

Microbiome, Gut and Systemic Health: New Frontiers in Personalised Nutrition

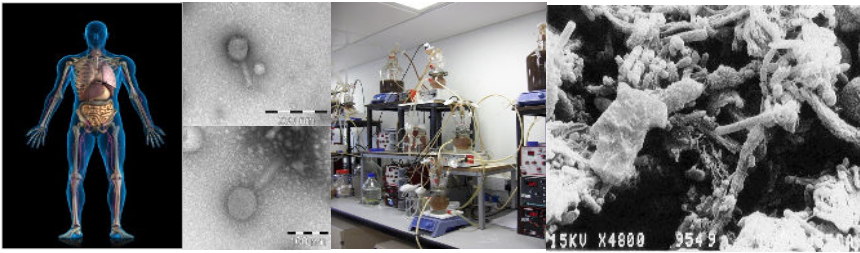


Professor Glenn Gibson
Prebiotics and Probiotics in Health and Disease:
Current Clinical Science
11:15-12:00pm

An event by:  Nutritional Medicine Institute

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Prebiotics and Probiotics

NMI Summit October 14th 2023

Glenn Gibson

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Let food be thy medicine and medicine be thy Food



**“All disease begins
in the gut”**

– Hippocrates
*Father of Modern
Medicine*
c.460 – c.370 BC



New Health Society

- Sir William Arbuthnot Lane
1856-1943



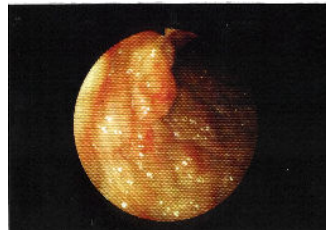
“The prolongation of life”

– Metchnikoff, 1907

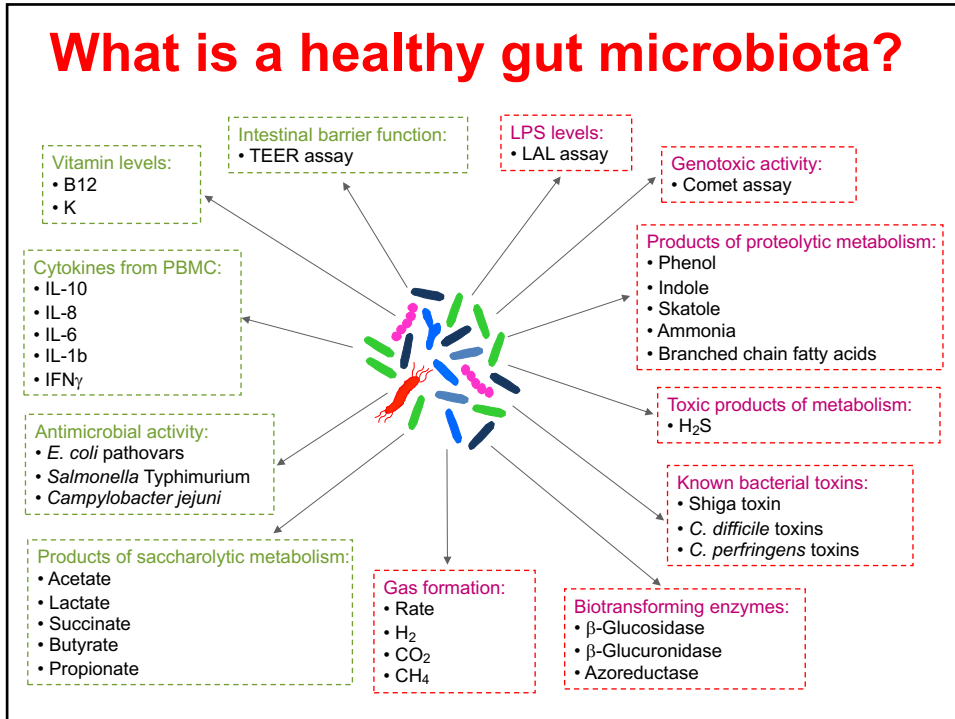
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It can go wrong.....



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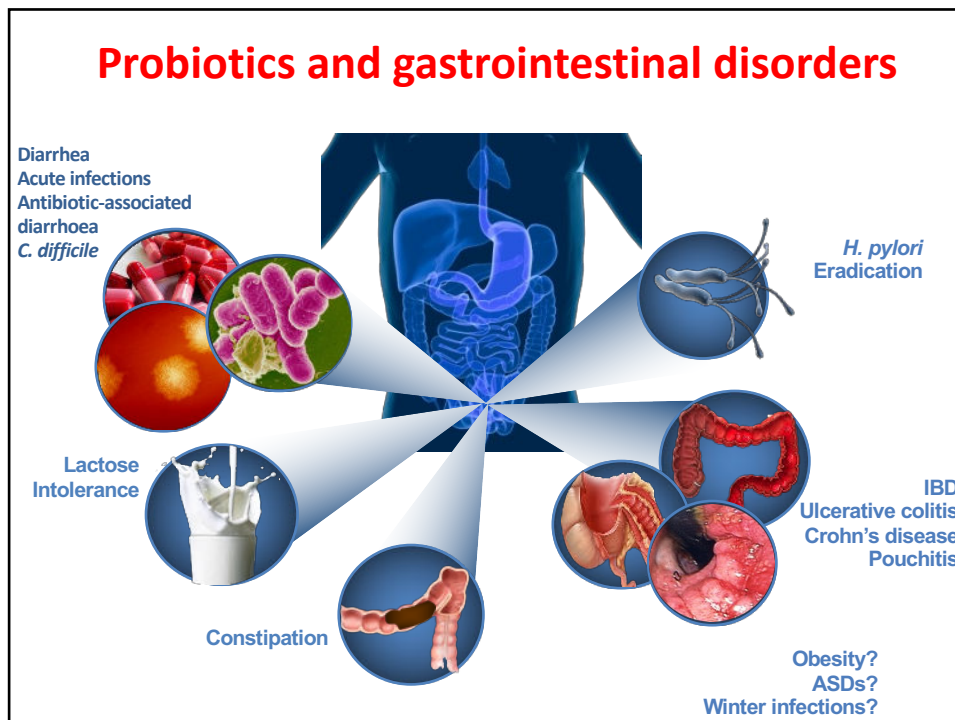
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Probiotics

