

MICROBIOM

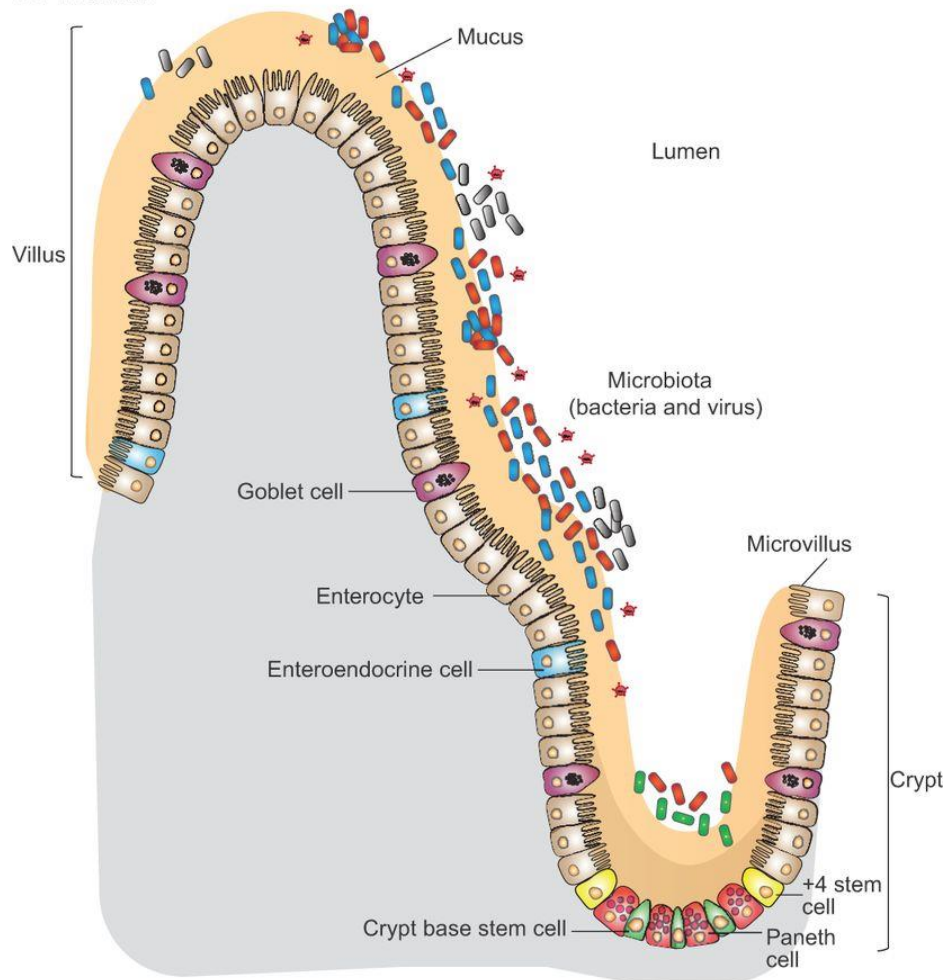
AND OBESITY

HEINZ GYAKY ® 2018 BUDAPEST

HUMAN MICROBIOM

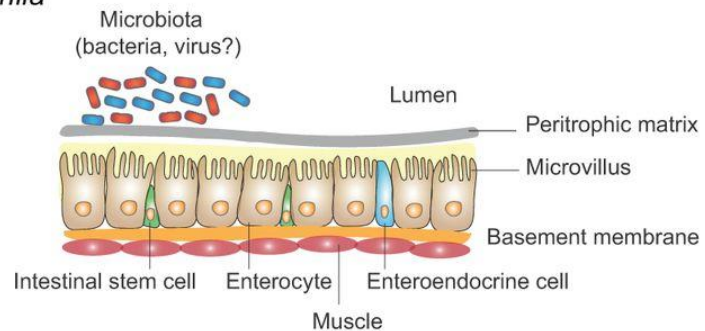
- **10 Billion bacteria are building a 1,5 – 2 kg heavy human microbiom**
- **It is located mainly in the human gut**
- **There is a intestinal controlled flora everywhere in our body**
- **Skin, mouth, stomach, blood, bladder, umbilical cord and placenta, vagina, lungs, ...**
- **Human microbiom is like a fingerprint, special and unique**
- **The bacteria have a system of communication and a controlled growing**

