

Skin and gut microbiome

MC webinar

Skin condition: indicative for general health

- Skin is window to our internal condition
- Many known skin aspects linked to diseases
 - E.g. “butterfly” rash → systemic lupus erythematosus¹



1. Ellis, R. R. WebMD (2022), <https://www.webmd.com/skin-problems-and-treatments/ss/slideshow-skin-and-health>

Skin condition: indicative for general health

- Other examples^{1,2}:
 - Itching → potentially diabetes, lymphoma, meds



1. American Academy of Dermatology Association (2021), <https://www.aad.org/public/diseases/a-z/skin-overall-health>
2. American Academy of Dermatology Association. (2018), <https://www.aad.org/public/diseases/a-z/heart-disease-warning-signs>

Skin condition: indicative for general health

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 - Itching → potentially diabetes, lymphoma, meds
 - Dry skin → potentially thyroid disorders
 - Dandruff → potentially Parkinson's disease, stroke
 - Acne → potentially PCOS



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Skin condition: indicative for general health

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 - Itching → potentially diabetes, lymphoma, meds
 - Dry skin → potentially thyroid disorders
 - Dandruff → potentially Parkinson's disease, stroke
 - Acne → potentially PCOS
 - Yellow/orange → potentially kidney or liver disease
 - Bumps around eyes → potentially high cholesterol
 - Painful lumps in your fingers/toes → potentially infective endocarditis

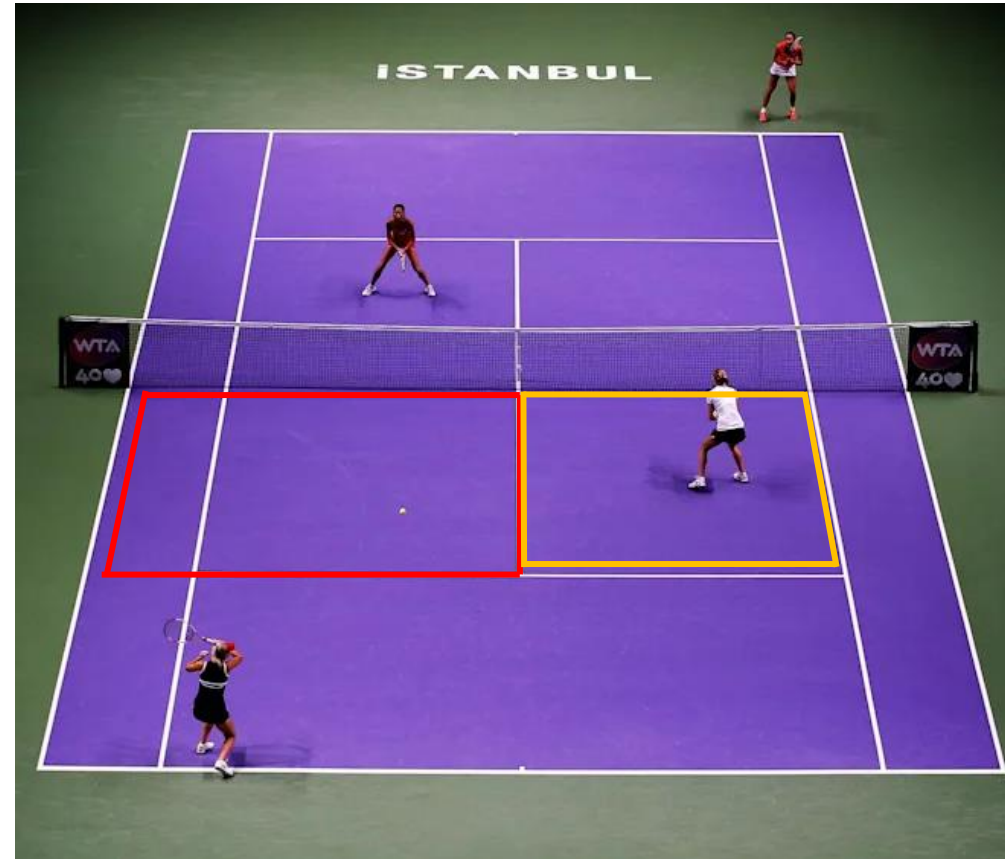


1. American Academy of Dermatology Association (2021), <https://www.aad.org/public/diseases/a-z/skin-overall-health>
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The skin: a large contact area with outside world



- The **intestines** are the largest area of contact with the outside world: approximately 32 m².¹
- The **microbial density in the gut** is very high: we harbor approximately **10¹⁴** bacterial cells in our gut.²
 - This is 1.3x more bacterial cells than human cells².

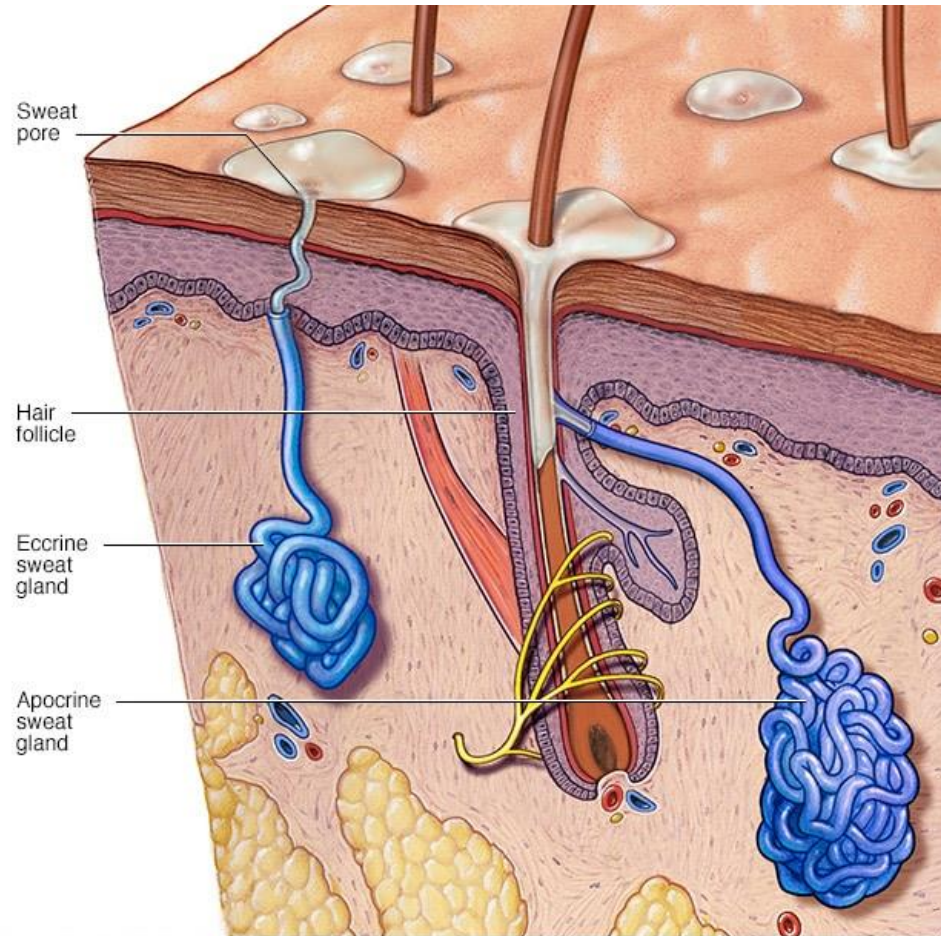


- The **skin** area of contact with the outside world: approximately 25 m².³

1. Helander, H. F. et al. Scandinavian Journal of Gastroenterology 49, 681–689 (2014)
2. Sender, R. et al. PLoS Biol 14, (2016)
3. Gallo, R. L. J Invest Dermatol 137, 1213–1214 (2017)
4. Mayo Clinic. Hyperhidrosis (2022), <https://www.mayoclinic.org/diseases-conditions/hyperhidrosis/symptoms-causes/syc-20367152>

The skin: a large contact area with outside world

- The **intestines** are the largest area of contact with the outside world: approximately 32 m^2 .¹
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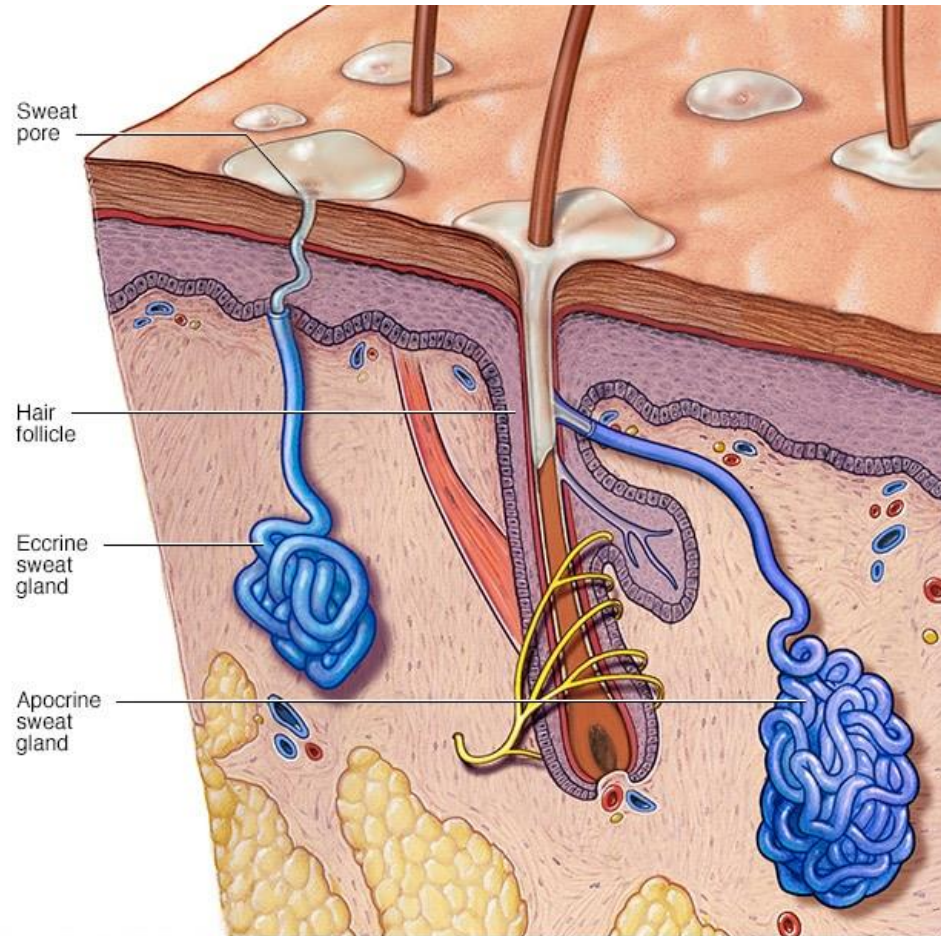
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- The **skin** area of contact with the outside world: approximately 25 m^2 .³
 - The classic 2 m^2 excludes hair follicles, eccrine and apocrine ducts, and sebaceous glands.^{3,4}

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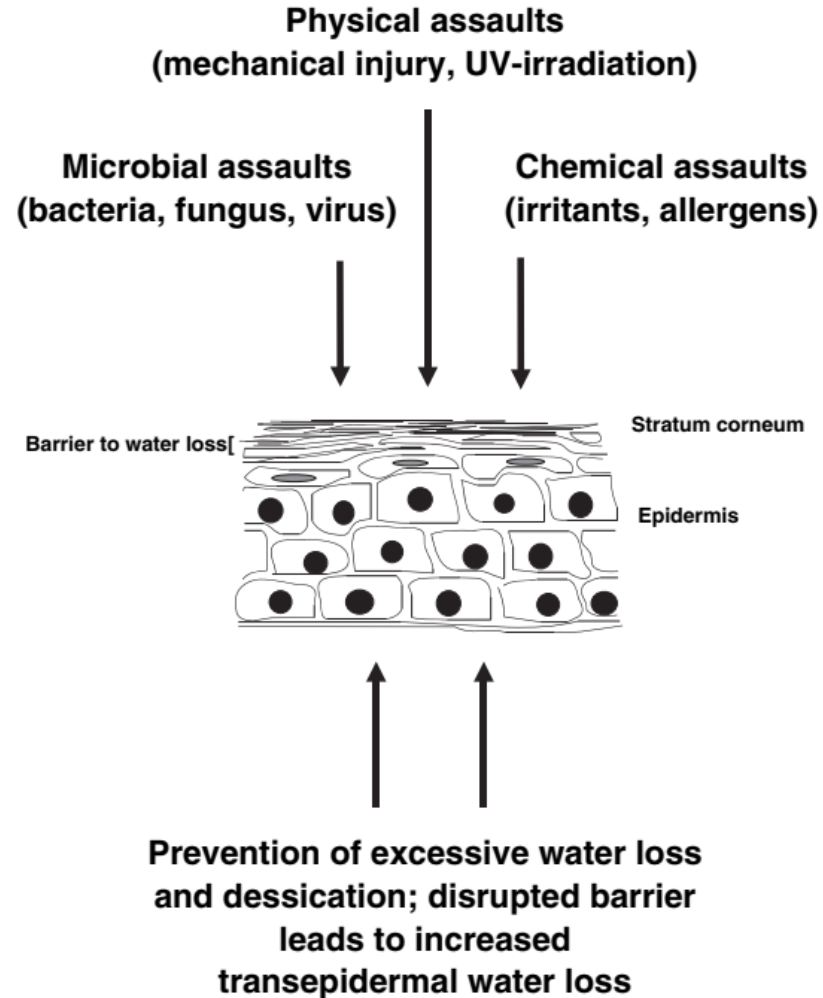
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- The **skin** area of contact with the outside world: approximately 25 m^2 .³
 - The classic 2 m^2 excludes hair follicles, eccrine and apocrine ducts, and sebaceous glands.^{3,4}
- On the skin, it is estimated that we carry about 10^{11} bacterial cells in total.²

1. Helander, H. F. et al. *Scandinavian Journal of Gastroenterology* 49, 681–689 (2014)
2. Sender, R. et al. *PLoS Biol* 14, (2016)
3. Gallo, R. L. *J Invest Dermatol* 137, 1213–1214 (2017)
4. Mayo Clinic. *Hyperhidrosis* (2022), <https://www.mayoclinic.org/diseases-conditions/hyperhidrosis/symptoms-causes/syc-20367152>

The skin: a barrier

- Intact skin barrier is essential for^{1,2}:
 - Retaining moisture
 - Repelling irritants
 - Protecting against physical loads
 - Safeguarding body from pathogens
 - Interacting with immune system.



1. Sinha, S. et al. Clinics in Dermatology 39, 829–839 (2021)
2. Proksch, E. et al. Experimental Dermatology 17, 1063–1072 (2008)

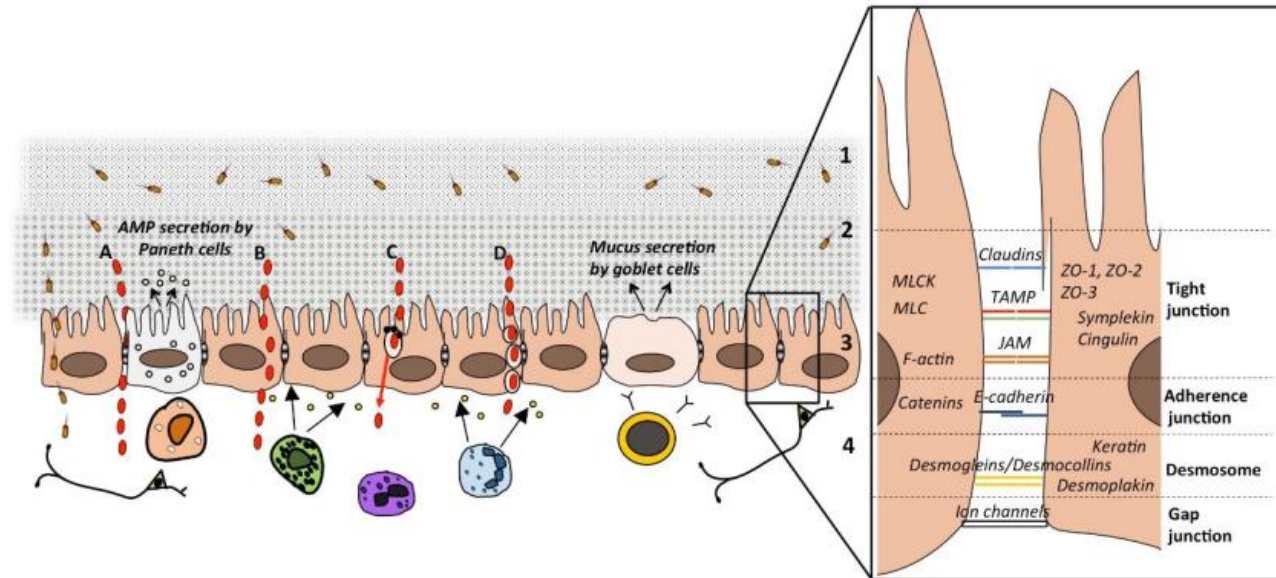
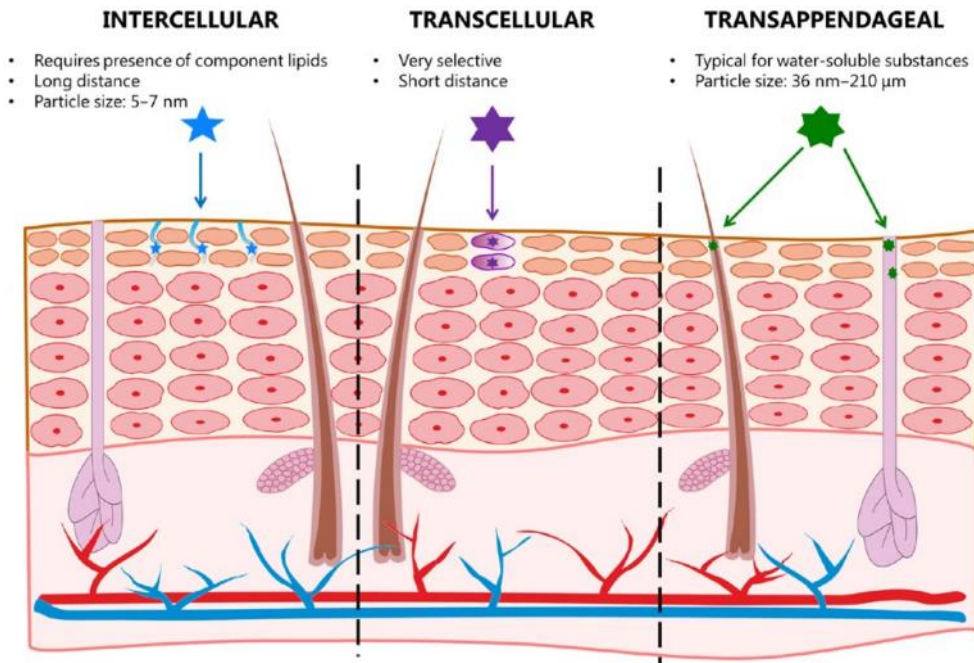
The skin vs gut: barrier dysfunction

- **Factors of skin barrier function¹⁻³:**

- Stratum corneum → mechanical
- Tight junctions (e.g. occludin, claudins, junctional adhesion molecule-1, zonula occludens protein 1 and multi-PDZ protein-1)
- Chemical/antimicrobial (e.g. lipids, acids, hydrolytic enzymes, antimicrobial peptides and macrophages, humoral and cellular immunity)

- **Factors of gut barrier function³⁻⁵:**

- Mucus layer → mechanical
- Tight junctions (e.g. occludin, zonulin, claudins, E-cadherin, β -catenin, Marvel D3, junctional adhesion molecules)
- Chemical/antimicrobial (e.g. mucins, antimicrobial peptides and macrophages, humoral and cellular immunity)

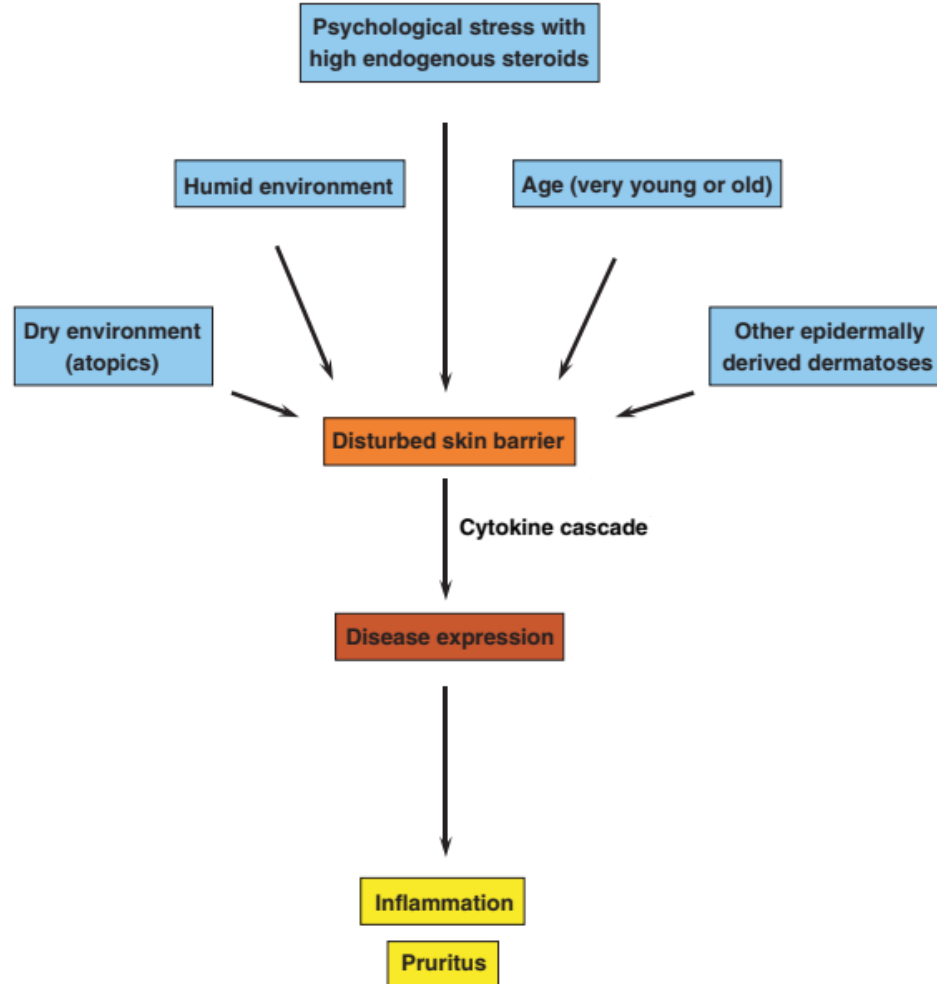


1. Dąbrowska, A. k. et al. *Skin Research and Technology* 24, 165–174 (2018)
2. Proksch, E. et al. *Experimental Dermatology* 17, 1063–1072 (2008)
3. De Pessemier, B. et al. *Microorganisms* 9, 353 (2021)
4. Schoultz, I. et al. *Cells* 9, 1909 (2020)
5. Di Tommaso, N. et al. *Int J Environ Res Public Health* 18, 12836 (2021)

