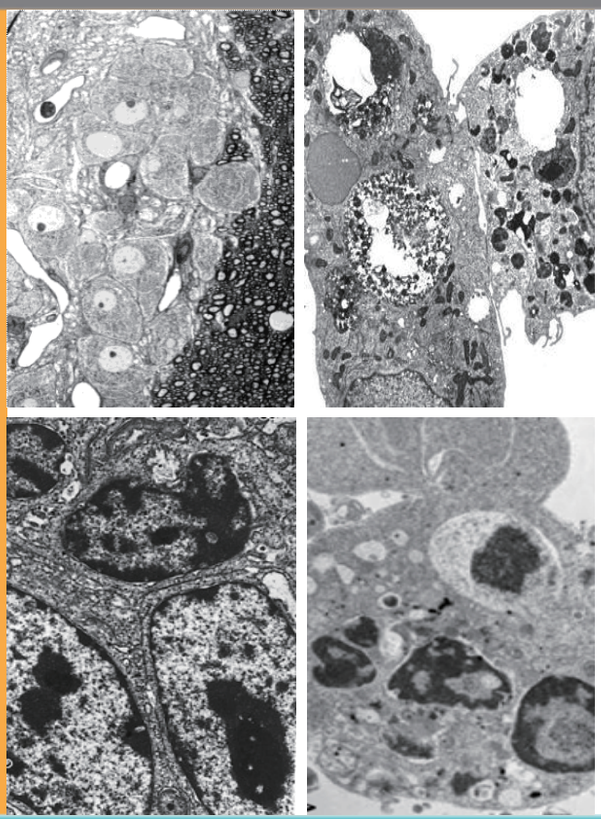
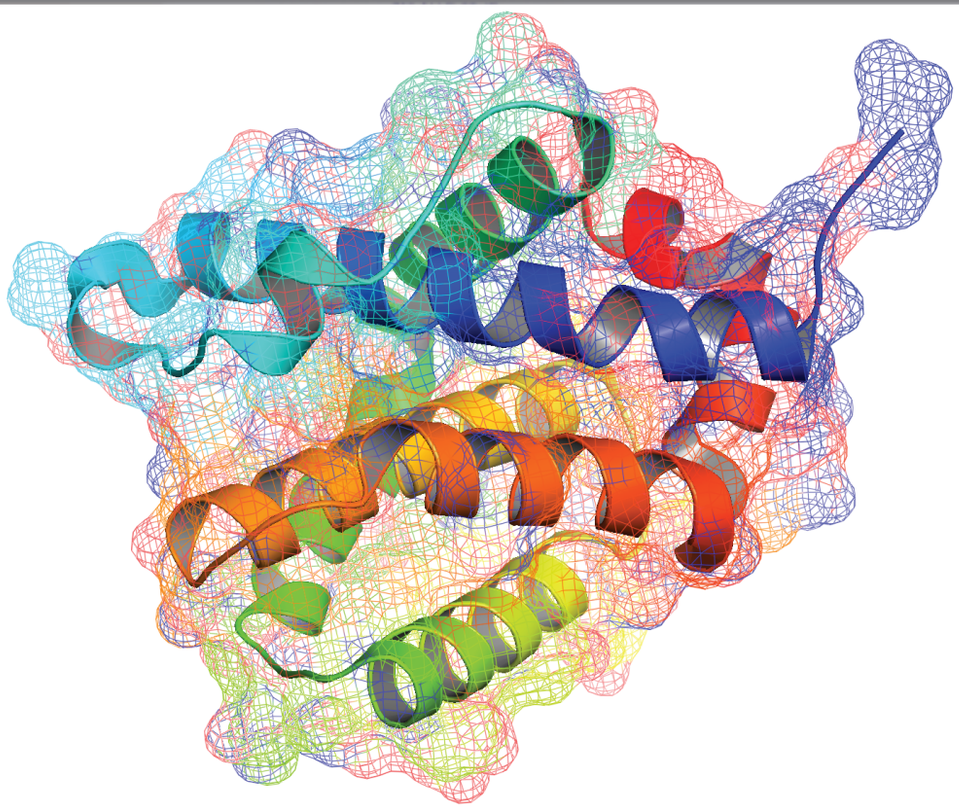
abcepta

Apoptosis Antibodies





Large images to the right is a ribbon and mesh 3D model of the key apoptosis protein Bak.

