



Thriving@Flinders presents...

Improving Wellbeing Through Gut Health

Your Facilitators

Dr Alyce Martin, Senior Research Fellow, Head of Gut Hormones in Health & Disease Lab

Dr Jake Robinson, Microbial Ecologist; Restoration Genomics & Biodiversity-Health Connections

Food origins, the environment and relation to gut health

Approximately **95%** of global food production is directly or indirectly linked to **soils**



What are soils?

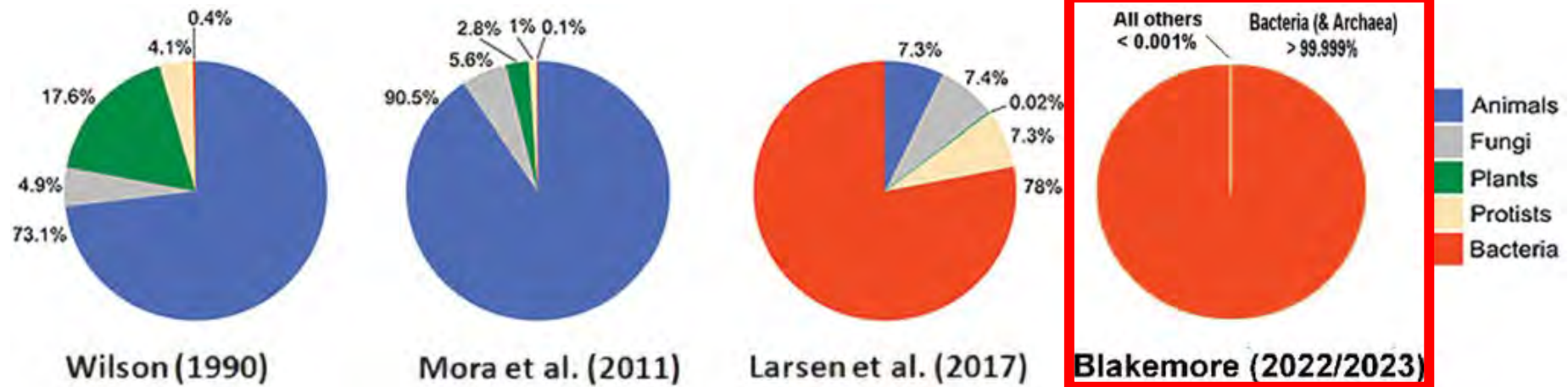
Soils are the foundation of terrestrial **life**

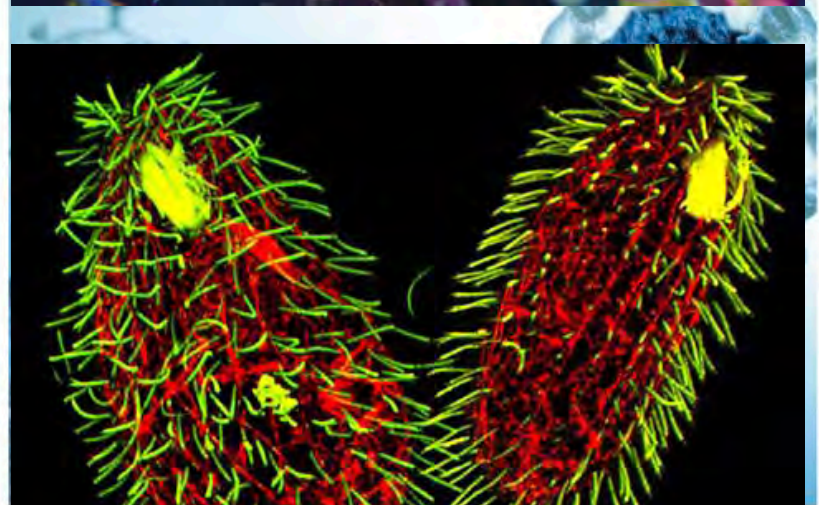
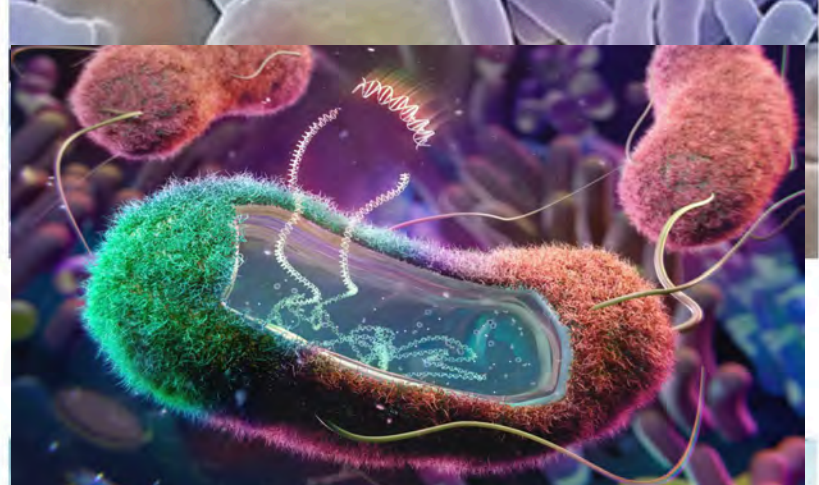
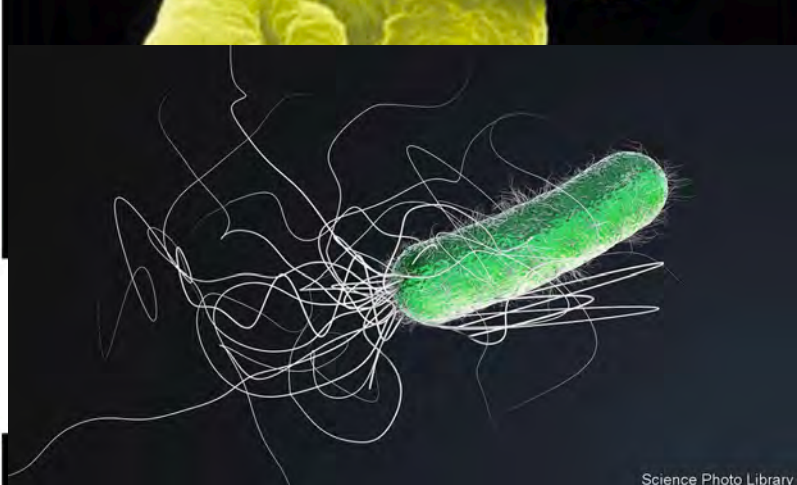
They are conglomerates of both abiotic (**non-living**) and biotic (**living**) components that form dynamic ecosystems