- Live microbes in the diet

The collage features a variety of probiotic products: Actimint Probiotic Mints, Good Start Probiotic, Naked Probiotic Juice, BioGaia Probiotic Drops, Live Active Probiotic, Multibionta Probiotic Multivitamin, and Attune Probiotic. A portrait of a man with a beard is also included, likely representing a historical figure in microbiology.

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How to choose a probiotic

- **Safety:** Good probiotics are safe
- **Dose:** Product should match levels used in human studies showing benefits
 - Different probiotics have been shown to be effective at different levels for varying conditions
 - It is not possible to provide one count or one application for all “probiotics”
- **Food or supplements?** Probiotic content is generally more important than the way they are consumed.

ISAPP guidelines at www.isapp.net

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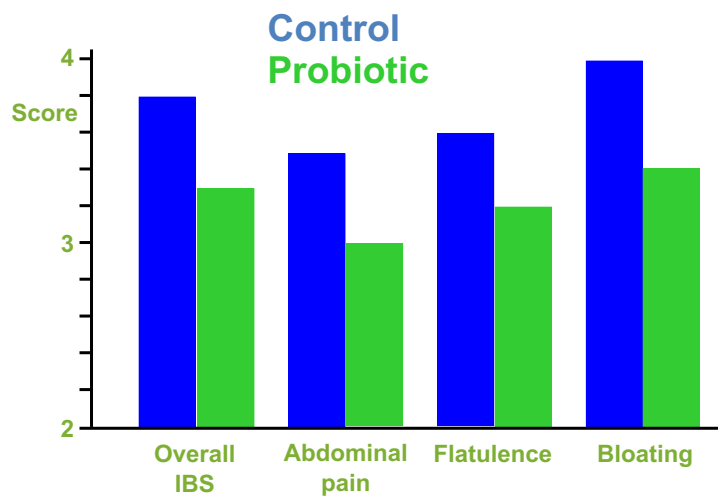
Irritable bowel syndrome

- A common gut complaint (up to 20%)
- Stress or gut? Are the 2 related? (migraine, schizophrenia and the gut)
- Mood vs food?
- Variable symptoms including abdominal pain, bloating; and bouts of diarrhoea or constipation or both



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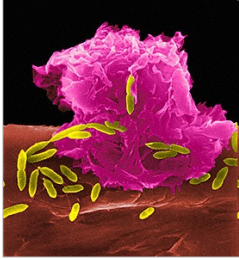
Irritable Bowel Syndrome



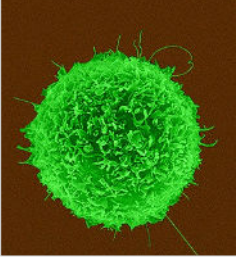
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Probiotics and immunity

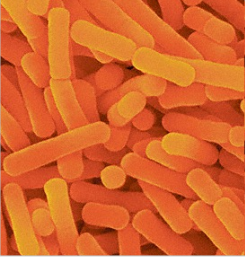
- *Lactobacillus rhamnosus* HN001
- 44-80 year old individuals



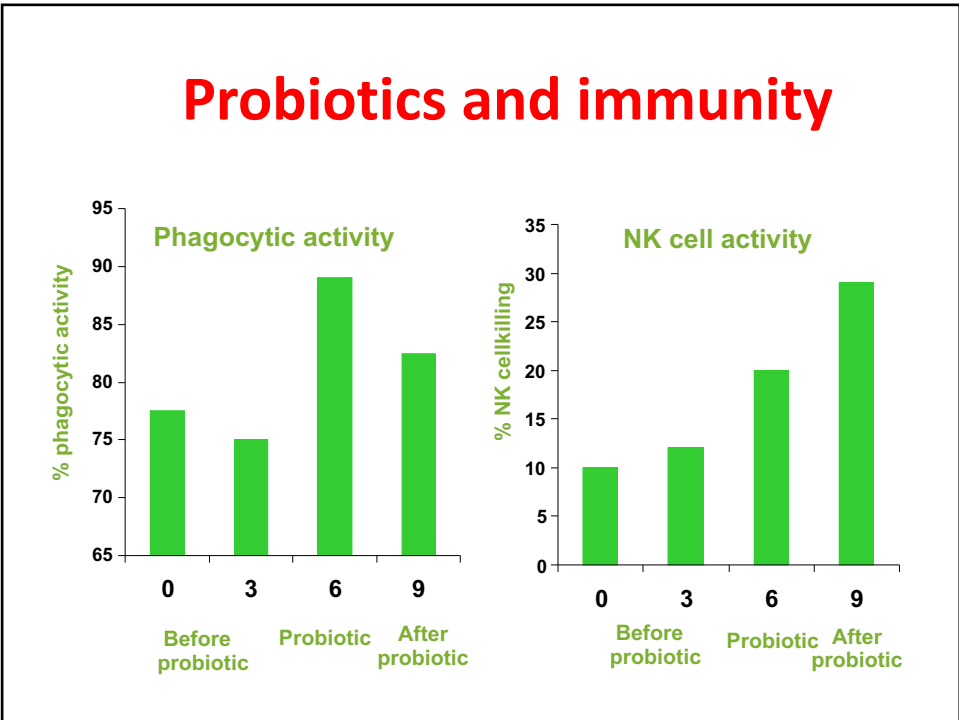
Macrophages



Natural killer cells



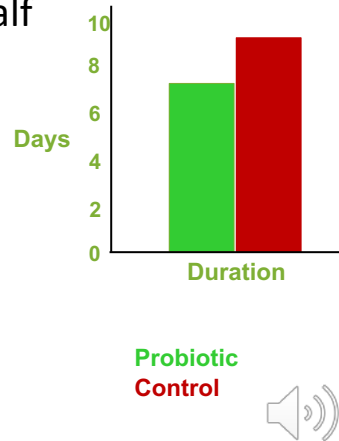
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Respiratory infections

