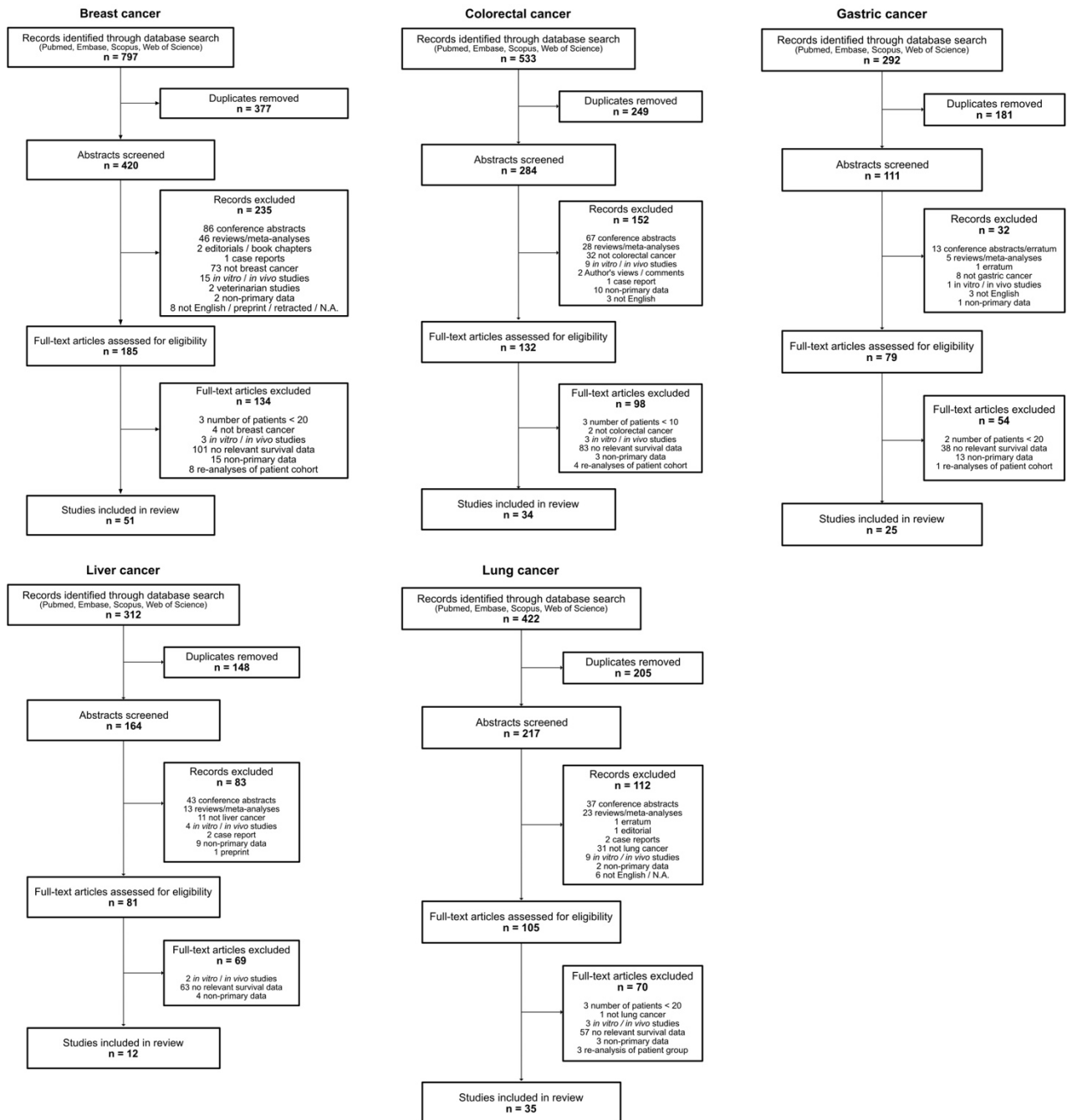
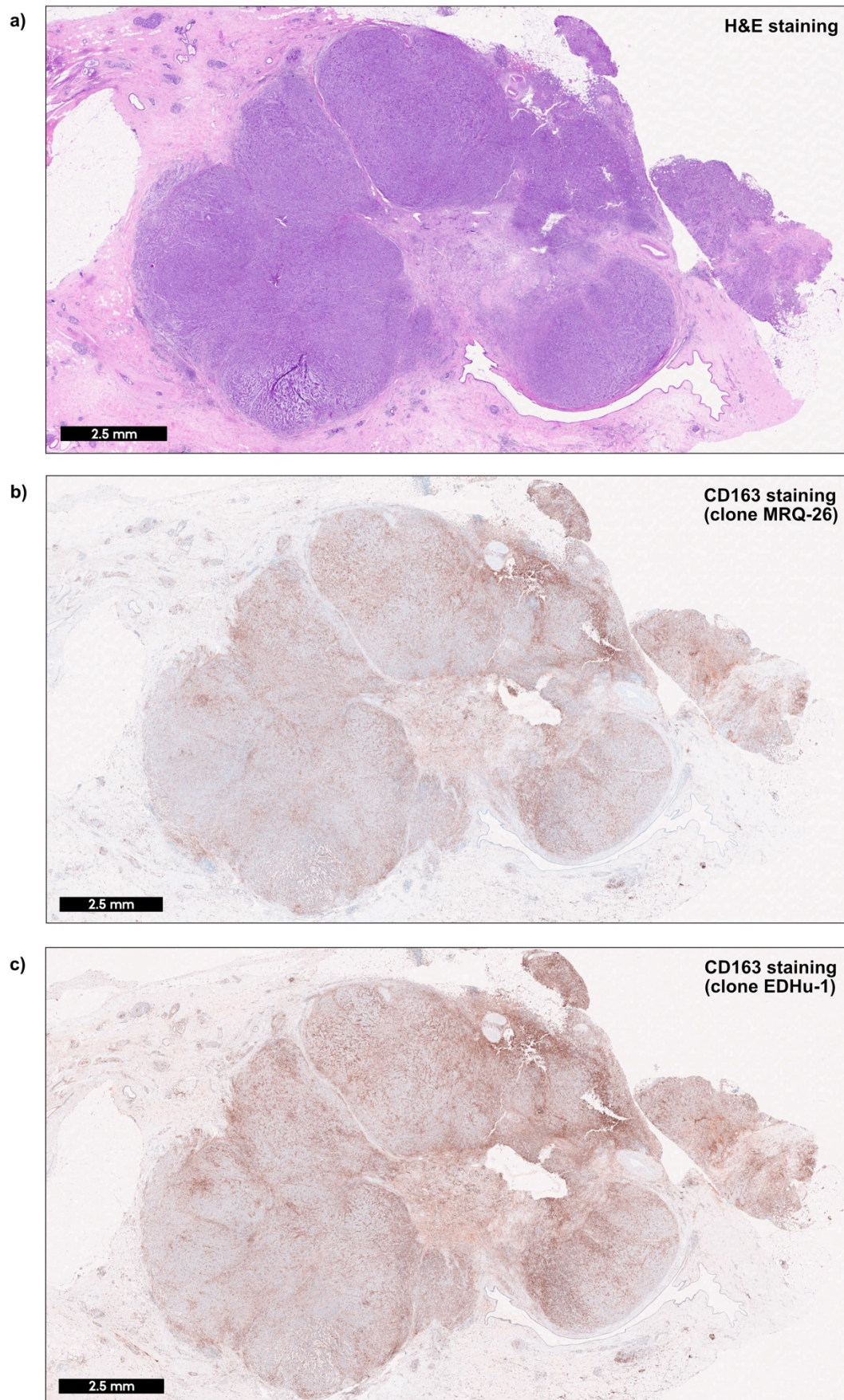