A Human

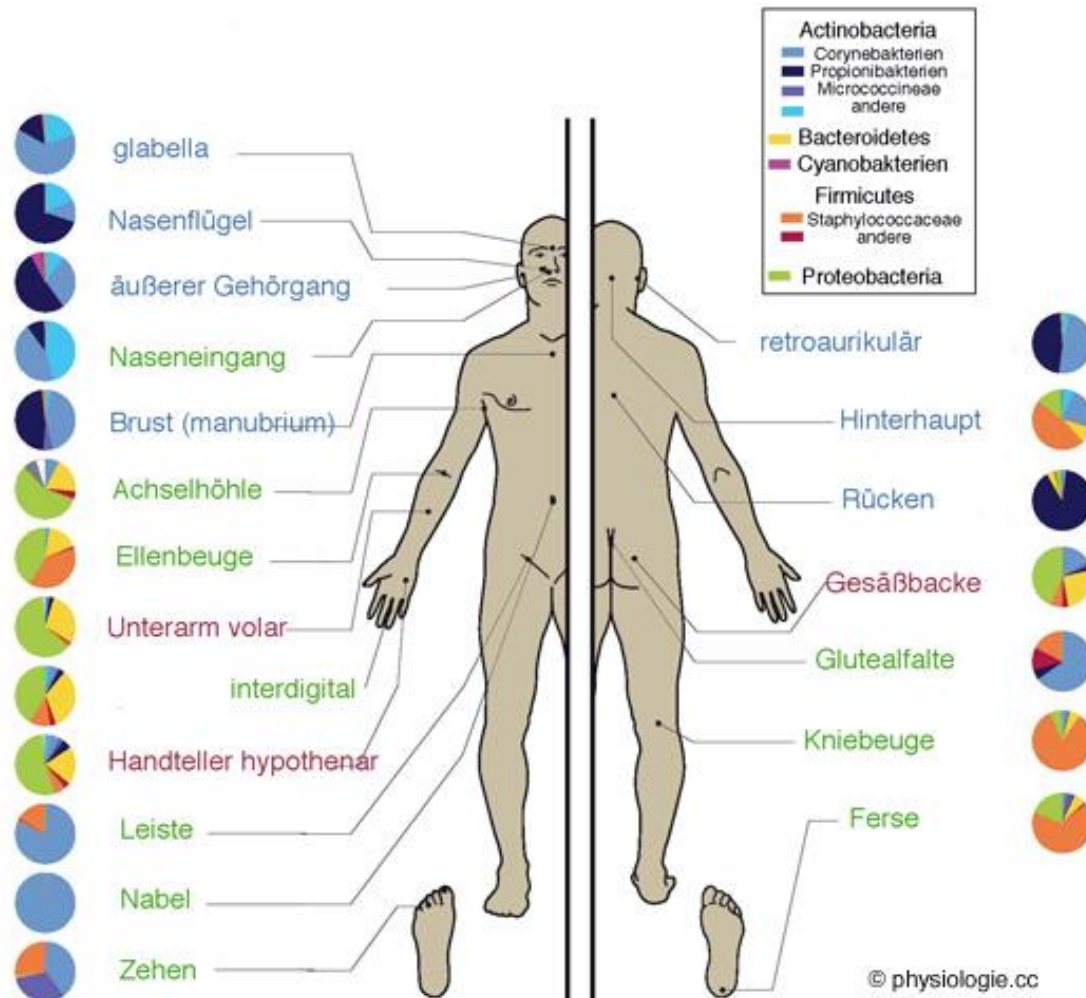


MICROBIOM AND GUT

B *Drosophila*



HUMAN MICROBIOM



TASKS OF OUR MICROBIOM

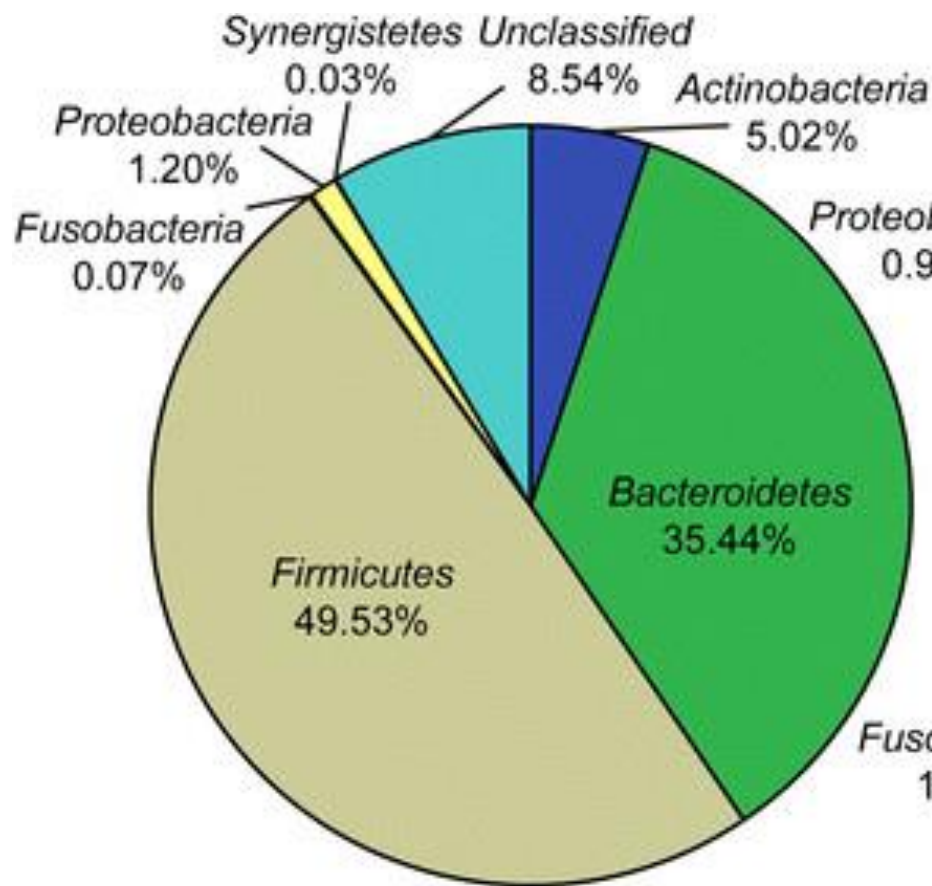
- **Controls 70-80 % of the immunity**
- **Controls 100% of our contact with the environment**
- **Involved in our digestion**
- **Produces vitamins, hormones and enzymes**
- **Communication with our brain, liver, adrenal gland**
