



The Royal
Australian &
New Zealand
College of
Psychiatrists



phn
TASMANIA

An Australian Government Initiative



Tasmanian Branch

The gut, brain and mental health connection

Wednesday 5 November - 6:00pm to 9:30pm



Acknowledgement of traditional owners

We acknowledge the Tasmanian Aboriginal people as the traditional owners and ongoing custodians of the land on which we are meeting today. We pay our respects to Elders past and present.

We would also like to acknowledge Aboriginal people who are joining us today.



Learning outcomes

After this session, I will be able to:

- ❖ Describe the relationship between diet quality, the gut microbiome, and common mental health conditions.
- ❖ Interpret current evidence on the role of dietary patterns in the prevention and management of neurodevelopmental and mental health conditions.
- ❖ Discuss how nutritional interventions can complement a biopsychosocial patient-centered approach to mental health in general practice.



Some housekeeping

- Tonight's session is being recorded
- At the end of the session, you will see QR code in the room. We appreciate you taking the time to complete this to help us improve our events programme
- Please don't forget to register for your next webinar via QR



Presenter

**Distinguished Professor Felice Jacka
OAM (she/her), Director, Food & Mood
Centre, IMPACT, Deakin University**



From Anxiety to Alzheimer's: Nutritional Psychiatry for the Prevention and Treatment of Mental and Brain Disorders



Deakin Distinguished Prof Felice N Jacka OAM
ISI Highly Cited Researcher

Food & Mood Centre
Deakin University
Australia





Food & Mood Centre Program



Early Life



Health Behaviours
& Determinants



Mental & Brain
Health



Physical Health



Healthy Ageing

Population health | Novel interventions | Mechanisms | Implementation science | Education and training

Pregnancy
Birth
Infancy
Neurodevelopment

Diet
Stress
Physical Activity
Sleep

Depression
Anxiety
Psychosis
Eating disorders
PTSD
Cognition
Neurobiology

Gut health
Cardio health
Metabolic health
Vascular health

Cognitive decline
Neurodegeneration



What is Nutritional Psychiatry?

- **Research** developing and evaluating nutritional approaches to the prevention and treatment of mental and brain disorders and their comorbidities
- The **application** of evidence-based nutritional approaches to the prevention and treatment of mental and brain disorders and their comorbidities
- Clinical, public health (prevention



what it is *not*

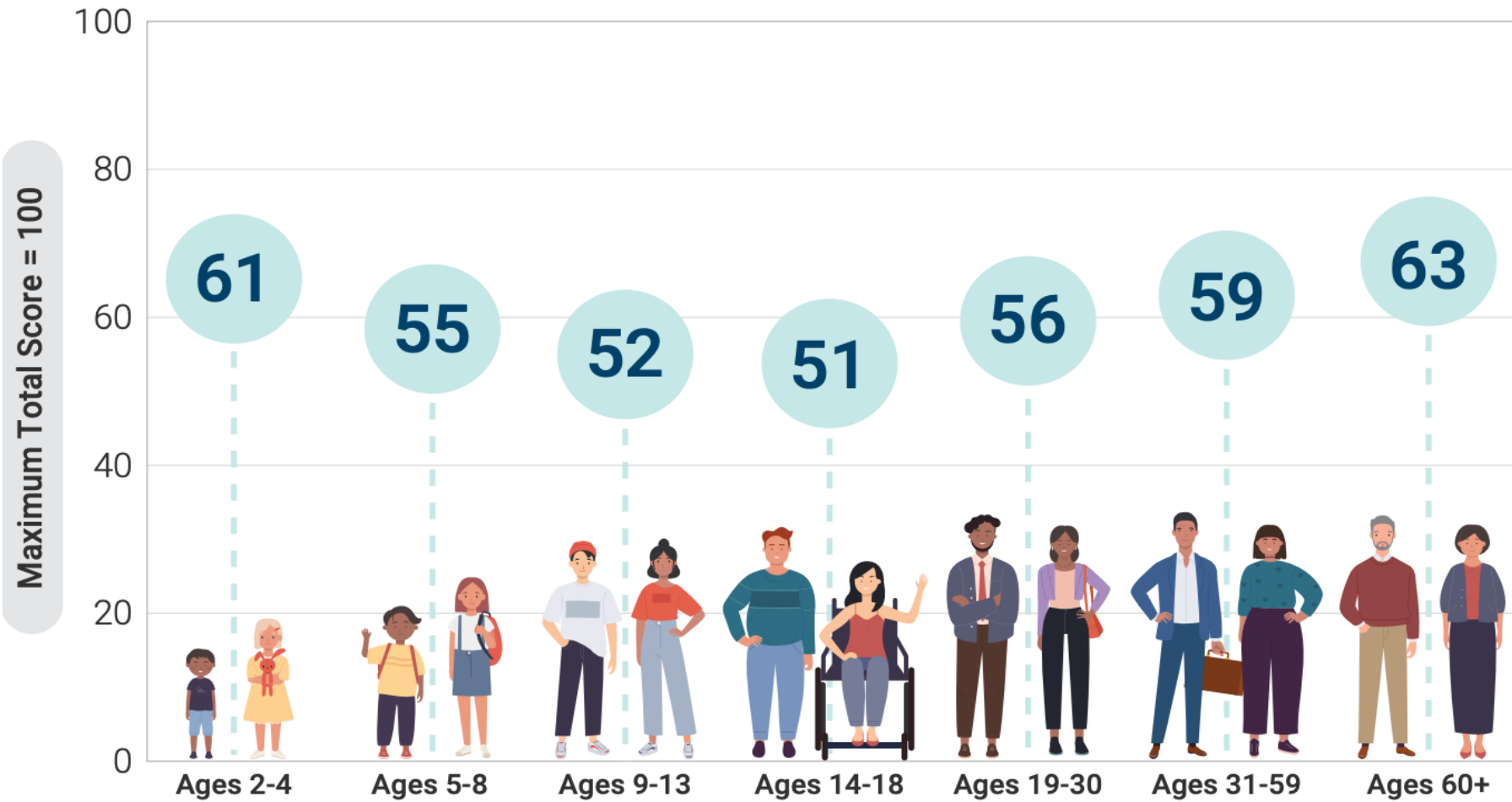
- complementary medicine
- integrative medicine
- alternative medicine
- functional medicine



Diet and Mental and Brain Health are Linked Across Life Stages



Adherence of the U.S. Population to the *Dietary Guidelines* Across Life Stages, as Measured by Average Total Healthy Eating Index-2015 Scores



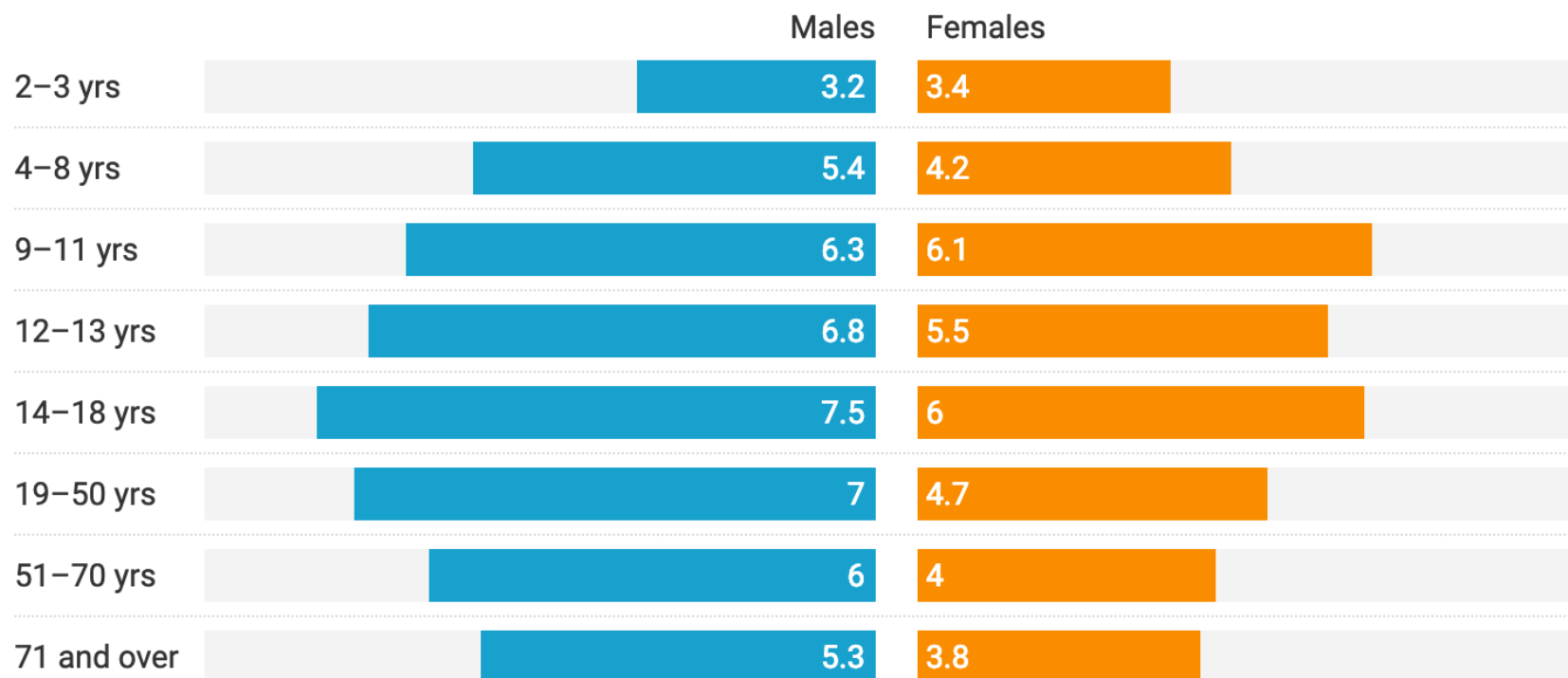
USDA and HHS. Dietary Guidelines for Americans, 2020-2025. 2020.





Consumption of discretionary food, by age and sex, 2011–12

Mean intake, serves per day



A serve of discretionary food is defined as 600kJ. Discretionary foods include cakes, biscuits, confectionary, chocolate, pastries, ice confections, butter, cream, potato chips, crisps and other fatty or salty snack foods, sugar sweetened soft drinks and cordials, sports and energy drinks and alcoholic drinks.

Source: [AIHW](#) • [Get the data](#)



TODDLERS

How well are children aged 2-3 meeting the Guidelines?

EATING HABITS



■ GENERALLY EAT ENOUGH

Fruits, dairy products & alternatives, calcium, folate, iodine

■ DON'T EAT ENOUGH

Vegetables, grain foods, meat & alternatives

■ EAT TOO MUCH

Sodium, saturated & trans fats, added sugars

MAIN TYPES OF DISCRETIONARY FOODS

Sweet biscuits, cakes and muffins, chocolate, savoury snack foods, fried potato products, pastries



UNICEF finds more obese children malnourished, reigniting junk food tax debate

A global report has found malnutrition is now more prevalent in obese or overweight children than those who are thin, with the blame placed on ultra-processed food.

Obesity and overweight to affect half of Australian children and young people by 2050, global study finds



Ultra-processed foods are making more Australian children both overweight and malnourished. (Supplied: Unsplash/7)



Diet during pregnancy

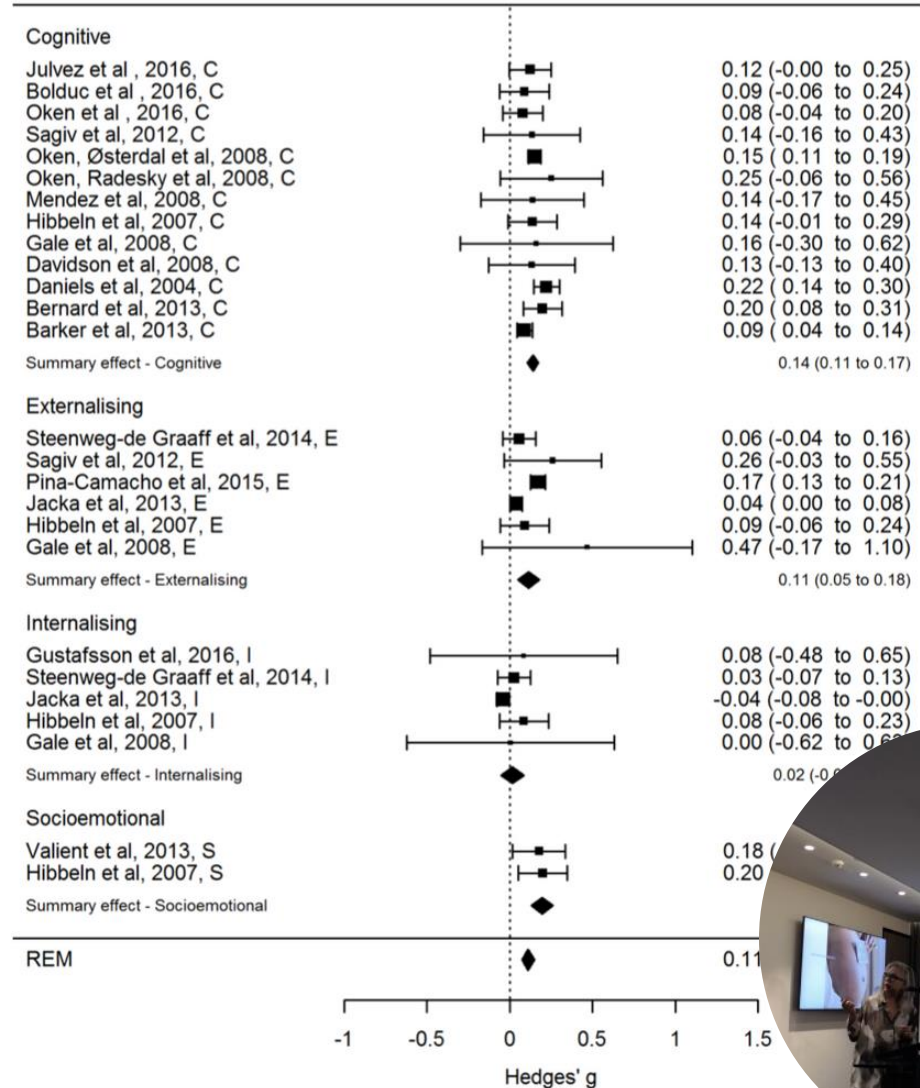


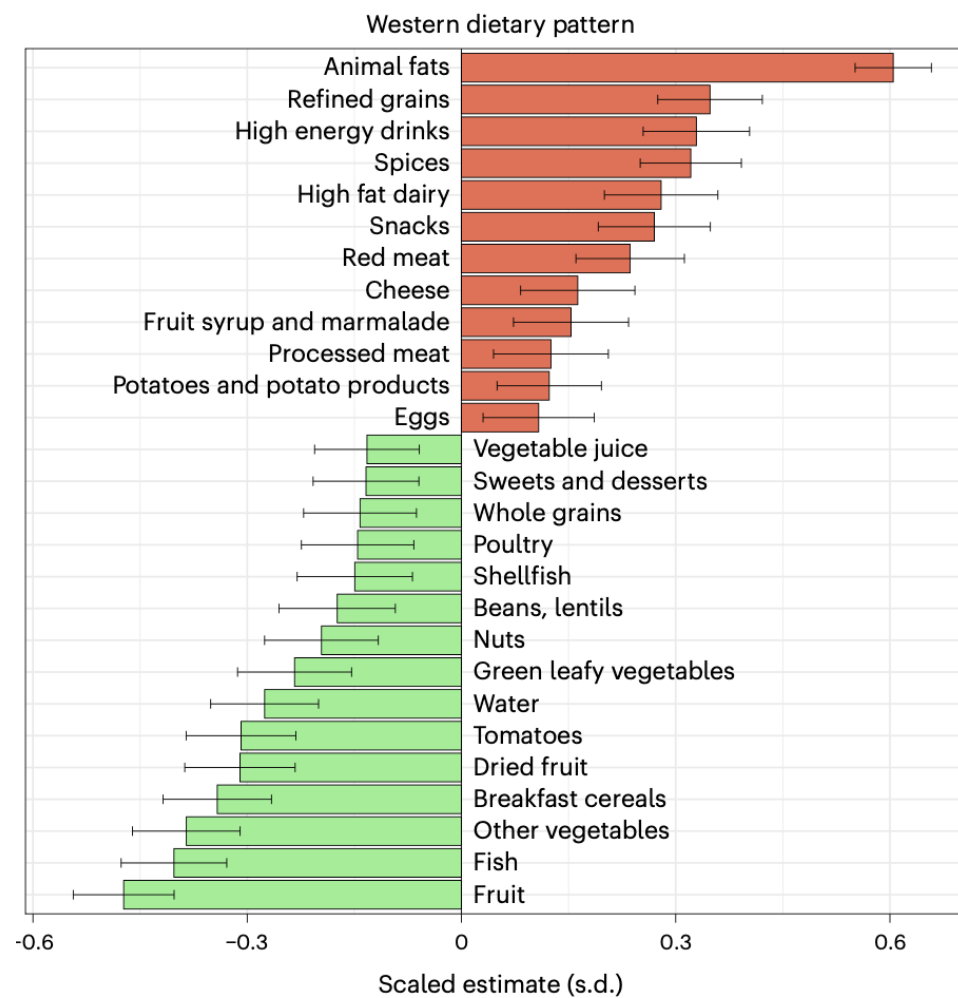
Early Life Diet

Better maternal diet quality had a small, statistically significant association with child emotional health and neurodevelopment

