

Human Ubiquitin Ligases PCR Array

Oncogenes & Tumor Suppressor Genes: AMFR, ANAPC10, ANAPC11, ANAPC13, ANAPC4, ANAPC5, ANAPC7, APC2, BARD1, BIRC2 (c-IAP2), BIRC3 (c-IAP1), BIRC7, BRCA1, BTRC (b-TrCP), CBL, CBLB, CBLC, CBLL1, CDC16, CDC20, CDC23, CDC27, CDH1 (E- Cadherin), CUL7, FBXO5, FBXW5, FBXW7, MDM2, MDM4, RCHY1, RFWD2 (COP1), RNF139, SIAH1, SIAH2, SKP2, TRAF2, TRAF5, TRAF6, TRAF7, VHL, XIAP.

HECT: HACE1, HECTD1, HECTD3, HECW1, HERC1, HERC2, HERC3, HERC4, HERC5, HERC6, HUWE1, ITCH, NEDD4, NEDD4L, SMURF1, SMURF2, TRIP12, UBE3A, UBE3B, UBE3C, UBR5, WWP1.

U-Box: NOSIP, STUB1, UBE4A, UBE4B, WDSUB1.

UBL: PIAS1, PIAS2, PIAS4, RANBP2, RBX1, TOPORS, UHRF2.

Single RING-Finger:

BIRC/IAP: BIRC2 (c-IAP2), BIRC3 (c-IAP1), BIRC7, XIAP.

BRE1: RNF20, RNF40.

CBL: CBL, CBLB, CBLC, CBLL1.

Deltex: DTX3, DTX4, RNF146.

Goliath: RNF13, RNF128, RNF130, RNF167.

Makorin: MKRN1, MKRN2.

March: MARCH1, MARCH11, MARCH2, MARCH3, MARCH5, MARCH6, MARCH7, MARCH8.

MDM: MDM2, MDM4.

Mindbomb: MIB1, MIB2.

NFX: NFX1, NFXL1.

PDZRN: LNX1, PDZRN3, PDZRN4.

Pellino: PELI1, PELI2.

PEX: PEX2, PEX12.

Polycomb: BMI1 (PCGF4), PCGF2 (RNF110), PCGF3, PCGF5, RING1, RNF2.

Praja: PJA1, PJA2, RNF115, RNF126.

RBR: ANKIB1, ARIH1, ARIH2, PARK2, RBCK1, RNF14, RNF144A, RNF144B, RNF19A, RNF19B, RNF216, RNF31 (IRF9).

RC3H: RC3H1, RC3H2.

RKHD: MEX3A, MEX3C, MEX3D.

TRAC-I: RNF114, RNF125, RNF138, RNF166.

TRAF: TRAF2, TRAF3, TRAF4, TRAF5, TRAF6, TRAF7.

TRIM/RBCC: MID1, MID2, PML, RFPL3, RNF135, TRIM10, TRIM11, TRIM13 (RFP2), TRIM17, TRIM2, TRIM22, TRIM23, TRIM24, TRIM25, TRIM26, TRIM27, TRIM28, TRIM3, TRIM31, TRIM32, TRIM33, TRIM36, TRIM37, TRIM38, TRIM39, TRIM4, TRIM40, TRIM41, TRIM44, TRIM45, TRIM48, TRIM5, TRIM52, TRIM54, TRIM56, TRIM61, TRIM62, TRIM63, TRIM64, TRIM67, TRIM68, TRIM71, TRIM72, TRIM73, TRIM74, TRIM75, TRIM8, TRIM9, TRIML1.

UBR Box: UBR1, UBR2, UBR3, UBR4, UBR7.

VPS: VPS11, VPS18, VPS41, VPS8.

ZNRF: ZNRF1, ZNRF2.

Others: AMFR, ATRX, BCOR, BFAR, BRAP, BRCA1, CCNB1IP1, CDC34, CGRRF1, CHFR, CNOT4, DCST1, DZIP3, FANCL, HLTF, IRAK1, IRF2BPL, LONRF1, LRSAM1, LTN1, MALT1, MNAT1, MAP3K1 (MEKK1), MEX3D, MGRN1, MSL2, MYCBP2, MYLIP, NEURL (NEU1), NHLRC1, OSTM1, PAX6, PHRF1, RAD18, RBBP6, RCHY1, RFWD2 (COP1), RNF10, RNF103, RNF11, RNF111, RNF113A, RNF121, RNF123, RNF139, RNF145, RNF150, RNF152, RNF168, RNF170, RNF175, RNF181, RNF187, RNF207, RNF208, RNF212, RNF215, RNF219, RNF220, RNF24, RNF26, RNF34, RNF38, RNF4, RNF41, RNF43, RNF44, RNF5, RNF6, RNF8, RSPRY1, SHPRH, SYVN1, TNFAIP3, TOPORS, TRAIP, TTC3, UBB, UBC, UNK, WHSC1, ZER1, ZNF645.

Multi-Subunit RING-Finger:

SOF Complex: BTBD (BTBD1-17), CUL1, FBXO12, FBXO14, FBXO15, FBXO16, FBXO17, FBXL20, FBXL3, FBXL4, FBXL5, FBXO11, FBXO18, FBXO2, FBXO21, FBXO25, FBXO3, FBXO30, FBXO31, FBXO32, FBXO33, FBXO4, FBXO43, FBXO44, FBXO5, FBXO6, FBXO7, FBXO9, FBXW10, FBXW11, FBXW12, FBXW2, FBXW4, FBXW5, FBXW7, LMO7, RBX1, SKP1, SKP2,

TCPAN17

ECV Complex: CUL2, FEM1B, RBX1, TCEB1, TCEB2, VHL, ZYG11B.

Cul3 Complex: BTBD1, BTBD2, CUL3, DIABLO (SMAC), ENC1, GAN, KBTBD10, KBTBD7, KCTD10, KEAP1, KLHL13, KLHL2, KLHL20, KLHL21, KLHL22, KLHL24, KLHL7, KLHL9, RBX1, RHOBTB1, RHOBTB3, SPOP, TNFAIP1, ZBTB16.

Cul4 Complex: CRBN, CUL4A, CUL4B, DDA1, DDB1, DDB2, DET1, DTL, PHIP, RBX1, RFWD2 (COP1), VPRBP.

ECS Complex: ASB1, ASB18, ASB2, ASB3, ASB9, CISH, CUL5, LRRC41, RNF7, SOCS1, SOCS2, SOCS3, SOCS4, SOCS5, SOCS6, SPSB1, SPSB2, SPSB4, TCEB1, TCEB2, WSB1.

Cul7 Complex: CUL7, RBX1, SKP1.

APC/C: ANAPC10, ANAPC11, ANAPC13, ANAPC2, ANAPC4, ANAPC5, ANAPC7, APC2, CDC16, CDC20, CDC23, CDC27, CDH1 (E- Cadherin).

BRCC Complex: BARD1, BRCA1, BRCA2, BRCC3, RAD51.

KPC Complex: RNF123.

Multi-Subunit RING-Finger Cullins & Adaptors: ANAPC11, APC2, CUL1, CUL2, CUL3, CUL4A, CUL4B, CUL5, CUL7, DDB1, RBX1, RNF7, SKP1, TCEB1, TCEB2.