- 479 healthy adults (18-67) given daily vitamins and minerals – half given a probiotic as well
- Trial over two winter-spring periods
- Probiotic had no effect on the incidence
- 20% fewer symptoms and 2d reduction in duration
- Immune stimulation



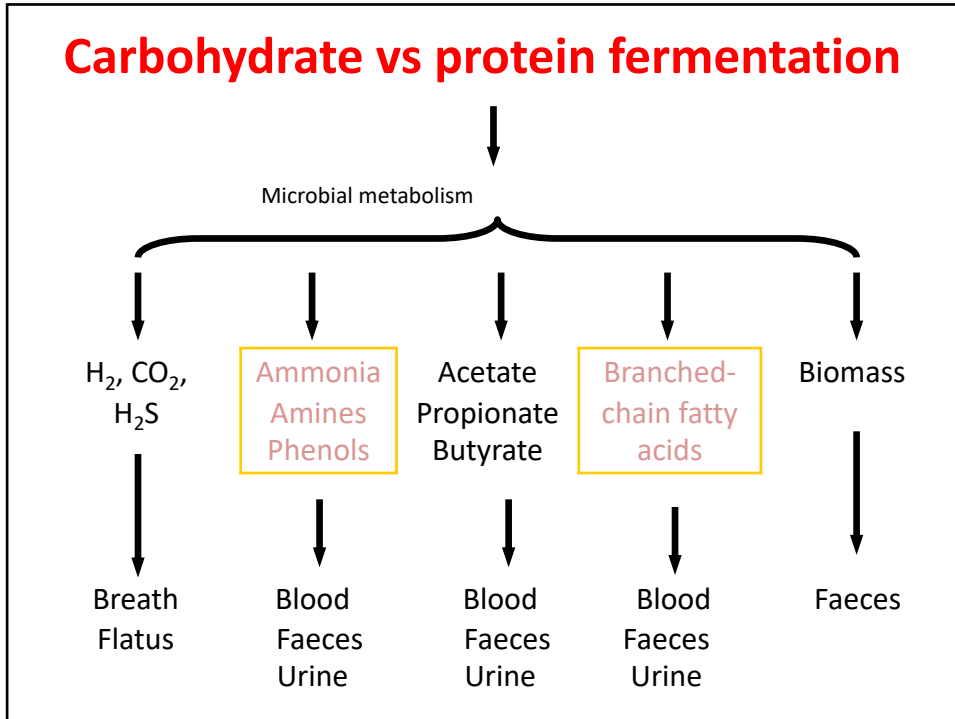
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Recent observations

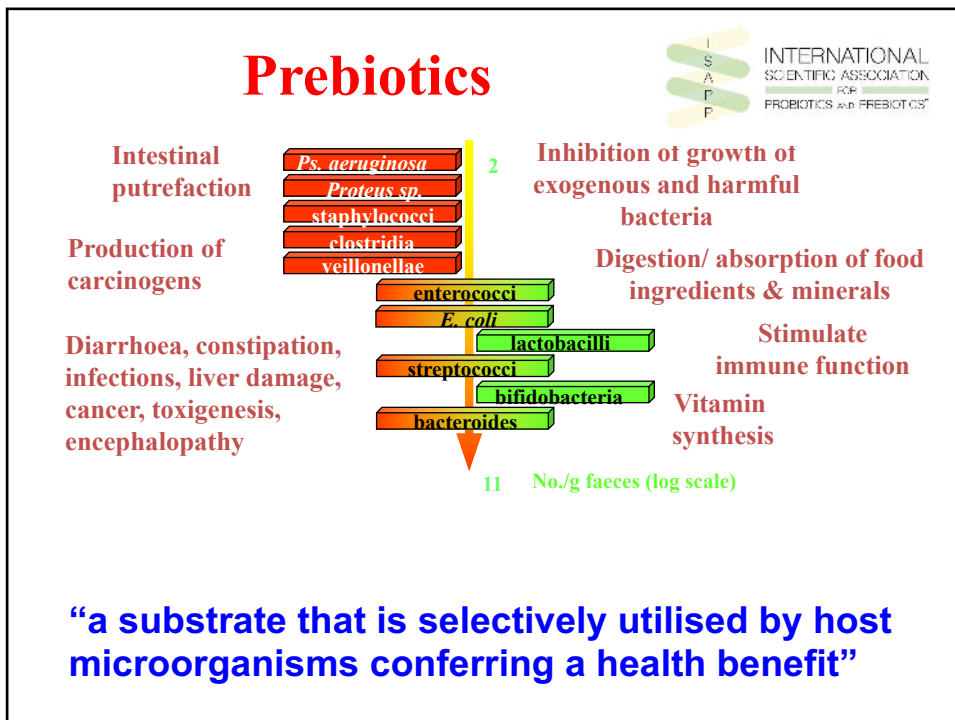
- **Diarrhoea**
 - Probiotics have been used to reduce diarrhoea in infant day care centres, in frequent traveller's. A new area is high level sportspersons and those with 'stressful' jobs
- **Inflammatory Bowel Disease (IBD)**
 - Studies suggest that administration of probiotics could benefit patients with UC and CD
- **Autism**
 - Recent data suggests the gut microflora plays a role in autism – Altering the gut microflora by reducing the numbers of pathogens in ASD patients, while stimulating more beneficial gut bacteria, may help alleviate some of the gut related symptoms



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Prebiotics

selectivity a key condition that needs to be demonstrated, *in vivo*, in the complex human (animal) microbiota


utilised meaning a growth promoter

confer(s) refers to one or a limited number of beneficial bacteria.

