



# Effective health management

via long-term alteration of the  
gastrointestinal microbiome  
- a case study



RITA BÉRCZES<sup>1</sup>, ESZTER BOKOR<sup>1</sup>, ESZTER JUDIT TÓTH<sup>1</sup>, DÖME CSEH<sup>1</sup>,  
BENCE VERPELÉTI<sup>1</sup>, SZILVIA BIANKA LÁSZLÓ<sup>1</sup>

MEDIPREDICT LTD, BUDAPEST, HUNGARY



## alterations of the **gastrointestinal microbiome** affect the health **significantly**

### Brain/Behavior:

- Microbes interact with brain
- Microbes influence cell neogenesis, learning, mood, anxiety
- Microbial diversity reduced in AN and linked to depression and ED symptoms

AN:  
anorexia nervosa  
ED:  
erectile dysfunction

### Intestinal tract:

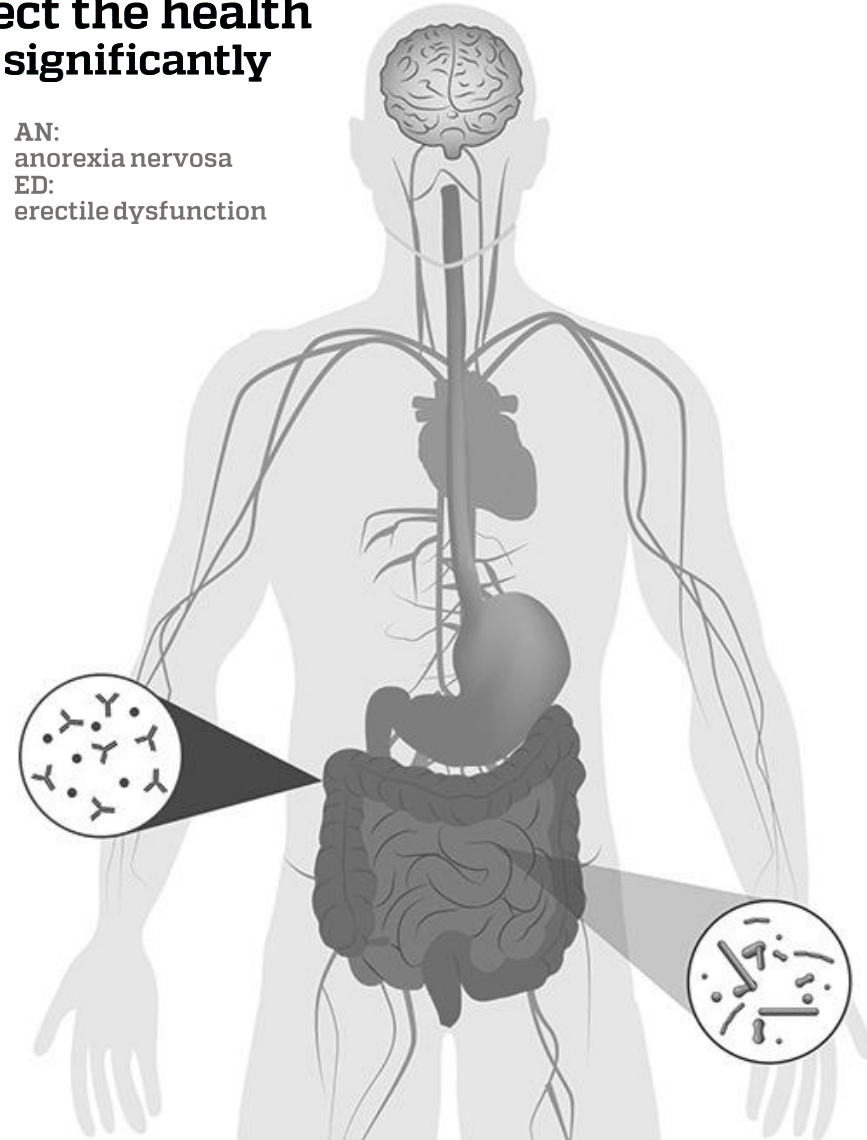
- Microbes degrade nutrients and regulate gut permeability
- Production of increased fecal branched-chain fatty acid in AN
- Increased gut permeability in AN animal model