Supplementary Figure 1: PRISMA flowcharts for each type of cancer



Supplementary Figure 1: PRISMA flowcharts. Flowcharts showing the article selection process for all five types of cancer separately: Breast cancer, colorectal cancer, gastric cancer, liver cancer, and lung cancer. N.A.: Not available.

Supplementary Figure 2: Hematoxylin-eosin staining and corresponding CD163 stainings of breast cancer tissue



Supplementary Figure 2: Sections (3 μ m) of formaldehyde-fixed paraffin-embedded breast cancer tissue were mounted on TOMO slides (Matsunami Glass) and dried for 1 hour at 60°C. All CD163-stainings were performed on the automated platform Benchmark Ultra (Roche Tissue Diagnostics) by an indirect sequential immunoenzymatic technique. Standard settings and reagent kits of Benchmark Ultra were used in deparaffinization, rehydration, antigen retrieval, and endogenous peroxidase blocking. Each antibody incubated for 32 minutes at room temperature, and the OptiView DAB IHC Detection Kit (Roche Tissue Diagnostics) was used for detection and visualization. Slides were counterstained with Mayer's hematoxylin and bluing reagent, dehydrated, and mounted. **a)** Hematoxylin-eosin staining. **b)** CD163-staining using the antibody clone MRQ-26 (Ready-to-use, Ventana, Roche Tissue Diagnostics, 760-4437). **c)** CD163-staining using the antibody clone EDHu-1 (1:450, Bio-Rad, MCA1853).

Table S1: Search strings

Pubmed	
Type of cancer	Search string
Lung cancer	((((macrophag*) AND (CD163)) AND (survival OR prognostic OR prognosis OR outcome)) AND ("lung cancer" OR "lung carcinoma"))
Colorectal cancer	((((macrophag*) AND (CD163)) AND (survival OR prognostic OR prognosis OR outcome)) AND ("colorectal cancer" OR "colorectal carcinoma" OR "colon cancer" OR "rectal cancer" OR "colon carcinoma" OR "rectal carcinoma"))
Gastric cancer	((((macrophag*) AND (CD163)) AND (survival OR prognostic OR prognosis OR outcome)) AND ("gastric cancer" OR "gastric carcinoma"))
Liver cancer	((((macrophag*) AND (CD163)) AND (survival OR prognostic OR prognosis OR outcome)) AND ("liver cancer" OR "hepatocellular carcinoma" OR "intrahepatic cholangiocarcinoma"))
Breast cancer	((((macrophag*) AND (CD163)) AND (survival OR prognostic OR prognosis OR outcome)) AND ("breast cancer" OR "breast carcinoma"))
Web of Science	
Type of cancer	Search string
Lung cancer	ALL=(macrophag* AND CD163 AND (survival OR prognostic OR prognosis OR outcome) AND ("lung cancer" OR "lung carcinoma"))
Colorectal cancer	ALL=(macrophag* AND CD163 AND (survival OR prognostic OR prognosis OR outcome) AND ("colorectal cancer" OR "colorectal carcinoma" OR "colon cancer" OR "rectal cancer" OR "colon carcinoma" OR "rectal carcinoma"))
Gastric cancer	ALL=(macrophag* AND CD163 AND (survival OR prognostic OR prognosis OR outcome) AND ("gastric cancer" OR "gastric carcinoma"))
Liver cancer	ALL=(macrophag* AND CD163 AND (survival OR prognostic OR prognosis OR outcome) AND ("liver cancer" OR "hepatocellular carcinoma" OR "intrahepatic cholangiocarcinoma"))
Breast cancer	ALL=(macrophag* AND CD163 AND (survival OR prognostic OR prognosis OR outcome) AND ("breast cancer" OR "breast carcinoma"))
Scopus	
Type of cancer	Search string
Lung cancer	TITLE-ABS-KEY (macrophage) AND TITLE-ABS KEY (cd163) AND TITLE-ABS-KEY (survival OR prognostic OR prognosis OR outcome) AND TITLE-ABS-KEY ("lung cancer" OR "lung carcinoma")
Colorectal cancer	TITLE-ABS-KEY(macrophage) AND TITLE-ABS-KEY(CD163) AND TITLE-ABS-KEY(survival OR prognostic OR prognosis OR outcome) AND TITLE-ABS-KEY("colorectal cancer" OR "colorectal carcinoma" OR "colon cancer" OR "rectal cancer" OR "colon carcinoma" OR "rectal carcinoma")
Gastric cancer	TITLE-ABS-KEY(macrophage) AND TITLE-ABS-KEY(CD163) AND TITLE-ABS-KEY(survival OR prognostic OR prognosis OR outcome) AND TITLE-ABS-KEY("gastric cancer" OR "gastric carcinoma")
Liver cancer	TITLE-ABS-KEY(macrophage) AND TITLE-ABS-KEY(CD163) AND TITLE-ABS-KEY(survival OR prognostic OR prognosis OR outcome) AND TITLE-ABS-KEY("liver cancer" OR "hepatocellular carcinoma" OR "intrahepatic cholangiocarcinoma")
Breast cancer	TITLE-ABS-KEY(macrophage) AND TITLE-ABS-KEY(CD163) AND TITLE-ABS-KEY(survival OR prognostic OR prognosis OR outcome) AND TITLE-ABS-KEY("breast cancer" OR "breast carcinoma")