Soils are inherently **relational**

59-99.9% of the planet's species live in soil ecosystems

Anthony, 2023; Blakemore, 2025

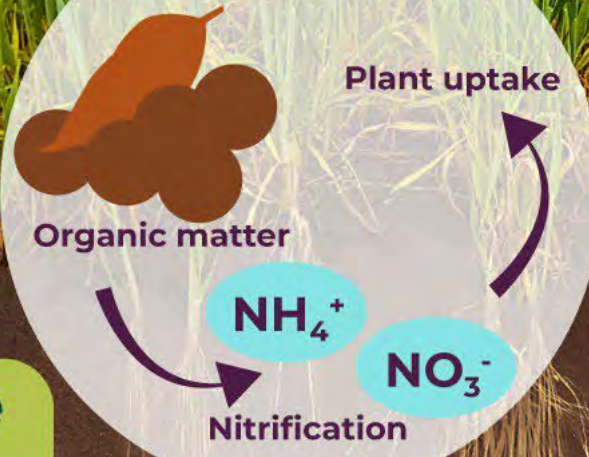




Decomposition



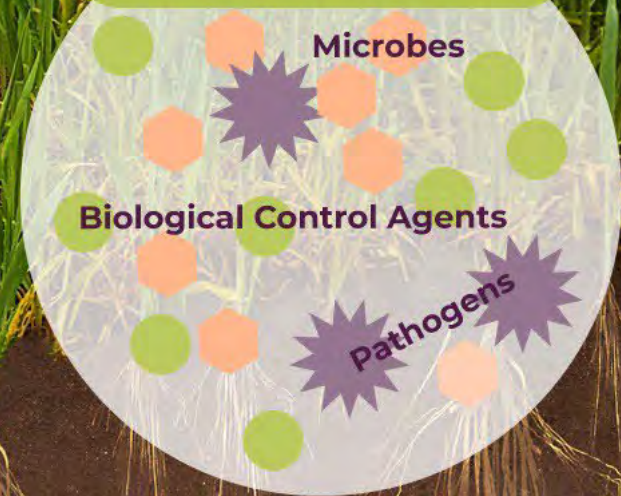
Nutrient cycling



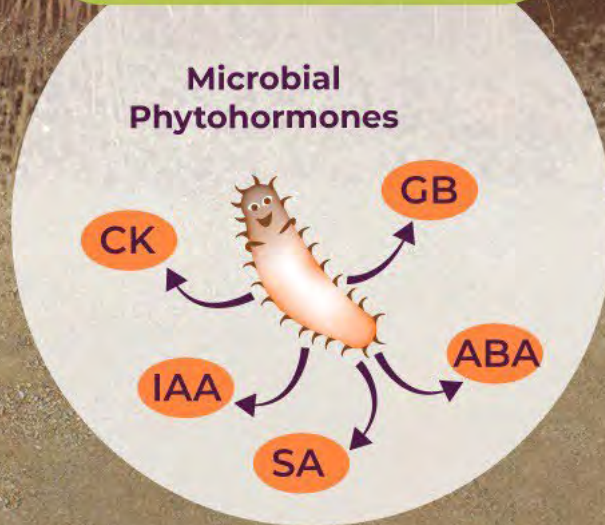
Soil structure and aggregation



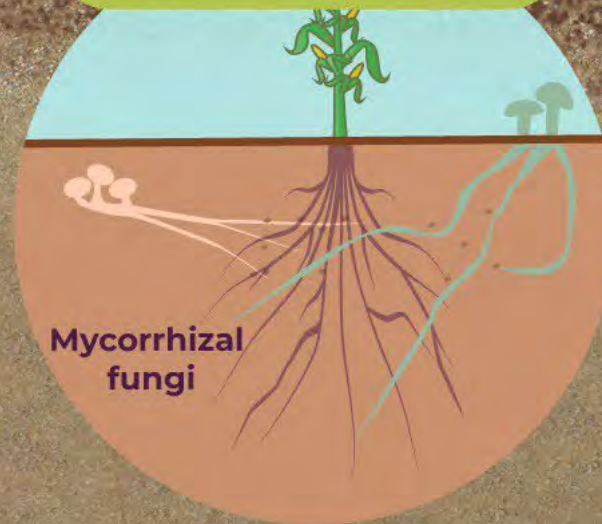
Disease suppression



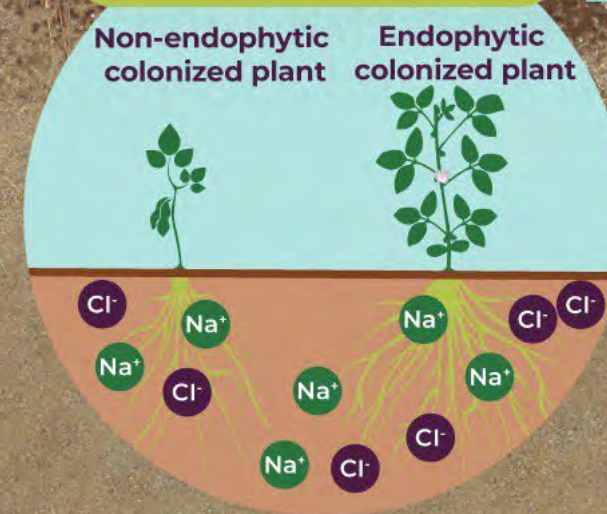
Phytohormone production



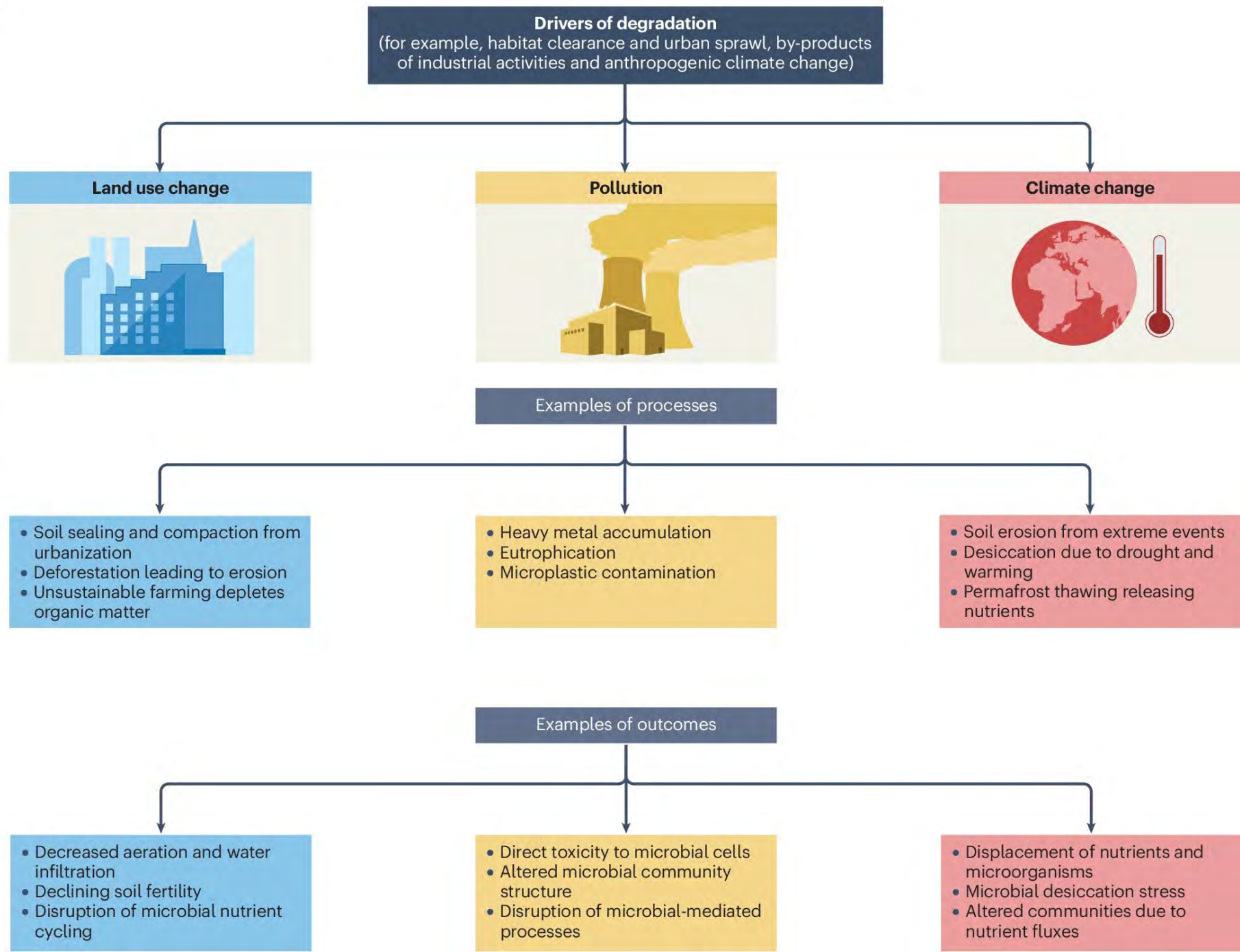
Symbiotic relationships



Salinity regulation



Feedback loops
(for example, pollution and land use change exacerbate climate change and vice versa)



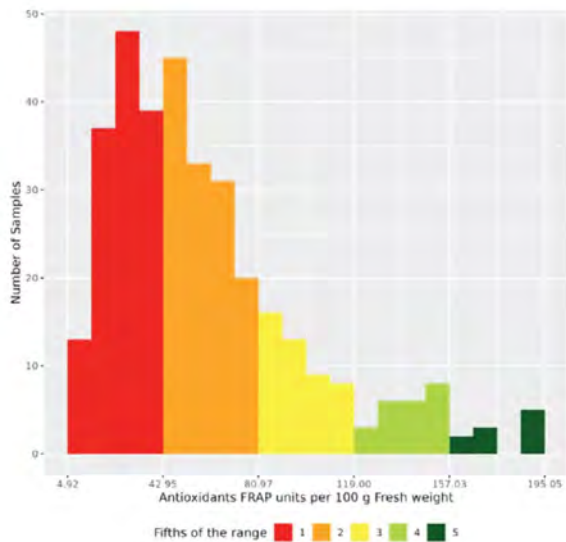
Food carries environmental histories

e.g., A 40-fold difference in the nutrient density of carrots from one place to another

