Supplementary Table 1: Intratumoral microbiota and their impact on cancer immunotherapy efficacy

Function to anti-tumor immune response	Microbiota type	Tumor type	Target cell	Main pathway or molecule	Mechanism	Reference
Enhance	*Bifidobacterium*	Breast cancer	Monocyte, Dendritic cell	STING pathway	Activating dendritic cells *via* the STING signaling pathway	[1]
	A.muciniphila	Melanoma	NK cell, Dendritic cell	STING pathway	Promoting antigen presentation	[2]
	Clostridiales	Breast cancer	$CD8^+$ T-cell	PERK pathway	Related metabolite trimethylamine N-oxide induced pyroptosis in tumor cells by activating the endoplasmic reticulum stress	[3]

					kinase PERK and thus enhanced $CD8^+$ T cell-mediated anti-tumor immunity in TNBC *in vivo*	
	S. caprae, *A. odontolyticus*	Melanoma	T cell	HLA-bound peptides	Deriving immunogenic HLA-I and HLA-II bacterial peptides and activating cellular immunity after being presented to T cells	[4]
	H. hepaticus	Colorectal cancer	Tfh cell	TLS	Increasing the number of Tfh cells in the colon and promoting the maturation of the TLS adjacent to the tumor	[5]
Decrease	*F. nucleatum*	Colorectal cancer	Cancer cell	TLR4 and MYD88 pathway	Targeting TLR4 and MYD88 innate immune signaling and specific microRNAs to	[6]

				activate the autophagy pathway	
B. fragilis	Colorectal cancer	Macrophage	NLRP3 pathway	Inhibiting macrophage activation and reducing the release of proinflammatory cytokines such as IL-18 and IL-1β	[7]
Malassezia *Alternaria*	Pancreatic ductal adenocarcinoma;	TH2 and innate lymphoid cells 2	KRAS pathway	Facilitating IL-33 secretion	[8]
Fusobacterium	Pancreatic ductal adenocarcinoma;	Myeloid cell	ROS	Increasing production of ROS and inflammatory cytokines	[9]
Methylobacterium	Gastric cancer	$CD8^+$ T cell	TGF-β pathway	Inhibiting immune infiltration of $CD8^+$ T cells	[10]
N. ramosa	Prostate cancer		immunosuppression	Inducing inflammation, promoting immunosuppression	[11]

A.muciniphila: *Akkermansia muciniphila*; *S. caprae*: *Staphylococcus caprae*; *A. odontolyticus*: *Actinomyces odontolyticus; H. hepaticus*: *Helicobacter*

hepaticus; F. nucleatum: *Fusobacterium nucleatum; B. fragilis*: *Bacteroides fragilis; N. ramosa*: *Nevskia ramose*; Tfh. T follicular helper; TLS: tertiary lymphoid structures; ROS: reactive oxygen species; IL: interleukin; TGF-β: transforming growth factor-β.

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