Bacteria Profiles

A.I. Bacteria

Bacteroides fragilis (B. fragilis)

B. fragilis is an obligate anaerobe species (it can't survive in oxygen). It can take complex plant carbohydrates that the human digestive system can't handle, and break them down into simpler sugars. Inside the gut, it is a commensal bacteria species, meaning that we help it but it doesn't directly help or hurt us. It does help us indirectly by using up resources so bad bacteria can't grow, and it makes the gut environment more hospitable to other helpful bacteria. It is very common in the human microbiome, but if it somehow escapes the gut it can cause infections elsewhere in the body, and it can resist some antibiotics.

Faecalibacterium prausnitzii (F. prausnitzii)

F. prausnitzii is very abundant in healthy human guts: it can be 5-15% of the bacteria in a gut microbiome – but it often is absent in the guts of people with some bowel diseases. When it consumes sugars, it produces short-chain fatty-acids (which increase nutrient absorption, and regulate the immune system) and carbon dioxide. It also forms a protective layer in the gut, preventing other microbes from getting into the rest of the body. It is an obligate anaerobe (it can't survive in oxygen).

Escherichia coli (E. coli)

E. coli is usually only a very small part of a gut microbiome (less than 1%). However, it is an opportunistic species: normally the relationship between a human and their gut *E. coli* is mutually beneficial (it helps by producing vitamin K), but after dysbiosis (an imbalance in the gut microbiome) *E. coli* can spread and take over. As a facultative anaerobe (can survive in oxygen or without oxygen), it can survive in our feces, so untreated human sewage can contaminate water with *E. coli*.

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Clostridium difficile (C. difficile)

C. difficile is common in many people's gut microbiomes, but only in very small amounts. It produces carbon dioxide. If something happens that causes dysbiosis (an imbalance in the microbiome), like taking antibiotics, it can spread in colonies that produce toxins. Sometimes *C. difficile* infections are treated with a new procedure called a Fecal Matter Transplant, where a healthy person gives a sample of their good bacteria (in their poo) to a sick person to repopulate their microbiome. (Don't do that at home! Doctors do this very carefully.) It is an obligate anaerobe – it can't live in oxygen, although it can form spores that will survive until away from oxygen.

Lactobacillus acidophilus (L. acidophilus)

L. acidophilus produces carbon dioxide and lactic acid, which makes the gut more acidic and less hospitable to bad bacteria. It is one of the few bacteria species that has been approved as a probiotic supplement, but it is also part of the gut microbiome. As an aerotolerant anaerobe, it can survive small amounts of oxygen. It doesn't just do fermentation inside of humans: it can also be found in fermented foods like miso.

Lactoplantibacillus plantarum (L. plantarum)

L. plantarum is an approved probiotic bacteria species. It can survive outside the body because as an aerotolerant anaerobe, it can survive in oxygen. It produces carbon dioxide and lactic acid, so it makes the gut more acidic and less welcoming to bad bacteria like *Listeria*. There's some evidence that eating it can help with inflammatory bowel disease, but it can only visit, not stay permanently inside the gut. It is found in probiotics or fermented foods like olives, tempeh, and sauerkraut.

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