Supplementary Table 1. ASPC heterogeneity across recent single-cell and single-nuclei studies stratified by adipose depot: SAT, VAT, and other depots

Study	Method	Sample (*n*)	ASPC clusters	Characteristics of ASPC clusters
SAT				
Merrick et al. (2019) [29]	sc	ov/ob (8)	3 PDGFRA$^+$, PDGFRB$^+$, SCA1$^+$	(1) IP: DPP4, CD55, PI16, WNT2 (2) CPA: ICAM1, PPARG, GGT5, APOE, VCAM1, DEPP1 (3) SMC-like: ACTA2, THY1, APOE
Vijay et al. (2020) [4]	sc	ob (16): T2DM (6), non-T2DM (10)	7 CD34$^+$	(SP1) less mature PreAd/ASC: MGP, APOD, CXCL14, WISP2 (SP2) more mature PreAd: APOE, FABP4, CEBPB, CD36 (SP3) less mature PreAd/ASC: MGP, APOD, CXCL14, WISP2 (SP4) Fibro: FBN1, PI16, IGFBP6, COL3A1, COL6A3, COL1A1 (SP5) Inflammatory/HSC: CCL5, CD3E, IL7R, IL32, PTPRC
Backdahl et al. (2021) [49]	STx	le (3) ov (2) ob (5)	4 PDGFRA$^+$	(C07) PreAd/ASC: DCN, CXCL14, APOD, MGP (C09) UMP/Fibro: DCN, PRG4, FBN1, TNXP, VCAN, DPP4, CD55, PI16, CREB5 (C11) MTX: MT2A, MT1A, SOD2, MT1X, ADIRF, FABP4 (C12) mix of C07/C09: DCN, COL1A1, COL1A2, CFD, THY1, PI16, CFH, MGP, LPL
Hildreth et al. (2021) [21]	sc	le (3) ob (3)	3 ITGB1$^+$, PDGFRA$^+$, PDGFRB$^+$	(1) APC: PI16, DKK1, PRG4, DPP4 (2) PreAd: CD34, ICAM1, CXCL14, GPC3, APOD (3) IP (DPP4$^+$ PreAd-subtype): CD34, ICAM1, CD26, DPP4
Emont et al. (2022) [3]	sc, sn	sc: le (3), ov (4), ob (2) sn: le (2), ov (2), ob (9)	6 PDGFRA$^+$	(hASPC1): CEBPD, CXCL14, APOD, CXCL12, GPC3 (hASPC2) ASC: ALDH1A3, PRG4, FBN1, PI16, CD55, DPP4, COL1A1 (hASPC3): FGF10, C7, FMO2, PRKG11, ABCA10 (hASPC4) Areg: EPHA3, F3, KCNIP1, PTCH2, FLRT2, SLIT2 (hASPC5): SGCZ, PDZRN4, PIEZO2, NOX4, TWIST1 (hASPC6): PDE4D, CLIC5, GLI3, WT1