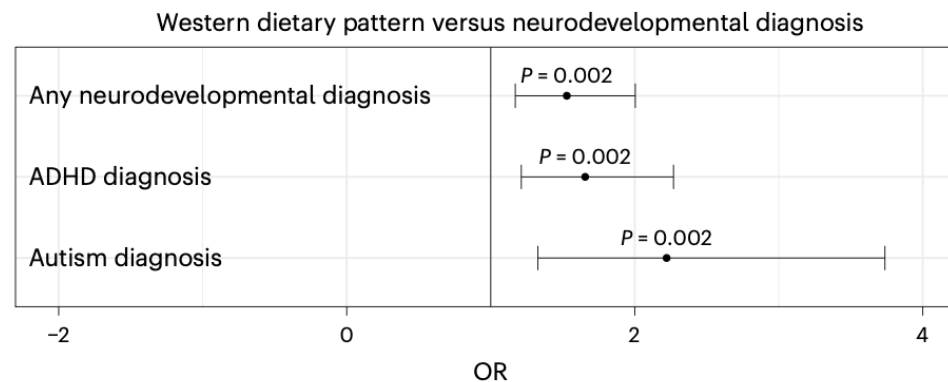
Borge et al. BMJ Open 2017

BMJ Open The importance of maternal diet quality during pregnancy on cognitive and behavioural outcomes in children: a systematic review and meta-analysis





Horner et al. (2025) Nature Metabolism
COPSAC

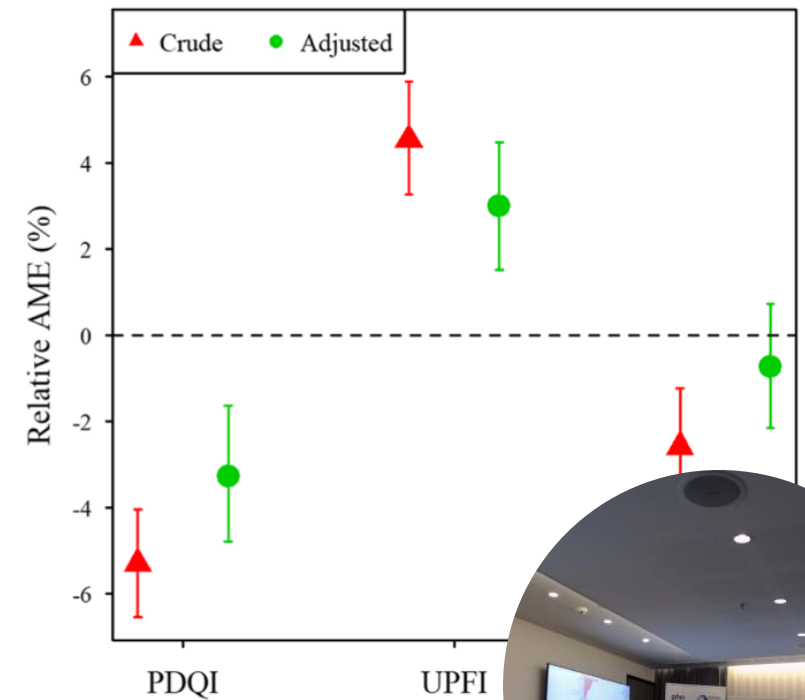
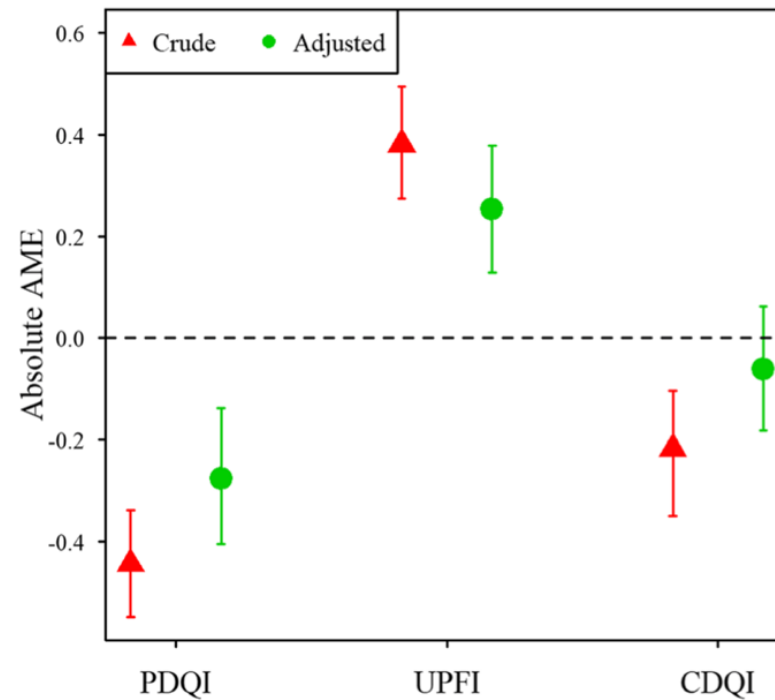


Early Life Diet



The associations between maternal and child diet quality and child ADHD – findings from a large Norwegian pregnancy cohort study

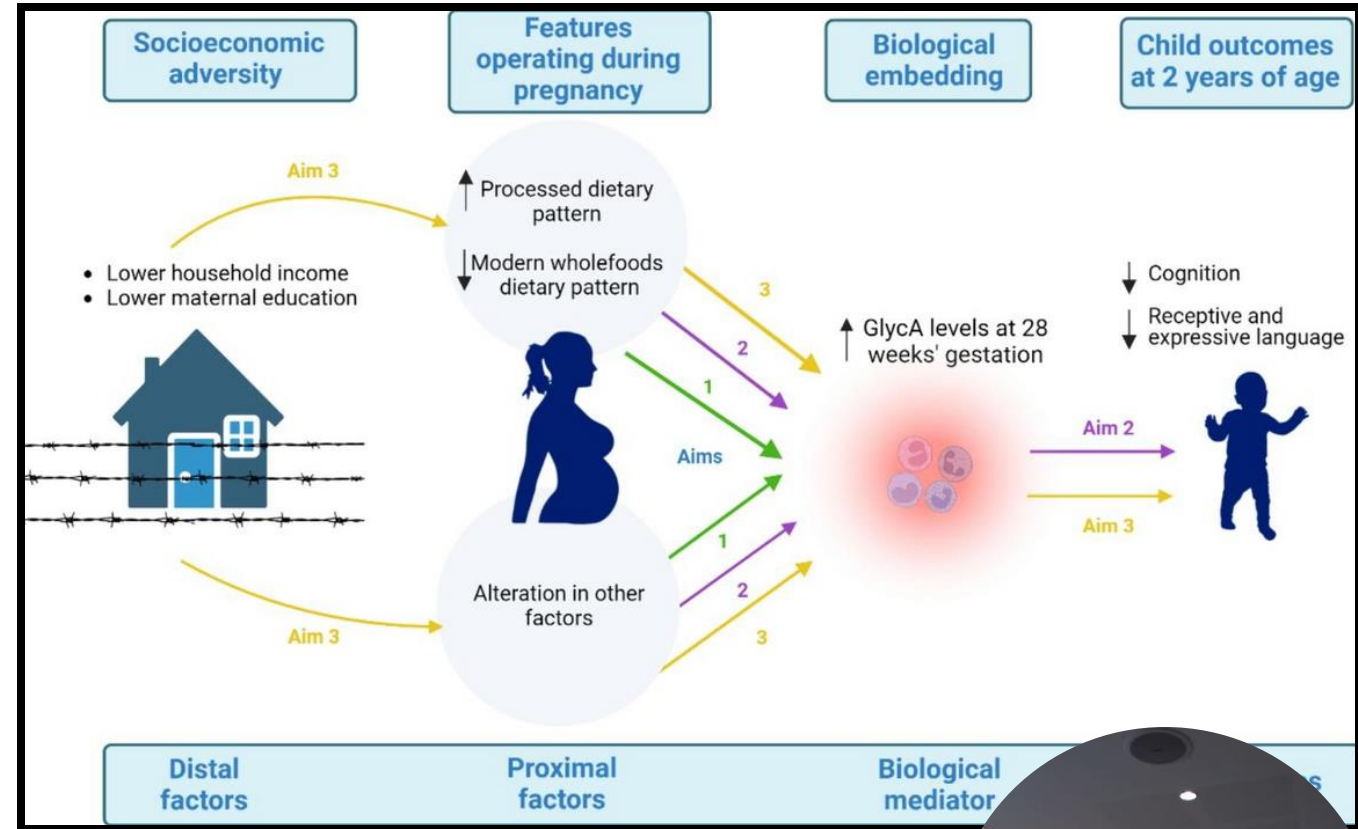
Tiril Cecilie Borge^{1*}, Guido Biele¹, Eleni Papadopoulou², Lene Frost Andersen³, Felice Jacka^{4,5,6,7}, Merete Eggesbø², Ida Henriette Caspersen², Heidi Aase¹, Helle Margrete Meltzer⁸ and Anne Lise Brantsæter



Borge et al. 2021. BMC Psychiatr.

Prenatal diet and language/cognition

- Socioeconomic adversity operates through maternal diet.
- This elevates prenatal inflammation and reduces offspring cognition/language.





The SMILES trial



Diet as Intervention for Depression



67 adults with moderate to severe MDD

Adjunctive to current treatment

12 week study

Individual **nutritional** consulting
sessions

Social support protocol

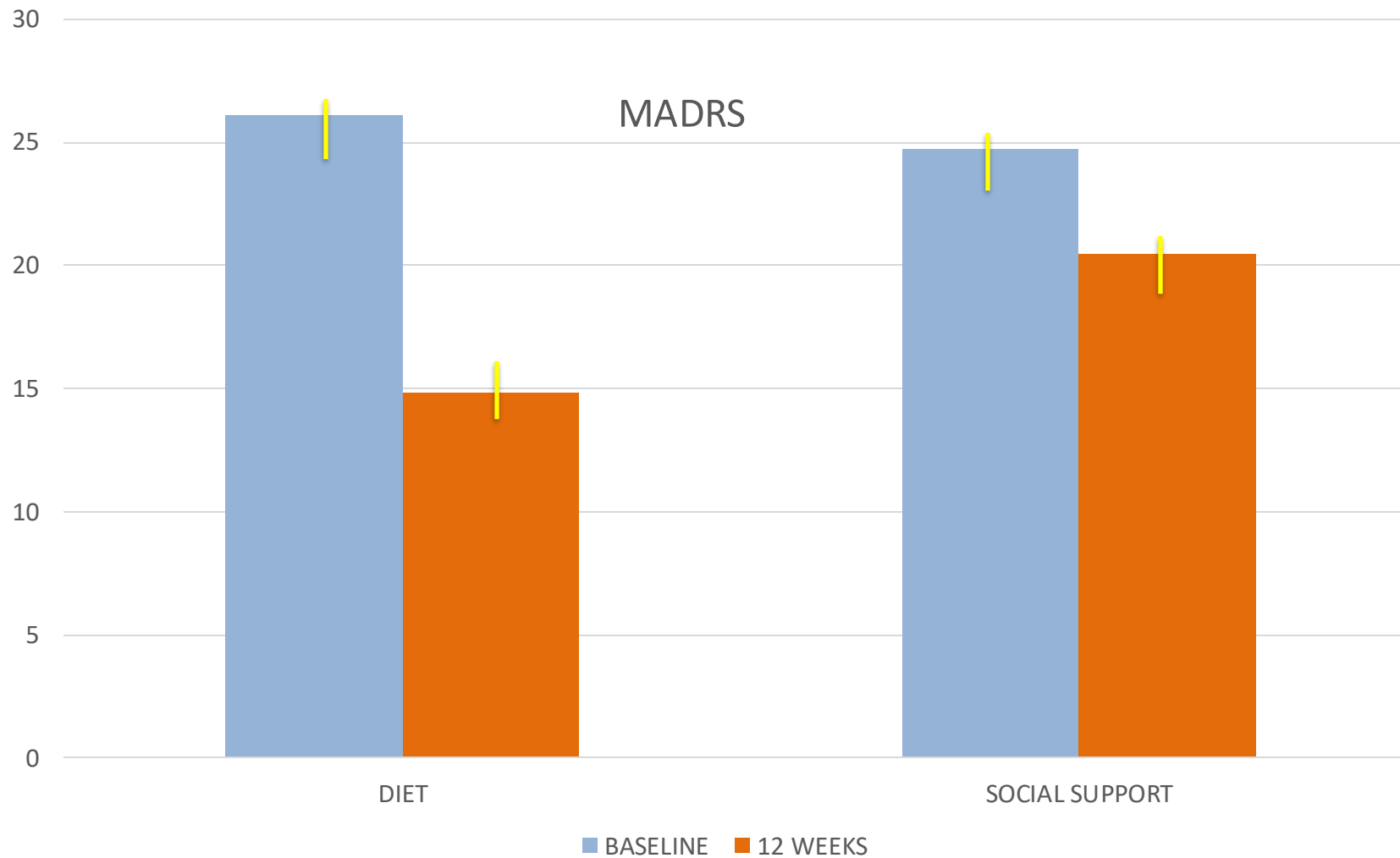


SMILES

*Cohen's
 $d = -1.16$*

(95% CI $-1.73, -0.59$)

NNT = 4.1





Protein	AND	Cereals and Starchy Vegetables	AND	Vegetables
Tinned sardines 		with wholegrain biscuits 		plus avocado, tomato and cucumber 
Tinned salmon 		with tinned chickpeas 		and salad 
Tinned tuna 		plus instant brown or basmati rice 		with tinned corn, peas and beetroot 
Egg 		on wholemeal toast 		with avocado, tomato and mushrooms 
Supermarket rotisserie chicken (skin removed) 		with couscous 		and frozen vegetables 



The impact of the Mediterranean diet on alleviating depressive symptoms in adults: a systematic review and meta-analysis of randomized controlled trials

Bruno Bizzozero-Peroni ^{1,2}, Vicente Martínez-Vizcaíno ^{1,3}, Rubén Fernández-Rodríguez ^{1,*},
Estela Jiménez-López ^{1,4,5}, Sergio Núñez de Arenas-Arroyo ¹, Alicia Saz-Lara ¹,
Valentina Díaz-Goñi ¹, and Arthur Eumann Mesas ¹

n=5 RCTs with 1507 participants

Significant reduction among young and middle-aged adults with MD or mild to moderate depressive symptoms



SYSTEMATIC REVIEW/META-ANALYSIS

OPEN

The Effects of Dietary Improvement on Symptoms of Depression and Anxiety: A Meta-Analysis of Randomized Controlled Trials

Joseph Firth, PhD, Wolfgang Marx, PhD, Sarah Dash, PhD, Rebekah Carney, PhD, Scott B. Teasdale, PhD, Marco Solmi, MD, Brendon Stubbs, PhD, Felipe B. Schuch, PhD, André F. Carvalho, MD, Felice Jacka, PhD, and Jerome Sarris, PhD

Firth et al. Psychosomatic Medicine (2019)

- N=16 RCTs with 45,826 participants
- Dietary interventions significantly reduced depressive symptoms
- Greater benefits when delivered by nutrition professionals

Study name	Statistics for each study						
	Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Agarwal et al. 2015	0.353	0.120	0.014	0.118	0.589	2.941	0.003
Assaf et al. 2015	0.027	0.010	0.000	0.008	0.046	2.744	0.006
Einvik et al. 2010	-0.048	0.089	0.008	-0.222	0.127	-0.534	0.593
Endevelt et al. 2010	0.711	0.248	0.061	0.226	1.196	2.873	0.004
Forster et al 2012	0.223	0.124	0.015	-0.020	0.466	1.798	0.072
Hyypä et al. 2003	-0.136	0.182	0.033	-0.492	0.220	-0.749	0.454
Imayama et al. 2011	0.273	0.096	0.009	0.085	0.461	2.844	0.004
Jacka et al. 2017	0.865	0.279	0.078	0.319	1.412	3.102	0.002
Jenkinson et al. 2009	0.216	0.103	0.011	0.013	0.418	2.088	0.037
Kasckow et al. 2014a	-0.583	0.414	0.172	-1.395	0.230	-1.406	0.160
Kasckow et al. 2014b	0.120	0.255	0.065	-0.381	0.620	0.469	0.639
Kieman et al. 2001	-0.095	0.233	0.054	-0.552	0.362	-0.408	0.683
McMillan et al. 2011	0.149	0.388	0.150	-0.611	0.908	0.383	0.702
Nieman et al. 2000	0.159	0.207	0.043	-0.247	0.565	0.768	0.442
Scheier et al. 2005	0.234	0.115	0.013	0.009	0.459	2.035	0.042
Wardle et al. 2000	1.683	0.166	0.028	1.358	2.008	10.139	0.000
	0.275	0.089	0.008	0.100	0.450	3.074	0.002

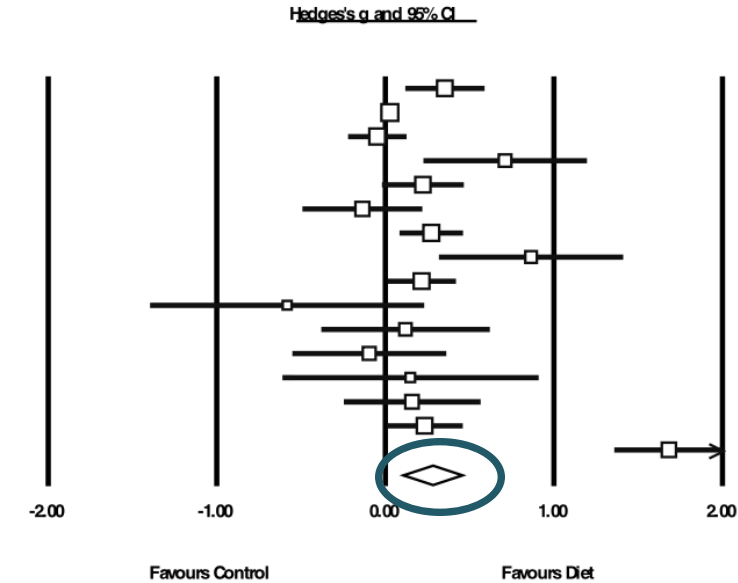


FIGURE 1. Meta-analysis of the effects of dietary interventions on depressive symptoms. Box size represents study weighting. Diamond represents overall effect size and 95% CIs.