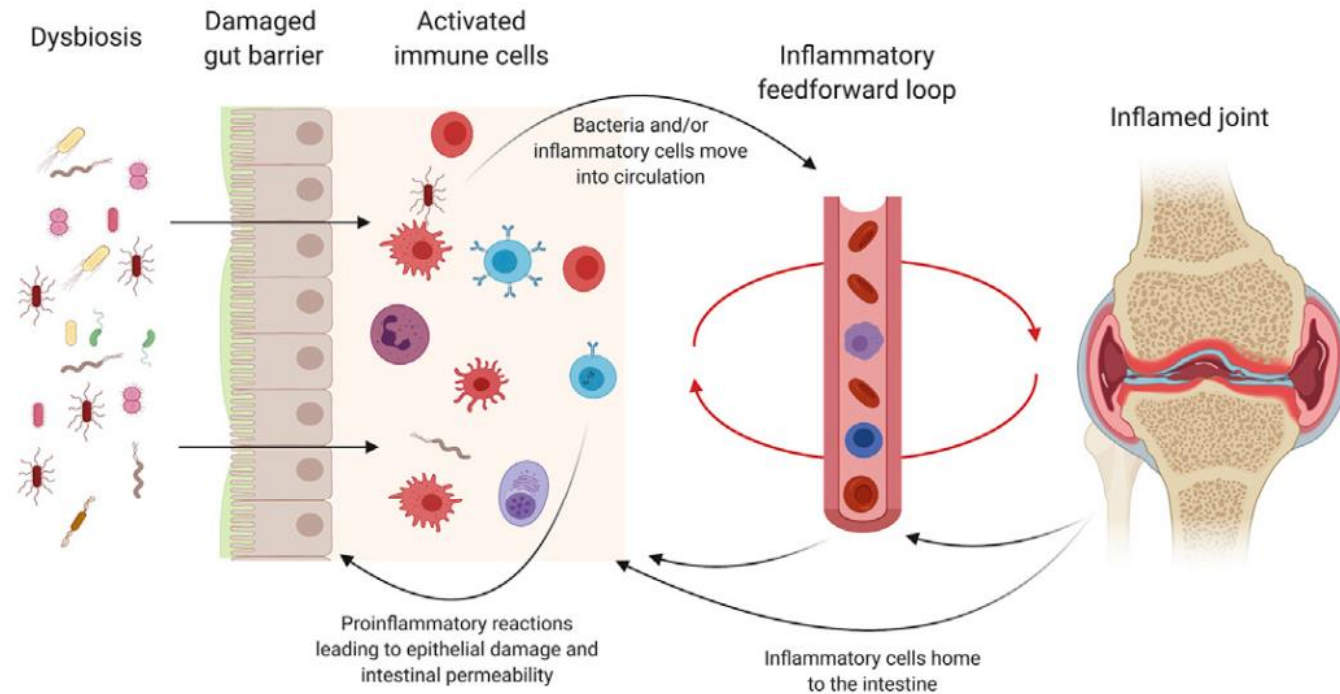
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The skin vs gut: central role of immune system

- Malfunctioning skin barrier: inflammation¹

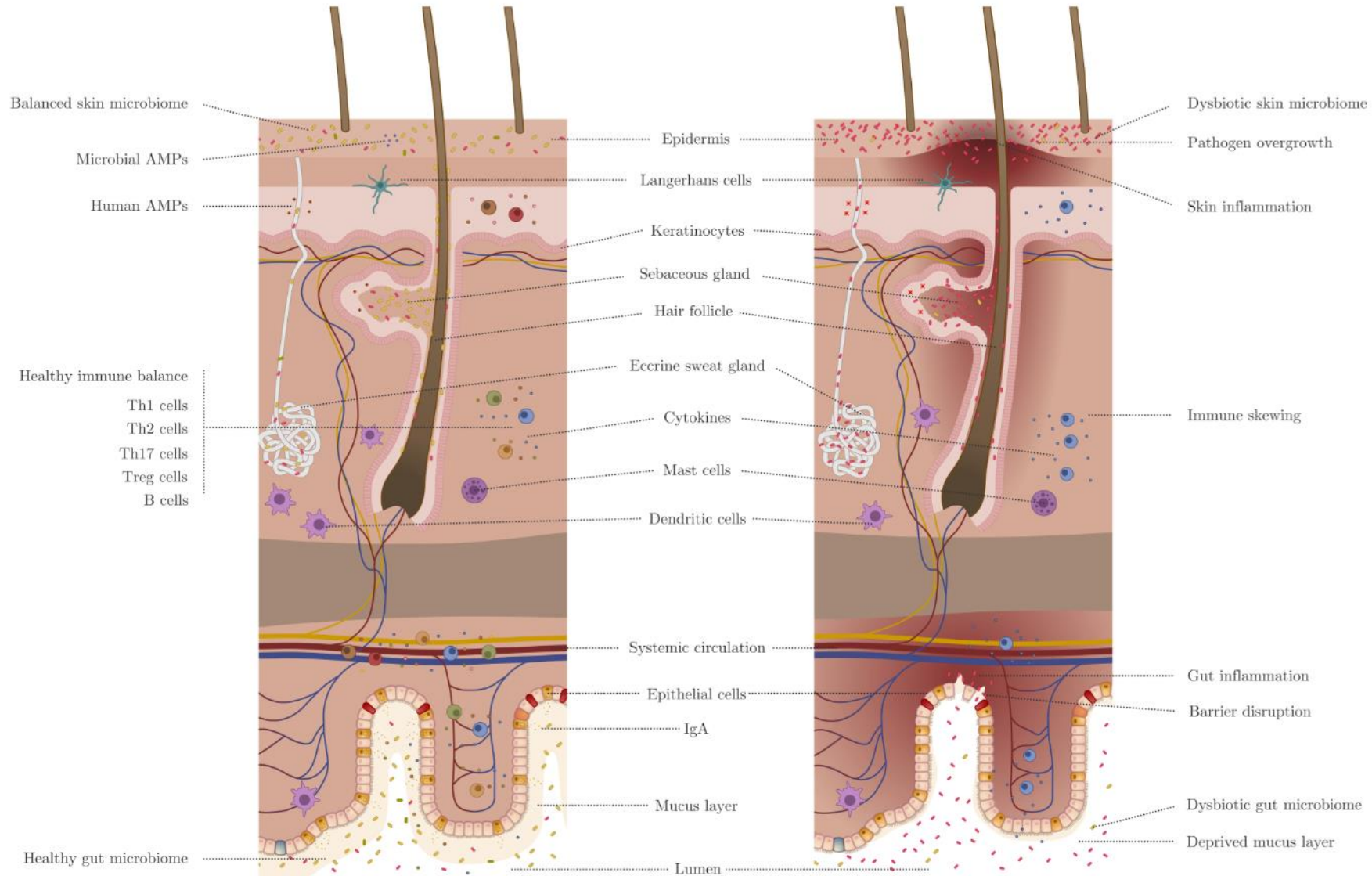


- Malfunctioning gut barrier: inflammation²⁻⁴
 - And vice versa!



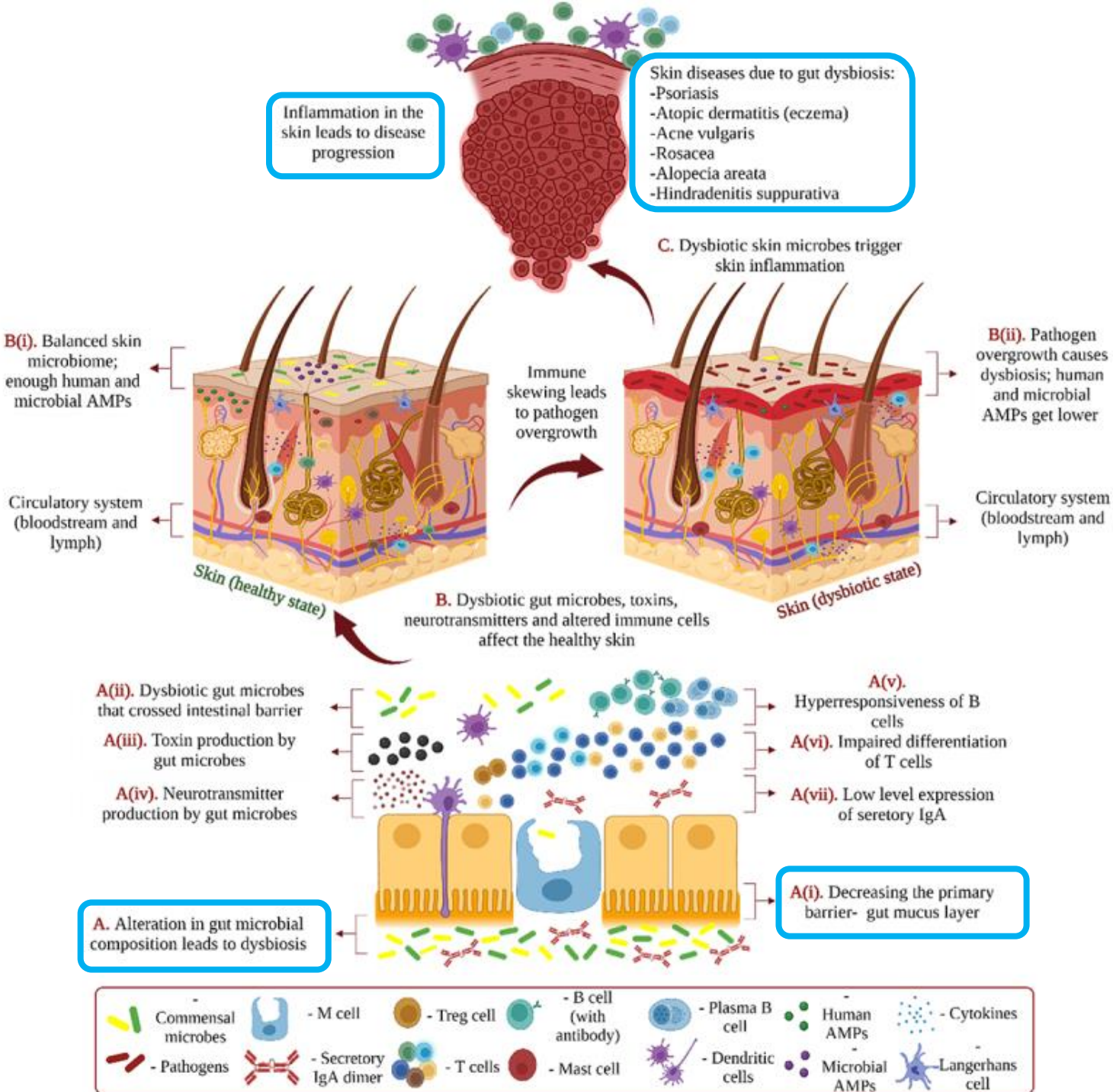
1. Dąbrowska, A. k. et al. Skin Research and Technology 24, 165–174 (2018)
 2. Matei, D. E. et al. Med 2, 864–883.e9 (2021)
 3. Blander, J. M. et al. Nat Immunol 18, 851–860 (2017)
 4. Hooper, L. V. et al. Science 336, 1268–1273 (2012)

The gut-skin axis¹



¹ De Pessemer, B. et al. *Microorganisms* 9, 353 (2021)

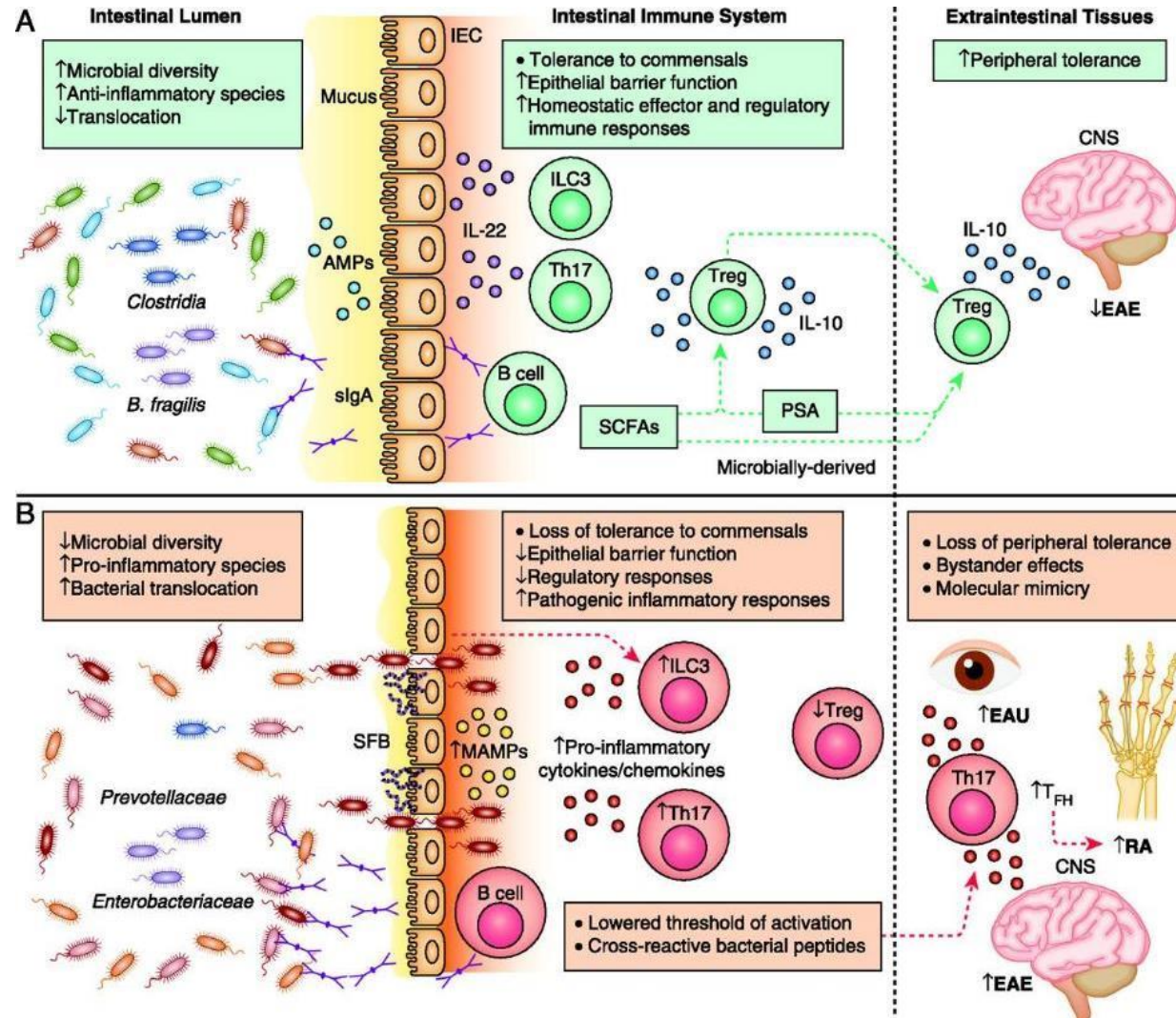
The gut-skin axis¹



1, Mahmud, Md. R. et al. Gut Microbes 14, 2096995

Gut-skin axis: Immune system

Microbiome plays role in training and tuning of immune system¹



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Example gut inflammation – skin

IBD is often associated with skin manifestations¹

- ~40% of IBD patients have extraintestinal manifestations (EIM)
 - Most common EIMs are peripheral arthritis, aphthous stomatitis, uveitis, and erythema nodosum.
- Skin is the most commonly affected organ, including:
 - Perianal manifestations such as erythema, abscesses, ulcers, fissures, and fistulas.
 - Orofacial manifestation such as aphthous stomatitis, angular cheilitis and ulceration, mucosal nodularity, etc.
 - Erythema nodosum (painful bumps on leg)
 - Pyoderma gangrenosum



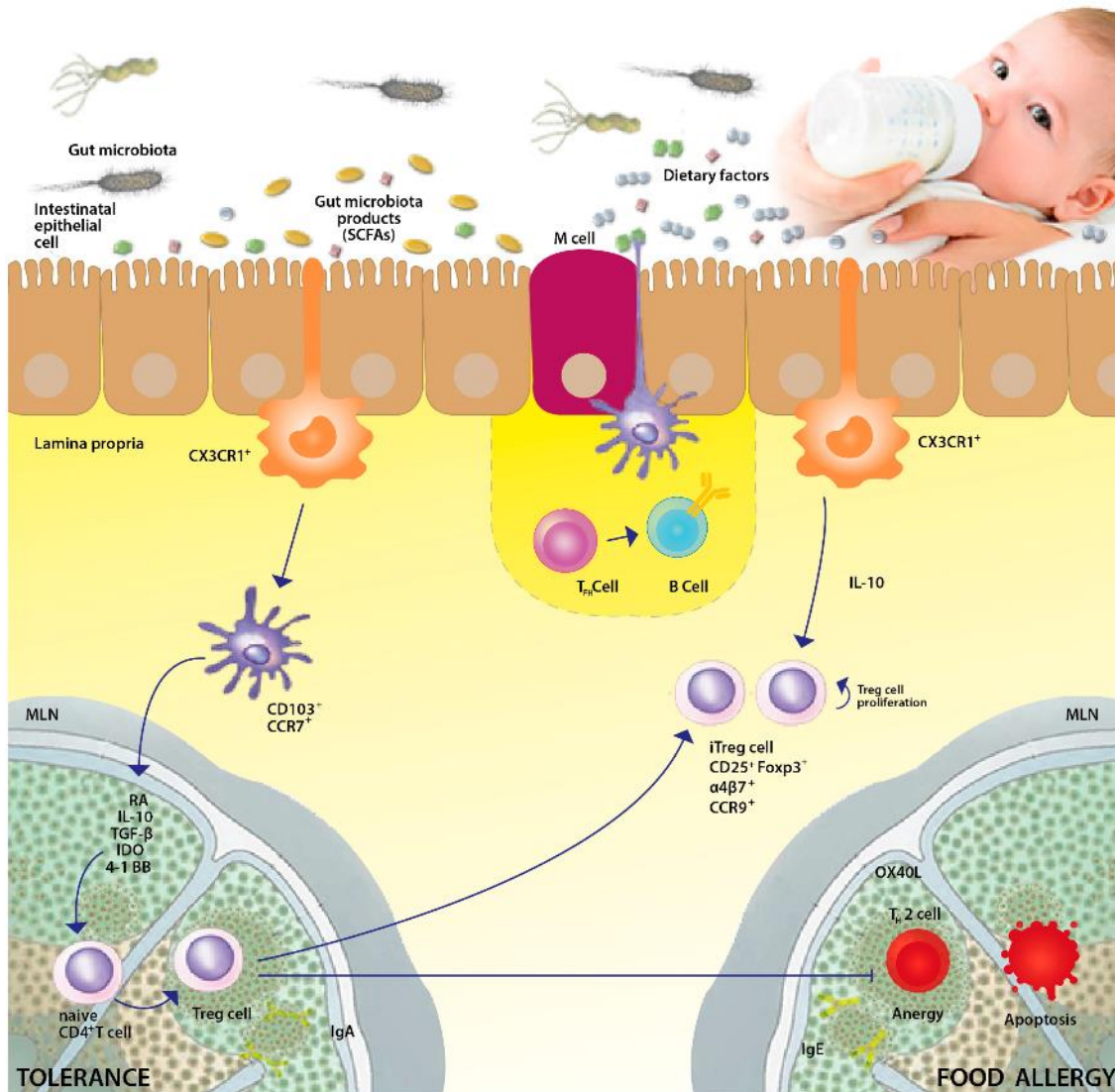
Gut-skin axis:
Immune system
→ Atopic dermatitis
(neurodermatitis)

Atopic dermatitis¹

- Atopic eczema (atopic dermatitis) is one of the most common forms of eczema, a condition that causes the skin to become itchy, dry and cracked.
- Most common type of eczema in children
- Hands in adults, and the inside of the elbows, backs of the knees and the face and scalp in children
- Usually begins before the second year of life
- Personal history of asthma or hay fever or a history of atopic disease in a first-degree relative
- Around 101.27 million adults and 102.78 million children worldwide have AD, corresponding to prevalence rates of 2.0% (95% UI 1.4-2.6) and 4.0% (95% UI 2.8-5.3), respectively



Healthy gut microbiome prevents allergies



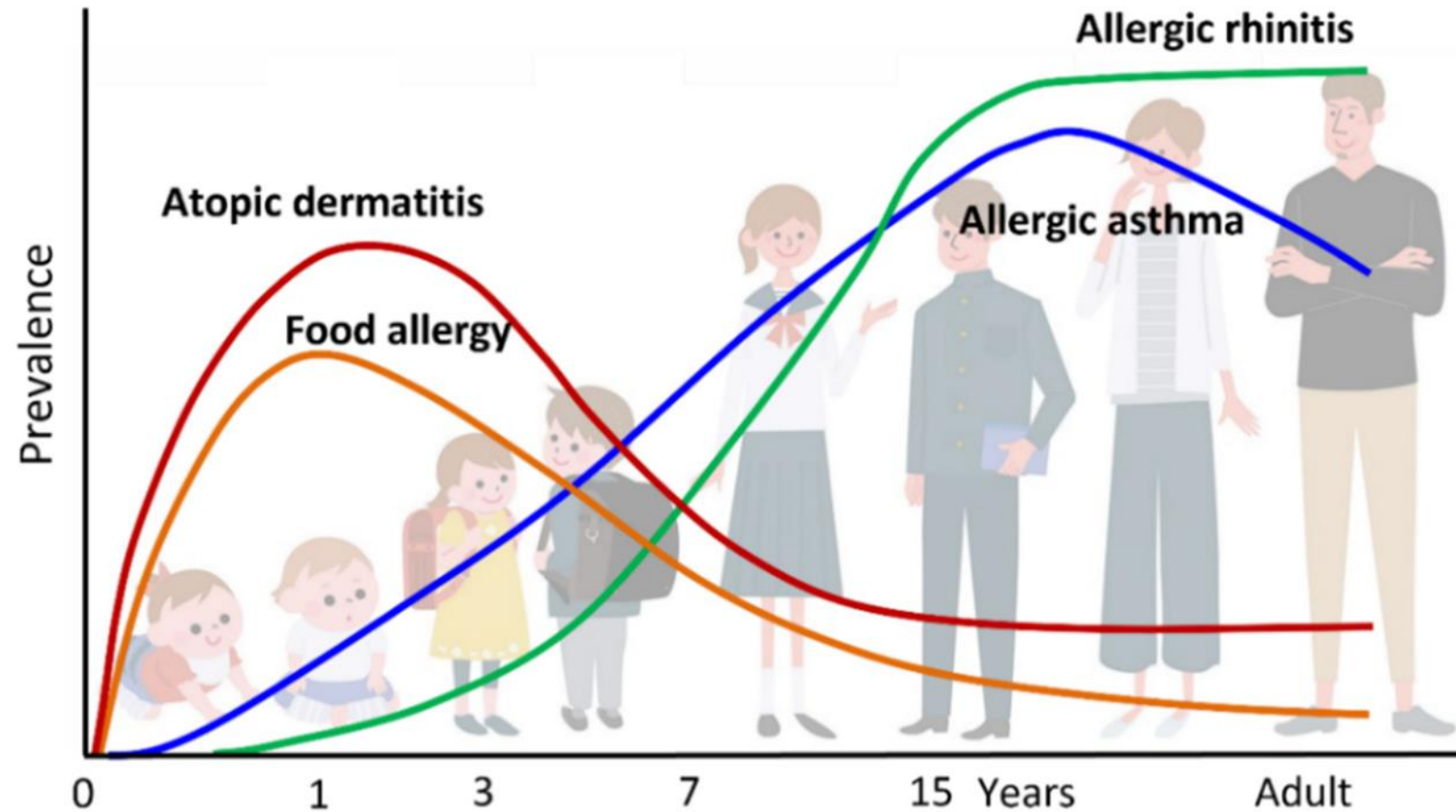
Examples of evidence for causality:

- At birth babies have more Th2 than Th1 cells, exposure to commensals skews this towards Th1.¹
- Treg cells crucial for balanced immune response¹:
 - Microbes induce Treg.
 - Germ-free animals lack Treg.
- In mice, gut microbiome composition determines if they develop food allergy¹.
- Strong correlations between exposure to diverse microbial environment and asthma^{2,3}.

