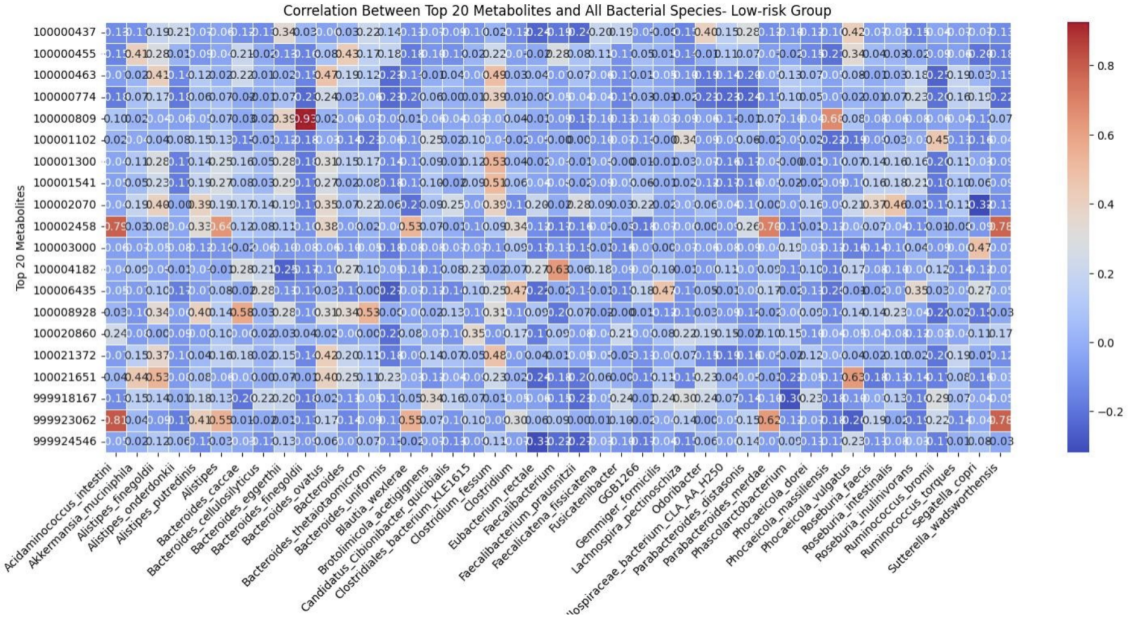
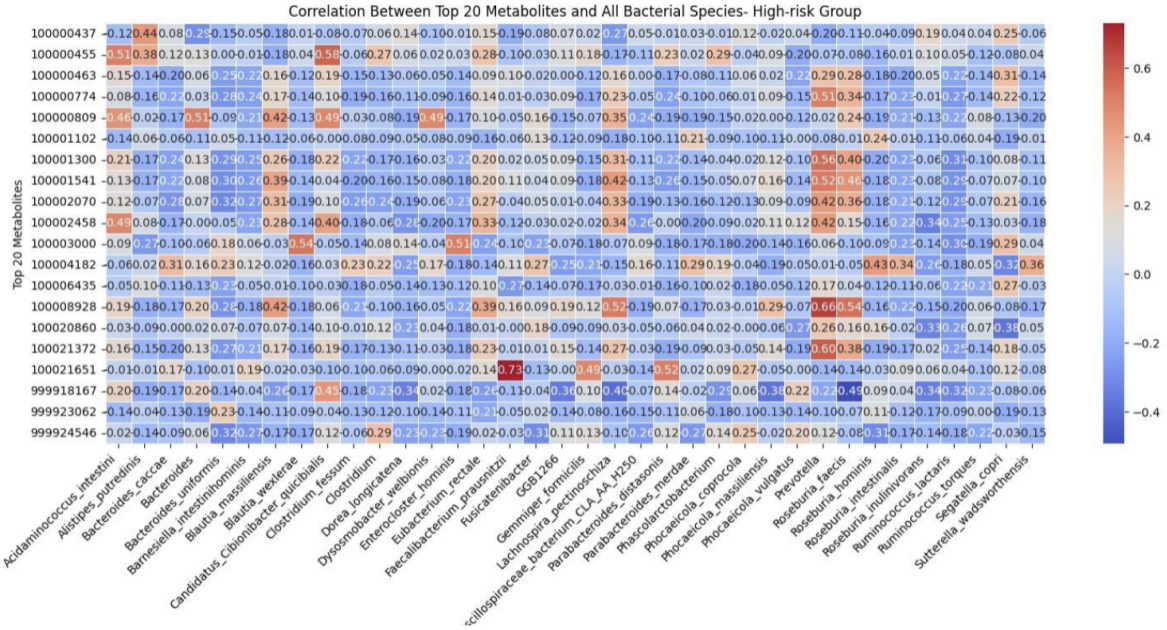


Bacteria	Metabolite(s)	ID	Correlation	Summary of Existing Literature	Sources
Acidaminococcus intestini	3-methylglutaconate	100002458	0.75	A. intestini genome encodes gene Acin_0297, which may suggest potential involvement in glutaconate metabolism, but there is currently no direct evidence linking it to 3-MGA. Elevated levels of 3-MGA are typically associated with deficiencies in leucine degradation enzymes. However, A. intestini has been shown to have a link to adenomas, which may imply potential for CRC biomarker.	UniProt Bork, 2014
	N/A	999923062	0.81		
Alistipes	3-methylglutaconate	100002458	0.64	*Alistipes* species has been associated with various conditions such as colitis and cardiovascular disease, but there is currenlty no direct evidence linking it to 3-MGA. Strangely enough, *Alistipes* has been shown to have a *protective* effect against mentioned conditions. It is possible that elevated levels of this bacteria may be a response to symptoms of CRC.	Parker (2020)
	N/A	999923062	0.55		
Bacteroides caccae	2-hydroxybutyrate/2-hydroxyisobutyrate	100008982	0.58	Little existing literature on relationship between B. caccae and 2-hydroxybutyrate/2-hydroxyisobutyrate, but B. caccae has been shown to exhibit increased abundance in pre-operative CRC patients. Additionally, a bloodstream infection caused by B. caccae has been previously identified, which may imply a pathogenic role (but it was a case study). A little on *Bacteroides* species itself, there are discrepancies in whether they are abundant or depleted in CRC tissues.	Png, 2022 Yang, 2021 (bloodstream infection)

Bacteroides finegoldii	6-hydroxynicotinate	100000809	0.93	Same relevance of *Bacteroides* to CRC. However, findings regarding B. finegoldii are limited. Additionally, from our previous analysis, very little existing evidence linked 6-hydroxynicotinate to CRC in the first place. Interesting that this would have the highest correlation, though.	Xu, 2020 (discrepancies)
Blautia wezlerae	N/A	999923062	0.55		
Faecalibacterium	3beta-hydroxy-5-cholenoate	100004182	0.63	Research suggests that F. pausnitzii may play a role in suppressing colorectal tumorigenesis and proliferation. However, interestingly enough, only the genus *Faecalibacterium* was correlated with a top 20 metabolite in the analysis, and F. prausnitzii was not. The interactions between Faecalibacterium and 3beta-hydroxy-5-cholenoic acid has not been explored much.	Yao, 2021
Parabacteroides merdae	3-methylglutaconate	100002458	0.76	P. merdae has not been directly connected to CRC, but other species within the genus (e.g. P. distasonis) has been shown to alleviate metabolic dysfuctions and obesity.	Ezeji, 2021
	N/A	999923062	0.62		
Phocaeicola massiliensis	6-hydroxynicotinate	100000809	0.68	Phocaeicola species has been shown to be reduced in tumor tissues, whicih may influence local immune environment to facilitate tumor metastasis. P. massiliensis has also been found within the microbiome of colorectal polyps (precursors to CRC).	Ota, 2024