- **The Communication is always bidirectional**

MICROBIOTA AND THE RELATIONSHIP TO DIET UND OBESITY

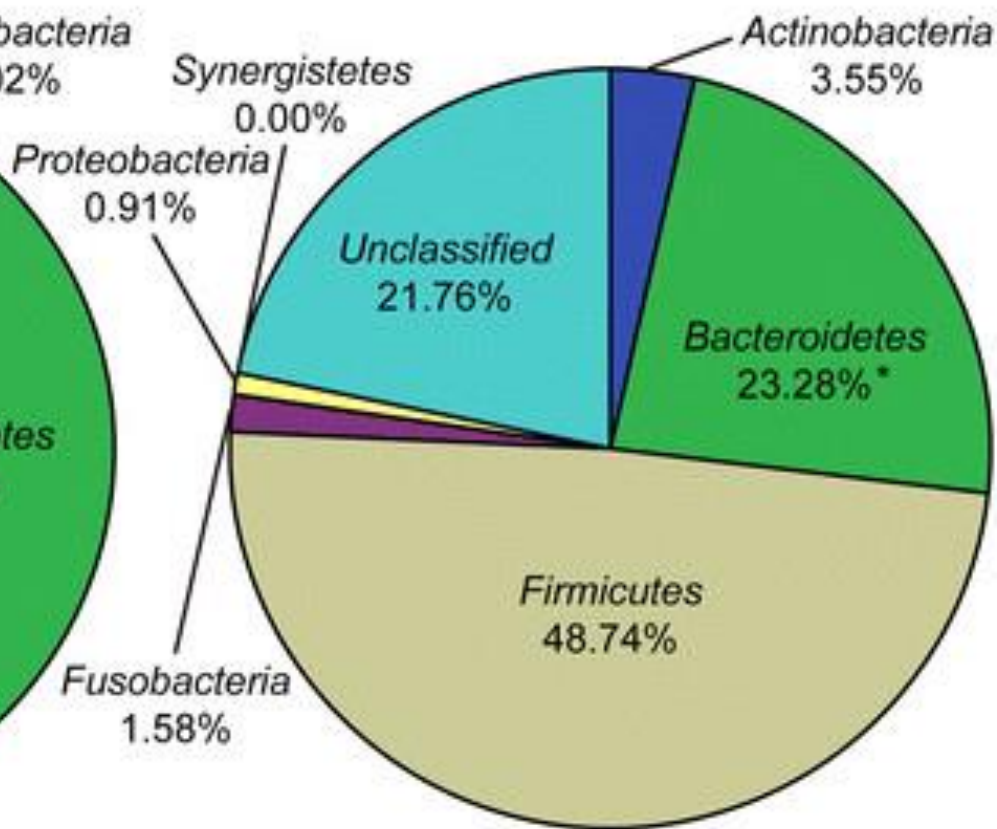
- **The bacterial composition of lean and obese humans**
- **The impact of diet on the gut microbiota**
- **Can we manipulate the gut microbiota**
- **Mechanisms by which the gut microbiota can impact on weight gain**