### Immunology:

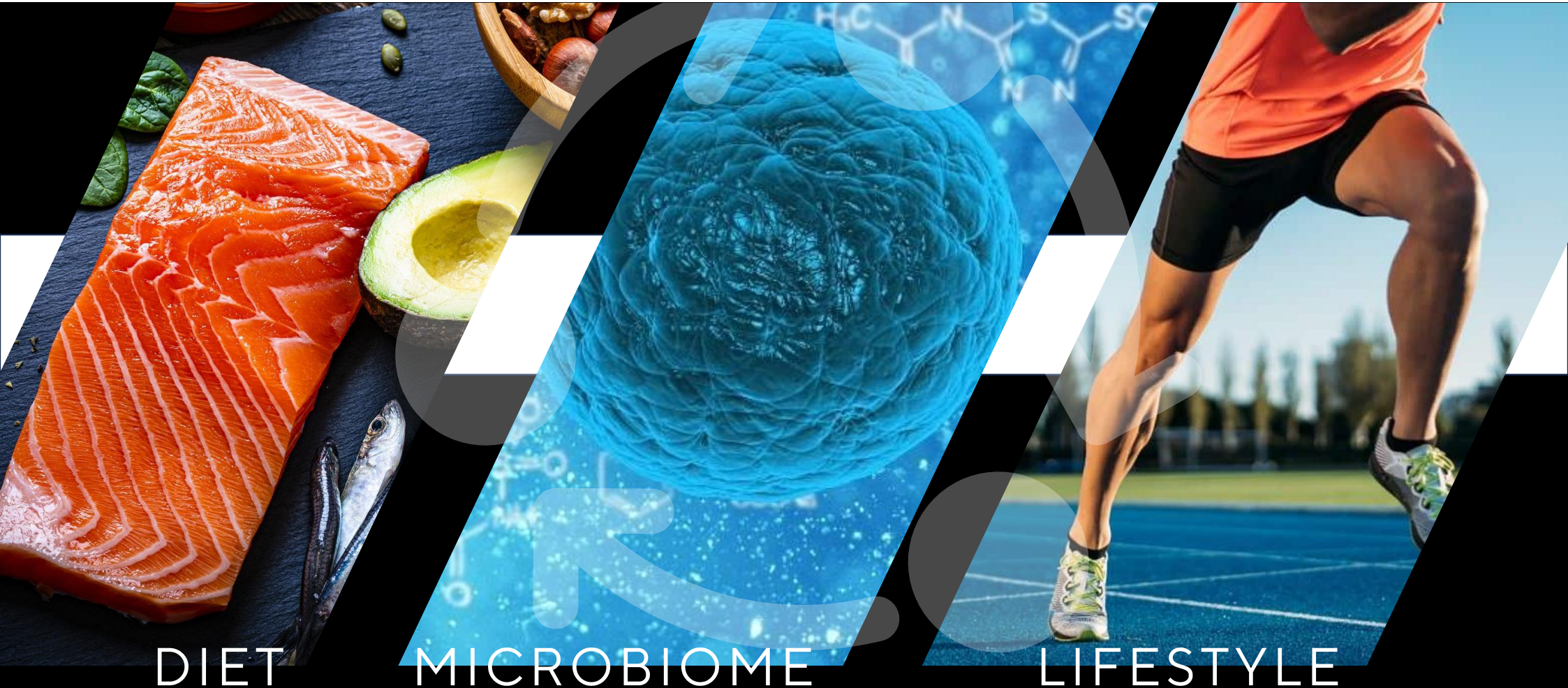
- Bacterial antigens traverse intestinal wall
- Low grade inflammation in AN
- Antibodies against hunger/satiety hormones in AN

### Gut microbiome:

- Microbe diversity reduced
- Altered bacterial community-structures
- More protein-fermenting and less butyrate-producing taxa (probably feed on mucin and aggravate gut permeability/inflammation)







DIET

MICROBIOME

LIFESTYLE

# introduction

alterations in the gastrointestinal microbiome  
affect our health significantly

# methods

## process of the gut microbiome analysis

1 SHOTGUN  
METAGENOMIC  
SEQUENCING ON  
ILLUMINA PLATFORM

2 TAXON ANALYSIS

- ALPHA DIVERSITY
- KEYSTONE SPECIES
- PATHOBIONTS
- HEALTH POTENTIALS
- FUNCTIONAL CAPACITY
- DISEASE-SPECIFIC PATTERNS
- DRUG INTERACTIONS