Martinez-Colon et al. (2022) [22]	sc	ob (3)	11 CD34$^+$	(C0) PreAd: IL11, PTGS2 (C3) PreAd: MMP3, MMP1 (C4, P15)[a] PreAd/Inflammatory: COL3A1, DCN, IGF1, ISG15, COL1A2, COL6A3 (C5) PreAd: HIST1H4C, HIST1H1A (C7) PreAd: PTX3, ADM (C10) PreAd: SNHG15, IL1R1 (C11) PreAd: UBE2C, TOP2A (C13) PreAd: HSPA6, HSPA1A (C14) PreAd: NEAT1, MTRNR2L8(C15) PreAd: CCL20, PTGS2 (C16, P9) PreAd/ASC: MGP, CFD, CXCL14, APOD
Liu et al. (2022) [28]	sc	ly (5): ov (5) Non-ly (4): le (2), ov (2)	4 PDGFRA$^+$, DCN$^+$, CD34$^+$, CD105$^+$, CD73$^+$, THY1$^+$, CD59$^+$, CD44$^+$, ITGB1$^+$, CSF1$^+$	(c0) CPA: GGT5, CXCL14, APOD, APOE, MGP, WISP2, C7, (c1) transient IP>CPA state: CD9, MMP2, POSTN, WISP2, COL14A1, CTHRC1, DPP4 (c3) IP: DPP4, CD55, PRG4, FBN1, LOXL1, EFHD1, CLEC3B (c5) MTX/stress-responsive: CHI3L1, HLA-DRA, HLA-DRB1, HLA-DRB5, MT1X, MT2A, MT1E, MT1G, MT1M, MT1A
Whytock et al. (2022) [54]	sc, sn[b] full-length (SMARTseq)	ov (1) ob (1)	5 (sc), 4 (sn) No general marker Stem (sc: 3, sn: 1) CD34$^+$, PDGFRA$^+$, PDGFRB$^+$ PreAd (sc: 2, sn: 3) ATXN1$^+$, ZNF423$^+$, CD38$^+$	sc (Stem 1): DCN, PDGFRA, CXCL14, FBN1, APOD, FMO1 (Stem 2): DCN, PDGFRA, PDGFRB, CD34, THY1, CFD, PRG4, COL1A1 (Stem 3): PDGFRB, ABCA10, CXCL14, FBLN1, APOD, MGP, MMP2, COL6A3 (PreAd 1): ATXN1, ZNF423RBFOX1, DZX4, CSMD1 (PreAd 2): CD38, DLK1, DGAT2, GPT2, PLCH2 sn (Stem) PDGFRA, CD34, DCN, COL1A1, COL1A2, CXCL14 (PreAd 1) ZNF423, HDC, HPGD, BTK (PreAd 2) ATXN1, ZNF274, lncRNA562, SLC16A5 (PreAd 3) CD38, FAM13C, HBA2, PDE9A

