

Supplementary Information

Meta-Analysis of Gene Expression Reveals the Core Transcriptomic

Profile of Lesional Scalp in Alopecia Areata

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SUPPLEMENTARY METHODS

Data Extraction

Raw gene expression data hosted in GEO or ArrayExpress were obtained (**Fig. 1**). Whenever possible, metadata for each gene set and sample were aggregated into an Excel spreadsheet for subsequent analysis. These included: a) Geneset Id; b) Disease; c) Organismo; d) Design; e) Dugss; f) Summary; g) Source; h) Analysis; i) Platform; j) Cases vs controls.

SUPPLEMENTARY RESULTS

Characteristics of Included Studies

A total of five microarray datasets deposited in the NCBI GEO database between 2014 and 2017 that were derived from skin scalp tissue RNA from various cohorts and interventional studies were identified, for a total of 82 samples from patients with AA and 30 samples from non-AA controls.

The GSE68801 observational study by Jabbari A *et al.* (2015) analyzed gene expression across a diverse cohort, including 22 patients with plaque-type AA, 6 patients with transient plaque-type AA (lasting less than one year), 23 patients with universal AA, 9 patients with total AA, and 36 healthy controls.¹ The findings revealed 964 unique upregulated and 741 downregulated genes.

GSE45512 by Xing L *et al.* (2014) study analyzed gene expression in five AA patients and five healthy controls.² To evaluate the efficacy of JAK inhibitors in AA, patients with moderate to severe disease received oral ruxolitinib at a dose of 20 mg twice daily. Participants had to have experienced more than 30% hair loss for at least three months with no regrowth at enrollment. They found 1,472 unique upregulated genes and 733 unique downregulated genes were identified.

Twelve patients were recruited for GSE80342 (Mackay-Wiggan J *et al.*, 2016) study assessing the effects of ruxolitinib, with scalp biopsies taken at baseline and twelve weeks after starting a 20 mg BID ruxolitinib regimen.³ Additional biopsies were collected before the twelve-week mark in some cases. For comparison, biopsies from three healthy control subjects were included. Transcriptomic analysis of basal responders versus controls identified 361 up-regulated genes and 362 down-regulated genes, respectively.

In GSE58573 study, Xing L *et al.* (2014) involved two AA patients who underwent skin biopsies of the affected scalp before starting oral ruxolitinib treatment and again 12 weeks

after treatment initiation.² Scalp biopsies from three individuals without AA served as controls. RNA was extracted, and cDNA libraries were profiled on Affymetrix microarray chips. The manuscript did not provide a complete list of differentially expressed genes. Using GEO2R and the R limma package, no significant differentially expressed genes (DEGs) were identified between AA basal samples (n=2) and controls (n=3), likely due to the small sample size. Nonetheless, the dataset was included in the final meta-analysis.

GSE74761 study by Guttman-Yassky E *et al.* (2017) examined three baseline AA samples from an intervention study using ustekinumab.⁴ Hair regrowth was assessed in three AA patients 20 weeks after initiating treatment, which included three subcutaneous doses of 90 mg ustekinumab administered at weeks 0, 4, and 16. Skin biopsies were collected from both lesional and non-lesional scalp areas (when available) at the beginning of the study (week 0) and at week 20. Additionally, biopsies were obtained from three healthy controls for comparison. Transcriptomic analysis of basal AA versus controls identified 1,550 up-regulated genes and 1,491 down-regulated genes.

Characteristics of Excluded Studies

Datasets were excluded for the following reasons: androgenetic alopecia (GSE90594, GSE106780, GSE78722, GSE84839), cicatricial alopecia (GSE59131, GSE58934, GSE113052, GSE125733, GSE101620, GSE81071, GSE11905), or experimental alopecia models (E-MTAB-837, E-MTAB-9472, E-MTAB-9471). GSE93978 analyzed miRNA levels in blood samples of AA patients (**Table S1**).

From studies meeting all inclusion criteria, three studies were ultimately excluded (**Table S1**). Study GSE111061 analyzed gene expression of lesional scalp skin samples in AA at baseline (t0) and after treatment with tofacitinib.⁵ It was excluded because the analysis was conducted using RNAseq instead of microarrays and because healthy controls were not

included in the study. Study GSE148346 analyzed gene expression of baseline (t0) samples and after intervention with ritilecitinib and brepocitinib in a randomized controlled trial.⁶ It was excluded for not including healthy controls in the design. Finally, study GSE80688 analyzed gene expression of baseline (t0) samples and after intervention with tofacitinib.⁷ It was excluded due to the lack of healthy controls and the use of RNAseq instead of microarrays.

