

S3 Table. Characteristics of identified *Bacteroides* species. Identification of *Bacteroides* species at the end of PlanHab experiment with their mucin degrading and inflammogenic characteristics of medical relevance reconstructed from published literature. The k-mer search strategy (RDPTools; n=7) with Sab score>0.87 to type and cultivated strains with reported relevance for dysbiotic medical conditions and described metabolic characteristics was used in this analysis.^[1-9]

<i>Bacteroides</i> species	¹ Degradation of mucin	² α -Fucosidase activity	³ Indole production	⁴ Aesculin hydrolysis	⁵ Associated with the following clinical manifestations
<i>B. acidifaciens</i>	+	+	-	+	inflammatory bowel disease
<i>B. caccae</i>	+	+	-	+	inflammatory bowel disease
<i>B. dorei</i>	+	+	-	-	type 1 diabetes
<u><i>B. fragilis</i></u>	+	+	-	+	inflammatory bowel disease
<u><i>B. ovatus</i></u>	+	+	+	+	type 1 diabetes, inflammation
<u><i>B. thetaiotamicron</i></u>	+	+	+	+	enteric infections, inflammation
<u><i>B. vulgatus</i></u>	-	+	-	+	ulcerative colitis

¹ *Bacteroides* derive nutrients from either diet or host derived or commensal derived polymers. Overutilization of host derived polymers (e.g. during constipation) results in thinning of mucus layer and modified barrier functioning.^[8, 10]

² De-glycosylation of mucin components leads to degradation mucus properties and degradation of collocated immune compounds (IgA). Free fucose is a danger signal to human intestinal epithelial cells and is directly utilized in fermentations by facultatively anaerobic enteropathogenic *E.coli* and other bacteria, affecting the mucosal physicochemical characteristics.^[11]

³ Indole is a microbe-generated signal substance that has positive effects on its host as well as the microbiome. Indole functions as a ‘quorum-sensing’ signal that regulates the virulence and biofilm formation of EHEC, *Pseudomonas* and other commensal bacteria. Indole strengthens the barrier function of the mucous membrane by repairing ‘tight junctions’.^[12, 13]

⁴ Aesculin hydrolysis *in-vivo* generates secondary derivatives from the family of coumarins that exert potent positive pharmacological effects on the host.^[14]

⁵ The same commensal *Bacteroides* species observed in numerous healthy fecal samples undergo significant metabolic changes associated with the clinical manifestations under specific environmental conditions.

The underlined species were recently identified as those exhibiting extensive genomic variants with markedly different metabolic capacities in patients.^[15]

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