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Supplementary Table 1. Continued

Study	Method	Sample (*n*)	ASPC clusters	Characteristics of ASPC clusters
Gu et al. (2023) [16]	sc	(1)Σ13	12 No general marker Fibro (1)$^{+}$ASC (3) ENG^{+}, MME^{+}, FAP^{+} PreAd (8) APOD^{+}, CXCL14^{+}, MGP^{+}	(1) Fibro: TXNIP (2) ASC: SDC1 (3) ASC: APOD (4) ASC: IGFBP5 (5) PreAd: APOE (6) PreAd: DEPP1 (7) PreAd: PDGFRL (8) PreAd: DSP (9) PreAd: TPPP3 (10) PreAd: TK1 (11) PreAd: CIAO2A (12) PreAd: RAI14
Massier et al. (2023) [34]	sc, sn, STx	le (3) ov (1) ob (9) Σ83	17 CD34^{+}, PDGFRA^{+}, PDGFRB^{+}	(sfC0) CPA: APOD, CXCL14, CFD (sfC01) FAP: NEGR1, EBF1, ABCA10 (sfC02) APC: PI16, CD55, COL1A1, COL1A2 (sfC03) CD34^{-} FAP: CALN1. COL19A1, DLGAP1 (sfC04) FAP: APOD, CXCL14, TXNIP (sfC05) FAP/MTX: MT2A, MT1X, TIMP1 (sfC06) FAP: SEMA3C, ROBO2, EBF1 (sfC07) FAP: COL3A1, COL1A1, COL1A2 (sfC08) FAP: TPT1, MGP, APOD (sfC09) FAP: ABCA8, ABCA9, ABCA10, RORA (sfC10) FAP: FBN1, EBF2, ADAMTSL1 (sfC11) MSL: ITLN1, MSLN, EZR (sfC12) FAP: ABCA10, SLIT2, LAMA2 (sfC13) FAP: CD74, HLA-DRA, FABP4 (sfC14) FAP: PTPRG, COL4A1, COL4A2 (sfC15) FAP: SLC4A7, ACSL4 (sfC16) late CPA: PLIN1, PDE3B, PPARG
Divoux et al. (2024) [25]	sc	ov/ob (8) ABD-/GF-SAT, apple- vs. pear-shaped women	6 DCN^{+}, PDGFRA^{+}, PDGFRB^{+}	(CPA 1) ZNF423, CD38, DLK1, PPARG, LOX, MFAP5 (CPA 2) ZNF423, CD38, MFAP5 (MSC 1) VIM, PDGFRB (MSC 2) DPP4, CD55, CD44, THY1, POSTN, VIM (MSC 3) DPP4, THY1, LUM (SMC-like) ITGA5, CD55, CD44, THY1, MYL9, ACTA2
Ferrero et al. (2024) [20]	sc	ob (3)	6 TM4SF1^{-}, Lin^{-} (CD45, PECAM1)	(1) ASC: DPP4, CD55, PI16, PRG4, LY6A, CD24 (2) PreAd: ICAM1, PPARG, PDGFRA, FABP4, APOC, APOD (3) HHIP^{+}/Areg^{c}: IGFBP7, NOV, ALDH1A1, EPHA3, APOD, SLIT2, MGP, F3 (4) IFIT^{+}: ISG15, IFI6, IFI27, MX1, MX2 (5) SFRP4^{+}: SFRP2, CTHRC1, COL14A1, WSP2, MGP (6) RBP5^{+}: COL3A1, COL6A1, COL6A3, APOE
Ruoss et al. (2024) [52]	sc	le (4) ov (4) ob (3)	11 No general marker Prefibrocytes (3) MSR1, ITGAX, FBP1, SPP1 Fibro(7) DCN^{+}, CFD^{+}, PDGFRA^{+} Early PreAds (1) PLIN1^{+}, CIDEA^{+}, CIDEC^{+}, ADIPOQ^{+}	(1) Prefibrocytes (early): RGS5, APOLD1, RBP7, CD52, MSR1, KDR, CDH5, ITGA6 (2) Prefibrocytes (late): TNXB, CFD, MGP, COL6A2, CD55, LRP1, CD44, CD74, IL7R (3) early Fibro/Fibrocytes: CD34, PTPRC, CD14, CD68, CD163 (4, P1) Fibro: CXCL14, APOD, APOE, CXCL12, SLC15A3, VCAM1, CD36 (5, P2) Fibro: CILP, ITGA11, ANGPTL2, PLA2Ga, KLF6 (6, P3) C1QTNF3^{+}-Fibro/UMP: PRG4, CD55, DPP4, FBN1, SFRP4, SEMA3C, CD70 (7, P4) Fibro/IPA/MTX: ICAM1, PDGFRB, CD36, CCL2, POSTN, MT1X, MT2A (8, P5) hedgehog-Fibro: HHIP, PTCH2, IGFBP7, BGN, NRP1, F3 (9, P6) COL8A1^{+}-Fibro: COMP, PCSK5, MGP, SFRP2, F3 (10, P7) dendritic-like Fibro: CD74, C1QA, HLA-DRA, CCL3, CD36, MRC1 (11) early PreAd: PLIN1, ADIPOQ, PLIN4, RBP4, SAA1, G0S2, CD36, MCAM

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Supplementary Table 1. Continued