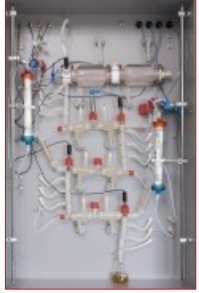
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Prebiotic effects and the gut: testing





In vitro tests allow comparative studies and eventually selection of ingredients showing a potential effect

In vivo studies are essential to prove a prebiotic effect

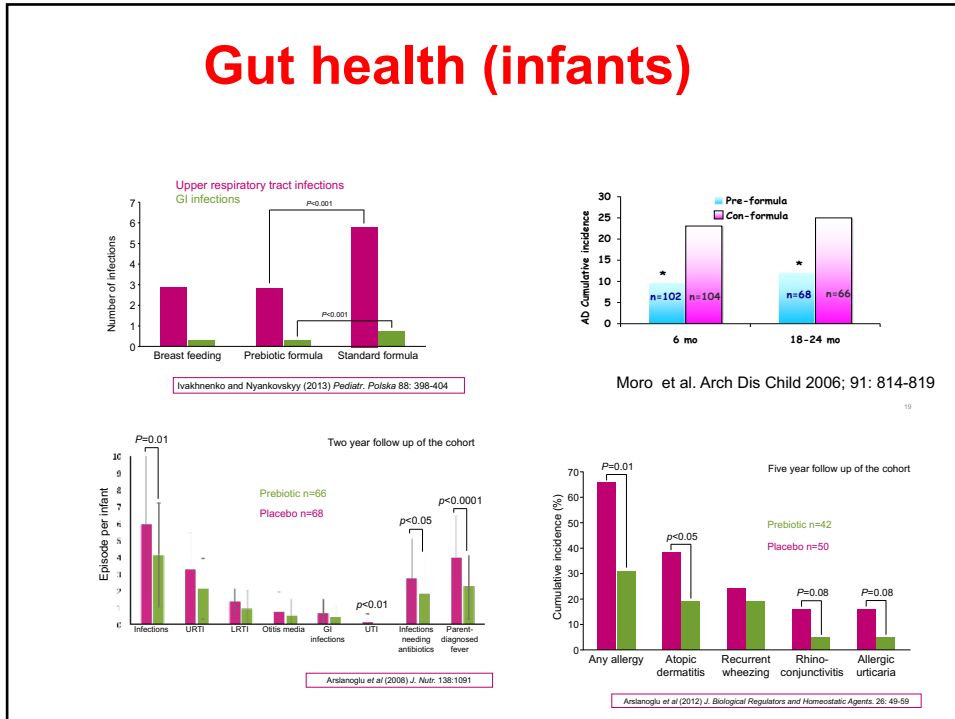




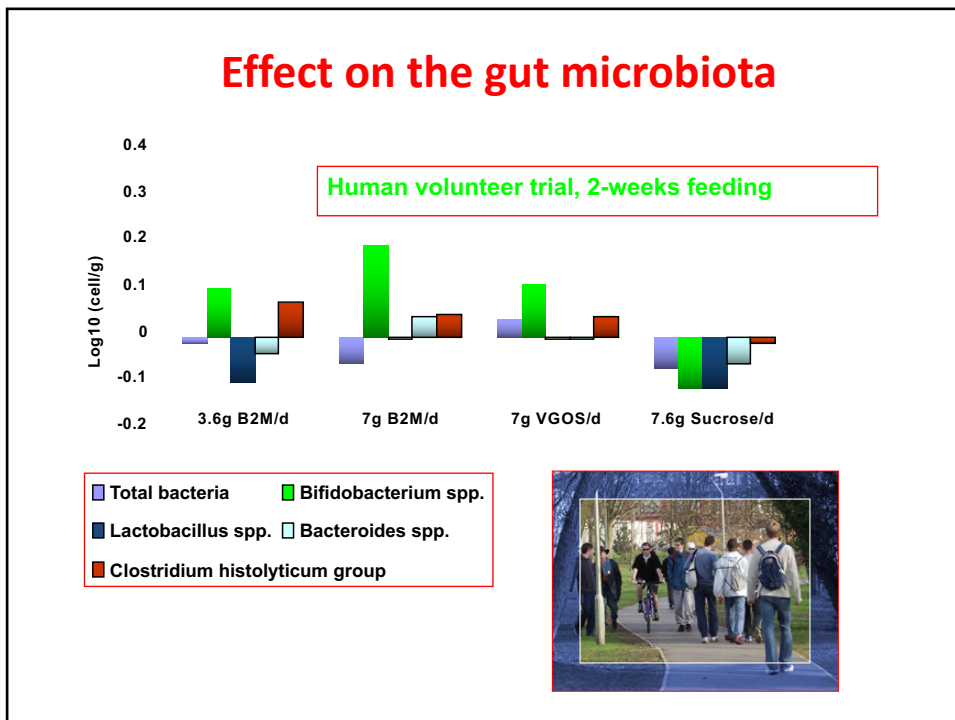




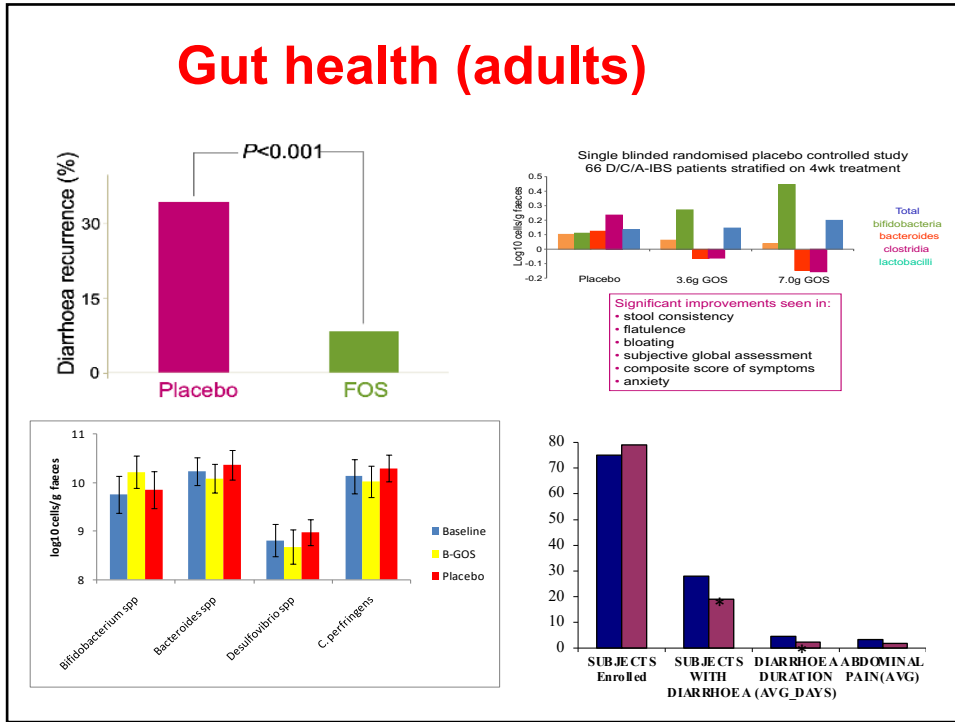
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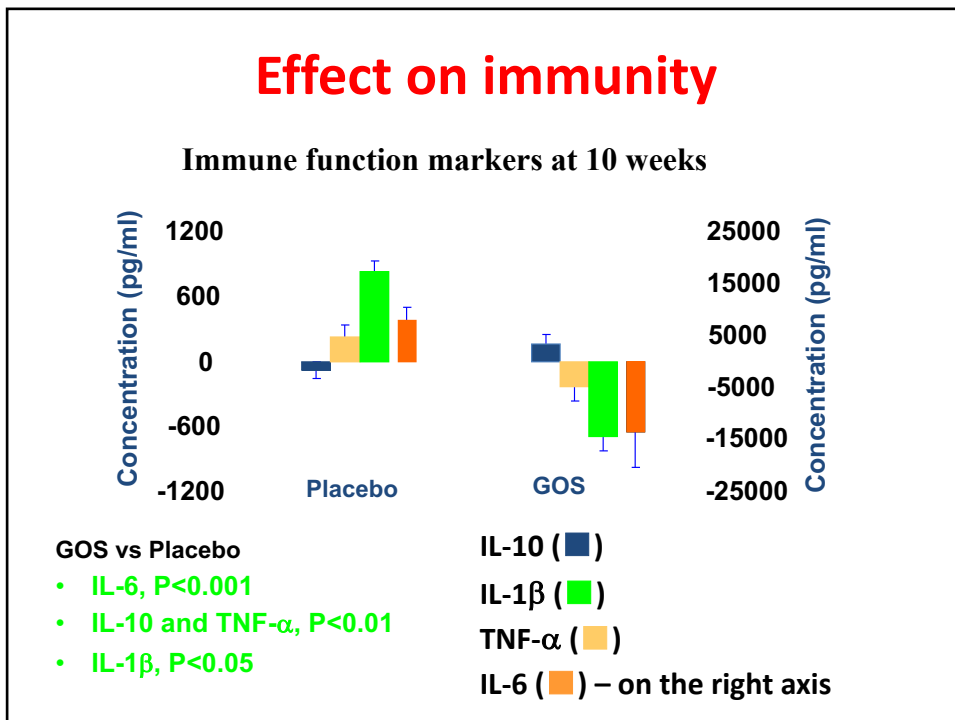
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low-FODMAP diet vs prebiotic supplementation

symptom perception

microbiota activity

By 4 weeks administration, both treatments had opposite effects on intestinal microbiota but a similar clinical benefit in patients with functional gut disorders.

After treatment discontinuation the decrease in symptoms persisted in the prebiotic group, but reappeared immediately in the low-FODMAP group.

Intermittent prebiotic administration might be an alternative to continuous dietary restrictions for patients with functional gut symptoms.

Gastroenterology

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Two randomised, controlled, double-blind crossover studies

To examine the effect of prebiotic in 60 adults (age 30 – 70 yrs) identified at risk of metabolic syndrome

Two study cohorts:

