Supplemental Material

Content

Supplemental Table 1 Index and keyword terms used in the databases. 2
Supplemental Table 2 Inclusion and Eligibility criteria. 4
Supplemental Table 3 Description of GRADE Approach. 5
Supplemental Table 4 Definition of comparator interventions across included systematic reviews. 6
Supplemental Table 5 The level of evidence certainty rating for each included review. 8
Supplemental Table 6 MSC-related adverse events. 25
Supplemental Figure 1 Use the corrected coverage area index to quantify the degree of overlap among system evaluations. 27
Supplemental Figure 2 Individual and overall rating of each included review. 28
Supplemental Figure 3 Change of authorship order statement. .....**错误!未定义书签。**

Supplemental Table 1 Index and keyword terms used in the databases.

Database	Index and keyword terms
PubMed	(("Mesenchymal Stem Cells"[MeSH Terms] OR "mesenchymal stem cell*" OR MSC OR MSCs OR "stem cell*" OR "stromal cell*" OR "mesenchymal cell*" OR "bone marrow" OR "umbilical cord" OR "adipose derived") OR ("Platelet-Rich Plasma"[MeSH Terms] OR PRP OR "platelet rich plasma") OR ("Exosomes"[MeSH Terms] OR exosome* OR "extracellular vesicle*" OR EV OR EVs) OR ("Regenerative Medicine"[MeSH Terms] OR "regenerative therapy" OR "cell therapy")) AND ("Fistula"[MeSH Terms] OR fistula* OR "perianal fistula*" OR "anal fistula*" OR "complex perianal fistula*" OR "fistulizing Crohn*" OR "perianal fistulizing Crohn*" OR "Perianal Crohn's Disease") AND ("Meta-Analysis"[Publication Type] OR "Systematic Review"[Publication Type] OR meta-analysis OR systematic review)
Cochrane	#1 Mesenchymal Stem Cells #2 stem cell #3 stromal cell #4 mesenchymal cell #5 umbilical cord #6 bone marrow #7 adipose derived #8 Platelet-Rich Plasma #9 Exosomes #10 extracellular vesicle #11 Regenerative Medicine #12 cell therapy #13 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 #14 Fistula #15 complex perianal fistulas #16 Complex anal fistula #17 perianal fistulizing Crohn's disease #18 Perianal Crohn's Disease #19 Fistulizing Crohn's #20 #14 OR #15 OR #16 OR #17 OR #18 OR #19 #21 Meta-Analysis #22 systematic review #23 #21 OR #22 #24 #13 AND #20 AND #23
EMBASE	#1 mesenchymal AND ('stem'/exp OR stem) AND ('cells'/exp OR cells)

	#2 stem AND cell #3 stromal AND cell #4 mesenchymal AND cell #5 bone AND marrow #6 umbilical AND cord #7 'thrombocyte rich plasma' #8 'exosome' #9 'regenerative medicine' #10 'cell therapy' #11 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 #12 'fistula' #13 complex AND perianal AND fistulas #14 perianal AND fistula #15 'anus fistula' #16 #12 OR #13 OR #14 OR #15 #17 'meta' #18 'systematic review' #19 #17 OR #18 #20 #11 AND #16 AND #19
Web of Science	TS= (Mesenchymal Stem Cell OR stem cell OR stromal cell OR MSC OR mesenchymal cell OR adipose derived OR umbilical cord OR bone marrow OR Platelet-Rich Plasma OR PRP OR Exosomes OR extracellular vesicle OR Regenerative Medicine OR regenerative therapy OR cell therapy) AND TS= (Fistula OR Complex anal fistula OR complex perianal fistulas OR perianal fistulizing Crohn's disease OR Perianal Crohn's Disease) AND TS= (Meta OR systematic review)

Supplemental Table 2 Inclusion and Eligibility criteria.

Criteria	Inclusion	Exclusion
Population	• Human patients suffer from fistula diseases. • Particularly of concern: perianal fistula, complex perianal fistula, fistula related to Crohn's disease.	• Animal studies.
Intervention	Regenerative therapies, including but not limited to: • Mesenchymal stem cells (MSC) • Bone marrow derived • Umbilical cord derived • Fat derived • Platelet-rich plasma (PRP) • Exosomes or extracellular vesicles (exosome-based therapy) • Other cell therapies based on regenerative medicine	• Non-renewable therapy is the main intervention (such as simple fibrin glue, fistula plug).
Comparison	• Placebo • Conventional conservative or drug therapy	
Outcomes	• Combined remission • Clinical remission • Clinical response • Adverse events	
Type of design	• Meta-analysis (including systematic review with or without Meta-analysis)	• Original research (RCT, cohort, case-control study) • Basic experimental research or animal studies • Narrative review, expert opinions, editorials, conference summaries
Years of publication	• From the beginning until December 15, 2025.	
Publication type	• Published systematic reviews or Meta-analysis	• Abstract only • Letters • Comments
Language	• English	

Supplemental Table 3 Description of GRADE Approach.

Description of GRADE Approach
The only modification to Pollock's methods was application of the seven AMSTAR-2 critical domains (as opposed to the four critical domains described by Pollock and colleagues, which was published prior to AMSTAR-2). Specifically, downgrades were applied as follows: 1) Imprecision was downgraded one level if 100-199 participants were included in relevant reviews, or two levels if <100 participants were available; 2) Risk of bias at the review level was downgraded one level if one critical domain was absent or two levels if two or more critical domains were absent; 3) Risk of bias at the included study level was downgraded one level if >75% of studies were high risk of bias; 4) Inconsistency was downgraded one level if I2 statistics were >75%. GRADE assessments were conducted in duplicate by two investigators (S.C. and Y.W), and disagreements were resolved by consensus.

Supplemental Table 4 Definition of comparator interventions across included systematic reviews.