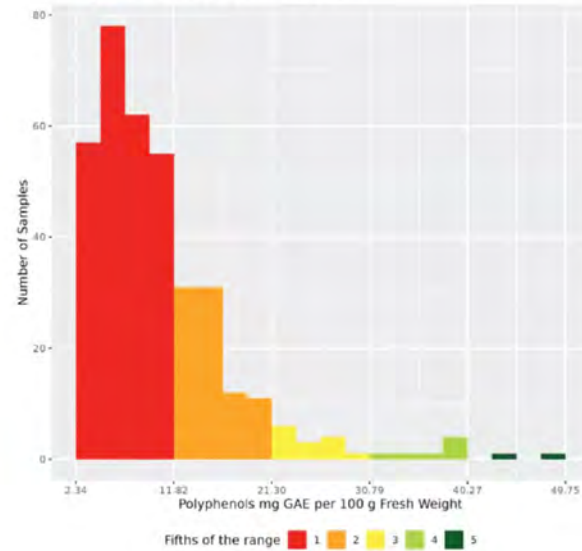
Nutrient Variation



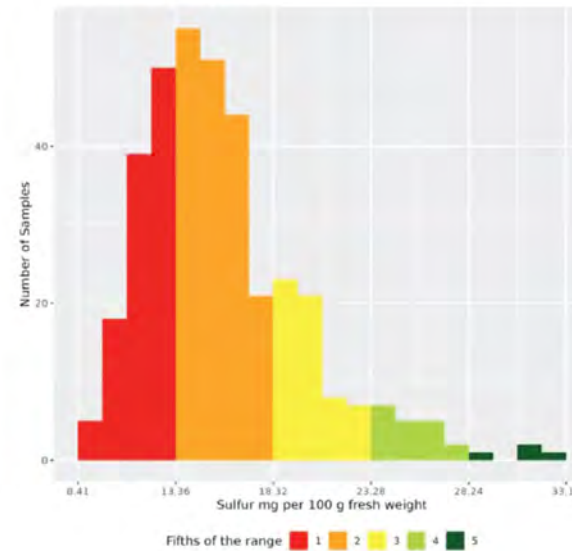
Antioxidants in carrots



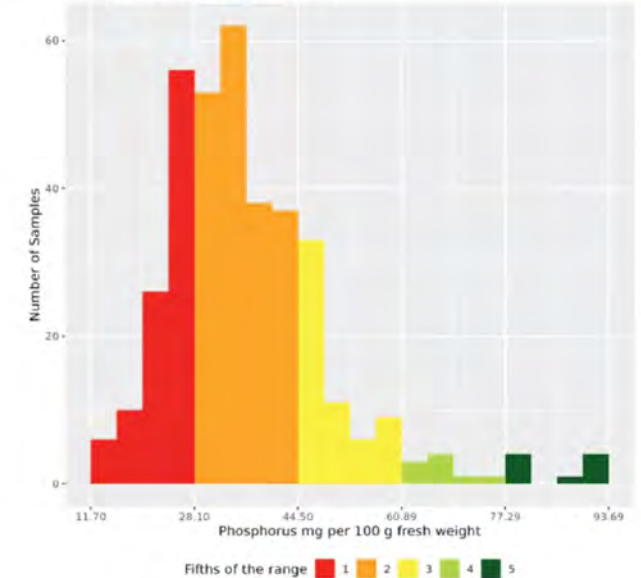
Polyphenols in carrots



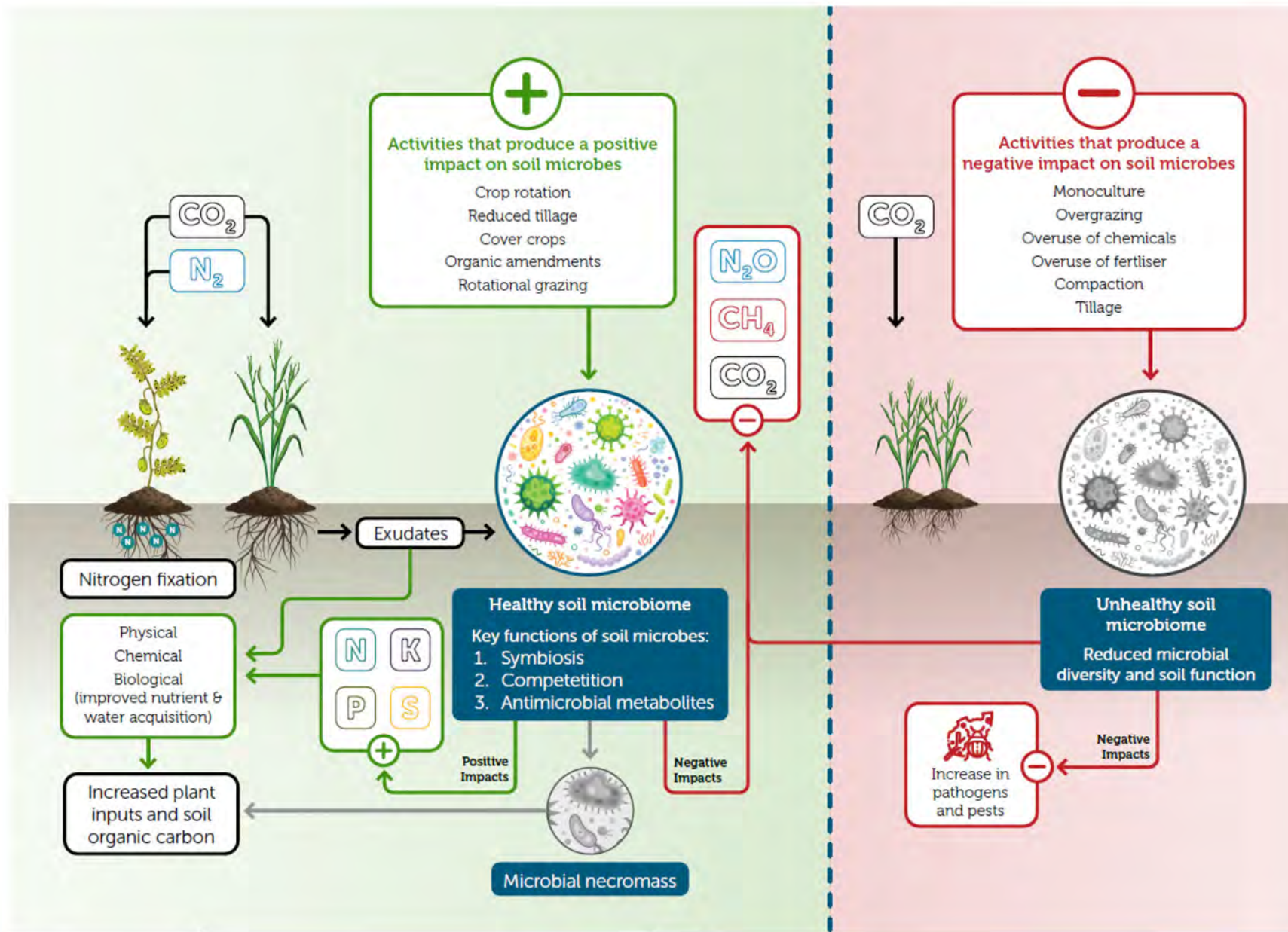
Sulfur in carrots



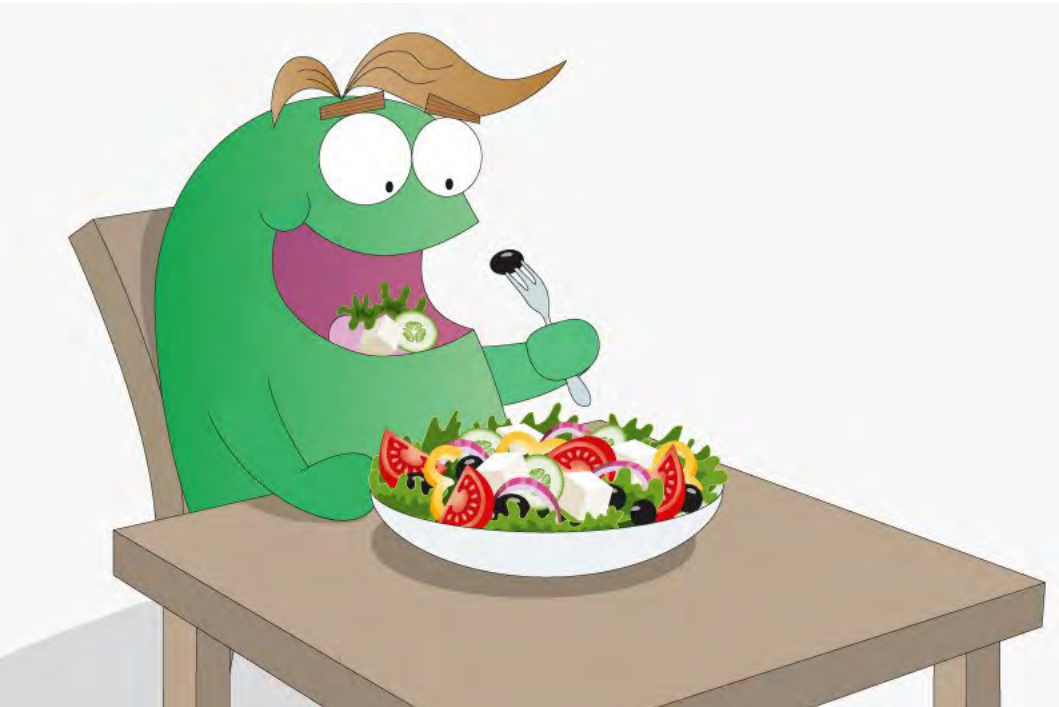
Phosphorus in carrots



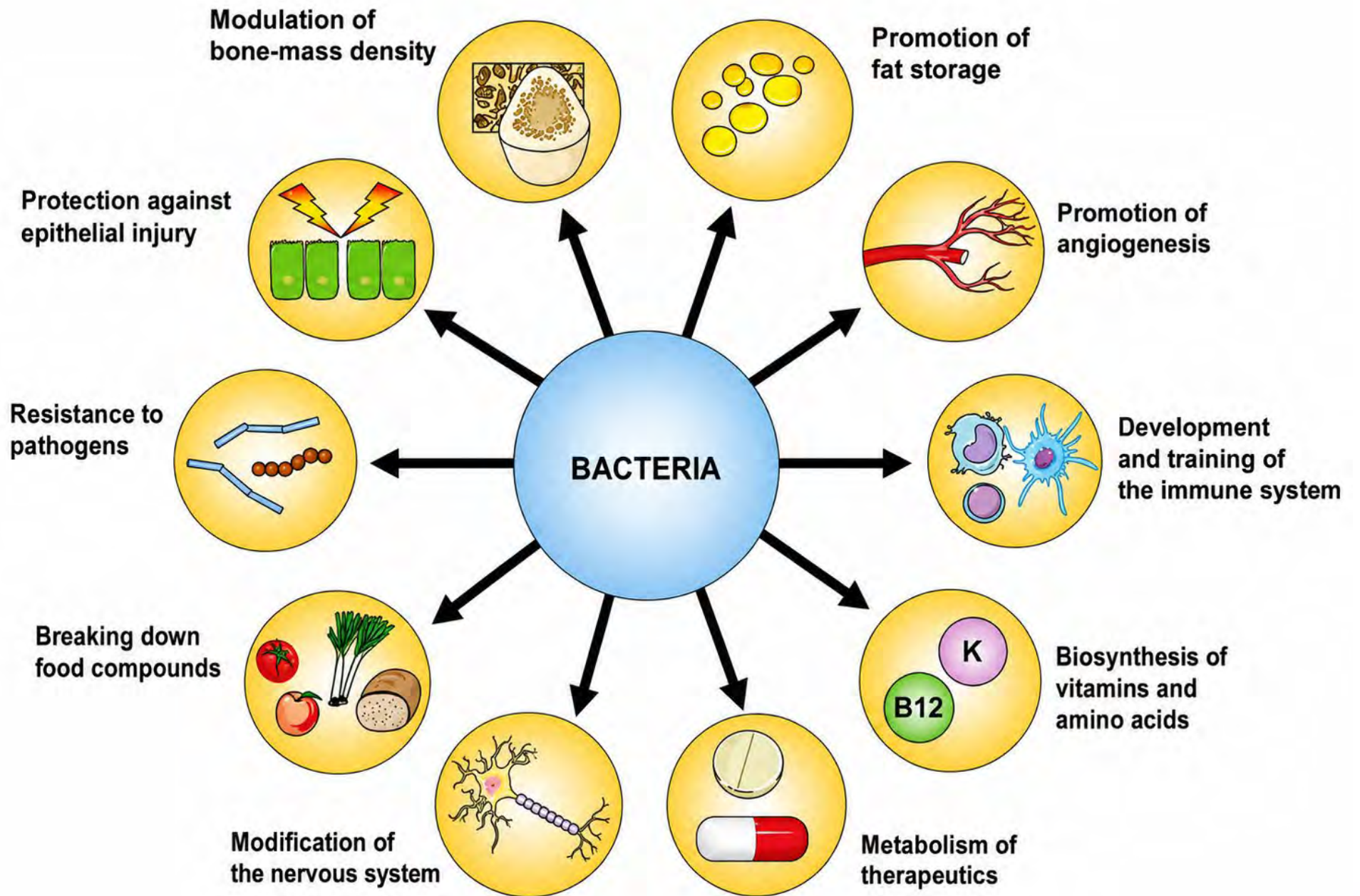
The soil microbiome appears to be the strongest driver of this variation

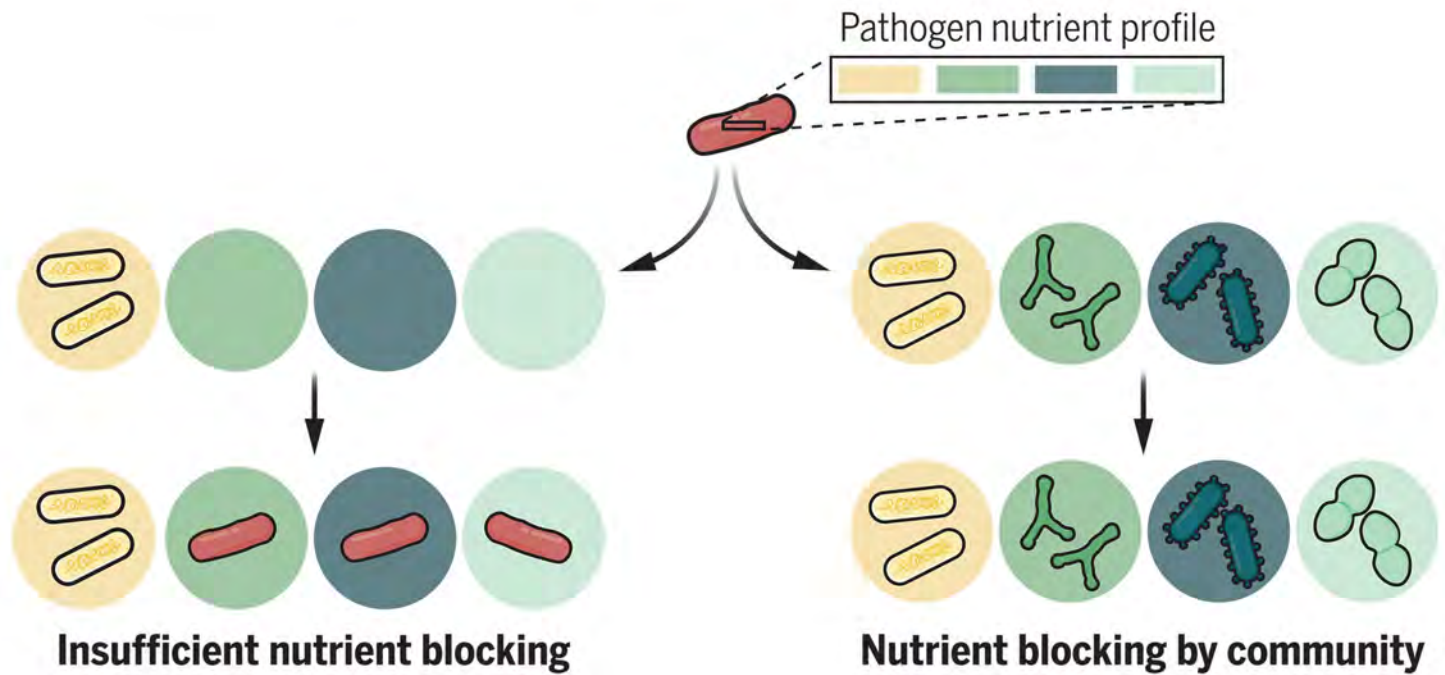
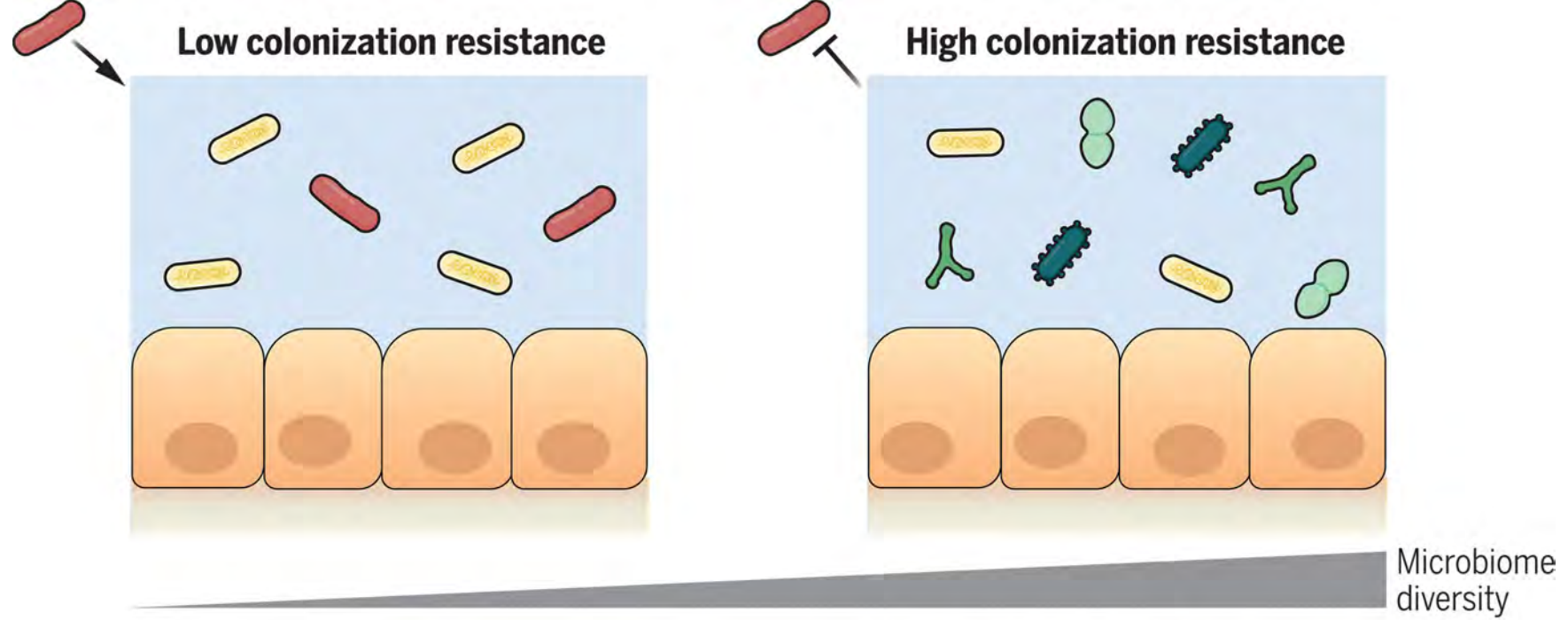


Although humans have used more than **7,000 plant species** for food throughout history, today just **three crops** – *wheat, rice* and *maize* – provide half of global caloric intake.



**You are what your
microbes eat!**





PROBIOTICS vs PREBIOTICS

Live bacteria found in certain foods or supplements that provide health benefits.

Food components that come from types of carbohydrates (mostly fiber) we can't digest.



GUTXY

**Activity: How many plant foods
are you eating?**

**Poo is not taboo – what your poo
is telling you**

**How much do you know about your
gut?**

Quiz time!

How long does it normally take food to travel from mouth to poo?

- 2–4 hours
- 6–12 hours
- 24–72 hours
- 5–7 days

Quiz time!

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Most people have a gut transit time of 24–72 hours. Faster transit leads to looser stools; slower transit produces harder stools.

Quiz time!

What is considered a normal range for healthy bowel movement frequency?

- Once a month
- Once a week
- 3 times a day to 3 times a week
- Every hour

Quiz time!

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- Once a month
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- Every hour

Normal frequency varies widely, but most healthy people fall between three times a day and three times a week. What matters most is your personal pattern.

Quiz time!

True or False:

Ignoring the urge to poo can lead to constipation.

Quiz time!

True or False:

Ignoring the urge to poo can lead to constipation.

Answer: True. Holding on repeatedly can desensitise the rectum and slow motility.

Quiz time!

Which of the following foods commonly turns poo red (without being blood)?

- Spinach
- Beetroot
- Bananas
- Chicken

Quiz time!

Which of the following foods commonly turns poo red (without being blood)?

- Spinach
- Beetroot 
- Bananas
- Chicken

Beetroot can cause a harmless red colour called *beeturia*.

Quiz time!

True or False:
Stress can change your poo.

Quiz time!

True or False:

Stress can change your poo.

Answer: True. Stress acts via the gut-brain axis to speed up or slow down motility.