Study	Method	Sample (*n*)	ASPC clusters	Characteristics of ASPC clusters
Whytock et al. (2024) [24]	sn full-length (SMARTseq)	20–30 years: le (4); ov (3), ob (3) 65–89 years: le (1), ov (5), ob (5)	2 No general marker	(Stem): PDGFRA, DCN, C3, LUM, APOD, CXCL14, MGP, COL1A1 COL1A2, COL3A1, COL6A3 (PreAd): ZNF423, RBFOX1, PTPRD, CTNNA2, NRXN3, CNTNAP2
Lazarescu et al. (2025) [46]	sn	ob (5)	5 PDGFRA^{+} (except for cluster 4)	(1) ASC: DPP4, CD55 (2) CPA: PPARG (3) DPP4, CD55, CD9, THY1, ITGB1, CD55 (4) PDE4D (5) ALDH1A3, CD55
Loft et al. (2026) [53]	sn	ob (14)[d]	4 PDGFRA^{+}, DCN^{+}	(1) UMP/IP: DPP4, SEMA3C, FBN1 (2) committed ASPCs: CXCL14, CFD, C3 (3) PreAd: PPARG, ACACB, CD36, SEMA3A (4) Areg: EPHA3, F3, MEOX2, IGFBP7
Miranda et al. (2025) [32]	sn, STx	le (24) ob (25)[e]	5 No general marker	(APC1/ASC) UMP: DCN, DPP4, CD55, ITGA11 (APC2) CPA: PPARG, GPC3, COL15A1 (APC3) CPA (stressed): PDGFRA, PPARG, GPC3, JUN, FOSB (APC4) Areg[f]: PDGFRA, KCNIP1, F3, EPHA3, GPC3 (APC5) Profibrotic: PDGFRA, PPARG, ADAM12, POSTN, VCAN, HIF1A
Reinisch et al. (2025) [23]	sn	ob (77): MHO (32), MUO (45)	4 PDGFRA^{+}, LAMA2^{+}	(1) UMP[g]: PI16, DPP4, CD55, CD34, MFAP5 (2) Areg[g]: EPHA3, SEMA5A, BOC, F3 (3) CPA1: FMO2, CD36, PPARG, LMO3, BOC (4) CPA2: ICAM1, LDLR, MEDAG, CTSL
VAT				
Vijay et al. (2020) [4]	sc	ob (16) subtypes: T2DM (6), non-T2DM (10)	6 CD34^{+} (VP1-3) MSLN^{+}, WT1^{+}, UPK3B^{+} (VP4-6) CFD^{+}	(VP1): UCP1, PLA2G2A, SLPI, MT-ND5, PRG4 (VP2): SLPI, RPS26, TPM2 (VP3): SOD2, CCL2, NAMPT, KRT8, KRT18, MT1A, MT2A, PRG4 (VP4) less mature PreAd/ASC: MGP, APOD, CXCL14, GPX3, EIF1, MT1A (VP5) Fibro: MFAP5, S100A4 (VP6) Inflammatory/HSC: TYROBP, HLA-DRA, CD74
Emont et al. (2022) [3]	sn	le (2) ov (1) ob (7)	6 PDGFRA^{+}	(hASPC1): CEBPD, CXCL14, APOD, CXCL12, GPC3 (hASPC2) ASC: ALDH1A3, PRG4, FBN1, PI16, CD55, DPP4, COL1A1 (hASPC3): FGF10, C7, FMO2, PRKG11, ABCA10 (hASPC4) Areg: EPHA3, F3, KCNIP1, PTCH2, FLRT2, SLIT2 (hASPC5): SGCZ, PDZRN4, PIEZO2, NOX4, TWIST1 (hASPC6): PDE4D, CLIC5, GLI3, WT1
Martinez-Colon et al. (2022) [22]	sc	ob (3)	13 CD34^{+}	(C0) PreAd: IL11, PTGS2 (C1, P1/4)[a]: PreAd/MSL: KRT18, ALDH1A3, MSLN (C3): PreAd: MMP3, MMP1 (C4) PreAd: COL3A1, DCN, KRT18, MSLN (C5) PreAd: HIST1H4C, HIST1H1A (C7) PreAd: PTX3, ADM (C9, P1/4)[a] PreAd/MSL: SLPI, KRT8 (C10) PreAd: SNHG15, IL1R1 (C13) PreAd: HSPA6, HSPA1A (C14) PreAd: NEAT1, MTRNR2L8 (C15) PreAd: CCL20, PTGS2 (C16, P9)[a] PreAd/ASC: MGP, CFD, CXCL14, APOD (C22, P1/4)[a] PreAd/MSL: SLPI, KRT8

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Supplementary Table 1. Continued