Phocaeicola vulgatus	chenodeoxycholic acid sulfate (2)	100021651	0.63	P. vulgatus influences metabolism of primary bile acides such as CDCA, which may apply to its sulfate as well. Studies have identified a relative reduction in Phocaeicola species in tumor tissues, implying potential suppressive role. Additionally, P. vulgatus has been associated with increased risk of subsequent CRC diagnosis. In a cohort study, 5.5% of patients with elevated P. vulgatus were later diagnosed with CRC.	Wang, 2024 Ota, 2024 Justesen, 2024
Sutterlla wasworthensis	3-methylglutaconate	100002458	0.78	S. wadsworthensis has been shown in murine studies to enhance efficacy of PD-1 blockade therapy (cancer immunotherapy). However, elevated levels of fecal S. wadsworthensis has also been associated with increased risk of escalating to immunotherapies in IBD patients. S. wadsworthensis has also been commonly associated with autism and Down syndrome. Its direct invovlement in 3-MGA metabolism has not been explored much.	Gao, 2024 Rimmer, 2024 (fecal S. wadsworthensis) Hiippala, 2016 (autism, DS)
	N/A	999923062	0.78		
		Note: metabolites starting in "9" are excluded (no name in data file?)	Note: Listed are bacteria/metabolite with correlation greater than 0.55 (indicating some predictive value)		



Bacteria	Metabolite(s)	ID	Correlation	Summary of Existing Literature	Sources
Acidaminococcus intestini	itaconate	100000455	0.51	*Acidaminococcus* has been shown to decrease in abundance from control to adenoma to carcinoma, while itaconate may promote cancer growth. Potential role in development of CRC and production of itaconate?	Hua, 2022
Bacteroides	6-hydroxynicotinate	100000809	0.51	"There are discrepancies in whether [Bacteroides] are abundant or depleted in CRC tissues" (from low-risk group). Additionally, B. fragilis has been shown to have the strongest link to CRC by promoting tumorigenesis. However, this species is not included in the chart (and inferably not the data either, may have to double check). It is also interesting that the genus of bacteria shows up in this group, but specific species show up in the low-risk group.	Zamani, 2020
Blautia wexlerae	1-(1-enyl-palmitoyl)-GPE (P-16:0)*	100003000	0.54	Contradicting research indicating that B. wexlerae may have both protective and adverse effects on CRC. On one hand, the *Blautia* species may contribute to mucus function in the colon by producing SCFAs essential to maintaining gut barrier. On another hand, it has been found that there is an increased abundance of B. wexlerae in patients with CRC. Interestingly enough, for the metabolite: "Not much research has been published linking 1-(1-enyl-palmitoyl)-GPE (P-16:0)* directly to cancer."	Holmberg, 2024 (mucus function) Kadhim, 2025 (increased abundance)
Candidatus Cibionibacter quicibialis	itaconate	100000455	0.58	No direct evidence linking Candidatus Cibiobacter qucibialis to CRC currently. Additionally, the "Candidatus" designation indicates that the bacteria has not been cultured in a lab, suggested not much is known about it. Meanwhile, itaconate was identified as the top metabolite marker of CRC.	NIH

Enterocloster hominis	1-(1-enyl-palmitoyl)-GPE (P-16:0)*	100003000		0.51	Limited research on the link between E. hominis and CRC. However, another *Enterocloster* species has been identified by a study to produce carcinogenis metabolites, which may promote CRC.	Liang, 2024