3 ESTABLISHMENT OF  
DISEASE RISKS  
ACCORDING TO  
EVIDENCE-BASED  
MEDICINE

4 REGULAR,  
PERSONALIZED  
DIETARY AND  
LIFESTYLE  
RECOMMENDATIONS

5 LONG-TERM  
HEALTH  
MAINTENANCE



# case study

A man in a dark suit is seen from behind, standing by a large window in a modern office. He is looking out at a city skyline with several buildings. The scene is dimly lit, with the primary light source being the window, creating a silhouette effect on the man. In the foreground, there are two black office chairs and a dark desk with some papers on it.

## 55-YEAR-OLD MALE

### PROFILE

- ENTREPRENEUR WITH A STRESSFUL, BUSY LIFESTYLE
- REGULAR ALCOHOL CONSUMPTION (ONE GLASS OF RED WINE PER DAY)
- FORMER SMOKER
- PAST OCCASIONAL CANNABIS USE

### MEDICAL HISTORY

- MULTIPLE SHOULDER AND KNEE OPERATIONS DUE TO TRAUMA
- PREVIOUS STOMACH AND DUODENAL ULCERS
- SEASONAL ALLERGY
- PROSTATIC HYPERPLASIA
- RECENT WEIGHT LOSS (14 KG) DUE TO SARS-COV-2 INFECTION

### MEDICATIONS

- INHALATIVE BRONCHODILATOR
- RESPIRATORY STEROID

# case study

## risk for inflammatory conditions

### FINDINGS OF THE MICROBIOME ANALYSIS:

- LOW ALPHA DIVERSITY
- LOW PREVALENCE OF PROTECTIVE SPECIES
- HIGH NUMBER OF PATHOBIONTS
- LOW BUTYRATE PRODUCTION
- LOW PROPIONATE PRODUCTION
- LOW ACETATE PRODUCTION
- LOW VITAMIN PRODUCTION
- ABNORMAL BILE ACID CONVERSION



- INCREASED RISK OF CARDIOVASCULAR DISEASES, SUCH AS ATHEROSCLEROSIS
- INCREASED RISK OF LIVER DISEASES
- INCREASED RISK OF METABOLIC DISEASES, SUCH AS TYPE 2 DIABETES



# case study // improving the composition

## DIETARY COACHING:

- CONSUPTION OF INULIN, GALACTO- AND FRUCTO-OLIGOSACCHARIDES
- CONSUMING BACTERIA-SPECIFIC NUTRIENTS
- AVOIDANCE OF HIGH-FAT AND CARBOHYDRATE-RICH DIET



ALPHA DIVERSITY OF THE GI MICROBIOME IMPROVED

THE AMOUNT OF KEYSTONE SPECIES APPEARED OR INCREASED

THE NUMBER OF PATHOBIONTS DECREASED

# MICROBIOME Data Panel



START OF HEALTH COACHING

DATE/TITLE		2020. 06.26.	2021. 07.27.	2021. 10.13.	2022. 08.23.
ALPHA DIVERSITY		5.60	5.96	5.88	5.73
KEYSTONE SPECIES	FAECALIBACTERIUM PRAUSNITZII	3.60%	2.82%	0.98%	2.45%
	AKKERMANSIA MUCINIPHILA	0.00%	0.00%	0.56%	0.00%
	BIFIDOBACTERIA	0.00%	0.00%	0.01%	0.07%
PATHOBIONTS		0.23%	0.31%	0.26%	0.05%