REFERENCES

1. Jabbari A, Cerise JE, Chen JC, *et al.* Molecular signatures define alopecia areata subtypes and transcriptional biomarkers. *EBioMedicine* 2016;**7**:240–7. doi:10.1016/j.ebiom.2016.03.036
2. Xing L, Dai Z, Jabbari A, *et al.* Alopecia areata is driven by cytotoxic T lymphocytes and is reversed by JAK inhibition. *Nat Med* 2014;**20**:1043–9. doi:10.1038/nm.3645
3. Mackay-Wiggan J, Jabbari A, Nguyen N, *et al.* Oral ruxolitinib induces hair regrowth in patients with moderate-to-severe alopecia areata. *JCI Insight* 2016;**1**. doi:10.1172/jci.insight.89790
4. Guttman-Yassky E, Ungar B, Noda S, *et al.* Extensive alopecia areata is reversed by IL-12/IL-23p40 cytokine antagonism. *Journal of Allergy and Clinical Immunology* 2016;**137**:301–4. doi:10.1016/j.jaci.2015.11.001
5. Jabbari A, Sansaricq F, Cerise J, *et al.* An Open-Label Pilot Study to Evaluate the Efficacy of Tofacitinib in Moderate to Severe Patch-Type Alopecia Areata, Totalis, and Universalis. *Journal of Investigative Dermatology* 2018;**138**:1539–45. doi:10.1016/j.jid.2018.01.032
6. Guttman-Yassky E, Pavel AB, Diaz A, *et al.* Ritlecitinib and brepocitinib demonstrate significant improvement in scalp alopecia areata biomarkers. *Journal of Allergy and Clinical Immunology* 2022;**149**:1318–28. doi:10.1016/j.jaci.2021.10.036
7. Crispin MK, Ko JM, Craiglow BG, *et al.* Safety and efficacy of the JAK inhibitor tofacitinib citrate in patients with alopecia areata. *JCI Insight* 2016;**1**. doi:10.1172/jci.insight.89776

SUPPLEMENTARY INFORMATION

Supplementary tables

Table S1. Main Characteristics of Excluded Studies and Reasons for Exclusion.

GEO series accession number	Disease	Organism	Design	Drugs	Summary	Institution	PMID (publication year)	Source	Analyses	Platform	Disease vs controls samples	Reasons of exclusion
GSE93978	AA	Human	Observational	-	The miRNA expression characteristics in alopecia areata	Huashan hospital, Shanghai, China.	PMID: 30983035 (2019)	Blood	Micro RNA array	Agilent-070156 Human miRNA	AA (n=5) vs controls (n=5)	Blood micro RNA levels
GSE148346	AA	Human	Drug intervention	Ritlecitinib and brepocitinib	Molecular responses to PF-06651600 and PF-0670084 versus placebo in nonlesional and lesional scalp biopsies of biopsy samples from patients with AA.	Icahn School of Medicine at Mount Sinai, NY, USA	PMID: 34863853 (2022)	Scalp	mRNA array	[HG-U133_Plus_2] Affymetrix Human Genome U133 Plus 2.0 Array	AA: PF-06651600 (n=18), PF-06700841 (n=16)	No healthy controls

GEO series accession number	Disease	Organism	Design	Drugs	Summary	Institution	PMID (publication year)	Source	Analyses	Platform	Disease vs controls samples	Reasons of exclusion
GSE80688	AA	Human	Drug intervention	Tofacitinib	Safety and Efficacy of the JAK Inhibitor Tofacitinib Citrate for Alopecia Areata and Variants	Stanford University, Stanford, USA	PMID: 27699252 (2016)	Scalp	RNA-Seq	Illumina HiSeq 2000 (Homo sapiens)	Pre (n=23); Post (n=23)	No healthy controls
GSE111061	AA	Human	Drug intervention	Tofacitinib	An Open-Label Pilot Study to Evaluate the Efficacy of Tofacitinib in Moderate to Severe Patch Type Alopecia Areata, Totalis and Universalis	Columbia University, NY, USA	PMID: 29452121 (2019)	Scalp	RNA-Seq	Illumina HiSeq 2500 (Homo sapiens)	AA (n=3); controls (n=3)	RNA-Seq

Table S2. Shared DEG between independent data sets and MA DEG list.