Distributed by:

CliniSciences Group

Table of Contents

LEGENDS

Validation
DB = Phospho-specific Dot Blot
E = Elisa
ICC = Immunocytochemisty
IF = Immunofluorescence
IHC = Immunohistochemistry
WB = Western Blot

Specificity
B = Bovine
C = Chicken
H = Human
M = Mouse
P = Pig
Pr = Primate
R = Rat
Z = Zebrafish
*based on 93-100% sequence homology

The images on the right are from the Abcepta Necroptosis Cell Death Survey wall chart, an overview of necroptosis cell death programs and protein associations.

Abcepta: A Leader in Apoptosis Antibodies

Abcepta has a vast collection of apoptosis antibodies. Abgent's apopto-sis antibody product line focuses on the BH3 domain of the Bcl-2 protein. Our antibodies target a range of pro-apoptotic members of the BH3 domain such as Bax, Bak, Bid, and Bim, among many others. In addition to the Bcl-2 proteins, our apoptosis line includes products against novel targets such as ABL, BRAF, p53, and TAO.

Apoptosis (programmed cell death), is a tightly regulated process for dismantling and termination of unneeded, aging, mutated, or infected cells. It is characterized by cell shrinkage, membrane blebbing, phago-cytotic engulfment of the fragmented cell, DNA fragmentation, and mitochondrial release of cytochrome C. Dysregulation of cellular death/survival signals is implicated in a broad range of human disease. Deactivation of apoptosis removes the brakes from cellular growth, leading to the unchecked proliferation that a hallmark of cancer, autoim-mune disease, and viral infections.

Apoptosis Overview

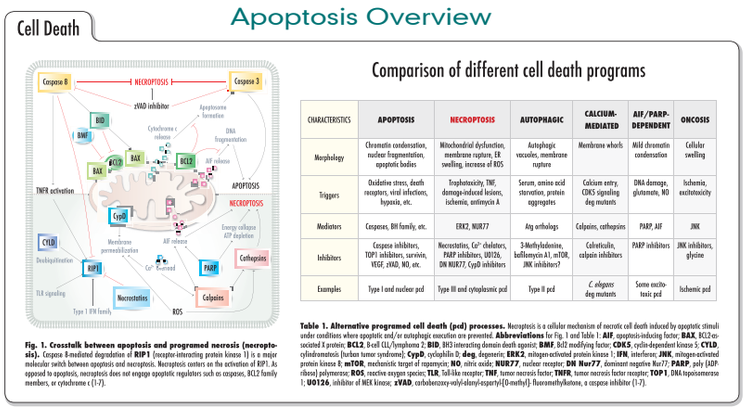
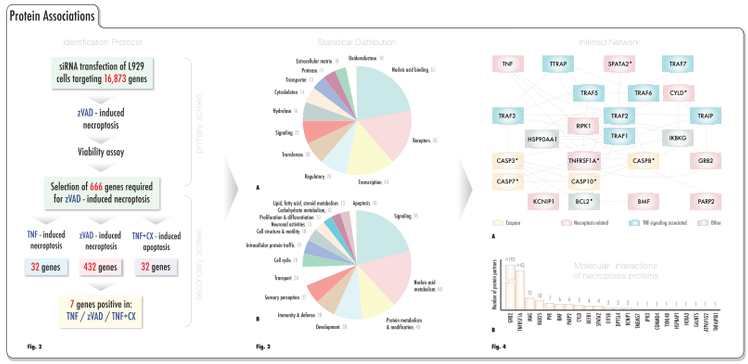


Fig. 1. Crosstalk between apoptosis and programed necrosis (necroptosis). Caspase 8-mediated degradation of **RIP1** (receptor-interacting protein kinase 1) is a major molecular switch between apoptosis and necroptosis. Necroptosis centers on the activation of RIP1. As opposed to apoptosis, necroptosis does not engage apoptotic regulators such as caspases, BCL2 family members, or cytochrome c (1-7).

