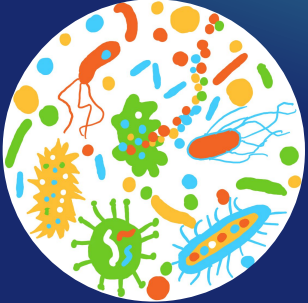




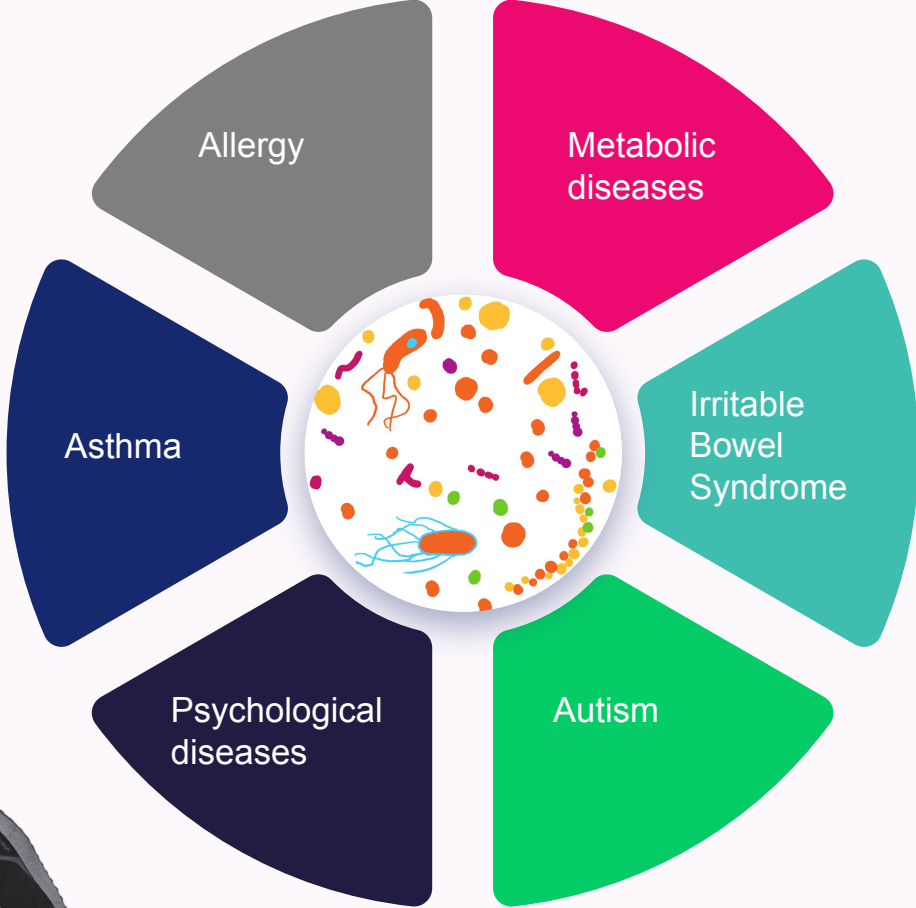
Primed to commercialise
a next generation
probiotic



The Gut Microbiome is directly linked to Health and Well-being



Healthy



Unhealthy

New Market Opportunities



As we learn more about the gut microbiome, both **therapeutic and prophylactic next generation probiotics** will be developed and commercialised



Proliferation of literature in the last 5 years – **over 20,000** new research publications looking at health and the microbiome



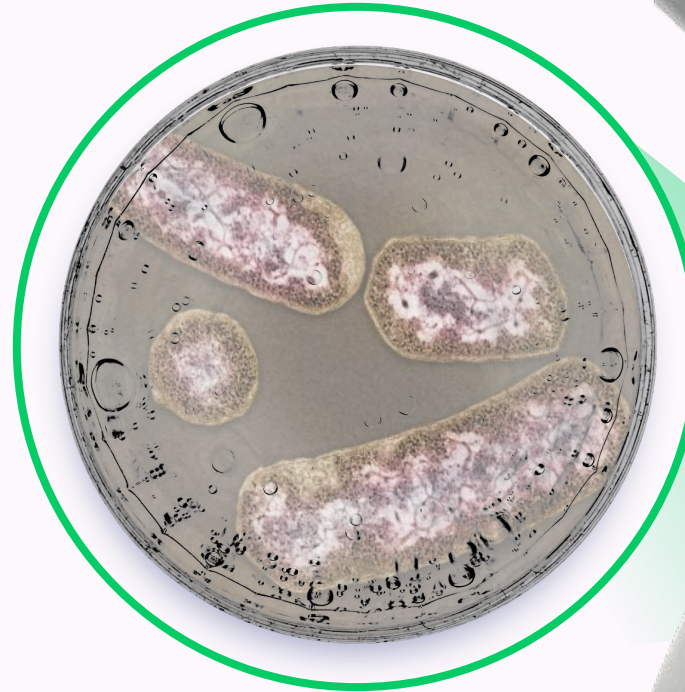
The global probiotics market size was estimated at **USD 77 billion** in 2022 and is expected to grow at an annual growth rate (AGR) of **14% from 2023-2030¹**