Systematic review	Condition	Intervention	Comparator
Cheng, F.2023	FCD	MSC	Fibrin glue or Saline solution
Wang, T.2024	PF	MSC	Not reported
Serrano, F. V.2024	FCD	HSC	Not reported
Ciccocioppo, R.2019	PF	MSC	Fibrin glue or Saline solution
Vuyyuru, S. K.2024	FCD	MSC	Placebo (saline)
Fousekis, F. S.2024	FCD	Darvadstrocel	Not applicable
Wang, H.2023	PF	MSC	Fibrin glue or Saline solution
Zou, M.2025	PF	MSC	Fibrin glue or Saline solution
Emile, S. H.2025	PF	MSC	Anti-TNF, Saline solution, Surgery
Cao, Y.2017	FCD	MSC	Fibrin glue or Saline solution
Cao, Y.2021	FCD	MSC	Fibrin glue or Saline solution
Guillo, L.2025	FCD	MSC	Not reported
Cheng, F.2020	PF	MSC	Fibrin glue or Saline solution
Taxonera, C.2025	FCD	Darvadstrocel	Not reported
Cheng, F.2023	PF	MSC	Fibrin glue or Saline solution
Lightner, A. L.2018	FCD	MSC	Fibrin glue or Saline solution
Lee, M. J.2018	FCD	MSC	Placebo (saline)
Choi, S.2019	PF	MSC	Not reported
Cheng, F.2019	FCD	MSC	Placebo (saline)
Li, A.2023	FCD	MSC	Saline solution
Dave, M.2015	FCD	MSC	Not reported
El-Nakeep, S.2022	FCD	MSC	Placebo (saline)
Ko, J. Z.2021	FCD	MSC	Not applicable
Ye, Lei.2016	FCD	MSC, HSC	Not applicable
Narang, S. K.2017	CG	MSC, PRP	Not applicable
Qiu, Y.2017	FCD	MSC, HSC	Not reported
Qiu, Y.2024	FCD	MSC	Placebo (saline)
Cheng, F.2025	PF	MSC exosomes	Not applicable

Elsamna, S. T.2025	Cleft Palate Repair	PRP	Not reported
Mazzaro, M. C.2024	FCD	PRP	Not applicable
Adamska, P.2024	Oroantral Communication and Fistulas	PRP	Not applicable
Xu, Y.2024	PF	PRP	Not reported
Mardiyan, K. E.2023	Vesicovaginal fistula	PRP	Not applicable
Wang, Y.2023	PF	PRP	Not reported
Luo, Q.2022	PF	PRP	Fibrin glue or Surgery

Notes: Perianal fistulas, PF; Fistulizing Crohn's disease, FCD; mesenchymal stem cells, MSC; platelet rich plasma, PRP; hematopoietic stem cell, HSC;

Supplemental Table 5 The level of evidence certainty rating for each included review.

Clinical response

Source	Follow up	Type of cell intervention	Disease State	Study Design	No of studies	Sample size	Indicator type	Effect size (95% CI)	I2,%	GRADE rating
Wang, T.2024	24 w	MSCs/MSCs + fibrin glue	Perianal fistulas	Mixed	11	920	OR	1.86(1.39 to 2.50)	37.7	Low
Wang, T.2024	48 w	MSCs/MSCs + fibrin glue	Perianal fistulas	Mixed	6	446	OR	2.23(1.52 to 3.26)	59.2	Low
Wang, T.2024	96 w	MSCs/MSCs + fibrin glue	Perianal fistulas	Mixed	4	212	OR	2.08(1.17 to 3.68)	0	Low
Ciccocioppo, R.2019		MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	4		RR	1.54 (1.03 to 2.29)		Moderate
Vuyyuru, S. K.2024		MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	2	233	RR	1.26 (1.01 to 1.57)	0	Low
Lee, M. J.2018		MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	2	233	RR	1.27(1.02 to 1.59)	0	Moderate

Clinical remission

Source	Follow up	Type of cell intervention	Disease State	Study Design	No of studies	Sample size	Indicator type	Effect size (95% CI)	I2,%	GRADE rating
Ciccocioppo, R.2019		MSCs/MSCs + fibrin glue	Perianal fistulas	Mixed	4	415	RR	1.57 (1.07 to 2.31)	57	Moderate
Cheng, F.2020		MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	2	88	RR	5.92(1.34 to 25.15)	58	Critically low

Lightner, A. L.2018	≤ 24 w	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	3	234	OR	3.06 (1.05 to 8.90)		Low
Lightner, A. L.2018	≥24 w	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	3	234	OR	2.37 (0.90 to 6.25)		Low
Luo, Q.2022		PRP	Perianal fistulas	Mixed	3	162	RR	1.2 (0.95 to 1.52)	0	Critically low

Combined remission

Source	Follow up	Type of cell intervention	Disease State	Study Design	No of studies	Sample size	Indicator type	Effect size (95% CI)	I2,%	GRADE rating
Cheng, F.2023	⩾48 w	MSCs/MSCs + fibrin glue	Perianal fistulas	Mixed	3	139	OR	2.79(1.37 to 5.67)	0	Low
Cheng, F.2020		MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	5	281	OR	1.77(1.28 to 2.45)	0	Moderate
Guillo, L.2025	12 w	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	3	66	RR	1.6(1.0 to 2.8)	0	Critically low
Guillo, L.2025	24 w	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	4	270	RR	1.5(1.1 to 1.9)	0	Moderate
Lee, M. J.2018		MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	2	233	RR	1.31 (0.98 to 1.73)	0	Moderate
Vuyyuru, S. K.2024		MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	2	233	RR	1.31 (0.98 to 1.73)	0	Low
Cheng, F.2023		MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	3	231	RR	1.99(1.17 to 3.38)	0	Moderate
Cheng, F.2019		MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	4	435	OR	1.95(1.33 to 2.87)	0	Moderate

Clinical and/or radiological healing

Source	Follow up	Type of cell intervention	Disease State	Study Design	No of studies	Sample size	Indicator type	Effect size (95% CI)	I2,%	GRADE rating
Wang, H.2023	⩽12 w	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	4	275	RR	2.49(1.63 to 3.80)	22	Low
Zou, M.2025	⩽12 w	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	3	232	RR	2.51(1.55 to 4.08)	16.3	Moderate
Wang, H.2023	⩽24 w	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	5	474	RR	1.25(1.00 to 1.55)	0	Low
Zou, M.2025	⩽24 w	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	4	1066	RR	1.11(0.96 to 1.29)	4.5	Moderate
Wang, H.2023	⩽48 w	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	5	400	RR	1.35(1.10 to 1.67)	9	Low
Zou, M.2025	⩽48 w	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	5	885	RR	1.31(1.02 to 1.69)	58.2	Low
Wang, H.2023	⩾48 w	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	4	129	RR	1.85(1.10 to 3.10)	0	Critically low
Cheng, F.2023	⩾48 w	MSCs/MSCs + fibrin glue	Perianal fistulas	Mixed	6	307	OR	2.13(1.34 to 3.38)	0	Moderate
Cheng, F.2023	⩾52 w	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	4	339	RR	1.8(1.17 to 2.78)	0	Moderate
Zou, M.2025	⩾96 w	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	2	85	RR	1.58(0.91 to 2.74)	0	Critically low
Emile, S. H.2025		MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	8	686	OR	1.78(1.26 to 2.52)	0	Moderate