Whole Diet-Focused Treatments



The CALM Trial

- CALM Trial
- Lifestyle intervention compared to psychotherapy (non-inferiority)
- Group sessions



Effectiveness of a group-based telehealth lifestyle program for Victorians experiencing COVID-19 related distress



6 sessions over 7 weeks



Diet and exercise program

Psy





Lifestyle therapy is non-inferior to cognitive behavioural therapy for the reduction of depression symptoms

n=182



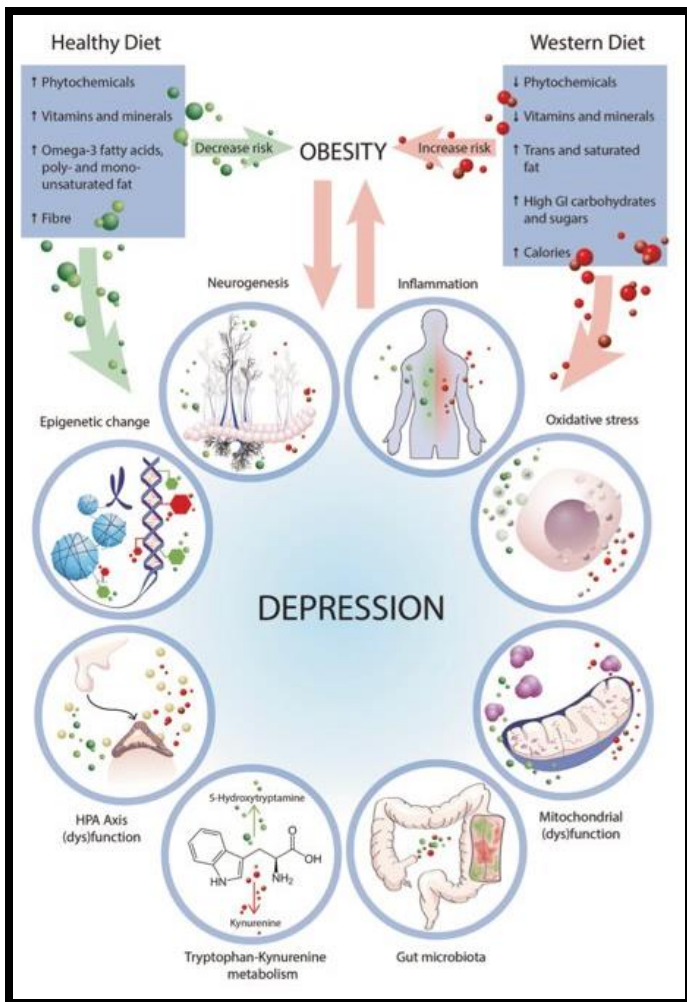
Lifestyle therapy

OR



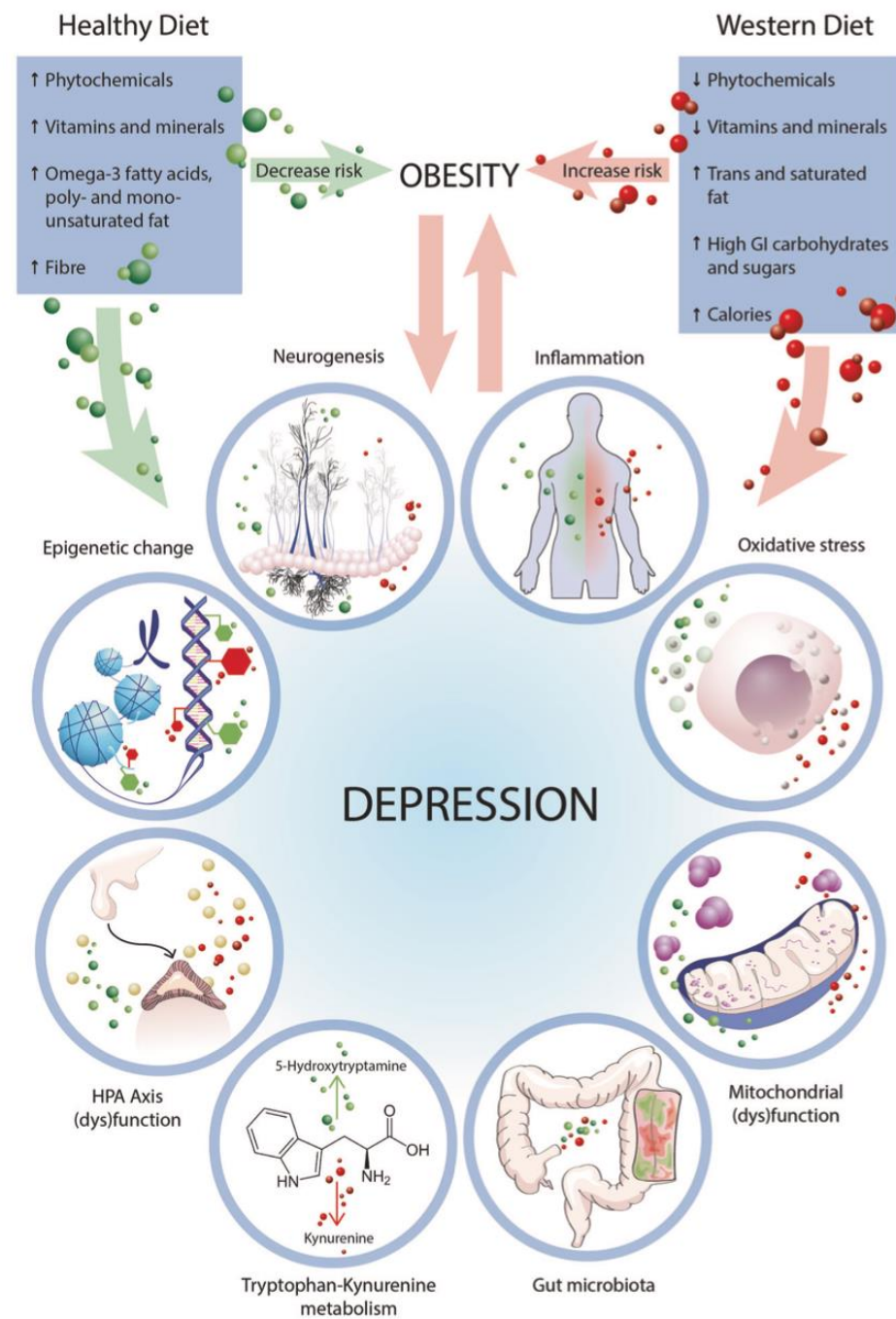
CBT





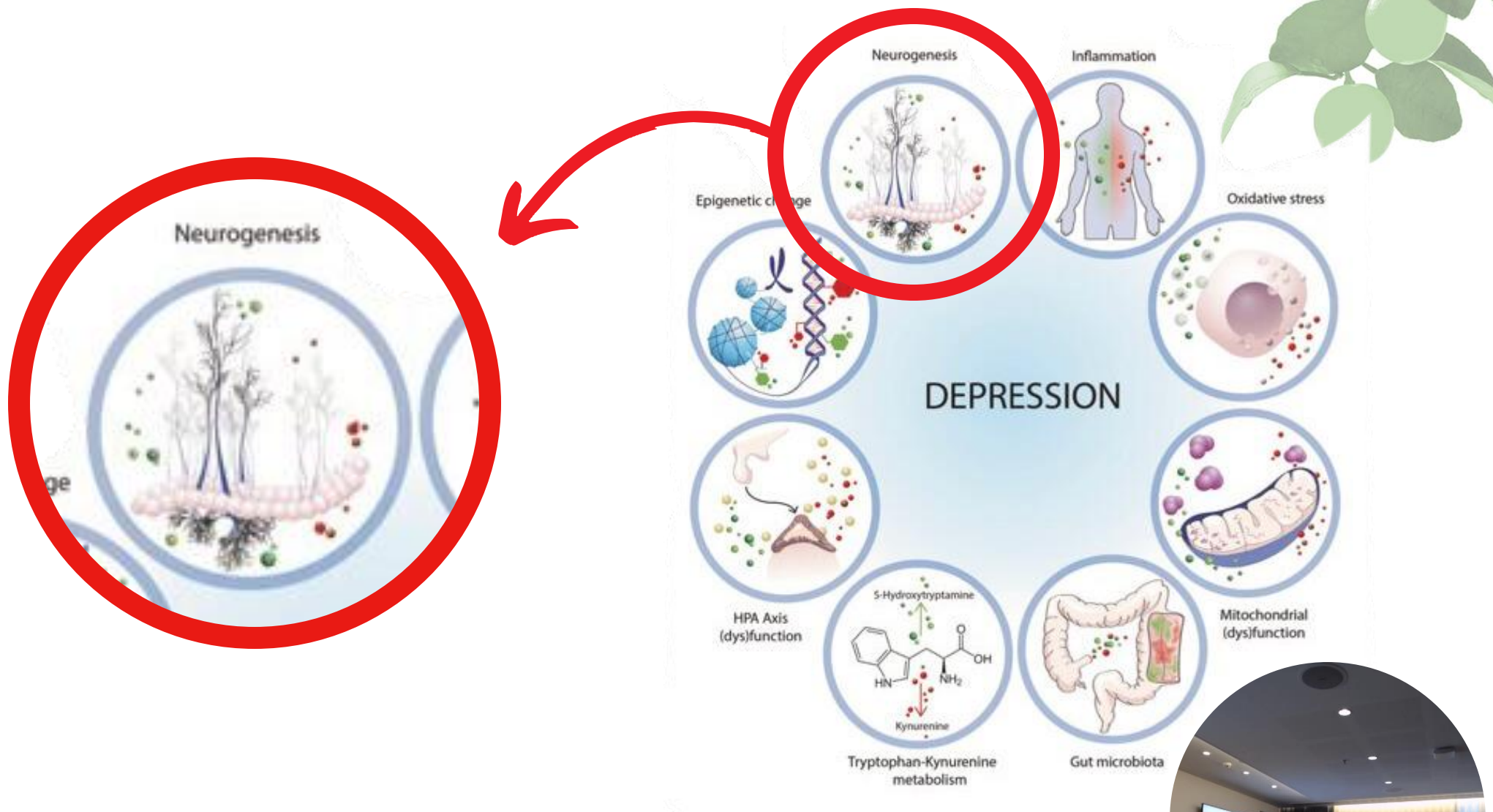
Mechanisms in Nutritional Psychiatry





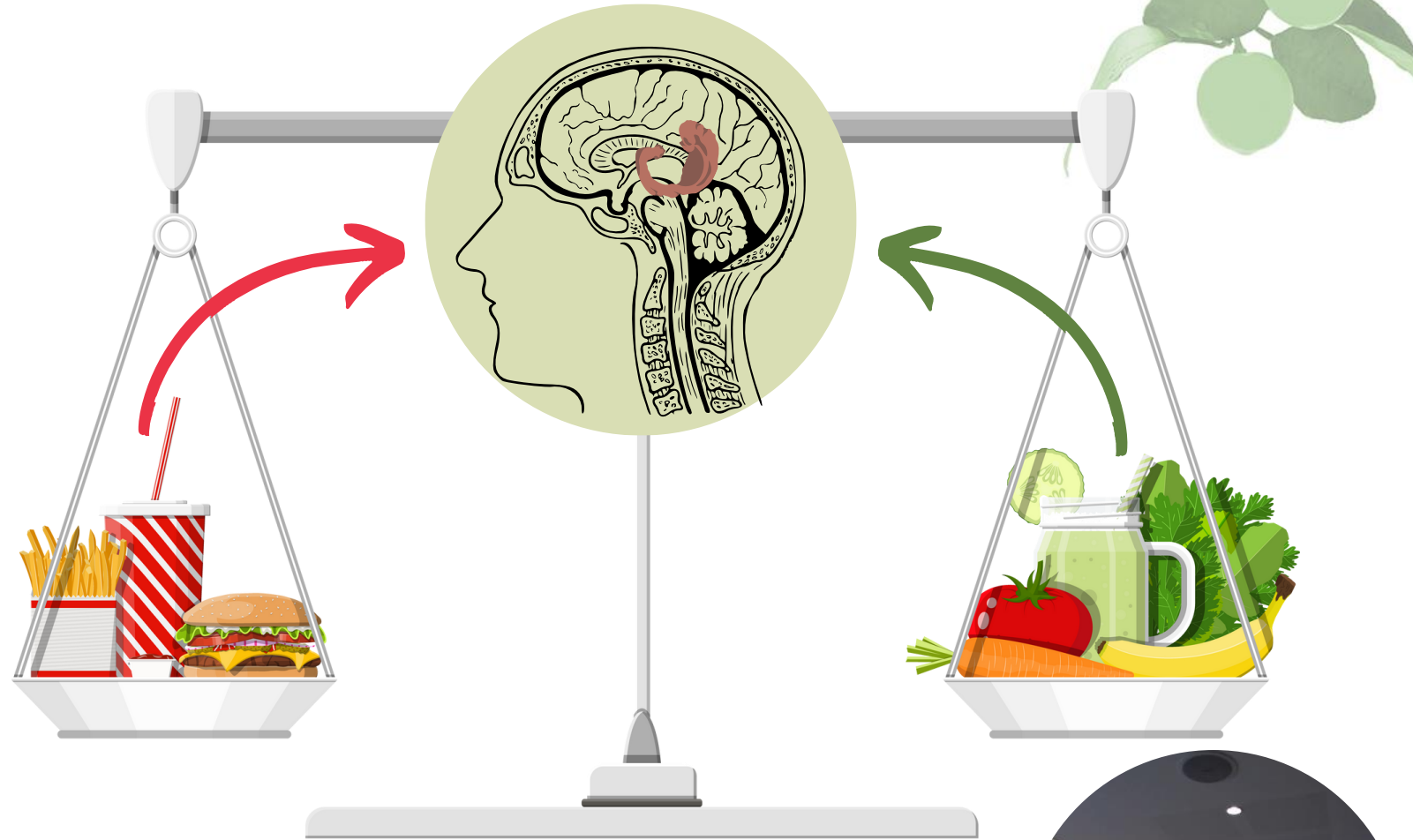
Marx et al. (2020) Mol Psych





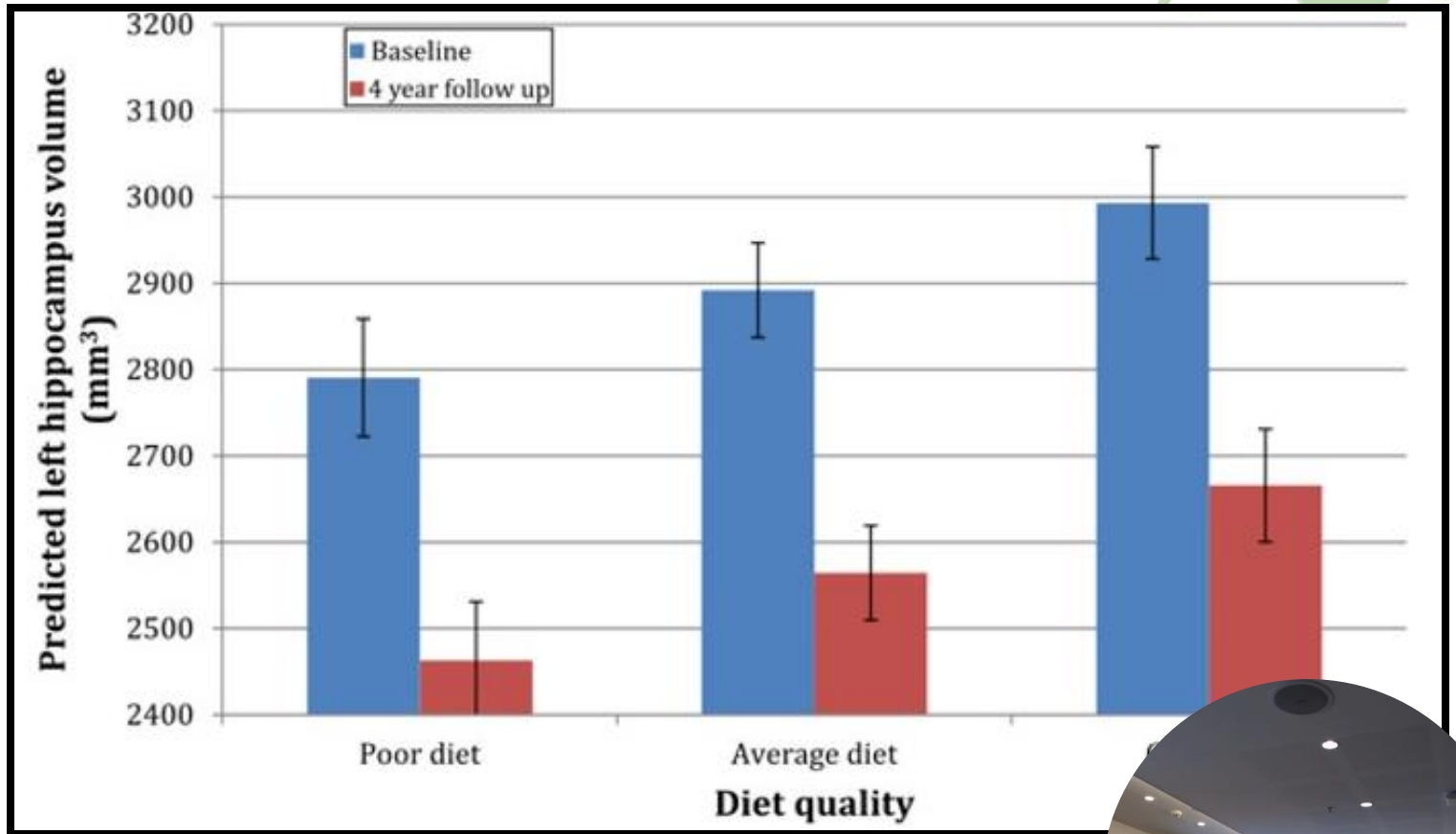
Neurogenesis

- Brain plasticity
- Hippocampal volume



Neurogenesis

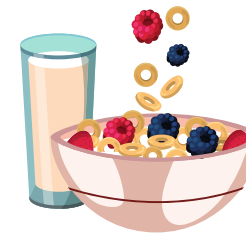
- Brain plasticity
- Hippocampal volume



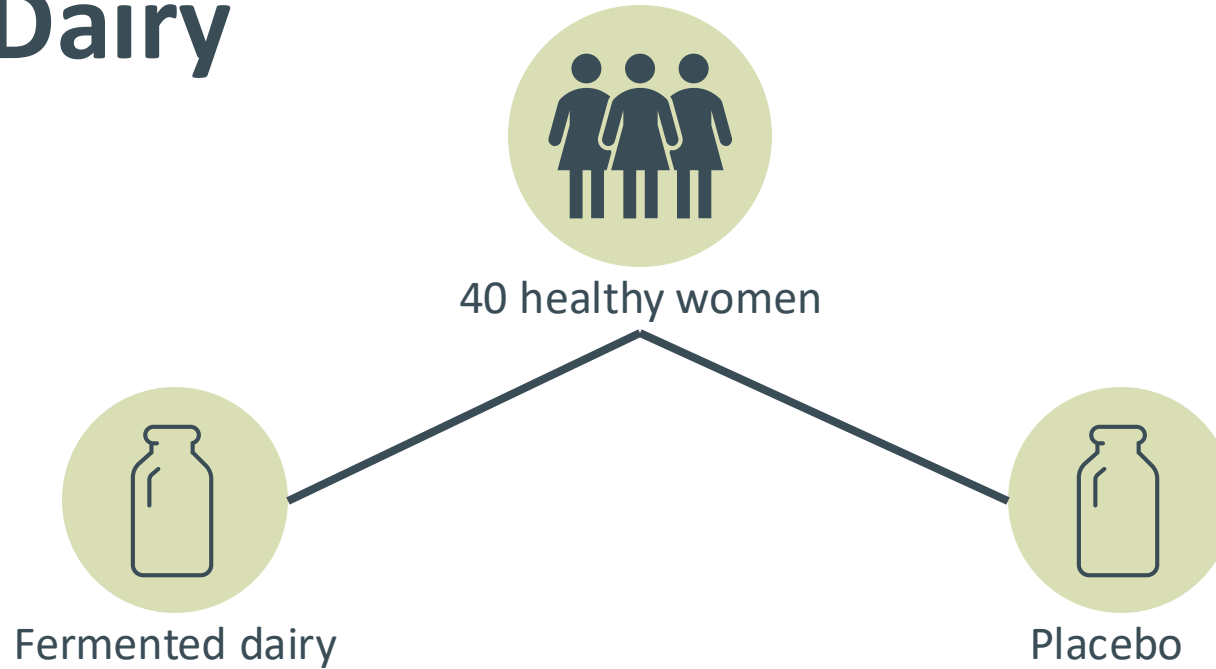
Impact of Western diet



- Healthy adults
- Two types of breakfast:
 - high in saturated fat and added sugar (Western-style)
 - healthier option