¹ <https://www.grandviewresearch.com/industry-analysis/probiotics-market>

Prevotella copri
is an important part
of the gut microbiome

A key bacteria
in the gut microbiome of humans and
companion / farm animals

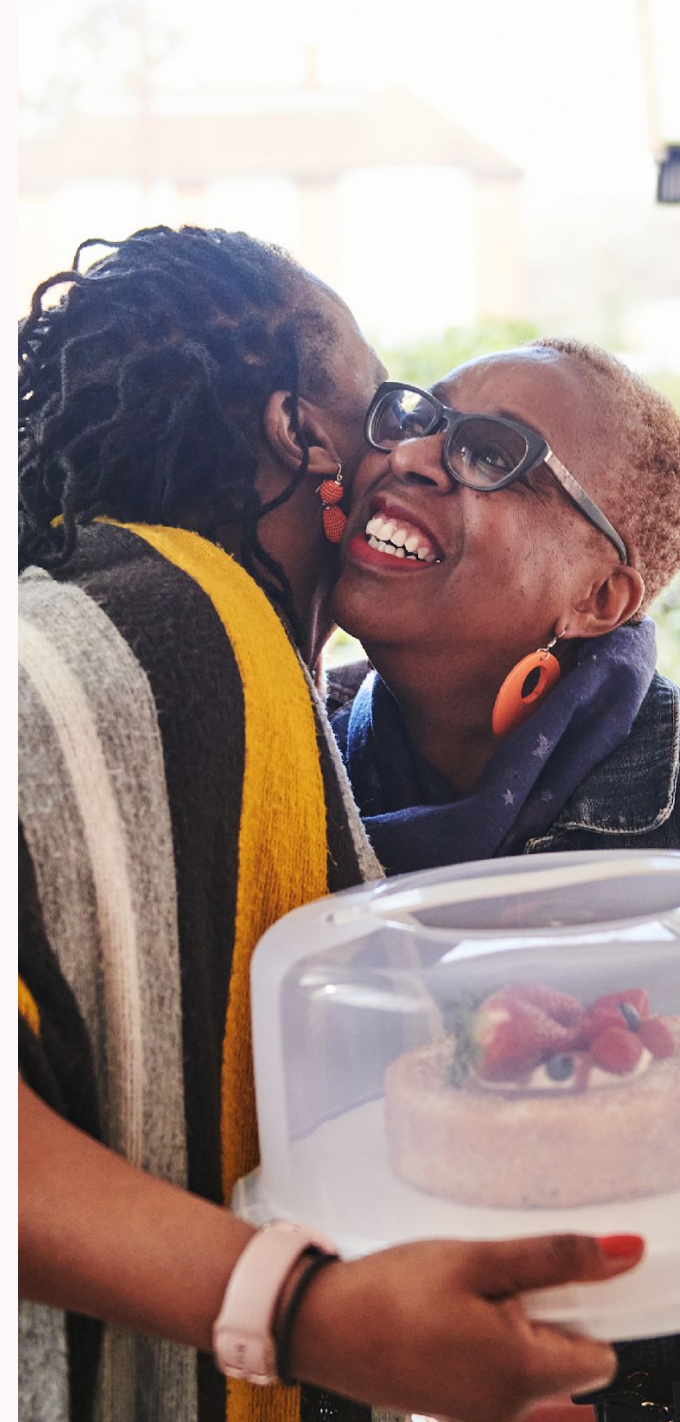
Recent large population studies have
highlighted the positive relationships of
Prevotella copri with human health



Primed for commercialisation

Prevatex has

- ✔ Completed research supporting the importance of *Prevotella copri* in healthy human and animal gut microbiomes
- ✔ Developed significant intellectual property around manufacture and use of *Prevotella copri* as a probiotic
- ✔ Developed commercial scale capability for manufacture and supply of *Prevotella copri*





Prevotella copri:
Population
Studies

Large population-based studies confirm benefits of *Prevotella copri* in the gut



8,208 individuals, ages 8–84 *Prevotella copri* was strongly associated with good general health