Embase	
Type of cancer	Search string
Lung cancer	macrophag*:ti,ab,kw AND cd163:ti,ab,kw AND (survival:ti,ab,kw OR prognostic:ti,ab,kw OR prognosis:ti,ab,kw OR outcome:ti,ab,kw) AND ('lung cancer':ti,ab,kw OR 'lung carcinoma':ti,ab,kw)
Colorectal cancer	macrophag*:ti,ab,kw AND cd163:ti,ab,kw AND (survival:ti,ab,kw OR prognostic:ti,ab,kw OR prognosis:ti,ab,kw OR outcome:ti,ab,kw) AND ('colorectal cancer':ti,ab,kw OR 'colorectal carcinoma':ti,ab,kw OR 'colon cancer':ti,ab,kw OR 'rectal cancer':ti,ab,kw OR 'colon carcinoma':ti,ab,kw OR 'rectal carcinoma':ti,ab,kw)
Gastric cancer	macrophag*:ti,ab,kw AND cd163:ti,ab,kw AND (survival:ti,ab,kw OR prognostic:ti,ab,kw OR prognosis:ti,ab,kw OR outcome:ti,ab,kw) AND ('gastric cancer':ti,ab,kw OR 'gastric carcinoma':ti,ab,kw)
Liver cancer	macrophag*:ti,ab,kw AND cd163:ti,ab,kw AND (survival:ti,ab,kw OR prognostic:ti,ab,kw OR prognosis:ti,ab,kw OR outcome:ti,ab,kw) AND ('liver cancer':ti,ab,kw OR 'hepatocellular carcinoma':ti,ab,kw OR 'intrahepatic cholangiocarcinoma':ti,ab,kw)
Breast cancer	macrophag*:ti,ab,kw AND cd163:ti,ab,kw AND (survival:ti,ab,kw OR prognostic:ti,ab,kw OR prognosis:ti,ab,kw OR outcome:ti,ab,kw) AND ('breast cancer':ti,ab,kw OR 'breast carcinoma':ti,ab,kw)

Supplementary Table 1: Search strings for all five types of cancer (lung cancer, colorectal cancer, gastric cancer, liver cancer, and breast cancer) in each of the four databases (PubMed, Web of Science, Scopus, and Embase) used to identify literature for the present review.

Supplementary Table 2: Extracted data from each of the included studies

No.	Study	Country	No. of patients	Method	Anti-CD163 antibody	Survival	Cut-off	Result (univar)	Result (multivar)	Histopathological localization
Lung cancer (n =35)										
1	Backman, 2021	Sweden	357	IHC	10D6 (Novocastra)	OS	Median	N.A.	N.S.	Tumor, Stroma, Total*
2	Cao, 2019	China	137	mIF	10D6 (ZSGB-Bio)	DFS, OS	Median	Poor	Poor	Central, Margin
3	Carus, 2013	Denmark	335	IHC	EDHu-1 (AbD Serotec)	OS, RFS	Median	N.S.	N.A.	Tumor nest, Tumor stroma
4	Chen, 2020	China	213	IHC	10D6 (ZSGB-Bio)	N.A.	ROC	Poor	N.A.	Stroma
5	Gao, 2020	China	217	IHC	EPR19518 (Neo-markers)	DFS, OS	X-tile / Scoring system	Poor	Poor	Center of tumor + invasive margin (total)
6	Huang, 2021	China	73	IHC	EPR19518 (Abcam)	OS	Scoring system	Poor	N.A.	N.A.
7	Hwang, 2020	South Korea / Japan	349	IHC	EPR19518 (Abcam)	OS	Median	N.S.	N.A.	N.A.
8	Jackute, 2018	Lithuania	80	IHC	MRQ-26 (Ventana)	OS	Median	Poor	Poor	Tumor islets, Tumor stroma, Total
9	Katopodi, 2021	Greece	96	N.A.	N.A.	OS, RFS	N.A.	Poor	N.A.	Invasive border
10	Klein, 2023	Germany	45	IHC	MRQ-26 (CellMarque)	OS	Median / scoring system	Poor	Poor	N.A.

11	Kovaleva, 2021	Russia	87	IHC	10D6 (Biocare)	OS	Scoring system	Poor	N.S.	Tumor nest + tumor stroma (total)
12	La Fleur, 2018	Sweden	312	IHC	10D6 (Novocastra)	OS	Quantiles	N.S.	N.S.	Tumor + stroma + lumen (total)
13	Larroquette, 2022	France	152	IHC	10D6 (Leica Biosystems)	OS, PFS	“Maxstat” / “Survminer” R package	Poor	Poor	Tumor , Stroma
14	Li, 2021	China	33	mIHC	10D6 (ZSGB-Bio)	PFS	“Survminer” R package	N.S.	Poor	Tumor region, Stroma region, Total region
15	Lin, 2016	Taiwan	97	IHC	10D6 (Thermo Fisher Scientific)	DFS, OS	≥5% positive cells	Poor	N.A.	N.A.
16	Lu, 2023	China	150	IHC	10D6 (ZSGB-Bio)	OS	X-tile	Poor (tumor) Fav. (stroma)	N.A.	Tumor region, Stroma region
17	Ma, 2010	China	100	IHC	10D6 (ZSGB-Bio)	OS	Median	N.S.	N.S.	Tumor islets, Tumor stroma, Total
18	Matsubara, 2021 ¹	Japan	331	IHC	10D6 (Leica Biosystems)	OS, PFS	ROC	Poor	Poor	N.A.
19	Nagano, 2024	Japan	172	IHC	10D6 (Leica Biosystems)	OS, RFS	Continuous	N.S.	N.A.	N.A.
20	Ohri, 2009	United Kingdom	40	IHC	10D6 (Novocastra)	N.A.	Median	Fav.	N.A.	Tumor islets , Tumor stroma
21	Peng, 2023	China	553	mIF	10D6 (ZSGB-Bio)	DFS	Scoring system	N.S.	N.A.	Tumor nest, Tumor stroma

¹ Matsubara *et al.* (2021): CD163 expression in lung cancer cells.

