

**Supplementary File 1. List of AR of co-expressed genes. Each gene has an absolute Pearson's correlation coefficient (|CC|) of > 0.5 with AR expression (p< 0.001)**

Gene	CC	Gene	CC
AR	1	PRNP	-0.75
F7	0.716	DONSON	-0.681
PATZ1	0.709	TTK	-0.662
ZNF205-AS1	0.699	EHBP1	-0.654
NFATC4	0.681	PICALM	-0.649
SPDEF	0.67	NAB1	-0.644
MXD4	0.661	USP1	-0.642
CTNND2	0.651	GALNT2	-0.63
SLCO2A1	0.645	PGM1	-0.628
RHOH	0.643	GLS	-0.613
SGSM3	0.638	STIL	-0.612
TP53TG1	0.636	TOP2A	-0.612
FGFR4	0.634	BUB1	-0.609
PYGO1	0.633	GART	-0.609
MGAT5	0.632	SNRPD1	-0.596
PCDHA5	0.621	BTG3	-0.595
DALRD3	0.616	CRLF3	-0.594
SLC9A1	0.614	MSN	-0.594
IGHM	0.612	XPO1	-0.594
AMBP	0.603	ATR	-0.593
CRAT	0.601	CCT8	-0.592
MVK	0.601	IPO5	-0.589
ZNF552	0.597	CHST6	-0.585
FZD4	0.592	DLGAP5	-0.584
INPP5J	0.592	TRMT11	-0.58
ADCY2	0.591	IARS	-0.577
PIP	0.59	PRPS2	-0.573
SLC1A4	0.588	CDC27	-0.571
RHOB	0.587	BIRC2	-0.568
ADCY10	0.587	IL27	-0.566
FRAT1	0.582	PMAIP1	-0.565
SLC29A3	0.581	PMS1	-0.565
MMP26	0.581	SMC4	-0.564
AQP6	0.58	SLC9A6	-0.562
VRK3	0.58	UPF3A	-0.562
PRDM5	0.58	BICD2	-0.56
RNF103	0.58	IKBKAP	-0.559
IGLJ3	0.576	ZCCHC11	-0.558
FOXA1	0.574	RCN2	-0.556
CD84	0.573	CHRNA5	-0.555
CRP	0.572	SOD2	-0.555
IGF1	0.572	HNRNPH3	-0.554
ALAD	0.571	NDC80	-0.55

OSGIN2	0.571	LRRC40	-0.547
CACFD1	0.57	HNRNPH1	-0.547
ABHD11	0.57	SPATS2L	-0.546
CYB561	0.569	ZZZ3	-0.544
AKT1	0.568	NMI	-0.544
BCAN	0.568	TBC1D1	-0.544
GGTLC1	0.568	CDC20	-0.542
MEGF9	0.567	PLS3	-0.54
GH1	0.566	NCOA4	-0.539
EPB41L4	0.565	CKS2	-0.538
SEMA3F	0.565	DARS	-0.538
CLDN5	0.564	MBNL1	-0.538
FLT3	0.563	USP16	-0.537
NOL12	0.563	MTMR2	-0.535
DCXR	0.562	PRKD3	-0.534
NAT2	0.562	CEP57	-0.533
KLRG1	0.56	SRPK1	-0.533
PCDHA12	0.56	CUL5	-0.532
ZNF444	0.559	DEK	-0.532
IGFBP5	0.559	SERBP1	-0.531
CASS4	0.558	HMMR	-0.53
CETN1	0.558	HIF1A	-0.529
DNMT3A	0.558	PLSCR1	-0.529
TREML2	0.558	CEBPD	-0.528
MTMR3	0.558	YBX3	-0.525
SLC5A5	0.558	ACYP1	-0.524
NME3	0.557	CDC42EP3	-0.524
ALDH4A1	0.556	TAF1D	-0.52
MT1G	0.556	SF3A3	-0.52
NARFL	0.555	FXD5	-0.519
CAMK2A	0.553	PTS	-0.519
GATA3	0.553	UBA2	-0.519
IDS	0.553	CD58	-0.518
ITGA2B	0.553	CDC5L	-0.518
MAPK3	0.553	COL18A1	-0.517
APOA1	0.551	CAV2	-0.516
CHN2	0.549	TEX10	-0.516
GRM4	0.549	QTRTD1	-0.513
GUCY2D	0.549	AMD1	-0.511
GRID2	0.548	ANP32E	-0.511
RABEP2	0.547	RHBDL2	-0.509
SLC44A4	0.545	MRPL39	-0.509
CAB39L	0.545	DDX18	-0.508
GSR	0.545	E2F3	-0.508
SEPP1	0.545	GPATCH8	-0.507
DNASE2B	0.544	IL27RA	-0.507
ZNF835	0.544	NUP160	-0.506