Ciccocioppo, R.2019	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	3		RR	1.34 (1.02 to 1.77)		Moderate
Cheng, F.2020	MSCs/MSCs + fibrin glue	Perianal fistulas	RCT	7	736	OR	2.03(1.5 to 2.74)	42	Moderate
Choi, S.2019	MSCs/MSCs + fibrin glue	Perianal fistulas	Mixed	4		OR	2.63(1.055 to 6.57)	72.6	Low
Cheng, F.2023	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	6	374	RR	1.92(1.27 to 2.90)	0	Moderate
Zou, M.2025	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	3	657	RR	1.43(0.92 to 2.24)	77.5	Low
Cao, Y.2017	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	5	261	RD	0.21(0.09 to 0.32)	29	Low
Cao, Y.2021	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	7	518	OR	2.21(1.19 to 4.11)	35	Low
Wang, H.2023	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	3	247	RR	1.43(1.09 to 1.86)	0	Low
Cheng, F.2019	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	5	449	OR	2.05(1.41 to 3.00)	0	Moderate
El-Nakeep, S.2022	MSCs/MSCs + fibrin glue	Fistulizing CD	Mixed	4	269	RR	1.48(1.12 to 1.96)	0	High
Qiu, Y.2017	MSCs/MSCs + fibrin glue	Fistulizing CD	Mixed	3	282	OR	3.83(1.06 to 13.86)	69	Moderate
Qiu, Y.2024	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	8	465	OR	1.99(1.31 to 3.04)	0	Moderate
Cheng, F.2020	MSCs/MSCs + fibrin glue	Fistulizing CD	RCT	5	449	OR	2.05(1.41 to 3.0)	0	Low

Zou, M.2025	MSCs/MSCs + fibrin glue	Cryptoglandular	RCT	3	228	RR	1.26(0.91 to 1.75)	30.5	Moderate
Wang, H.2023	MSCs/MSCs + fibrin glue	Cryptoglandular	RCT	2	174	RR	1.16(0.69 to 1.95)	60	Critically low
Cheng, F.2020	MSCs/MSCs + fibrin glue	Cryptoglandular	RCT	3	193	OR	2.98(0.86 to 10.29)	68	Low
Cheng, F.2023	MSC	Fistulizing CD	RCT	4	354	RR	1.82(1.19 to 2.78)	0	Moderate
Li, A.2023	MSC	Fistulizing CD	RCT	5	558	RR	2.06(1.46 to 2.89)	0	Moderate
Cheng, F.2020	MSCs + fibrin glue	Perianal fistulas	RCT	4	237	RR	3.27(1.15 to 9.28)	66	Moderate
Cheng, F.2023	MSCs + fibrin glue	Perianal fistulas	RCT	3	162	OR	2.3(1.21 to 4.36)	0	Low
Cheng, F.2023	Autologous	Fistulizing CD	RCT	3	20	RR	5.2(0.75 to 35.82)	34	Critically low
Wang, H.2023	Autologous	Perianal fistulas	RCT	4	196	RR	1.25(0.93 to 1.68)	19	Low
Zou, M.2025	Autologous	Perianal fistulas	RCT	4	277	RR	1.45(0.95 to 2.21)	57.9	Moderate
Cheng, F.2020	Autologous	Perianal fistulas	RCT	4	301	OR	3.19(1.05 to 9.65)	71	Low
Cheng, F.2023	Allogeneic	Fistulizing CD	RCT	5	354	RR	1.82(1.19 to 2.78)	0	Moderate
Wang, H.2023	Allogeneic	Perianal fistulas	RCT	2	225	RR	1.48(1.11 to 1.98)	0	Moderate
Cheng, F.2020	Allogeneic	Perianal fistulas	RCT	3	429	OR	1.97(1.34 to 2.91)	0	Moderate
Zou, M.2025	Allogeneic	Perianal fistulas	RCT	2	613	RR	1.21(0.86 to 1.68)	71.5	Moderate
Wang, H.2023	AMSC	Perianal fistulas	RCT	5	400	RR	1.35(1.1 to 1.67)	9	Moderate
Cheng, F.2020	AMSC	Perianal fistulas	RCT	6	709	RR	2.29(1.38 to 3.79)	52	Moderate
Wang, H.2023	BMSC	Perianal fistulas	RCT	1	21	RR	1.8(0.54 to 6.0)		Critically low

Cheng, F.2020	BMSC	Perianal fistulas	RCT	1	21	RR	1.75(0.24 to 12.64)		Critically low
Serrano-Fernandez, V.2024	HSC	Fistulizing CD	Mixed	5	252	RR	0.47(0.26 to 0.86)	66	Moderate
Wang, H.2023	< 10*107	Perianal fistulas	RCT	3	156	RR	1.51(1.02 to 2.21)	0	Low
Zou, M.2025	≥ 20/60× 107	Perianal fistulas	RCT	3	232	RR	1.53(0.81 to 2.90)	74.1	Low
Wang, H.2023	≥ 10× 107	Perianal fistulas	RCT	3	265	RR	1.3(1.02 to 1.66)	31	Moderate
Zou, M.2025	≥ 100× 107	Perianal fistulas	RCT	3	653	RR	1.13(0.85 to 1.50)	51	Moderate
Cao, Y.2021	2 × 107 cells/m	Fistulizing CD	Mixed	1	7	RR	4(0.26 to 61.76)		Critically low
Cao, Y.2021	3 × 107 cells/mL	Fistulizing CD	Mixed	3	24	RR	1.3(0.76 to 2.22)	0	Critically low
Cao, Y.2021	4 × 107 cells/mL	Fistulizing CD	Mixed	1	6	RR	3(0.17 to 53.71)		Critically low
Cao, Y.2021	9 × 107 cells/mL	Fistulizing CD	Mixed	2	19	RR	0.35(0.09 to 1.39)	0	Critically low
Xu, Y.2024	PRP	Perianal fistulas	Mixed	6	357	OR	1.35(1.14 to 1.6)	0	Low
Wang, Y.2023	PRP	Perianal fistulas	Mixed	4	254	RR	1.3(1.10 to 1.54)	13	Low