1. Aitoro, R. et al. *Nutrients* 9, 672 (2017)
2. Akdis, C. A. et al. (*European Academy of Allergy and Clinical Immunology*, 2014)
3. Ege, M. J. et al. *New England Journal of Medicine* 364, 701–709 (2011)

Atopic march

- Strong association between atopic dermatitis and food allergies¹.
- Also between atopic dermatitis and asthma and allergic rhinitis².
- The development of these allergies is linked and referred to as: **atopic march**³.



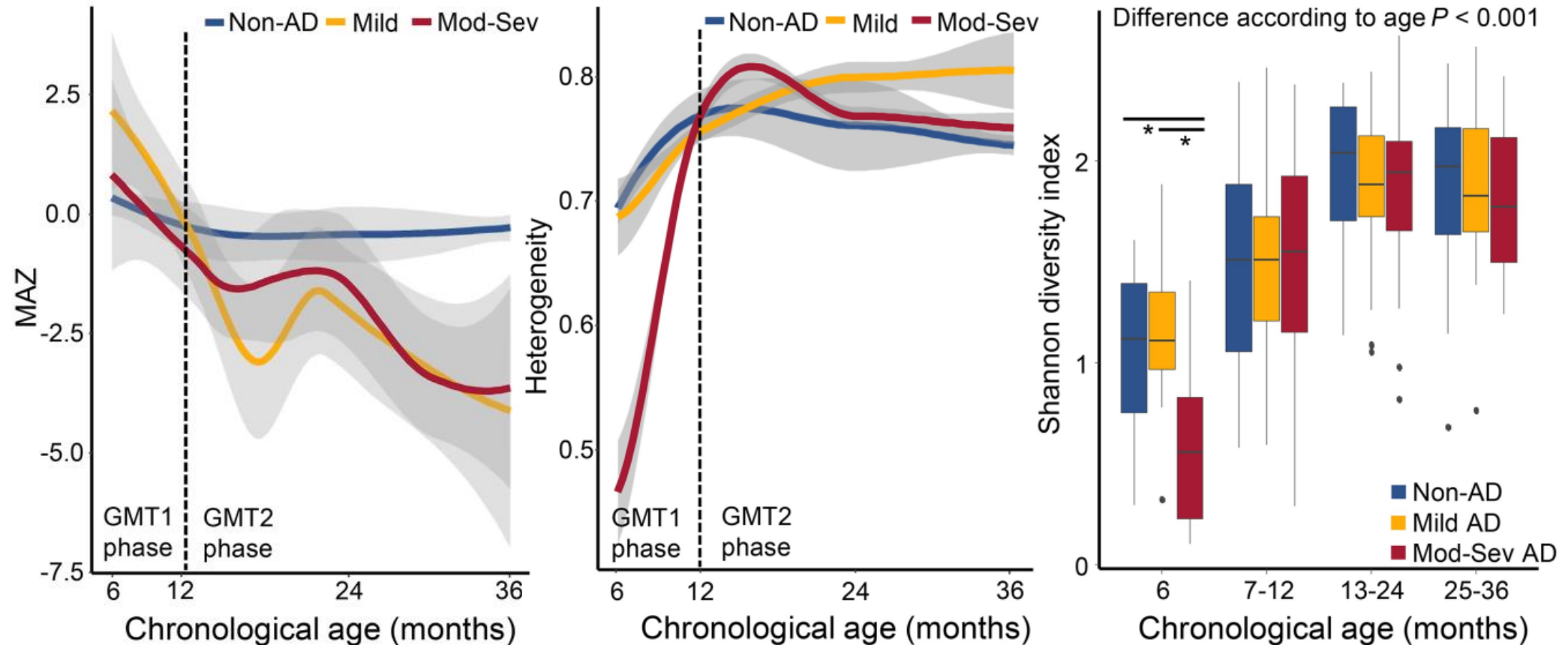
1. Tsakok, T. et al. *Journal of Allergy and Clinical Immunology* 137, 1071–1078 (2016)

2. Pinart, M. et al. *Lancet Respir Med* 2, 131–140 (2014)

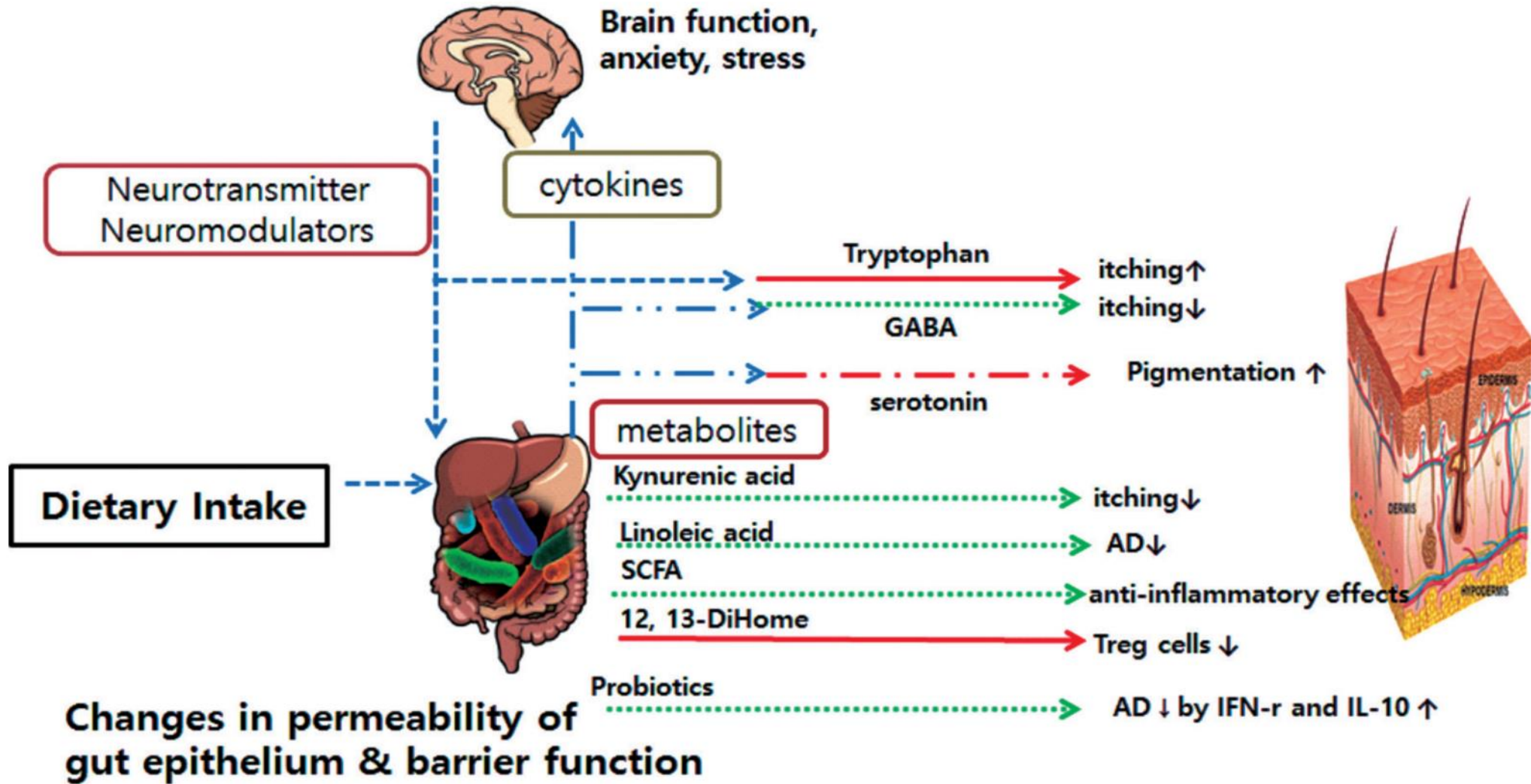
3. Tsuge, M. et al. *Children* 8, 1067 (2021)

Gut microbiome in atopic dermatitis

- Initial early maturation, followed by delayed maturation¹
- Low heterogeneity and diversity¹



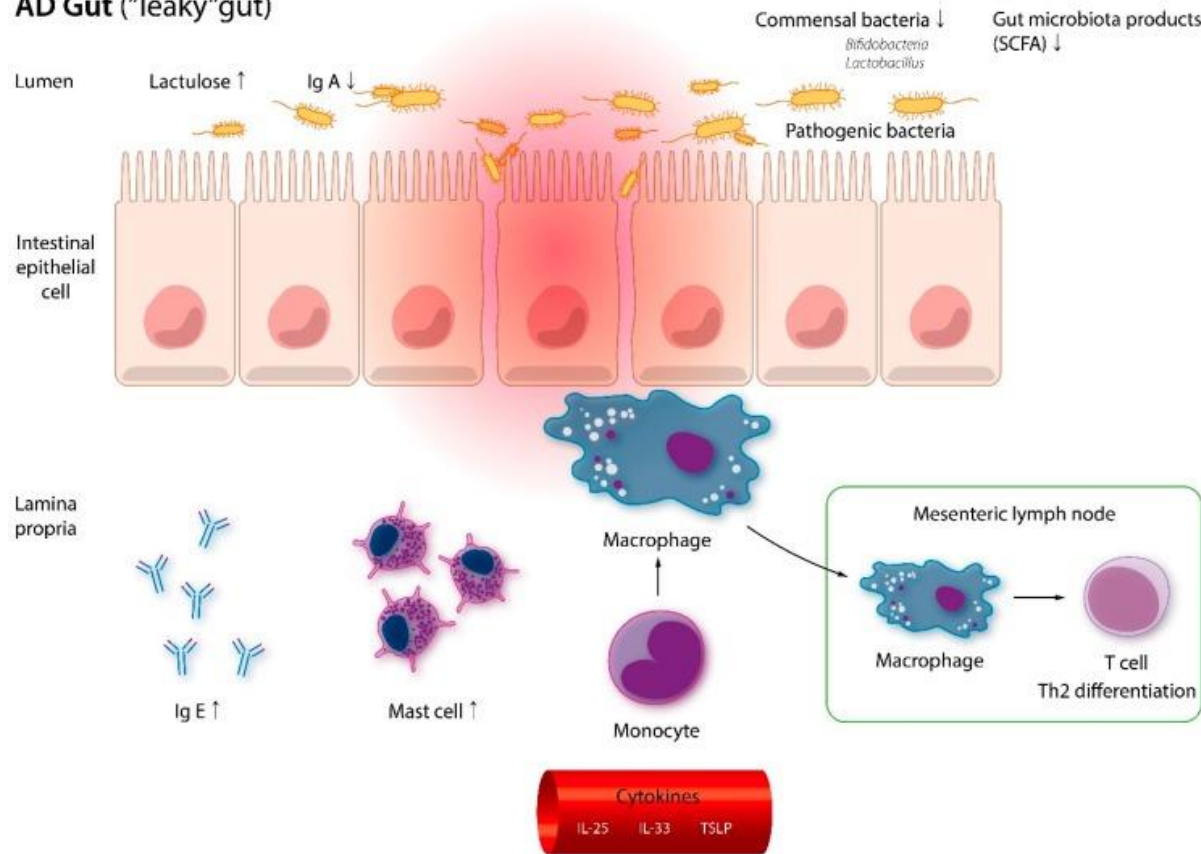
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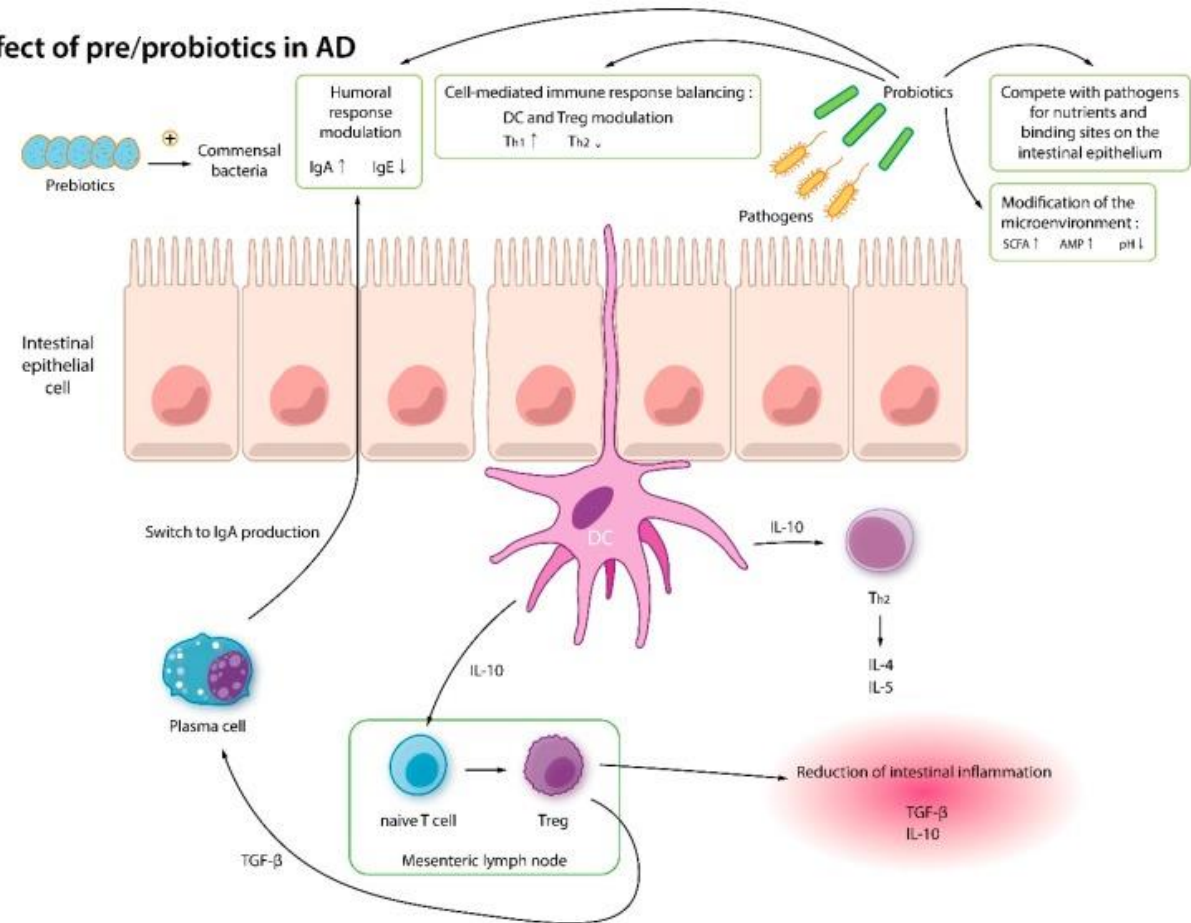
1. Lee, S.-Y. et al. Allergy Asthma Immunol Res 10, 354–362 (2018)

Gut microbiome in atopic dermatitis¹

AD Gut ("leaky" gut)

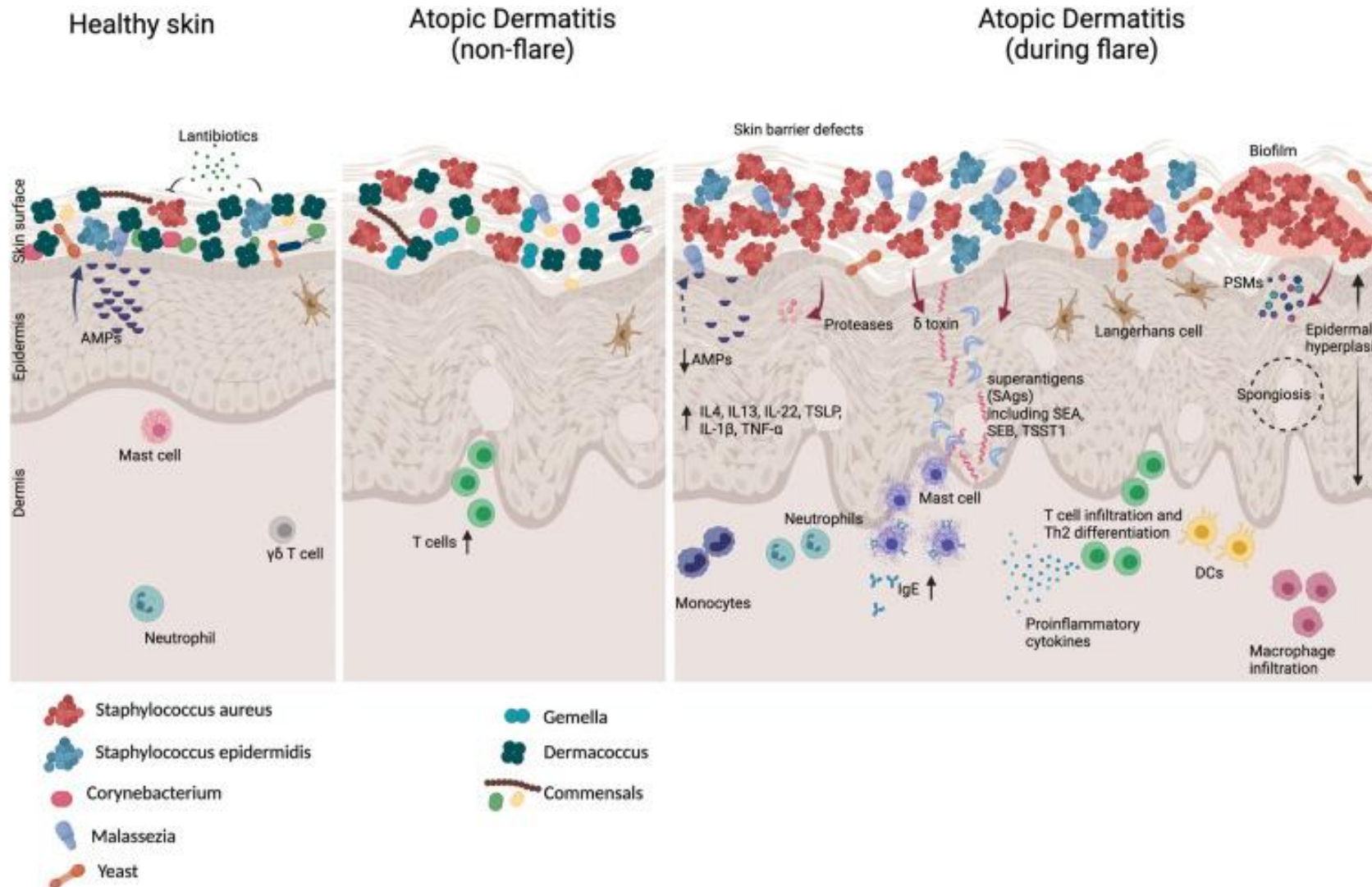


Effect of pre/probiotics in AD



1. Kim, J. E. et al. J Clin Med 8, 444 (2019)

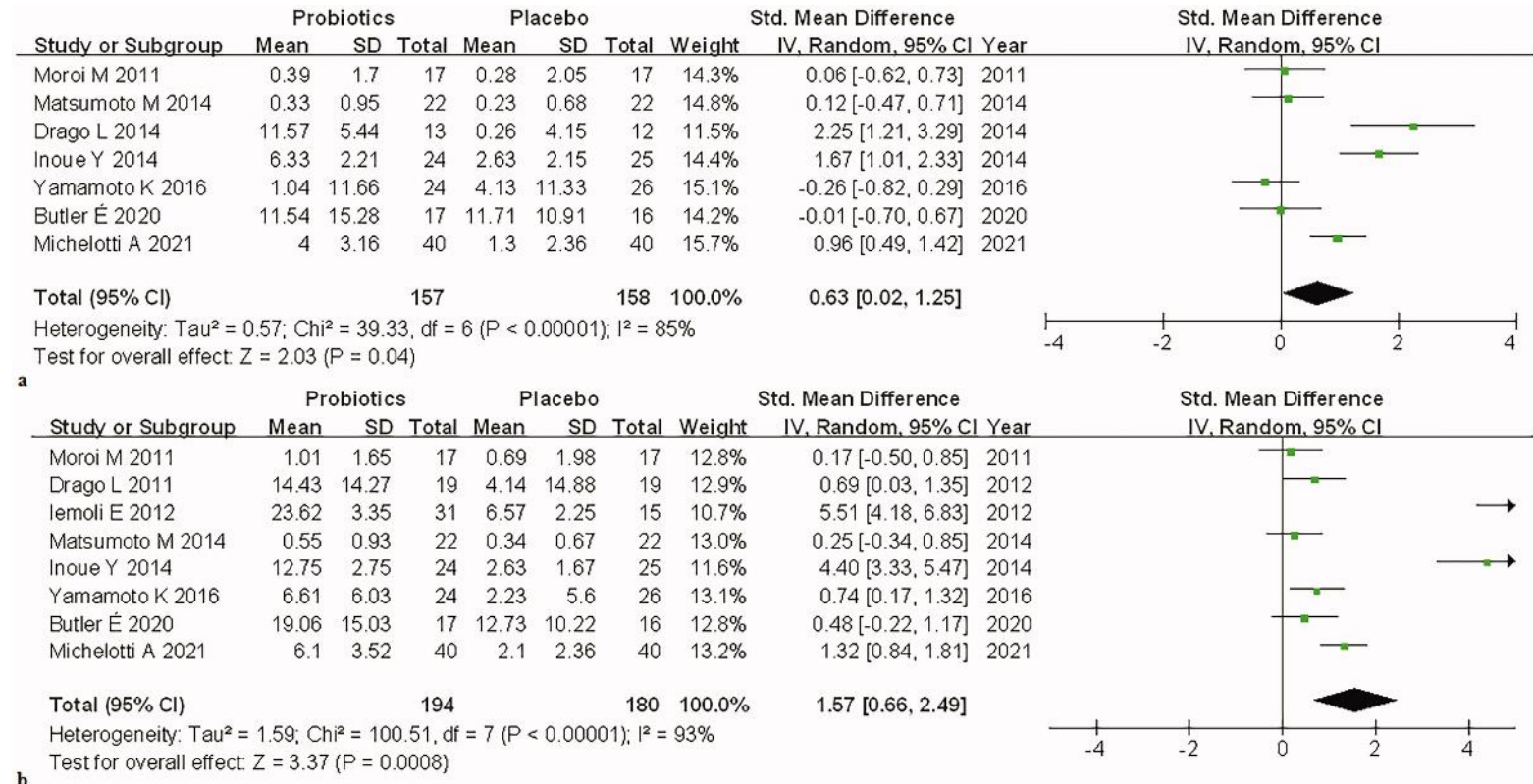
Skin microbiome in atopic dermatitis¹



1. Koh, L. F. et al. Allergy International 71, 31–39 (2022)

Atopic dermatitis and probiotics

- Meta-analyses show that probiotics can be beneficial for:
 - Prevention and treatment of atopic dermatitis in children¹
 - Mixed strains only
 - Treatment of atopic dermatitis in adults on short and long term (figure)²
 - Prevention of atopy and food hypersensitivity in children³