KCNMA1	0.544	ZNF207	-0.506
POLL	0.542	FBXO5	-0.504
ITSN2	0.541	NCK1	-0.504
CCL13	0.541	EXOSC9	-0.504
TACR2	0.541	SRSF11	-0.504
MGAT4C	0.54	SMS	-0.504
CACNG4	0.539	SPTLC1	-0.504
AVIL	0.538	TOPBP1	-0.503
KCNK13	0.538	ARCN1	-0.502
MAPK4	0.538	CBR1	-0.502
TSPAN1	0.538	HJURP	-0.502
CHIA	0.537	TCP1	-0.502
CAPN9	0.536	LYN	-0.501
CHRNA2	0.536	ANAPC1	-0.501
AKAP7	0.535	OSBPL11	-0.501
CHN2	0.535		
LDLRAP1	0.533		
CLN3	0.531		
PRB1	0.531		
TM9SF1	0.53		
RHBDD3	0.529		
CDSN	0.529		
KAZALD1	0.529		
TREM2	0.529		
PARM1	0.527		
ARL15	0.526		
GGT2	0.526		
ZZEF1	0.526		
SCN2B	0.526		
PDE11A	0.525		
SIGLEC5	0.525		
SLC11A2	0.525		
PLEKHG3	0.524		
TM7SF2	0.524		
AMHR2	0.523		
CA12	0.523		
UGT2A3	0.523		
KAT6B	0.523		
AMELY	0.522		
PRKRIR	0.522		
ATP2A3	0.521		
TBC1D9	0.52		
PGLYRP1	0.52		
PLCH1	0.519		
CD80	0.518		
KLK13	0.518		
PCDHA9	0.518		

TSSK2	0.517
ATP6IP1	0.516
FAM162A	0.516
NCR1	0.516
ST6GALNAC2	0.516
XBP1	0.516
CEND1	0.515
LDB3	0.515
IFT27	0.515
WAS	0.515
IRX5	0.514
PVRL1	0.514
CEACAM3	0.514
CDY1	0.513
DTNA	0.513
PSG3	0.513
TGFB3	0.513
DLG3	0.512
MC2R	0.511
OR1D2	0.511
DNAI1	0.51
MAG	0.51
OR10C1	0.51
PIGR	0.51
SPAG8	0.51
ARHGEF16	0.509
PHF20	0.509
GJC2	0.509
ZNF507	0.509
NUDT4	0.509
FAM46C	0.508
NCR2	0.508
PNPLA2	0.508
CALCRL	0.507
EGLN3	0.507
HIST1H1D	0.507
SPATA7	0.506
KXD1	0.506
CCNG2	0.505
CRIP2	0.505
WDTC1	0.505
LDB1	0.505
PDK2	0.505
PNLIP	0.505
TSPAN31	0.505
SCTR	0.505
SELENBP1	0.505

VPREB3	0.505
AGR2	0.504
SMPDL3A	0.504
CEBPE	0.504
CD19	0.502
DNAH6	0.502
CXCL6	0.502
IL21	0.502
ODF1	0.502
AP1G1	0.501
TET3	0.501