22	Rakee, 2019	Norway	523	IHC	MRQ-26 (Ventana)	DSS	Mean / Maximal χ^2 method	N.S.	N.S.	Intratumoral, Stromal
23	Shen, 2018	China	85	IHC	N.A. (Boster Biological Technology)	OS	Median	Poor	N.S.	N.A.
24	Sumitomo, 2019	Japan	160	IHC	MRQ-26 (Roche/ Ventana Medical Systems)	DFS, OS	ROC / Median	Poor	N.S.	Tumor islets, Tumor stroma
25	Sumitomo, 2023	Japan	221	IHC	MRQ-26 (Ventana Medical Systems)	OS	ROC / Median	Poor	N.A.	Tumor islets, Tumor stroma
26	Takam Kamga, 2024	France	52	IHC	N.A. (Novocastra)	OS, PFS	>25% positive cells	N.S.	N.A.	N.A.
27	Tosi, 2024	Italy	39	mIF	10D6 (Leica Biosystems)	OS	Linear predictor median value	N.A.	Poor	Peritumoral/stromal*
28	Vieira, 2016	France	64	IHC	10D6 (Novocastra)	OS	Median	N.S.	N.A.	N.A.
29	Wang, 2020	China	122	IHC	N.A. (Thermo Fisher Scientific)	OS, PFS	Median	Poor	N.A.	N.A.
30	Wu, 2022	China	681	mIF	10D6 (ZSGB-Bio)	DFS	Scoring system	Poor	N.S.	Tumor nest , Tumor stroma
31	Yanagawa, 2023	Japan	104	IHC	10D6 (Leica Biosystems)	OS, RFS	Median	Poor	Poor	N.A.
32	Yang, 2022	China	250	IHC	10D6 (Invitrogen)	OS	X-tile	Poor	N.A.	Core of tumor , Invasive margin

33	Yoshida, 2022	Japan	485	IHC	MRQ-26 (CellMarque)	RFS	75 th percentile	Poor	N.A.	N.A.
34	Zhang, 2017	China	164	IHC	RM3/1 (Abcam)	DFS, OS	Median	Poor	N.A.	N.A.
35	Zhang, 2023	China	248	IHC	Polyclonal (Abcam)	DSS	N.A.	Poor	Poor	Stroma
Colorectal cancer (n = 34)										
1	Akter, 2022	South Korea	399	IHC	N.A. (Abcam)	OS, RFS	Scoring system	N.S.	N.S.	N.A.
2	Cavalleri, 2022	Italy	165	IHC	10D6 (Leica Biosystems)	DFS	Median	Fav.	Fav.	Invasive front
3	Deng, 2023	China	116	IHC	N.A. (Abcam)	OS	Median	Poor	N.A.	N.A.
4	Edin, 2012	Sweden	431	IHC	N.A. (Novocastra)	DSS	Scoring system	Fav.	N.S.	Invasive front
5	Herrera, 2013	Spain	235	RT-qPCR	N.A.	DFS, OS	Tertiles (low/medium vs. high)	Poor	N.A.	N.A.
6	Kaidi, 2022	Sweden	310	RT-qPCR	N.A.	RFS	N.A.	N.S.	N.S.	N.A.
7	Kather, 2018	Germany	286	IHC	EDHu-1 (BioRad)	OS	Continuous	N.A.	N.S.	Tumor Core, Outer Margin*
8	Ke, 2023	China	45	IHC	N.A. (Abcam)	OS	Median	Poor	N.S.	N.A.
9	Kim, 2018	South Korea	516	IHC	N.A. (Leica Biosystems)	OS, PFS	Median	N.S.	N.A.	Intra-epithelial, Stromal
10	Kitagawa, 2022	Japan	275	IHC	10D6 (Leica Biosystems)	OS, RFS	Median	N.S.	N.A.	Intratumoral, Stromal

11	Koelzer, 2016	Greece	137	IHC	10D6 (Novocastra)	OS	Mean	N.S.	N.A.	Stroma
12	Kou, 2022	China	64	IHC	GHI/61 (Santa Cruz)	OS, RFS	ROC	Poor	N.A.	N.A.
13	Kwak, 2016	South Korea	193	IHC	N.A. (Novocastra)	OS	Maximal χ^2 method	Poor	N.A.	Tumor center , Invasive Margin
14	Liu, 2021	China	201	IHC	D6U1J (Cell Signaling Technology)	OS	Scoring system	Poor	Poor	N.A.
15	Liu, 2021	China	191	IHC	EPR19518 (Abcam)	DFS, OS	X-tile	Poor	Poor	N.A.
16	Ma, 2022	Sweden	1247	IHC	10D6 (Abcam)	N.A.	N.A.	Poor	N.A.	Tumor tissue cellular , Tumor tissue stromal
17	Majid, 2024	Norway	1096	mIHC	EPR14643 (Abcam)	RFS	33 rd vs 66 th percentile	Fav.	N.A.	Stroma
18	Mezheyeuski, 2023	Sweden	286	mIHC	10D6 (Novocastra)	OS	33 rd and 66 th percentile	Poor	N.A.	N.A.
19	Nagorsen, 2007	Germany	40	IHC	10D6 (Novocastra)	OS	Median	Fav.	N.A.	Stromal , Total (stromal + epithelial)
20	Noti, 2022	Switzerland / Canada	257	IHC	10D6 (Leica Biosystems)	OS	Median	Fav.	N.A.	Tumor center , Tumor Front (invasive margin), Tumor microenvironment (stroma)
21	Pinto, 2019	Portugal	44	IHC	MRQ-26 (Novocastra)	OS	Median	N.S.	N.A.	Intratumoral region, Invasive front