- **Four** consecutive days
- Significant reduction in HDLM and reduced interoceptive sensitivity to hunger and fullness in Western-style group



Fermented Dairy Trial

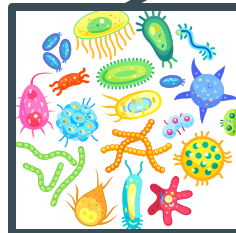


8 Weeks

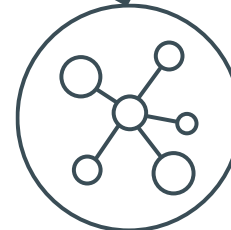


FOOD & MOOD
CENTRE

Brain imaging and function



Microbiome



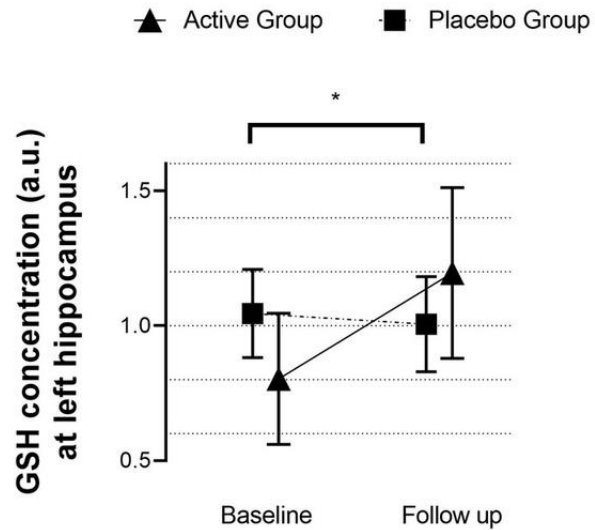
Inflammation and Antioxidant status

- Mood
- Cog
- Bo
- Qu

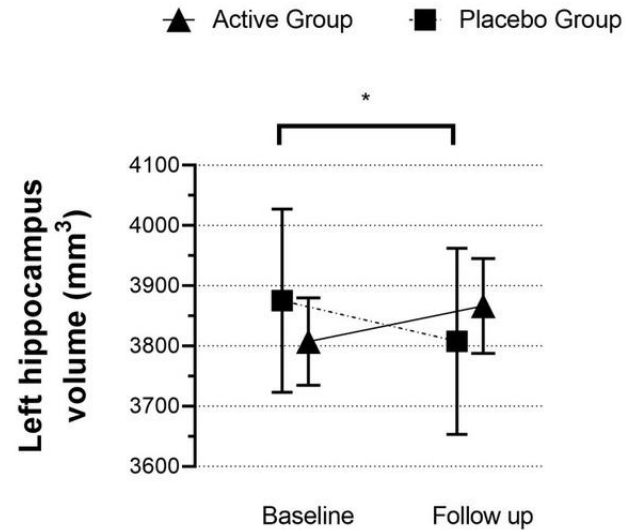


Probiotic-enriched yoghurt can impact brain structure and function

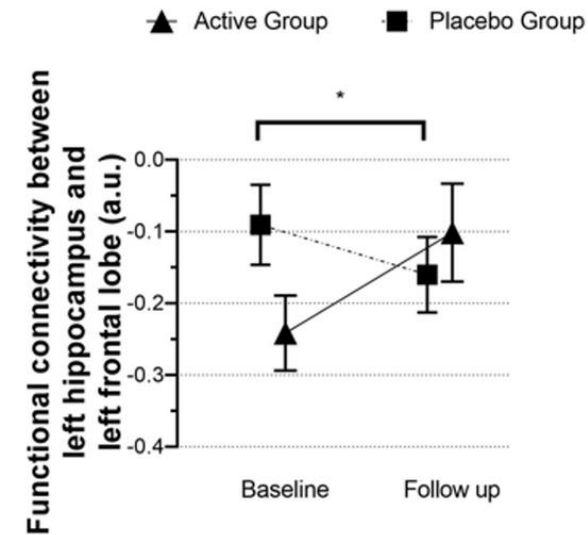
- Randomised controlled trial (8 weeks) of probiotic-enriched yoghurt (BB-12) versus a milk-based placebo in healthy women (n=40)



Glutathione concentration
(antioxidant)



Left hippocampal
volume

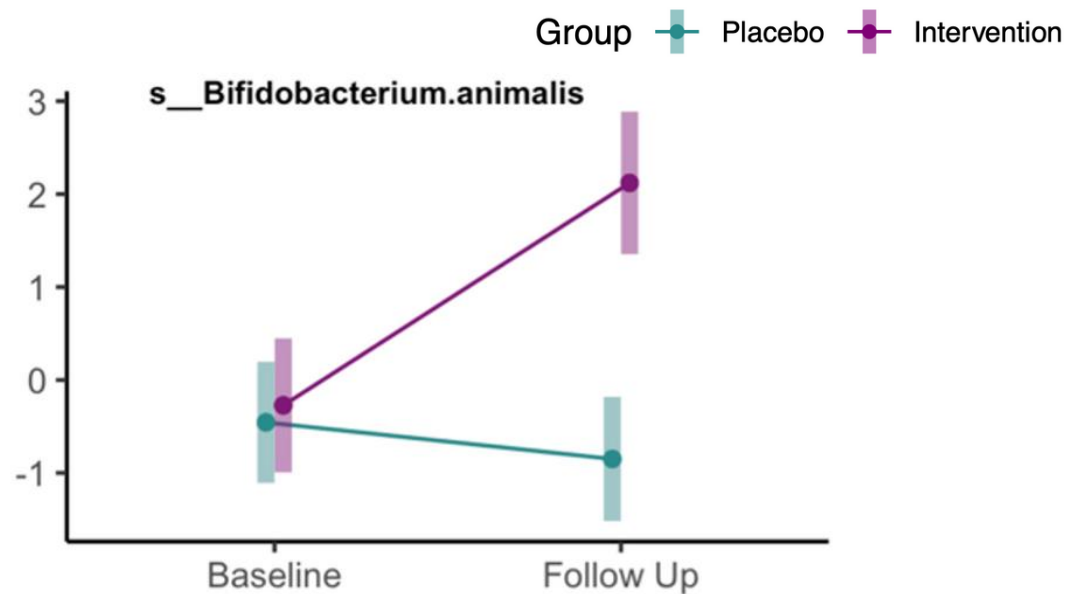


Functional
connectivity

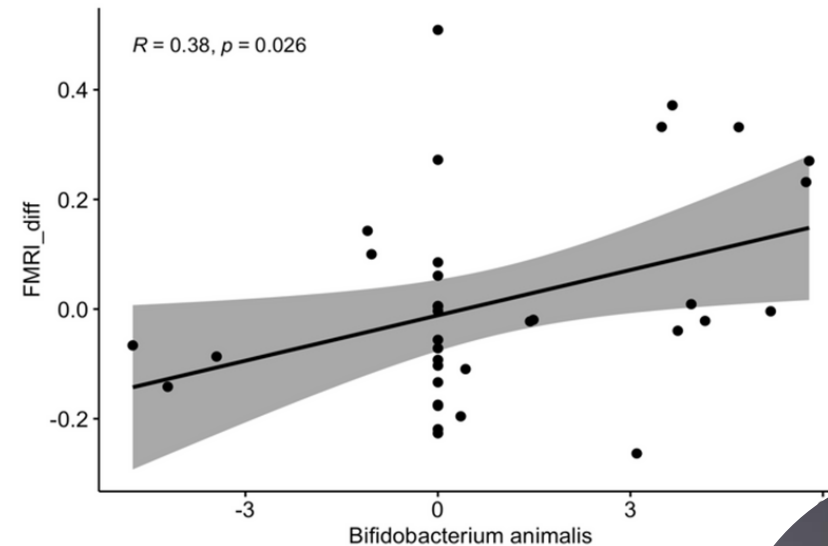
Unpublished data; no photos please



Changes in *Bifidobacterium animalis* are positively correlated with changes in brain functional connectivity

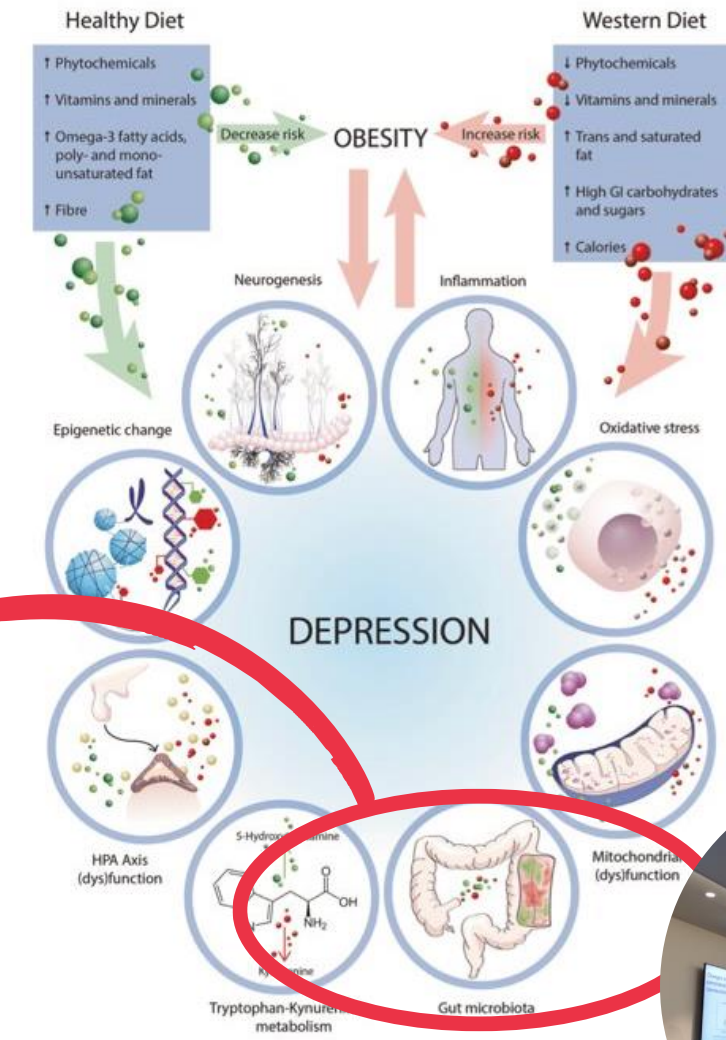
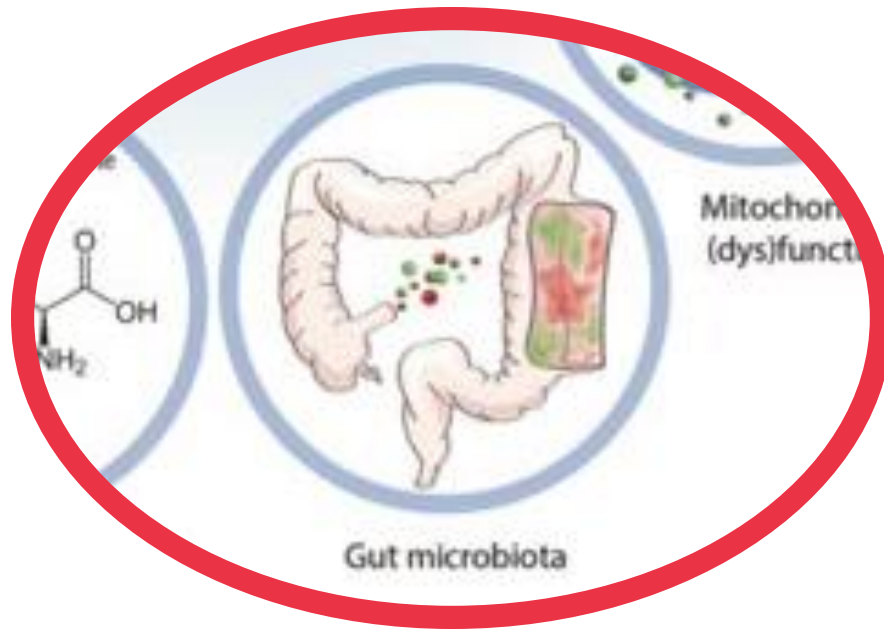