Other outcomes

Source	outcome	Type of cell intervention	Disease State	Study Design	No of studies	Sample size	Indicator type	Effect size (95% CI)	I2,%	GRADE rating
Wang, T.2024	PDAI, 24 w	MSC	Perianal fistulas	Mixed	2		SMD	-0.07(-0.66,0.51)		Critically low

Wang, T.2024	PDAI, 48 w	MSC	Perianal fistulas	Mixed	2		SMD	-0.2(-0.47,0.06)		Critically low
Elsamna, S. T.2025	Fistula occurrence	PRP	Cleft palate fistula	RCT	5	164	RR	0.32(0.12,0.82)	0	Low
Xu, Y.2024	Recurrent rate	PRP	Perianal fistulas	Mixed	2	120	0R	1.17(0.44,3.11)	0	Critically low
Emile, S. H.2025	AE	MSC	Perianal fistulas	RCT	8	686	OR	1.0(0.7,1.42)	2	Moderate
Cheng, F.2020	AE	MSC	Perianal fistulas	RCT	3	454	OR	1.06(0.71,1.59)	0	Moderate
Cheng, F.2023	AE	MSC	Perianal fistulas	RCT	2	84	OR	0.77(0.27,2.24)	0	Critically low
Wang, T.2024	AE	MSC	Perianal fistulas	RCT	8	686	RR	0.87 (0.69,1.10)		Low
Ciccocioppo, R.2019	AE	MSC	Perianal fistulas	RCT	4		RR	1.06 (0.93, 1.22)		Moderate
Vuyyuru, S. K.2024	AE	MSC	Fistulizing CD	RCT	1	208	RR	0.99 （0.81,1.21）		Low
Cheng, F.2023	AE	MSC	Fistulizing CD	RCT	2	245	OR	1.29(0.7,2.36)	0	Moderate
Lightner, A. L.2018	AE	MSC	Fistulizing CD	RCT	1	212	OR	1.07(0.61,1.89)		Low
Cheng, F.2019	AE	MSC	Fistulizing CD	RCT	2	410	OR	1.14(0.75,1.74)	0	Moderate
Cao, Y.2021	AE	MSC	Fistulizing CD	RCT	3	432	RR	0.58(0.3,1.14)	59	Low
Vuyyuru, S. K.2024	SAE	MSC	Fistulizing CD	RCT	1	205	RR	1.27(0.67,2.42）		Low
Lightner, A. L.2018	SAE	MSC	Fistulizing CD	RCT	3	234	RR	0.53 (0.28,0.98)		Low

Li, A.2023	Perianal abscess	MSC	Fistulizing CD	RCT	3	429	OR	1.07(0.67,1.72)	0	Low
Li, A.2023	Proctal-gia	MSC	Fistulizing CD	RCT	3	448	OR	1.1(0.63,1.92)	0	Low

Cumulative incidence of safety

Source	outcome	Type of cell inter-vention	Disease State	Study Design	No of studies	Sample size	Incidence (95% CI)	I2,%	GRADE rating
Ciccocioppo, R.2019	Proportion with AEs	MSC	Perianal fistu-las	Mixed	17		0.53 (0.30 0.75)		Moderate
Emile, S. H.2025	Proportion with AEs	MSC	Perianal fistu-las	Mixed	40		0.373(0.271,0.475)		Moderate
Taxonera, C.2025	Proportion with AEs	MSC	Fistulizing CD	Mixed	7	797	0.25 (0.22,0.28)	71	Moderate
Ciccocioppo, R.2019	Proportion with AEs	MSC	Perianal fistu-las	RCT	4		0.71 (0.35–0.96)		Low
Taxonera, C.2025	Serious AEs	MSC	Fistulizing CD	Mixed	8	825	0.08(0.06,0.1)	59	Moderate
Ciccocioppo, R.2019	Treatment-related AEs	MSC	Perianal fistu-las	RCT	3		0.13 (0.05–0.24)		Low
Ciccocioppo, R.2019	Treatment-related AEs	MSC	Perianal fistu-las	Mixed	12		0.01 (0.00–0.07)		Moderate
Ciccocioppo, R.2019	Severe treatment-related AEs	MSC	Perianal fistu-las	RCT	5		0.01 (0.00–0.02)		Low
Ciccocioppo, R.2019	Severe treatment-related AEs	MSC	Perianal fistu-las	Mixed	17		0.00 (0.00–0.00		Moderate

Ciccocioppo, R.2019	Acute local AEs	MSC	Perianal fistulas	RCT	2	0.08 (0.03–0.16)	Low
Ciccocioppo, R.2019	Acute local AEs	MSC	Perianal fistulas	Mixed	8	0.37 (0.00–0.86)	Moderate
Ciccocioppo, R.2019	Acute systemic AEs	MSC	Perianal fistulas	RCT	2	0.00 (0.00–0.03)	Low
Ciccocioppo, R.2019	Acute systemic AEs	MSC	Perianal fistulas	Mixed	7	0.00 (0.00–0.06)	Moderate
Ciccocioppo, R.2019	Rate of late local AE/patient/month	MSC	Perianal fistulas	RCT	2	0.00 (0.00–0.00)	Low
Ciccocioppo, R.2019	Rate of late local AE/patient/month	MSC	Perianal fistulas	Mixed	7	0.00 (0.00–0.01)	Moderate
Ciccocioppo, R.2019	Rate of late systemic AE/patient/month	MSC	Perianal fistulas	RCT	2	0.00 (0.00–0.03)	Low
Ciccocioppo, R.2019	Rate of late systemic AE/patient/month	MSC	Perianal fistulas	Mixed	7	0.01 (0.00–0.03)	Moderate
Ciccocioppo, R.2019	Number of AE/patient/month	MSC	Perianal fistulas	Mixed	13	0.13 (0.05–0.24)	Moderate
Ciccocioppo, R.2019	Number of AE/patient/month	MSC	Perianal fistulas	RCT	2	0.52 (0.42–0.62)	Low
Ciccocioppo, R.2019	Proportion acute death	MSC	Perianal fistulas	Mixed	20	0.00 (0.00–0.00)	Moderate
Ciccocioppo, R.2019	Rate of late death per person/month	MSC	Perianal fistulas	Mixed	19	0.00 (0.00–0.00)	Moderate
Ciccocioppo, R.2019	Rate of late death per person/month	MSC	Perianal fistulas	RCT	3	0.04 (0.00–0.08)	Low