22	Shabo, 2009 ²	Sweden	101	IHC	10D6 (Novocastra)	OS, RFS	Positive (any positive cells) vs. negative	Poor	Poor	N.A.
23	Shabo, 2014 ³	Sweden	75	IHC	10D6 (Novocastra)	DSS	Scoring system	Poor	Poor	N.A.
24	Shi, 2022	China	129	IHC	10D6 (Origene)	OS	Mean	Poor	N.A.	N.A.
25	Shibutani, 2021	Japan	54	IHC	N.A. (Leica Biosystems)	PFS	ROC	Poor	N.A.	Invasive margin
26	Shin, 2021	South Korea	148	IHC	N.A. (Thermo Fisher Scientific)	DFS, OS	“Maxstat” in R	N.S.	N.A.	N.A.
27	Sugimura-Nagata, 2021	Japan	269	IHC	10D6 (Leica Biosystems)	OS	ROC	N.S.	N.A.	N.A.
28	Wang, 2023	China	255	IHC	N.A. (ZSGB-Bio)	OS	X-tile	Poor	Poor	Intratumor, Invasive front
29	Wei, 2019	China	81	IHC	N.A. (Abcam)	OS, RFS	Median	Poor	Poor	Tumor invasive front, Non-invasive front
30	Xu, 2021	China	1021	IHC	10D6 (Fuzhou Maixin Biotech.)	DFS, OS	StepMiner algorithm	Poor	Poor	N.A.
31	Xue, 2021	China	209	IHC	EPR19518 (Abcam)	DFS, OS	Median	Poor	Poor	N.A.
32	Ye, 2019	China	1008	IHC	EPR19518 (Abcam)	DFS, OS	Median	Poor	Poor	N.A.

² Shabo *et al.* (2009): CD163 expression in rectal cancer cells.

³ Shabo *et al.* (2014): They present data for CD163 expression on macrophages and tumor cells separately. This table uses the data for macrophages.

33	Yilmaz, 2022	USA	1218	IHC	10D6 (Leica Biosystems)	DSS	Median	N.S.	N.A.	N.A.
34	Zlobec, 2010	Switzerland	1138	IHC	10D6 (Neo-Markers)	DSS	Scoring system	N.S.	N.A.	Intratumoral + stromal (total)
Gastric cancer (n = 25)										
1	Cheng, 2017 ⁴	China	136	IHC	EPR14643 (Abcam)	OS, DSS	Scoring system	Poor	Poor	N.A.
2	Fu, 2017	China	36	IHC	N.A. (Abcam)	DSS	Median	Poor	N.A.	N.A.
3	Guo, 2020	China	490	IHC	Polyclonal (Abcam)	OS	Median	Poor	N.S.	N.A.
4	Hu, 2021	China	112	IHC	EPR19518 (Abcam)	OS	Median	Poor	Poor	N.A.
5	Huang, 2018	China	662	IHC	10D6 (Fuzhou Maixin Biotech.)	DFS, DSS	Median	Poor	Poor	N.A.
6	Huang, 2019	Australia	43	IHC	MRQ-26 (Cell Marque)	OS, RFS	Terciles	Fav.	N.A.	Tumor core
7	Jeremiasen, 2020	Sweden	71	IHC	10D6 (Novus Biologicals)	OS	Scoring system	Poor	N.S.	N.A.
8	Jia, 2023	China	80	mIHC	D6U1J (Cell Signaling Technology)	OS	“Survminer” R package	Poor	N.A.	N.A.
9	Kawahara, 2010	Japan	111	IHC	N.A. (Novocastra)	OS	Median/ 25% quantile vs. 75% quantile	N.S.	N.A.	N.A.

⁴ Cheng *et al.* (2017): They present data for CD163 expression on macrophages and tumor cells separately. This table uses the data for macrophages.

10	Kim, 2017	South Korea	373	IHC	MRQ-26 (Cell Marque)	OS	Mean	N.S.	N.A.	Tumor cell nests + invasive front area (total)
11	Kim, 2015	South Korea	128	IHC	10D6 (Novocastra)	DFS	Scoring system	Fav.	Fav.	Invasive front – (Stromal + Epithelial) Tumor center – (Stromal + Epithelial) Stromal – (Tumor center + Invasive front) Epithelial – (Tumor center + Invasive front)
12	Kinoshita, 2022	Japan	68	IHC	Polyclonal (Bioss)	OS	ROC	Poor	Poor	N.A.
13	Kovaleva, 2022	Russia	63	IHC	10D6 (BioCare)	OS	Median	N.S.	Poor	N.A.
14	Liu, 2019	China	598	IHC	Polyclonal (Abcam)	OS	Median	Poor	Poor	N.A.
15	Liu, 2021	China	200	IHC	N.A. (Abcam)	DFS, DSS, OS	Median	Poor (invasive margin) Fav. (core of tumor)	Poor (invasive margin)	Core of tumor, Invasive Margin
16	Ni, 2021	China	584	IHC	EPR19518 (Abcam)	N.A.	X-tile	Poor	N.S.	N.A.
17	Pantano, 2013	Italy	52	IF	10D6 (Novocastra)	OS	Median	N.S.	N.A.	N.A.
18	Park, 2016	South Korea	113	IHC	N.A. (Novocastra)	DFS, OS	ROC	Poor	N.S.	Tumor nest, Tumor stroma, Invasive tumor margin