Faecalibacterium prausnitzii	chenodeoxycholic acid sulfate (2) (CDCA-S)	100021651		0.73	F. prausnitzii plays a major role in producing energy to colonocytes and anti-inflammatory metabolites that contribute to intestinal health (e.g. butyrate) (although from previous analysis, the link between CDCA and CRC is unclear). It has been shown before that F. prausnitzii can be present in fourfold lesser quantities in CRC patients compared to healthy individuals. If F. prausnitzii is shown to have a positive correlation with CDCA, it could indicate that CDCA may have similar anti-inflammatory qualities. However, it is unclear why this relationship would manifest more in the high-risk group than the low-risk group.	Ferreira-Halder, 2017
Lachnospira pectinoschiza	2-hydroxybutyrate (2HB) /2-hydroxyisobutyrate (2HIB)	100008928		0.52	L. pectinoschiza has been shown to have an inverse relationship with cancer progression, which may suggest a role in early tumorigenesis. A study found that increased abundance has been observed in patients with early stage CRC.	Berbert, 2022
Prevotella	phenyllactate (PLA)	100000774		0.51	P. intermedia in the *Prevotella* genus has been found in higher concentrations in colorectal adenocarcinoma tissues than in adenomatous polyps, which may indicate a role in transition from benign to malignant states. Not much research has been done on the link between *Prevotella* and specific metabolites.	Lo, 2022
	alpha-hydroxyisovalerate	100001300		0.56	These metabolites are associated with PPAR-alpha activation and insulin sensitivity, which may suggest that *Prevotella* plays a role in their production?	Lustgarten, 2014
	2-hydroxy-3-methylvalerate (HMVA)	100001541		0.52		
	2-hydroxybutyrate (2HB) /2-hydroxyisobutyrate (2HIB)	100008928		0.66		
	2-hydroxy-4-(methylthio) butanoic acid (HMTBA)	100021372		0.6		
Roseburia faecis	2-hydroxybutyrate (2HB) /2-hydroxyisobutyrate (2HIB)	100008928		0.54	R. intestinalis has been shown to sensitize colorectal cancer to radiotherapy by producing butyrate, which reinforces gut barrier, reduces inflammation, and promotes apoptosis. Studies have also observed a significant decrease in the *Roseburia* gut microbiota species in CRC species (e.g. 3.59% to 1.56% in Borges-Canha, 2015).	Dong et al., 2024 Borges-Canha et al., (2015)
	Note: Research is already limited on the relationship between some of these bacteria and CRC, searching with the metabolite of interest usually doesn't result in much	Note: Metabolites starting in "9" are excluded (no name in data file?)	Note: Listed are bacteria/metabolite with correlation greater than 0.50 (indicating some predictive value, though to be honest, I don't think values hovering 0.5 are significant enough...)		Note: Don't think it would be possible to reach anything conclusive on the relationship between any of these bacteria and metabolites, though the correlation is interesting to see; some of these bacteria have established links to CRC, but then are correlated to metabolites which have not been shown to affect CRC much at all	