The Dutch Microbiome Project¹

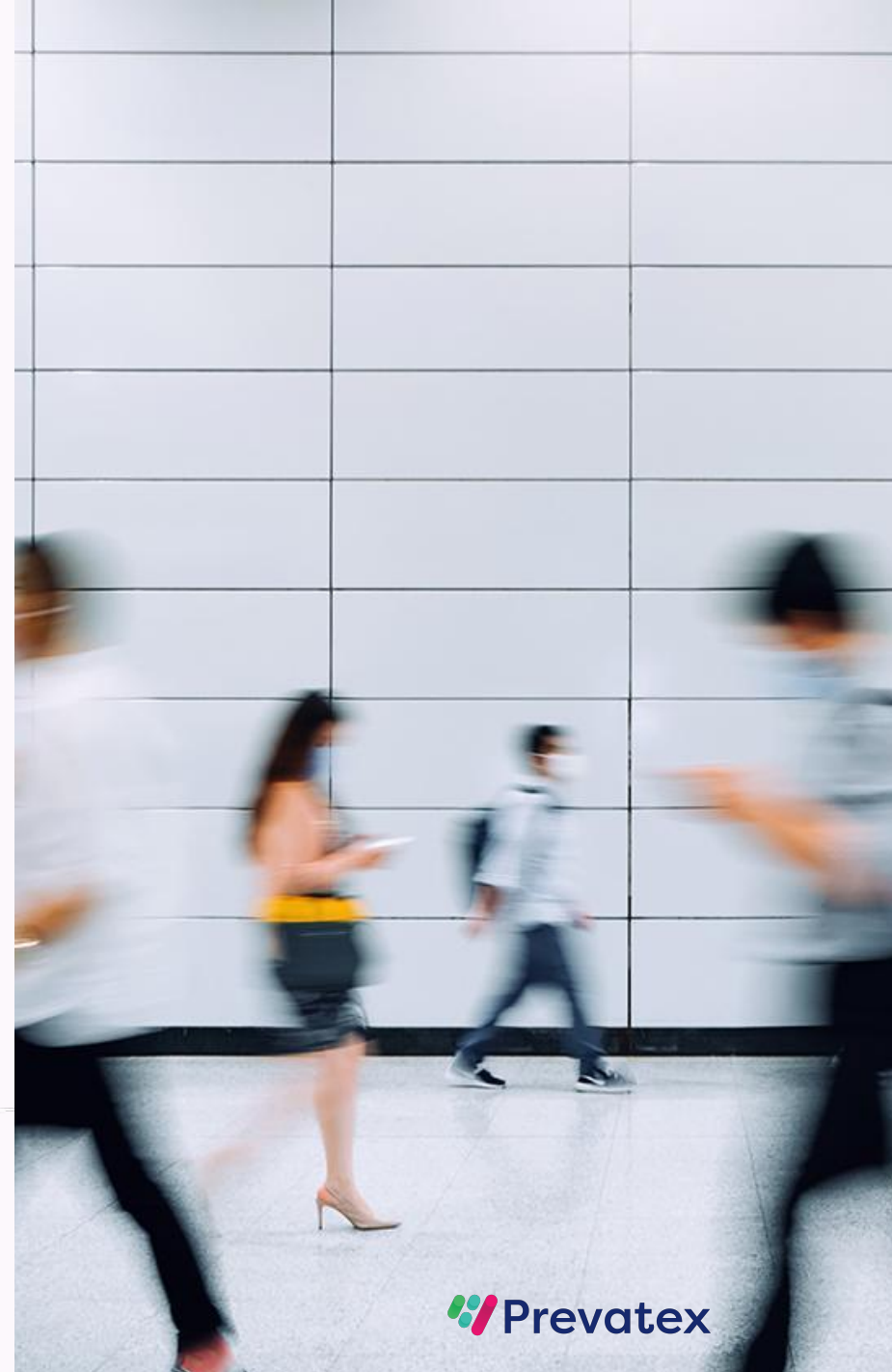


1,098 individuals *Prevotella copri* was related to improved cardiometabolic markers

(PREDICT 1) study²

¹ Gacesa R *et al*: Environmental factors shaping the gut microbiome in a Dutch population. *Nature* 2022, 604(7907):732-739

² Asnicar F *et al*: Microbiome connections with host metabolism and habitual diet from 1,098 deeply phenotyped individuals. *Nat Med* 2021, 27(2):321-332



Large population-based studies confirm link between *Prevotella copri* and health outcomes



21,000 gut microbiomes from 7 data repositories, across 5 continents, ages (18–107) *Prevotella copri* was one of the key bacteria associated with healthy aging¹



612 elderly subjects across 5 European countries before/after administration of 12-month Mediterranean Diet) *Prevotella copri* was positively associated with lower frailty, improved cognitive function and lower inflammatory markers²

¹ Ghosh TS, Shanahan F, O'Toole PW: Toward an improved definition of a healthy microbiome for healthy aging. Nature Aging 2022, 2(11):1054-1069