19	Wei, 2021	China	50	IHC	10D6 (Leica Biosystems)	OS	Median	Poor	Poor	N.A.
20	You, 2023	China	95	IHC	Polyclonal (Servicebio)	OS	N.A.	Poor	Poor	N.A.
21	Zhang, 2017	China	236	IHC	N.A. (Abcam)	DSS, OS	Mean	Poor	Poor	N.A.
22	Zhang, 2021	China	166	IHC	D6U1J (Cell Signaling Technology)	DFS, OS	Median	Poor	Poor	N.A.
23	Zhang, 2022	China	409	IHC	EPR19518 (Abcam)	DFS, OS	N.A.	N.S.	N.A.	N.A.
24	Zhou, 2020	China	173	IHC	N.A. (Abcam)	RFS	N.A.	Poor	N.A.	N.A.
25	Zhu, 2020	China	90	IHC	N.A. (Fuzhou Maixin Biotech.)	OS	16.5 cells per high power field	Poor	Poor	N.A.
Liver cancer (n = 12)										
1	Ali, 2024	Czech Republic	64	IHC	10D6 (Leica Biosystems)	DFS, OS, RFS	25 th percentile	Poor	N.A.	Tumor center, Inner Margin, Outer Margin, Peritumoral
2	Asahi, 2020	Japan	69	IHC	10D6 (Leica Biosystems)	OS	ROC	N.S.	N.A.	Outer border area, Inner border area, Intratumor area
3	Atanasov, 2019	Germany	58	IHC	10D6 (Leica Biosystems)	OS, RFS	≤5% vs. >5% positive cells	N.S.	N.A.	Tumor central area, Tumor-infiltrating front
4	Bao, 2019	China	69	IHC	10D6 (Thermo Fisher Scientific)	OS, RFS	Median	Poor	N.A.	N.A.

5	Hasita, 2010	Japan	39	IHC	10D6 (Novocastra)	DFS, OS	Median	Poor	Poor	N.A.
6	Jing, 2019	China	153	IHC	N.A. (Cell Signaling Technology)	OS, RFS	X-tile	N.S.	N.A.	N.A.
7	Kong, 2013	China	295	IHC	N.A. (AbD Serotec)	OS, RFS	75 th percentile	Poor	N.S.	Intratumoral, Peritumoral
8	Kono, 2016	Japan	77	IHC	N.A. (Abcam)	DFS, OS	ROC	Poor	Poor	Peritumoral
9	Mashiko, 2024	Japan	53	IHC	N.A. (Novocastra)	OS, RFS	N.A.	Poor	Poor	Intratumoral, Peritumoral
10	Minami, 2018	Japan	105	IHC	10D6 (Diagnostic BioSystems)	OS, RFS	Mean	N.S.	N.A.	Intratumoral + Peritumoral (total)
11	Woo, 2022	South Korea	322	IHC	MRQ-26 (CellMarque)	DFS	N.A.	Poor	Poor	N.A.
12	Yeung, 2015	China	84	IHC	N.A. (Novocastra)	DFS, OS	ROC	Poor	Poor	Intratumoral, Peritumoral
Breast cancer (n = 51)										
1	Adams, 2018	USA	138	IHC	N.A. (Cell Marque)	OS	Median	Poor	N.A.	N.A.
2	Ali, 2021	Egypt	120	IHC	EP324 (Medaysis)	OS	Median	Poor	N.S.	N.A.
3	Bobrie, 2022	France	276	IHC	10D6 (BioSB)	OS, RFS	Scoring system	Fav.	N.S.	N.A.
4	Bottai, 2016	Italy	203	IHC	N.A. (Novocastra)	OS, RFS	Scoring system	Poor	N.S.	N.A.

5	Cha, 2018	South Korea	140	IHC	MRQ-26 (Ventana)	DFS, OS	Median	N.S.	N.A.	N.A.
6	Chafe, 2021	Canada	2960	IHC	10D6 (Novocastra)	DSS	Scoring system	Poor	N.A.	N.A.
7	Esbona, 2018	USA	313	IF	10D6 (Novus Biologicals)	OS, PFS	Lowest vs. highest quartile	Poor	Poor	Tumor nest, Tumor stroma
8	Fang, 2024	China	163	IHC	(10D6, Invitrogen)	DFS, OS	Median	N.S.	N.A.	Tumor region, Stromal region
9	Fortis, 2017	Greece	97	IHC	10D6 (BioCare)	DFS, OS	Median	N.S.	N.A.	Tumor center, Invasive margin
10	Garvin, 2018 ⁵	Sweden	81	IHC	10D6 (Novocastra)	DFS	Scoring system	N.S.	N.A.	N.A.
11	Hammerl, 2021	The Netherlands	68	mIF	MRQ-26 (Cell Marque)	DFS	N.A.	Fav.	N.A.	Border stroma Border tumor Center stroma Center tumor
12	Honkanen, 2019	Finland	40	IHC	10D6 (Neo-markers)	OS	Median	N.S.	N.A.	Tumor center, Invasive margin
13	Jamiyan, 2020	Japan	107	IHC	10D6 (Novocastra)	OS, RFS	Median	Poor	Poor	Tumor nest, Tumor stroma
14	Jeong, 2019	South Korea	367	IHC	N.A. (Thermo Fisher Scientific)	DFS, OS	Maximal χ^2 method	Poor	Poor	Tumor nest, Tumor stroma
15	Kaewkangsadan, 2017	United Kingdom	33	IHC	10D6 (Abcam)	DFS, OS	Scoring system	N.S.	N.A.	N.A.

⁵ Garvin *et al.* (2018): They present data for CD163 expression on macrophages and tumor cells separately. This table uses the data for macrophages.

16	Kim, 2020	South Korea	334	IHC	Polyclonal (Abcam)	DFS, OS	Median	N.S.	N.A.	N.A.
17	Klingen, 2017	Norway	282	IHC	10D6 (Dako)	DSS, RFS	Upper quartile	Poor	Poor	N.A.
18	Li, 2020	China	108	IHC	N.A. (Cell Signaling Technology)	RFS	ROC	Poor	Poor	Tumor tissue, Invasive Margin
19	Li, 2021	China	50	IHC	10D6 (ZSGB-Bio)	OS	Specified number of CD163 ⁺ cells	Poor	N.A.	Tumor nest, Tumor stroma
20	Liu, 2017	China	102	IHC	OTI1B4 (Origene)	DFS, OS	>10% staining	Poor	Poor	N.A.
21	Liu, 2017	China	203	IHC	OTI1B4 (Origene)	DFS, OS	>10% staining	Poor	Poor	N.A.
22	Liu, 2022	China	68	IHC	N.A.	RFS	X-tile	Poor	N.A.	Tumor tissue, Invasive Margin
23	Maisel, 2022	USA	443	IF-IHC	Polyclonal (Sigma-Aldrich)	PFS	Bootstrap approach	Poor	Poor	N.A.
24	Matikas, 2018	Sweden	71	IHC	10D6 (Novocastra)	DFS	<10% vs. 10-30% vs. >30%	N.S.	N.A.	Tumor + Adjacent stroma area (total)
25	Medrek, 2012	Sweden	144	IHC	10D6 (Novocastra)	DSS, OS, RFS	Scoring system	Poor	N.S.	Tumor nest, Tumor stroma
26	Miyasato, 2017	Japan	149	IHC	10D6 (Novocastra)	DRFS, DSS, RFS	Mean	N.S.	N.A.	N.A.
27	Ntostoglou, 2024	South Korea	791	IHC	10D6 (Novocastra)	DFS	"SurvMisc" package in R	Poor	Poor	Tumor center