THE COMPOSITION OF LEAN AND OBESE HUMANS

- **We are watching two groups of bacterias: Phylum bacteroidetes und Phylum firmicutes**
- **Obese humans have an increase of Firmicutes and the Firmicutes/bacteroidetes-ratio changes**
- **High Firmicutes populationes can be found in all obese humans and in their family members**
- **High „western“ diet and maybe the microbiom transmission in the family are causes**



non-obese



obese

THE IMPACT OF DIET ON THE GUT MICROBIOTA

The population of Bacteroidetes is increasing during a diet with fat restriction or carbohydrate restriction or calorie restriction and exercise

High dietary fiber causes an increase of Faecalbacterium prausnitzii

Low F. prausnitzii populations are seen in gut diseases with high inflammatory (Crohn, ...)

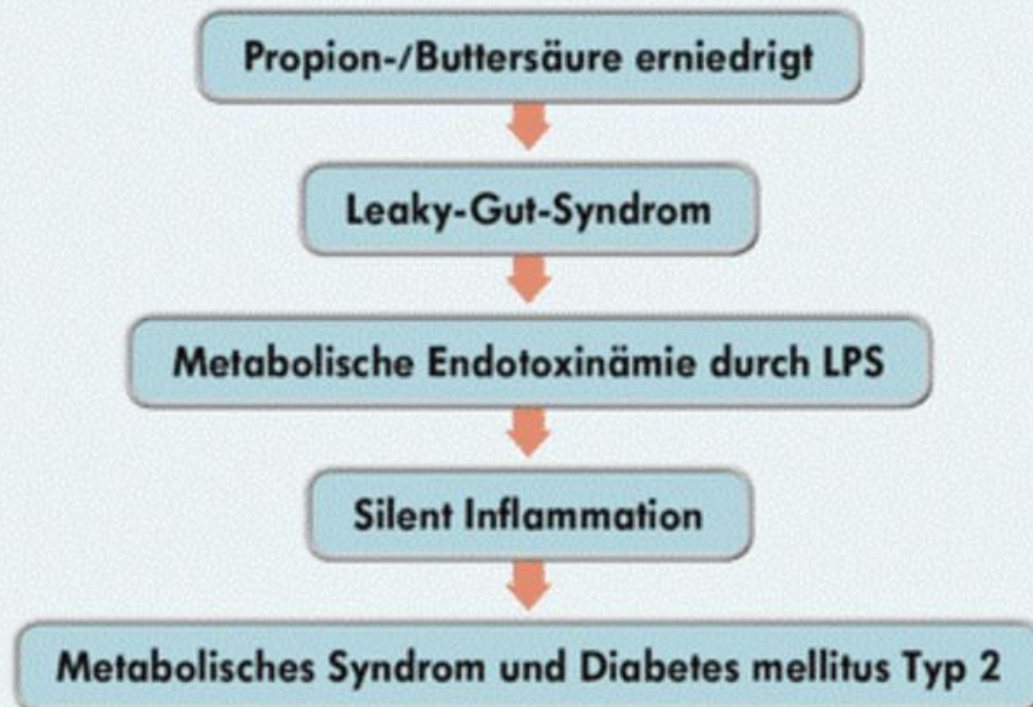
F. prausnitzii is responsible for the production of propionic acid and butyric acid, the main energy supplier of the tight junctions