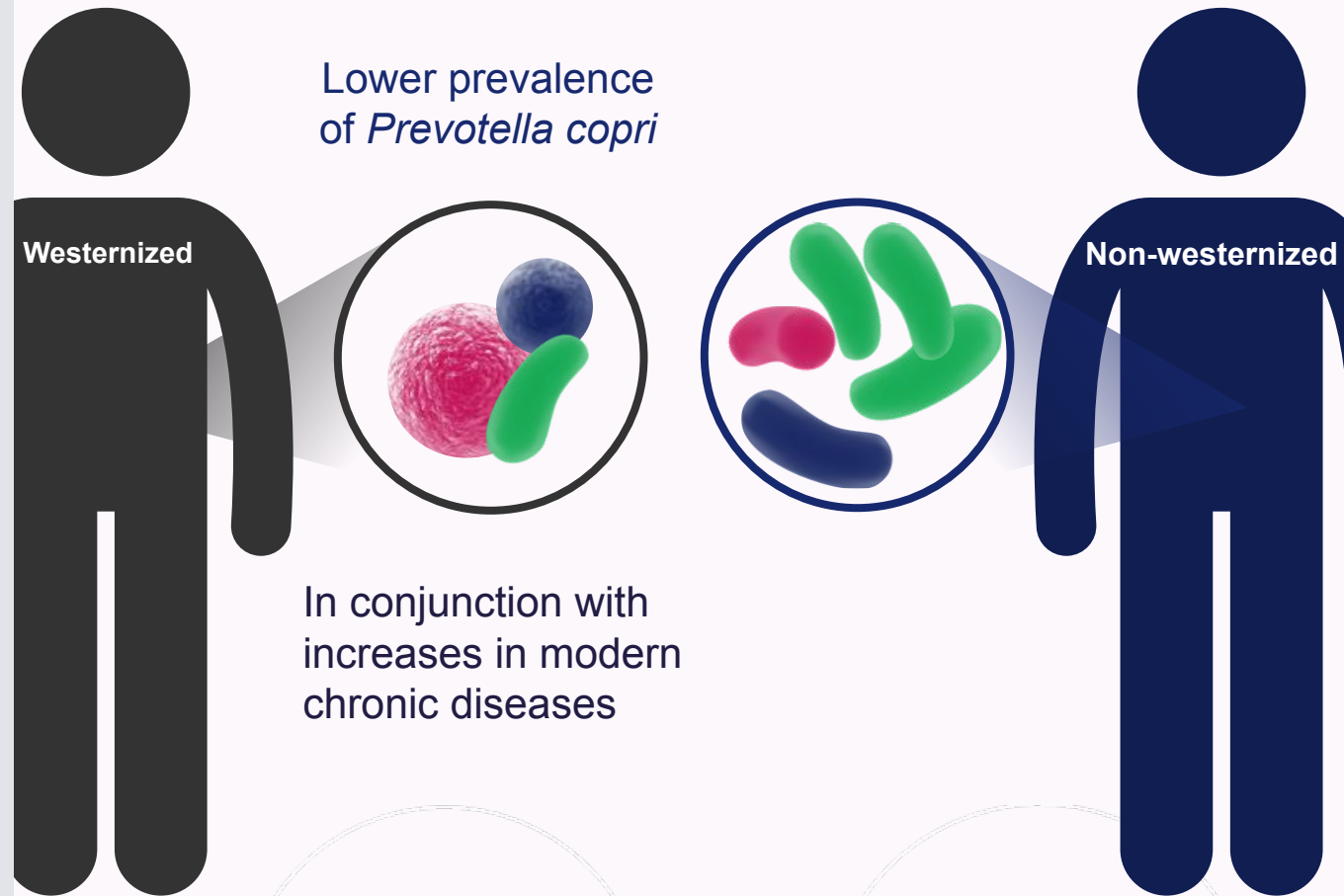
² Ghosh TS, Rampelli S, Jeffery IB, Santoro A, Neto M, Capri M, Giampieri E, Jennings A, Candela M, Turroni S et al: Mediterranean diet intervention alters the gut microbiome in older people reducing frailty and improving health status: the NU-AGE 1-year dietary intervention across five European countries. Gut 2020, 69(7):1218-1228



Prevotella copri has been lost with westernisation

Samples from 29 countries show substantial loss of *Prevotella copri* with westernization (From 95% down to 30% prevalence)^{1,2}

272 recently sequenced non-Westernised metagenomes
Prevotella copri is one of the most prevalent gut bacteria



¹ Tett-A et al. The *Prevotella copri* Complex Comprises Four Distinct Clades Underrepresented in Westernized Populations, Cell Host and Microbe 2019
² Filipo-C et al. Impact of diet in shaping gut microbiota revealed by a comparative study in children from Europe and rural Africa, PNAS 2010

Prevotella copri
is also key to healthy
companion animal
microbiomes



In dogs,
Prevotella copri is:

● Part of the healthy
canine gut
microbiome

● Significantly reduced
in intestinal, atopic,
and heart disease^{1,2,3}

● A prime candidate for
novel canine probiotic
products



Ongoing Prevatex
research is advancing
understanding and
creating new IP



Why focus on early life?

Development of chronic disease and allergy starts in early life¹



The microbiome at these **time points** is **critical**



Origins of disease **begin in-utero**

and **in the first years of life**

¹ Hoffman-DJ et al. Developmental Origins of Health and Disease: Current Knowledge and Potential Mechanisms, Nutr Rev 2017



Ground-breaking new science



The Barwon Infant Study (BIS) is an internationally unique study designed to investigate the relationship between the human microbiome and health.