1. Jiang, W. et al. Paediatr Drugs 22, 535–549 (2020)
2. Li, Y. et al. Journal of Dermatological Treatment 0, 1–10 (2022)
3. Zhang, G.-Q. et al. Medicine (Baltimore) 95, e2562 (2016)

Interventions – *L. sakei* probio65

- *L. sakei* probio65 is isolated from kimchi
- Mostly studied for its effect on atopic dermatitis
 - Two RCTs^{1,2}
 - Several animal studies
- In addition, in vitro and preclinical studies show:
 - Anti-inflammatory effects^{3,4}
 - Pathogen inhibition⁵
 - Increasing insulin sensitivity^{6,7}

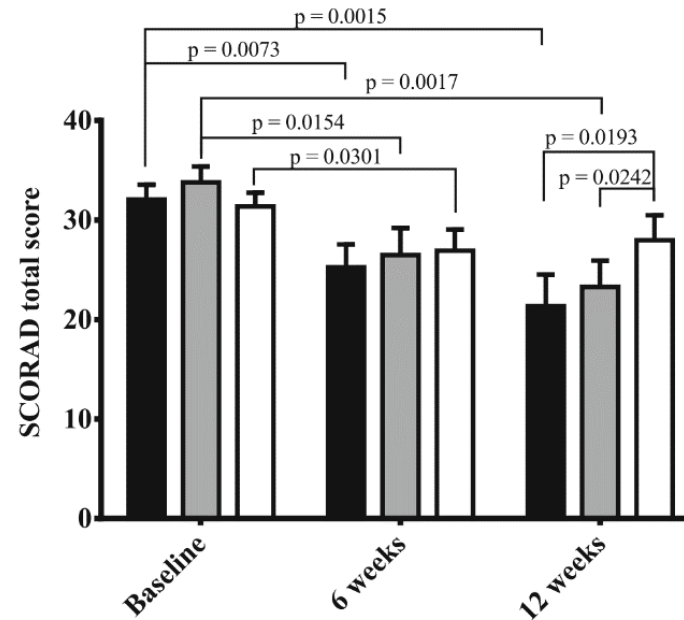


Fig. 2 Assessment of SCORAD total score. Results are expressed as mean; error bars (SEM). Statistical analysis was performed using paired t-tests when comparing within same group while Wilcoxon rank sum test was used when comparing between groups. I. Live cell (bar in black): freeze-dried *Lactobacillus sakei* proBio65 (1×10^{10} cells/day; $n = 16$). II. Dead cell (bar in gray): freeze-dried dead *Lactobacillus sakei* proBio65 (1×10^{10} cells/day; $n = 22$). III. Placebo (bar in white): microcrystalline cellulose only ($n = 20$). Statistical analysis was performed using paired *t* tests

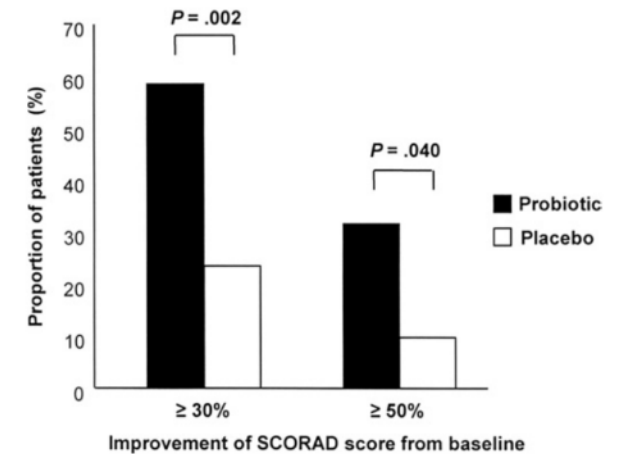


Figure 2. Patients achieving at least 30% and 50% improvement in SCORAD scores at the study end point.

1. Woo, S.-I. et al. *Annals of Allergy, Asthma & Immunology* 104, 343–348 (2010)
2. Rather, I. A. et al. *Probiotics Antimicrob Proteins* 13, 315–326 (2021)
3. Lim, J.-H. et al. 39, 313–316 (2011)
4. Iorio, R. et al. *Transl Vis Sci Technol* 10, 8 (2021)
5. Park, C. W. et al. *J Med Food* 11, 405–412 (2008)
6. Bajpai, V. K. et al. *Journal of Food Biochemistry* 40, 264–274 (2016)
7. Gulnaz, A. et al. *Biology (Basel)* 10, 348 (2021)

Case report: atopic dermatitis

Case with asthmatic complaints in combination with eczema:

- Girl, 1 year old
- Since 3 weeks after birth eczema
- Snotty noses and frequent wheezing
- Emovate (clobetason) via dermatologist; pediatrician does not find deviations.

- Mother used a lot of antibiotics at the end of her pregnancy.

- Were there any GI complaints?

Case report: atopic dermatitis

GI complaints of this client::

- Abdominal pain
- Defecation frequency: often 10 times/day
- Stool type: diarrhea, alternating color
- Bloating: daily after a meal
- Bulging
- Abdominal pain after meals
- Burping
- Fatty sticky stools
- Undigested remains
- Stinky stools
- Explosive defecation
- Food intolerances
- Relationship with other complaints ?

Case report: atopic dermatitis



Approach:

- Adjusted diet: less sugar, less milk except sour dairy, more vegetables and less grain products.
- Prescribed probiotics.

Results:

- Skin: no more deviations.
- Stools: normal with now and then a peak that responds well to probiotics
- No more respiratory tract problems.

Gut-skin axis:

Hormones

→ **Acne**

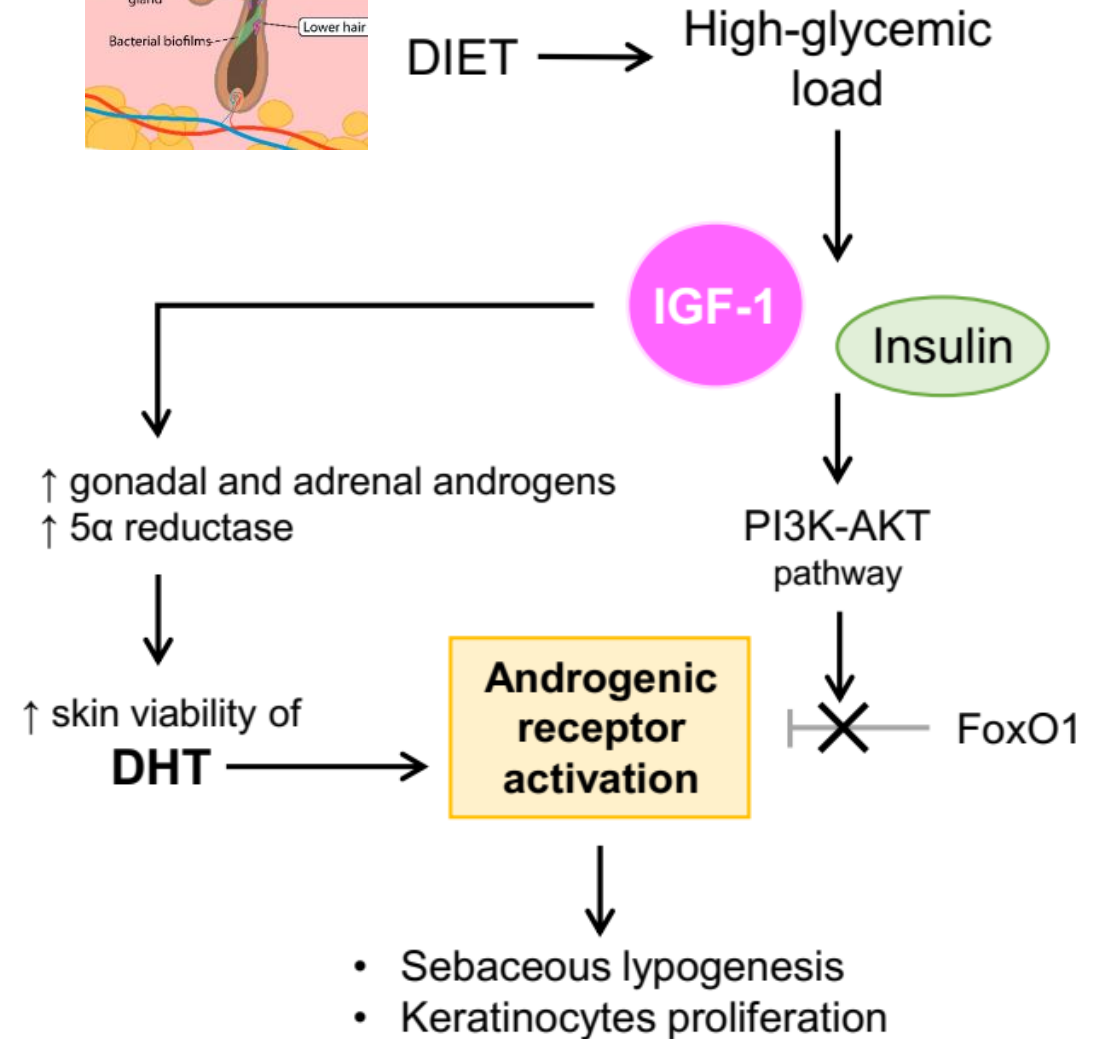
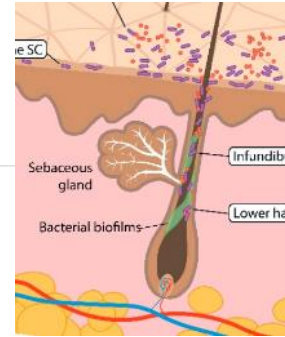
Acne

- **What is it?** An inflammatory skin condition affecting hair follicles and sebaceous glands, commonly seen in adolescents.
- **Lesions:** Include open and closed comedones, papules, pustules, nodules, and cysts, with potential scarring and pigmentary changes.
- **Causes:** Multifactorial, involving abnormal follicular keratinization, excess sebum production due to hormonal factors, proliferation of *Propionibacterium acnes* bacteria, and inflammation.
- **Treatment:** Targets various aspects such as hormone regulation, sebum reduction, follicular clearance, bacterial control, and inflammation mitigation.



Acne pathogenesis

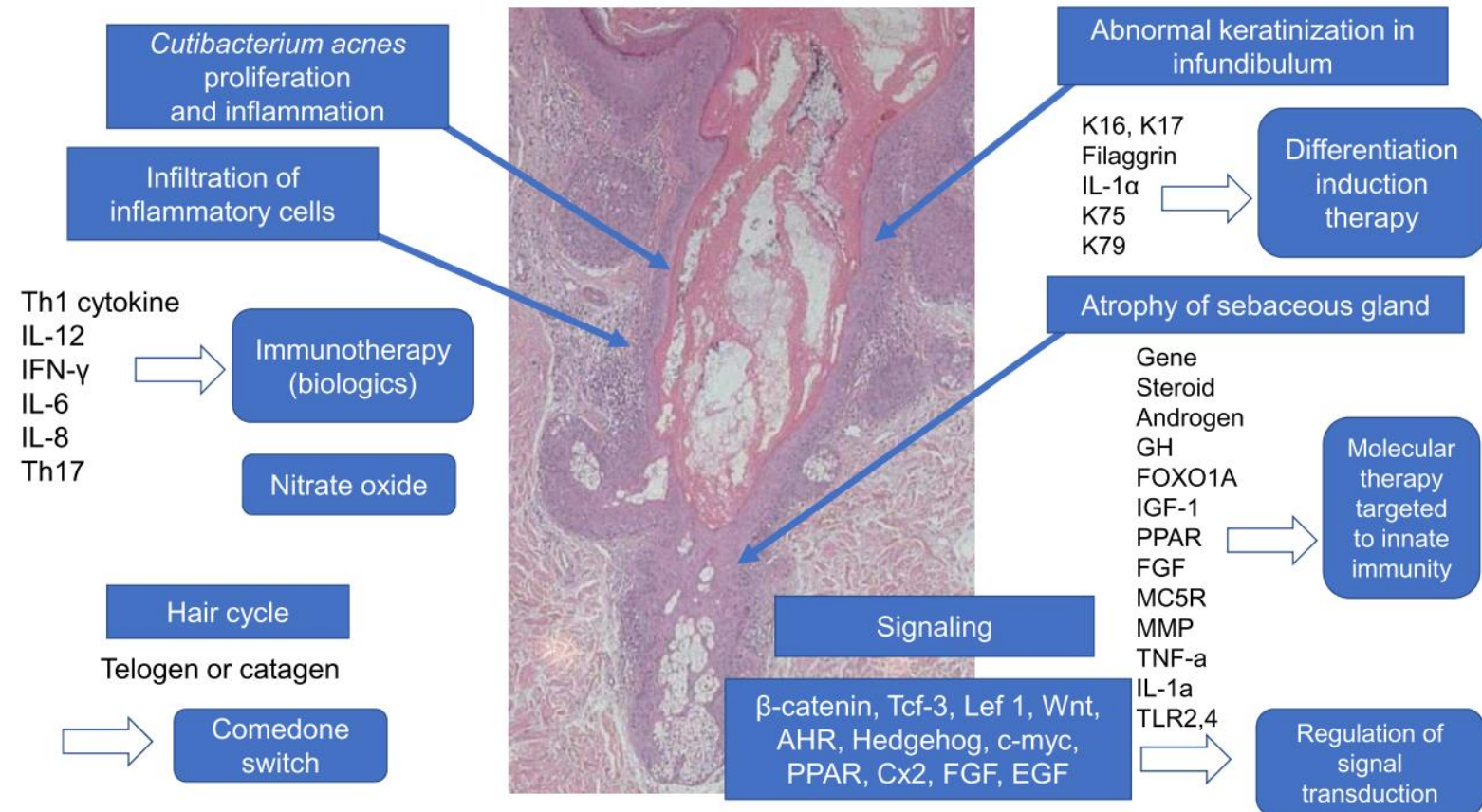
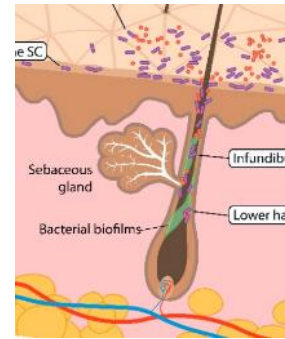
- Involved pathways^{1,2}:
 - Increased sebum excretion
→ Endocrinological factors (e.g. androgens)
 - IGF-1 involved: induces testosterone and DHEA production, and stimulates sebaceous lipogenesis and androgen receptor signaling



1. Kurokawa, I. et al. F1000Res 9, F1000 Faculty Rev-792 (2020)
2. Sánchez-Pellicer, P. et al. Microorganisms 10, 1303 (2022)

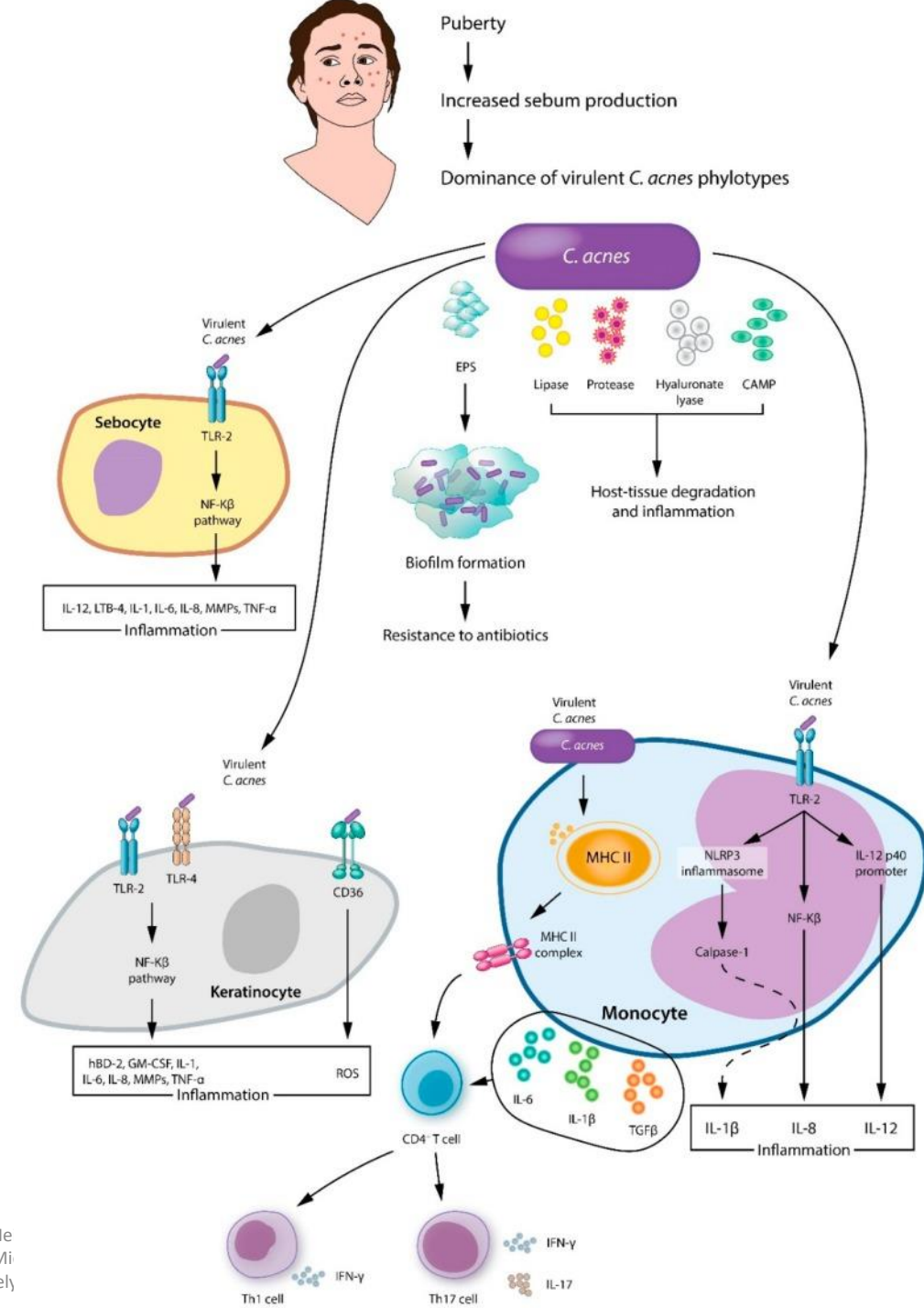
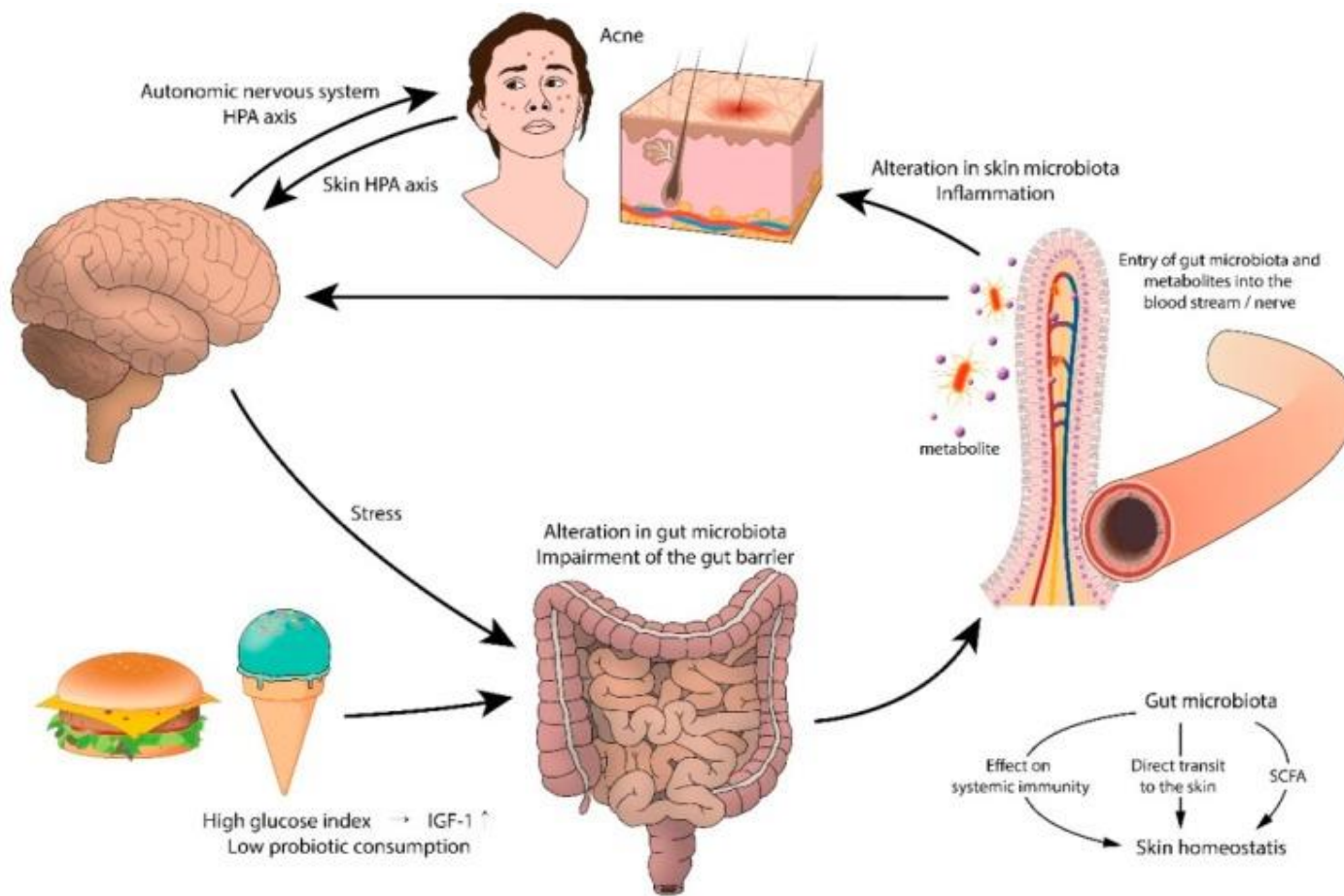
Acne pathogenesis

- Involved pathways^{1,2}:
 - Increased sebum excretion
→ Endocrinological factors (e.g. androgens)
 - IGF-1 involved: induces testosterone and DHEA production, and stimulates sebaceous lipogenesis and androgen receptor signaling
 - Abnormal keratinization of follicular infundibulum
 - Bacterial proliferation
 - Inflammation