CHARACTERISTICS	APOPTOSIS	NECROPTOSIS	AUTOPHAGIC	CALCIUM-MEDIATED	AIF/PARP-DEPENDENT	ONCOSIS
Morphology	Chromatin condensation, nuclear fragmentation, apoptotic bodies	Mitochondrial dysfunction, membrane rupture, ER swelling, increase of ROS	Autophagic vacuoles, membrane rupture	Membrane whorls	Mild chromatin condensation	Cellular swelling
Triggers	Oxidative stress, death receptors, viral infections, hypoxia, etc.	Trophotoxicity, TNF, damage-induced lesions, ischemia, antimycin A	Serum, amino acid starvation, protein aggregates	Calcium entry, CDK5 signaling deg mutants	DNA damage, glutamate, NO	Ischemia, excitotoxicity
Mediators	Caspases, Bfl family, etc.	ERK2, NUR77	Atg orthologs	Calpains, cathepsins	PARP, AIF	JNK
Inhibitors	Caspase inhibitors, TOP1 inhibitors, survivin, VEGF, zVAD, NO, etc.	Necrostatins, Ca^{2+} chelators, PARP inhibitors, U0126, DN NUR77, CypD inhibitors	3-Methyladenine, bafilomycin A1, mTOR, JNK inhibitors?	Calvirculin, calpain inhibitors	PARP inhibitors	JNK inhibitors, glycine
Examples	Type I and nuclear pcd	Type III and cytoplasmic pcd	Type II pcd	*C. elegans* deg mutants	Some excito-toxic pcd	Ischemic pcd

Table 1. Alternative programed cell death (pcd) processes. Necroptosis is a cellular mechanism of necrotic cell death induced by apoptotic stimuli under conditions where apoptotic and/or autophagic execution are prevented. **Abbreviations** for Fig. 1 and Table 1: **AIF**, apoptosis-inducing factor; **BAX**, BCL2-associated X protein; **BCL2**, B-cell CLL/lymphoma 2; **BID**, BH3 interacting domain death agonist; **BMF**, Bcl2 modifying factor; **CDK5**, cyclin-dependent kinase 5; **CYLD**, cylindromatosis (turban tumor syndrome); **CypD**, cyclophilin D; **deg**, degenerin; **ERK2**, mitogen-activated protein kinase 1; **IFN**, interferon; **JNK**, mitogen-activated protein kinase 8; **mTOR**, mechanistic target of rapamycin; **NO**, nitric oxide; **NUR77**, nuclear receptor; **DN Nur77**, dominant negative Nur77; **PARP**, poly (ADP-ribose) polymerase; **ROS**, reactive oxygen species; **TLR**, Toll-like receptor; **TNF**, tumor necrosis factor; **TNFR**, tumor necrosis factor receptor; **TOP1**, DNA topoisomerase 1; **U0126**, inhibitor of MEK kinase; **zVAD**, carbobenzoxy-valyl-alanyl-aspartyl-[O-methyl]- fluoromethylketone, a caspase inhibitor (1-7).

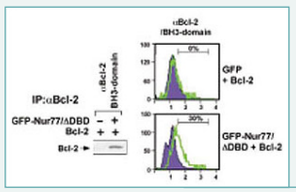
Apoptosis Protein Associations



Apoptosis Antibodies – Featured Products

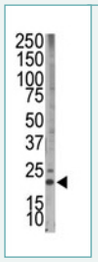
Abcepta has a vast portfolio of apoptosis antibody products. Our coverage includes an extensive collection of BH3 domain antibodies.

Left: Analysis of Bcl-2 BH3 domain exposure in HEK293 cells transfected with a plasmid coding for a DNA-binding domain-deleted construct of Nur77 (GFP-Nur77/dDBD) by using AP1303a for IP and a different Bcl-2 antibody for western blot.
Right: Same analysis in flow cytometry.



