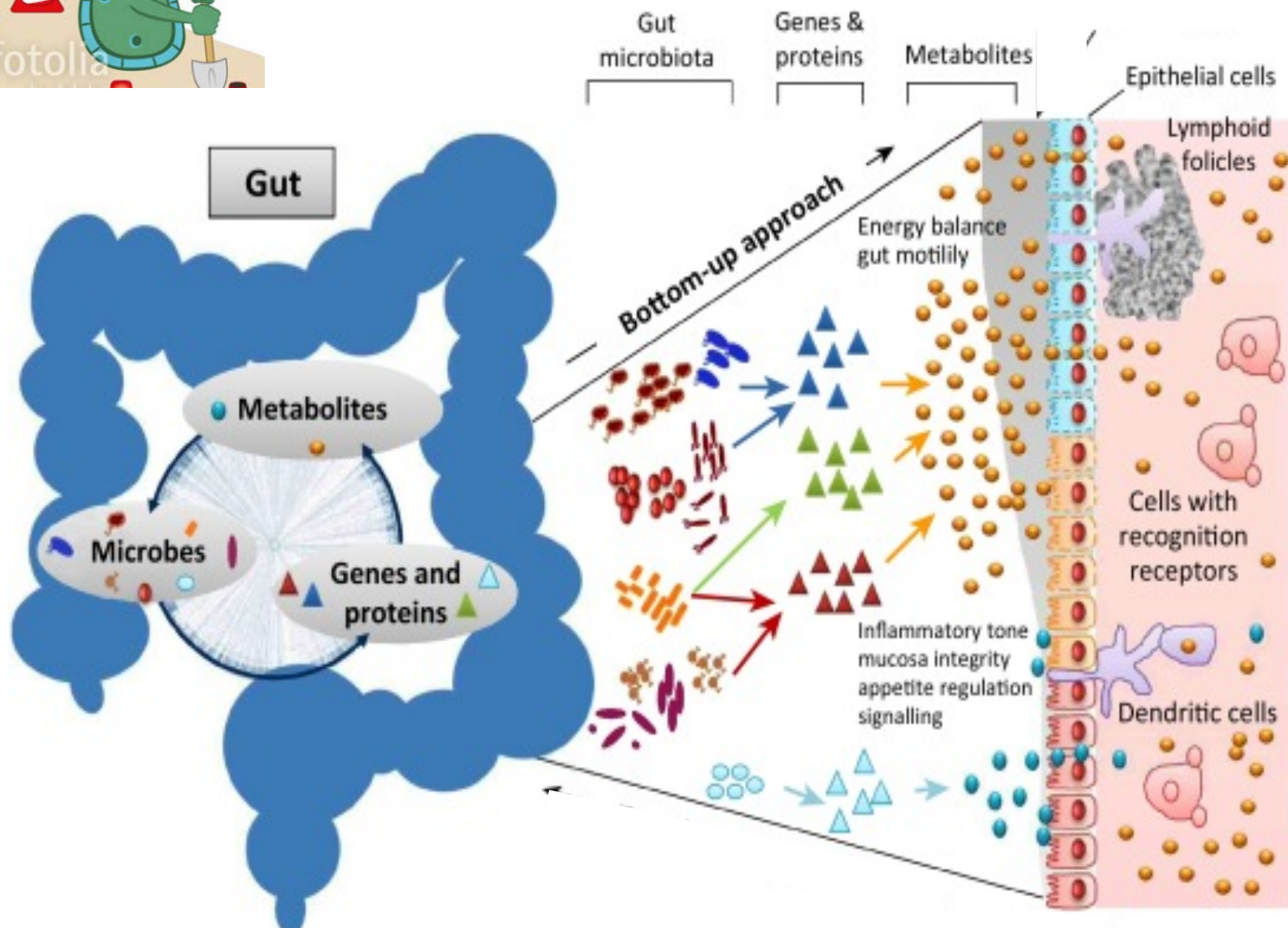
[Amund Riser](#) 



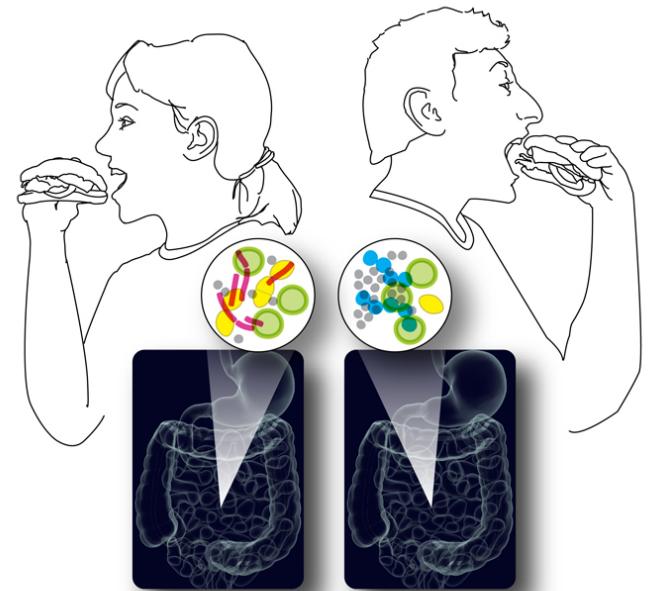
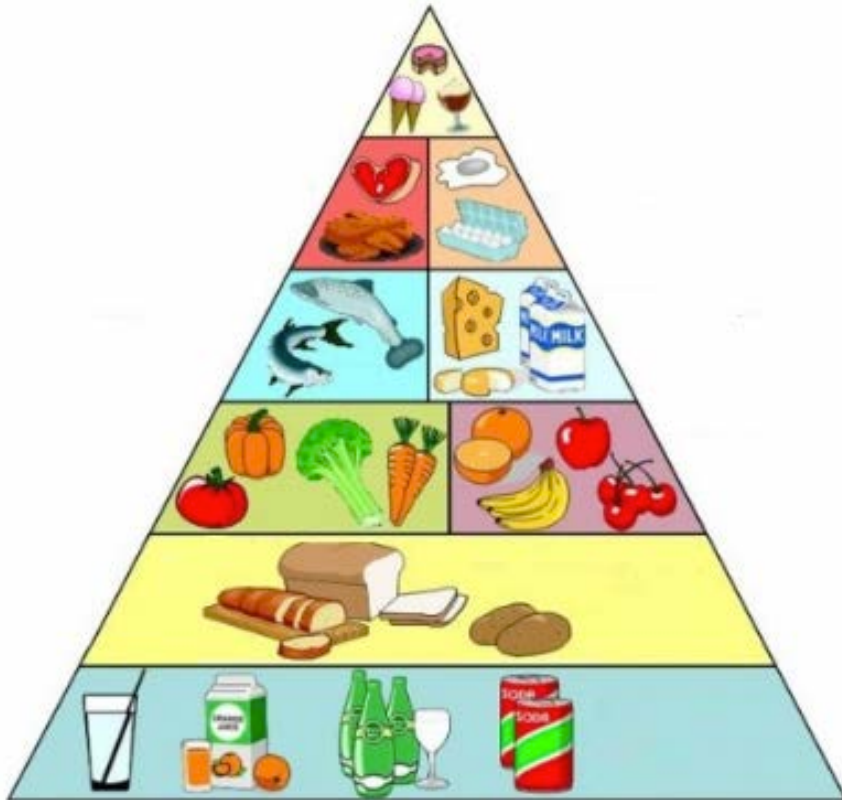
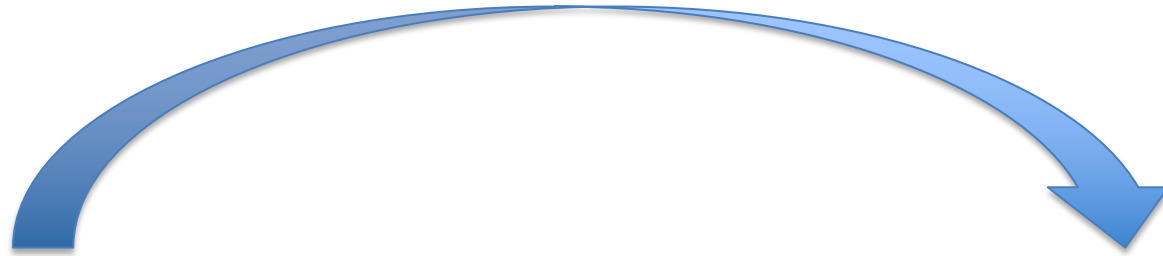
Il microbiota e' un super organismo attivo