28	Oda, 2023	Sweden	83	IHC	10D6 (Novocastra)	DFS	Scoring system	N.S.	N.A.	N.A.
29	Omilian, 2024	USA	546	IHC	10D6 (Novocastra)	DSS, OS	Tertiles	N.A.	Fav.	Tumor center*
30	Ozkan, 2020	Turkey	51	IHC	EP324 (Epitomics)	OS, PFS	Median	Fav.	N.S.	Intratumoral, Stromal
31	Pelekanou, 2018	USA	554	IF	10D6 (Novocastra)	OS	Median	Fav.	N.S.	N.A.
32	Ramos, 2020	France	238	IHC	10D6 (Novocastra)	PFS	Scoring system	Poor	N.A.	N.A.
33	Reddy, 2019	USA	20	IHC	10D6 (Thermo Fisher Scientific)	OS, PFS	Highest vs. lowest quartiles	N.S.	N.A.	N.A.
34	Schnellhardt, 2020	Germany	132	IHC	N.A.	DFS, RFS	ROC	Poor	N.A.	Invasive front – Stromal Invasive front – Intraepithelial Central tumor – Stromal Central tumor - Intraepithelial
35	Shabo, 2008 ⁶	Sweden	127	IHC	10D6 (Novocastra)	DRFS, DSS	25% positive cancer cells	Poor	Poor	N.A.
36	Shimada, 2017	Japan	258	IHC	10D6 (Leica Biosystems)	DSS, RFS	Median	N.S.	N.A.	N.A.
37	Shinohara, 2022	Japan	20	mIHC	10D6 (Leica Biosystems)	RFS	Median	N.S.	N.A.	Intratumoral, Stromal

⁶ Shabo *et al.* (2008): CD163 expression in breast cancer cells.

38	Sousa, 2015	Finland / Sweden	537	IHC	10D6 (Novocastra)	OS, RFS	Median	N.S.	Poor	N.A.
39	Takada, 2018	Japan	30	IHC	10D6 (Leica Biosystems)	OS, PFS	Median	N.S.	N.A.	N.A.
40	Tavares, 2021	Brazil	76	IHC	10D6 (Ventana)	OS	Maximization of the log-rank test	N.S.	N.A.	N.A.
41	Tiainen, 2015	Finland	276	IHC	N.A. (Thermo Fisher Scientific)	OS	Median	Poor	Poor	Invasive area + stroma (total)
42	Tian, 2016	China	278	IHC	OTI2G12 (Abcam)	DFS, OS	N.A.	Poor	N.A.	N.A.
43	Tymoszuk, 2014	Austria/ France	86	RT-qPCR	N.A.	OS, RFS	Median	Poor	N.A.	N.A.
44	Wang, 2022	China	272	IHC	EPR19518 (Abcam)	DFS	Median	Poor	N.S.	N.A.
45	Xuan, 2014	China	48	IHC	10D6 (Novocastra)	RFS	Scoring system	Poor	N.A.	N.A.
46	Yamaguchi, 2021	Japan	116	IHC	N.A.	DSS, OS	Scoring system	Poor	N.A.	N.A.
47	Yang, 2018	China	200	IHC	10D6 (Abcam)	OS, RFS	Median	Poor	Poor	Tumor nest, Tumor stroma
48	Ye, 2021	China	91	IHC	N.A. (Abcam)	OS, RFS	Mean	Poor	N.A.	N.A.
49	Zhang, 2018	China	278	IHC	N.A. (Abcam)	DFS, OS	Mean	Poor	Poor	N.A.
50	Zhang, 2021	China	105	IHC	EPR19518 (Abcam)	OS	Scoring system	Poor	N.A.	N.A.

51	Zwager, 2023	The Netherlands	347	IHC	MRQ-26 (Ventana)	DFS, OS	N.A.	N.S.	N.A.	N.A.
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Supplementary Table 2: Characteristics of studies (n = 157) included in the present review, including the reported survival analyses results. For each paper, the following characteristics are listed:

Study: First author and year published.

No. of patients: Patients included in the survival analyses regarding CD163.

Methods: Method used to measure CD163. IF: Immunofluorescence, IHC: Immunohistochemistry, mIF: Multiplex immunofluorescence, mIHC: Multiplex immunohistochemistry, RT-qPCR: Quantitative reverse transcription polymerase chain reaction.

Anti-CD163: The anti-CD163 antibody clone used for IHC or IF. The company selling the antibody is stated in parentheses.

Survival: The survival time parameters investigated in the studies. DFS: Disease-free survival, DRFS: Distant relapse-free survival, DSS: Disease-specific survival, OS: Overall survival, PFS: Progression-free survival, RFS: Relapse/recurrence-free survival. The survival time parameter associated with a statistically significant result is marked with **bold**.

Cut-off: The parameter used to distinguish between low and high tumoral presence of CD163⁺ cells. ROC: Receiver operating characteristic curve.

Results: Results in univariate (univar) and multivariate (multivar) analyses, respectively. Poor: Significant association between a high tumoral presence of CD163⁺ cells and reduced survival. Favorable: Significant association between a high tumoral presence of CD163⁺ cells and prolonged survival. N.S.: No significant association between a high tumoral presence of CD163⁺ cells and survival.