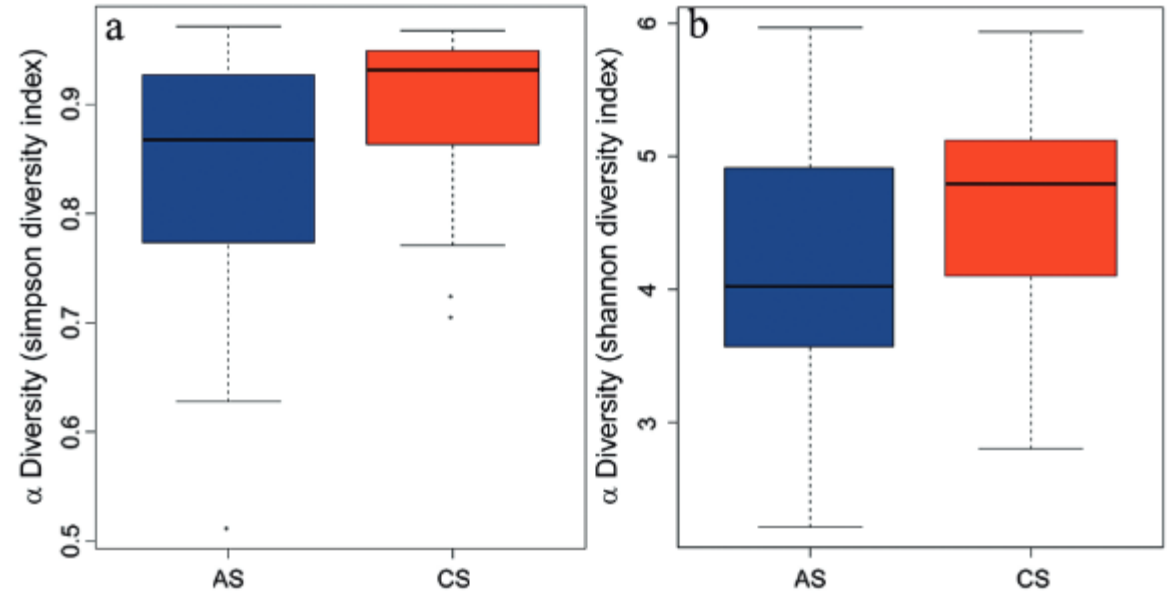
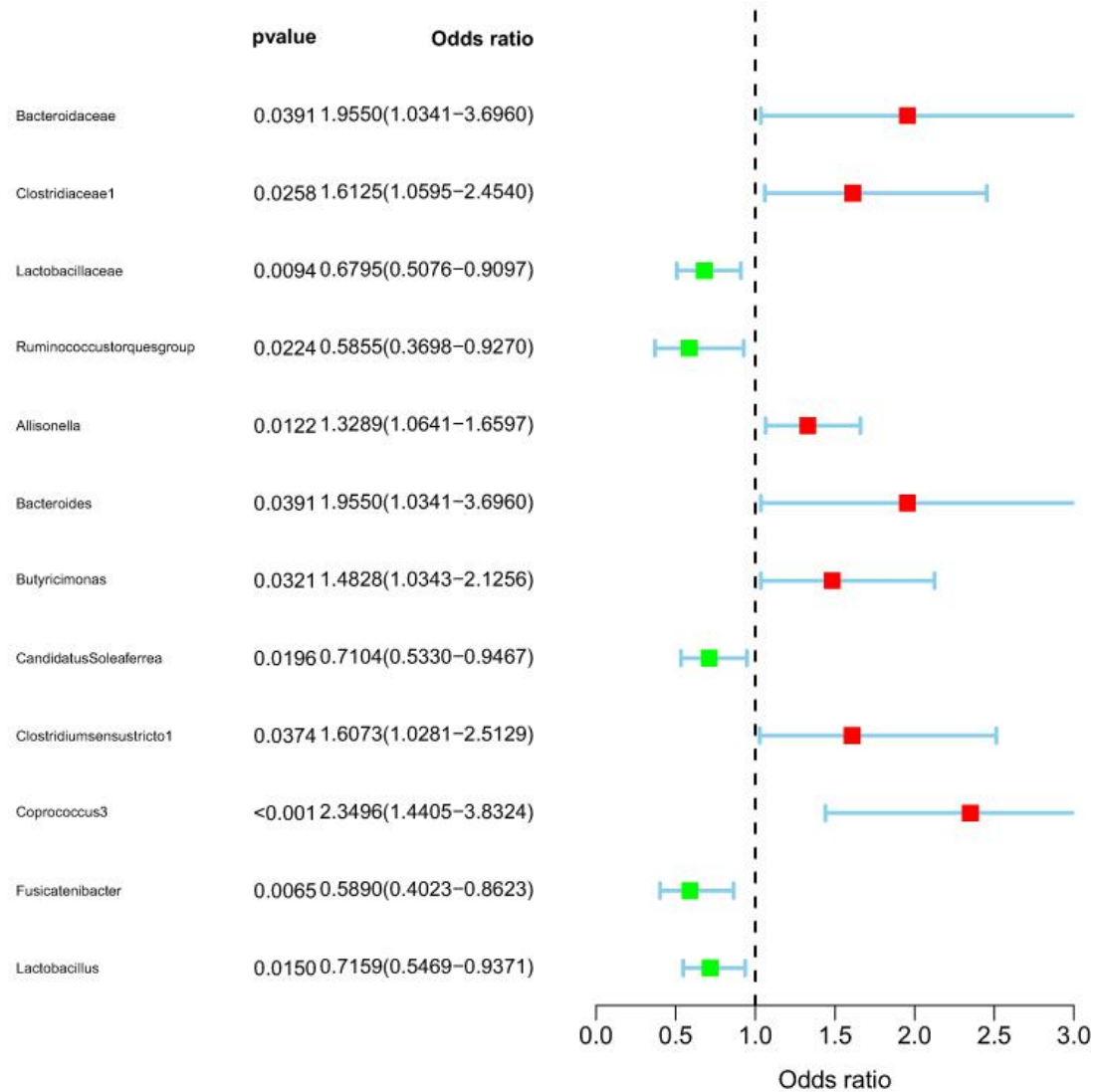


1. Kurokawa, I. et al. F1000Res 9, F1000 Faculty Rev-792 (2020)
2. Sánchez-Pellicer, P. et al. Microorganisms 10, 1303 (2022)

Acne and microbiome



Acne and microbiome^{1,2}



Lactobacillus rhamnosus SP1

- The *Lactobacillus rhamnosus* SP1 is a human isolate.
- A small but well-designed RCT shows an effect on **acne**¹; insulin sensitivity is expected to be a mechanism of action.
- In addition, there is evidence for:
 - Denture stomatitis²
 - Inhibition of *Candida*²
 - Prevention of caries^{3,4} (fig, lower beta-defensin probably due to healthier oral microbiome)
 - Degrading immunogenic gluten peptides⁵
- Typical use: acne, caries, gluten sensitivity

Table 2. Dental Caries in the Intervention Group (n = 123) and Control Group (n = 82) at Baseline and at the End of the Study.

	Probiotic Group	Control Group	Odds Ratio
Nursery schools, n	8	8	
Participants, n	123	82	
ICDAS 2–6 >0, baseline, %	39.3	42.3	0.94 (0.62–1.44)
ICDAS 2–6 >0, 12 mo, %	54.4	65.8	0.76 (0.51–1.14)
ΔICDAS 2–6 >0, 12 mo – baseline, %	16.2	20.8	0.76 (0.38–1.51)
ICDAS 5–6 >0, baseline, %	23.3	22.5	1.17 (0.68–2.01)
ICDAS 5–6 >0, 12 mo, %	33.3	45.1	0.71 (0.43–1.15)
ΔICDAS 5–6 >0, 12 mo – baseline, %	9.7	24.3	0.35 (0.16–0.79)^a

Table 2. Change from baseline to 12 weeks in the investigator’s global improvement rating of adult acne in the two study groups (data are given as counts and percentages).

Rating	Probiotic group (n=10)	Placebo group (n=10)
Worsened	0 (0%)	0 (0%)
Unchanged	2 (20%)	9 (90%)
Improved	6 (60%)	1 (10%)
Markedly improved	2 (20%)	0 (0%)
Resolved	0 (0%)	0 (0%)

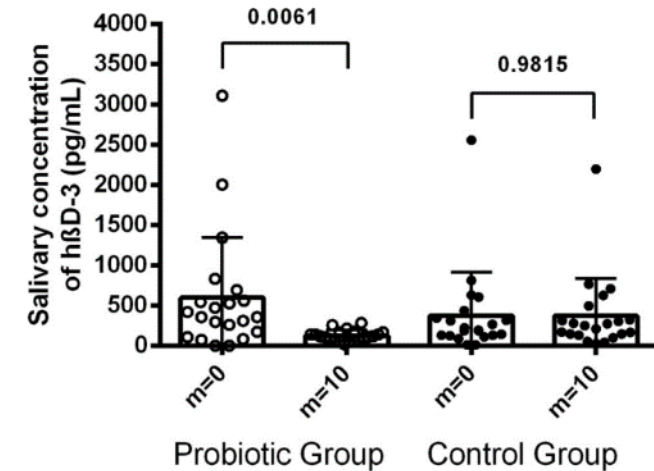


Fig. 2 Salivary concentration of hβD-3, expressed as pg/mL, of the groups at baseline (m = 0) and the end of the intervention (m = 10). The probiotic group showed a significant decrease in salivary concentration of hβD-3 (p = 0.0061) and a decrease in variability once the probiotic was consumed. No changes were observed in the control group

- Fabbrocini, G. et al. *Beneficial Microbes* 7, 625–630 (2016)
- Lee, X. et al. *Australian Dental Journal* 64, 229–236 (2019)
- Rodríguez, G. et al. *J Dent Res* 95, 402–407 (2016)
- Sandoval, F. et al. *Clin Oral Invest* (2021)
- FrancaVilla, R. et al. *Appl Environ Microbiol* 83, e00376-17 (2017)

Case report – female 32, late onset acne

Initial complaints start therapy (July, 2023):

- Histamin intolerance + post COVID syndrome
- (Subclinical hypothyroid → Hashimoto!)
- Gut issues: diarrhea and nausea after certain foods + eczema rash; defecation 1 x 2 days
 - Diet: limit gluten
 - Dietary supplements: basics
 - Regular medication: euthyrax
 - Probiotics + arabinogalactan fibers (*Larix Laricina*)

Probiotics selected to increase barrier function:

- Tight junctions
- Migraines
- Brain fog

Prebiotics selected to support immune system

- *Larix occidentalis*



Gut health, energy, mental clarity improved:

- More regular stool (every day)
- Much less bloating + no nausea
- Clearer head, brain fog is less
- Fewer migraine episodes



Decides to stop OAC

Case report – female 32, late onset acne

Skin issues

- Eczema as a child, acne in puberty → OAC

Late onset acne after cessation of oral birth control in December 2023

- No stool analysis available



March 2024

Case report – female 32, late onset acne

After 1 month of probiotics - Selected to lower effects of stress

- Increases TJ function
- Lowers mucosal inflammation
- Reduces oxidative stress in mucosa



*Hi Dorte,
The first month with the new probiotics is over. My skin seems to be a bit calmer, so that's good news :-). In terms of energy, things are also going a bit better. I can work a little longer again (now work 4x 6.5 hours)*

Case report – female 32, late onset acne

After 2 months of probiotics



Case report Acne

- Anna, 1992
- **Main complaints:** acne and vaginal yeast infections; had been suffering from acne for 16 years and dermatological treatments had no effect.
- Fatigue, frontal hair loss, cold hands/feet, Hashimoto antibodies (no treatment), difficulty maintaining weight, high LDL cholesterol, recurrent vaginal yeast infections, PMS, breast cysts.
- Diet: Low carbs, no sugar
- **Faecal analysis:**



Case report Acne

Datum monsterafname: 31.08.2023 13:52
 Materiaal: FE
 Gevalideerd door: Dr. Herbert Schmidt
 Gevalideerd op: 22.09.2023
 Uitslagstatus: Uitslagstatus op
 Eindbericht: 22.09.2023

Test	Uitslag	Eenheid	Nombereik	Voorg onderzoek
Fecesdiagnostiek				
Mikrobiomanalyse Midi PLUS (Microbiom Center)				
Moleculair-genetische microbioanalyse 3.0				
Kenmerken van de feces				
Kleur	bruin			FE
Consistentie	brilj			FE
pH-waarde	7,0		5,8 - 6,5	FE
Diversiteit				
Diversiteit	5,62		> 5	FE

De diversiteit aan bacteriën in de darm kan van mens tot mens sterk variëren. Frequent gebruik van antibiotica, infecties, toenemende leeftijd, eenzijdige voeding of roken zijn hierop van invloed.

Grad **5**

Enterotype
Prevotella

Het menselijke microbiom kan in drie enterotypes ingedeeld worden. De darmbacteriën vormen, afhankelijk van het enterotype, stabiele, maar duidelijk verschillende clusters met typische metabolische eigenschappen. Enterotype 1 wordt gekenmerkt door hoge aantallen Bacteroides en enterotype 2 door een sterke Prevotella kolonisatie. Enterotype 3 wordt gekenmerkt door een Ruminococcus flora.

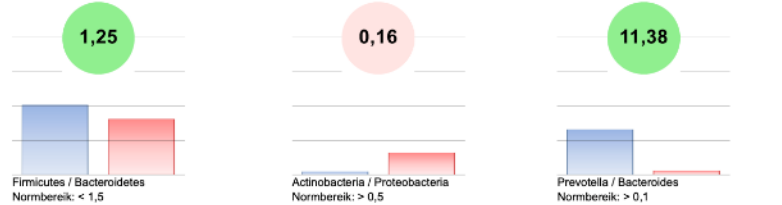
Enterotyp **2**

Dysbiose-Index

De dysbiose index is een maatstaf die afwijkingen binnen het microbiom weergeeft. Bij deze maatstaf wordt rekening gehouden met alle onderzochte bacteriefamilia, -geslachten en -soorten e.e.a. afhankelijk van hun relevantie.

Index **20**

Ratio



FE=feces *Externe analyse (R), A) geaccrediteerd NA) niet geaccrediteerd

Test	Uitslag	Eenheid	Nombereik	Voorg onderzoek
Indeling van bacteriën naar fyllum				
Actinobacteria	0,5	%	1,0 - 5,0	FE
Bacteroidetes	40,7	%	30 - 60	FE
Firmicutes	50,9	%	30 - 60	FE
Fusobacteria	0,0	%	0,0 - 1,0	FE
Proteobacteria	3,2	%	1,5 - 5,0	FE
Verrucomicrobia	1,0	%	1,5 - 5,0	FE
Overige	3,6	%		FE

Metaboolom (stofwisselingsactieve bacteriegroepen)				
Secundaire galzuren	-42,3	%		FE
TMA / TMAO	14,9	%		FE
Indoxylsulfaat	30,0	%		FE
Fenolen	-10,6	%		FE
Ammoniak	-27,9	%		FE
Histamine	-50,0	%		FE
Equol	-30,9	%		FE
Beta-glucuronidasen	-43,3	%		FE

Indeling van bacteriën naar fyllum met de belangrijkste bacteriegeslachten en -soorten				
Actinobacteria				
Bifidobacterium	2,3 x 10 ⁹	KVE/g feces	> 5,0 x 10 ⁹	FE
Bifidobacterium adolescentis	74	%		FE
Bifidobacterium longum	26	%		FE

Bacteroidetes				
Bacteroides	2,9 x 10 ¹⁰	KVE/g feces	> 1,5 x 10 ¹¹	FE
Bacteroides uniformis	40	%		FE
Bacteroides ovatus	9	%		FE
Prevotella	3,3 x 10 ¹¹	KVE/g feces	> 1,0 x 10 ¹⁰	FE
Prevotella copri	30	%		FE

Firmicutes				
Butyraatproducerende bacteriën				
Totaal kiemgetal	1,6 x 10 ¹¹	KVE/g feces	> 1,2 x 10 ¹¹	FE
Faecalibacterium prausnitzii	7,4 x 10 ¹⁰	KVE/g feces	> 5,0 x 10 ¹⁰	FE
Eubacterium rectale	9,4 x 10 ⁹	KVE/g feces	> 1,0 x 10 ¹⁰	FE
Eubacterium hallii	1,2 x 10 ¹⁰	KVE/g feces	> 5,0 x 10 ⁹	FE
Roseburia spp.	1,8 x 10 ¹⁰	KVE/g feces	> 2,0 x 10 ¹⁰	FE
Ruminococcus spp.	2,5 x 10 ¹⁰	KVE/g feces	> 3,0 x 10 ¹⁰	FE
Coprococcus spp.	1,7 x 10 ¹⁰	KVE/g feces	> 2,0 x 10 ¹⁰	FE
Butyrivibrio spp.	4,2 x 10 ⁹	KVE/g feces	> 5,0 x 10 ⁹	FE

Clostridia				
Totaal kiemgetal	1,8 x 10 ⁹	KVE/g feces	< 4,0 x 10 ⁹	FE
Clostridia Cluster I	1,0 x 10 ⁵	KVE/g feces	< 2,0 x 10 ⁹	FE

Fusobacteria				
Fusobacterium	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁷	FE

Verrucomicrobia				
Akkermansia muciniphila	9,9 x 10 ⁶	KVE/g feces	> 5,0 x 10 ⁹	FE

FE=feces *Externe analyse (R), A) geaccrediteerd NA) niet geaccrediteerd



Case report Acne

Test	Uitslag	Eenheid	Normbereik	Vorig onderzoek
Proteobacteria				
Pathogene of potentieel pathogene bacteriën				
Haemophilus spp.	4,7 x 10 ⁴	KVE/g feces	< 1,0 x 10 ⁹	FE
Acinetobacter spp.	< 1,0 x 10 ⁴	KVE/g feces	< 1,0 x 10 ⁶	FE
Proteus spp.	< 1,0 x 10 ⁴	KVE/g feces	< 1,0 x 10 ⁶	FE
Klebsiella spp.	2,5 x 10⁹	KVE/g feces	< 1,0 x 10 ⁶	FE
Enterobacter spp.	2,3 x 10⁸	KVE/g feces	< 1,0 x 10 ⁶	FE
Serratia spp.	3,3 x 10⁷	KVE/g feces	< 1,0 x 10 ⁶	FE
Haflria spp.	< 1,0 x 10 ⁴	KVE/g feces	< 1,0 x 10 ⁶	FE
Morganella spp.	< 1,0 x 10 ⁴	KVE/g feces	< 1,0 x 10 ⁶	FE
Citrobacter spp.	1,7 x 10 ⁸	KVE/g feces	< 5,0 x 10 ⁶	FE
Pseudomonas spp.	1,9 x 10⁸	KVE/g feces	< 5,0 x 10 ⁷	FE
Providencia spp.	< 1,0 x 10 ⁴	KVE/g feces	< 5,0 x 10 ⁷	FE
H2S-vorming				
Sulfaatreducerende bacteriën (SRB)	7,3 x 10 ⁸	KVE/g feces	< 2,0 x 10 ⁹	FE
Desulfovibrio piger	< 1,0 x 10 ⁴	KVE/g feces	< 1,0 x 10 ⁹	FE
Desulfomonas pigra	< 1,0 x 10 ⁴	KVE/g feces	< 1,0 x 10 ⁹	FE
Bilophila wadsworthii	< 1,0 x 10 ⁴	KVE/g feces	< 2,0 x 10 ⁹	FE
Immunogeniteit / mucine vorming				
Immunogeen werkende bacteriën				
Escherichia coli	3,7 x 10⁷	KVE/g feces	10 ⁶ - 10 ⁷	FE
Enterococcus spp.	4,7 x 10 ⁶	KVE/g feces	10 ⁶ - 10 ⁷	FE
Lactobacillus spp.	9,5 x 10 ⁴	KVE/g feces	10 ⁶ - 10 ⁷	FE
Mucine vorming / slijmvliesbarrière				
Akkermansia muciniphila	9,9 x 10⁶	KVE/g feces	> 5,0 x 10 ⁹	FE
Faecalibacterium prausnitzii	7,4 x 10 ¹⁰	KVE/g feces	> 5,0 x 10 ¹⁰	FE
Archaea				
Methanogenen				
Methanobrevibacter spp.	4,7 x 10 ⁷	KVE/g feces	< 1,0 x 10 ⁸	FE
Mycobloem: relevante gisten				
Candida albicans (CA)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida krusei (CK)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida glabrata (CG)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida dubliniensis (CD)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida parapsilosis (CP)	4,2 x 10³	KVE/g feces	< 1,0 x 10 ³	FE
Candida tropicalis (CTp)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida lusitanae (CL)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Parasieten				
Pathobionten				
Blastocystis hominis	negatief	negatief		FE
Dientamoeba fragilis	positief	negatief		FE
Pathogene dierprotozoa				
Giardia lamblia	negatief	negatief		FE
Entamoeba histolytica	negatief	negatief		FE
Cryptosporidium spp.	negatief	negatief		FE

Test	Uitslag	Eenheid	Normbereik	Vorig onderzoek
Cyclospora cayalensis	negatief	negatief		FE
Vertering				
Veïgehalte	4,60	g/100g	< 3,5	FE
Stikstofgehalte	0,60	g/100g	< 1,0	FE
Suikergehalte	2,90	g/100g	< 2,5	FE
Watergehalte	79,10	g/100g	75 - 85	FE
Extra parameter(s)				
Caiprotectine	18,22	mg/l	< 50	FE
Alfa-1-antitripsine	5,0	mg/dl	< 27,5	FE
Secretoir immunoglobuline A	<167,0	µg/ml	510 - 2040	FE
Zonuline	44,08	ng/ml	< 55	FE
Speciale gastro-enterologische diagnostiek				
Gluten-sensitieve enteropathie / coeliakie				
Anti-gliadine antilichamen in feces	27,45	UM	< 100	FE
Anti-transglutaminase antistoffen in feces	<50,00	UM	< 100	FE

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be

Case report Acne

- **Treatment**
 - MyOwnBlend
 - vitD, linidol, magnesium, Omega3, linidol, silybum-curcuma, lyopogold (enzymes)
 - No diet changes

MC ID	Product	Daily dose
M002	MyOwnBlend, magistral preparation 2 months (oral)	
BB008	Yeast reduction	2
BB011	Butyrate generator	2
BB020	Bacillus clausii UBBC-07	2
BB023	2'-Fucosyllactose	2
BB027	L. rhamnosus SP1	1
BB028	L. plantarum P-8	1
BB058	S. Boulardii	2
BB056	L. rhamnosus GG	2
BB029	PHGG	1

Case report Acne

- 3rd consultation (after 1.5 jars of MOB): going very well, almost all complaints are gone, no longer tired, wakes up naturally in the morning, acne has disappeared, no more vaginal complaints, also had recurrent skin ulcers and these are also gone.
- Now three months later, it's still going very well, no more acne or vaginal complaints; In addition, she has much more energy, strength training is very easy for her, and her trainer is impressed by how quickly she is progressing.



Case report Acne

Materiaal: FE Gevalideerd op: 08.04.2024 Uitslagstatus op: 08.04.2024

Test	Uitslag	Eenheid	Nombereik	Vorig onderzoek
Fecesdiagnostiek				
Mikrobiomanalyse Midl PLUS (Microbiom Center)				
Moleculair-genetische microbiomanalyse 3.0				
Kenmerken van de feces				
Kleur	bruin		braun	FE MAU VSDU
Consistentie	brijig		breitig	FE MAU VVFV
pH-waarde	5,6		5,8 - 6,5	FE MAU TEST3
Diversiteit				
Diversiteit	5,06		> 5,5	FE NAU MSDD

De diversiteit aan bacteriën in de darm kan van mens tot mens sterk variëren. Frequent gebruik van antibiotica, infecties, toenemende leeftijd, eenzijdige voeding of roken zijn hierop van invloed.

Grad



Enterotype	FE
Prevotella	NAU MSDD

Het menselijke microbiom kan in drie enterotypes ingedeeld worden. De darmbacteriën vormen, afhankelijk van het enterotype, stabiele, maar duidelijk verschillende clusters met typische metabolische eigenschappen. Enterotype 1 wordt gekenmerkt door hoge aantallen Bacteroides en enterotype 2 door een sterke Prevotella kolonisatie. Enterotype 3 wordt gekenmerkt door een Ruminococcus flora.