Recruited **1,064 pregnant** women with **1,074 infants born**

BIS is the first study globally to compare the human maternal microbiome during pregnancy with the baby's risk of allergic disease.

Prevatex Discoveries

Prevotella copri in mothers protects from infant allergy

In women who carried *Prevotella copri* in the gut microbiome during pregnancy, their offspring



Were protected from developing food allergy at age one¹



Had significantly reduced risk of allergic sensitisation to aeroallergens at age four



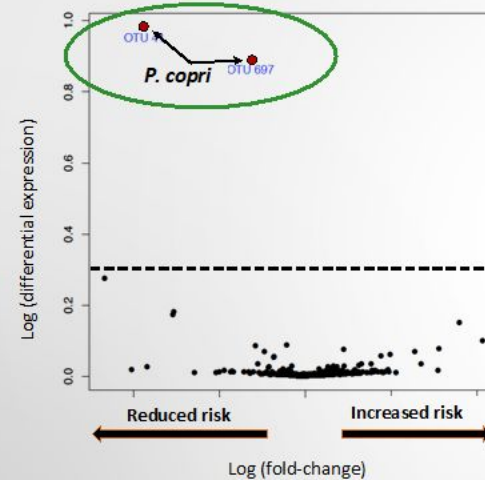
¹ Vuillermin PJ et al: Maternal carriage of *Prevotella* during pregnancy associates with protection against food allergy in the offspring. Nat Commun 2020, 11(1):1452

Prevotella copri was the only bacteria strongly associated with protection against food allergy

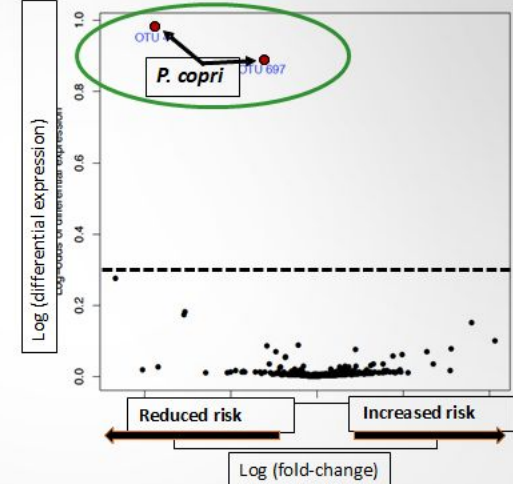


There was a clear association between abundance of *Prevotella copri* during pregnancy and a reduced risk of proven food allergy at 1 year of age¹

Analysis of bacterial OTUs and risk of food allergy



Analysis of bacterial OTUs and risk of food allergy

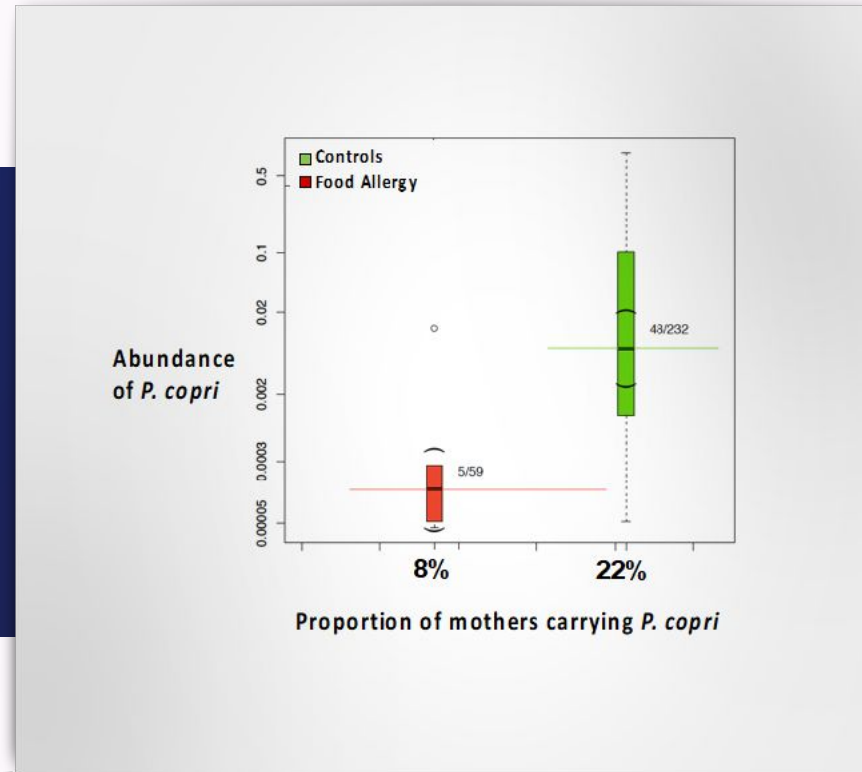


¹ Vuillermin PJ et al: Maternal carriage of *Prevotella* during pregnancy associates with protection against food allergy in the offspring. Nat Commun 2020, 11(1):1452