MA	All_Independent_datasets	G_X_M	G_J_M	G_X_J	X_J_M
CCL13	CCL13	STK32A	CCL18	CCL13	CXCL9
CD1C	CD8A	GLYATL2	CCL13	CD8A	CXCL10
CD2	CD1C	XAF1	CD8A	CD1C	MMP12
CD8A	CD1B	MREG	CD1C	CD1B	CCL13
CXCL9	PRF1	CELF2	CD1B	PRF1	CD8A
GZMA	P2RY14	ARHGAP20	PRF1	P2RY14	CCL5
HLA-DMA	CD163	APOL6	P2RY14	CD163	KLRK1
HLA-DMB	MS4A4A	IFI44	CD163	MS4A4A	CD1C
IFI30	GZMB	PDE4B	MS4A4A	ADAMDEC1	CD1B
PIK3R2	MS4A6A	DCLK1	HLA-DQB1	GZMB	CD2
IL2RG	FYB	KIAA0226L	F5	COL6A6	GZMA
KLRC4-KLRK1	GLIPR1	JMY	GZMB	MS4A6A	TRAT1
KLRK1	CELF2	SAMD9L	SIGLEC1	FYB	THEMIS
PIK3CG	STAT1	RARRES3	GVINP1	PRKCB	GZMK
PSMB9	LCP1	DDIT4L	MS4A6A	GLIPR1	TFEC
SLAMF8	GBP4	CD163	FABP7	CELF2	ITGAL
SFMBT2	SAMD9L	CTSS	FYB	STAT1	PRF1
CCL18	DDIT4L	CCL13	ESRRG	LCP1	IRF1
CXCL10	FPR3	GZMB	GLIPR1	GLRB	P2RY14
CYTIP	PTPRO	GBP4	HLA-F	GBP4	CD163
PSMB8-AS1	B2M	P2RY14	LOC284578	SAMD9L	TRBC1
PTPRO	CTSS	STAT1	CELF2	HIF3A	MS4A4A
TYROBP	DCLK1	PTPRO	STAT1	DDIT4L	IKZF1
HLA-F	APOL6	PRF1	CEACAM1	FCER1A	CD28
HCK	PDE4B	OAS2	MAL	FPR3	CD3D
KMO	KIAA0226L	MS4A4A	LCP1	PTPRO	APOBEC3G
HCLS1	OAS2	CD1C	ANTXR2	B2M	EOMES
CCL5	FCGR2A	PARP9	GBP4	POSTN	CCL8
MPEG1	RUNDC3A	MS4A6A	ENPP4	CTSS	FAM26F
NFAM1	MREG	IFI27	SAMD9L	DCLK1	SNX20
FCGR2B	F11R	KIAA1456	HLA-DMA	APOL6	HCP5
GZMK	TDH	CD1B	DDIT4L	ANGPTL1	CD53
SNX20	SERGEF	CD8A	RUNX3	EVI2B	GZMB