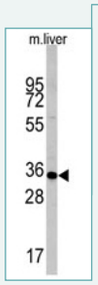
Featured Products

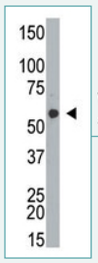
CATALOG #	TARGET	VALIDATION	SPECIFICITY
AP1303a	Bcl-2 BH3	WB, IP, F, E, FC†	H
AP1308a	Bim BH3	WB, IHC, E	H
AP1313b	CASP6	WB, E	H, M
AP7084b	FASTK	WB, E	H, M
AP1332a	HtrA3	WB, IHC, E	H, R
AP1321a	NIP3 BH3	WB, IF, IHC, E	H, M
AP1007d	PRMT5	WB, IHC, E	H
AP6231a	PSEN1	WB, IHC, E	H, M
AP1317a	Puma BH3 domain	WB, IHC, E	H, M
AP2183b	SQSTM1 (p62)	WB, IF, IHC, E	H
AP1336b	TrxL	WB, IHC, E	H



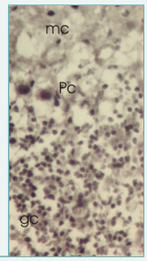
Western blot analysis of Bim-BH3 domain antibody in HL-60 cell lysate.

Western blot analysis of CASP6 antibody in mouse liver tissue lysate.

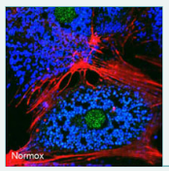




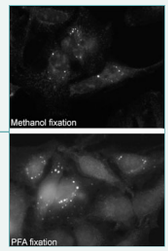
Western blot analysis of FASTK antibody in HL-60 cell lysate.



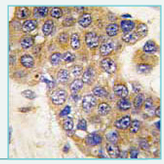
Mouse cerebellar cortex showing molecular cell layer (mc), Purkinje cells (Pc) and granular cell layer. Trxl-1 antibody gives strong nuclear labeling in Purkinje cells and granular cells with lower cytoplasmic staining. The results correspond precisely to TrxL-1 mRNA expression shown with in situ hybridization and could be abolished with peptide used for immunization.



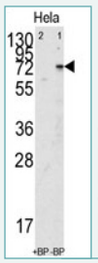
Isolated mouse hepatocytes plated on coverslips were cultured under normoxic conditions for 6 hr. The cells were then fixed in 2% paraformaldehyde in PBS for 1 hr, and processed for IF (red: F-actin, blue: ATP-synthase, green: BNIP3).



IF staining of SQSTM1 (p62) antibody on Methanol-fixed and PFA fixed HeLa cells.

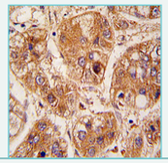


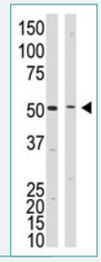
Formalin-fixed and paraffin-embedded human breast carcinoma tissue reacted with Puma BH3 Domain antibody.



Western blot analysis of PRMT5 antibody pre-incubated w/o(lane 1) and with(lane 2) blocking peptide (BP1007d) in Hela cell line lysate.

Formalin-fixed and paraffin-embedded human hepatocarcinoma tissue reacted with PRMT5 antibody.





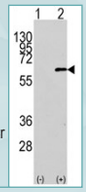
Western blot analysis of PSEN1 antibody in mouse kidney tissue lysate (lane 1) and HL60 cell lysate (lane 2) lysate.