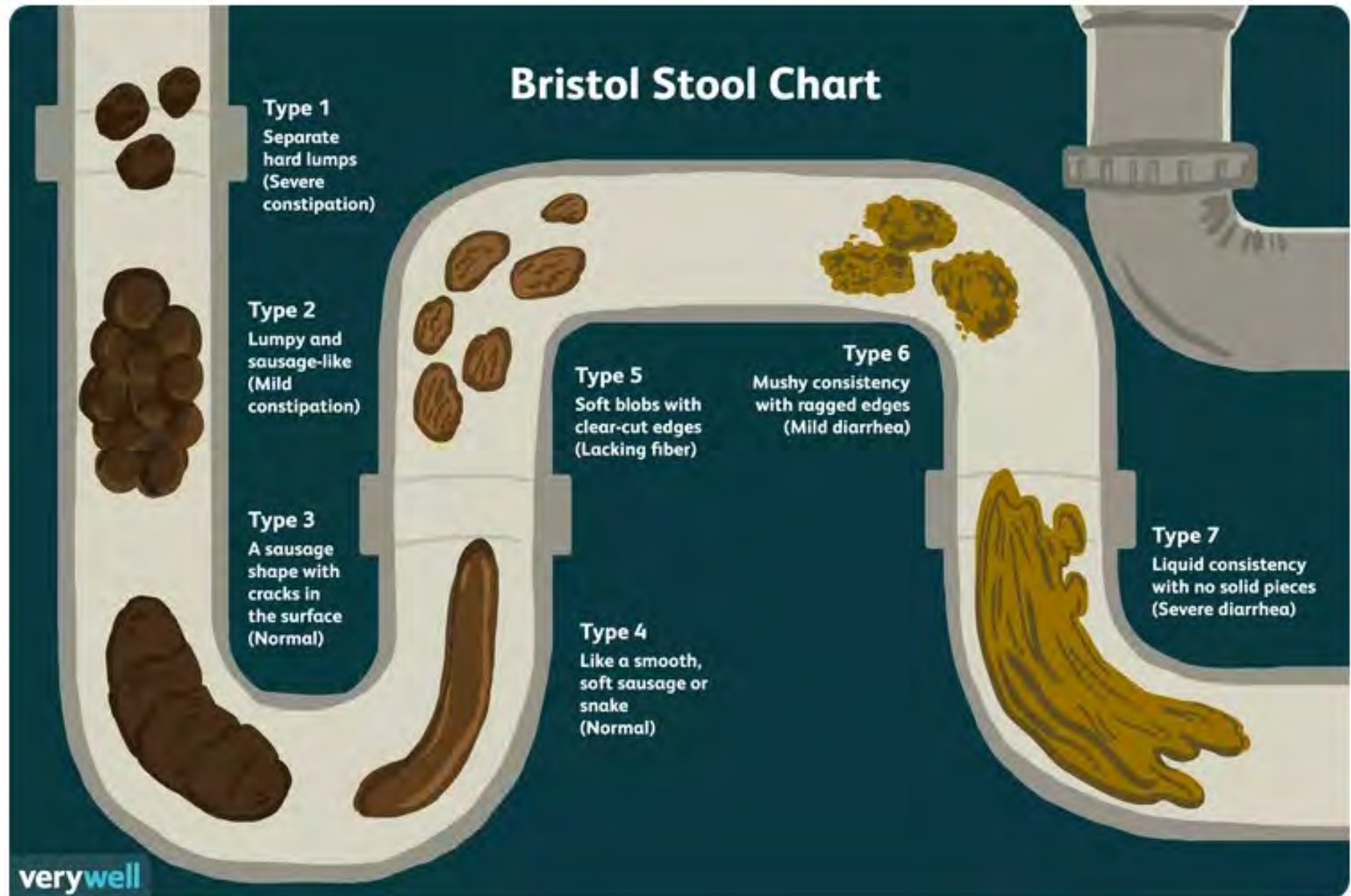
Everyone poos... But most of us never look at it, even though it's one of the best daily indicators of gut health.

Your stool is a **real-time readout** of digestion, microbiome activity, inflammation, and transit time.

Stool reflects:

- Diet quality
- Hydration
- Microbiome composition
- Gut motility
- Inflammation or infection

The universal **language** of poo...



Colour: what's normal, what's not



healthline

What your poo reveals about your **microbiome**

Stool is a window into microbial activity.

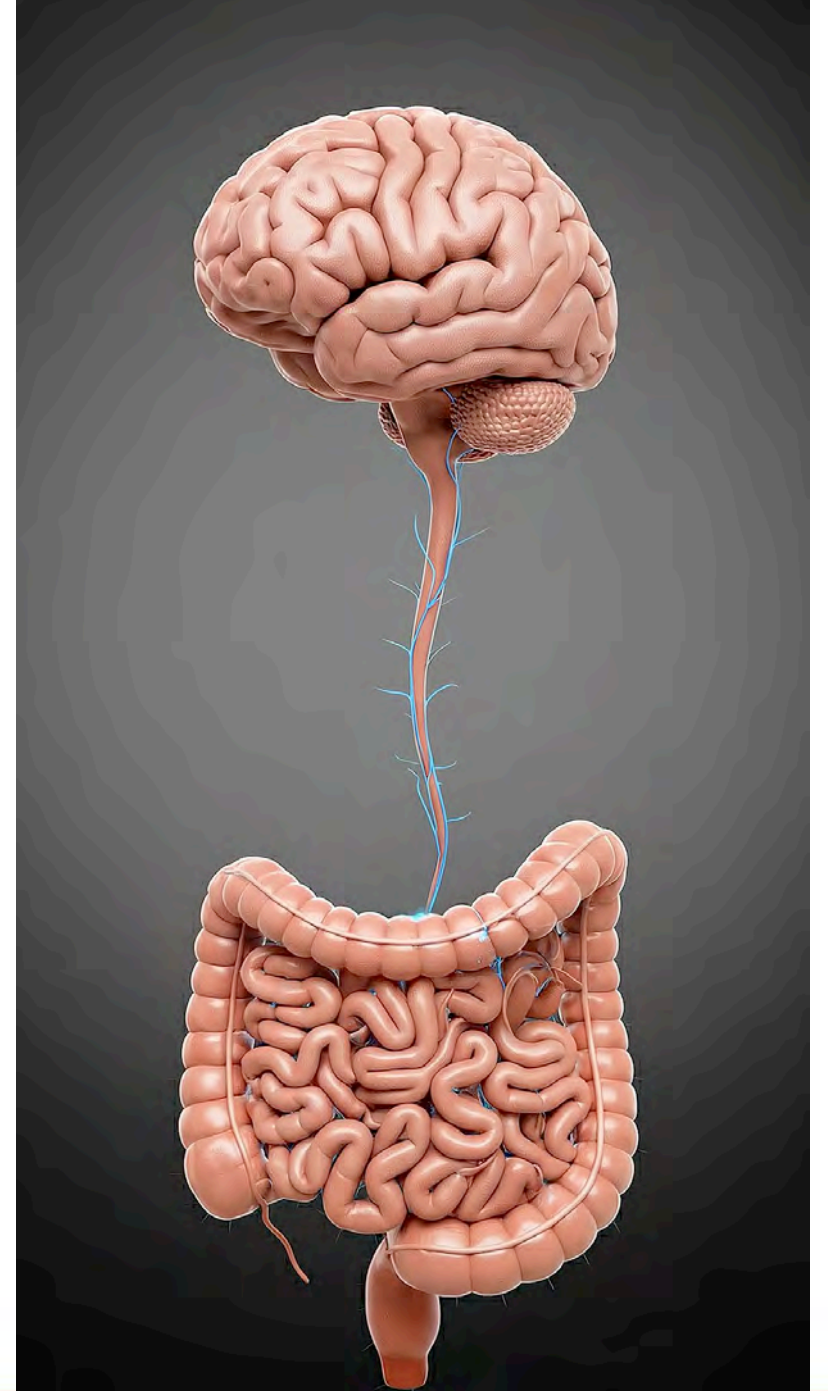
- Fibre → short-chain fatty acids → softer, well-formed stool
- Low fibre → hard, dry stool
- Dysbiosis → bloating, irregularity, unpredictable stool form
- Antibiotics → loose, pale, urgent stools
- Fermentable foods → gas + softer stool (normal unless painful)

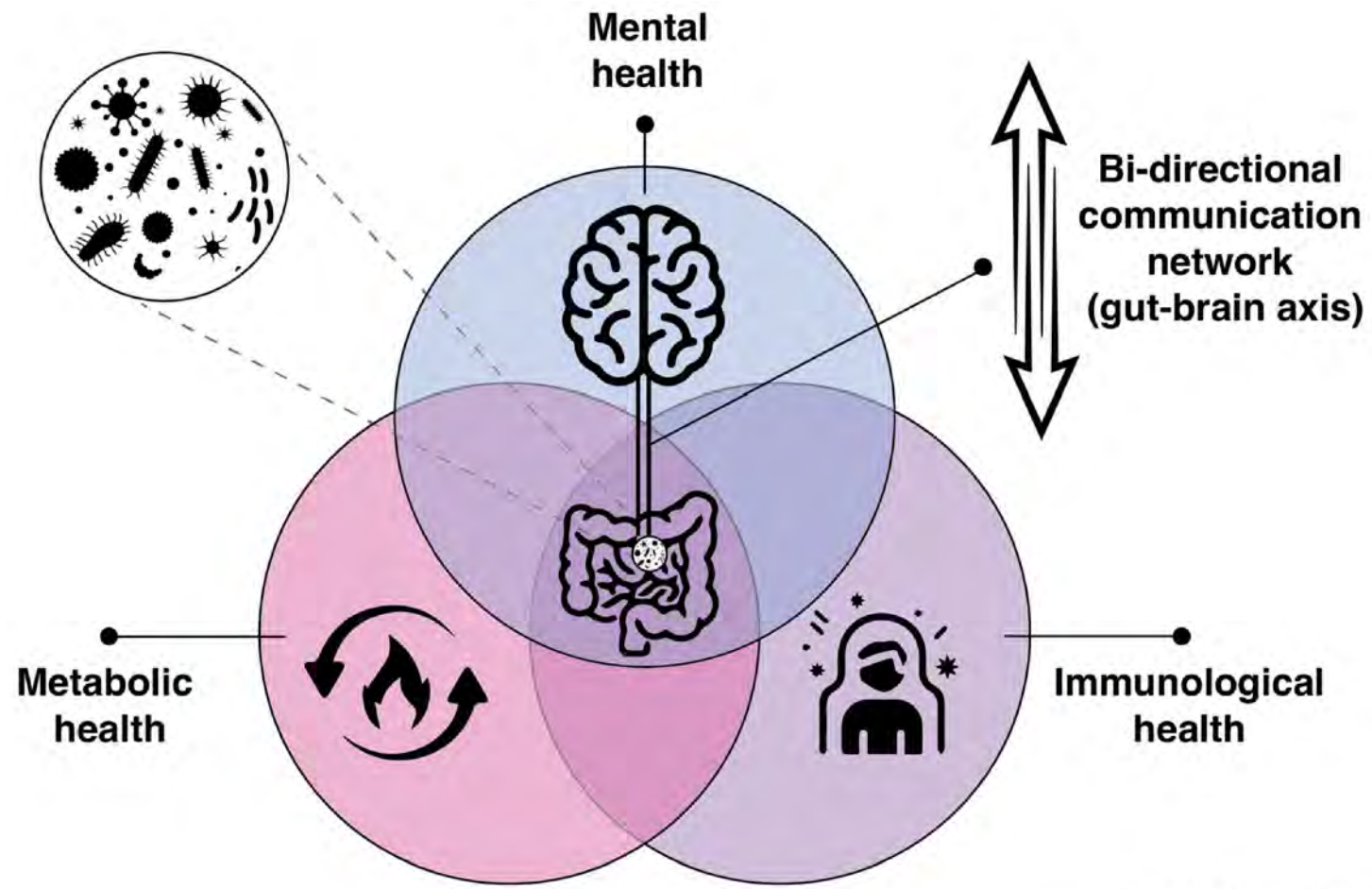
When to seek **help**:

- Blood in stool (not beetroot)
- Persistent diarrhoea or constipation
- Unexplained weight loss
- Oily, floating stools
- New changes lasting >4 weeks



Gut health, the types of food you eat and how you feel

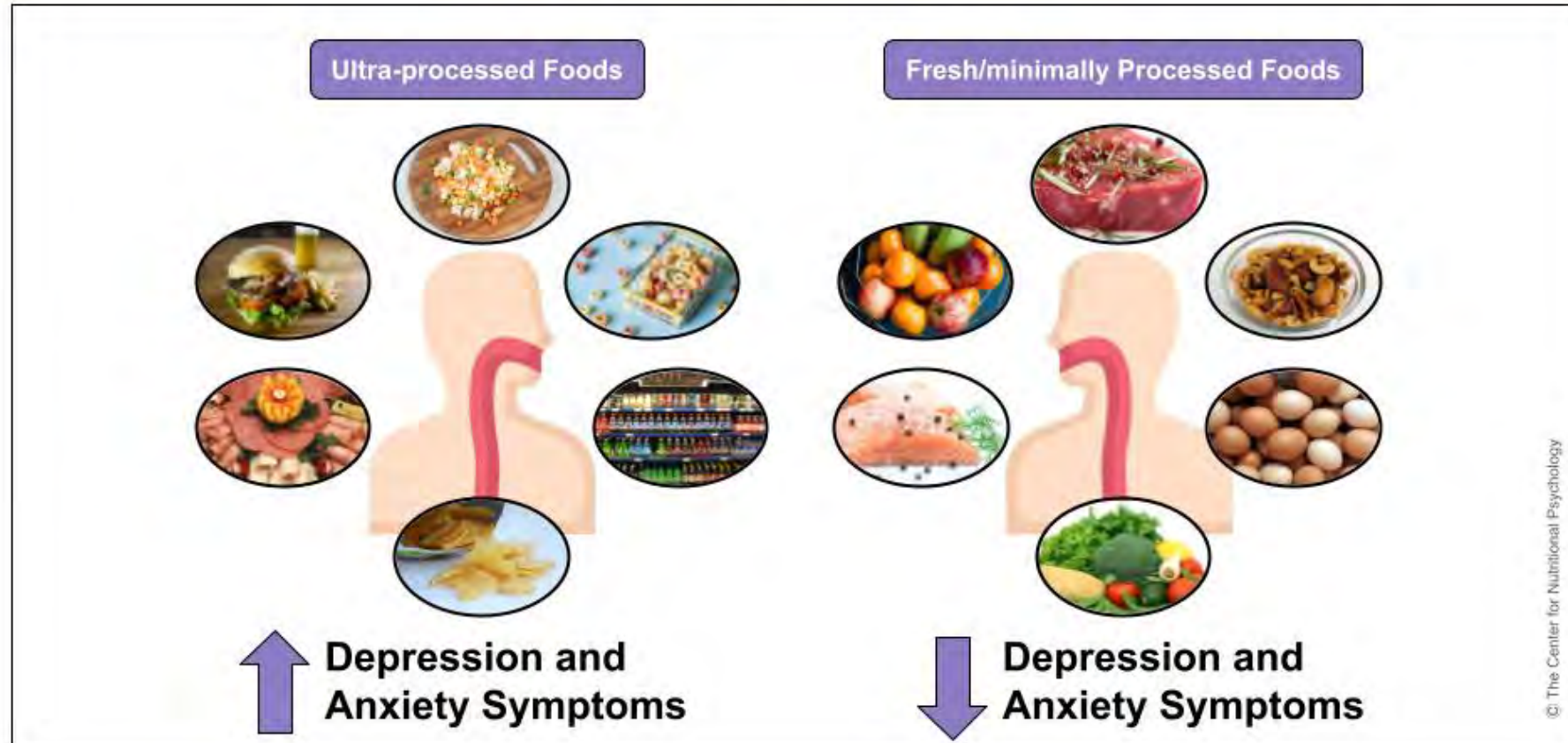




Trends in Microbiology

- Producing chemicals that communicate with the brain
- Shaping inflammation linked to mood and mental health
- Influencing how we respond to stress

Coletro et al., (2022) Association of Food Types with Depression and Anxiety Symptoms



The **SMILES Trial** was the first major randomised controlled trial to test whether improving diet could help treat clinical depression, not just prevent it (Jacka et al. 2017).