CD209	FAM46B	FCGR2A	FPR3	C5orf56	PLEK
CD86	GLB1L2	FPR3	PTPRO	SERHL2	AMICA1
AMICA1	SESN3	OXR1	RGS22	PDE4B	SAMD3
CD14	ELOVL6	FYB	MIR143HG	CDHR1	CTSW
SLFN11	EPHB2	LCP1	B2M	NBEA	XCL1
HLA-DRB1	SLC4A3	GLIPR1	SLC2A14	NR2F2	MS4A6A
HLA-DRB4	SLC40A1	B2M	CTSS	LOC286058	CD84
LOC100996809	PALLD	GNB1	DCLK1	ABLIM2	CD209
CD3D	EZR	CD274	APOL6	KIAA0226L	SAMSN1
ITGAL	KALRN	SLC1A6	PDE4B	OAS2	FYB
P2RY13	ATP8A2	CBLN2	HSPA12A	OAS3	GLIPR1
TRAT1	CD109	ELOVL6	ATP2A3	ETV6	GPR171
PIK3R5	PADI1	FAM43A	CECR1	GIMAP2	ADAMTS3
CCR1	CDS1	SLC7A11	GRB14	PRKACB	LCP2
KLRC1	RIMS2	RUNDC3A	TOX	EPB41L3	CELF2
KLRC2	FAM218A	CD109	FAM46C	FCGR2A	JAK3
RP11-389C8.2	RIMS3	FCHSD1	KIAA0226L	IL7	ITGAX
MRC1	MCHR1	PPP1R2	SCN3A	QKI	STAT1
MNDA	SEC14L2	FAM83A	OAS2	RNF213	PSMB9
MMP12	ACTN1	MAP7	TG	IFIT3	MNDA
HLA-DOA	FLNB	HOMER1	NCALD	UBE3B	CIITA
TLR1	MLLT11	RIMS2	MEG3	CRTAP	FCGR2B
CD83	FAM83A	LYPD6	FCGR2A	JAK2	AIM2
IL15	DUSP14	RMND5A	ERBB4	RALGAPA1	LCP1
TAP1	FGG	RC3H1	PPARGC1A	UST	EPSTI1
CPVL	FLRT3	F11R	LINC00667	STARD10	HCLS1
MS4A6A	S100P	FGF18	EFNA5	ENAH	CCR2
CKLF	OXR1	DUSP14	RUNDC3A	ARL4C	GBP4
RHOF	SLC7A8	S100P	SLC16A6	PLXNA2	SAMD9L
CD163L1	PLCD1	FOXE1	ABI2	SLC44A1	ARHGAP9
GPR183	TRPM6	KRT31	MREG	RUNDC3A	CCR1
LCK	CYFIP2	PSORS1C2	PREP	LYPD6B	CXCL11
C1QC	CREB5	GJA3	F11R	HOMER2	ACSS3
HLA-DRB1	SH3GL3	PKP1	DDX17	H2AFX	DDIT4L
HLA-DRB1	RASSF9	TRPM6	A2ML1	ZNF263	PDE6A

IL2RB	PDZRN3	KALRN	TDH	STON2	BIRC3
ST3GAL5	GNB1	EZR	LPAR3	MREG	FPR3
ITGAX	BNC2	RNF39	CD24	RIT1	PTPRC
NLRC5	SHF	HSPA14	SERGEF	F11R	PTPRO
SAMD3	JMY	MLLT11	FXYD6	MRC2	MPEG1
CD163	FAM43A	KRT40	DSC2	PDLIM5	AIF1
CTSW	FCHSD1	CMYA5	FAM46B	ALDH4A1	LOC100506776
CCL4	CHN2	CST1	GLB1L2	XPR1	IL15
CCL8	CSNK1E	KRT82	ROPN1	CD164	B2M
CCR2	CMYA5	CDS1	SESN3	MAST4	CTSS
GABBR1	NCS1	PADI1	ELOVL6	TDH	DCLK1
UBD	LYPD6	PIRT	TCP11L2	TMEM132A	APOL6
HLA-DQB1	HOMER1	EPHB2	ALDOB	ATG4B	PTPN22
HLA-DRB1	RC3H1	PLCD1	CYP1B1	SERGEF	IRF8
HLA-DRB3	FOXE1	SLN	EPHB2	HRAS	PDE4B
HLA-DRB4	RMND5A	SEC14L2	SLC4A3	CPT1A	SLA2
LOC100996809	EHD3	LY6G6D	UBE2H	FAM46B	LGALS2
LOC101060835	CHST2	RASSF9	SLC40A1	GLB1L2	GBP5
CLECL1	FOXN1	OVOL1	PALLD	RGMA	HCK
CCBE1	HSPA14	TRIM10	TUBB2A	TJP1	GZMH
ADRB2	SLC1A6	DSG4	EZR	SESN3	C16orf54
BZRAP1-AS1	PARM1	CHST2	KANK1	C10orf35	KIAA0226L
DPEP2	OVOL1	RIMS3	KALRN	ELOVL6	OAS2
GMFG	SLC7A11	SH3GL3	ATP8A2	EPHB2	SELL
GLIPR1	PPP1R2	PARM1	CD109	SLC4A3	MRC1
C1orf162	TRIM9	ATP8A2	PADI1	LUZP1	FCGR2A
MS4A4A	PKP1	KRT33A	FHDC1	MGEA5	ITGB2
LY86	OXCT2	ANGPTL7	CDS1	CCHCR1	CD48
IL32	SLC16A9	GPRC5D	B3GALNT2	SLC40A1	DLX6
ABCG1	TRIM10	S100A3	RIMS2	PALLD	CXCR6
CD1B	SLN	FAM83G	FZD3	WDR66	BTN3A3
GVINP1	FGF18	PALLD	NRBF2	ITGBL1	COTL1
SIRPG	WNK4	KRT83	FAM218A	BMP7	CD52
HCP5	GJA3	CSNK1E	KIF1B	EZR	GBP1