B animalis (bacterium in the yoghurt) increased in the intervention group



Change in *B animalis* correlated with change in functional connectivity





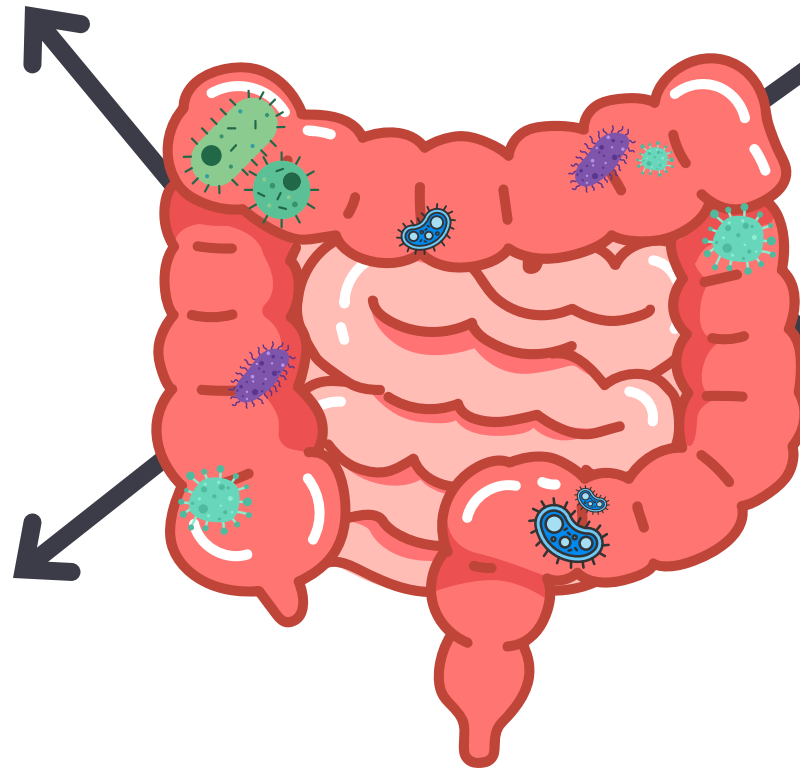
Primary role of gut bacteria

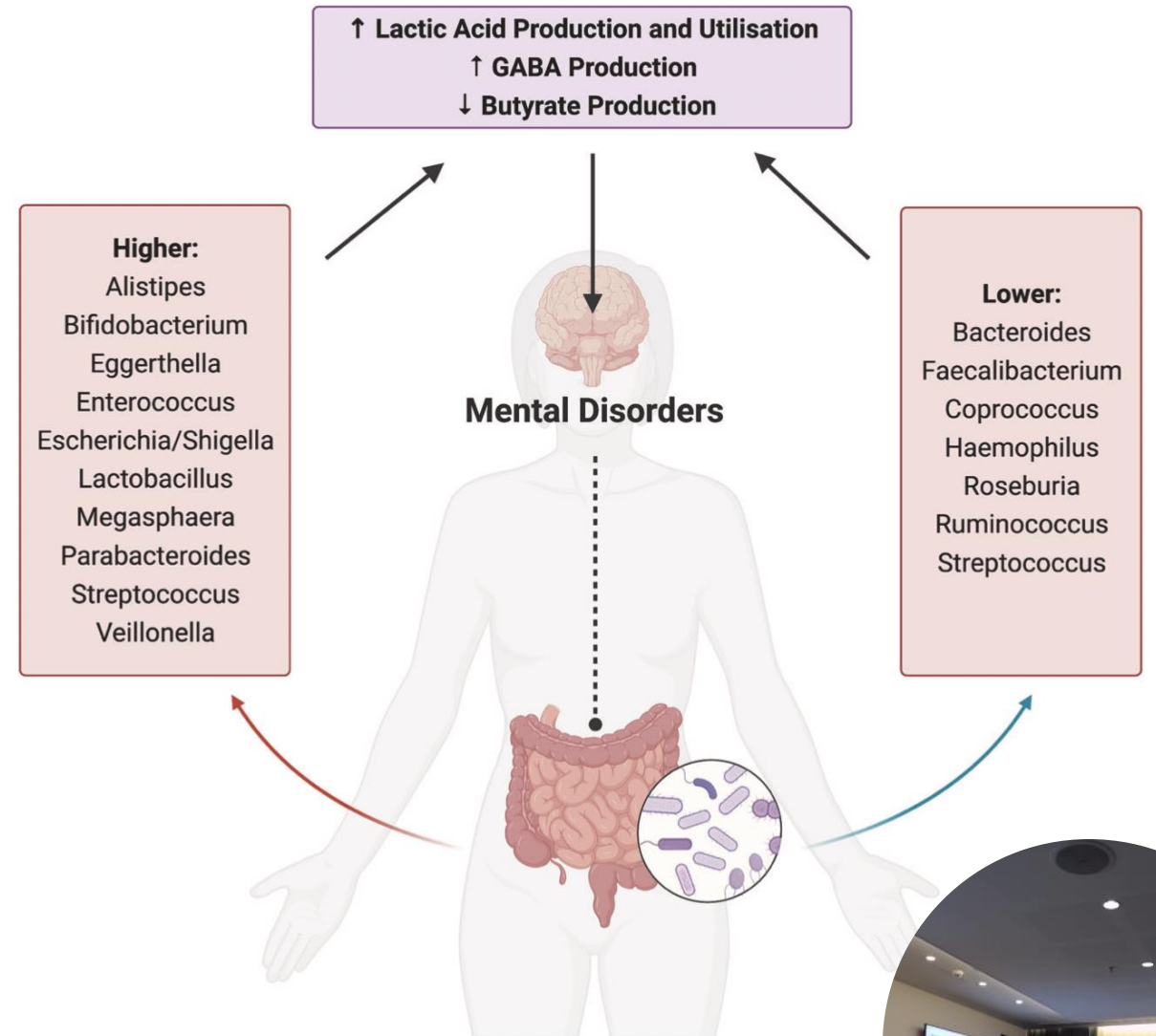
Digestion, absorption,
metabolism and
transformation of
macronutrients

Production of metabolites
including short chain fatty
acids (SCFA)

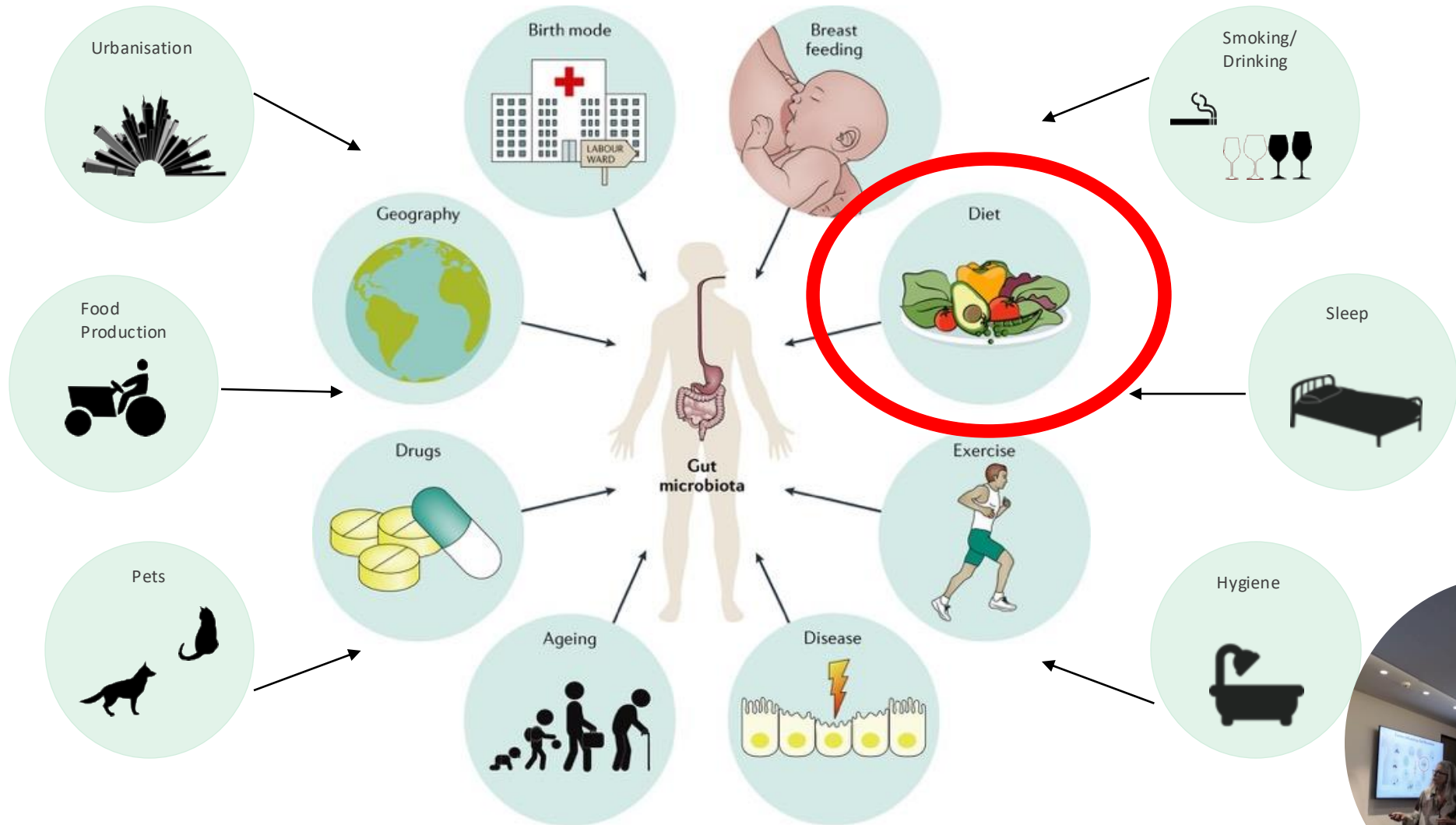
Extraction of beneficial
and bioactive
compounds

Synthesis of vitamin K,
vitamin B and CLA



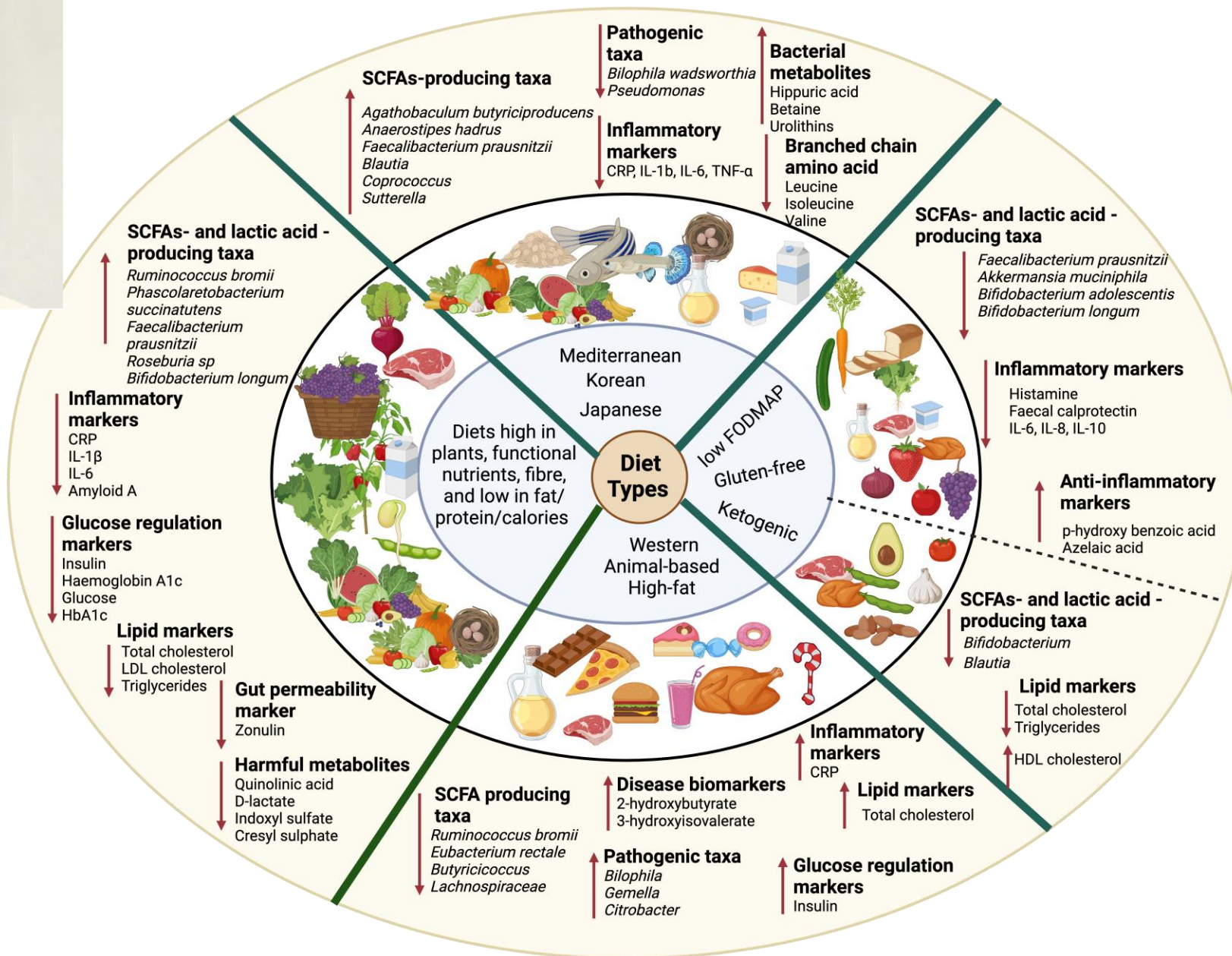


Factors Influencing Gut Microbiota



Nature Reviews | Gastroenterology & Hepatology

Adapted from Quigley. Nat. Rev. Gastroenterol. Hepatol. 2017; Singh et al. J Transl Med. 2017. McDonald et al. bioRxiv. 2018

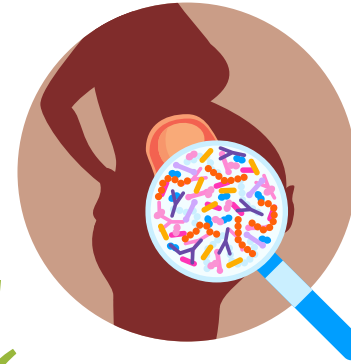




“Is modification of the prenatal diet to change the early life gut microbiota a potential strategy for improving child mental health outcomes?”