- bevande alcoliche
- prodotti fermentati
- biocombustibili
-

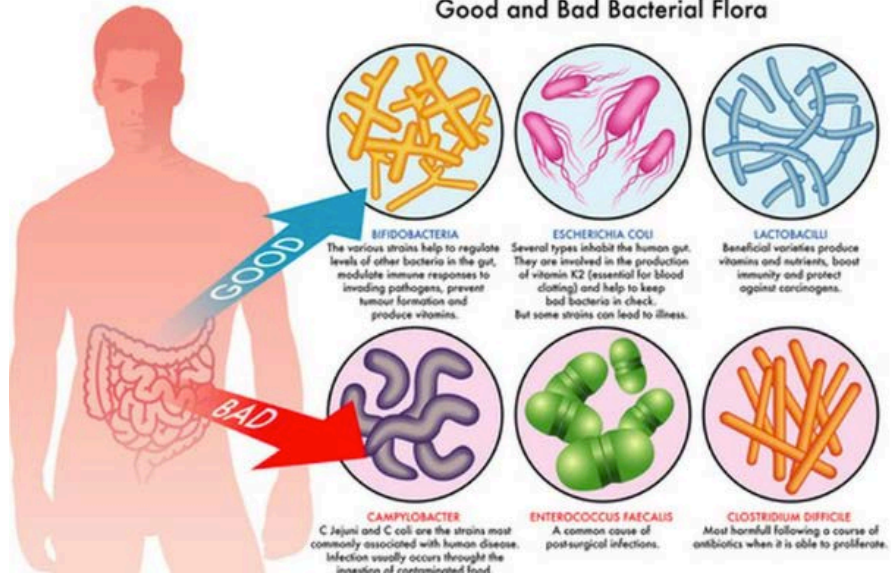




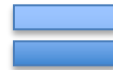
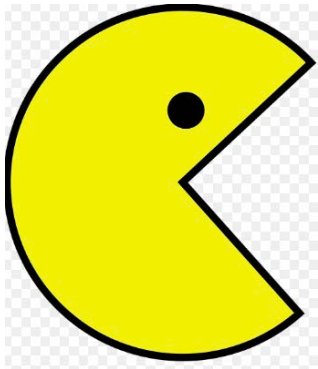
Alimenti come veicolo di microrganismi e come nutrienti per il microbiota