Histopathological localization: The tumor components and/or spatial localizations (within the primary tumor or in the surrounding peritumoral tissue) in which CD163 was measured (using the terminology as stated in the individual papers). Localizations marked with **bold** indicates that a significant association with survival was found based on measurement of CD163 in this location. An asterisk (*) marks papers that only performed multivariate analyses, and these papers were not included in the overview of histopathological localizations in the “Results”-section. A list stating e.g. “Tumor nest, Tumor stroma, Total” indicates that three different analyses were performed, while a list stating e.g. “Invasive area + stroma (total)” indicates that only one analysis including CD163 measurements from all mentioned areas was performed (these papers were not included in the overview of histopathological localizations).

N.A.: Not available / Not applicable.

Supplementary Table 3: Construction of groups based on CD163 measurements in different histopathological components and spatial localizations

Groups in the present review	Tumor epithelium	Tumor stroma	Tumor center	Tumor periphery
Terms used the included studies	Tumor Intratumoral Intra-epithelial Epithelial Tumor region Tumor nest Tumor islets Tumor tissue cellular Central ¹	Stroma(I) Tumor stroma Stroma region Tumor tissue stromal Tumor microenvironment Margin ¹	Center of tumor / Tumor center Core of tumor / tumor core Tumor central area Central tumor Intratumoral region Intratumoral Non-invasive front Intratumor area Tumor tissue	Invasive front Tumor invasive front Invasive tumor margin Invasive margin Invasive border Inner margin Inner border area Outer margin Outer border area Tumor front Tumor-infiltrating front Peritumoral

¹Cao et al. (2019), lung cancer: The authors state that the used terms “margin” macrophages refer to stromal macrophages, while “central” macrophages refer to macrophages infiltrating the tumor islets. Thus, this paper was counted in the “Tumor stroma” and “Tumor epithelium” categories and not the “Center of tumor” vs. “Invasive front”.

Supplementary Table 3: Overview of terms from the included literature contributing to our four constructed groups of histopathological components (tumor epithelium and tumor stroma) and spatial localizations (tumor center and tumor periphery). Importantly, the categorization of survival results was done based on full text assessment of each of the included papers, and in this table, the terms are taken out of context to provide an overview of the heterogeneous terminology used in the included literature. Supplementary Table 2 and 4 provide further details on the extracted data from each study.

Supplementary Table 4: Distribution of survival results in each histopathological component / spatial localization for each type of cancer

Study	Tumor epithelium			Tumor stroma			Tumor center			Tumor periphery		
	Favorable	N.S.	Poor	Favorable	N.S.	Poor	Favorable	N.S.	Poor	Favorable	N.S.	Poor
Lung cancer												
Cao, 2019			X			X						
Carus, 2013		X			X							
Chen, 2020						X						
Jackute, 2018		X			X							
Katopodi, 2021												X
Larroquette, 2022			X		X							
Li, 2021		X			X							
Lu, 2023			X	X								
Ma, 2010		X			X							
Ohri, 2009	X				X							
Peng, 2023		X			X							
Rakae, 2019		X			X							
Sumitomo, 2019		X				X						
Sumitomo, 2023		X				X						
Wu, 2022			X		X							
Yang, 2022									X		X	
Zhang, 2017						X						
Total (lung cancer)	1	8	4	1	9	5	0	0	1	0	1	1
	7,69%	61,54%	30,77%	6,67%	60,00%	33,33%	0,00%	0,00%	100,00%	0,00%	50,00%	50,00%
Colorectal cancer												
Cavalleri, 2022										X		
Edin, 2022										X		
Kim, 2018		X			X							
Kitagawa, 2022		X			X							
Koelzer, 2016					X							
Kwak, 2016									X		X	
Ma, 2022			X			X						
Majid, 2024				X								
Nagorsen, 2007				X								
Noti, 2022					X		X				X	
Pinto, 2019								X			X	
Shibutani, 2021												X
Wang, 2023								X				X
Wei, 2019								X				X
Total (colorectal cancer)	0	2	1	2	4	1	1	3	1	2	3	3
	0,00%	66,67%	33,33%	28,57%	57,14%	14,29%	20,00%	60,00%	20,00%	25,00%	37,50%	37,50%
Gastric cancer												
Huang, 2019							X					
Kim, 2015	X			X				X		X		
Liu, 2021							X					X
Park, 2016			X			X						X
Total (gastric cancer)	1	0	1	1	0	1	2	1	0	1	0	2
	50,00%	0,00%	50,00%	50,00%	0,00%	50,00%	66,67%	33,33%	0,00%	33,33%	0,00%	66,67%
Liver cancer												
Ali, 2024								X				
Asahi, 2020								X			X	
Atanasov, 2019								X			X	
Kong, 2013								X				X
Mashiko, 2024									X			X
Kono, 2016												X
Yeung, 2015								X				X
Total (liver cancer)							0	5	1	0	2	4
							0,00%	83,33%	16,67%	0,00%	33,33%	66,67%
Breast cancer												
Esbona, 2018			X			X						
Fang, 2024		X			X							
Fortis, 2017								X			X	
Honkanen, 2019								X			X	
Jamiyan, 2020			X			X						
Jeong, 2019			X		X							
Li, 2020								X				X
Li, 2021		X				X						
Liu, 2022								X				X
Medrek, 2012		X				X						
Ntostoglou, 2024									X			
Ozkan, 2020		X		X								
Schnellhardt, 2020						X						X
Shinohara, 2022		X			X							
Yang, 2018		X				X						
Total (breast cancer)	0	6	3	1	3	6	0	4	1	0	2	3
	0,00%	66,67%	33,33%	10,00%	30,00%	60,00%	0,00%	80,00%	20,00%	0,00%	40,00%	60,00%
Results across all cancers												
Total (all cancers)	2	16	9	5	16	13	3	13	4	3	8	13
	7,41%	59,26%	33,33%	14,71%	47,06%	38,24%	15,00%	65,00%	20,00%	12,50%	33,33%	54,17%

Supplementary Table 4: Distribution of reported associations between patient outcomes and CD163⁺ cell counts in tumor epithelium, tumor stroma, tumor center, and tumor periphery (shown for each type of cancer as well as in total). N.S.: Non-significant.