30 volunteers bread = 2 slices/day

30 volunteers juice = 250 ml/day

Treatment 1

Washout

Treatment 2

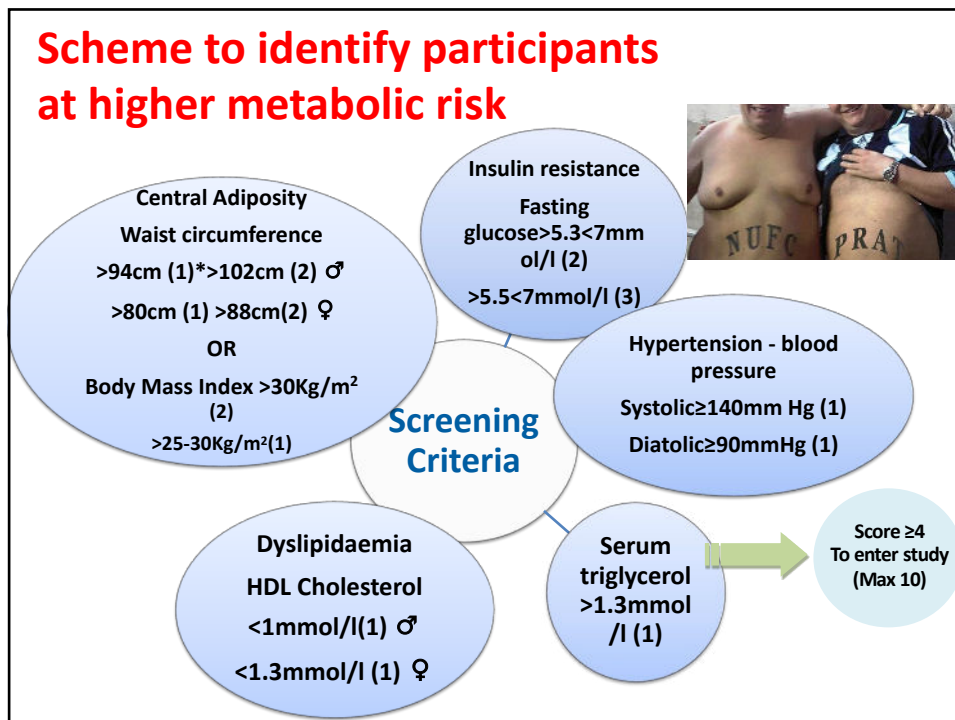
Treatment 2

Washout

Treatment 1

Placebo and active products consumed for twelve-weeks in a crossover manner, with a six-week washout period in-between.

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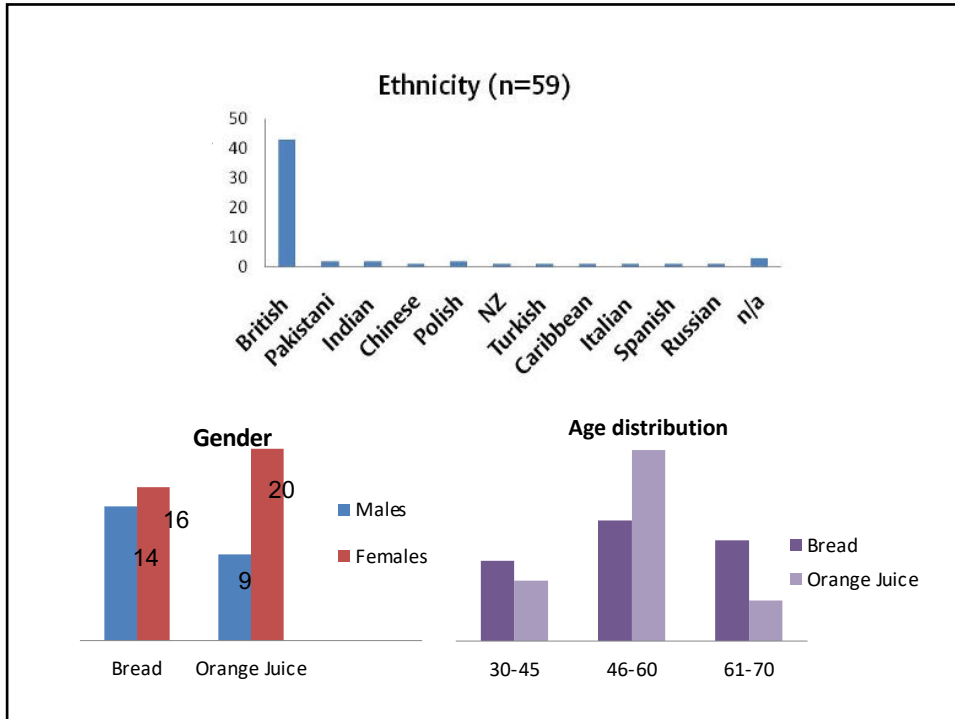


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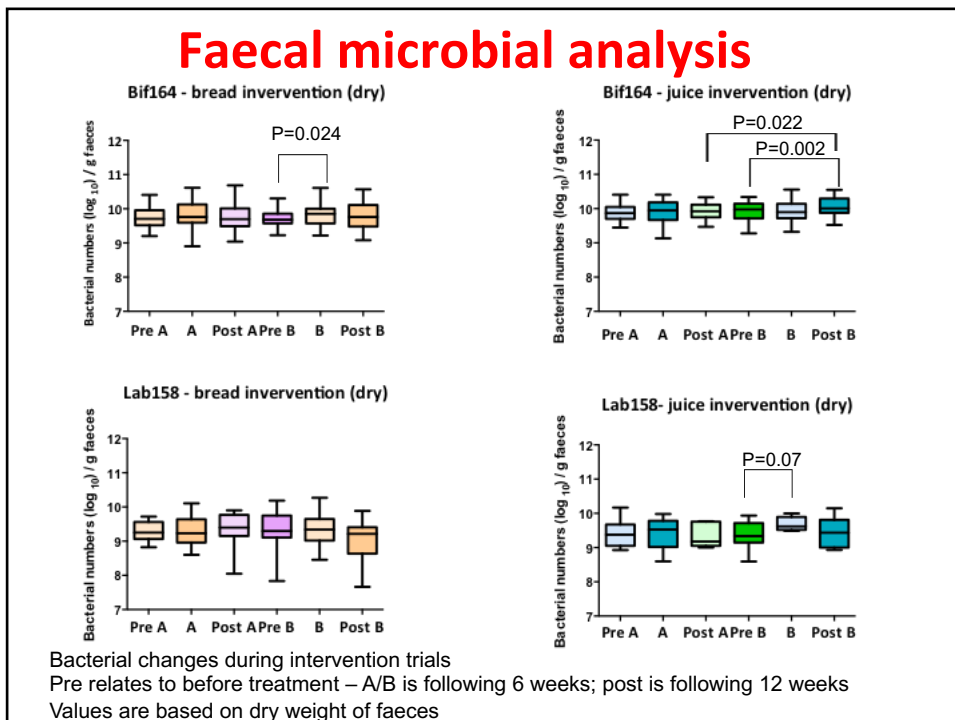
- ## Outcome measures
- Glycated haemoglobin (HbA1c)
 - Plasma biomarkers of inflammation
 - Fasting lipid profile
 - Urinary micro-albuminuria and creatine concentrations
 - Faecal analysis, microbial profiles
 - Insulin and glucose
 - Calprotectin
 - Anthropometrics (weight, BP, BMI)
 - Habitual diet and physical activity levels