Good and Bad Bacterial Flora



Ruolo dei probiotici



Intestino
sano

Plant Protein



Animal Protein



→
↑*Bifidofacterium*
↑*Lactobacillus*
↓*Bacteroides*
↓*Clostridium perfringens*

→
↑*Bacteroides*
↑*Alistipes*
↑*Bilophila*
↑*Ruminococcus*
↓*Bifidobacterium*

→ ↑SCFA's

→ ↑TMAO

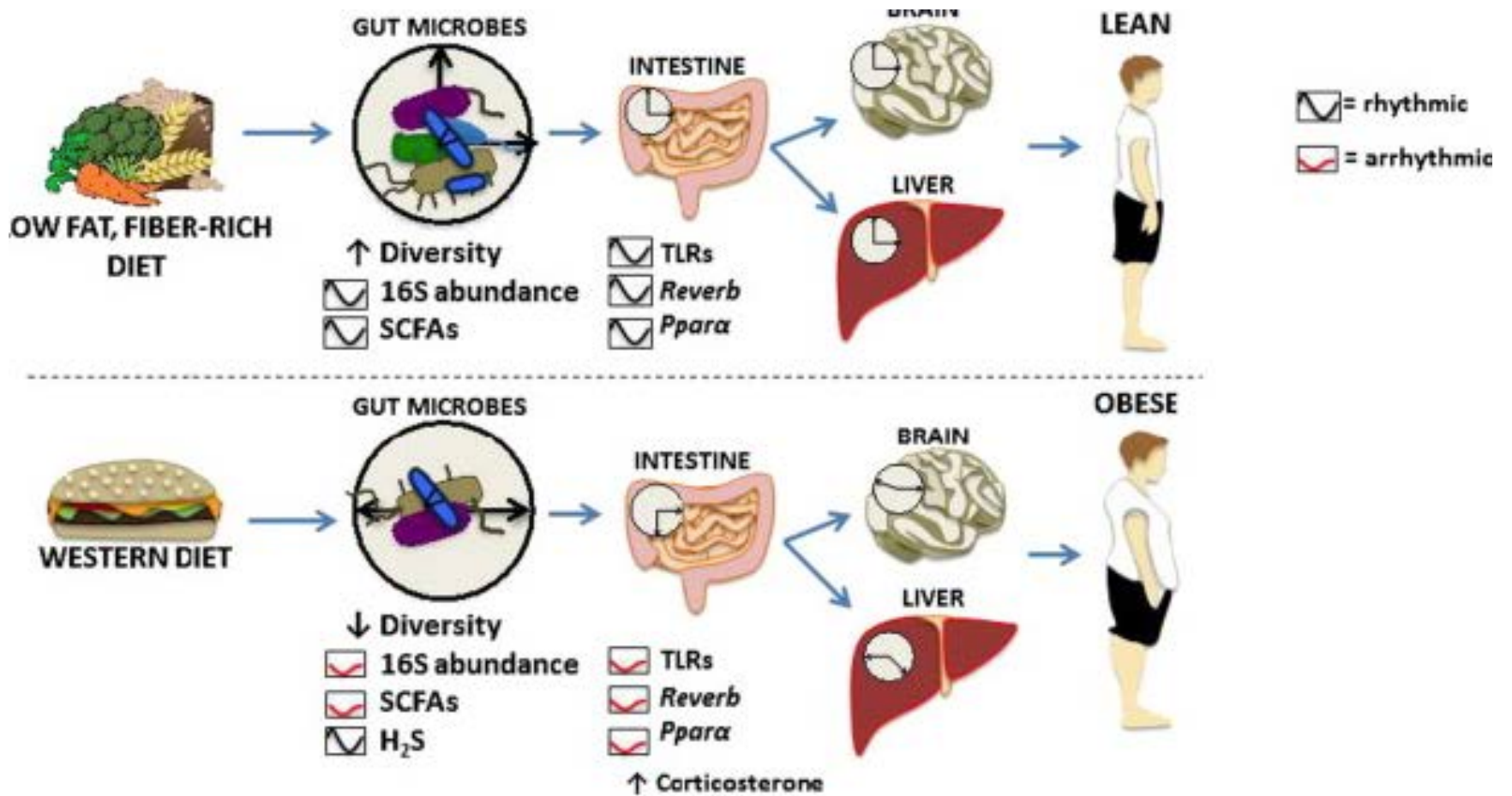
→ ↓SCFA's

↑Gut Barrier
↑Tregs
↓Inflammation

CVD

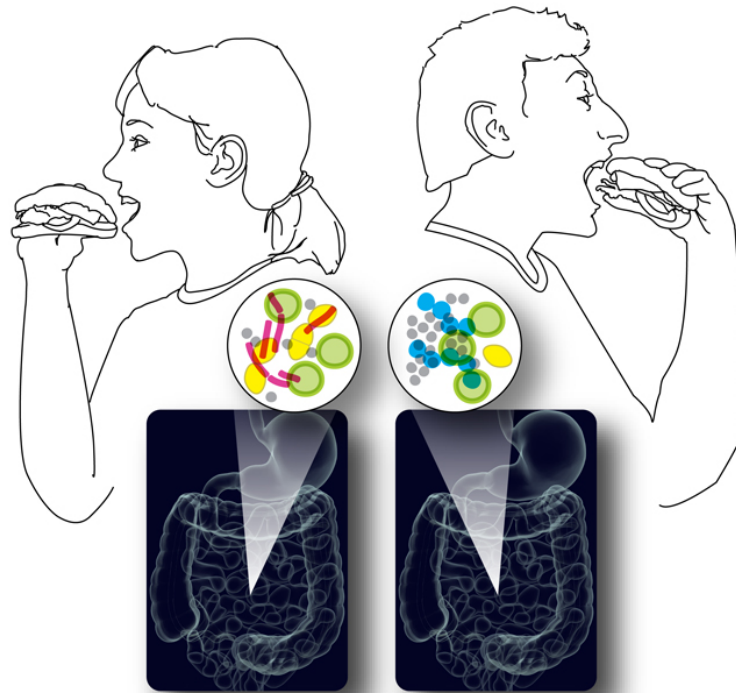
IBD