# case study // the effect of non-adherence

## SHIFT IN DIET AND LIFESTYLE

- TEMPORARILY DIFFERENT DIET FROM THE RECOMMENDED ONE
- EXCESSIVE ALCOHOL INTAKE



THE ANTI-INFLAMMATORY CAPACITY  
OF THE GUT MICROBIOME WAS  
TEMPORARILY LOST

# MICROBIOME Data Panel



DIET AND LIFESTYLE SHIFT

FUNCTIONAL CAPACITY	2020. 10.29.		2022. 08.13.		2022. 09.16.	
ANTI-INFLAMMATORY CAPACITY	25.52	<input checked="" type="checkbox"/>	27.71	<input checked="" type="checkbox"/>	7.64	
BUTYRATE PRODUCTION	17.83%	<input checked="" type="checkbox"/>	19.63%	<input checked="" type="checkbox"/>	10.56%	
PROPIONATE PRODUCTION	17.48%	<input checked="" type="checkbox"/>	25.46%	<input checked="" type="checkbox"/>	11.98%	
ACETATE PRODUCTION	34.21%	<input checked="" type="checkbox"/>	36.60%	<input checked="" type="checkbox"/>	17.12%	
VITAMIN PRODUCTION	B1, B2, B3, B5, B6, B7, B9, B12, K2		B1, B2, B3, B5, B6, B7, B9, B12, K2		B1, B2, B3, B5, B6, B7, B9, B12, K2	
BILE ACID CONVERSION				<input checked="" type="checkbox"/>		



# case study // assessment of disease risks

THE COMPOSITIONAL AND FUNCTIONAL ANALYSIS CAN BE USED FOR RISK ASSESSMENT OF MICROBIOME-INFLUENCED DISEASES




AN UNFAVORABLE GUT MICROBIOME CAN SUPPORT THE DEVELOPMENT OF CHRONIC DISEASES



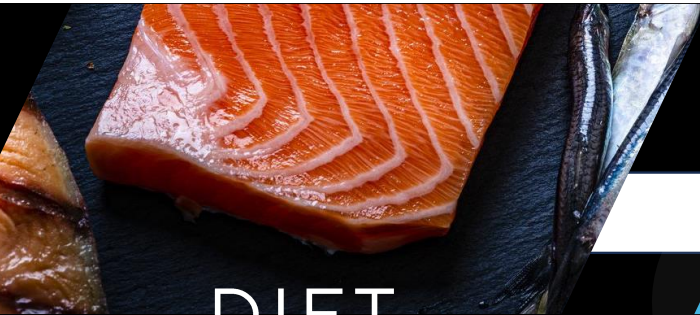
# MICROBIOME Data Panel

## RISK OF DISEASES

2022.09.16.



COLON CANCER	LOW
ATHEROSCLEROSIS	INCREASED
INSULIN RESISTANCE	INCREASED
LIVER DYSFUNCTION	INCREASED
SEVERE COVID-19 INFECTION	INCREASED
RHEUMATOID ARTHRITIS	AVERAGE
KIDNEY DISEASE	AVERAGE
KIDNEY STONES	INCREASED



## DIET

- MEDITERRANEAN DIET
- NORDIC DIET
- FODMAP
- DASH
- INULIN
- OLIGOSACCHARIDES
- POLYPHENOLS
- SPECIFIC NUTRIENTS



## MICROBIOME

- ALPHA DIVERSITY
- KEYSTONE SPECIES
- PATHOBIONTS
- FUNCTIONAL CAPACITY
- DISEASE-SPECIFIC PATTERNS
- DRUG INTERACTIONS



## LIFESTYLE

- STRESS MANAGEMENT
- RESTORATIVE SLEEP
- PHYSICAL ACTIVITY

## CONCLUSION

**Improving the microbiome composition is more effective long-term but it reacts quickly to changes in adherence to health coaching.**

📅 2023. december 5.

📍 Hotel Intercontinental

# BIOMEET

## Az egészség belülről.

Az idén első alkalommal megrendezésre kerülő eseményünk mélyreható betekintést nyújt az emberi mikrobiom világába, mindezt a szakma kutatóitól és jeles képviselőitől – közérthető módon. Összehozza a vezető szakértőket és kutatókat, akik inspiráló előadásaikkal és interaktív beszélgetéseikkel segítenek feltárni a mikrobiom rejtett titkait és potenciálját az egészségmegőrzés, valamint a betegségek kezelése terén.



**A Mikrobiom kutatás hazai úttörői.**

**Egy helyen. Érthetően.**





**Thank you**  
**for your attention!**

**RITA BÉRCZES, MD.**

HEALTH COACH

RITA.BERCZES@MEDIPREDICT.COM



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[INSTAGRAM/MEDIPREDICTHEALTH](https://INSTAGRAM/MEDIPREDICTHEALTH)



[LINKEDIN/MEDIPREDICT](https://LINKEDIN/MEDIPREDICT)



[INFO@MEDIPREDICT.COM](mailto:INFO@MEDIPREDICT.COM)