Enterotyp



Dysbiose-index	FE
	NAU RECHN

De dysbiose index is een maatstaf die afwijkingen binnen het microbiom weergeeft. Bij deze maatstaf wordt rekening gehouden met alle onderzochte bacteriefyla, -geslachten en -soorten e.e.a. afhankelijk van hun relevantie.

Index



Ratio

0,84

2,08

111,36

Firmicutes / Bacteroidetes
Nombereik: < 3,0

Actinobacteria / Proteobacteria
Nombereik: > 1,0

Prevotella / Bacteroides
Nombereik: > 0,4

FE=feces

Test	Uitslag	Eenheid	Nombereik	Vorig onderzoek
Indeling van bacteriën naar fyllum				
Actinobacteria	2,7	%	1,5 - 7	FE
Bacteroidetes	52,0	%	20 - 45	FE
Firmicutes	43,7	%	50 - 75	FE
Fusobacteria	0,0	%	0,0 - 1,0	FE
Proteobacteria	1,3	%	1,0 - 3,5	FE
Verrucomicrobia	0,1	%	1,5 - 5,0	FE
Overige	0,3	%		FE
Metaboolom (stofwisselingsactieve bacteriegroepen)				
Secundaire galzuren	-40,0	%		FE
TMA / TMAO	90,5	%		FE
Indoxylsulfaat	-50,0	%		FE
Fenolen	60,0	%		FE
Ammoniak	-10,2	%		FE
Histamine	-50,0	%		FE
Equol	28,0	%		FE
Beta-glucuronidasen	-48,8	%		FE
Indeling van bacteriën naar fyllum met de belangrijkste bacteriegeslachten en -soorten				
Actinobacteria				
Bifidobacterium	1,7 x 10 ¹⁰	KVE/g feces	> 1,0 x 10 ¹⁰	FE
Bacteroidetes				
Bacteroides	4,4 x 10 ⁹	KVE/g feces	> 5,0 x 10 ¹⁰	FE
Prevotella	4,9 x 10 ¹¹	KVE/g feces	> 1,0 x 10 ¹⁰	FE
Prevotella copri	46	%		FE
Firmicutes				
Butyraatproducerende bacteriën				
Totaal kiemgetal	1,9 x 10 ¹¹	KVE/g feces	> 2,4 x 10 ¹¹	FE
Faecalibacterium prausnitzii	1,1 x 10 ¹¹	KVE/g feces	> 1,0 x 10 ¹¹	FE
Eubacterium rectale	6,0 x 10 ⁹	KVE/g feces	> 2,0 x 10 ¹⁰	FE
Eubacterium hallii	1,1 x 10 ¹⁰	KVE/g feces	> 1,5 x 10 ¹⁰	FE
Roseburia spp.	1,0 x 10 ¹⁰	KVE/g feces	> 3,0 x 10 ¹⁰	FE
Ruminococcus spp.	1,3 x 10 ¹⁰	KVE/g feces	> 5,0 x 10 ¹⁰	FE
Coprococcus spp.	3,0 x 10 ¹⁰	KVE/g feces	> 5,0 x 10 ¹⁰	FE
Butyrivibrio spp.	8,2 x 10 ⁹	KVE/g feces	> 1,5 x 10 ¹⁰	FE
Clostridia				
Totaal kiemgetal	7,2 x 10 ⁸	KVE/g feces	< 4,0 x 10 ⁹	FE
Clostridia Cluster I	1,0 x 10 ⁵	KVE/g feces	< 2,0 x 10 ⁹	FE
Fusobacteria				
Fusobacterium	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁷	FE
Verrucomicrobia				
Akkermansia muciniphila	9,0 x 10 ⁷	KVE/g feces	> 5,0 x 10 ⁹	FE
Proteobacteria				
Pathogene of potentieel pathogene bacteriën				
Haemophilus spp.	7,0 x 10 ⁸	KVE/g feces	< 5,0 x 10 ⁸	FE

FE=feces

*Externe analyse (R), A) geaccrediteerd (NA) niet geaccrediteerd

Case report Acne

Test	Uitslag	Eenheid	Nommerk	Vorig onderzoek
Acinetobacter spp.	5,3 x 10 ⁶	KVE/g feces	< 1,0 x 10 ⁶	FE
Proteus spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Klostridium spp.	2,7 x 10 ⁷	KVE/g feces	< 1,0 x 10 ⁷	FE
Enterobacter spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Serratia spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁷	FE
Hafnia spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Morganella spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Citrobacter spp.	2,7 x 10 ⁷	KVE/g feces	< 5,0 x 10 ⁸	FE
Pseudomonas spp.	< 1,0 x 10 ⁵	KVE/g feces	< 5,0 x 10 ⁷	FE
Providencia spp.	< 1,0 x 10 ⁵	KVE/g feces	< 5,0 x 10 ⁷	FE
H2S-vorming				
Sulfaatreducerende bacteriën (SRB)	2,4 x 10 ⁸	KVE/g feces	< 2,5 x 10 ⁹	FE
Desulfovibrio piger	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁹	FE
Desulfomonas pigra	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁹	FE
Bilophila wadsworthii	< 1,0 x 10 ⁵	KVE/g feces	< 2,0 x 10 ⁹	FE
Immunogeniciteit / mucine vorming				
Immunogeen werkende bacteriën				
Escherichia coli	1,7 x 10 ⁶	KVE/g feces	10 ⁶ - 10 ⁷	FE
Enterococcus spp.	5,31 x 10 ⁵	KVE/g feces	10 ⁶ - 10 ⁷	FE
Lactobacillus spp.	3,7 x 10 ⁵	KVE/g feces	10 ⁵ - 10 ⁷	FE
Mucine vorming / slijmvliesbarrière				
Akkermansia muciniphila	9,0 x 10 ⁷	KVE/g feces	> 5,0 x 10 ⁹	FE
Faecalibacterium prausnitzii	1,1 x 10 ¹¹	KVE/g feces	> 1,0 x 10 ¹¹	FE
Archaea				
Methanogenen				
Methanobrevibacter spp.	3,6 x 10 ⁸	KVE/g feces	< 5,0 x 10 ⁸	FE
Opmerking: Het nieuwe OmicsSnap-buise en de daarin aanwezige matrix maken een nog effectievere monstervorming mogelijk, vooral bij grampositieve bacteriën. Dit resulteert in lichtere verschuivingen in de nommeren. We vragen u hier rekening mee te houden.				
Mycobloom: relevante gisten				
Candida albicans (CA)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida krusei (CK)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida glabrata (CG)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida dubliniensis (CD)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida parapsilosis (CP)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida tropicalis (CTp)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida lusitanae (CL)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Parasieten				
Pathobionten				
Blastocystis hominis	negatief		negatief	FE
Dientamoeba fragilis	positief		negatief	FE
Pathogene darmprotozoa				
Giardia lamblia	negatief		negatief	FE
Entamoeba histolytica	negatief		negatief	FE

Test	Uitslag	Eenheid	Nommerk	Vorig onderzoek
Cryptosporidium spp.	negatief		negatief	FE
Cyclospora cayentanensis	negatief		negatief	FE
Vertoring				
Vetgehalte	4,22	g/100g	< 3,5	FE
Stikstofgehalte	0,36	g/100g	< 1,0	FE
Suikergehalte	3,26	g/100g	< 2,5	FE
Watergehalte	82,51	g/100g	75 - 85	FE
Extra parameter(s)				
Calprotectine	< 17,90	mg/l	< 50	FE
Alfa-1-antitripsine	4,2	mg/dl	< 27,5	FE
Secretoir immunoglobuline A	< 167,0	µg/ml	510 - 2040	FE
Zonuline	47,65	ng/ml	< 55	FE

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Gut-skin axis:
Immune system
→ Psoriasis

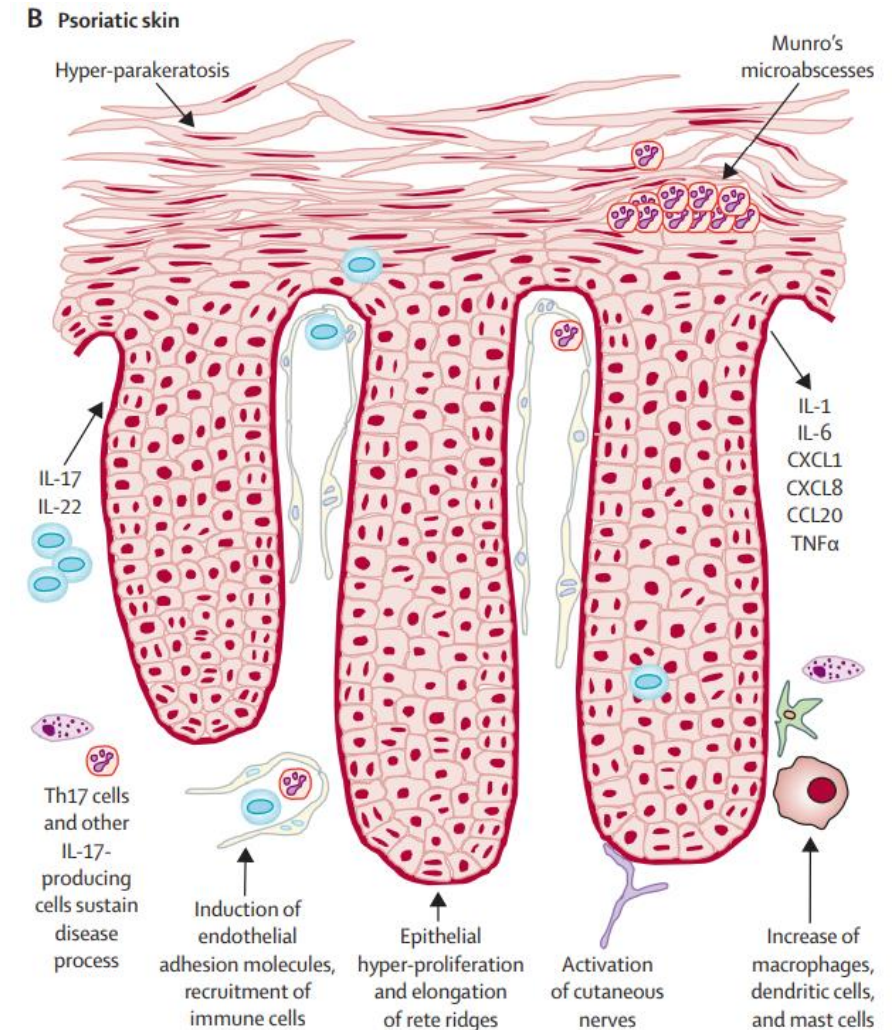
Psoriasis¹

- **Definition:** Chronic immune-mediated inflammatory skin disease with multiple subtypes (plaque (85%), flexural, guttate, pustular, erythrodermic).
- **Genetic Component:** Heritability estimated at 60–90%.
- **Challenging Sites:** Scalp, face, nails, genitalia, palms, and soles are difficult-to-treat areas.
- **Comorbidities:** Psoriatic arthritis, psychological, cardiovascular, and hepatic diseases are common and need holistic management.
- **Treatment Options:** Include topical therapies (vitamin D analogs, corticosteroids), phototherapy (NB-UVB, PUVA), conventional systemic agents (methotrexate, ciclosporin, acitretin), targeted biologics (TNF, IL-17, IL-23 inhibitors), and oral small molecule inhibitors (dimethyl fumarate, apremilast).



Psoriasis and immune system

- Primarily expressed through skin symptoms but characterized as immune-mediated disease¹⁻³.
- Apart from skin symptoms (pain, itch, bleeding) psoriasis also involves^{1,3}:
 - Severe psychological burden
 - Comorbidities such as metabolic syndrome, psoriatic arthritis, NAFLD, depression, cardiovascular diseases, Crohn's disease.
- Note: **many of the psoriasis comorbidities are part of the metabolic syndrome**⁴⁻⁶



1. Boehncke, W.-H., Schön, M.P., 2015. The Lancet 386, 983–994.

2. Hugh, J.M., Weinberg, J.M., 2018. Cutis 102, 6–12.

3. Rendon, A., Schäkel, K., 2019. Int J Mol Sci 20.

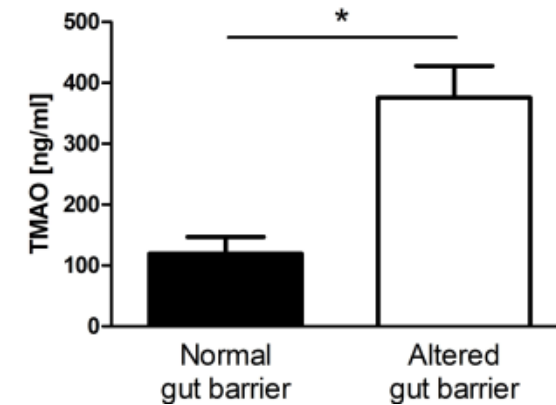
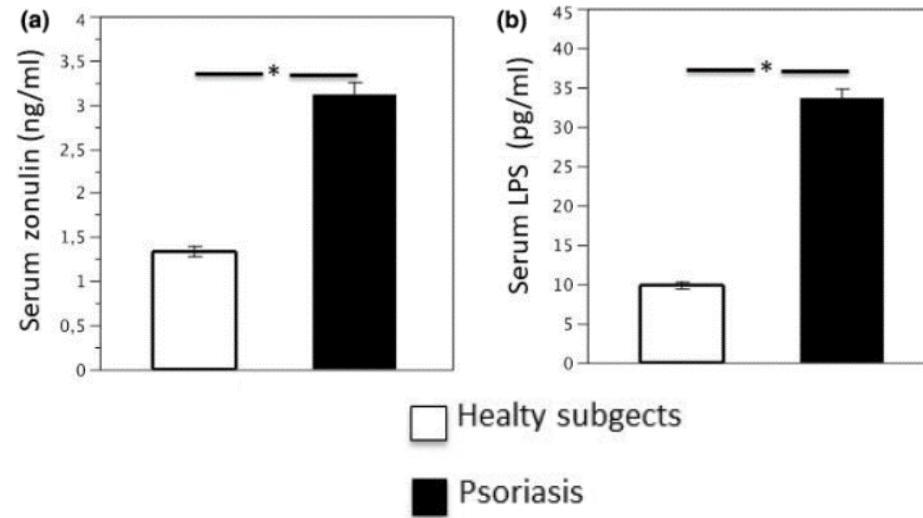
4. A. Ighbariya, R. Weiss, Jcrpe (2018) 49–57.

5. M.C. Petersen, G.I. Shulman, Physiol Rev 98 (2018) 2133–2223.

6. R. Kumari, S. Kumar, R. Kant, Diabetes & Metabolic Syndrome: Clinical Research & Reviews 13 (2019) 2409–2417

Psoriasis and leaky gut

- Elevated permeability and serum LPS¹.
- In pt group with leaky gut²:
 - Elevated serum TMAO²
 - Higher disease severity score (PASI).
 - Higher inflammatory markers.
 - More GI complaints.

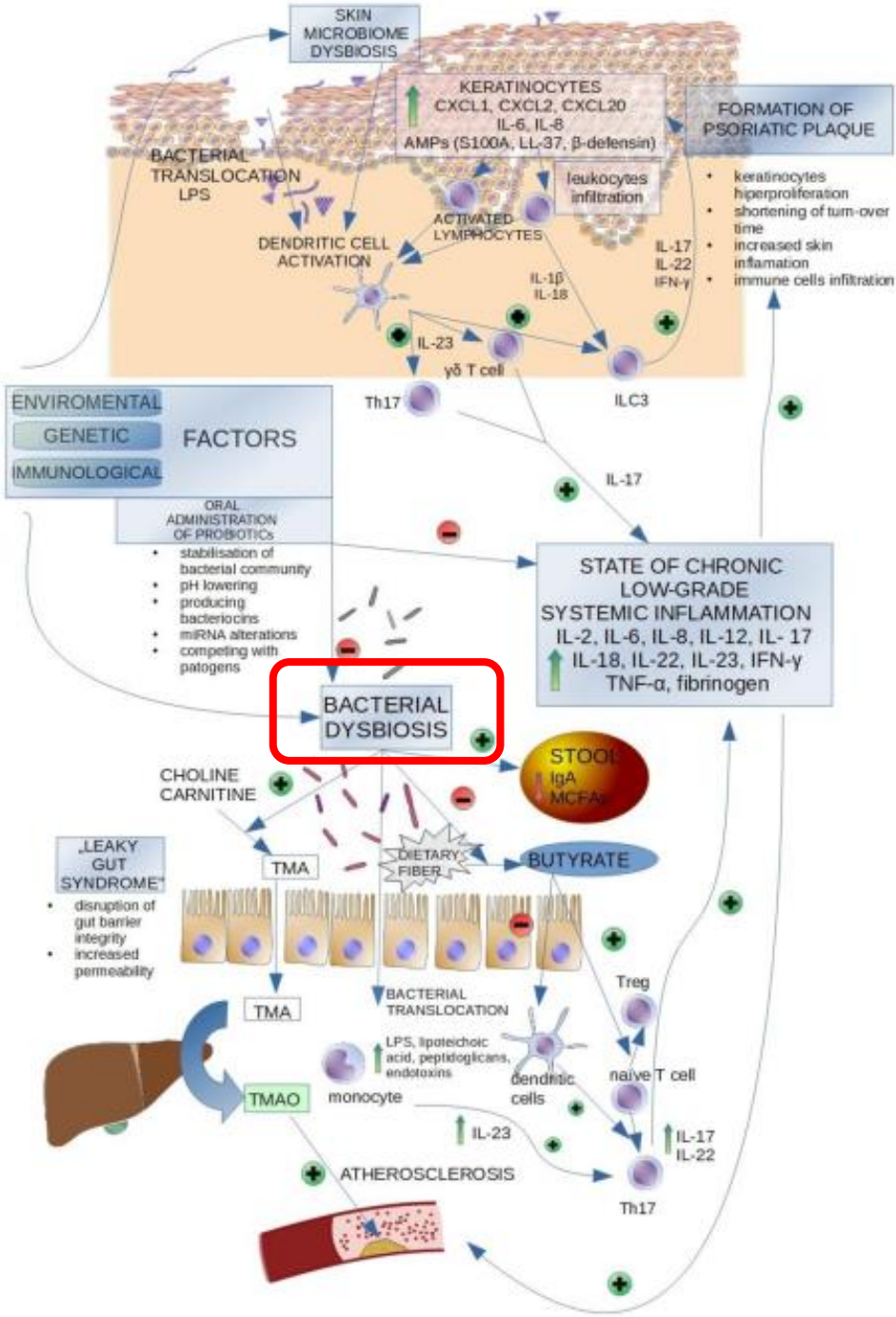


	Normal Gut Barrier (n=46)	Altered Gut Barrier (n=68)	P-value
Age (years)	42.6±14.2	45.2±13.5	0.427
Men, n (%)	31 (67.4%)	48 (70.6%)	0.803
PASI score	10.3 [6.3–12.7]	19.7 [16.7–21.1]	<0.001
Neutrophil-to-lymphocyte ratio	1.71 [1.47–2.04]	2.86 [2.20–4.42]	<0.001
C-reactive protein (mg/L)	1.92 [0.70–3.60]	3.76 [2.35–5.67]	<0.05

	Normal Gut Barrier (n=46)	Altered Gut Barrier (n=68)	P-value
Total	1.46 [1.07–1.67]	3.20 [2.53–3.67]	<0.001
Reflux	1.50 [1.00–2.00]	2.50 [1.50–3.00]	<0.001
Abdominal pain	1.33 [1.00–1.67]	3.00 [2.33–3.67]	<0.001
Indigestion	1.75 [1.25–2.00]	4.00 [2.75–5.00]	<0.001
Diarrhea	1.33 [1.00–1.67]	2.33 [1.33–3.00]	<0.001
Constipation	1.33 [1.00–1.67]	3.00 [1.67–4.00]	<0.001

1. Richetta, A. G. et al. J. Dermatol. 47, (2020)
 2. Sikora, M. et al. J Inflamm Res 14, 237–243 (2021)

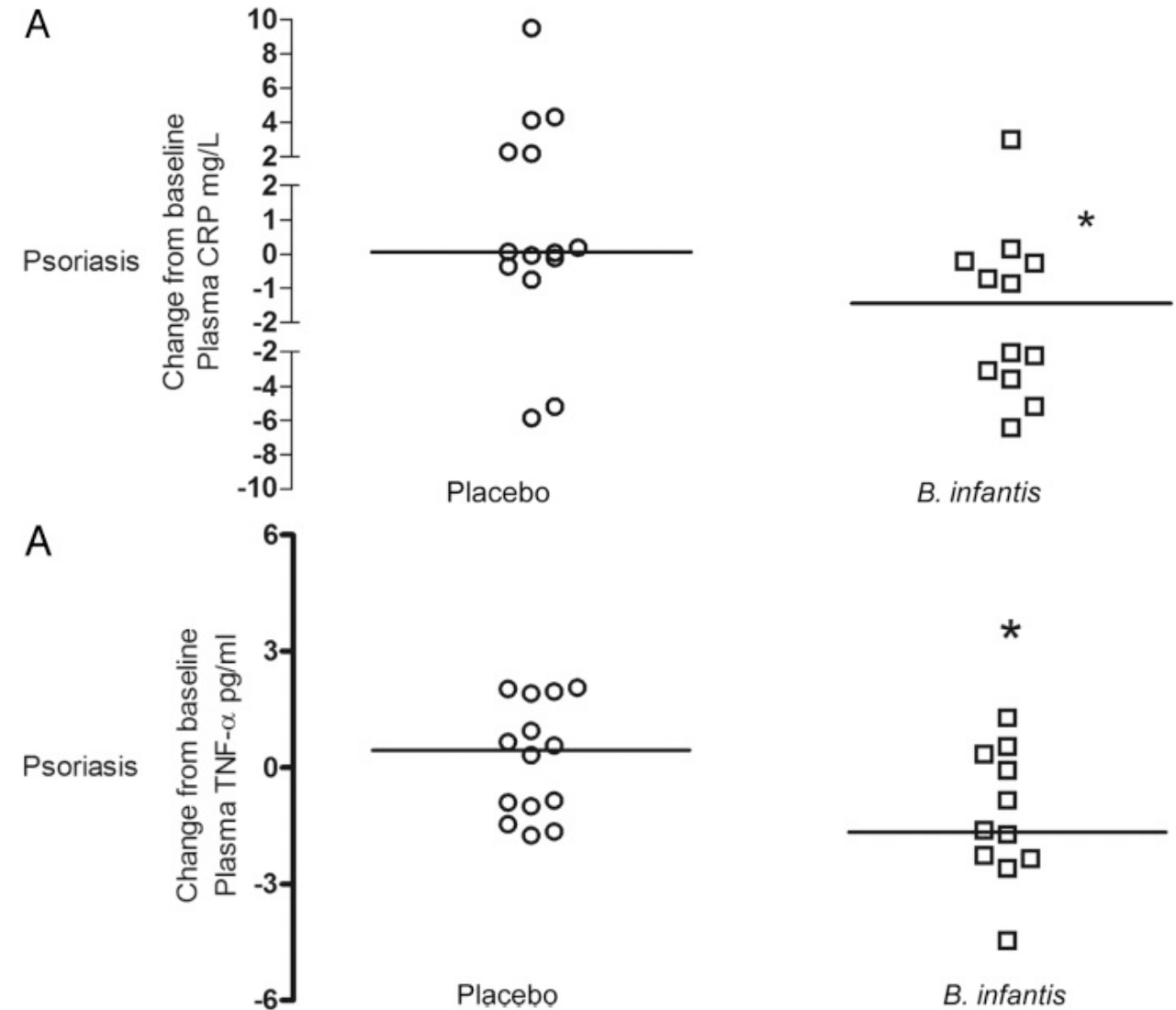
Psoriasis and gut microbiome¹



1. Polak, K. et al. Int J Mol Sci 22, 4529 (2021)

Probiotics for psoriasis

- Almost no clinical studies that investigate direct effect of probiotics on psoriasis.
- One study with *Bifibobacterium longum* subsp. *longum* 35634¹
- Case report with *B. coagulans* Unique IS-2 (see later)



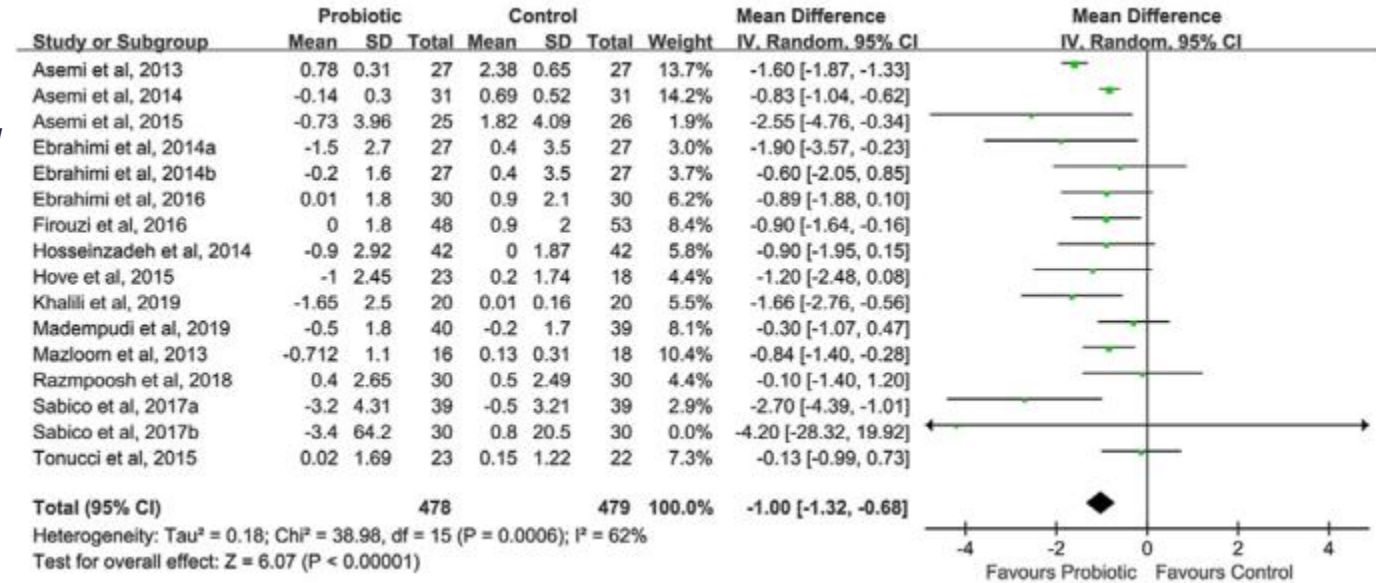
1. Groeger, D. et al. Gut Microbes 4, 325–339 (2013)

Probiotics for metabolic dysfunction

Is there evidence that treatment of the microbiome can be useful for metabolic syndrome and diabetes?