Effetto della dieta sul microbiota intestinale

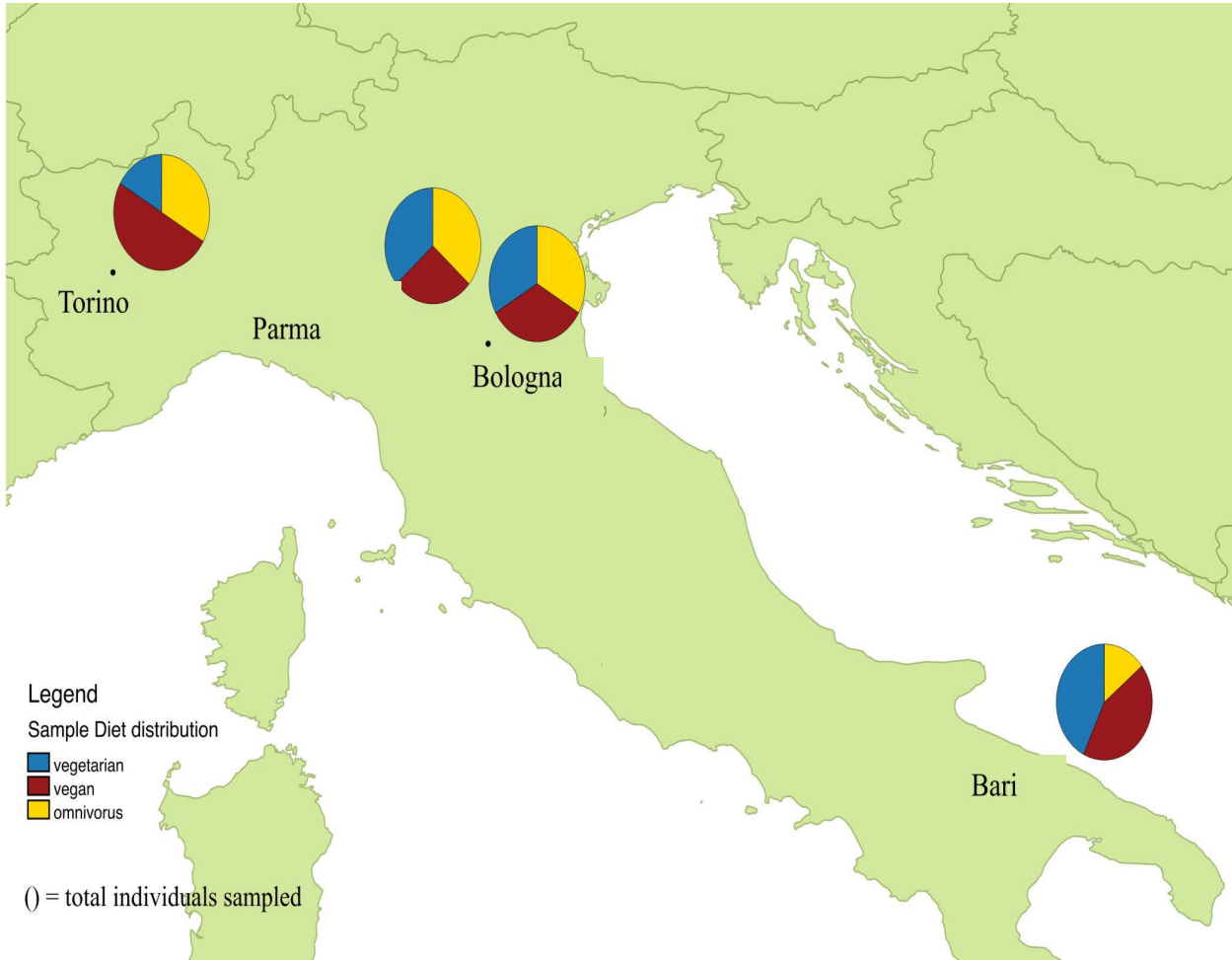
Casi studio



PROGRAMMI DI RICERCA SCIENTIFICA DI
RILEVANTE INTERESSE NAZIONALE
RICHIESTA DI COFINANZIAMENTO (D.M.
1152/ric del 27/12/2011)

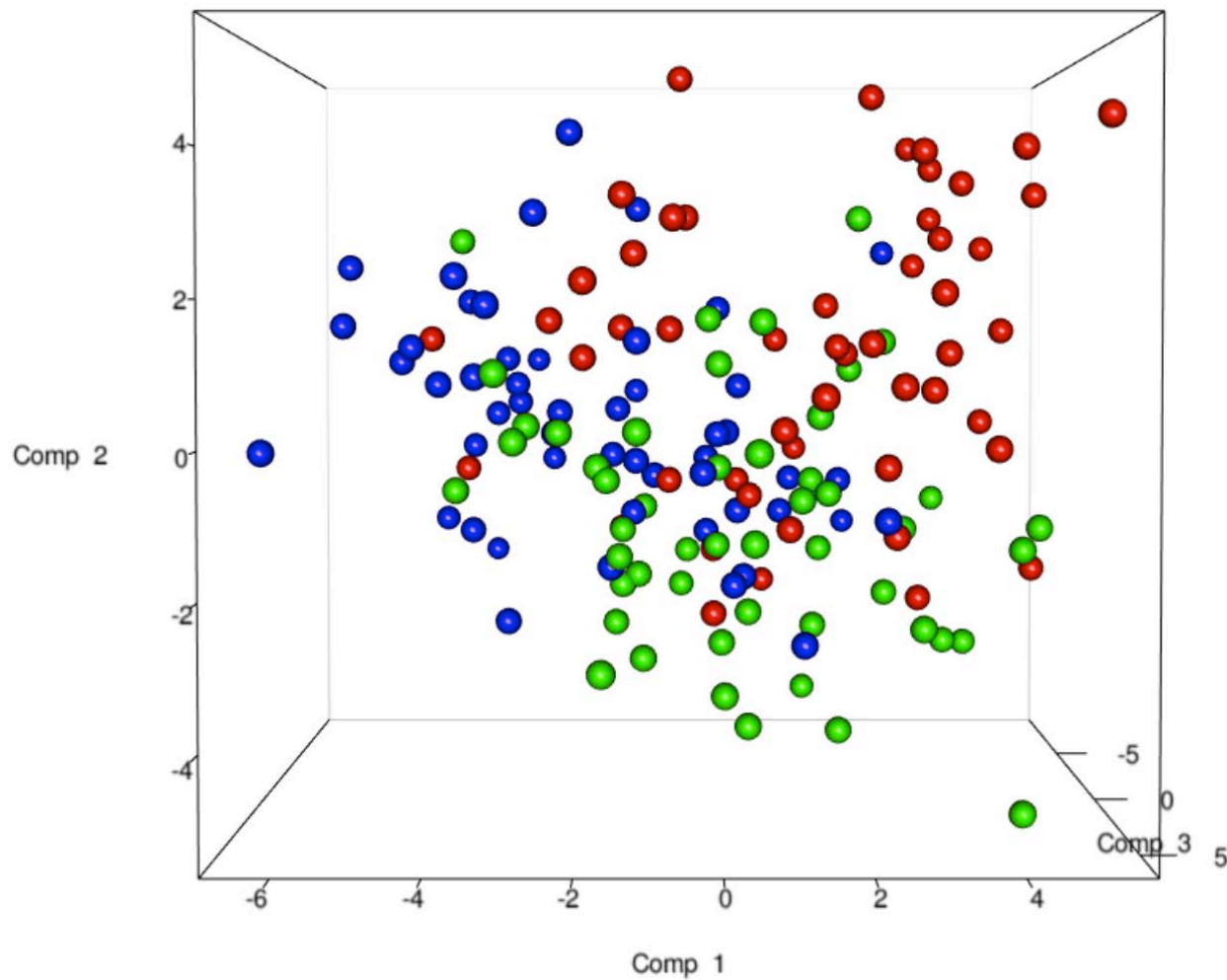
Microrganismi negli alimenti e nell'uomo: studio del microbiota e del relativo metaboloma in funzione della dieta onnivora, vegetariana o vegana