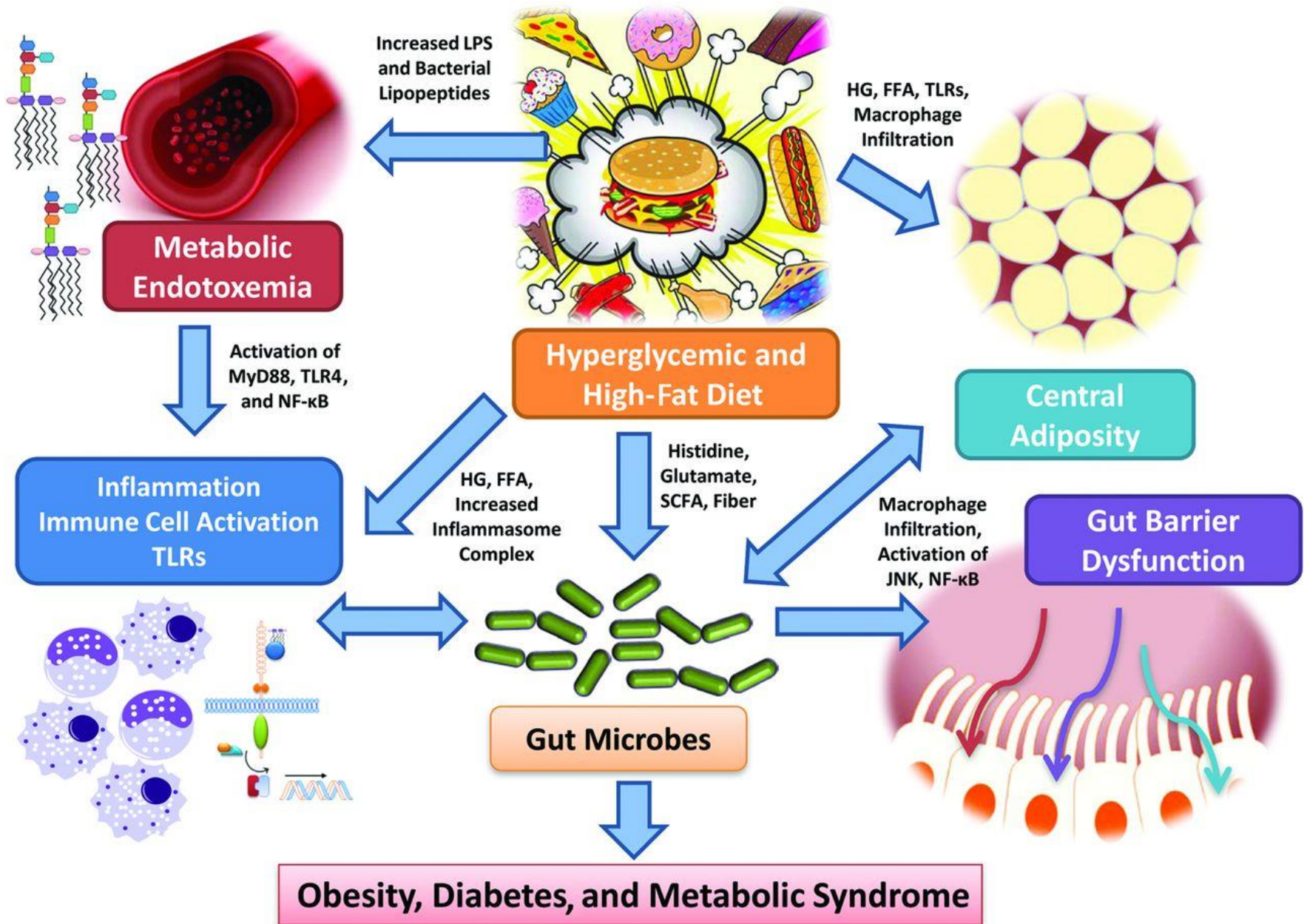
MECHANISMS BY WHICH THE GUT MICROBIOTA CAN IMPACT ON WEIGHT GAIN

- **Firmicutes increase the calorie intake by 20% and allow the fermentation of fiber into glycogen and not into short chain fatty acids**
- **The absence of *F. prausnitzii* and the higher Firmicutes population causes inflammation in the gut**
- **The intestinal barrier gets leaky, endotoxin, a part of the gram-negative bacteria, overloads liver and the fatty tissue. A silent inflammation starts.**
- **We measure high zonulin in faeces and high LPS endotoxin (lipopolysaccharide) in Blood as a marker for silent inflammation.**
- **Obesity is also associated with a decrease in the overall microbial diversity of the gut, although the total amount of microbes remains the same**

MECHANISMS BY WHICH THE GUT MICROBIOTA CAN IMPACT ON WEIGHT GAIN

Störungen der saccharolytischen und mukonutritiven Flora – Wegbereiter für das metabolische Syndrom