Ciccocioppo, R.2019	Rate of rehospitalization per person/months	MSC	Perianal fistulas	Mixed	5		0.01 (0.00–0.03)	Moderate
Taxonera, C.2025	New perianal abscess	MSC	Fistulizing CD	Mixed	8	820	0.09(0.07,0.11)	Moderate
Taxonera, C.2025	Another surgery	MSC	Fistulizing CD	Mixed	7	186	0.12(0.07,0.17)	Moderate

Cumulative incidence of efficacy

Source	Follow up	outcome	Type of cell intervention	Disease State	No of studies	Sample size	Incidence (95% CI)	I2,%	GRADE rating
Guillo, L.2025	3 m	combined remission	MSC	Fistulizing CD	6	90	0.36 (0.24, 0.49)	28	Critically low
Guillo, L.2025	6 m	combined remission	MSC	Fistulizing CD	15	289	0.58 (0.51, 0.64)	20	Moderate
Taxonera, C.2025	6 m	combined remission	Darvadstrocel	Fistulizing CD	4	111	0.61 (0.51, 0.70)	0	Low
Taxonera, C.2025	12 m	combined remission	Darvadstrocel	Fistulizing CD	2	25	0.70 (0.47, 0.88)	0	Critically low
Guillo, L.2025	12 m	combined remission	MSC	Fistulizing CD	7	115	0.52 (0.39, 0.65)	45	Low
Choi, S.2019		combined remission	MSC	Perianal fistulas	6		0.52 (0.42, 0.62)	47.9	Low
Cheng, F.2019		combined remission	MSC	Fistulizing CD	8	269	0.56 (0.46, 0.69)	56	Moderate
Ciccocioppo, R.2019		combined remission	MSC	Perianal fistulas	1		0.53 (0.27 to 0.79)		Critically low
Guillo, L.2025		combined remission	BMSC	Fistulizing CD	5	54	0.56 (0.26, 0.82)	68	Critically low

Guillo, L.2025		combined remission	AMSC	Fistulizing CD	4	154	0.57 (0.47, 0.67)	0	Low
Cheng, F.2025	6 m	combined remission	Exosomes	Perianal fistulas	3	36	0.57 (0.43, 0.76)	0	Critically low
Mazzaro, M. C.2024		combined remission	PRP	Perianal fistulas	9	138	0.48 (0.31, 0.65)	68	Critically low
Wang, Y.2023		combined remission	PRP	Perianal fistulas	8		0.66 (0.52, 0.79)	83.07	Critically low
Guillo, L.2025	3 m	Clinical remission	MSC	Fistulizing CD	5	80	0.32 (0.23, 0.43)	0	Critically low
Guillo, L.2025	6 m	Clinical remission	MSC	Fistulizing CD	12	239	0.62 (0.50, 0.72)	50	Moderate
Taxonera, C.2025	6 m	Clinical remission	Darvadstrocel	Fistulizing CD	7	424	0.68 (0.63, 0.73)	0	Moderate
Taxonera, C.2025	12 m	Clinical remission	Darvadstrocel	Fistulizing CD	7	191	0.77 (0.70, 0.84)	0	Low
Guillo, L.2025	12 m	Clinical remission	MSC	Fistulizing CD	8	133	0.58 (0.47, 0.69)	36	Low
Choi, S.2019		Clinical remission	MSC	Perianal fistulas	10		0.71 (0.62, 0.79)	0	Low
Dave, M.2015		Clinical remission	MSC	Fistulizing CD	5	91	0.40 (0.07, 0.79)	90.3	Critically low
Guillo, L.2025		Clinical remission	BMSC	Fistulizing CD	3	29	0.68 (0.25, 0.93)	65	Critically low
Guillo, L.2025		Clinical remission	AMSC	Fistulizing CD	5	157	0.56 (0.48, 0.64)	44	Low

Guillo, L.2025	3 m	Clinical response	MSC	Fistulizing CD	8	115	0.71 (0.57, 0.82)	43	Low
Taxonera, C.2025	6 m	Clinical response	Darvadstrocel	Fistulizing CD	4	370	0.80 (0.73-0.86)	31	Moderate
Taxonera, C.2025	12 m	Clinical response	Darvadstrocel	Fistulizing CD	4	177	0.82 (0.75-0.88)	0	Low
Guillo, L.2025	6 m	Clinical response	MSC	Fistulizing CD	13	252	0.76 (0.69, 0.82)	0	Moderate
Guillo, L.2025	12 m	Clinical response	MSC	Fistulizing CD	8	131	0.77 (0.69, 0.84)	6	Low
Ciccocioppo, R.2019		Clinical response	MSC	Perianal fistulas	18		0.80 (0.70, 0.89)		Moderate
Ciccocioppo, R.2019		Clinical response	MSC	Perianal fistulas	4		0.64 (0.57, 0.70)		Low
Cheng, F.2025		Clinical response	MSC Exosomes	Perianal fistulas	3	36	0.86 (0.75, 0.98)	0	Critically low
Choi, S.2019		Clinical and/or radiological healing	MSC	Perianal fistulas	3		0.51 (0.38, 0.64)	71.4	Critically low
Emile, S. H.2025		Clinical and/or radiological healing	MSC	Perianal fistulas	43		0.58 (0.51,64.7)		Moderate
Choi, S.2019		Clinical and/or radiological healing	MSC	Perianal fistulas	16	400	0.63 (0.53, 0.71)	54.05	Low
Cheng, F.2019		Clinical and/or radiological healing	MSC	Fistulizing CD	13	348	0.63 (0.53, 0.74)	67	Low
Dave, M.2015		Clinical and/or radiological healing	MSC	Fistulizing CD	7	82	0.61 (0.36, 0.85)	68.9	Critically low