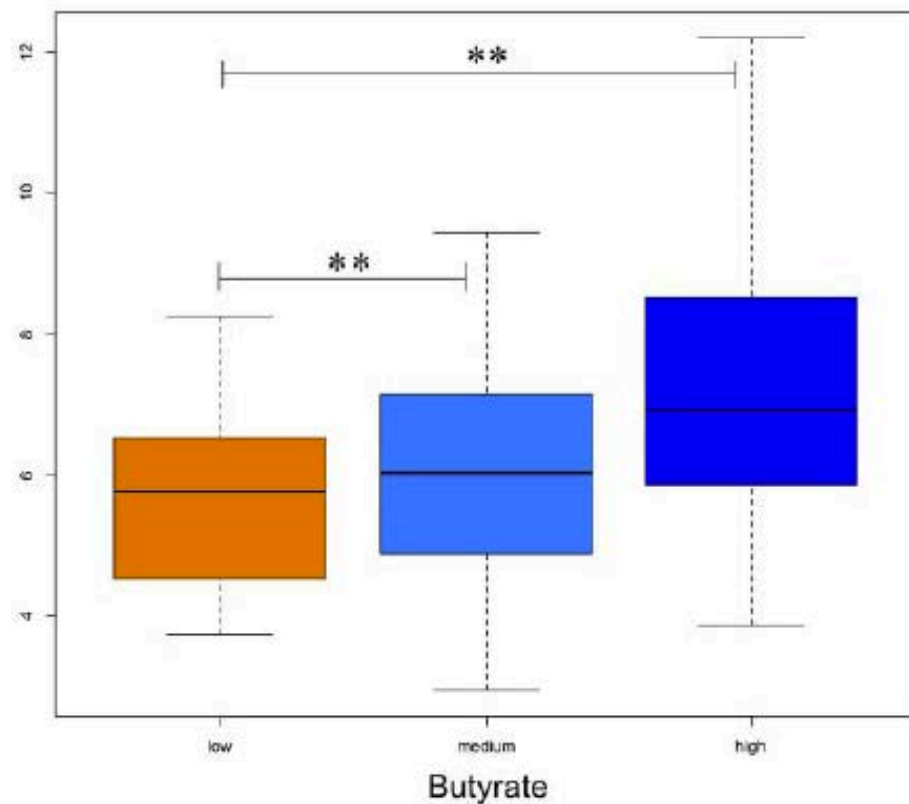
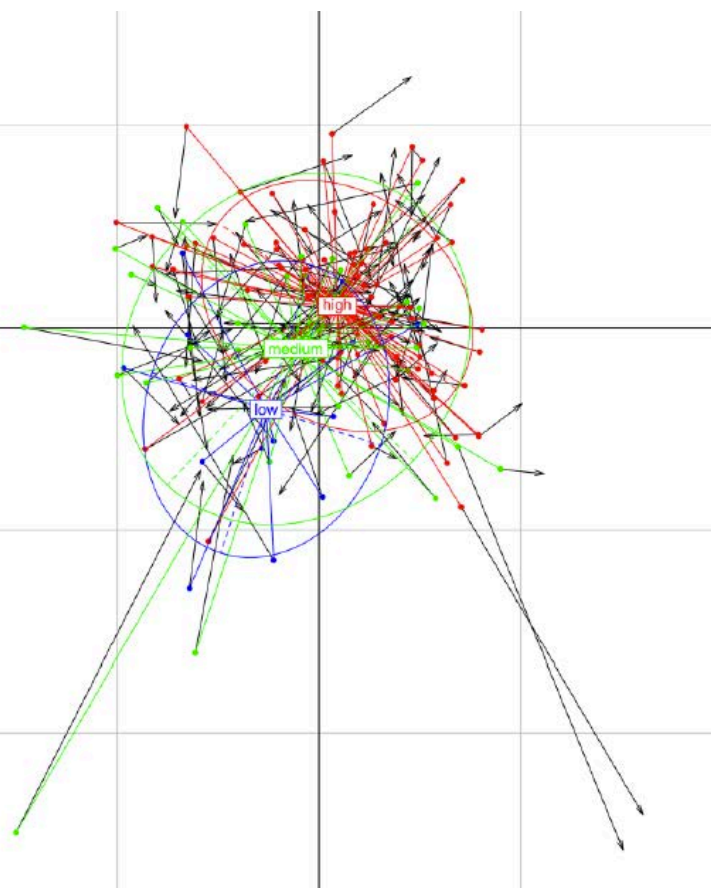
Studio
 osservazionale su
 50 onnivori
 50 vegani
 50 vegetariani

Composizione del microbiota intestinale in funzione della dieta



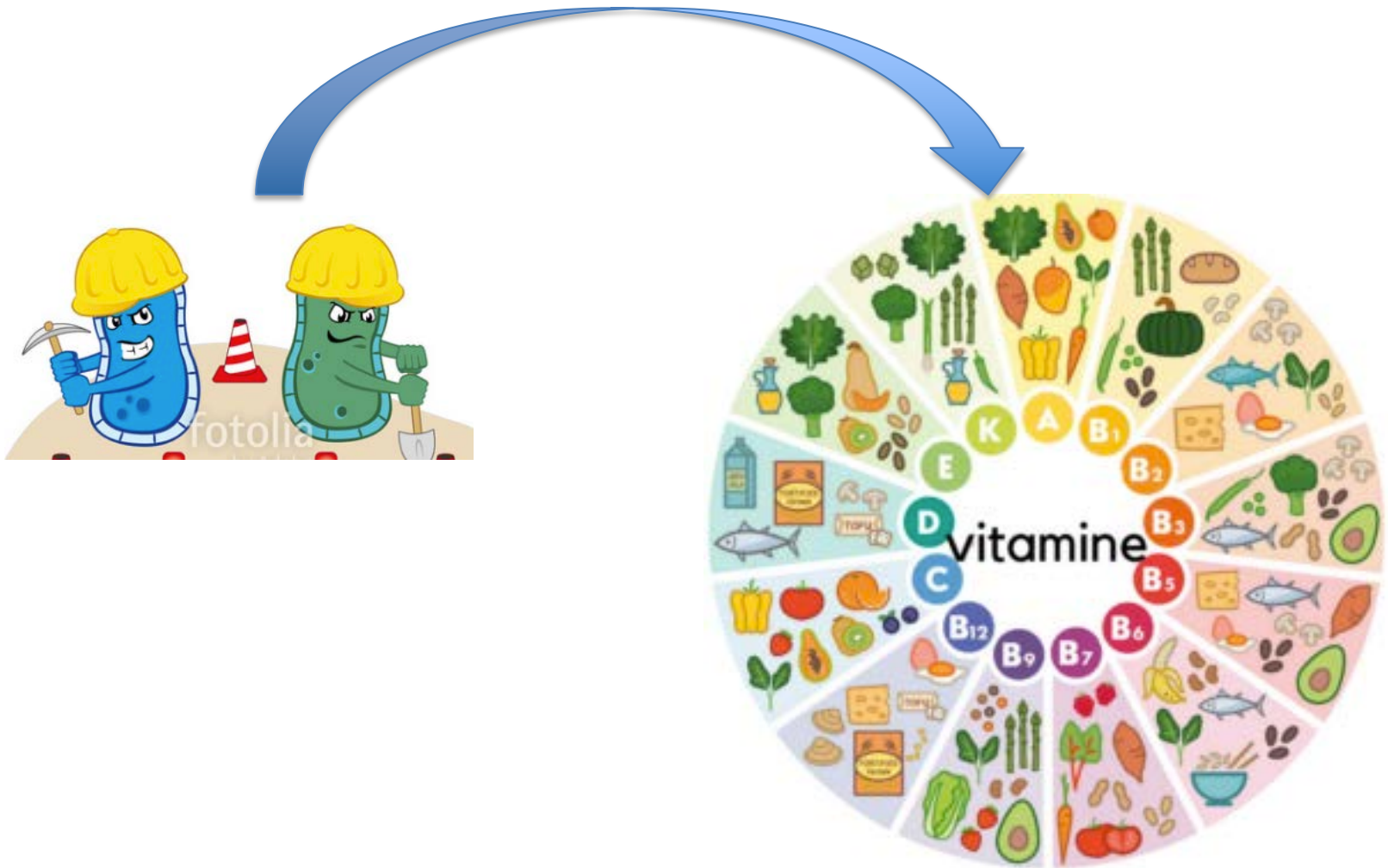
- ovo-lacto-vegetarian
- vegan
- omnivore