A healthy prenatal dietary pattern indirectly related to lower internalising behaviour via changes in maternal alpha diversity

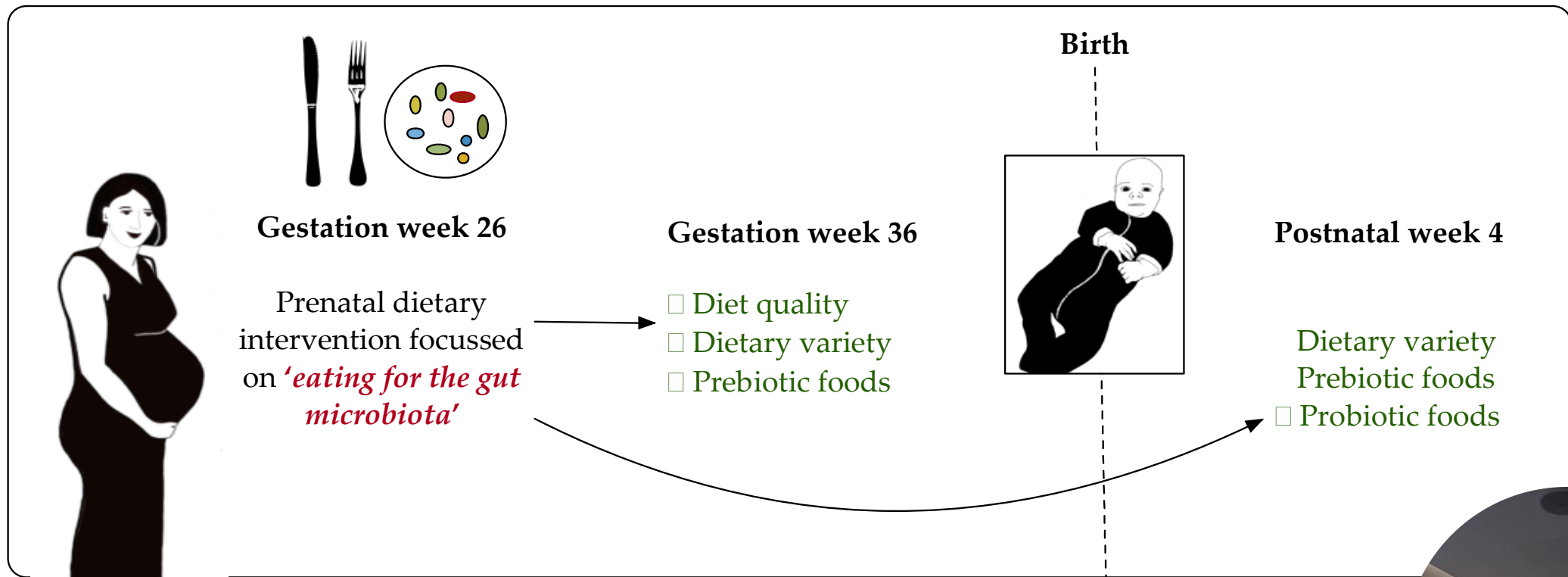


Natural Indirect Effect

X Natural Direct Effect

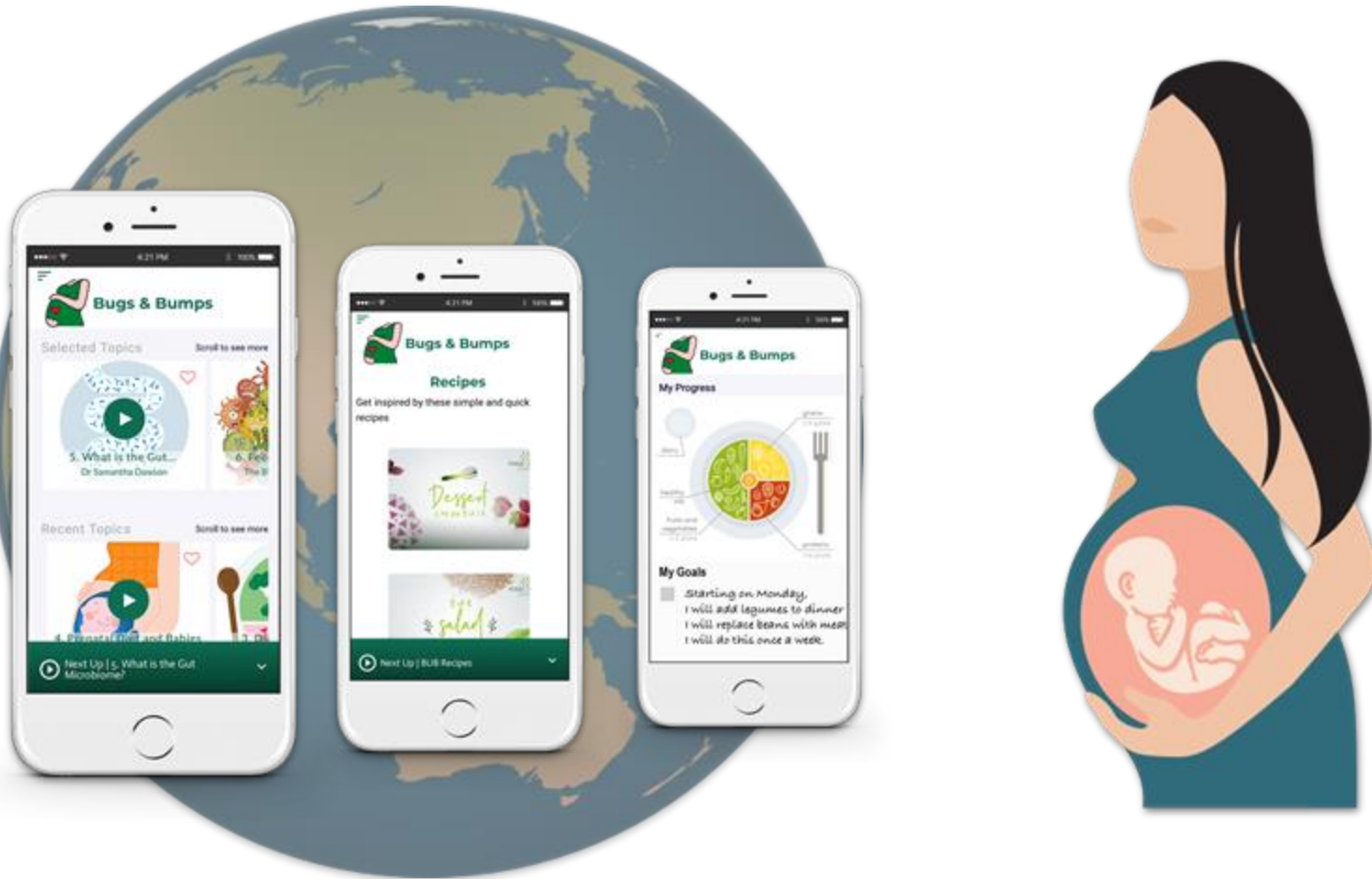


Gut-focused intervention improved prenatal diet quality





Bumps and Bugs (BUB):



An e-health perinatal nutrition education intervention for improving diet quality in pregnant populations





GRAIN FOODS



WHOLEGRAINS
KEEP YOU FULLER
FOR LONGER



IMPORTANT
SOURCE OF FIBRE



WAYS TO INCLUDE

Roasted
cauliflower
with cumin
or sumac and
olive oil



Add grated
zucchini or
carrot

Have
microwaved
frozen peas
as a side



DO I NEED TO "EAT FOR 2?"

TIP

Only a small amount of
extra food is needed in
your 2nd trimester



This extra amount is equal to
a sandwich or a piece of thick
toast with peanut butter



Study Aims

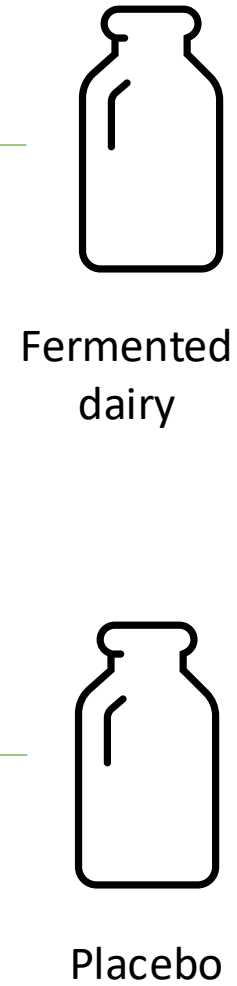


To evaluate an educational smartphone program to support women to improve their diet quality in late pregnancy

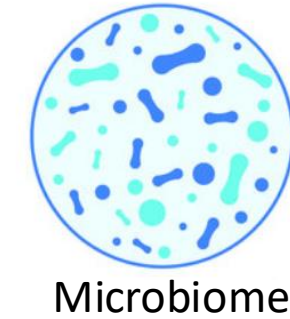
- Maternal mental wellbeing during and after pregnancy,
- Child neurodevelopmental outcomes at 18-months,
- Gut microbiomes (mums & bubs), vaginal and breast microbiomes



FERMENTED DAIRY TRIAL



8 weeks



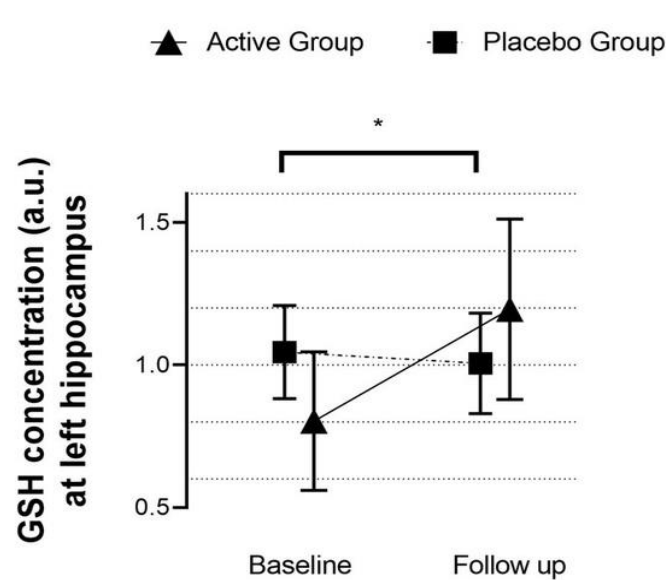
- Mood
- Cognitive function
- Bowel symptoms
- Quality of Life

Marx et al. Gut (2025) In Press

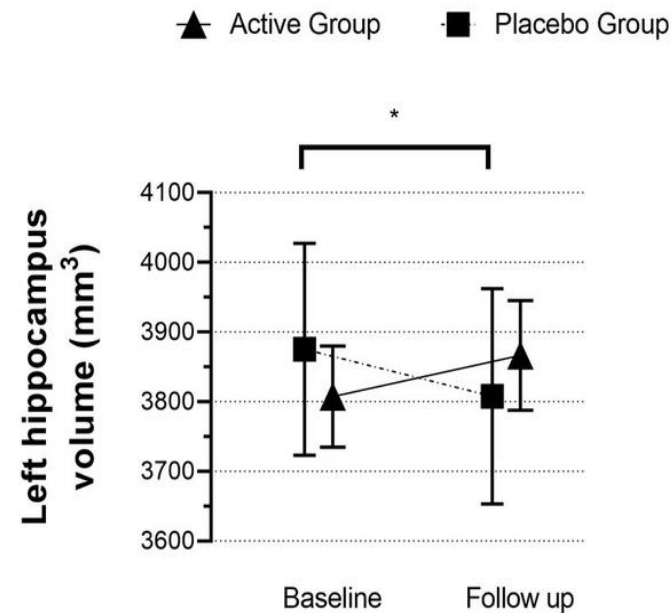


Probiotic-enriched yoghurt can impact brain structure and function

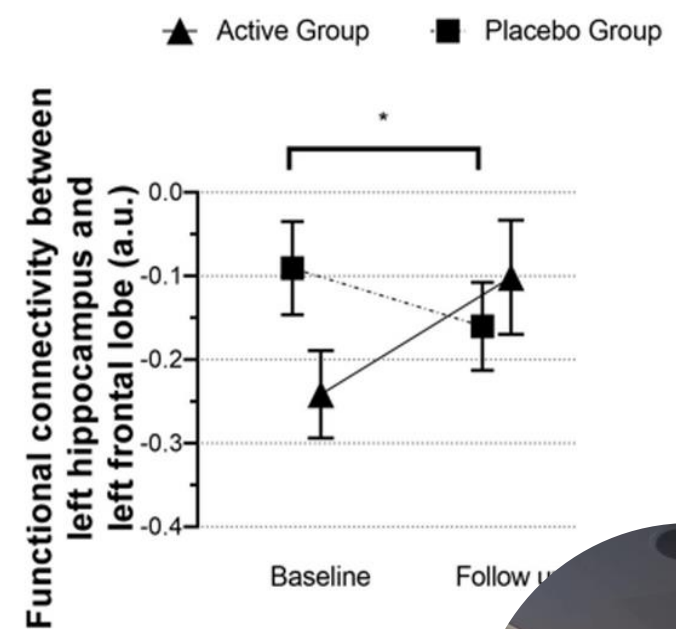
- Randomised controlled trial (8 weeks) of probiotic-enriched yoghurt (BB-12) versus a milk-based placebo in healthy women (n=40)



Glutathione concentration
(antioxidant)



Left hippocampal
volume

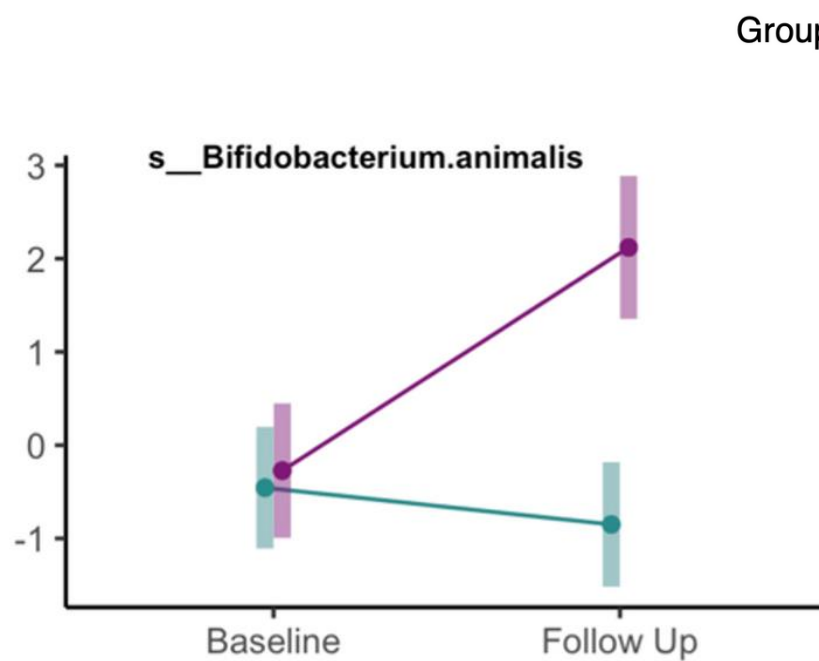


Functional
connectivity

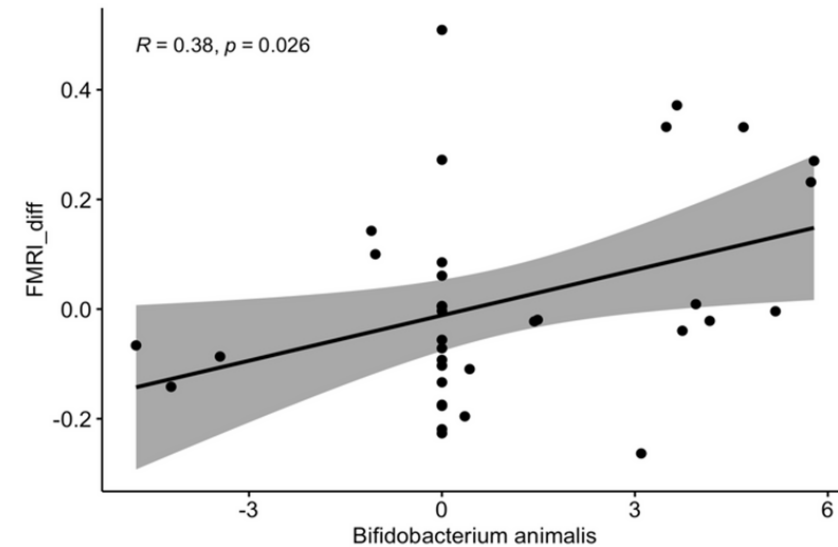
Marx et al. Gut (2025) In Press



Changes in *Bifidobacterium animalis* are positively correlated with changes in brain functional connectivity



B animalis (bacterium in the yoghurt) increased in the intervention group



Change in *B animalis* correlated with change in functional connectivity

Marx et al. Gut (2025) In Press





- Reforming rotational training p 308
- Nye and me: theatrical tales p 318
- Diagnosing asthma in children p 326
- The NHS is failing deaf people pp 305; 331
- 2 CPD hours in the education pages



ULTRA-PROCESSED
The foods that damage health
and shorten life



UPF intake associated
with an increased risk of
more than 70% of
health outcomes
studies



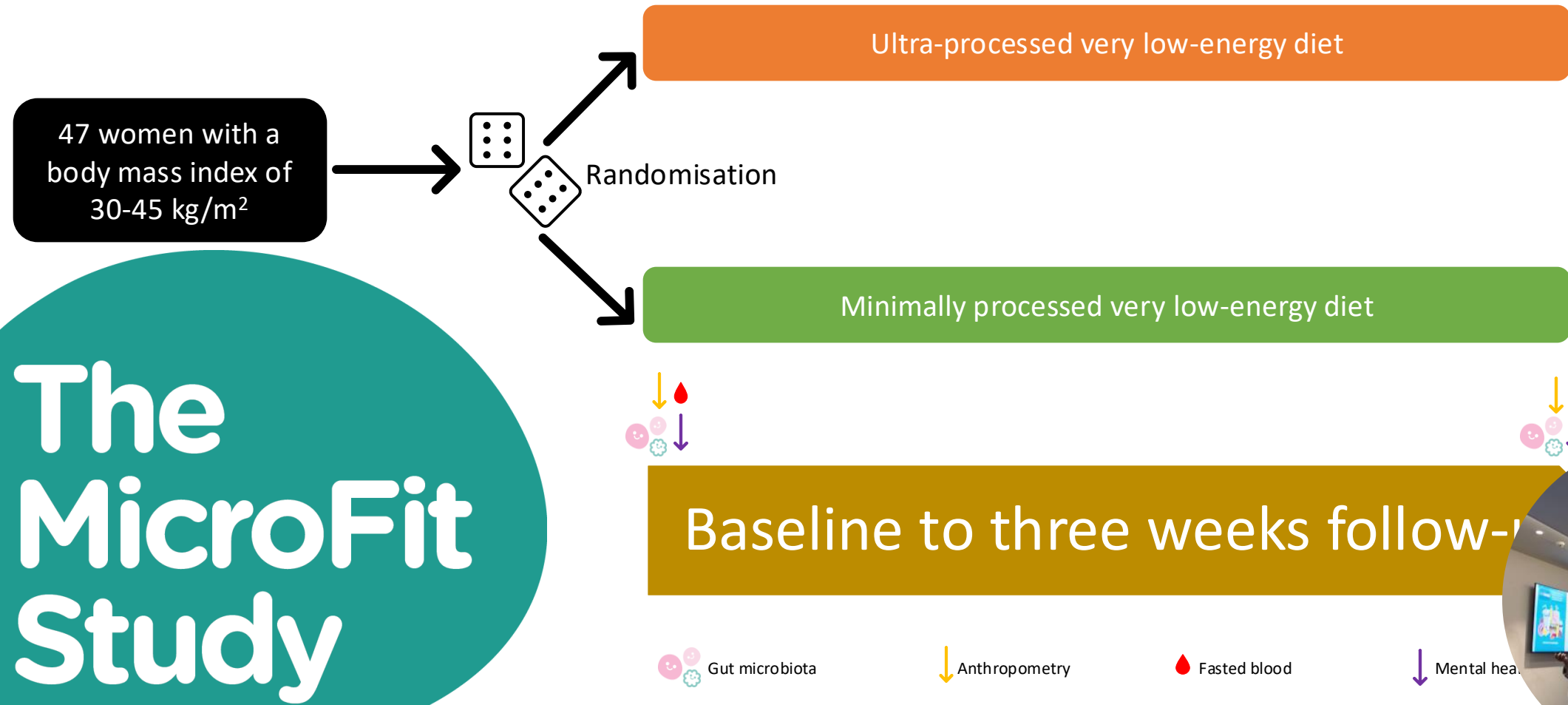
Particularly strong
evidence for increased
risk of:

- Early death
- Cardiometabolic Diseases
- Common Mental Disorders



Lane et al. BMJ (2024) 683 citat.....