Apoptosis Antibodies

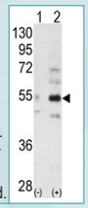
CATALOG #	TARGET	VALIDATION	SPECIFICITY
AP1300a	A1 BH3 domain	WB, IHC, E	H
AP7694a	ABL1	WB, E	H
AP7694b	ABL1	WB, IHC, E	H
AP7102a	ACVR1C	WB, IHC, E	H
AP7028c	AKT1	WB, E	H
AP7141a	AKT1	WB, IHC, E	H
AP6401b	Alpha-synuclein	WB, IHC, E	H
AP7110d	ALS2CR2	WB, E	H
AP7201a	AMPK alpha	WB, E	H, M
AP2509a	ANDR Sumoylation Site	IHC, E	H
AP1262a	AOS1	WB, IHC, E	H, M
AP2511a	AOS1	WB, IHC, E	H, M
AP1151a	APG12L	IF, E	H
AP1816b	APG12L	IHC, E	H
AP1816a	APG12L	WB, IHC, E	H
AP1812a	APG5L	WB, IHC, E	H, M, B*, P*, R*, Z*
AM1813a	APG7	WB, E	H
AP6306a	APP	WB, E	H, M
AP1314c	Bad	WB, E	H
AP1314b	Bad	WB, IHC, E	H
AP1322a	Bad BH3	IHC, E	H
AP1301a	Bak BH3	WB, IHC, E	H
AP1302a	Bax BH3	WB, IHC, E	H, M
AP1303a	Bcl-2 BH3	WB, IP, F, E, FC†	H
AP7877c	BCL2L10	WB, E	H
AP7878c	BCL2L13	WB, E	H
AP1304a	Bcl-G BH3	WB, IHC, E	H, M
AP1305a	Bcl-w BH3	WB, IHC, E	H, M
AP1306a	Bcl-x BH3	IHC, E	H
AP1818d	BECN1	IHC, E	H
AP1818f	BECN1	WB, E	H
AP1818b	BECN1 (APG6)	WB, IHC, E	H, M
AP1818a	BECN1 (APG6)	WB, IHC, E	H, M
AP1307a	Bid BH3	WB, IHC, E	H
AP1319a	Bik BH3	WB, IHC, E	H, M
AP1308a	Bim BH3	WB, IHC, E	H
AP6124a	BIRC3	IHC, E	H
AP6125a	BIRC4	WB, IHC, E	H, M
AP6127a	BIRC6	IHC, E	H
AP6128a	BIRC7	WB, IHC, E	H
AP1309a	Bmf BH3	WB, IHC, E	H
AP1320a	BNIP3L BH3	IHC, E	H, M
AP1310a	Bok BH3	WB, IHC, E	H, M
AP7810c	BRAF	WB, IHC, E	H
AP7810d	BRAF	WB, IHC, E	H
AP7699c	BTK	WB, IHC, E	H
AT1400a	CASP1	WB, IHC, E	H
AT1402a	CASP10	WB, E	H
AT1403a	CASP14	WB, IF, E	H
AP7563c	CASP3	WB, IHC, E	H
AP1313b	CASP6	WB, E	H, M
AP7974a	CASP9	WB, E	H
AT1404a	CASP9	WB, IF, E	H
AP2514a	CBX4	WB, IHC, E	H, M
AP6294a	CD14	WB, IHC, E	H
AP7513b	CDC2L1	WB, IHC, E	H, Ha
AP7517b	CDK1	WB, E	H
AP7521b	CDK5	WB, E	H, M
AP7527b	CDKN1A	WB, IHC, E	H
AP1497a	CDC2	WB, E	H

Apoptosis Antibodies

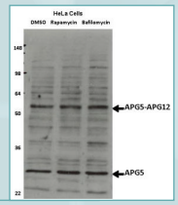
Western blot analysis of AKT1 antibody. 293 cell lysates either nontransfected or transiently transfected.



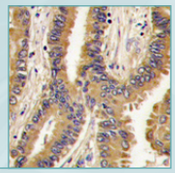
Western blot analysis of ALS2CR2 antibody. 293 cell lysates either nontransfected or transiently transfected.



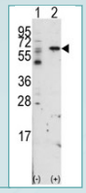
Western blot analysis of APG5 antibody in Hela cell lysates, which were treated with rapamycin or bafilomycin overnight.



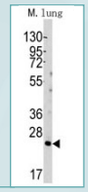
Formalin-fixed and paraffin-embedded human lung carcinoma tissue reacted with Bad antibody.



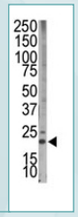
Western blot analysis of BECN1 antibody. 293 cell lysates either nontransfected or transiently transfected.