Study	Method	Sample (*n*)	ASPC clusters	Characteristics of ASPC clusters
Garritson et al. (2023) [35]	sc	le (4) ob (5)	4 (8)[h] PDGFRA$^+$	(FAP1) PreAd: FMO2, IGFBP3, PTGDS, CXCL12, CXCL14, APOD, TXNIP (FAP2) Inflammatory/stress-responsive: MT1A, CCL2, NAMPT, THBS1, MT1X, PTX3, SOD2, MT1M, CXCL2, NNMT, MT2A (FAP3) UMP/stem-like: SEMA3C, SLPI, MFAP5, PI16, CD55, PRG4, IFI27, FBN1, PLA2G2A, VCAN, HTRA3 (FAP4) Fibro-progenitor/Areg: SFRP4, CD9, COL14A1, CTHRC1, THY1, IGFBP2, COL1A1, WISP2, APOE Higher-resolution subclustering analysis[h]: (0) CPA: APOD, CXCL14 (1) UMP[i]: PI16[n], SEMA3C[n], OSR2[n], CD55, PRG4 (2) Areg[j]: THY1, CTHRC1 (3) immune cell-like: PTX3, CCL2, MT1A, MT1X (4) committed APC: ICAM1[n], CEBPB[n] (5) CPA: APOD, CXCL14 (6) Profibrotic/Fibro-progenitors: VCAN[n], MFAP5[n], HTRA3[n] (7) immune cell-like: PTX3, CCL2, MT1A, MT1X
Gu et al. (2023) [16]	sc	(1)Σ12	8 No general marker Fibro (1)$^+$ASC (1) ENG$^+$, MME$^+$, FAP$^+$ PreAd (6) APOD$^+$, CXCL14$^+$, MGP$^+$	(1) Fibro: TXNIP (2) ASC: APOD (3) PreAd: ITLN1 (4) PreAd: DSP (5) PreAd: TK1 (6) PreAd: CIAO2A (7) PreAd: RAI14 (8) PreAd: PTGDS
Massier et al. (2023) [34]	sc, sn, STx	ob (5)Σ83	15 CD34$^+$, PDGFRA$^+$, PDGFRB$^+$	(ofC0) FAP: ADIRF, TMSB4X, TPT1 (ofC01) FAP: KRT18, MT2A, TIMP1 (ofC02) CPA: APOD, CFD (ofC03) MSL: DPP4, EZR, PLCB1 (ofC04) FAP: CLIC4, CUX1, SAMD4A (ofC05) FAP: NEGR1, ABCA10, ABCA9 (ofC06) MSL: DPP4, EZR, ERBB4 (ofC07) APC: CD55, PI16 (ofC08) FAP: CRISPLD2, ZNF331 (ofC09) FAP: NOVA1, EBF1, FBN1 (ofC10) FAP: CD74, FTL, FTH1 (ofC11) MSL: DPP4, LRP2 (ofC12) MSL: PKHD1L1, ZBTB16 (ofC13) PDGFRB$^-$ FAP: CNTNAP2, CSMD1 (ofC14) FAP: LAMA2, FKBP5, PTPRG
Ferrero et al. (2024) [20]	sc	ob (3)	7 TM4SF1$^-$, Lin$^-$ (CD45, PECAM1) (IGFBP2$^+$: TM4SF1$^+$)	(1) ASC: DPP4, CD55, PI16, PRG4, LY6A, CD24 (2) PreAd: ICAM1, PPARG, PDGFRA, FABP4, APOC, APOD (3) HHIP$^+$/Areg[c]: IGFBP7, NOV, ALDH1A1, EPHA3, APOD, SLIT2, MGP, F3 (4) IFIT$^+$: ISG15, IFI6, IFI27, MX1, MX2 (5) SFRP4$^+$: SFRP2, CTHRC1, COL14A1, WSP2, MGP (6) RBP5$^+$: COL3A1, COL6A1, COL6A3, APOE (7) IGFBP2^{+c}: G0S2, C7, RBP1
Wang et al. (2024) [51]	sc	le (2) ob (6): non-T2DM (3), T2DM (3)	4 PDGFRA$^+$, APOD$^+$, CD34$^+$, THY1$^+$	(1) UMP: CD55, PI16, SLPI, SEMA3C (2) CD9, COL14A1, RARRES1, SFRP4 (3) CPA: ICAM1, NABP1, ABHD5, ATF3 (4) Areg: F3, SVEP1, ABCA8, CXCL12
Lazarescu et al. (2025) [46]	sn	le (1) ov (1) ob (7) NA (1)	4 PDGFRA$^+$	(1) CD55, ALDH1A3 (2) PPARG, F3 (3) ITGB1, THY1, F3 (4) PDE4D, ALDH1A3, WT1