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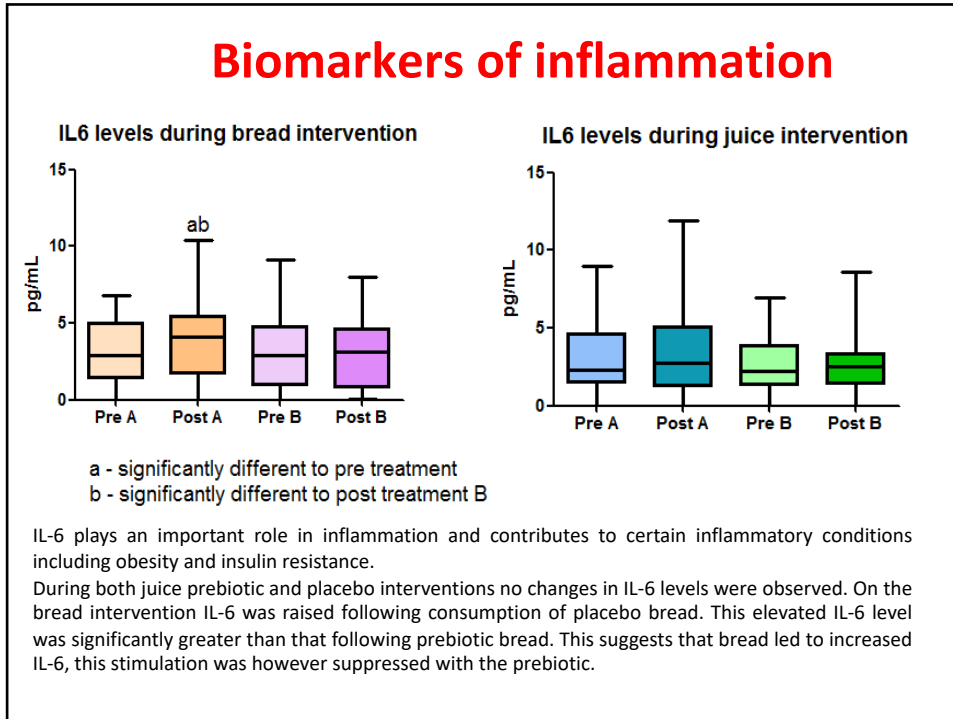
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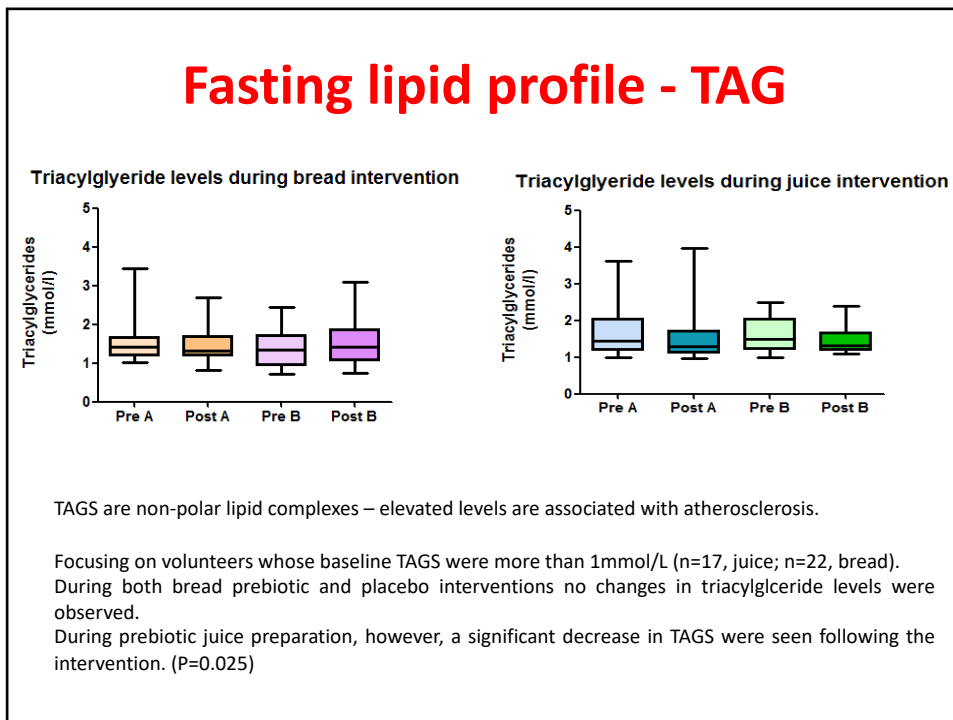
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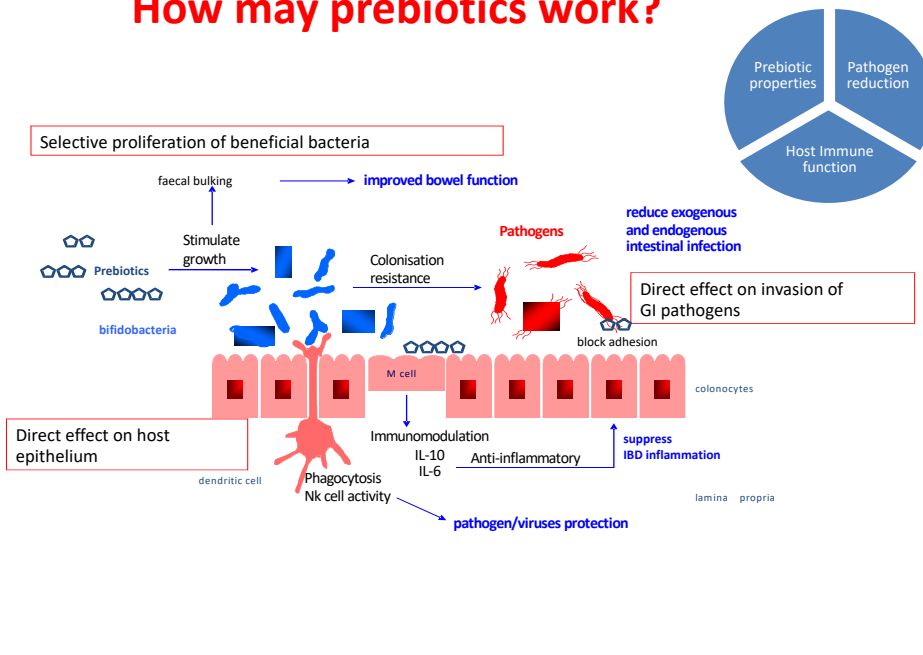