Qiu, Y.2017	Clinical and/or radiological healing	MSC	Fistulizing CD	13	251	0.57 (0.44, 0.69)	59.9	Moderate
Emile, S. H.2025	Clinical and/or radiological healing	MSC	Fistulizing CD	30		0.60 (0.55,0.66)		Moderate
Choi, S.2019	Clinical and/or radiological healing	MSC	Fistulizing CD	10		0.64 (0.52, 0.74)	45.9	Low
Cheng, F.2025	Clinical and/or radiological healing	MSC Exosomes	Fistulizing CD	2	25	0.60 (0.44, 0.83)	0	Critically low
Emile, S. H.2025	Clinical and/or radiological healing	MSC	Cryptoglandular	12		0.53 (0.36,0.71)		Moderate
Choi, S.2019	Clinical and/or radiological healing	MSC	Cryptoglandular	4		0.61 (0.37, 0.81)	62.2	Critically low
Cheng, F.2025	Clinical and/or radiological healing	MSC Exosomes	Cryptoglandular	1	11	0.45 (0.17, 0.77)		Critically low
Mazzaro, M. C.2024	Clinical and/or radiological healing	PRP	Fistulizing CD	9	138	0.82 (0.66, 0.95)	74	Critically low
Wang, Y.2023	Clinical and/or radiological healing	PRP	Perianal fistulas	14		0.72 (0.64, 0.79)	60.07	Low
Luo, Q.2022	Clinical and/or radiological healing	PRP	Perianal fistulas	9	289	0.65 (0.53, 0.77)	73	Low
Xu, Y.2024	Clinical and/or radiological healing	PRP	Perianal fistulas	18	418	0.68 (0.600.76)	58.5	Low
Emile, S. H.2025	Clinical and/or radiological healing	AMSC	Perianal fistulas	34		0.57 (0.50,0.65)		Moderate
Cao, Y.2017	Clinical and/or radiological healing	AMSC	Fistulizing CD	11		0.60 (0.39, 0.81)		Low

Qiu, Y.2017	Clinical and/or radiological healing	AMSC	Fistulizing CD	9	203	0.60 (0.44, 0.75)	65.3	Moderate
Emile, S. H.2025	Clinical and/or radiological healing	BMSC	Perianal fistulas	6		0.63 (0.49,0.77)		Low
Qiu, Y.2017	Clinical and/or radiological healing	BMSC	Fistulizing CD	2	24	0.62 (0.42, 0.79)	0	Critically low
Cao, Y.2017	Clinical and/or radiological healing	BMSC	Fistulizing CD	3		0.73 (0.59, 0.86)		Low
Emile, S. H.2025	Clinical and/or radiological healing	HUMSC	Perianal fistulas	2		0.47 (0.26,0.68)		Low
Qiu, Y.2017	Clinical and/or radiological healing	HSC	Fistulizing CD	2	24	0.29 (0.03, 0.85)	80.8	Critically low
Emile, S. H.2025	Clinical and/or radiological healing	Autologous	Perianal fistulas	24		0.58 (0.48,0.68)		Moderate
Choi, S.2019	Clinical and/or radiological healing	Autologous	Perianal fistulas	12		0.69 (0.56, 0.80)	64.8	Low
Cheng, F.2019	Clinical and/or radiological healing	Autologous	Fistulizing CD	8	104	0.79 (0.71, 0.87)	0	Low
Qiu, Y.2017	Clinical and/or radiological healing	Autologous	Perianal fistulas	9		0.62 (0.44, 0.77)	59.5	Moderate
Emile, S. H.2025	Clinical and/or radiological healing	Allogenic	Perianal fistulas	19		0.57 (0.51,0.64)		Moderate
Choi, S.2019	Clinical and/or radiological healing	Allogenic	Perianal fistulas	4		0.51 (0.43, 0.59)	0	Critically low
Qiu, Y.2017	Clinical and/or radiological healing	Allogenic	Perianal fistulas	4		0.47 (0.33, 0.61)	30.2	Low

Cheng, F.2019		Clinical and/or radiological healing	Allogenic	Fistulizing CD	5	244	0.52 (0.44, 0.60)	17	Low
Emile, S. H.2025	⩾12 m	Clinical and/or radiological healing	MSC	Perianal fistulas	24		0.58 (0.52,0.63)		Moderate
Emile, S. H.2025	<12 m	Clinical and/or radiological healing	MSC	Perianal fistulas	19		0.58 (0.45,0.70)		Moderate
Choi, S.2019	2 m	Clinical and/or radiological healing	MSC	Perianal fistulas	6		0.71 (0.61, 0.80)	0	Low
Choi, S.2019	6 m	Clinical and/or radiological healing	MSC	Perianal fistulas	7		0.54 (0.43, 0.64)	48	Low
Choi, S.2019	12 m	Clinical and/or radiological healing	MSC	Perianal fistulas	3		0.69 (0.47, 0.84)	0	Critically low
Cao, Y.2017		Clinical and/or radiological healing	0–1	Fistulizing CD			0.42 (0.05, 0.80)		Critically low
Cao, Y.2017		Clinical and/or radiological healing	2–4	Fistulizing CD			0.80 (0.65, 0.95)		Critically low
Cao, Y.2017		Clinical and/or radiological healing	5–7	Fistulizing CD			0.59 (0.43, 0.75)		Critically low
Cao, Y.2017		Clinical and/or radiological healing	8×10^7 cells/ml	Fistulizing CD			0.45 (0.13, 0.78)		Critically low
Cao, Y.2021		Clinical and/or radiological healing	Perianal fistula	Fistulizing CD	7		0.77 (0..64, 0.90)		Low
Cao, Y.2021		Clinical and/or radiological healing	through the sphincter	Fistulizing CD	3		0.76 (0.65, 0.87)		Critically low
Cao, Y.2021		Clinical and/or radiological healing	Rectovaginal	Fistulizing CD	7		0.27 (00.17, 0.37)		Low