The absence of maternal *Prevotella copri* is linked to development of food allergy in the infant



Mothers of infants that developed food allergy either had no *Prevotella copri* or very, very little in their gut microbiome



¹ Vuillermin PJ et al: Maternal carriage of *Prevotella* during pregnancy associates with protection against food allergy in the offspring. Nat Commun 2020, 11(1):1452

Prevatex Discoveries

Prevotella copri in infants protects from
childhood behavioural problems

Infants that carried *Prevotella copri* in the gut
microbiome at age 12 months, did not develop
behavioural problems at 2-years of age¹

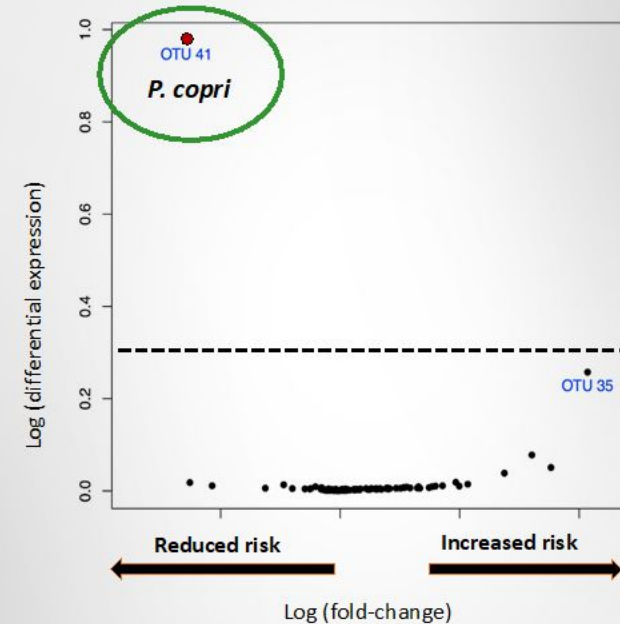
¹Loughman A et al: Gut microbiota composition during infancy and subsequent behavioural outcomes. EBioMedicine 2020, 52:102640

Prevotella copri in the infant microbiome at 1 year protected against adverse behavioural outcomes at 2 years



In 201 infants from an Australian birth cohort there was a clear association between reduced abundance of *Prevotella* in infancy and increased risk of adverse behaviour at 2 years of age

Analysis of bacterial OTUs and risk of adverse behaviour





Veterinary clinical trials
in dogs confirm benefits
of Prevatex's *Prevotella*
copri

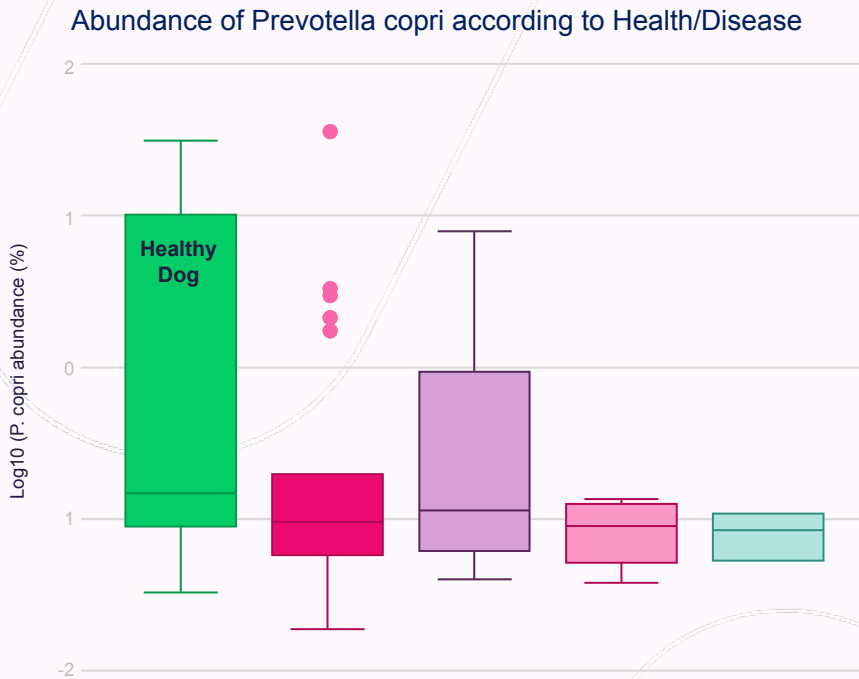


Prevatex Clinical Trial

80 Dogs were recruited in the UK.

The lowest levels of *Prevotella copri* were seen in dogs with:

Gastrointestinal problems, atopic skin disease and joint disease



Healthy dog

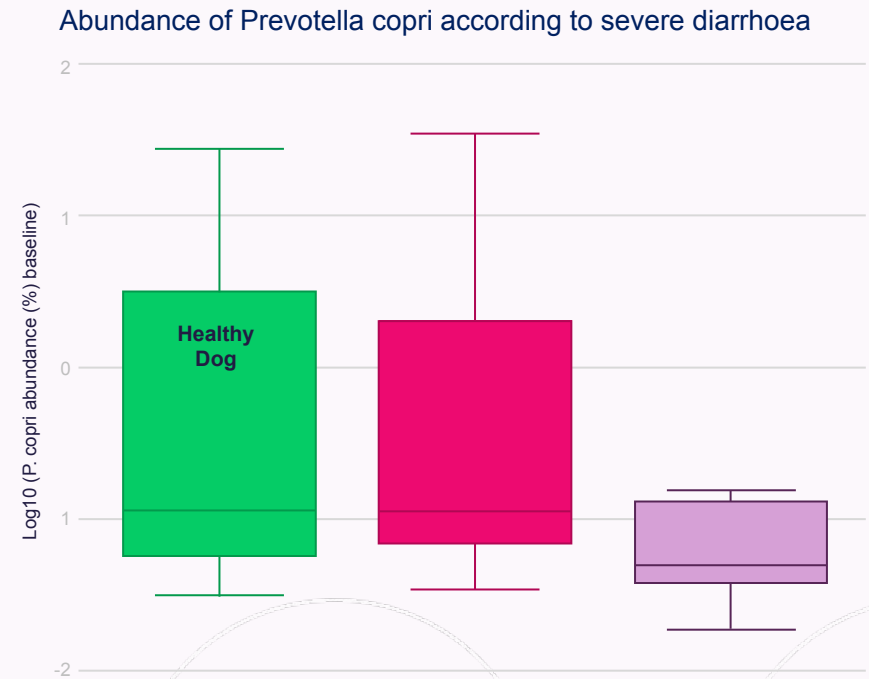
Gut disease

Skin disease

Gut & skin disease

Joint disease

Severe diarrhoea (2++ times per week)