SMILES Trial: Effects of the Mediterranean Diet on Depression



Jacka, F. N., O'Neil, A., Opie, R., Itsiopoulos, C., Cotton, S., Mohebbi, M., Castle, D., Dash, S., Mihalopoulos, C., Chatterton, M. L., Brazionis, L., Dean, O. M., Hodge, A. M., & Berk, M. (2017). A randomised controlled trial of dietary improvement for adults with major depression (the 'SMILES' trial). *BMC Medicine*, 15(1), 23.



Psychopharmacology
Institute

THE *GROUND*ED MINDS CONSORTIUM

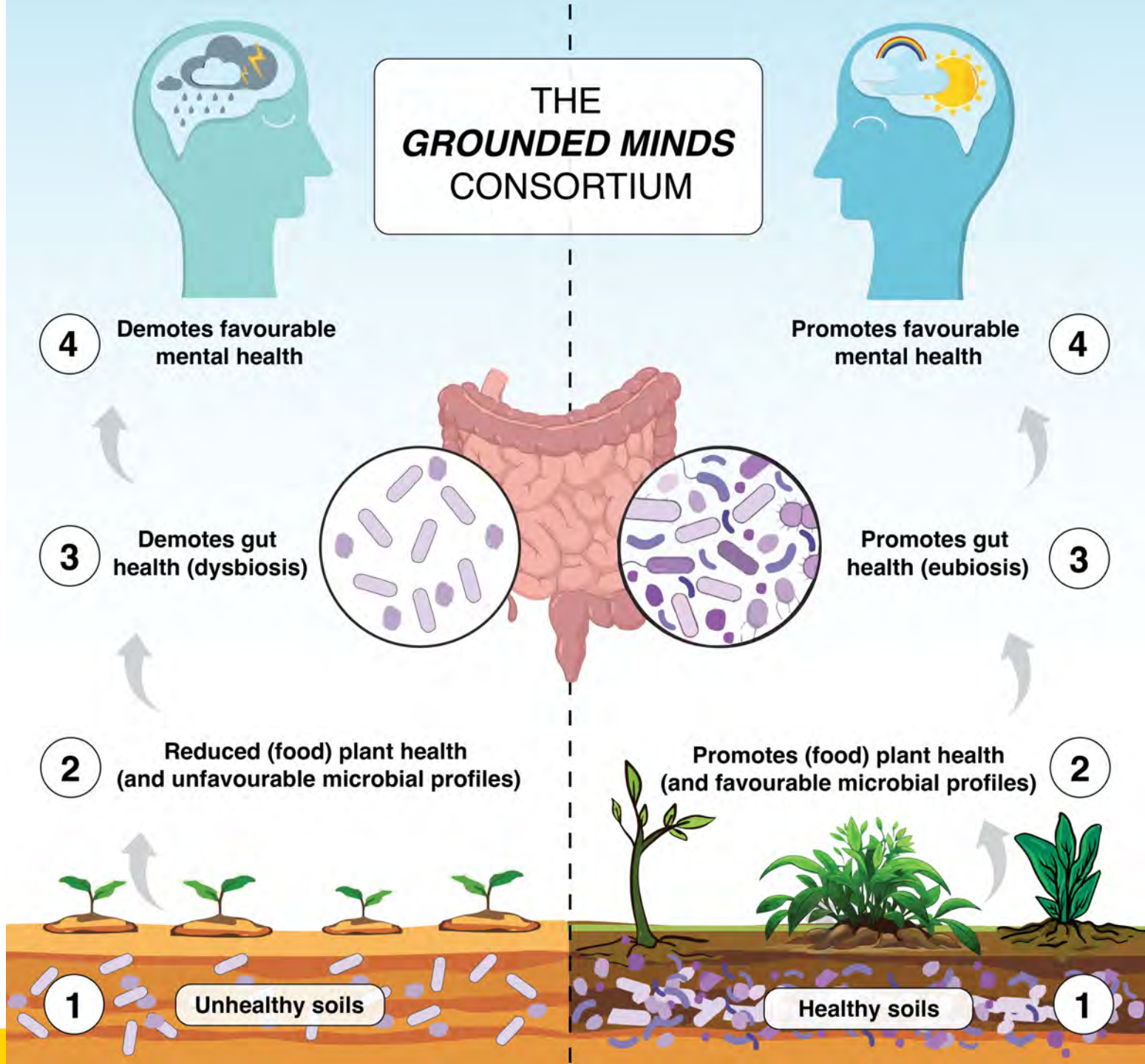
Nourishing the soil, gut & mind connection



A Deakin University & Flinders University Collaboration

Soil Yourself September **Speaker Series!**

www.youtube.com/@naturegutbrain



Australian Health Star Rating (HSR) System

The HSR system provides a front-of-pack summary of the overall nutritional profile of packaged foods.
Ratings range from 0.5 (least healthy) to 5 (most healthy).

1. THE HSR LOGO AND NUTRIENT INFORMATION

The HSR appears on the front of pack and consists of two parts:

- The star rating
- The nutrient content panel (optional)



NUTRIENT INFORMATION

PER 100 g

ENERGY	SAT FAT	SUGARS	SODIUM
1560 kJ	0.3 g	1.5 g	5 mg

Displays selected nutrient quantities per 100 g (or 100 mL).
Inclusion of this panel is optional and does not determine the star rating.

i The nutrient panel shows the amount of key nutrients per 100 g (or 100 mL). It is provided for information only and does not classify nutrients as "low" or "high" nor does it determine the star rating.

2. HOW THE STAR RATING IS CALCULATED

BASELINE ("RISK") NUTRIENTS

Higher amounts increase baseline (penalty) points.



MODIFYING ("BENEFICIAL") NUTRIENTS

Higher amounts contribute positive (modifying) points.



SCORING AND CONVERSION



Baseline points are offset by modifying points to produce a final nutrient profile score, which is converted to a Health Star Rating (0.5–5 stars) using category-specific cut-offs.

STAR RATING SCALE



3. IMPORTANT PRINCIPLES



WITHIN-CATEGORY COMPARISON

HSR is designed for comparing similar products within the same food category, not across all foods.



NOT AN ABSOLUTE HEALTH CLAIM

A higher star rating does not mean a food is "healthy" in all contexts or that it should be eaten in large amounts.



NUTRIENT-BASED ONLY

The HSR algorithm is based solely on the nutrients listed above and does not include ingredients or additives.



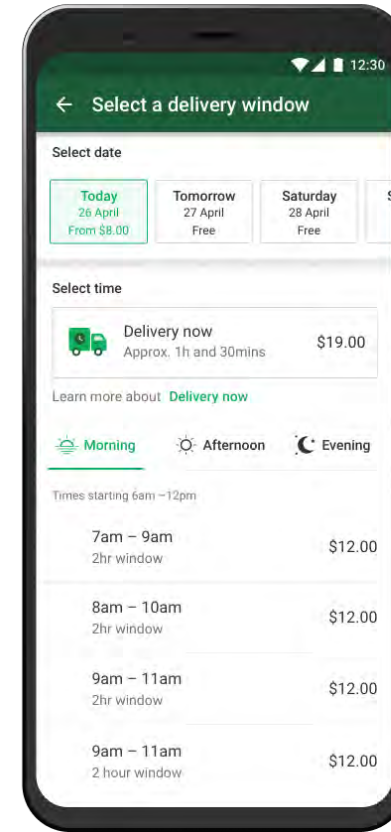
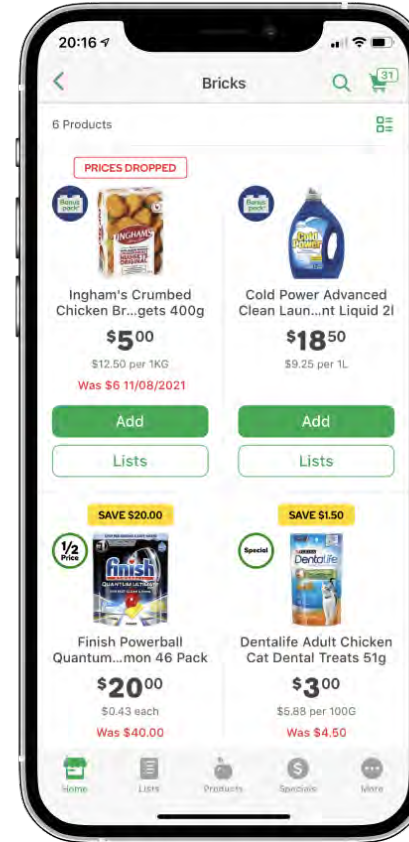
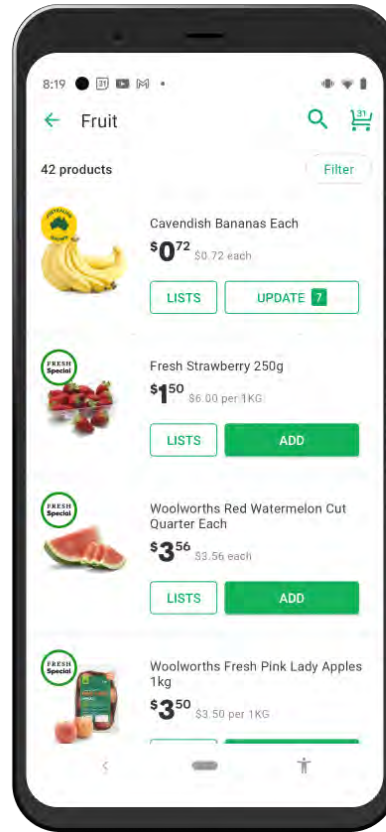
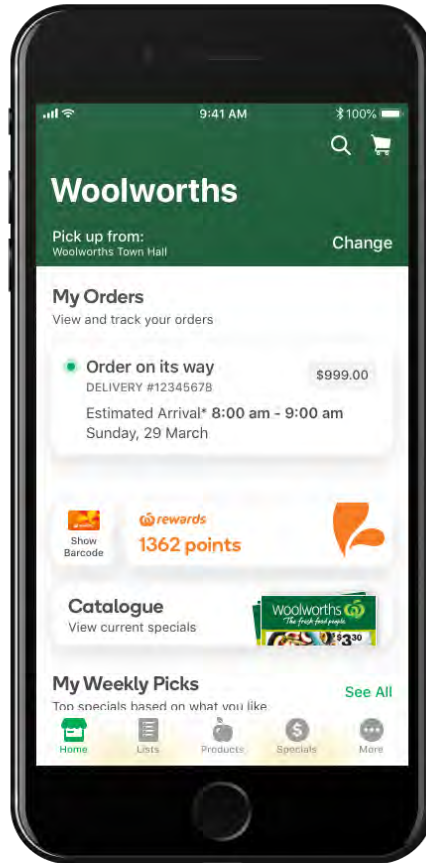
ONE OF MANY GUIDES

Other factors such as dietary patterns, portion size and overall lifestyle should also guide food choices.