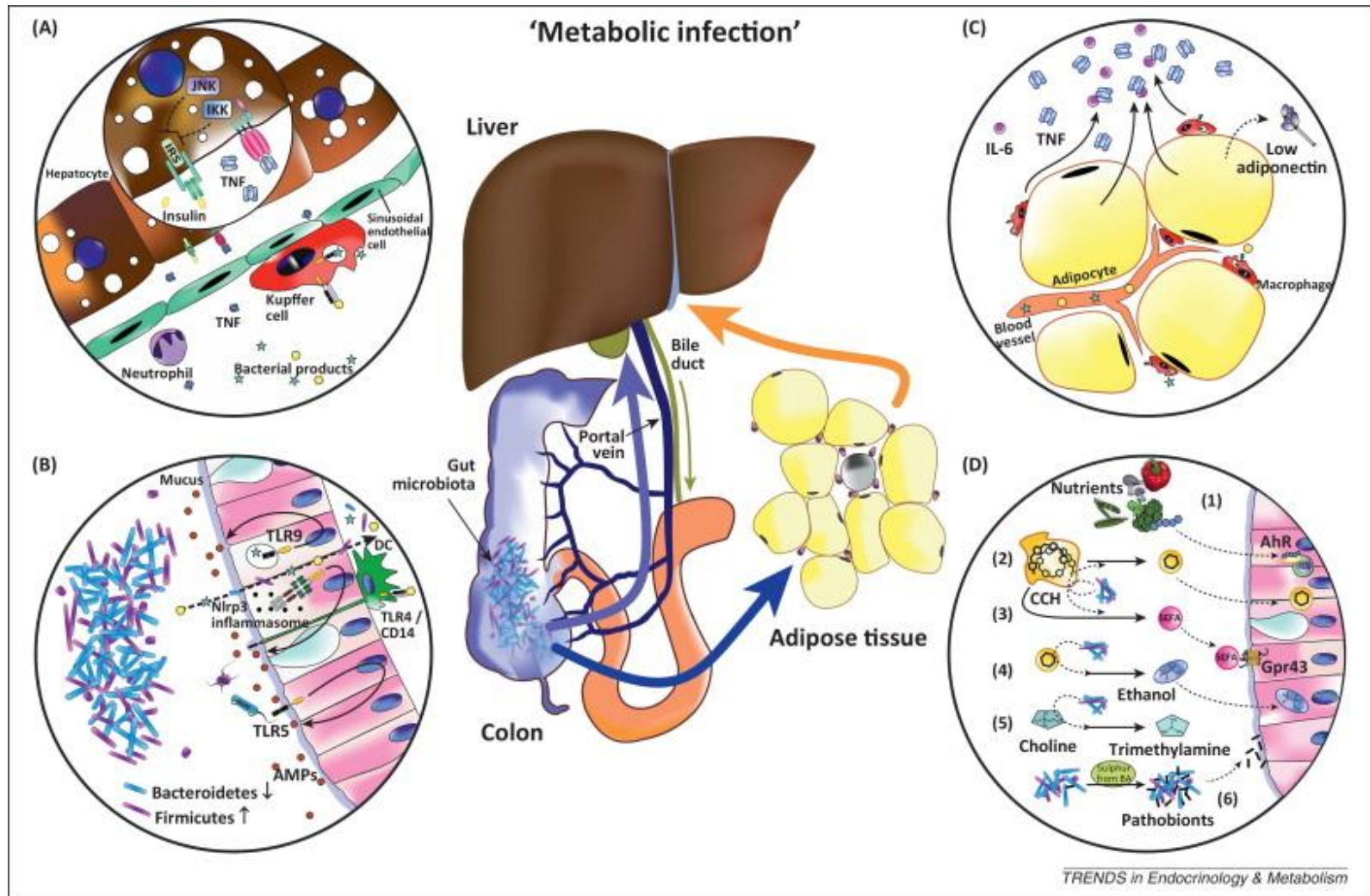
OVERVIEW ABOUT STUDIES AND MECHANISMS

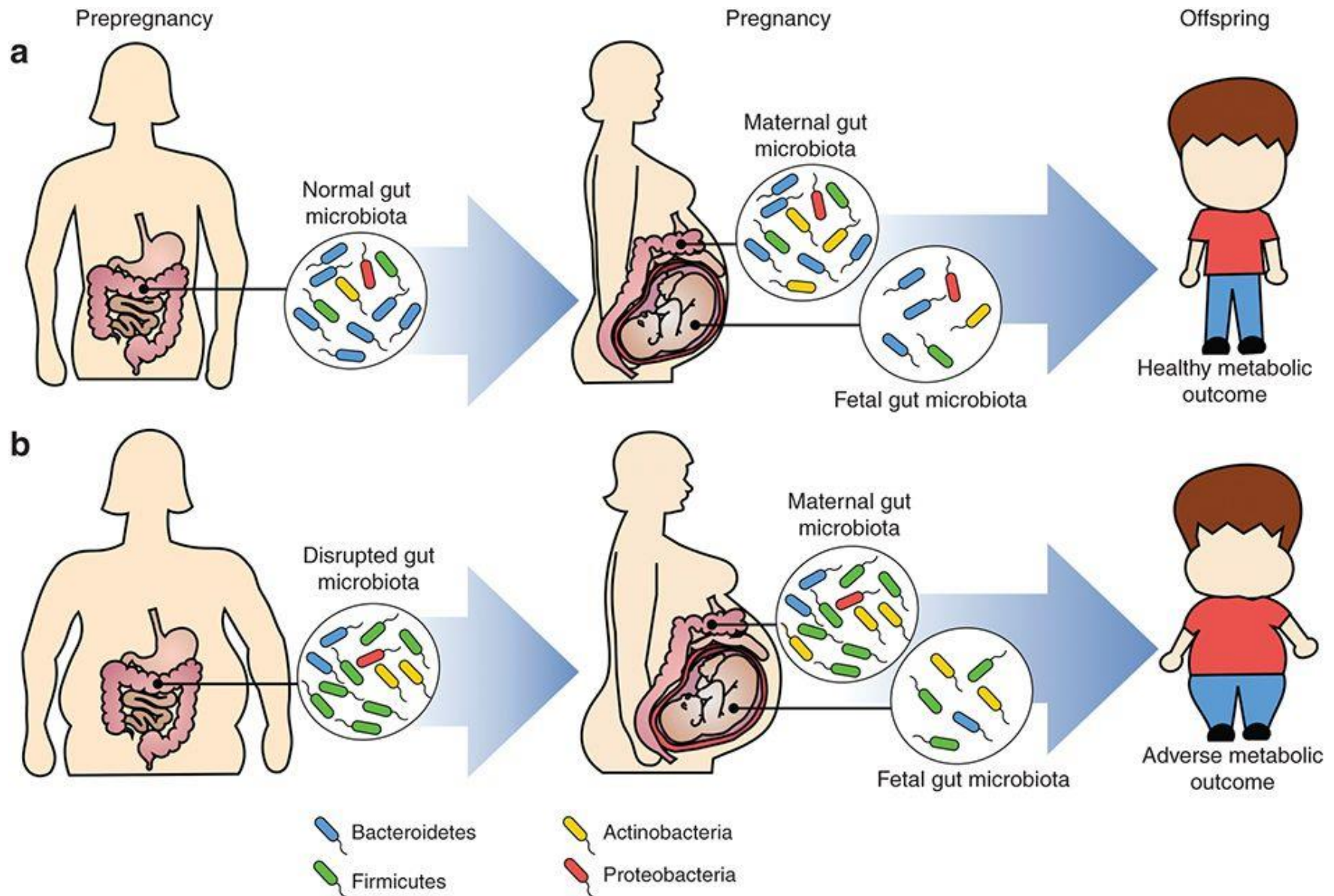


NON-ALCOHOLIC STEATOHEPATITIS: A MICROBIOTA-DRIVEN DISEASE

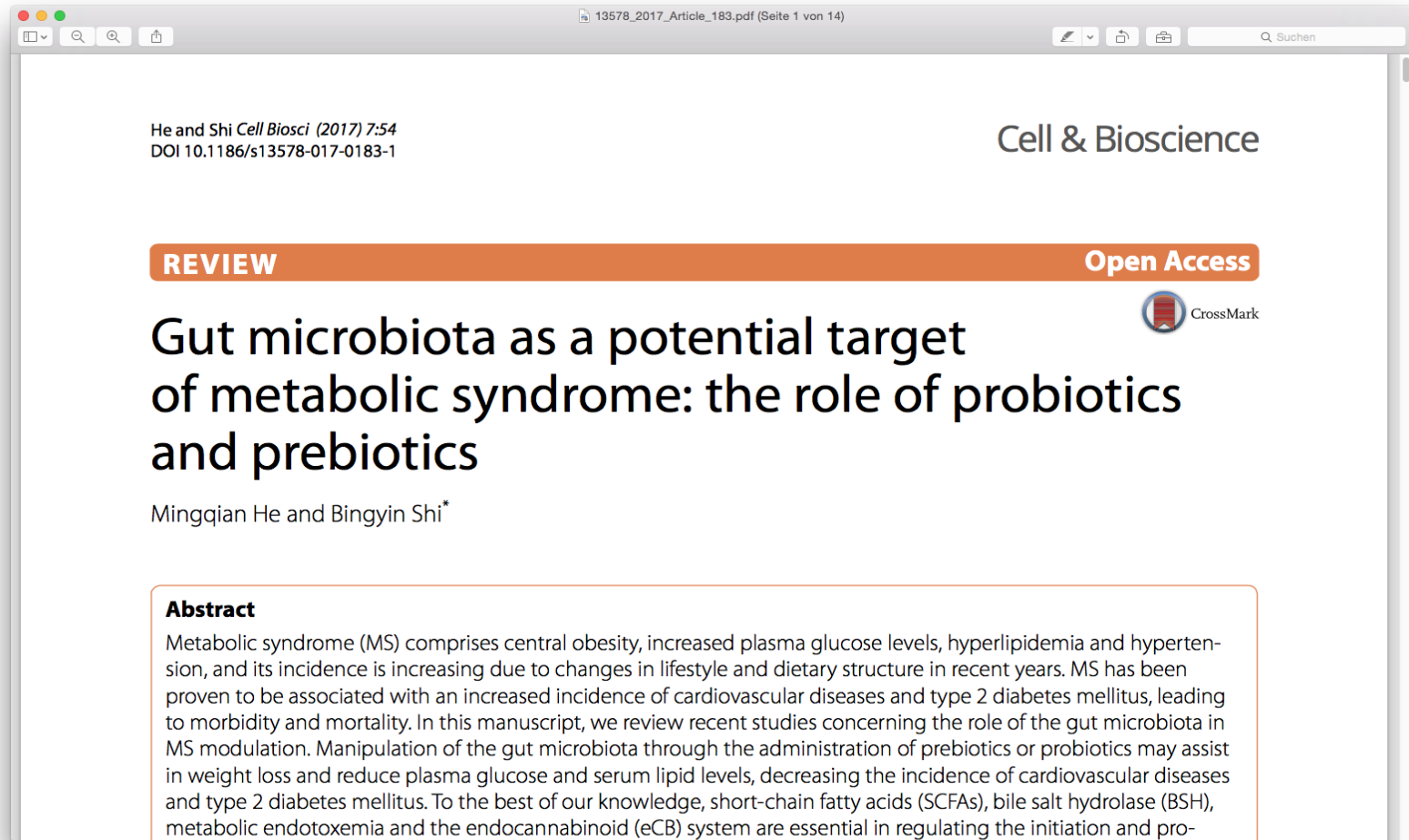
- **Whereas overnutrition and obesity are crucially involved in the development of a simple fatty liver, it remains unclear why approximately 10% of all affected individuals develop the 'inflammatory' phenotype so-called non-alcoholic steatohepatitis (NASH).**
- **A link between the intestinal microbiota and the development of obesity and its metabolic consequences including NAFLD is becoming clearer.**
- **First clinical studies are suggesting that microbial factors are driving forces of hepatic steatosis and inflammation that involve Toll-like receptors and proinflammatory cytokines such as tumor necrosis factor- α (TNF α).**