Qiu, Y.2017	Clinical and/or radiological healing	Systemic injection	Fistulizing CD	2		0.29 (0.03, 0.85)	80.8	Critically low
Qiu, Y.2017	Clinical and/or radiological healing	Local injection	Fistulizing CD	11		0.60 (0.47, 0.72)	57.9	Moderate
Mazzaro, M. C.2024	Clinical and/or radiological healing	PRP-SVF	Fistulizing CD	3	60	0.42 (0.29, 0.55)	0	Critically low
Mazzaro, M. C.2024	Clinical and/or radiological healing	ASC-PRP	Fistulizing CD	2	13	0.86 (0.58, 1.00)	0	Critically low
Wang, Y.2023	Clinical and/or radiological healing	PRP combined	Perianal fistulas	7		0.83 (0.77, 0.88)	0	Low
Luo, Q.2022	Clinical and/or radiological healing	PRP combined	Perianal fistulas	5	164	0.78 (0.70, 0.85)	5.8	Critically low
Mazzaro, M. C.2024	Clinical and/or radiological healing	Only PRP	Fistulizing CD	4	65	0.39 (0.12, 0.69)	82	Critically low
Wang, Y.2023	Clinical and/or radiological healing	Only PRP	Perianal fistulas	8		0.62 (0.55, 0.69)	10.81	Low
Luo, Q.2022	Clinical and/or radiological healing	Only PRP	Perianal fistulas	4	125	0.47 (0.37, 0.57)	0	Critically low
Xu, Y.2024	Recurrence	PRP	Perianal fistulas	14		0.18 (0.12, 0.26)	46.1	Low
Wang, Y.2023	Recurrence	PRP	Perianal fistulas	12		0.15 (0.08, 0.24)	75.59	Critically low
Luo, Q.2022	Recurrence	PRP	Perianal fistulas	8	274	0.12 (0.08, 0.17)	0	Low
Cheng, F.2025	no-response	MSC Exosomes	Perianal fistulas	3	36	0.18 (0.09, 0.37)	0	Critically low

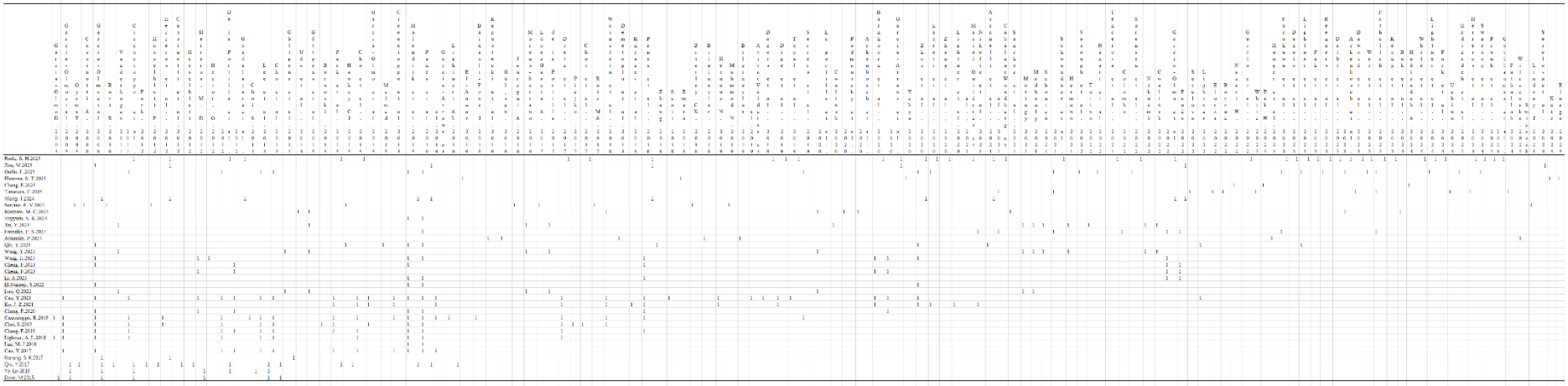
Xu, Y.2024	Incontinence consolidation	PRP	Perianal fistulas	8		0.27 (0.12, 0.46)	79.1	Low
Taxonera, C.2025	Last follow-up failure	Darvadstrocel	Fistulizing CD	7	191	0.34 (0.26, 0.43)	35	Low

Supplemental Table 6 MSC-related adverse events.

Study	Number	Complica-tions	Types of complications
Guillaumes et al., 2024	9	2	Deterioration of continence (1), bleeding (1)
Pronk et al., 2024	30	7	Wound necrosis (1), abscess (6)
Swaroop et al., 2024	10	4	Spinal headache (2), ecchymosis (1), abscess (1)
Herreros et al., 2024	73	12	Abscess (9), cellulitis (1), bleeding (1)
Lightner et al., 2024	15	3	Abscess (3)
White et al., 2024	33		Pain, bleeding, fever, abscess
Keung et al., 2023	10	9	Pain (7), abscess (2)
Fathallah et al., 2023	43	15	Abscess (9), pain (6)
Wei et al., 2023	10	3	Anal pain (2), elevated liver enzymes (1)
Dawoud et al., 2023	14	0	NA
Arkenbosch et al., 2023	25	3	Bleeding (2), wound infection (1)
Dalby et al., 2023	77	20	Abscess (2), bleeding (2), infection (6), infected hematoma (1), anal pain (6), urine retention (3)
Reenaers et al., 2023	16	5	Mild anal pain (3), mild bleeding (1), increased discharge (1)
Pak et al., 2023	11	0	NA
Lightner et al., 2023	18	15	Anal pain (13), abscess (2)
Dozois et al., 2023	20	8	Abscess (4), new tract (2), anal pain (1), non-healing wound (1)
Furukawa et al., 2023	22	2	Worse Crohn's and diarrhea (1), increase in blood bilirubin (1)
Guillo et al., 2022	10	8	Anal pain (4), abscess (3), new fistula tract (1)
Garcia-Olmo et al., 2022	25	3	Fistula (1), Abscess (1), Increased discharge (1)
Sørensen et al., 2022	12	0	NA
Tencerova et al., 2021	27	2	Abscess (2), anal pain
Schwandner et al., 2021	12	4	Abscess (4)