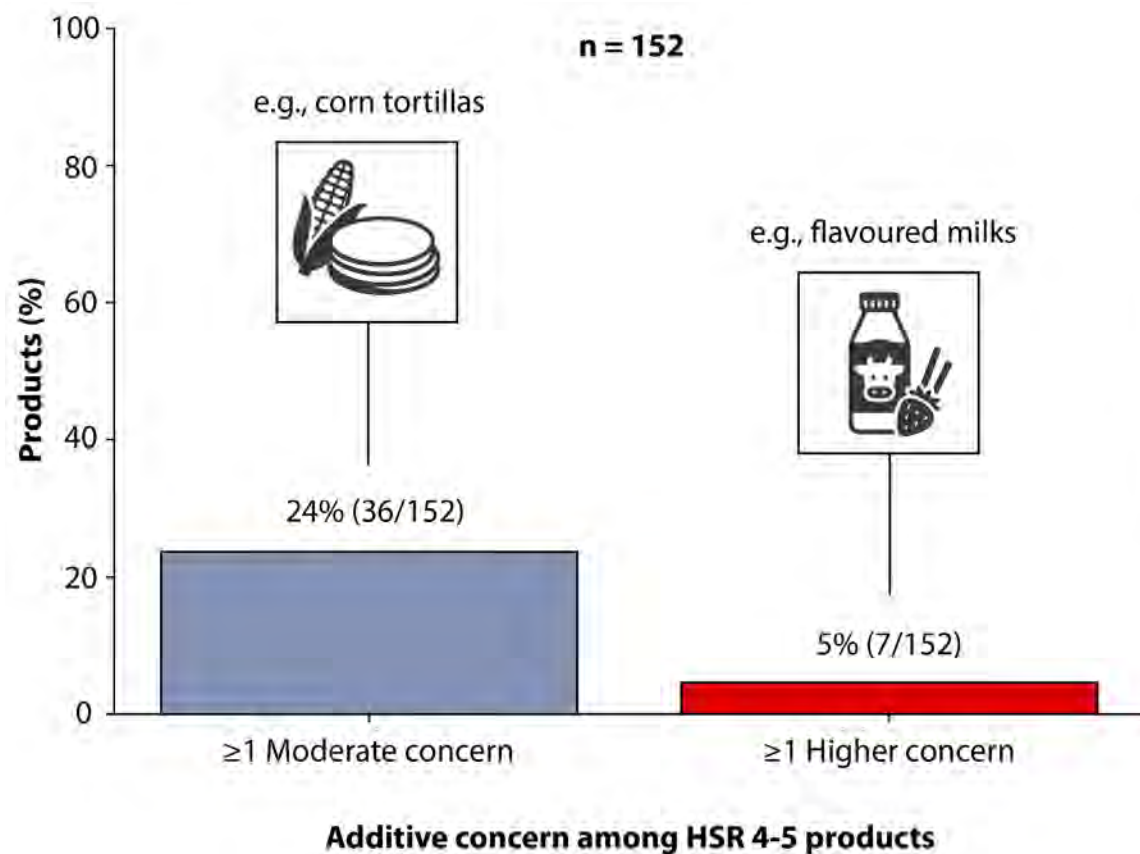
i In this study, we included only products displaying an HSR of 4.0–5.0 stars.
These products are considered "healthier choices" within their category according to the HSR system.

Adapted from Australian Government Department of Health (2019)
Health Star Rating System Five Year Review Report.

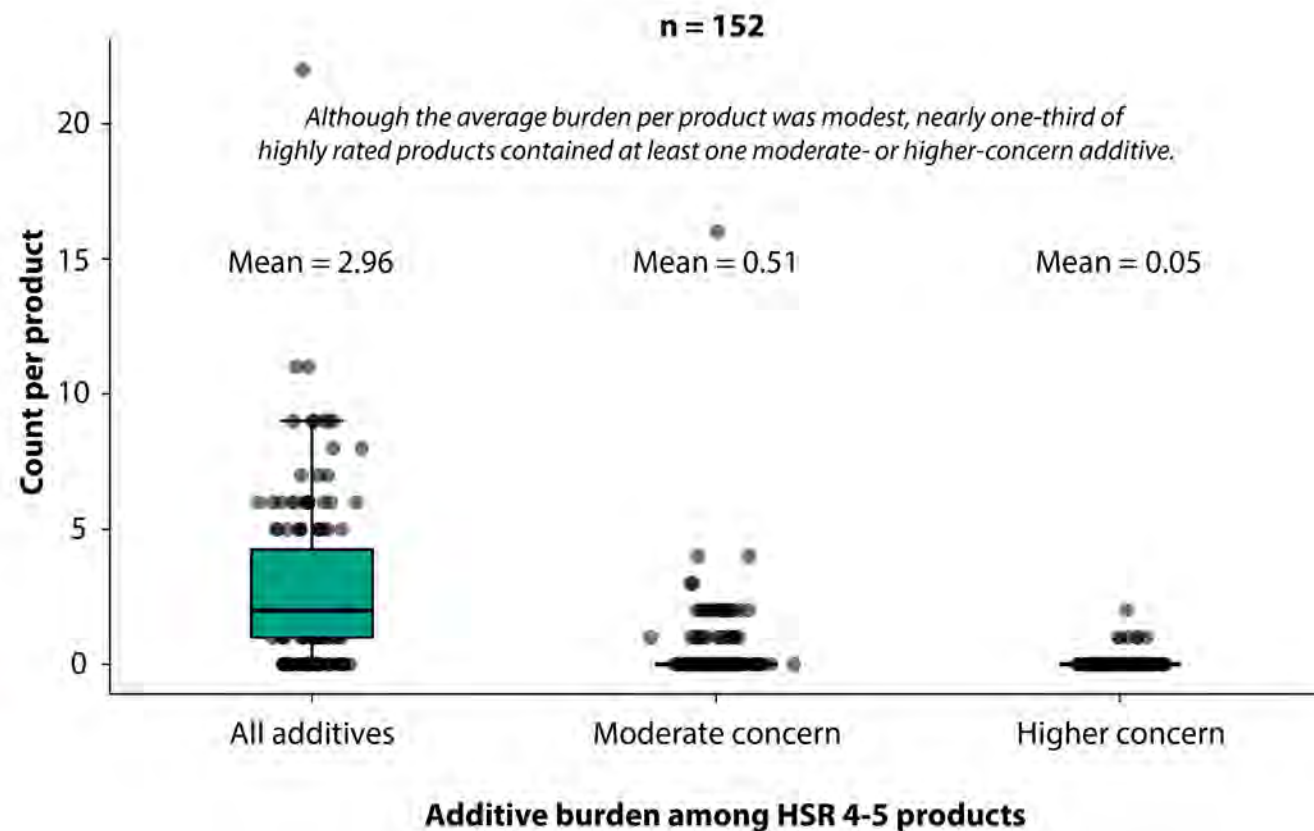
Do food and drink products with an HSR of 4-5 contain additives associated with negative impacts on gut health?



(a)



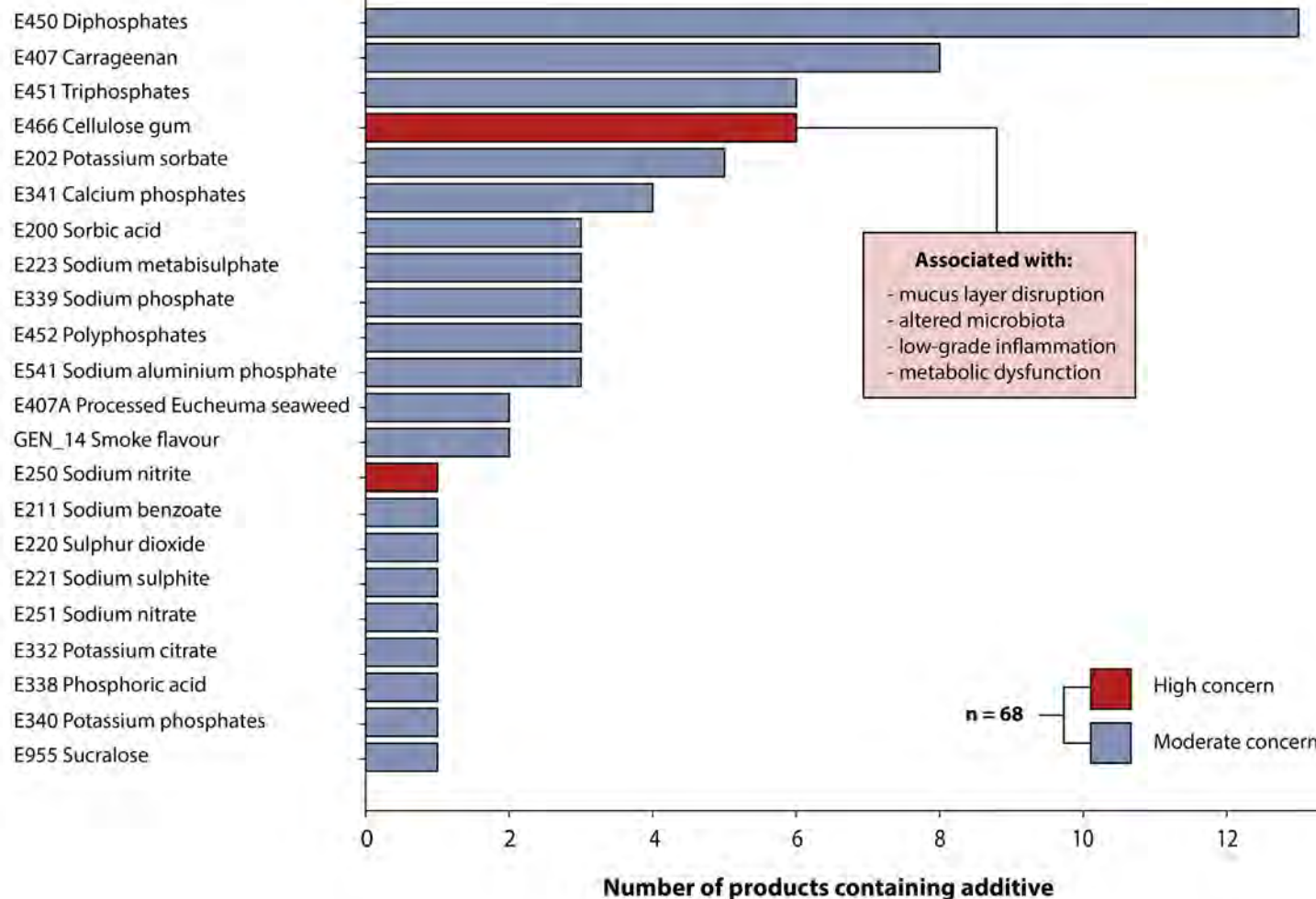
(b)



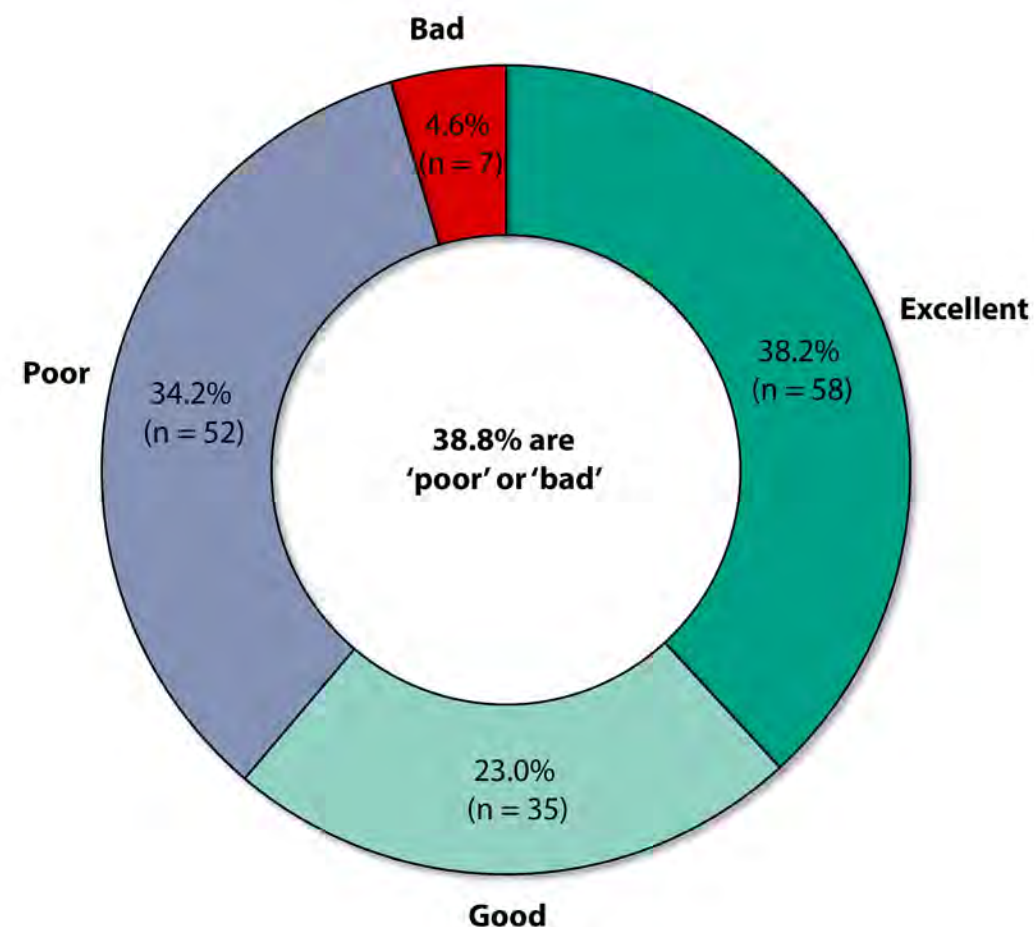
(a) **Prevalence** = how many products have potentially harmful additives