A randomised controlled trial of **ultra-processed** versus **minimally processed** very low-energy diets (900 kcal/d or less) on gut microbiota in women with a high body mass index



The
MicroFit
Study

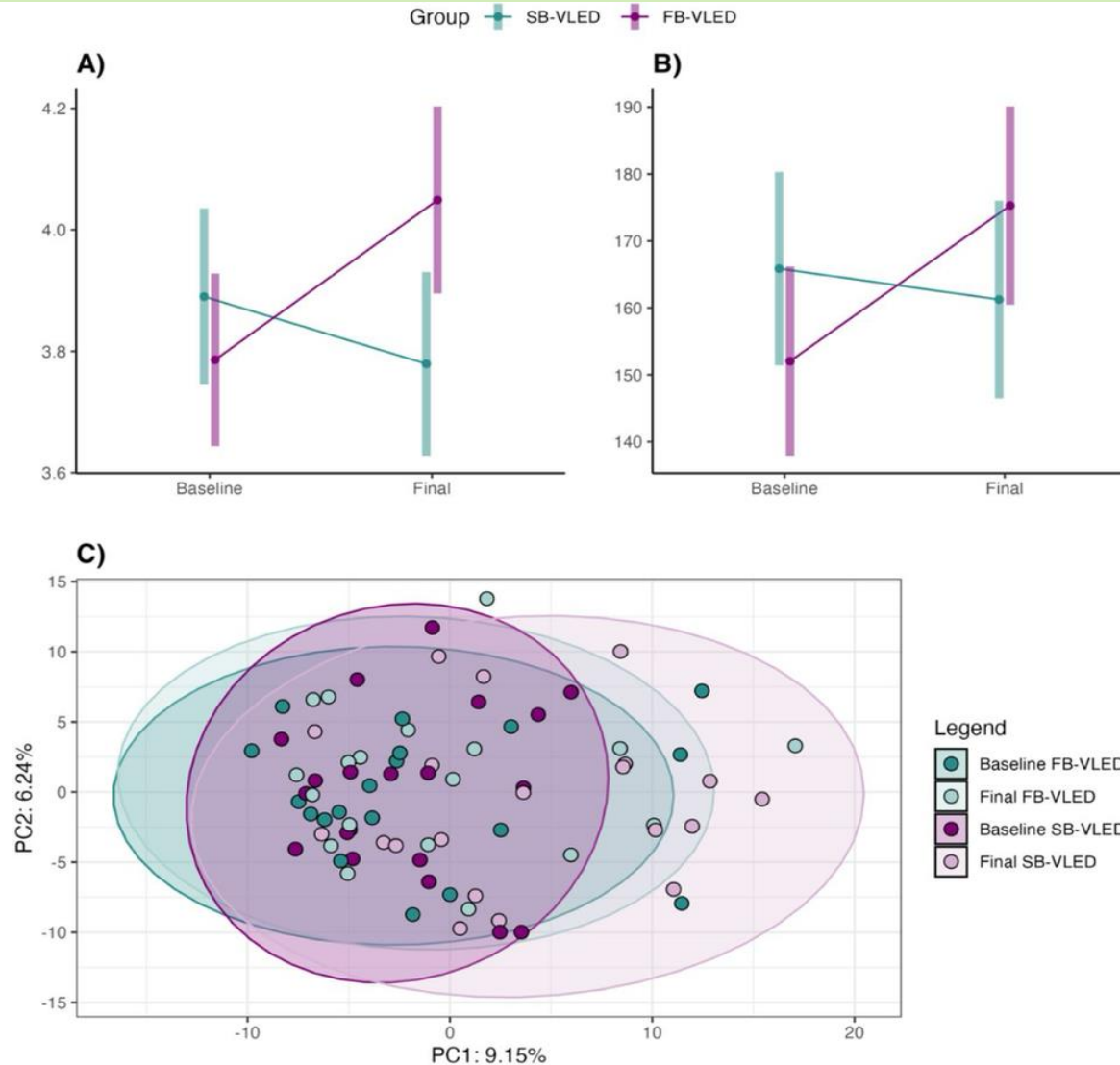


Degree of industrial processing may affect gut microbiome composition

The MicroFit Study



Lane et al. *Cell Reports Medicine* (2025)



policy and practice



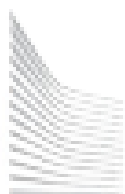


United Nations

unicef



World Health Organization



European
Commission





World mental health report: Transforming mental health for all

16 June 2022 | Report



Overview

Mental health is critically important to everyone, everywhere. All over the world, mental health needs are high but responses are insufficient and inadequate. The ***World mental health report: transforming mental health for all*** is designed to inspire and inform better mental health for everyone everywhere. Drawing on the latest evidence available, showcasing examples of good practice from around the world, and voicing people's lived experience, it highlights why and where change is most needed and how it can best be achieved. It calls on all stakeholders to work together to deepen the value and commitment given to mental health, reshape the environments that influence mental health, and strengthen the systems that care for mental health.

Executive summary: [Arabic](#) | [Chinese](#) | [English](#) | [French](#) | [Russian](#) | [Spanish](#)

WHO TEAM

Mental Health and Substance Use

EDITORS

World Health Organization

NUMBER OF PAGES

296

REFERENCE NUMBER

ISBN: 97892400

COPYRIGHT





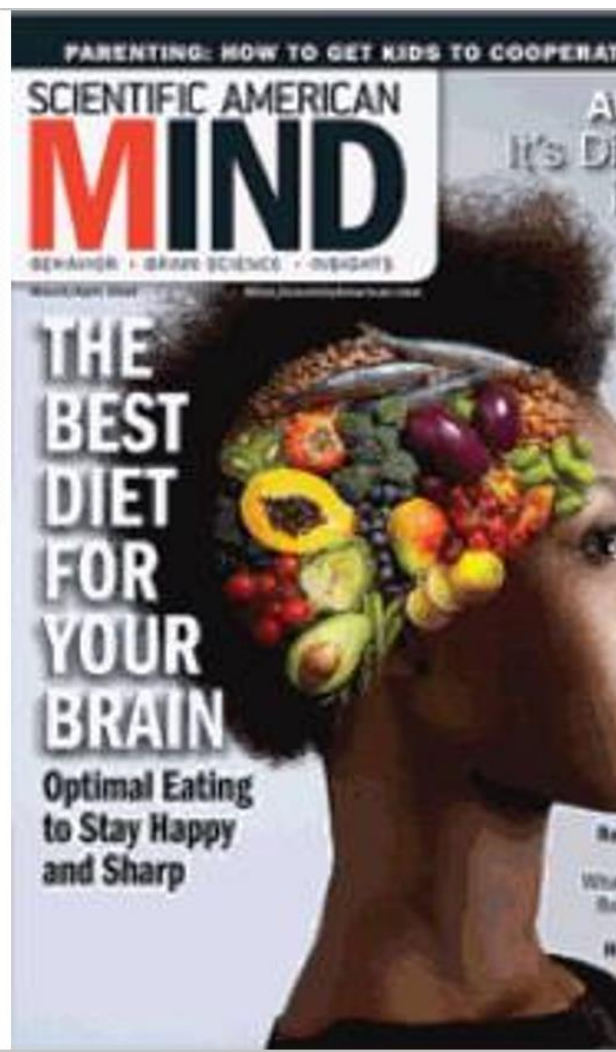
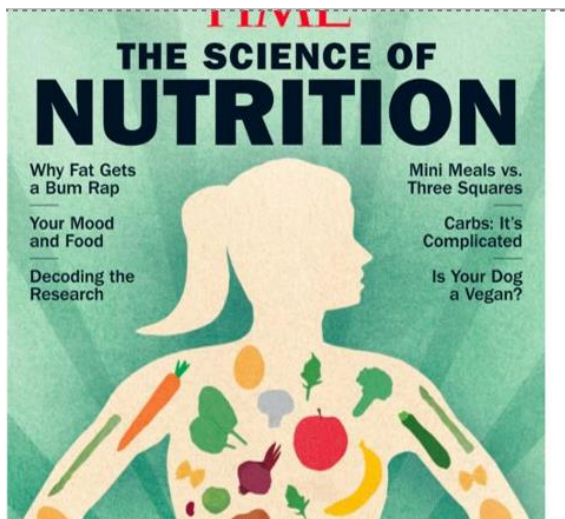
Global burden of disease Lifestyle And mental Disorders taskforce




FOOD & MOOD
CENTRE

The aim of the GLAD Taskforce is to investigate the contribution of lifestyle risk factors to common mental disorders globally in a way that affords integration into Global Burden of Disease (GBD) studies.





The Washington Post

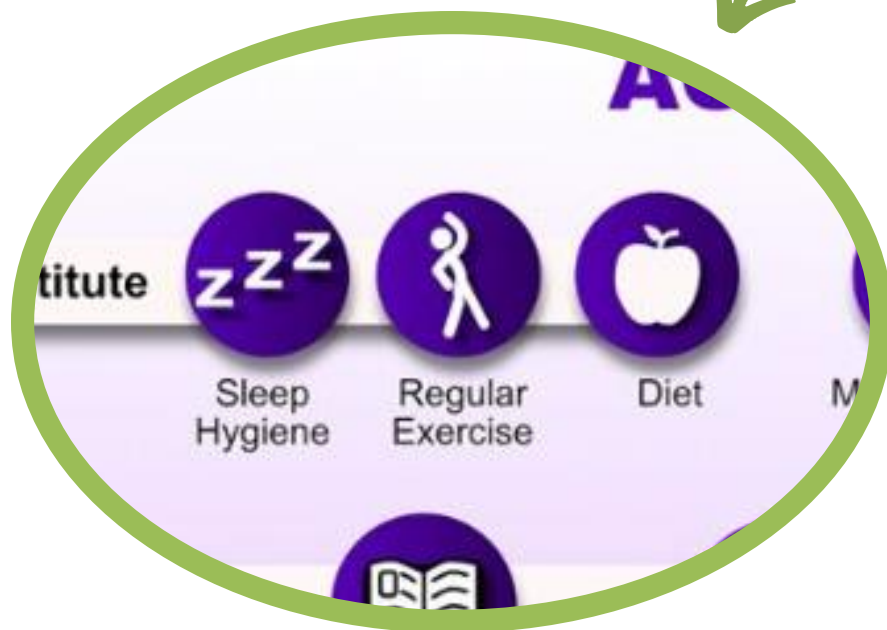
[Back to previous page](#)

Can what you eat affect your mental health? New research links diet and the mind.

By Gisela Telis, Tuesday, March 25, 8:12 AM



RANZCP Clinical Practice Guidelines



THE MANAGEMENT OF MAJOR DEPRESSION The Management of Major Depression



World Federation of Societies of Biological Psychiatry & Australasian Society of Lifestyle Medicine Lifestyle-Based Mental Health Care Clinical Guidelines for the management of depression



Evidence gradings & recommendations for (1) Exercise, (2) Relaxation, (3) Work, (4) Sleep, (5) Mindfulness, (6) Diet, (7) Green space, (8) Smoking cessation, (9) Loneliness and (10) Social support interventions



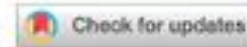
THE WORLD JOURNAL OF BIOLOGICAL PSYCHIATRY
<https://doi.org/10.1080/15622975.2022.2112074>



Taylor & Francis
Taylor & Francis Group

ORIGINAL INVESTIGATION

OPEN ACCESS



Clinical guidelines for the use of lifestyle-based mental health care in major depressive disorder: World Federation of Societies for Biological Psychiatry (WFSBP) and Australasian Society of Lifestyle Medicine (ASLM) taskforce

Wolfgang Marx^a , Sam H. Manger^{b,c} , Mark Blencowe^c, Greg Murray^d , Fiona Yan-Yee Ho^e , Sharon Lawn^{f,g} , James A. Blumenthal^{h,*}, Felipe Schuchⁱ , Brendon Stubbs^j , Anu Ruusunen^{a,k,l} , Hanna Demelash Desyibelew^m, Timothy G. Dinanⁿ , Felice Jacka^a , Arun Ravindran^o, Michael Berk^a  and Adrienne O'Neil^{a,*}



What about actual clinical practice?



74% psychiatrist and 66% psychologists reported **no training in nutrition**



Only 0.8% rated their **nutrition education as 'very good'**



Yet, **59% were recommending supplements** and 44% recommending specific diet strategies





foodmoodacademy@deakin.edu.au



foodandmoodcentre.com.au/academy



[@foodandmoodacademy](https://www.instagram.com/foodandmoodacademy)



[Food & Mood Academy](https://www.linkedin.com/company/food-mood-academy)

Connect with us

FOOD & MOOD
 ACADEMY

Follow us on Instagram

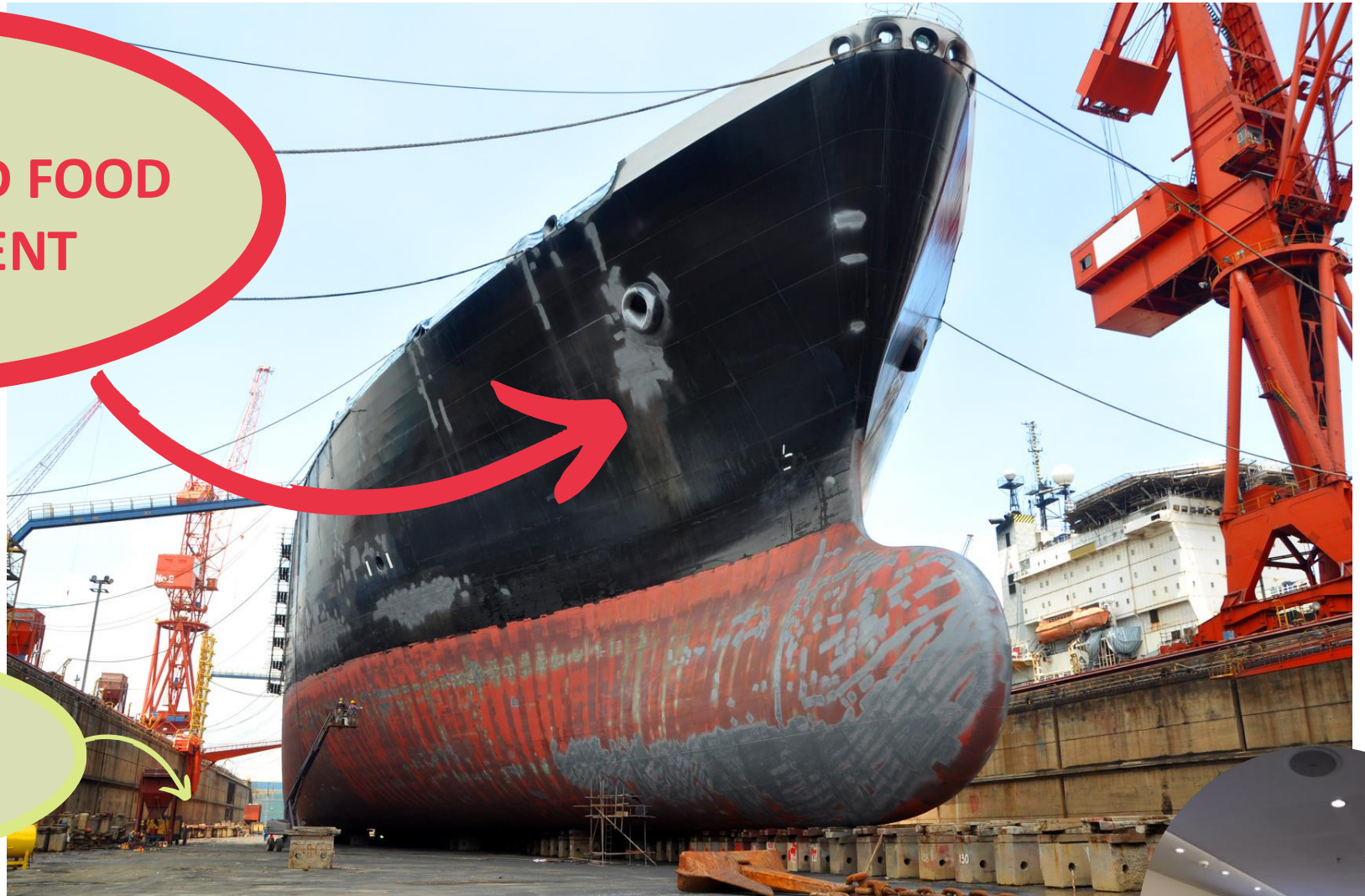


Dr Tetyana Rocks



INDUSTRIALISED FOOD ENVIRONMENT

LIFESTYLE
ADVICE



Costs of the industrialised food system

US\$20 trillion a year



Recent Insights

Explore



REPORT

Transforming the Global Food System for Human Health and Resilience



BLOG

The pathway to a sustainable food system is through human health

09.21.2023

Nutrition | Sustainability



VIDEO

Did you know there is a connection between your gut and the soil?

