

**Table S5:** The PRDRMs of Breast cancer in the HSN.

Module	Genes of module	JT test P-values
BM'1	CDK9 POLR3F POLR3A LZTS1 POLR3H NELFB GTF2F2 NFIA NFIB NFIC NFIX NELFCD POLR2D POLR2E POLR2F POLR2G POLR2H POLR2I POLR2K POLR2L POLR3B POLR3E POLR3D SSB SUPT4H1 NELFA NELFE CCNT1 CCNT2 CTDP1 HMGN3	0.002
BM'2	CD160 KIR3DL3 ISG20 KIR2DL1 KIR2DL2 KIR2DL3 KIR2DL4 KIR2DS1 KIR2DS3 KIR2DS4 KIR2DS5 KIR3DL1 KIR3DL2 KLRC1 KLRC2 KLRC3 KLRD1 KIR2DL5A KLRC4	0.0014
BM'3	RRAGB EIF3M RRAGA EIF5 CDK19 MTOR EIF3K EIF3E EIF3L RRN3 RPTOR RRAGD RHEB CLIP1 RRAGC MLST8 DEPTOR AKT1S1 EIF3A EIF3B EIF3C EIF3D EIF3F EIF3G EIF3H EIF3I EIF3J ULK2	0.0001
BM'4	NAMPT CCL26 ESAT DARC CHIA CXCL1 CXCL9 PF4 PON1 ACE2 CCL2 CCL13 CX3CL1 ZC3H12A CD163	0.0343
BM'5	TACC3 TRIOBP TPX2 MYCBP2 CUL9 ZZEF1 UBE2S NUMA1 OAZ1 OCA2 ODC1 AZIN1 AURKAIP1 KIF15 AURKA HECTD3 BORA NDEL1 CDC14B HERC2 DLGAP5 CUL7	0.00001
BM'6	FRA16A ELP2 STAT1 STAT2 STAT3 STAT5A STAT5B	0.0424
BM'7	CDR2 OR10A4 DBNL HLA-DOA HLA-DOB HLA-DPA1 HLA-DPB1 HLA-DQA1 HLA-DQA2 HLA-DQB1 HLA-DRA HLA-DRB1 HLA-DRB3 HLA-DRB4 HLA-DRB5 PAG1 B2M PTPN3 TRA TRB IV UNC119 CD3D CD3E CD3G CD247 CD4 CD8A CD8B CD28	0.0028
BM'8	SMC4 KIF20A NDC80 CENPA SMC2 KIF2C KLF6 DES NCAPD3 NCAPH DAPK2 RACGAP1 BIRC5 INCENP ATF3 PEBP1 NSUN2 CDCA8 NCAPG AURKC PRC1 AURKB PTTG1 KIF23 NCAPD2	0.00001
BM'9	STAM2 GNLV SHE EGR2 CELA1 FCAR IKZF3 SGMS1 NME2P1 HYAL1 IL2 IL2RA IL2RB IL2RG KRT19 SHD ALPK3 PZP SERPINB3 SRL TWIST1 TNFRSF4 SCGB1A1 UGCG ALPK1 STAM DOK2 SHF NMI CD80 CD86	0.0007