(b) **Burden** = how many additives per product

Most frequently literature-flagged additives of concern



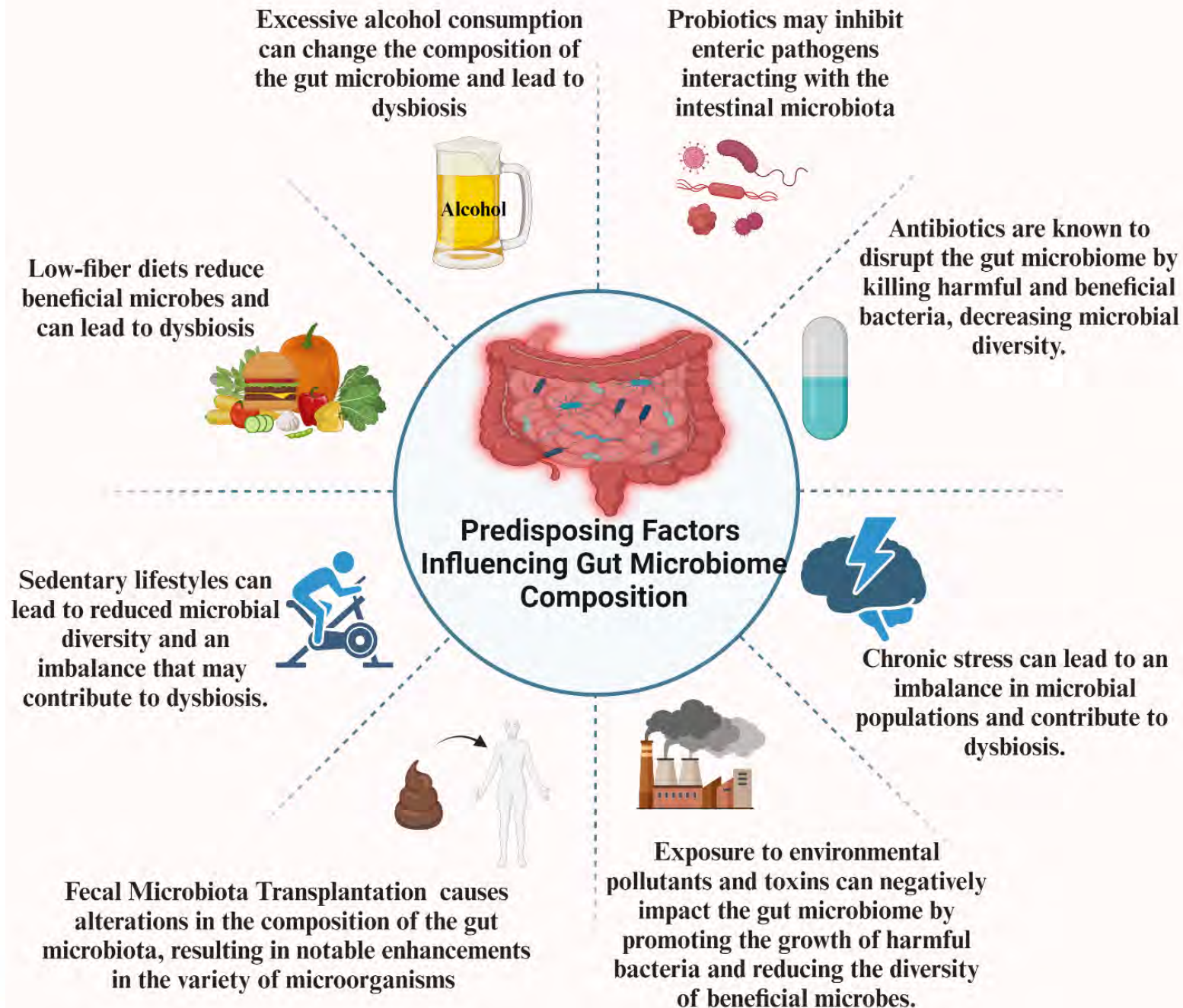
Distribution of Yuka categories among HSR 4-5 products (n = 152)



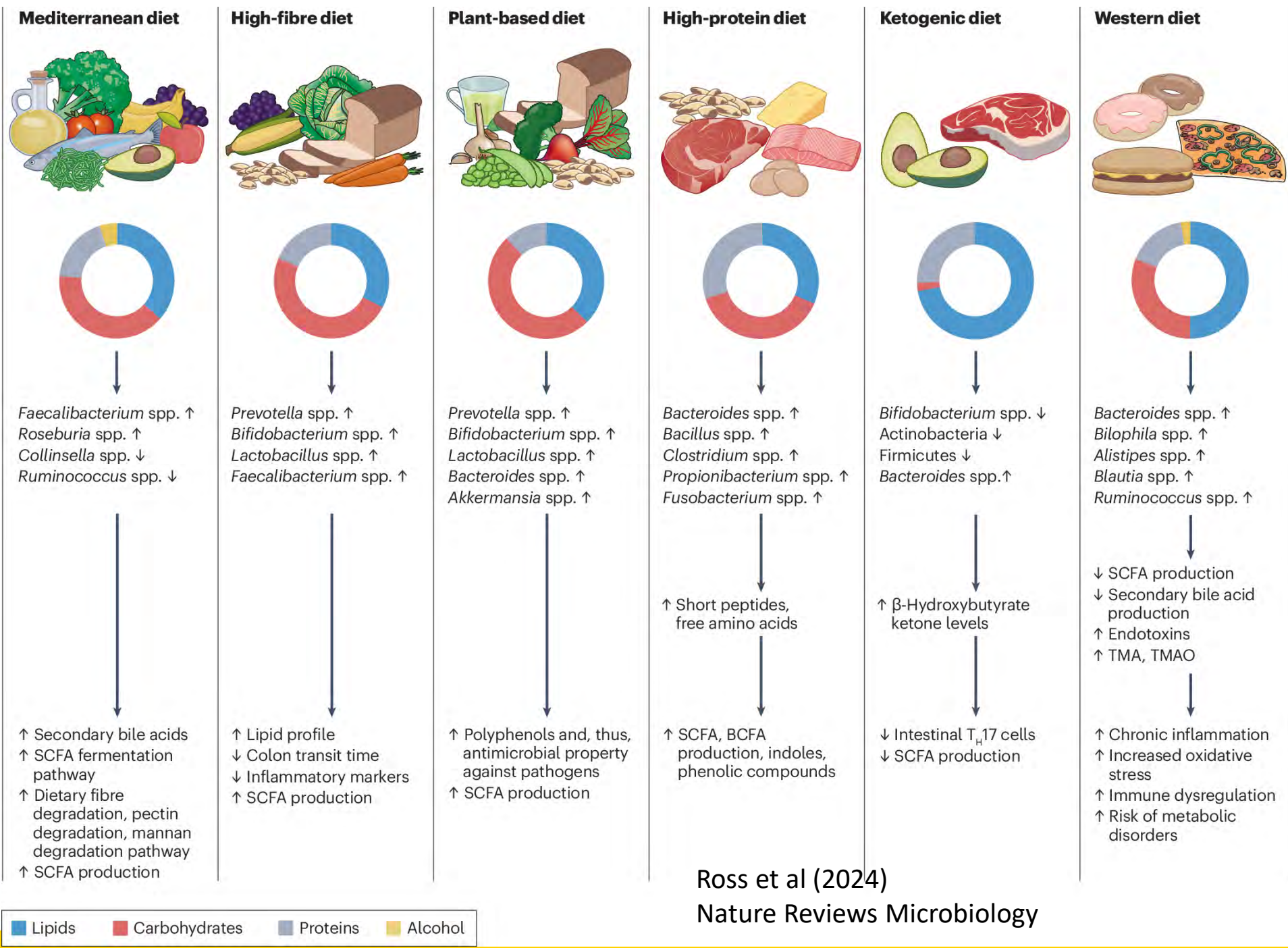
Summary

- Nearly one-third of highly-rated products (4–5 HSR) contained at least one additive linked in the literature to gut health concerns.
- This suggests a mismatch between the HSR system and emerging microbiome science.
- However, the analysis did not assess dosage or real-world exposure levels.
- More research is needed on cumulative additive exposure and gut health.

External factors (e.g. stress) and the effects on the microbiome + simple hacks to help your microbiome

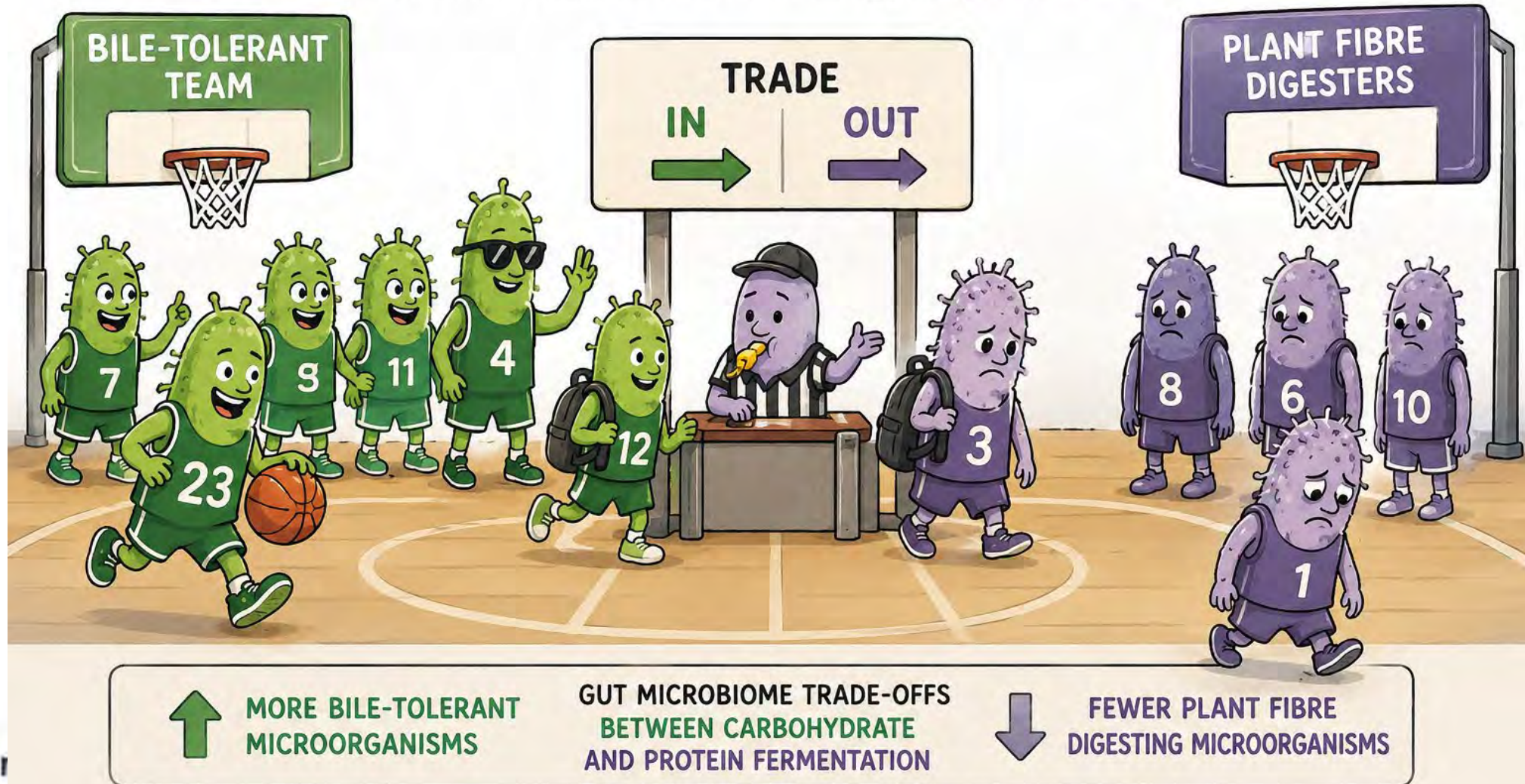


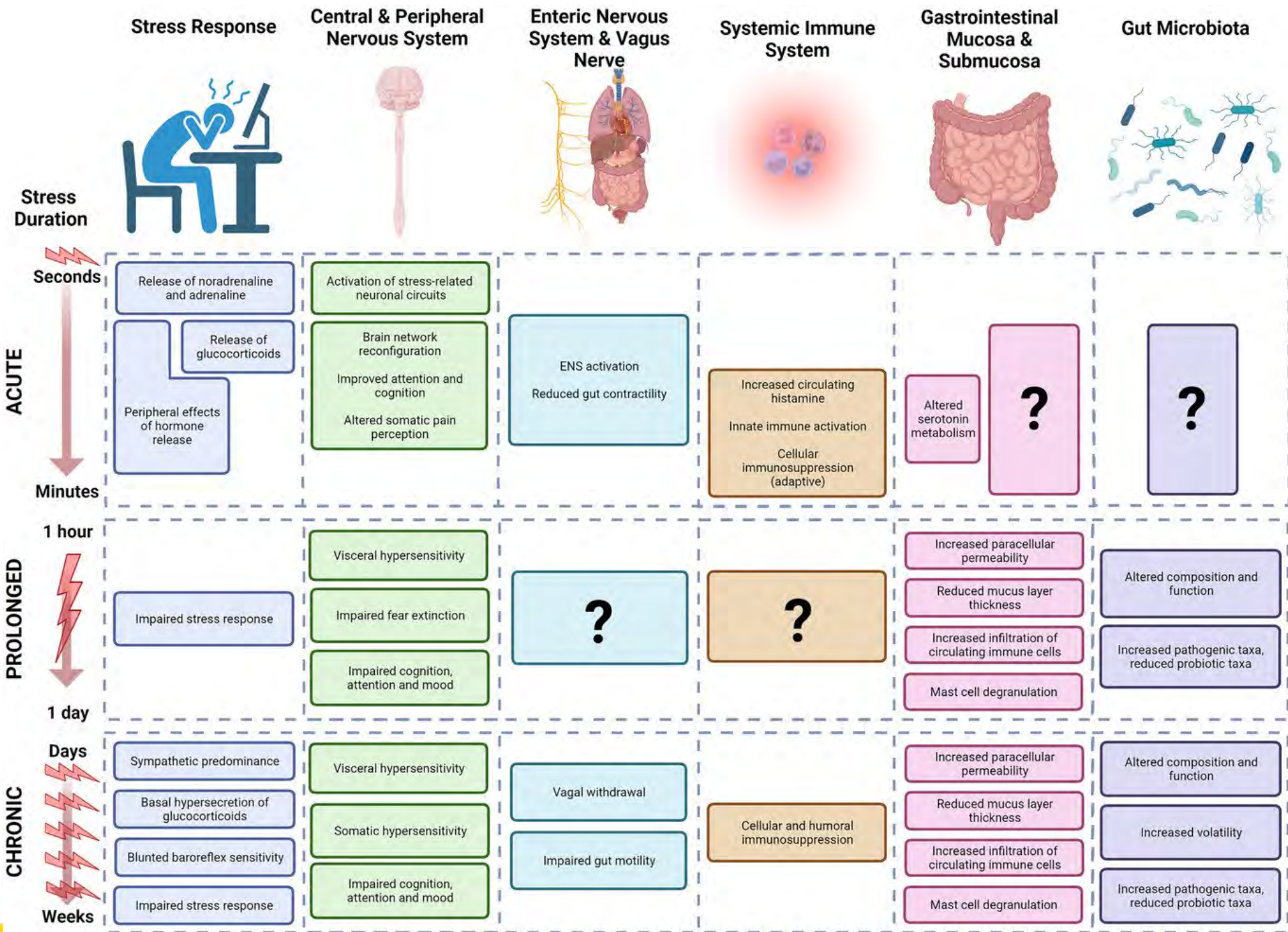
Diet has the strongest effect on the gut microbiome