Composizione del microbiota intestinale in funzione dell'aderenza alla dieta mediterranea



Correlazione con il consumo in fibre

Funzioni del microbiota in soggetti vegani e vegetariani



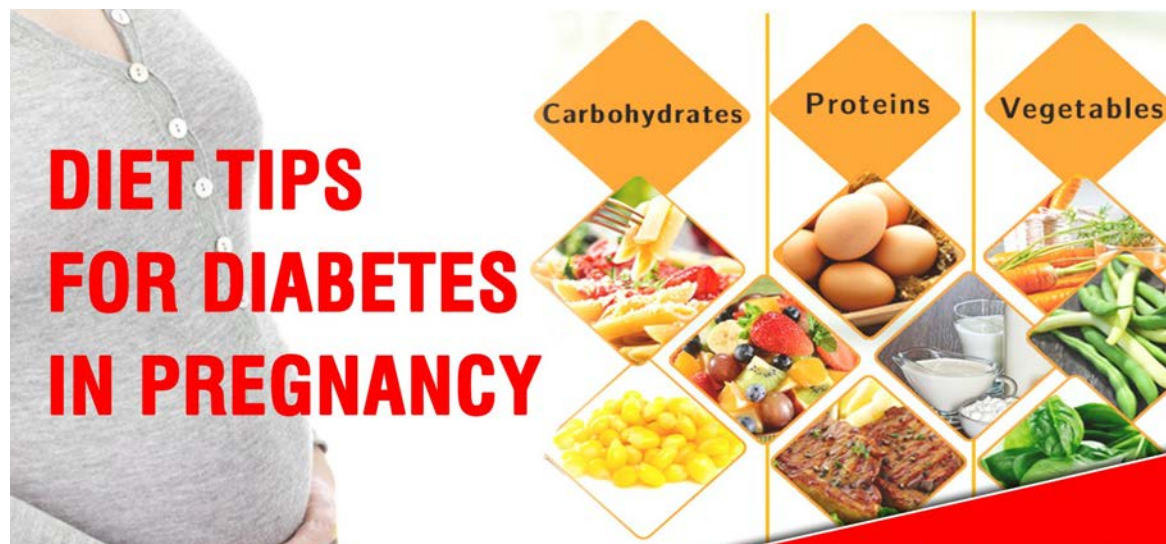


Intervento dietetico durante la gravidanza in pazienti con diabete gestazionale (GDM)



This is a prospective cohort study including 41 pregnant women diagnosed with GDM during their second trimester of pregnancy.

First visit at 24–28 weeks of gestational age at the time of GDM diagnosis (enrolment), second visit at 38 weeks or before delivery in the case of preterm delivery (study end).



**Adherence to the dietary recommendations**

	Adherent	Not adherent
Number	14	27
<i>Blood measurements</i>		
Fasting glucose (mg/dL)	88.9±25.3	100.6±13.8
Fasting insulin (μU/mL)	11.4 (10.8)	11.6 (12.4)
HOMA-IR (mmol/L*μU/mL)	2.4 (3.0)	3.1 (2.5)
CRP (mg/L)	3.2 (3.1)	8.4 (8.3)
<i>Dietary intakes</i>		
Sugars (% total kcal)	3.9±2.2	7.5±5.0
Oligosaccharides (g/day)	66.7±22.6	47.8±21.1
Fiber (g/day)	20.5±2.1	12.4±4.2
PUFA (%kcal)	5.0±1.1	4.0±0.9



Results

	Rho	Beta	95% CI	P
Dietary intakes*				
Proteins (% total kcal)				
<i>Faecalibacterium</i>	0.32	0.08	0.04 0.12	<0.001
Metabolic variables**				
Diastolic BP (mmHg)				
<i>Oscillospira</i>	-0.44	-2.01	-3.11 -0.91	<0.001
<i>Rikenecellaceae</i>	-0.51	-2.74	-3.97 -1.51	<0.001
Delta fasting glucose (mg/dL)				
<i>Faecalibacterium</i>	-0.54	-1.28	-1.71 -0.85	<0.001
Delta glycated hemoglobin (%)				
<i>Blautia</i>	-0.51	-0.06	-0.10 -0.03	0.001
Delta fasting insulin (μU/mL)				
<i>Blautia</i>	-0.35	-0.42	-0.67 -0.17	0.001
<i>Butyricimonas</i>	0.41	36.1	14.7 57.5	0.002
<i>Collinsella</i>	0.45	8.69	6.00 11.4	<0.001
<i>Coprobacillus</i>	0.39	6.52	3.29 9.75	<0.001
Delta HOMA-IR (mmol/L*μU/mL)				
<i>Blautia</i>	-0.36	-0.11	-0.17 -0.05	0.002
<i>Butyricimonas</i>	0.51	11.2	6.50 15.9	<0.001
<i>Collinsella</i>	0.45	2.37	1.80 2.94	<0.001
<i>Erysipelotrichia</i>	0.37	1.87	1.09 2.65	<0.001
Delta CRP (mg/L)				
<i>Sutterella</i>	0.62	7.57	5.02 10.1	<0.001