→ Yes

- For example: meta-analyses of 15 RCTs¹ or 33 RCTs² investigating the effect of probiotics in diabetes show favorable effects on HbA1c, HOMA-IR, and other markers.
 - Effects differ per strain, dosage, and population.
 - This is in accordance with the notion that the microbiome has a large inter-personal variation, and that effects are strain-specific.
- Moreover, there is strong mechanistic evidence that the gut microbiome is involved in the glycemic response and factors underlying metabolic dysfunction (IR, systemic low-grade inflammation)³⁻⁵.



1. Tao, Y.-W., Gu, Y.-L., Mao, X.-Q., Zhang, L., Pei, Y.-F., 2020. Journal of Translational Medicine 18.

2. Zhang, C. et al. Clinical Nutrition 41, 365–373 (2022)

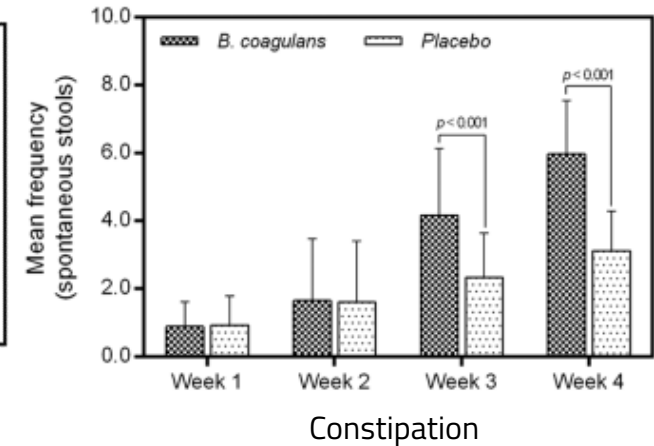
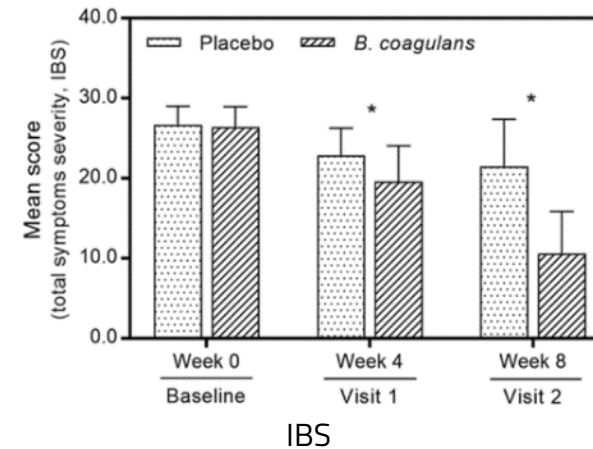
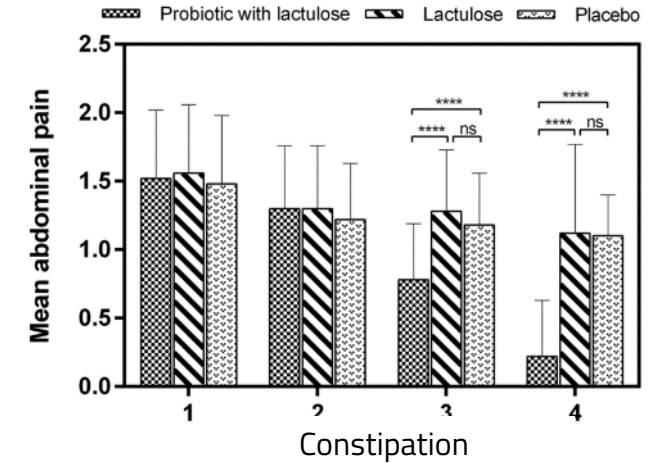
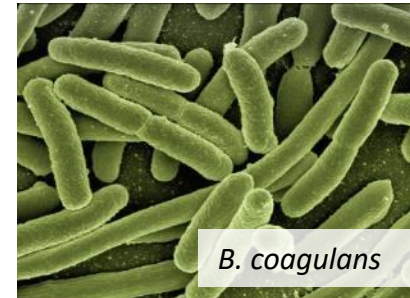
3. Janssen, A.W.F., Kersten, S., 2015. FASEB J. 29, 3111–3123.

4. Angelini, G., Salinari, S., Castagneto-Gissey, L., Bertuzzi, A., Casella-Mariolo, J., Ahlin, S., Boskoski, I., Gaggini, M., Raffaelli, M., Costamagna, G., Casella, G., Marini, P.L., Gastaldelli, A., Bornstein, S., Mingrone, G., 2020. Gut.

5. Dabke, K., Hendrick, G., Devkota, S., 2019. J Clin Invest 129, 4050–4057.

Bacillus coagulans Unique IS-2

- *Bacillus coagulans* Unique IS-2 is a spore-forming strain, making it extremely stable.
- Bacillus species are often called 'soil-based' probiotics, but this strain is isolated from a human stool sample¹.
- The evidence-based therapeutic uses consist of:
 - Constipation (fig)^{2,3,9}
 - IBS (fig)⁴⁻⁶
 - SIBO⁷
 - Liver cirrhosis⁸
 - Vaginosis (oral use)⁹
 - Ulcerative colitis¹⁰
- Typical uses: constipation, SIBO/IBS
- **Published case report with psoriasis**



1. Sudha, M. R. et al. Genetic Engineering and Biotechnology Journal (2010)
2. Madempudi, R. S. et al. Probiotics and Antimicrobial Proteins 12, 335–342 (2020)
3. Venkataraman, R. et al. Probiotics Antimicrob Proteins (2021)
4. Rogha, M. et al. Gastroenterol Hepatol Bed Bench 7, 156–163 (2014)
5. Sudha, M. R. et al. Beneficial Microbes 9, 563–572 (2018)
6. Madempudi, R. S. et al. Scientific Reports 9, (2019)
7. Khalighi, A. R. et al. Indian J Med Res 140, 604–608 (2014)
8. Pawar, R. et al. in (2012)
9. Venkataraman, R. et al. Probiotics Antimicrob Proteins (2021)
10. Bamola, V. D. et al. 2021.07.18.21260556 (2021)

***Bacillus coagulans* Unique IS-2 – psoriasis case report¹**

- 47 y/o woman, crops of pustules all over her body since 20 days.
- Psoriasis since her 15th.
- Rashes started on leg, rapidly progressed to whole body.
- Rashes associated with pain.
- Fever and arthritis of both knees.
- Random blood sugar 12,2mmol/l, triglycerides 3.88 mmol/l, CRP positive.
- Diagnosis: pustular psoriasis.
- Admitted in hospital, put on steroids, dapsons, was already on methotrexate. Also analgesics and antipyretics.



Figure 1 and 2. Pre-treatment: Pustular lesions prior to the treatment with probiotics

Bacillus coagulans Unique IS-2 – psoriasis case report¹

- No response after 2w, lesions + blood sugar kept increasing.
- Developed signs of steroid toxicity. Forced to withdraw steroids.
- Based on anecdotal evidence **put on probiotics, with biotin 10mg/d.**
- **All the other drugs were stopped.**
- In 15d, fever subsided, lesions started involuting, no new lesions appeared.
- General condition also showed improvement. Blood sugar level dropped.
- Continued same treatment, after six months free of lesions

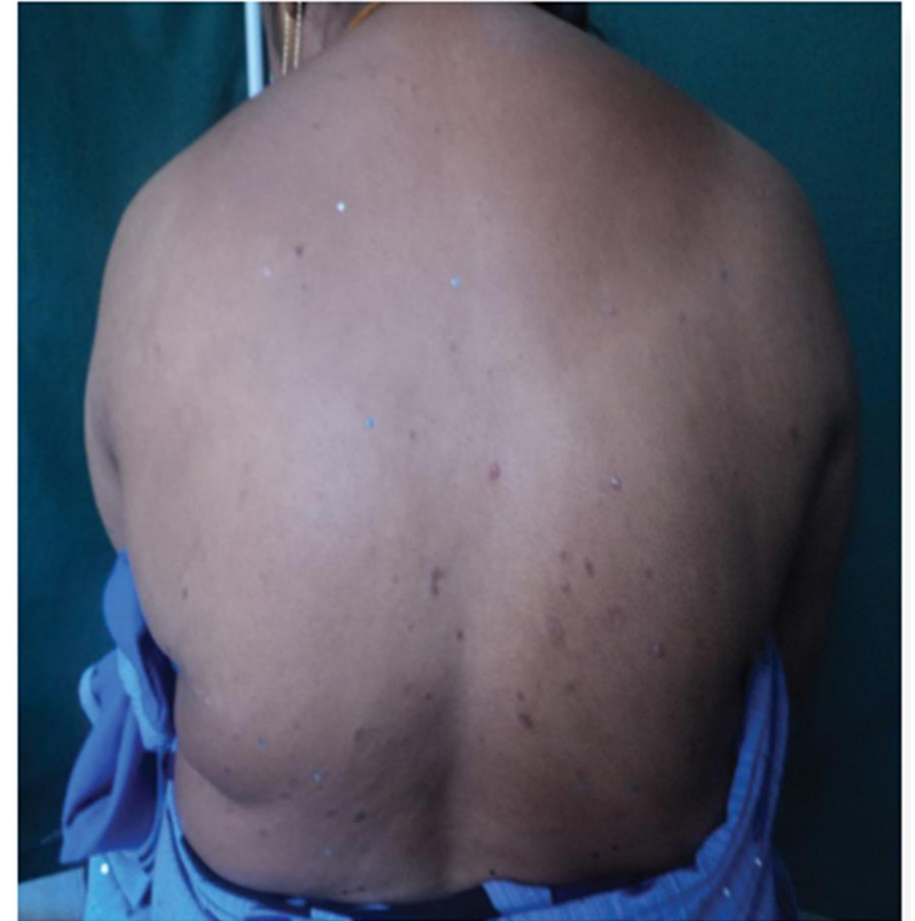


Figure 3 and 4. Post-treatment: Healed pustular lesions with few erythematous plaques after 4 weeks of treatment

Case report: psoriasis



- Pedro, 1967
- Psoriasis since summer '22, possible triggers are stress and temporary use of Naproxen.
- Medical history: Cholecystectomy
- Regular bowel movements several times a day, occasionally fatty or sticky, experiences frequent flatulence, but no bloating
- Experiences pain in the gut once every six months, takes diclofenac for relief.
- Eats 3 times a day with snacks, currently avoiding lactose and gluten (seem to have no effect on symptoms (3 weeks elimination))
- Family history: Sister alopecia areata, brother has psoriasis, another brother has a rheumatic condition.
- Suppl: Magnesium and Vitamin D (last vit D measurement was 71)
- MB:

Case report: psoriasis

Test	Uitslag	Eenheid	Nombereik	Vorig onderzoek
Feceediagnostiek				
Mikrobiomanalyse Midi PLUS (Microbiom Center)				
Moleculair-genetische microbiomanalyse 3.0				
Kenmerken van de feces				
Kleur	donkerbruin			FE
Consistentie	taai/brijig			FE
pH-waarde	7,5		5,8 - 6,9	FE
Diversiteit				
Diversiteit	5,10		> 5	FE

De diversiteit aan bacteriën in de darm kan van mens tot mens sterk variëren. Frequent gebruik van antibiotica, infecties, toenemende leeftijd, eenzijdige voeding of roken zijn hierop van invloed.

Grad **5**

Enterotype	
Bacteroides	FE

Het menselijke microbiom kan in drie enterotypes ingedeeld worden. De darmbacteriën vormen, afhankelijk van het enterotype, stabiele, maar duidelijk verschillende clusters met typische metabolische eigenschappen. Enterotype 1 wordt gekenmerkt door hoge aantallen Bacteroides en enterotype 2 door een sterke Prevotella kolonisatie. Enterotype 3 wordt gekenmerkt door een Ruminococcus flora.

Enterotyp **1**

Dysbiose-index	
Index	20

De dysbiose index is een maatstaf die afwijkingen binnen het microbiom weergeeft. Bij deze maatstaf wordt rekening gehouden met alle onderzochte bacteriefyla, -geslachten en -soorten e.e.a. afhankelijk van hun relevantie.

Ratio		
Firmicutes / Bacteroidetes	0,98	Normbereik: < 1,5
Actinobacteria / Proteobacteria	0,06	Normbereik: > 0,5
Prevotella / Bacteroides	0,40	Normbereik: > 0,1

FE=feces
Microbiome Center - NL...
Seite 1 von 5

Test	Uitslag	Eenheid	Nombereik	Vorig onderzoek
Indeling van bacteriën naar fyllum				
Actinobacteria	1,1	%	1,0 - 5,0	FE
Bacteroidetes	27,3	%	30 - 60	FE
Firmicutes	26,8	%	30 - 60	FE
Fusobacteria	0,0	%	0,0 - 1,0	FE
Proteobacteria	17,6	%	1,5 - 5,0	FE
Verrucomicrobia	7,2	%	1,5 - 5,0	FE
Overige	20,0	%		FE

Metaboolom (stofwisselingsactieve bacteriegroepen)				
Secundaire galzuren	-35,3	%		FE
TMA / TMAO	-43,5	%		FE
Indoxylsulfaat	-50,0	%		FE
Fenolen	-41,9	%		FE
Ammoniak	-26,7	%		FE
Histamine	-50,0	%		FE
Equol	-34,2	%		FE
Beta-glucuronidasen	93,7	%		FE

Indeling van bacteriën naar fyllum met de belangrijkste bacteriegeslachten en -soorten				
Actinobacteria				
Bifidobacterium	8,8 x 10 ⁹	KVE/g feces	> 5,0 x 10 ⁹	FE
Bifidobacterium longum	81	%		FE
Bifidobacterium adolescentis	18	%		FE

Bacteroidetes				
Bacteroides	6,3 x 10 ¹⁰	KVE/g feces	> 1,5 x 10 ¹¹	FE
Bacteroides uniformis	38	%		FE
Bacteroides ovatus	19	%		FE
Prevotella	2,5 x 10 ¹⁰	KVE/g feces	> 1,0 x 10 ¹⁰	FE

Firmicutes				
Butyraatproducerende bacteriën				
Totaal kiemgetal	8,4 x 10 ¹⁰	KVE/g feces	> 1,2 x 10 ¹¹	FE
Faecalibacterium prausnitzii	4,0 x 10 ¹⁰	KVE/g feces	> 5,0 x 10 ¹⁰	FE
Eubacterium rectale	1,4 x 10 ⁹	KVE/g feces	> 1,0 x 10 ¹⁰	FE
Eubacterium hallii	1,6 x 10 ¹⁰	KVE/g feces	> 5,0 x 10 ⁹	FE
Roseburia spp.	2,0 x 10 ⁹	KVE/g feces	> 2,0 x 10 ¹⁰	FE
Ruminococcus spp.	1,9 x 10 ¹⁰	KVE/g feces	> 3,0 x 10 ¹⁰	FE
Coprococcus spp.	4,3 x 10 ⁹	KVE/g feces	> 2,0 x 10 ¹⁰	FE
Butyrivibrio spp.	1,4 x 10 ⁹	KVE/g feces	> 5,0 x 10 ⁹	FE

Clostridia				
Totaal kiemgetal	3,5 x 10 ⁹	KVE/g feces	< 4,0 x 10 ⁹	FE
Clostridia Cluster I	1,0 x 10 ⁹	KVE/g feces	< 2,0 x 10 ⁹	FE

Fusobacteria				
Fusobacterium	7,5 x 10 ⁶	KVE/g feces	< 1,0 x 10 ⁷	FE

Verrucomicrobia				
Akkermansia muciniphila	7,2 x 10 ⁹	KVE/g feces	> 5,0 x 10 ⁹	FE

Proteobacteria				
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FE=feces
Microbiome Center - NL...
Seite 2 von 5

Case report: psoriasis

Test	Uitslag	Eenheid	Normbereik	Vorig onderzoek
Pathogene of potentieel pathogene bacteriën				
Haemophilus spp.	1,5 x 10 ⁷	KVE/g feces	< 1,0 x 10 ⁹	FE
Acinetobacter spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Proteus spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Klebsiella spp.	2,2 x 10⁹	KVE/g feces	< 1,0 x 10 ⁶	FE
Enterobacter spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Serratia spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Hafnia spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Morganella spp.	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁶	FE
Citrobacter spp.	7,5 x 10 ⁶	KVE/g feces	< 5,0 x 10 ⁸	FE
Pseudomonas spp.	< 1,0 x 10 ⁵	KVE/g feces	< 5,0 x 10 ⁷	FE
Providencia spp.	< 1,0 x 10 ⁵	KVE/g feces	< 5,0 x 10 ⁷	FE
H2S-vorming				
Sulfatreducerende bacteriën (SRB)	3,6 x 10⁹	KVE/g feces	< 2,0 x 10 ⁹	FE
Desulfovibrio piger	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁹	FE
Desulfomonas pigra	< 1,0 x 10 ⁵	KVE/g feces	< 1,0 x 10 ⁹	FE
Bilophia wadsworthii	< 1,0 x 10 ⁵	KVE/g feces	< 2,0 x 10 ⁹	FE
Immunogeniteit / mucine vorming				
Immunogeen werkende bacteriën				
Escherichia coli	1,4 x 10⁹	KVE/g feces	10 ⁶ - 10 ⁷	FE
Enterococcus spp.	< 1,0 x 10⁵	KVE/g feces	10 ⁶ - 10 ⁷	FE
Lactobacillus spp.	6,0 x 10 ⁵	KVE/g feces	10 ⁵ - 10 ⁷	FE
Mucine vorming / slijmvliesbarrière				
Akkermansia muciniphila	7,2 x 10 ⁹	KVE/g feces	> 5,0 x 10 ⁹	FE
Faecalibacterium prausnitzii	4,0 x 10¹⁰	KVE/g feces	> 5,0 x 10 ¹⁰	FE
Archaea				
Methanogenen				
Methanobrevibacter spp.	1,6 x 10⁶	KVE/g feces	< 1,0 x 10 ⁹	FE
Mycobloom: relevante gisten				
Candida albicans (CA)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida krusei (CK)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida glabrata (CG)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida dubliniensis (CD)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida parapsilosis (CP)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida tropicalis (CTp)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Candida lusitanae (CL)	< 1,0 x 10 ³	KVE/g feces	< 1,0 x 10 ³	FE
Parasieten				
Pathobionten				
Blastocystis hominis	negatief		negatief	FE
Dientamoeba fragilis	positief		negatief	FE
Pathogene darmprotozoën				
Giardia lamblia	negatief		negatief	FE
Entamoeba histolytica	negatief		negatief	FE
Cryptosporidium spp.	negatief		negatief	FE
Cyclospora cayentanensis	negatief		negatief	FE

Test	Uitslag	Eenheid	Normbereik	Vorig onderzoek
Vertering				
Vetgehalte	5,30	g/100g	< 3,5	FE
Stikstofgehalte	0,80	g/100g	< 1,0	FE
Suikergehalte	3,40	g/100g	< 2,5	FE
Watergehalte	74,20	g/100g	75 - 85	FE
Extra parameter(s)				
Calprotectine	28,39	mg/l	< 50	FE
Alfa-1-antitripsine	29,8	mg/dl	< 27,5	FE
Secretoir Immunoglobuline A	1142,4	µg/ml	510 - 2040	FE
Zonuline	123,09	ng/ml	< 55	FE
Speciale gastro-enterologische diagnostiek				
Gluten-sensitieve enteropathie / coeliakie				
Anti-gliadine antilichamen in feces	42,98	U/l	< 100	FE
Anti-transglutaminase antistoffen in feces	<50,00	U/l	< 100	FE

Case report: psoriasis

20-04-2023


- MyOwnBlend
- DJrepair Springfield once daily, 1 scoop
- Enzymes with meals
- Limit meal frequency to a maximum of 3 times a day
- Temporarily refrain from eating fruit use

Product	Daily dose
MyOwnBlend, magistral preparation 2 months (oral)	
L. rhamnosus GG	2
Bacillus coagulans Unique IS-2	2
2'-Fucosyllactose	3
S. Boulardii	2
Butyrate generator	2
Barrier	1
PHGG	3

Case report: psoriasis


9-6-23

- Evaluation: Skin improved from rating 10 to 8, so slight improvement. MOB and DJr are working well, took enzymes for a week but experienced more bloating and cramps, so stopped

Materiaal	FE	Gevalideerd door	Dr. Herbert Schmidt	Uitslagstatus	Eindbericht
		Gevalideerd op	30.06.2023	Uitslagstatus op	30.06.2023
Test	Uitslag	Eenheid	Normbereik	Vorig onderzoek	
Fecesdiagnostiek					
Extra parameter(s)					
Zonuline	103,80	ng/ml	< 55		123,09
					FE A) ELISA

12-09-23

- Seeing improvement, still some spots left, much fewer on the stomach, arms and legs are doing well. Ate differently during the holiday period but still stuck to the diet quite well, including lactose-free yogurt, etc. Fairly satisfied with the skin, still some unrest under the eyes.