C11orf21	SERPINA1	PDZRN3	RIMS3	CSPG4	PPM1H
DRAM1	CAPN12	SLC40A1	MCHR1	KALRN	RUNDC3A
APOL3	HOXC13	CHAC1	SEC14L2	SHB	MREG
GPR171	KRT40	FOXN1	ACTN1	ATP8A2	F11R
LOC100507535	PSORS1C2	ACTN1	ISCA1	SELENBP1	TDH
GBP5	COMP	HOXC13	TIAM1	CD109	SERGEF
CXCR3	ANGPTL7	SHF	FLNB	PADI1	UNC5B
B2M	PIRT	SERPINA1	MLLT11	LTBP2	FAM46B
PARVG	S100A3	B4GALNT3	FAM83A	KCNK10	GLB1L2
ARHGEF6	CBLN2	KRT33B	TMEM163	MYO10	SESN3
NLRC4	KRT31	KCNK7	DSG3	CDS1	ELOVL6
CXCR6	CST1	SLC16A9	DUSP14	RIMS2	SYTL2
CD96	KRT82	WNK4	DACH1	HSPB3	EPHB2
MARCH1	CHAC1	CREB5	FGG	SMAGP	SLC4A3
STAT1	KRT81	OXCT2	FLRT3	CCDC64B	SLC40A1
LILRB2	KRT33B	GIPC1	ATP12A	GALNT6	PALLD
HLA-A	DSG4	FLRT3	S100P	FAM218A	EZR
GZMH	KRT83	SESN3	SULF2	RIMS3	KALRN
EVI2A	LY6G6D	KRT81	UBE2D1	MCHR1	SDC2
SIT1	KRT33A	FGG	OXR1	SEC14L2	SPTBN5
PATL2	GPRC5D	EHD3	SLC7A8	ACTN1	ATP8A2
GPSM3		FLNB	PLCD1	KIF21A	CD109
SLAMF1		MCHR1	TRPM6	FLNB	PADI1
TAGAP		CAPN12	FETUB	MLLT11	CDS1
C1orf54		FAM218A	PPP1R1C	FAM83A	RIMS2
PLEK		CHN2	CYFIP2	ANK3	SMOC1
LOC101928789		SLC7A8	CREB5	LAD1	FAM218A
SP140		BNC2	SH3GL3	DUSP14	RIMS3
LOC285957		GLB1L2	RASSF9	FGG	MCHR1
SIGLEC1		TRIM9	PDZRN3	FLRT3	SEC14L2
TRIM68		COMP	GNB1	S100P	ACTN1
ACSS3		SERGEF	BNC2	OXR1	FLNB
VAV1		SLC4A3	SHF	SLC7A8	LEF1
ADAM28		TDH	JMY	PLCD1	MLLT11
SLC15A3		CYFIP2	FAM43A	TRPM6	SORCS2

SKAP1	FAM46B	FCHSD1	SLC4A1	FAM83A
LY96	NCS1	CHN2	FRMPD1	OTUB2
PYHIN1		TENM2	CYFIP2	EDN2
MLLT3		CSNK1E	LOC401317	PCDH7
NR2F2		CMYA5	CREB5	TGM3
LCP2		SAMD5	SH3GL3	ITGB6
MX2		NCS1	RASSF9	DUSP14
NLRC3		LYPD6	PDZRN3	FGG
TPK1		EIF5	GNB1	HSPA2
LOC101929880		PLEKHG1	BNC2	FLRT3
QPRT		TM4SF1	SHF	TMOD3
CD3E		HOMER1	JMY	S100P
STAT4		RC3H1	FAM43A	OXR1
SLC7A7		FOX E1	FCHSD1	SLC7A8
KIF21B		RMND5A	CHN2	PLCD1
ANXA2R		EHD3	CSNK1E	TRPM6
ITK		CHST2	CMYA5	PPP2R1B
RNASE6		FOXN1	EPB41L4B	CYFIP2
C5orf20		HSPA14	NCS1	CREB5
TIFAB		SLC1A6	LYPD6	SH3GL3
IKZF1		PARM1	GOLGA7B	FHOD3
SH2B3		OVOL1	PLEKHG4B	RASSF9
RCSD1		SLC7A11	CAMK2N1	PDZRN3
ITGAM		CYP1B1-AS1	HOMER1	PLA2G2E
LOC100505501		CTNND2	RC3H1	BEST3
FLT3		PPP1R2	FOX E1	GNB1
KIAA0226L		TRIM9	RMND5A	BNC2
BATF3		PKP1	EHD3	SHF
KBTBD11		OXCT2	CHST2	JMY
PLTP		SLC16A9	FOXN1	FAM43A
JAM2		TRIM10	HSPA14	THBS1
IL22RA2		SLN	SLC1A6	FCHSD1
BTN3A1		FGF18	PARM1	CHN2
CCDC113		WNK4	OVOL1	KLK12
DOK2		GJA3	KRT84	CSNK1E