**Associations
between
microbiota and
nutrient intakes
and metabolic
variables**



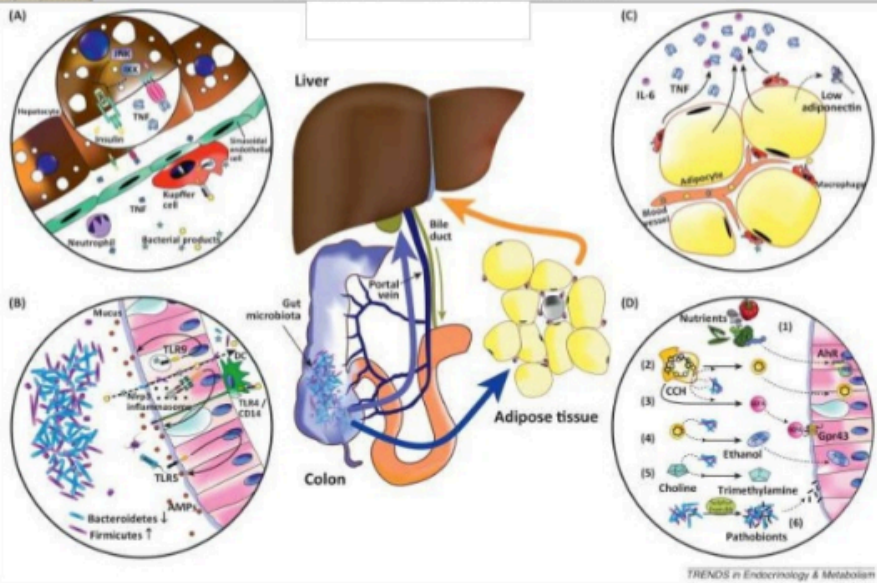


Patients who were **adherent to the dietary recommendations** showed a **better metabolic and inflammatory pattern** at the study end (decrease of fasting glucose, insulin resistance and CRP values)

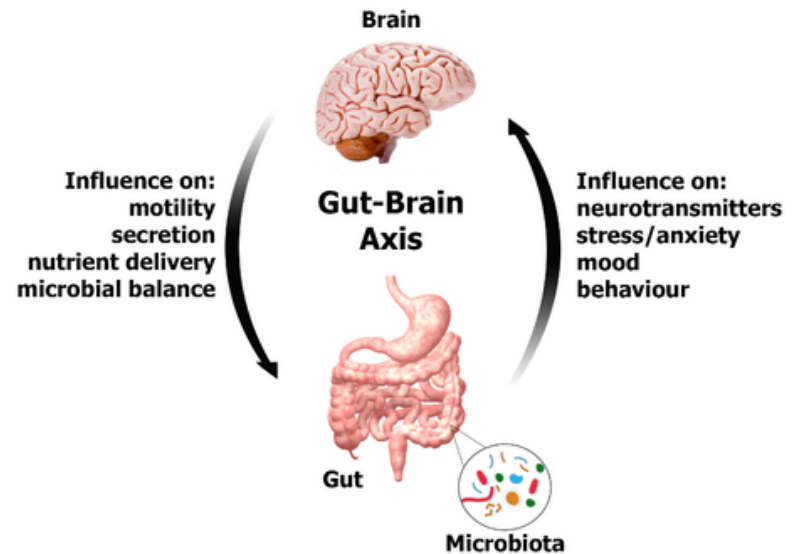
Blautia associated with adherent patient indicates a **healthy gut**, reduced inflammation and blood pressure values, diminished risk for type 1 diabetes and obesity. An inverse relationship between *Blautia* and insulin resistance was observed.

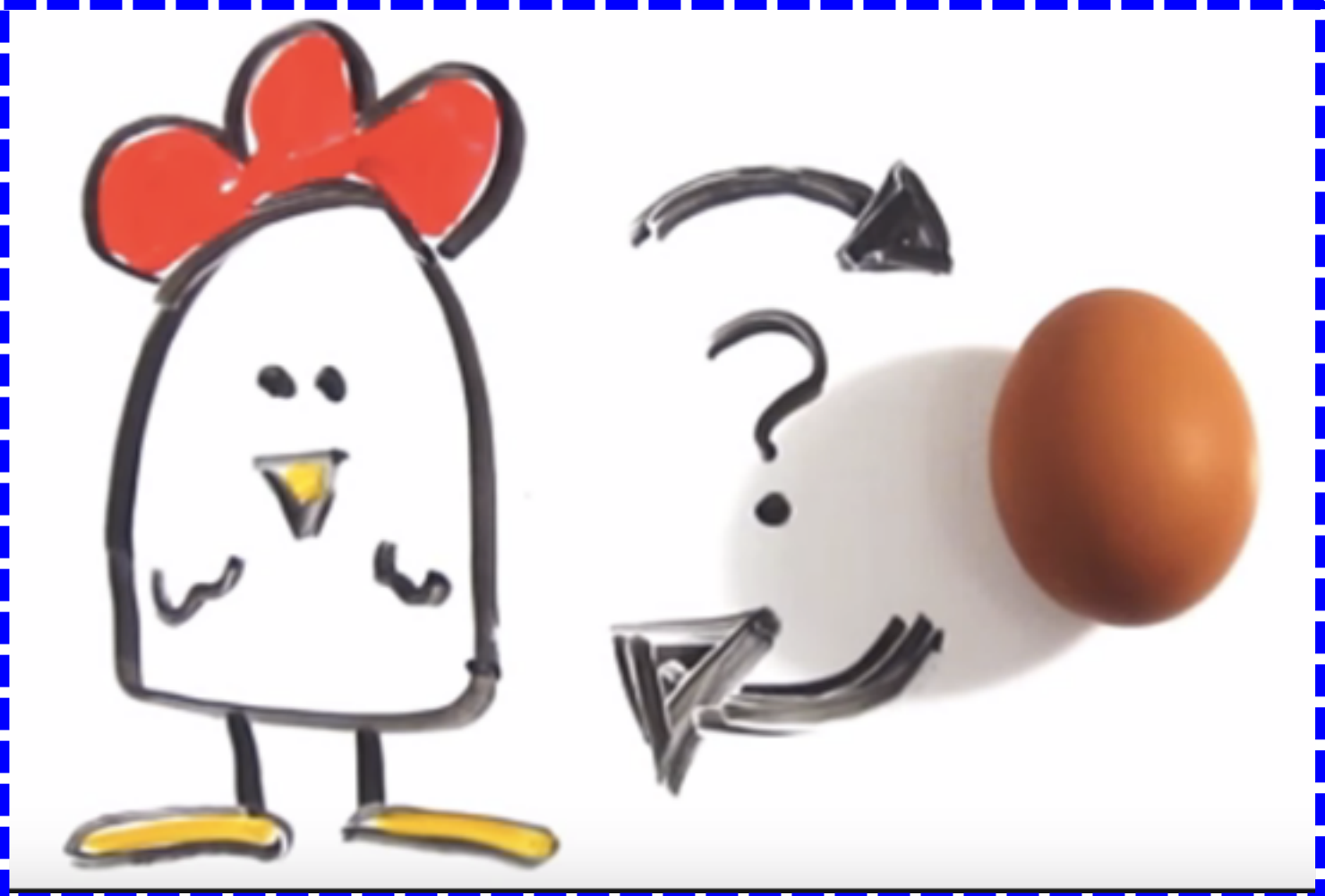
Bacteroides reduction was observed in adherents only. In diabetic patients *Bacteroides* was reported to play a major pathogenic role.