Healthy Dog

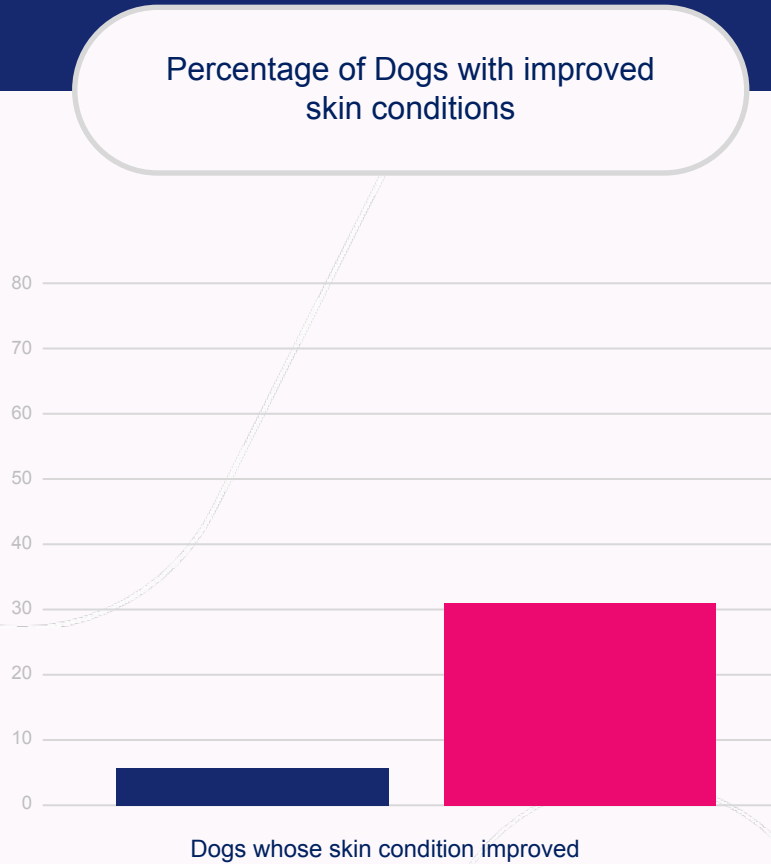
Once a week

2++ diarrhoea

Prevatex Clinical Trial

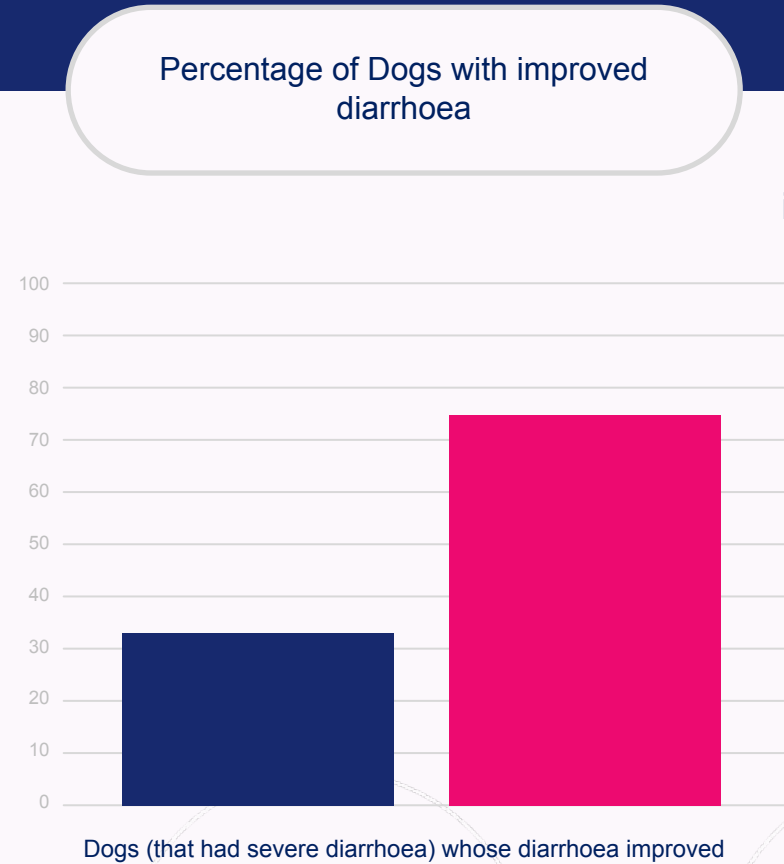
Treatment with *Prevotella copri* for 30 days resulted in

5.2-fold
improvement in
skin condition
over 30 days



Percentage of Dogs with improved diarrhoea

2.3-fold
improvement in
diarrhoea over
30 days



Control

P. copri



Prevotella copri
is not yet available as a
human PROBIOTIC



Prevotella copri: New commercial opportunity

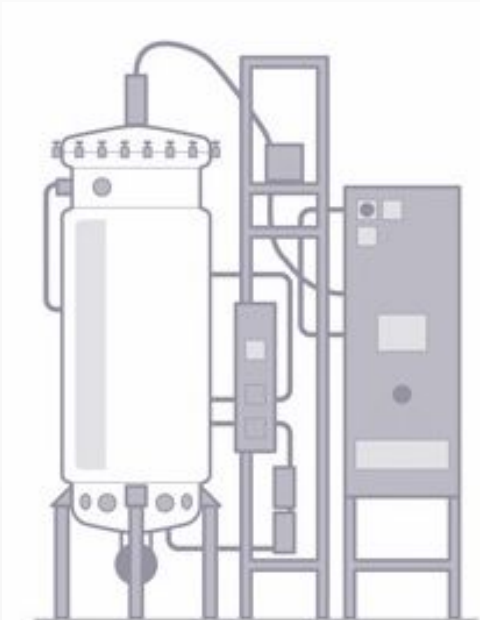
Prevatex has

- ✔ A proprietary, characterised *Prevotella copri* strain, PVX 03™
- ✔ Manufacturing capability at commercial scale
- ✔ Specific know how and IP around manufacture and use of *Prevotella copri* in humans and dogs
- ✔ Ongoing innovative new research creating new IP
- ✔ Next steps will be registration and launch of probiotics in key jurisdictions



The worlds first *Prevotella copri* Probiotic

Contract Manufacturing with Probiotics Australia



Growth optimized in the laboratory



Expanded to 20L and 300L with growth kinetics, viability



Now able to complete 6,000L commercial run:

- Freeze-dried API product
- cGMP compliant > ready for commercialisation



Probiotics Australia is Australia's first and only cGMP/TGA certified facility for probiotic API manufacturing



A state-of-the-art biomanufacturing plant that can cater for the next generation of biotechnologies



Probiotics Australia has been designed based on the requirements of cGMP, HACCP, and ACO and it is continuously monitored and improved by its quality assurance department



Probiotics Australia is committed to quality and safety via the certification of cGMP by the TGA (Therapeutic Goods Administration) which is the regulatory body for therapeutic goods in Australia

Compelling opportunity to commercialise PVX 03™ - the first *Prevotella copri* probiotic

Prevatex has

- ✔ Completed research supporting the role of *Prevotella copri* as an important part of a healthy microbiome
- ✔ Developed significant IP (as patents and know-how) around *Prevotella copri*
- ✔ Developed ability to manufacture *Prevotella copri* product at commercial scale
- ✔ Developed an understanding of the regulatory regimes for product release both as a human and or a veterinary probiotic





Next steps

To complete development
and bring to market novel
probiotic-based biotherapeutics to
establish and maintain a healthy
microbiome in humans
and companion animals.

Thank you.