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Supplementary Table 1. Continued

Study	Method	Sample (*n*)	ASPC clusters	Characteristics of ASPC clusters
Reinisch et al. (2025) [23]	sn	MHO (32) MUO (45)	5 PDGFRA^{+}, LAMA2^{+}	(1) UMP^{g}: PI16, DPP4, CD55, CD34, MFAP5 FAPs (2) Areg1^{g}: EPHA3, CD36, BOC, F3 (3) Areg2^{g}: EPHA3, ZNF804B, CCL12, IL15, SEMA5A (4) CPA1: FMO2, BOC, F3 (5) CPA2: ICAM1, LDLR, MEDAG, CTSL
Other depots				
Ha et al. (2020) [48]	sc	CD (11) UC (13) Creeping fat, mesenteric AT	5 No general marker	(P1) SFRP2, MGP, DCN, WISP2, COL1A1, COL3A1, COL6A3 (P2) CD34, FABP4, PPARG, SEMA3C, POSTN, FBN1 (P3) FABP4, CFD, PLA2G2A, CXCL12, GPC3, GPX3, PDGFRA, APOD (P4) ICAM1, DEPP1, FMO2, SVEP1, APOD (P5) TPX2, BIRC5, TOP2A, TYMS
Angueira et al. (2021) [17]	sn	le (1) ov (1) ob (1) Aortic PVAT	5 Lin^{-} (CD45, PECAM1, CD235a)	(1) Fibro/Progenitor: PDGFRA, CD55, PI16, MFAP5, LY6A (2) Intermediate/Transitional: F3, CD200, PPARG, PDGFRA (3) PreAd-1: PPARG, PDGFRA, COL15A1 (4) PreAd-2: PPARG, PDGFRA, COL4A4, FOSB (5) SMC-like: PPARG, PDGFRB, SEMA5A, TRPC6, NOTCH3, MCAM
Gu et al. (2023) [16]	sc	(1)∑3 Subcutaneous leg AT^{k}	20 no general marker Fibro (6)$^{+}$ASC (10) ENG^{+}, MME^{+}, FAP^{+} PreAd (4) APOD^{+}, CXCL14^{+}, MGP^{+}	(1) Fibro: BIRC5 (2) Fibro: FBXO32 (3) Fibro: TK1 (4) Fibro: TXNIP (5) Fibro: LSP1 (6) Fibro: OSMR (7) ASC: SDC1 (8) ASC: PAPPA (9) ASC: APOD (10) ASC: TOP2A (11) ASC: ACAN (12) ASC: CFD (13) ASC: G0S2 (14) ASC: IGFBP5 (15) ASC: H19 (16) ASC: KRT19 (17) PreAd: CIAO2A (18) PreAd: DSP (19) PreAd: DEPP1 (20) PreAd: APOE
Kumar et al. (2023) [56]	sc	le (16) ov (33) ob (71) un (1) NA (5)^{l} Breast AT	4 GLI2^{+}, HMGA2^{+}, WISP2^{+}, PLAGL^{+}	(1) Fibro-major: MMP3, CXCL1, CXCL2, CXCL3, CEBPB, THS1 (2) Fibro-matrix: COL1A1, COL3A1, COL15A1, POSTN, IGF1, TNC (3) Fibro-prematrix: GPX3, WISP2, CXCL14, CFD, FOS, PLA-2G2A, C3, TXNIP (4) Fibro-SFRP4: SFRP4, MGP, G0S2, OGN, ADIRF, CD9, PRG4, COL14A1
Massier et al. (2023) [34]	sc, sn, STx	(0)∑3 PVAT	8 CD34^{+}, PDGFRA^{+}, PDGFRB^{+}	(pfC0) APC: CD55, PI16, PKHD1L1, EZR, ARHGAP44 (pfC01) FAP: FBLN1, KCND2, ABCA10, FBN1, COL6A3, COL15A1 (pfC02) FAP: PDE3B, ARL17B, C7, COL15A1, FMO2, CD36 (pfC03) CPA: APOD, CFD, KRT19, PRG4, TM4SF1, ABCA10, EZR (pfC04) FAP: SEMA3A, PLEKHG2, NAMPT, ABCA10, LAMA2, FOSB, FBLN1 (pfC05) FAP: SDK1, KCNB2, CNTN4, FBN1, COL5A1 (pfC06) FAP: CD55, FHOD3, MFAP5, FBN1, HN1, COL12A1, VCAN (pfC07) FAP: CEMIP, VEGFC, ADAMTS9, SEMA5A, RBFOX1, JUN, SVEP1