Gut-Liver Axis

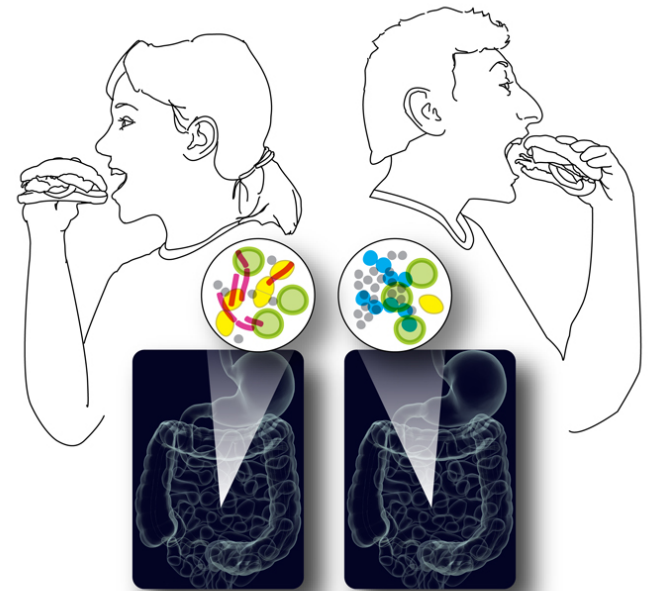
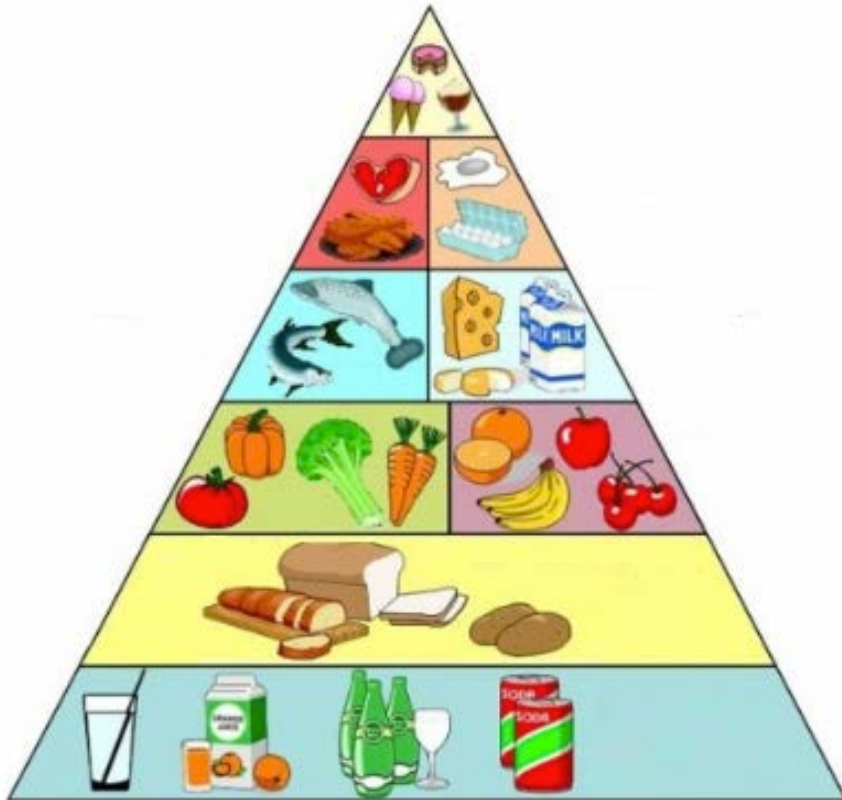
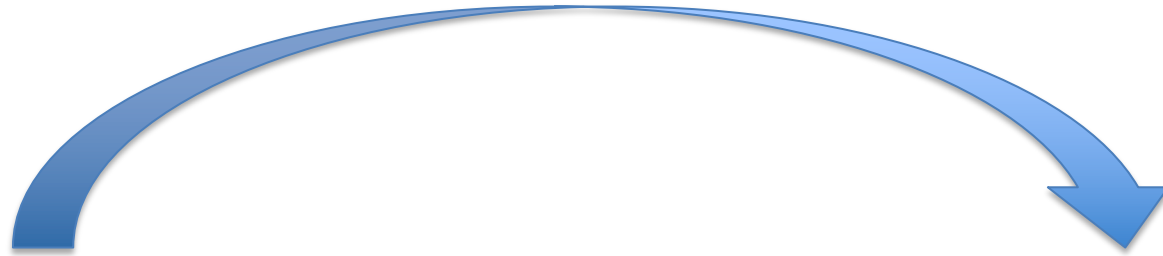


- Microbiota associato con:
- Obesità
- Celiachia
- Diabete
- Cancro
- Malattie neurodegenerative
- Etc....





Modulare il microbiota con l'alimentazione





Domande??

I'm not google!