Materiaal	FE	Gevalideerd door	Dr. Herbert Schmidt	Uitslagstatus	Eindbericht
		Gevalideerd op	17.10.2023	Uitslagstatus op	17.10.2023
Test	Uitslag	Eenheid	Normbereik	Vorig onderzoek	
Fecesdiagnostiek					
Extra parameter(s)					
Zonuline	55,82	ng/ml	< 55		103,80
					FE A) ELISA

Case report: psoriasis

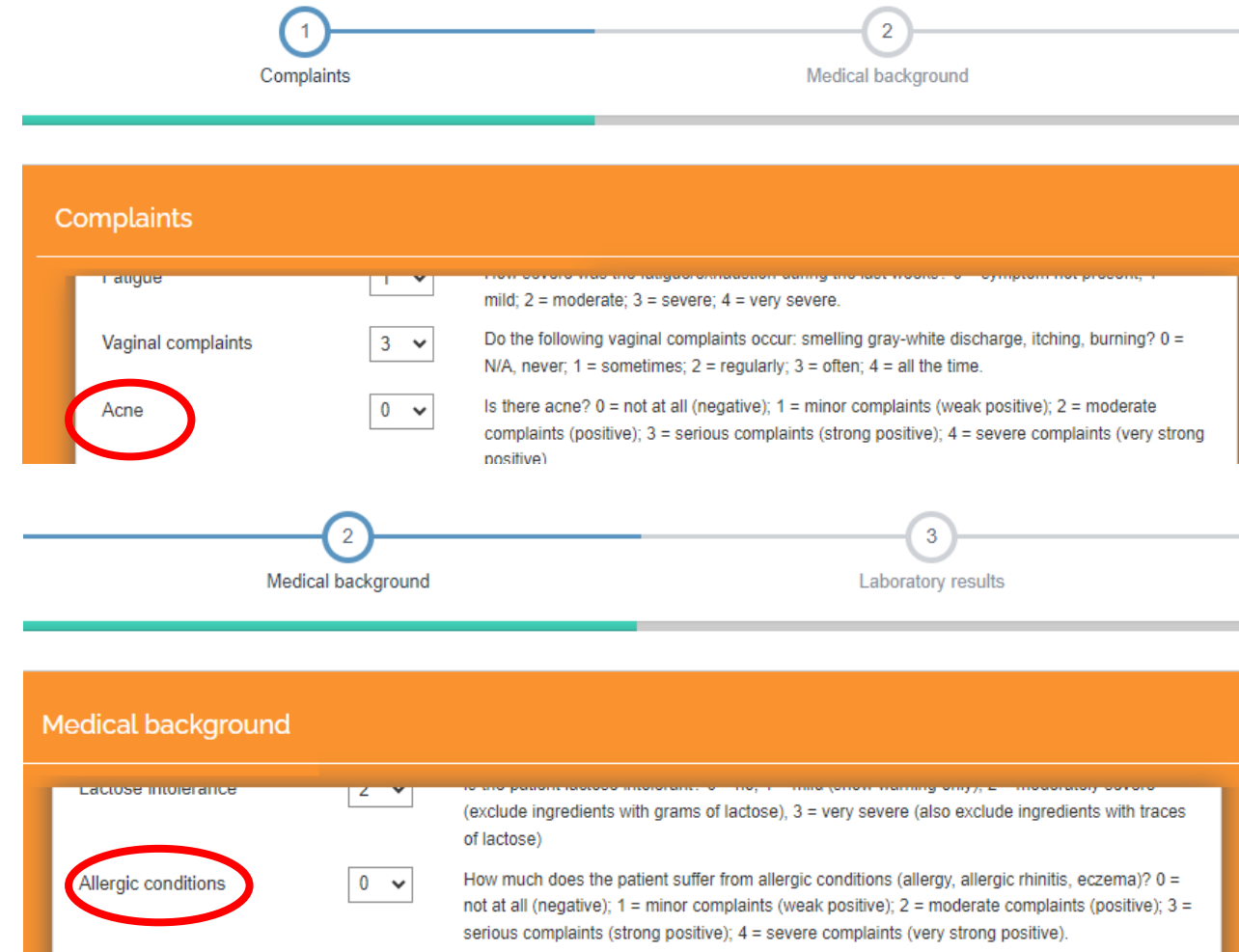


30-11-23

- *Skin has also improved significantly over the past few months, so I am satisfied. Still a few small spots, possibly related to Naproxen use for a cervical hernia. Bowels are doing well, occasional gas, bowel movements are good.*

Summary & Conclusions

- Skin is window to internal health
 - Many diseases have manifestations on skin
- Gut-skin axis involved in many skin problems
 - Both have barrier function
 - Both have intimate link with immune system
 - Both have large contact area with microbes
- Well-know gut-skin axis pathways:
 - Immune response
 - Hormones
 - Gut-brain axis
- Examples where probiotics can help:
 - Atopic dermatitis
 - Acne
 - Psoriasis
 - ...



1 Complaints

2 Medical background

Complaints

Fatigue	1	How severe was the fatigue/exhaustion during the last week? 0 = symptom not present; 1 = mild; 2 = moderate; 3 = severe; 4 = very severe.
Vaginal complaints	3	Do the following vaginal complaints occur: smelling gray-white discharge, itching, burning? 0 = N/A, never; 1 = sometimes; 2 = regularly; 3 = often; 4 = all the time.
Acne	0	Is there acne? 0 = not at all (negative); 1 = minor complaints (weak positive); 2 = moderate complaints (positive); 3 = serious complaints (strong positive); 4 = severe complaints (very strong positive)

2 Medical background

3 Laboratory results

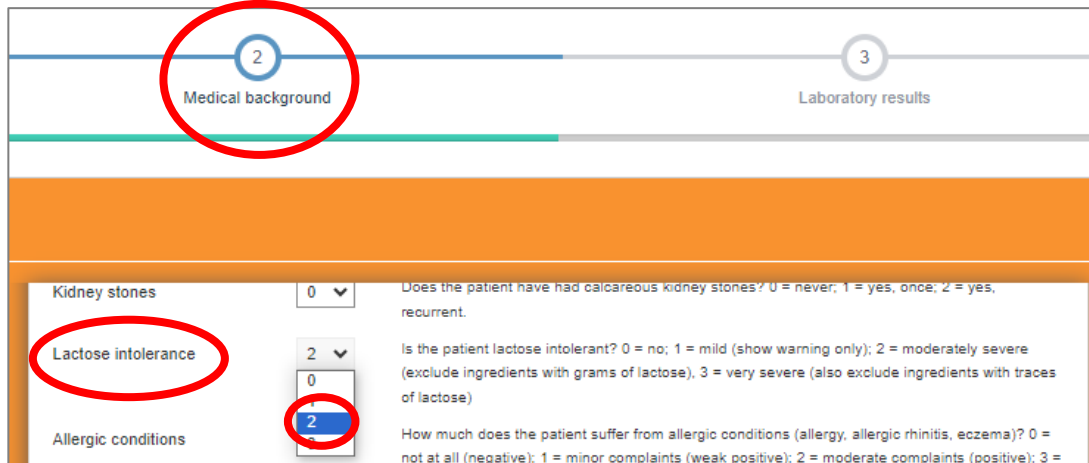
Medical background

Lactose intolerance	2	Is the patient lactose intolerant? 0 = no; 1 = mild (short warning only); 2 = moderately severe (exclude ingredients with grams of lactose); 3 = very severe (also exclude ingredients with traces of lactose)
Allergic conditions	0	How much does the patient suffer from allergic conditions (allergy, allergic rhinitis, eczema)? 0 = not at all (negative); 1 = minor complaints (weak positive); 2 = moderate complaints (positive); 3 = serious complaints (strong positive); 4 = severe complaints (very strong positive).

Updates

Advice Aid: continuously improved & fast

Improved processing of Lactose intolerance

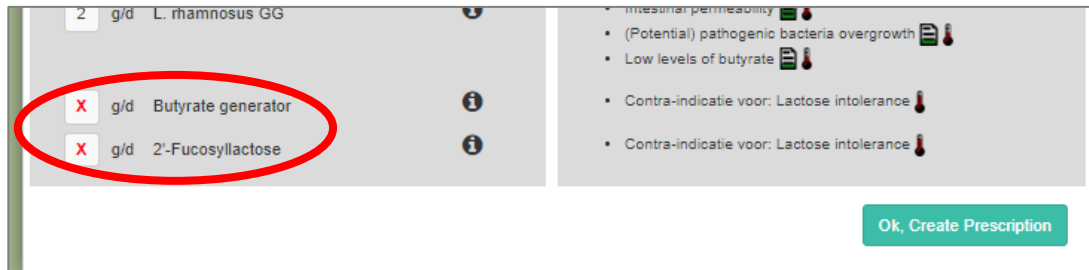


Medical background Laboratory results

Kidney stones 0 Does the patient have had calcareous kidney stones? 0 = never; 1 = yes, once; 2 = yes, recurrent.

Lactose intolerance 2 Is the patient lactose intolerant? 0 = no; 1 = mild (show warning only); 2 = moderately severe (exclude ingredients with grams of lactose), 3 = very severe (also exclude ingredients with traces of lactose)

Allergic conditions 2 How much does the patient suffer from allergic conditions (allergy, allergic rhinitis, eczema)? 0 = not at all (negative); 1 = minor complaints (weak positive); 2 = moderate complaints (positive); 3 =



2 g/d L. rhamnosus GG

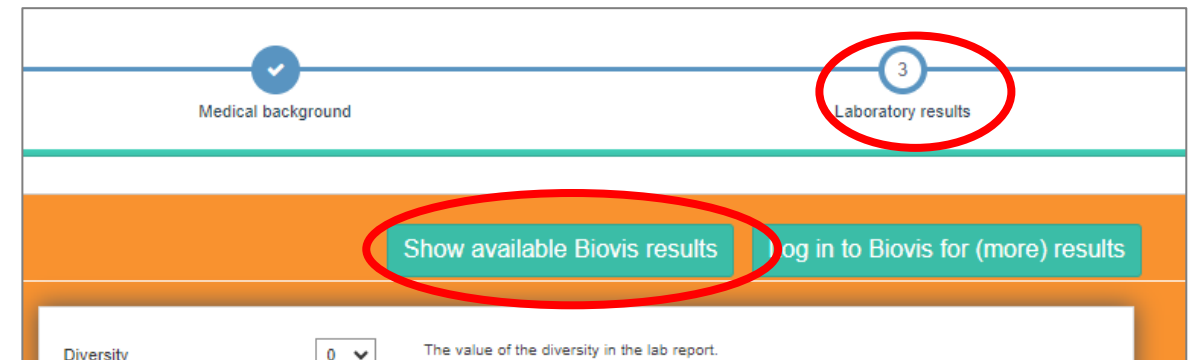
X g/d Butyrate generator

X g/d 2-Fucosyllactose

- Intestinal permeability
- (Potential) pathogenic bacteria overgrowth
- Low levels of butyrate
- Contra-indicatie voor: Lactose intolerantie
- Contra-indicatie voor: Lactose intolerantie

Ok, Create Prescription

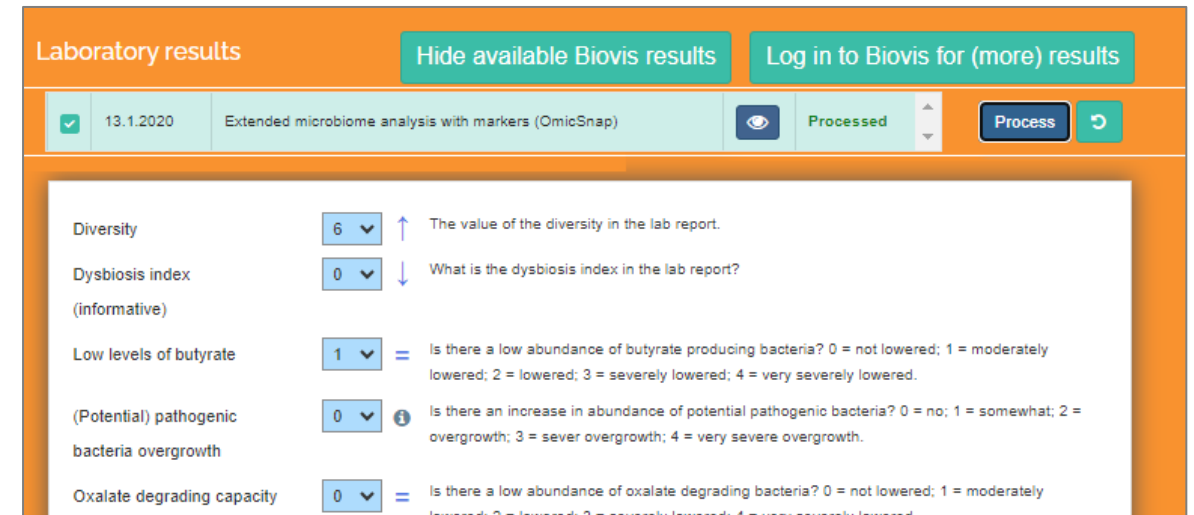
Automatic processing of Biovis results



Medical background Laboratory results

Show available Biovis results Log in to Biovis for (more) results

Diversity 0 The value of the diversity in the lab report.



Laboratory results Hide available Biovis results Log in to Biovis for (more) results

13.1.2020 Extended microbiome analysis with markers (OmicSnap) Processed Process

Diversity 6 ↑ The value of the diversity in the lab report.

Dysbiosis index 0 ↓ What is the dysbiosis index in the lab report? (informative)

Low levels of butyrate 1 = Is there a low abundance of butyrate producing bacteria? 0 = not lowered; 1 = moderately lowered; 2 = lowered; 3 = severely lowered; 4 = very severely lowered.

(Potential) pathogenic bacteria overgrowth 0 ⓘ Is there an increase in abundance of potential pathogenic bacteria? 0 = no; 1 = somewhat; 2 = overgrowth; 3 = sever overgrowth; 4 = very severe overgrowth.

Oxalate degrading capacity 0 = Is there a low abundance of oxalate degrading bacteria? 0 = not lowered; 1 = moderately lowered; 2 = lowered; 3 = severely lowered; 4 = very severely lowered.

Advice Aid: flexibility of ingredient selection

Additional suggestions for potentially useful BBs

Standard Product
 Magistral product
 Magistral mixture (MyOwnBlend)

Proposed prescription	Based on these scores
2 g/d Bacillus coagulans Unique IS-2	<ul style="list-style-type: none"> IBS Constipation Vaginal complaints
4 g/d PHGG	<ul style="list-style-type: none"> IBS Constipation Sad mood
2 g/d L. rhamnosus GG	<ul style="list-style-type: none"> IBS Intestinal permeability General diarrhea (Diarrhea, Antibiotics)
3 g/d DJ repair poeder	<ul style="list-style-type: none"> IBS Intestinal permeability Fatigue
2 g/d S. Boulardii	<ul style="list-style-type: none"> (Potential) pathogenic bacteria overgrowth Intestinal permeability General diarrhea (Diarrhea, Antibiotics)
2 g/d L. acidophilus LA02	<ul style="list-style-type: none"> IBS (Potential) pathogenic bacteria overgrowth Intestinal permeability
Alternatives (4)	
0 g/d Enterococcus faecium + Bacillus subtilis	<ul style="list-style-type: none"> IBS SIBO (small intestinal bacterial overgrowth) Fatigue
0 g/d L. plantarum P-8	<ul style="list-style-type: none"> IBS Stress Anxiety
0 g/d Barrier	<ul style="list-style-type: none"> Intestinal permeability (Potential) pathogenic bacteria overgrowth Sad mood
0 g/d Microbiota booster - vezelcomplex	<ul style="list-style-type: none"> IBS Constipation Intestinal permeability
Contraindications (2)	

Ok, Create Prescription

Ingredients *

Bacillus coagulans Unique IS-2	2	gram/d	
PHGG	4	gram/d	
L. rhamnosus GG	2	gram/d	
DJ repair poeder	3	gram/d	
S. Boulardii	2	gram/d	
L. acidophilus LA02	2	gram/d	
Alternatives			
Enterococcus faecium + Bacillus subtilis	0	gram/d	
L. plantarum P-8	0	gram/d	
Barrier	0	gram/d	
Microbiota booster - vezelcomplex	0	gram/d	
Other Ingredients			

Advised based on

- IBS
- Stress
- Anxiety

Support your treatment



Tracking the complaints of clients



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Ingredients are continuously expanded

Barrier
Bifido booster
DJ repair
IL-10 Immune balancer
TH1/TH2 Immune balancer
Pathogene reduction
Yeast reduction
Vitamin K2 booster
Butyrate generator
Microbiota booster

Bacillus clausii UBBC-07
Bacillus coagulans Unique IS-2
Enterococcus faecium Rosell-26 +
Bacillus subtilis Rosell-179
2'-Fucosyllactose
L. plantarum P8

L. rhamnosus SP1
Akkermansia
Bifidobacterium lactis HN019
Vaginal suppositories



S. Boulardii
L. acidophilus LA02
L. rhamnosus GG

PHGG
L. sakei probio65
Gut enricher
L. Plantarum DR7

Acacia fiber
L. fermentum ME-3
E. Coli MC231
...
...

New ingredient

Added acacia fiber

Acacia fiber



Product information:

This prebiotic is derived from the gum of Acacia Senegal trees and consists of over 90% fibers (also known as gum arabic). Research on acacia fibers has been conducted for decades. In MyOwnBlend, a realistically achievable dosage of approximately 5g/day is assumed, but in most clinical studies, a daily dosage of 25g/day or higher has been used. Therefore, the evidence score for many indications is somewhat lower. With this caveat, there is reasonable evidence from an RCT for bloating (1). There is also evidence from several clinical, non-blinded studies for a beneficial effect on constipation (2-4, 18). One of these studies shows a trend of improvement in IBS-C, which can be seen as some degree of evidence for IBS (18). A number of RCTs show an effect on metabolic dysfunction/insulin resistance (including 5-7). Additionally, there is some evidence for an effect in ulcerative colitis (8), inconsistent evidence for an effect on diarrhea (9-11), and some evidence for an effect on periodontitis (12). Furthermore, there is some clinical and in vitro evidence that acacia fibers can increase butyrate production (13, 14). Finally, various open-label studies demonstrate anti-inflammatory effects (including 15-17).

Active components: Organic Acacia Senegal Fiber

Ingredients: Organic Acacia Senegal Fiber

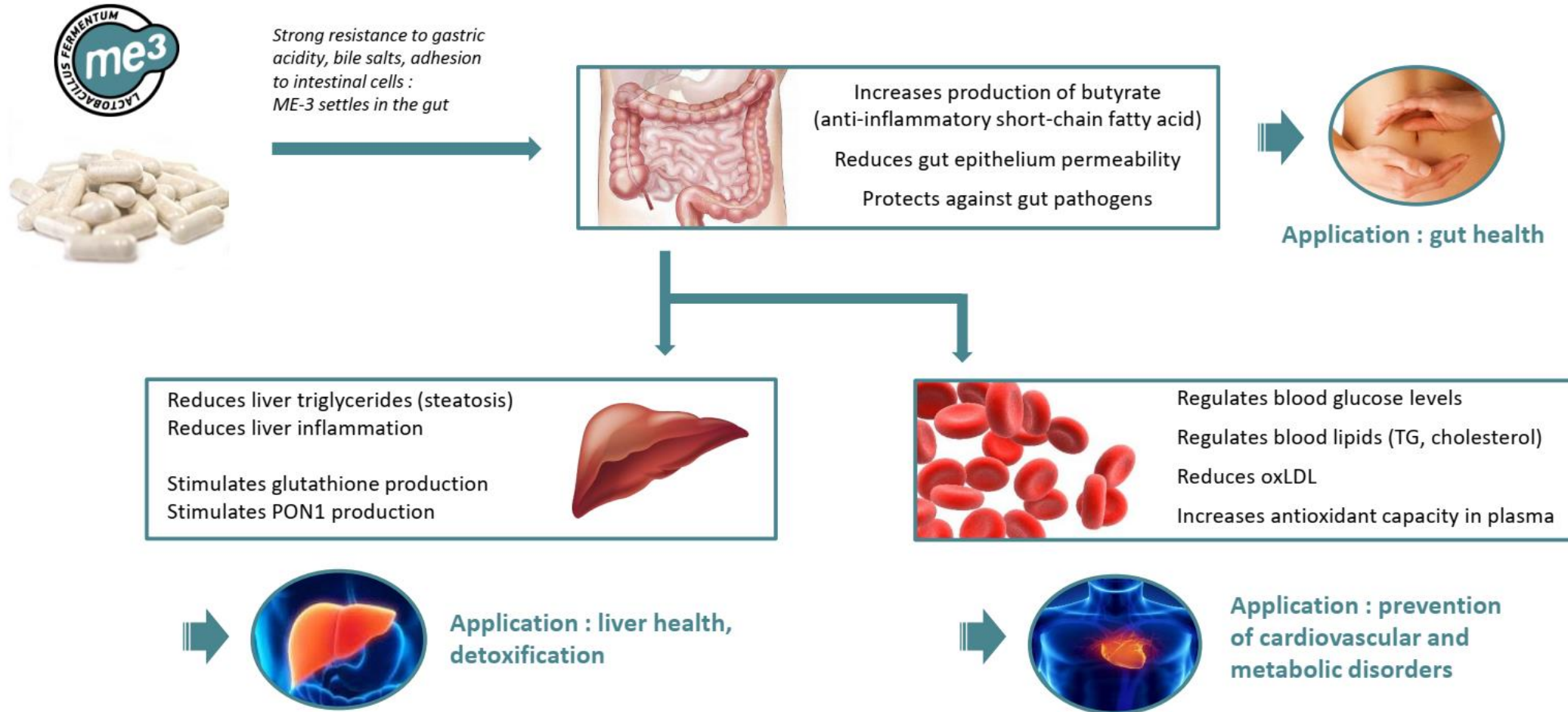
Min:3 g/d, Max:20 g/d

References:

(1) [The Effect of Gum Arabic \(Acacia senegal\) on Cardiovascular Risk Factors and Gastrointestinal Symptoms in Adults at Risk of Metabolic Syndrome: A Randomized Clinical](#)

Near future new ingredient

In the process of adding *L. fermentum* ME-3



Calender

Starters, intervision, Arbeitskreis

- Tuesday 18 June 2024, Arbeitskreis case discussions (DE/EN)
- Wednesday 26 June 2024, Arbeitskreis for MC starters (DE/EN)
- Thursday 11 July 2024, Case discussions (NL)

Thematic webinars

- Thursday 13 June 2024, SIBO part 1 (NL)
- Thursday 20 June 2024, SIBO part 1 (EN)



Thank you for your attention!