NON-ALCOHOLIC STEATOHEPATITIS: A MICROBIOTA-DRIVEN DISEASE





CONCLUSION



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Accumulating evidence suggests that gut microbiota plays a significant role in the initiation and progression of MS. The gut microbiota was proven to modulate plasma glucose, appetite, serum lipids and pro-inflammation.

In addition, prebiotics or probiotics, which are widely used to manipulate the microbiota, can reduce low-grade intestinal inflammation and improve gut barrier integrity to reduce plasma glucose and serum lipid levels, induce weight loss and decrease insulin resistance. Based on these current achievements, the gut microbiota may be a potential therapeutic target for MS.

However, clinical trials addressing the efficacy and efficiency of current or potential treatments on therapeutic applications in metabolic syndrome are needed.

TAKE HOME

- Reduce alcohol, carbohydrates and fat in your food !
- Raise salad, vegetables und resistant starch.
- Watch antibiotics, PPIs and heavy metals.
- Probiotics are usefull in the treatment of obesity, diabetes, irritable bowel syndrome, crohn disease, ...
- The treatment with probiotics lasts at least 6 months



The Best Sources of Healthy RESISTANT STARCH

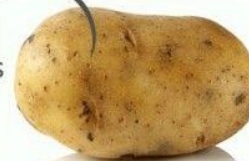
**TAKE
HOME**



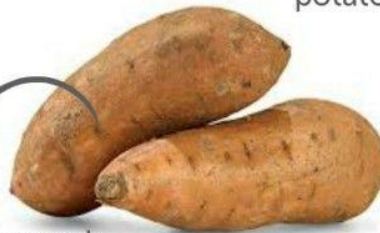
raw
potato
starch



green bananas
& plantains



potatoes



yams & sweet
potatoes



rice



lentils



legumes



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Thank you for your attention