Cabalzar-Wondberg et al., 2021	11	5	Abscess (4), cytomegalovirus viraemia (1)
Ascanelli et al., 2021	58	23	Abscess (1), hemorrhoids (11), abdominal pain (11)
Maciel Gutiérrez et al., 2021	20	3	Abscess (3)
Zhang et al., 2020	11	3	Anal pain (3)
Laureti et al., 2020	15	3	Bleeding (1), subcutaneous hematoma (2)
Zhou et al., 2020	11	7	Anal pain (7), abscess (3), pyrexia (3)
Garcia-Arranz et al., 2020	23	7	Abscess, back pain, urticaria, renal colic
Barnhoorn et al., 2020	13	10	Abscess (4), infection (4), Crohn's activity (2)
Topal et al., 2019	10	4	Abscess (2), Bruising at the liposuction site (2)
Dige et al., 2019	21	8	Abscess (2), anal pain (4), bleeding (1), urine retention (1)
Dozois et al., 2019	15	5	Abdominal wall seroma (1), abscess (1), fall of plug and abscess (1), abscess at 3 months (1), perianal cellulitis (1)
Panes et al., 2018	107	79	Anal pain (15), anal abscess/fistula (34), nasopharyngitis (11), diarrhea (9), abdominal pain (5), pyrexia (6)
Choi et al., 2017	15	9	Anal pain (2), bleeding (2), abscess (2), pyrexia (3)
Dietz et al., 2017	12	7	Debridement of granulation tissue in the fistula tract (1), seroma (2)
Cho et al., 2015	41	30	Anal pain (8), bleeding (3), anal inflammation (3), diarrhea (3), pyrexia (3), abdominal pain (7), disease exacerbation (4)
Park et al. 2015	6	12	Anal pain (5), abscess (1), infection (1), fever (1), abdominal pain (1), diarrhea (1), numbness (1), erythema (1)
Guadalajara et al., 2012	24	11	Abscess (1), perianal sepsis (3)
de la Portilla et al., 2012	24	13	Abscess (4), pyrexia (4), anal fistula infection (1), anal pain (2)
Herreros et al., 2012	124	108	Proctalgia (80), abscess (41), pain (25), abscess (24), pyrexia (17), swelling (12), pruritis (12)
Ciccocioppo et al., 2011	12	0	NA

Supplemental Figure 1 Use the corrected coverage area index to quantify the degree of overlap among system evaluations.



Supplemental Figure 2 Individual and overall rating of each included review.

First author et al.	Year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Quality assessment
Dave, M.	2015	Y	PY	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	NM	Y	Low
Ye, Lei.	2016	Y	Y	Y	Y	Y	N	N	Y	N	N	NM	NM	N	N	NM	Y	Critically low
Cao, Y.	2017	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	N	N	Y	NM	Y	Critically low
Narang, S. K.	2017	Y	PY	Y	Y	N	Y	N	Y	Y	N	NM	N	N	N	NM	Y	Critically low
Qiu, Y.	2017	Y	PY	Y	Y	Y	Y		Y	Y	N	Y	N	Y	Y	Y	Y	Moderate
Lightner, A. L.	2018	Y	PY	Y	Y	Y	Y	N	Y	Y	N	Y	N	N	Y	NM	Y	Critically low
Lee, M. J.	2018	Y	PY	Y	Y	Y	Y		Y	Y	N	Y	Y	Y	Y	NM	Y	Low
Choi, S.	2019	Y	PY	Y	PY	Y	N	N	Y	Y	N	Y	N	N	N	Y	Y	Critically low
Cheng, F.	2019	Y	PY	Y	PY	N	Y	N	Y	Y	N	Y	N	Y	Y	NM	Y	Critically low
Ciccocioppo, R.	2019	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Low
Cheng, F.	2020	Y	PY	Y	PY	Y	Y	N	Y	Y	N	Y	N	Y	Y	NM	Y	Critically low
Cao, Y.	2021	Y	N	Y	PY	Y	Y	N	Y	Y	N	Y	Y	N	Y	NM	Y	Critically low
Ko, J. Z.	2021	Y	PY	Y	PY	N	N	N	Y	N	N	NM	NM	N	N	NM	Y	Critically low
Luo, Q.	2022	Y	N	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	Y	NM	Y	Critically low
El-Nakeep, S.	2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	High
Mardiyan, K. E.	2023	Y	PY	Y	Y	N	N	N	Y	Y	N	NM	N	N	N	NM	Y	Critically low
Wang, Y.	2023	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Critically low
Wang, H.	2023	Y	PY	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Low
Li, A.	2023	Y	PY	Y	PY	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Low
Cheng, F.	2023	Y	PY	Y	Y	Y	Y	N	Y	Y	N	Y	N	N	Y	NM	Y	Critically low

Cheng, F.	2023	Y	PY	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Low
Qiu, Y.	2024	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Low
Mazzaro, M. C.	2024	Y	Y	Y	Y	Y	Y	N	Y	N	N	Y	NM	N	N	Y	Y	Critically low
Vuyyuru, S. K.	2024	Y	PY	Y	Y	Y	Y	N	Y	Y	N	Y	N	N	Y	NM	Y	Critically low
Fousekis, F. S.	2024	Y	N	Y	Y	Y	Y	N	Y	N	N	NM	NM	N	N	NM	Y	Critically low
Adamska, P.	2024	Y	Y	Y	PY	Y	Y	N	Y	Y	N	NM	NM	N	N	NM	Y	Critically low
Xu, Y.	2024	Y	PY	Y	Y	N	Y	N	Y	Y	N	Y	N	N	Y	Y	Y	Critically low
Wang, T.	2024	Y	N	Y	Y	N	Y	N	Y	Y	N	Y	N	N	Y	Y	Y	Critically low
Serrano, F. V.	2024	Y	Y	Y	PY	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Low
Zou, M.	2025	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	NM	Y	Critically low
Emile, S. H.	2025	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Low
Cheng, F.	2025	Y	PY	Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Low
Elsamna, S. T.	2025	Y	PY	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	NM	Y	Critically low
Guillo, L.	2025	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Low
Taxonera, C.	2025	Y	PY	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Low

Legend

Y	**Yes**
PY	**Partial yes**
N	**No**
NM	**No meta-analysis**