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- The use of prebiotic GOS supplement influenced gut microbiology
- Positive influence on some markers of MS
- Effects seen in food matrices that had good sensory properties, but a milder prebiotic influence than when used as a supplement

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How may prebiotics work?



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Prebiotics today

[Regular intake of prebiotics may promote recovery of normal sleep patterns after stress](#)

[Daily prebiotic intake can reduce anxiety levels and improve wellbeing](#)

[Women who took four weeks of prebiotic supplements consumed less sugar, study finds](#)

[Consuming mangos boosts gut microbiome diversity: Benefits for overweight and obese individuals](#)

[Prebiotic fiber inulin offers a protective effect against the damage of high-salt diet](#)

[Effects of a High-Prebiotic Diet versus Synbiotics on Mental Health](#)

[Prebiotics keep intestinal barriers strong](#)

[Prebiotics could enhance the learning and memory skills of infants](#)

[Probiotics and prebiotics can reduce the risk of frailty syndrome among the elderly](#)

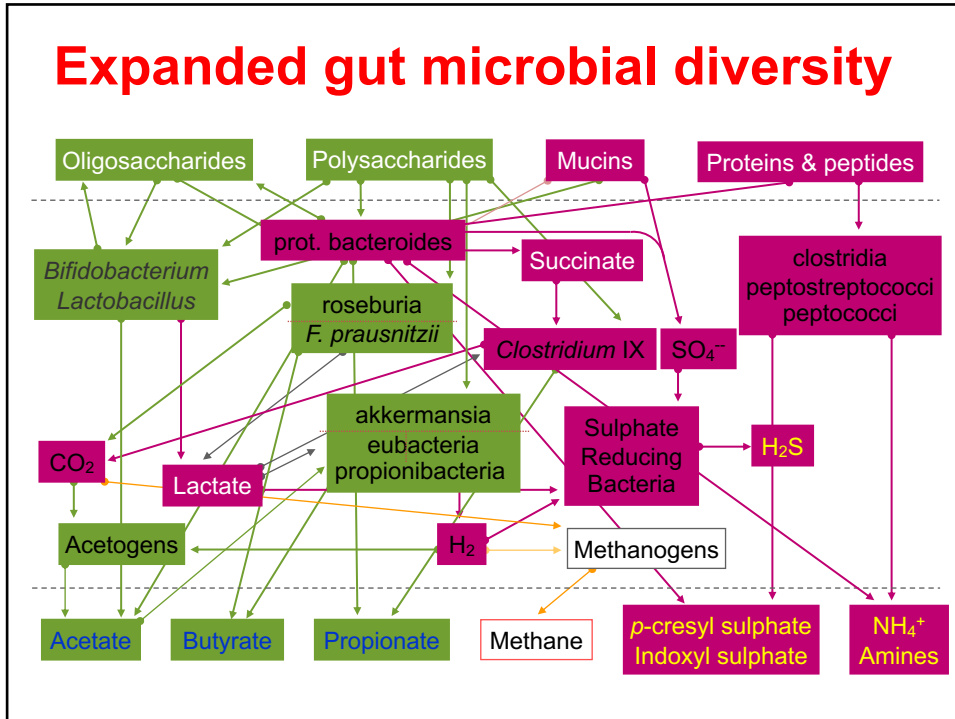
[Researchers to develop prebiotics from non-edible forest and sea resources](#)

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Differences between probiotics and prebiotics

PROBIOTICS	PREBIOTICS
Live, active micro-organisms.	Non-living, non-digestible, selectively metabolised carbohydrates (usually).
Probiotics must be kept alive to be effective.	Stable compounds not affected by temperature, stomach acid or time.
Need to compete well in the gut (or other appropriate ecosystem).	Selectively nourish the good bacteria already in the gut.
Approaching 50000 research articles.	In vivo studies are the preferred test.
Cannot extrapolate studies	Newer concept

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- Prof Kieran Tuohy
- PhD students

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Microbiome, Gut & Systemic Health:
New Frontiers in Personalised Nutrition

NMI SUMMIT 2023
Saturday 14th October

Featuring Dr. Gerard Mullin, Professor Glenn Gibson, Dr. Amrita Vijay,
Justine Bold, Dr. Jonathan Sutton and Benjamin Brown

An event by:  Nutritional Medicine Institute

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