ANIMAL-BASED DIETS:

Increase abundance of **bile-tolerant** microorganisms
and decrease those that digest **plant fibre**





What stress does to your gut

Simple hacks to help your gut microbiome

➤ Feed the “good” microbes

- Eat more **plant fibre**: vegetables, legumes, oats, nuts, seeds and fruit.
- Aim for **variety**: different fibres feed different microbes.
- Include **resistant starches** such as cooled potatoes, rice, pasta, or green bananas.
- Limit ultra-processed foods where possible

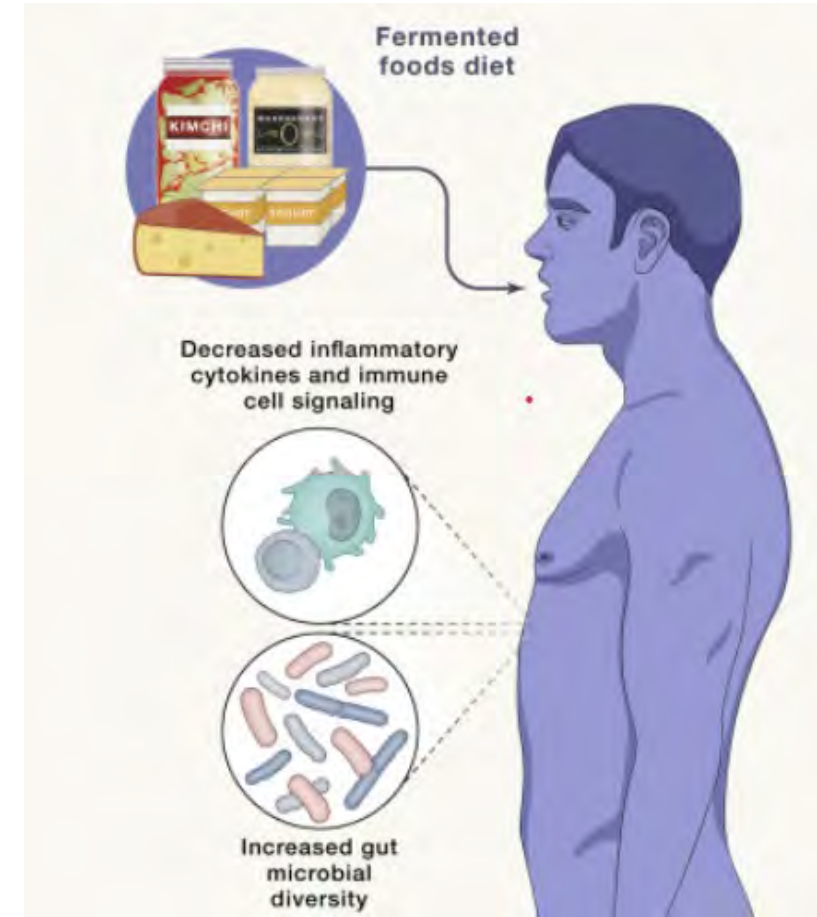
➤ Hydrate!

- Drink water consistently throughout the day

➤ Move your body and spend time in nature.

- Even short bouts of movement

Small, consistent habits have the biggest long-term impact on gut microbiome health.



Activity:

What are 3 things you can change to help your gut microbiome?

Nature connectedness and the microbiome

BENEFITS

Improved mental wellbeing

More pro-environmental behaviours

Greater vitality and happiness

More pro-nature conservation behaviours

More satisfied with life

Greater meaning and purpose in life

The five pathways to nature connection

1



Senses

Exploring and experiencing nature through all the senses

2



Beauty

Seeking and appreciating the beauty of the natural world

3



Emotion

Noticing and welcoming the feelings nature inspires

4



Meaning

Celebrating and sharing nature's events and stories

5

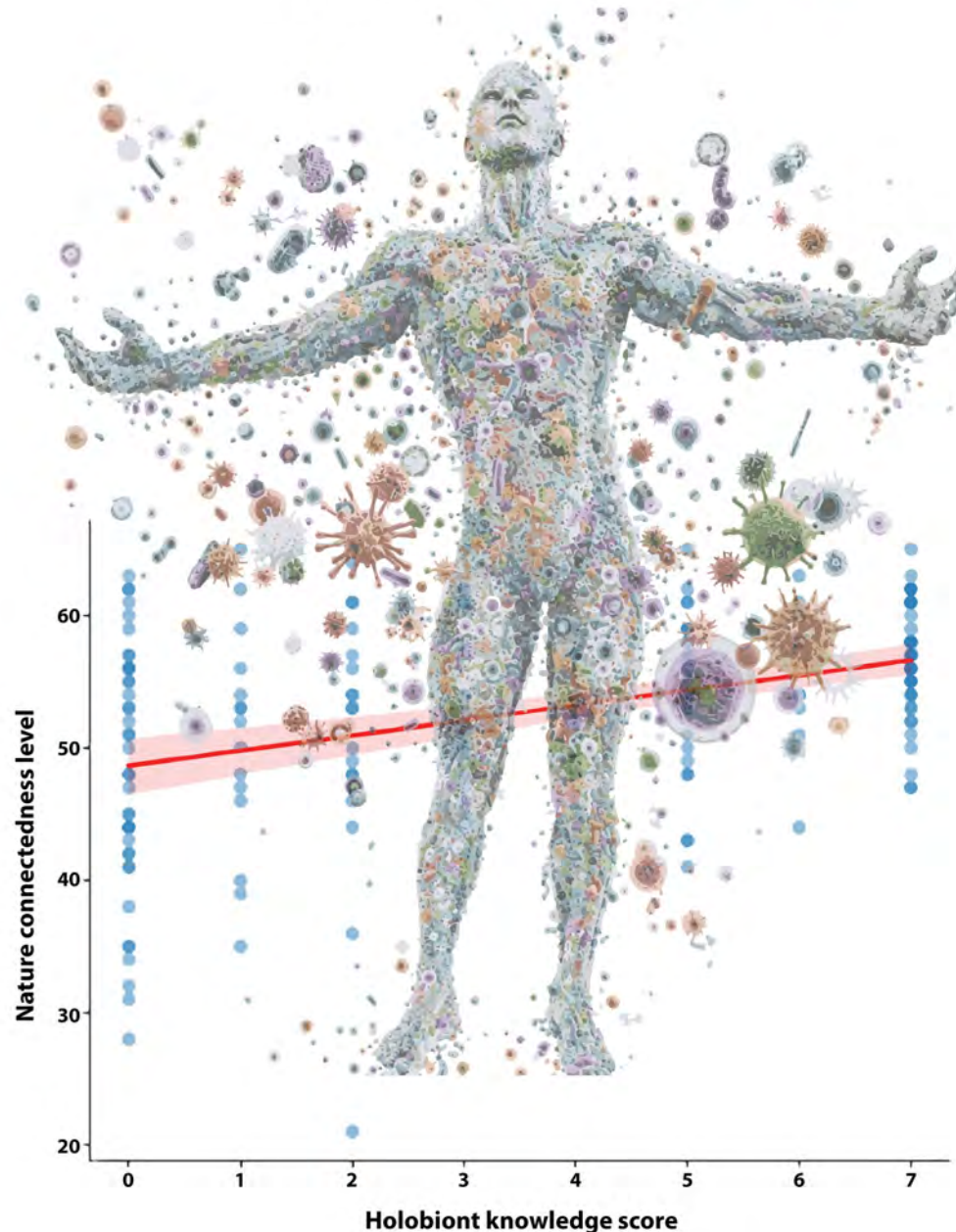


Compassion

Helping and caring for nature

What happens when people learn that humans are not standalone organisms, but 'walking ecosystems'?

Viewing ourselves as Nature



Using a randomised controlled study ($n = 190$), we found that:

- People with greater prior holobiont knowledge reported higher nature connectedness
- Exposure to a short holobiont-focused intervention significantly increased nature connectedness scores

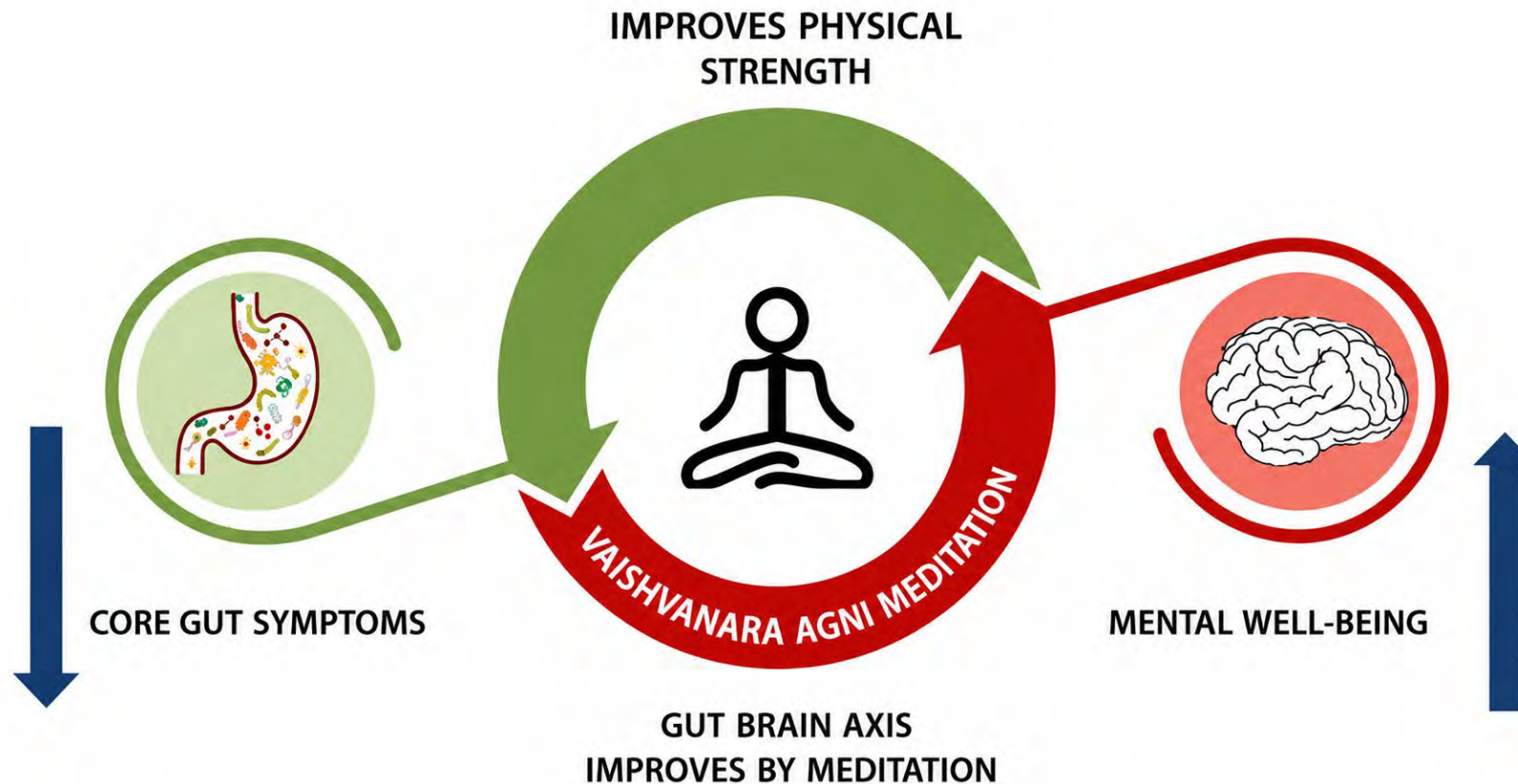
In other words, learning about the microbial dimension of human life strengthened people's psychological relationship with the natural world.

This matters because nature connectedness is associated with:

- improved wellbeing
- stronger pro-environmental behaviours
- greater ecological concern

Activity: complete NR-6 and IINS surveys

Holobiont meditation



Questions from participants

Homework: keep a food journal for a week