PILRA	SERPINA1	SLC7A11	CMYA5
THEMIS	CAPN12	PPP1R2	LAP3
F13A1	HOXC13	TRIM9	NCS1
APOC2	KRT40	PKP1	LYPD6
SLA	PSORS1C2	OXCT2	DLX4
DOCK2	KRT38	SLC16A9	EFHD1
GIMAP2	COMP	TRIM10	MT4
APOL1	KRTAP13-1	SLN	KRT74
CD52	ANGPTL7	FGF18	RTKN2
IL7R	PIRT	WNK4	HOMER1
TBC1D10C	S100A3	GJA3	PRSS53
SIMC1	CBLN2	SERPINA1	SIGLEC10
CD27	KRT31	CAPN12	RC3H1
FAM65B	KRTAP19-3	HOXC13	FOXE1
CCR7	KRTAP10-12	KRT40	RMND5A
FAM171A1	KRTAP19-1	PSORS1C2	EHD3
RP11-589P10.5	KRTAP17-1	COMP	KLHDC8A
FASLG	CST1	ANGPTL7	CHST2
CEACAM1	KRT82	PIRT	FAM49A
FAM26F	KRTAP2-1	S100A3	DLX1
BZRAP1	KRTAP1-3	CBLN2	CNTNAP2
LRMP	KRTAP2-3	KRT31	FOXN1
UBL3	KRTAP11-1	CST1	HSPA14
AIM2	KRTAP10-11	KRT82	PLA2G2F
ZCCHC18	KRTAP4-8	CHAC1	KIF5C
LY9	KRTAP5-8	KRT81	ODC1
CCL3	CHAC1	KRT33B	SLC1A6
CCL3L1	KRTAP4-5	DSG4	RHCG
CCL3L3	KRT81	KRT83	PARM1
AKR1C3	KRT33B	LY6G6D	DLX3
ABCB1	KRTAP7-1	KRT33A	CAPN8
ABCB4	DSG4	GPRC5D	OVOL1
APH1B	KRTAP4-2		SLC7A11
VSIG4	KRT83		FAM26D
CD3G	LY6G6D		BMP2
MFNG	KRT33A		DMBT1

IL7	GPRC5D	PPP1R2
CXorf65		CAPN14
CECR1		SP6
CRTAM		KRT36
AGPAT9		LRRC15
HSPA12A		SPINK7
SMYD4		C1orf168
ADAM19		KRT16
LOC101928173		TRIM9
NCOA4		PKP1
GNLY		ABCA4
FAM78A		OXCT2
LOC101927137		SLC16A9
CCDC28A		SERPINA3
WFDC2		TRIM10
ARHGAP9		MSX2
COL6A6		FGF5
CST7		CSDC2
SPOCK2		SLN
HCG27		FGF18
CBLN3		WNK4
NME5		IL1F10
LOC100996668		GJA3
ZEB1		KRT75
RP11-226L15.5		CRNN
ICOS		KRT73
IDO1		DLX2
SCML4		SERPINA1
P2RY8		KRT72
CHRM3-AS2		CAPN12
GPD1L		HOXC13
FLT3LG		BAMBI
CCL22		SMTNL2
CIITA		DNAJC6