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Supplementary Table 1. Continued

Study	Method	Sample (*n*)	ASPC clusters	Characteristics of ASPC clusters
Wu et al. (2023) [50]	sc	ob (1) ov (1) CD (9) Mesenteric AT	3 PDGFRA^{+}, THY1^{+}	(1) MSC1: DPP4, BMP8B (2) MSC2: F3, SFRP4 (3) MSC3: APOE, ICAM1, PPARG, FABP4
Ferrero et al. (2024) [20]	sc	ob (1) Mesocolic AT le (2) ov (1) Perirenal AT	7 TM4SF1^{-}, Lin^{-} (CD45, PECAM1)	for both, mesocolic and perirenal AT: (1) ASC: DPP4, CD55, PI16, PRG4, LY6A, CD24 (2) PreAd: ICAM1, PPARG, PDGFRA, FABP4, APOC, APOD (3) HHIP^{+}/Areg^{c}: IGFBP7, NOV, ALDH1A1, EPHA3, APOD, SLIT2, MGP, F3 (4) IFIT^{+}: ISG15, IFI6, IFI27, MX1, MX2 (5) SFRP4^{+}: SFRP2, CTHRC1, COL14A1, WSP2, MGP (6) RBP5^{+}: COL3A1, COL6A1, COL6A3, APOE (7) FMO2^{+m}: LMO3, MT-RNR1, MT-RNR2, ABCA6
Peters et al. (2025) [47]	sn	Non-OA (6) OA (15): le (7), ob (8) Infrapatellar fat pat (IFP)	5 PDGFRA^{+} (reduced in cluster 4)	(0) DPP4, PI16, CD34, FBN1, CD26, PIEZO2 (1) COL15A1, APOD, ABCA10, CD34, CD10 (2) CRTAC1, HLA-C, PRG4, FN1, SEMA3A (3) FABP4, ITGB8, ITGBL1, F13A1 (4) ENAH, MGAT4C, DCN, IGF1, COL14A1

Identified ASPC subclusters are listed according to the given names in the study, although our nomenclature suggests different names, revise foot notes for specific comments. Meta analysis are denoted as '(x)Σy,' where x represents the number of newly included patients in the study, and y indicates the number of previously published datasets incorporated into the analyses. Alternative gene names: ITGAX (CD11c), DPP4 (CD26), ITGB1 (CD29), ITGA6 (CD49f), ICAM1 (CD54), THY1 (CD90), LRP1 (CD91), VCAM1 (CD106), IL7R (CD127), PDGFRB (CD140b), F3 (CD142), CDH5 (CD144), MSR1 (CD204), NRP1 (CD304), KDR (CD309).