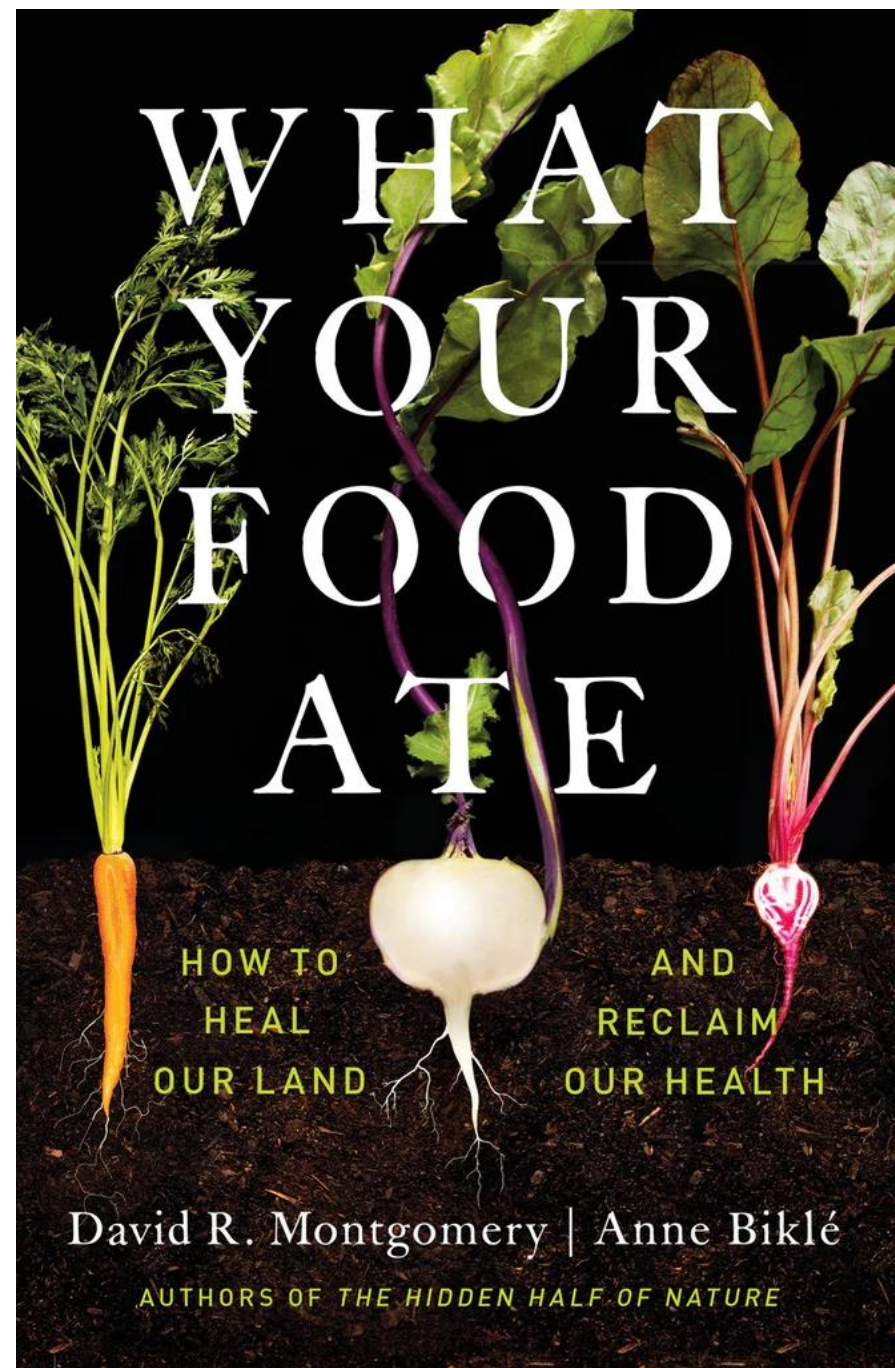
Nutrition | Sustainability



VIDEO

Fruit and veg prescriptions could save billions in healthcare b





Long-term biodiversity intervention shapes health-associated commensal microbiota among urban day-care children

Marja I Roslund¹, Riikka Puhakka¹, Noora Nurminen², Sami Oikarinen², Nathan Siter³, Mira Grönroos¹, Ondřej Cinek⁴, Lenka Kramná⁴, Ari Jumpponen⁵, Olli H Laitinen², Juho Rajaniemi³, Heikki Hyöty², Aki Sinkkonen⁶, ADELE research group



Roslund et al. (2020)



jakemrobinson.com

THE ***GROUND***ED MINDS CONSORTIUM

Nourishing the soil, gut & mind connection



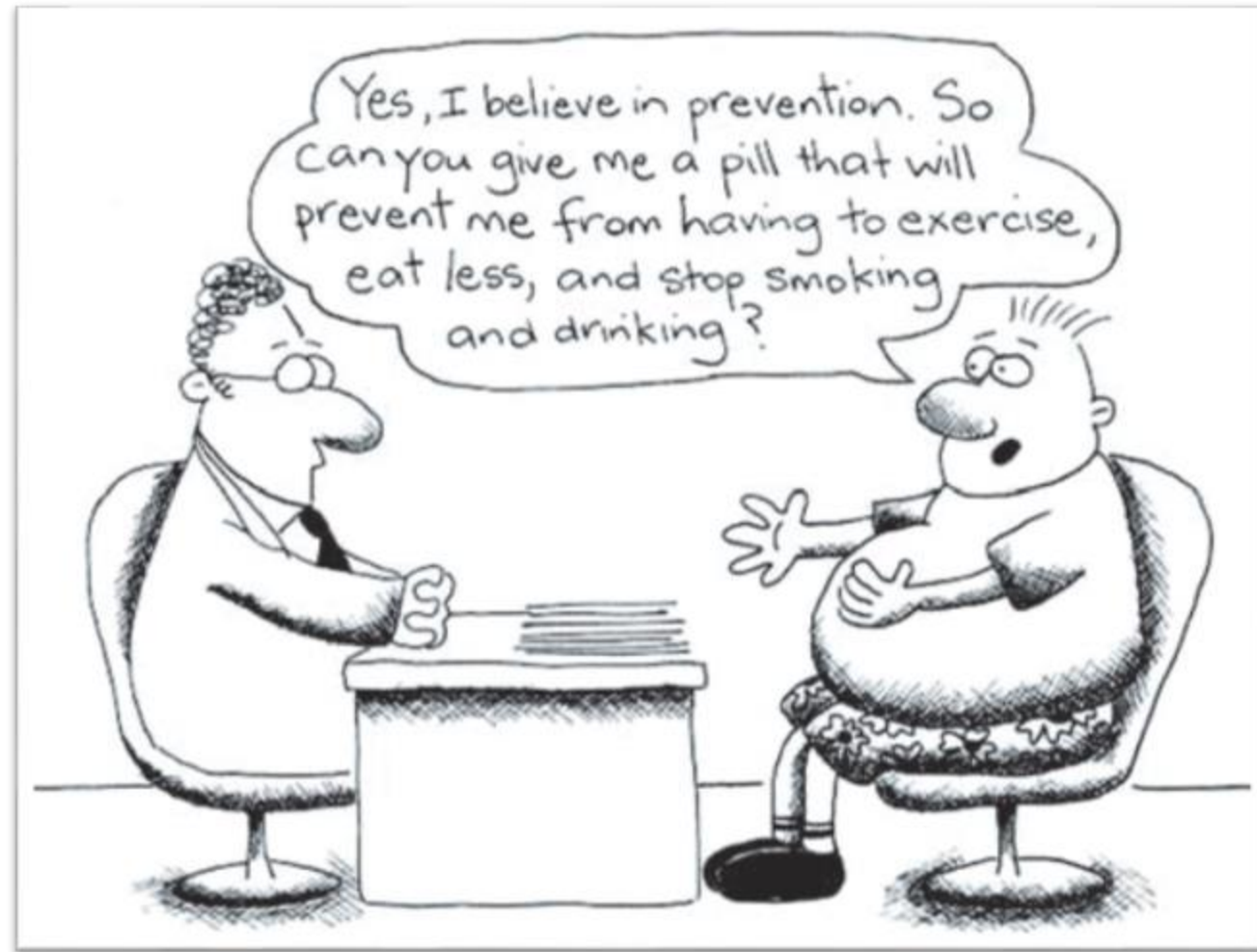
A Deakin University & Flinders University Collaboration



‘Transform the Food System to Promote Mental and Brain Health’

Our consortium leverages cutting-edge research and international expertise and reputations in microbiome science, nutritional psychiatry, agriculture, and ecology to bridge the missing links between soil, food, and mental and brain health in humans.





WWW.FOODANDMOODCENTRE.COM.AU



FOOD & MOOD

CENTRE

A **DEAKIN** IDEA



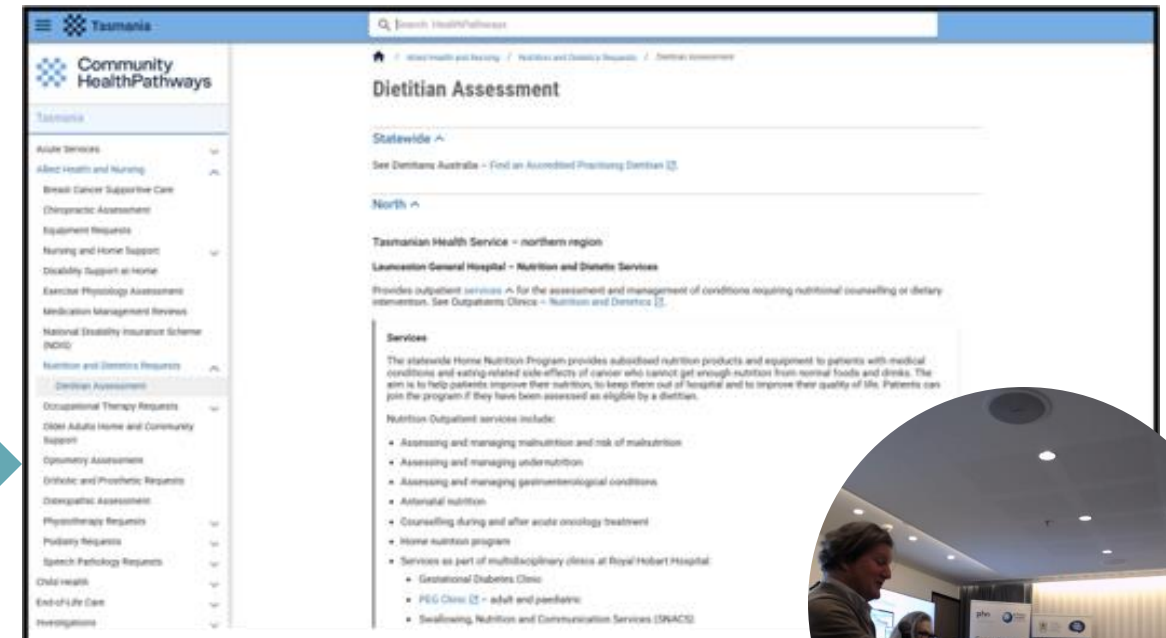
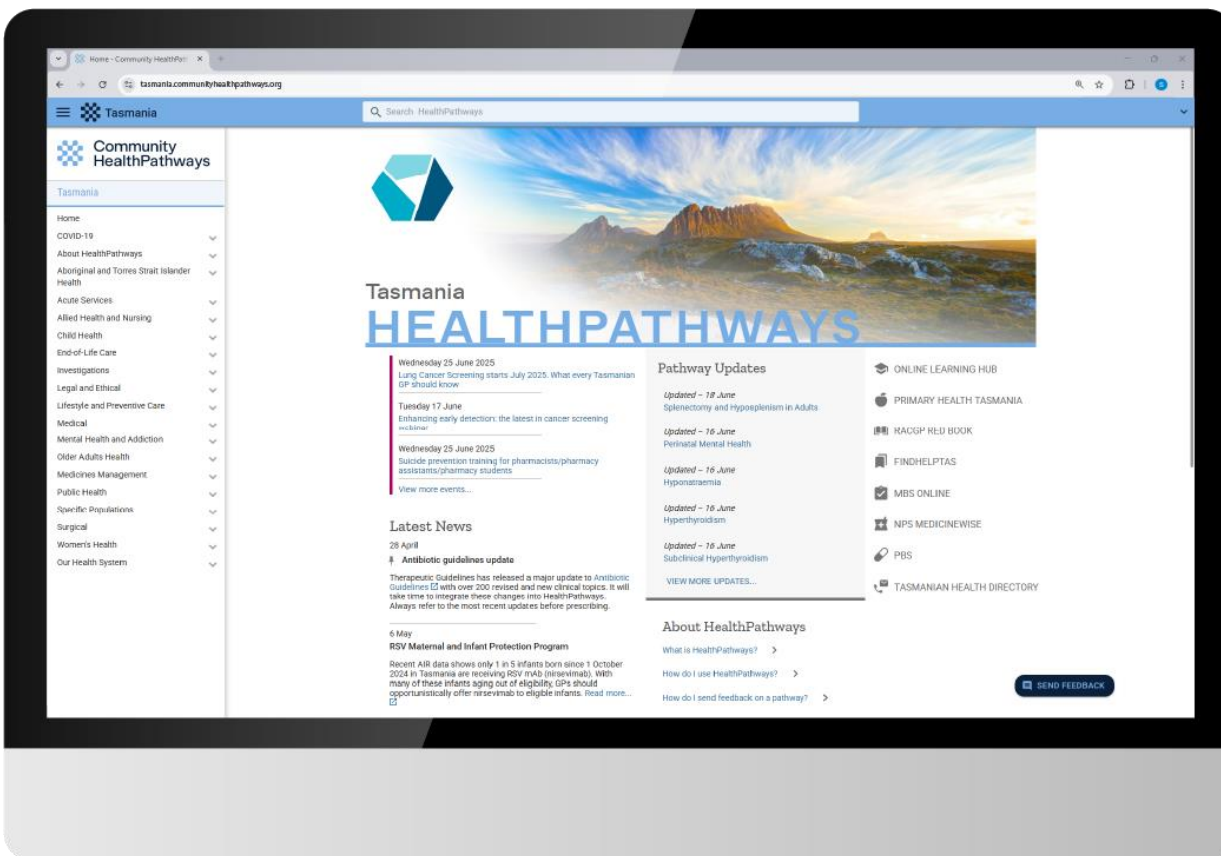


Tasmanian HealthPathways

is a web-based information portal developed by Primary Health Tasmania. It is designed to help primary care clinicians plan local patient care through primary, community and secondary healthcare system

tasmania.communityhealthpathways.org





To gain access to HealthPathways, please email
healthpathways@primaryhealthtas.com.au

Some final words

- Please complete the evaluation survey – this will help inform future events.
- Statements of attendance will be emailed to participants.
- For event queries, please contact events@primaryhealthtas.com.au

Thank you

Evaluation survey - The gut, brain
and mental health connection



Disclaimer

- Information presented in event organised by Primary Health Tasmania can come from a number of sources, and does not necessarily reflect the views of Primary Health Tasmania. Every reasonable effort is taken to ensure the information is accurate and current.
- The content is general in nature – please refer to any referenced guidelines or standards for further information. Health professionals should rely on their own independent inquiries and professional judgement when making any decisions.
- Primary Health Tasmania and the Australian Government are not responsible for any injury, loss or damage however arising from the use of or reliance on the information provided in this webinar.

Stay informed



www.primaryhealthtas.com.au



www.facebook.com/primaryhealthtas



www.twitter.com/TasPHN
[@TasPHN](https://twitter.com/TasPHN)