MIR155	KRT40
MIR155HG	PSORS1C2
SAMD9L	CST4
GSTK1	COMP
FLJ32255	ANGPTL7
CCL16	PIRT
CD1A	S100A3
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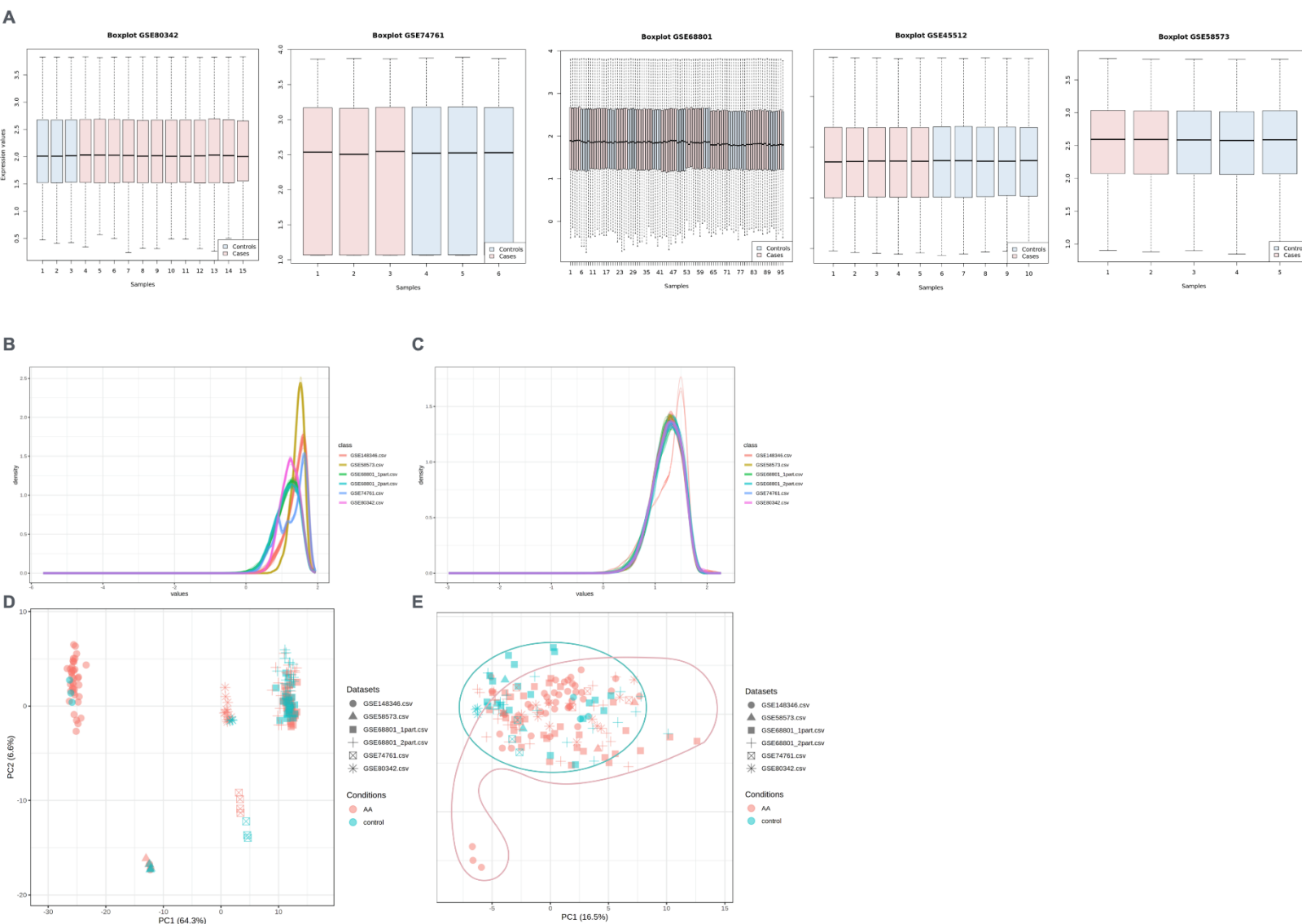
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BBOX1



for different datasets align more closely, indicating successful mitigation of batch effects. GSE68801 appears as two subsets (GSE68801_1 and GSE68801_2) due to technical batch stratification. **Panel D: Principal Component Analysis (PCA) for individual datasets before Batch Effect Correction.** Colors represent different conditions (A and control), while shapes denote different datasets. The separation of points indicates initial batch effects. **Panel E: Principal Component Analysis (PCA) for individual datasets after Batch Effect Correction.** Post-correction, points from different datasets (represented by various shapes) cluster together more tightly, indicating successful normalization and batch effect correction.