ASPC, adipose stromal and progenitor cell; SAT, subcutaneous adipose tissue; VAT, visceral adipose tissue; sc, single-cell RNA-sequencing; ov/ob, overweight or obese (body mass index [BMI] ≥25); IP, interstitial progenitor; CPA, committed preadipocyte; SMC, smooth muscle cell; ob, obese (BMI ≥30); T2DM, type 2 diabetes mellitus; SP, SAT progenitors (as defined in the referenced publication, Vijay et al.); Fibro, fibroblast-like; PreAd, pre-mature adipocyte; ASC, adipose stem cell; STx, spatial transcriptomic; le, lean (18.5≤ BMI <25); ov, overweight (25≤ BMI <30); UMP, uncommitted, multipotent progenitor cell; APC, adipose precursor cell; sn, single-nuclei RNA-sequencing; ly, stage III lymphedema; FAP, fibro-adipogenic progenitor; SMARTseq, Switching Mechanism At the 5′ end of the RNA Transcript sequencing; ABD, abdominal SAT; GF, gluteofemoral SAT; MSC/MSL, mesothelial cell; Lin, lineage (i.e., CD45^{-}, PECAM1^{-} cells=non-immune, non-endothelial); MHO, metabolically healthy obesity; MUO, metabolically unhealthy obesity; VP, VAT progenitor, as defined by the referenced publication (Vijay et al.); NA, unknown BMI or health status; CD, Crohn's disease; UC, ulcerative colitis; AT, adipose tissue; PVAT, perivascular adipose tissue; un, underweight (BMI <18.5); OA, osteoarthritis.

[a]Clusters 'C0–C22' were identified in the first annotation (Fig. 4A). Assigned cell types were used from Fig. 6 onwards (i.e., 'Adipose progenitors' as 'P0–P16'), but, to our understanding, no clear assignment was demonstrated. We assumed the matching C- and P-cluster according to the identified markers in the text and the dataset (Supplementary Data file S2) and the depot-specific abundances of C0-C22 (Supplementary Fig. S9D). The authors claim, that, i.e., P15 (Inflammatory ASPC) reacted to severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection in SAT.

[b]Whytock et al. [54] compared single-cell RNA-sequencing (scRNAseq) and single-nuclei RNA-sequencing (snRNAseq) and defined different clusters with both methods. ASPCs were divided into 'Stem and Pre-Ad' clusters, which had specific marker genes being differentially expressed in the subclusters, as shown in Figs. 1B (sn) and 3B (sc). Further, no general marker for ASPCs has been utilized.

[c]The authors discussed, whether the previously described Areg cluster is covered by either (3) HHIP^{+} or (7) IGFBP2^{+}. As the IGFBP2 population was only found in VAT and HHIP^{+} cells show a similar transcriptional pattern like the described EPHA3^{+} cluster [3], Aregs are associated with the HHIP^{+} subpopulation.

[d]Patients were enrolled for a bariatric surgery to the ATLAS study. Abdominal SAT biopsies were sampled after lifestyle-induced weight loss (WL) (5%–10%) and subsequent bariatric surgery-induced WL (20%–45%).

[e]This study included ob-samples before and after WL.

[f]The authors declared this cluster as 'adipogenesis-regulatory cells,' following our nomenclature, we name this subset Areg.

[g]The authors named clusters differently from our understanding of ASPC heterogeneity. Cluster (1) was names 'FAP,' but the characteristic marker genes most likely refer to UMP. Cluster (2) was termed 'anti-adipogenic progenitor' and corresponds to the Areg cluster.

[h]First, four FAP-clusters were identified based on scRNAseq to define the whole WAT heterogeneity. Subclustering analysis revealed eight distinct clusters, but DEGs were not displayed in the supplementary material. According to previous results, we assumed the association between both subclusters and assigned the eight subcluster to FAP1–4: FAP1–cluster (0), (4), (5); FAP2–cluster (3), (7); FAP3–cluster (1); FAP4–cluster (2), (6).

[i]The authors declared this cluster as 'uncommitted adipose progenitors,' following our nomenclature, we name this subset UMP.

[j]The authors declared this cluster as 'stem cell population enriched in adipogenic inhibitors,' following our nomenclature, we name this subset Areg.

[k]The authors analysed samples from SAT, VAT and subcutaneous leg AT. Although subcutaneous leg AT is typically classified as a regional subtype of SAT, the authors identified specific clusters and marker genes in subcutaneous leg AT and therefore treated it as a distinct depot throughout their analyses. Consequently, we decided to maintain this separation.

[l]Sample numbers (total *n*=126) were calculated according to Supplementary Tables 1 and 2.

[m]Specific cluster for mesocolic and perirenal AT, not observed in SAT or VAT

[n]Genes were mentioned in the study to define the eight clusters.