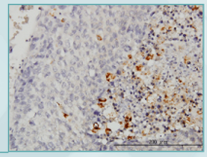
Western blot analysis of anti-hBid-BH3 antibody in mouse lung tissue lysates.



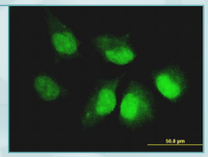
Western blot analysis of Bim-BH3 domain antibody in HL-60 cell lysate.



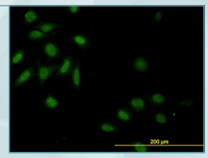
Immunoperoxidase of monoclonal antibody to CASP1 on formalin-fixed paraffin-embedded human hepatocellular carcinoma.



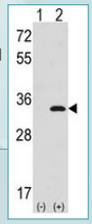
IFof to CASP14 on HeLa cell.

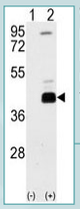


IFof monoclonal antibody to CASP9 on HeLa cell.

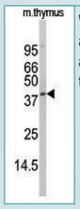


Western blot analysis of CDC2 antibody. 293 cell lysates either nontransfected or transiently transfected.

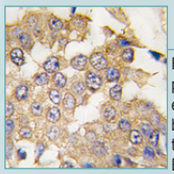




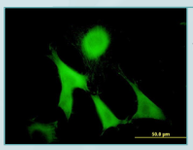
Western blot analysis of DAPK2 antibody. 293 cell lysates either nontransfected or transiently transfected.



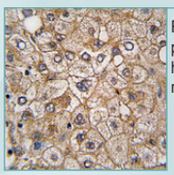
Western blot analysis of DRAK1 antibody in mouse thymus tissue lysate.



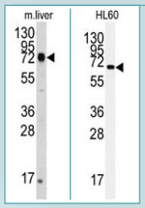
Formalin-fixed and paraffin-embedded human breast carcinoma tissue reacted with ERK2 antibody.



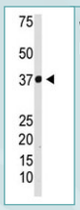
IFof monoclonal antibody to GAS2 on NIH/3T3 cell.



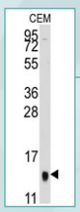
Formalin-fixed and paraffin-embedded human hepatocarcinoma tissue reacted with HRD1 antibody.



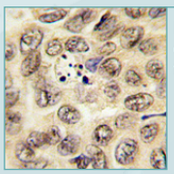
Western blot analysis of HSP70 in mouse liver tissue lysate (LEFT) and HL60 cell lysate (RIGHT).



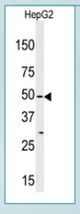
Western blot analysis of IKBa in Jurkat cell lysate.



Western blot analysis of GLT antibody in CEM cell line lysates.



Formalin-fixed and paraffin-embedded human lung carcinoma tissue reacted with MAX Antibody.



Western blot analysis of MLKLAK-C284 antibody in HepG2 cell line lysate.

Apoptosis Antibodies

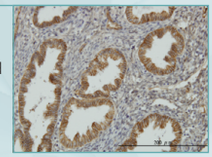
CATALOG #	TARGET	VALIDATION	SPECIFICITY
AP2184d	CHK1	WB, E	H
AT1535a	CIAPIN1	WB, E	H
AP7778c	CTGF	IHC, E	H
AP7217b	DAPK1	WB, IHC, E	H, M
AP7033a	DAPK2	WB, IHC, E	H, M, R
AP7773a	DAXX	WB, E	H
AT1763a	DIABLO	WB, E	H
AP1451a	DPF2	WB, E	H
AP7220a	DRAK1	WB, E	H, M
AP7221b	DRAK2	WB, IHC, E	H, M
AP1287b	Drosophila SUMO	WB, E	D, H
AP7501a	ERK2	WB, IHC, E	H
AP7128b	ERN2	WB, E	H
AP7703a	FAK2	WB, IHC, E	H, M
AP7084b	FASTK	WB, E	H, M
AP7832c	Gab1	IHC, E	H
AT2155a	GAS2	WB, IF, E	H
AM1124a	GLT	WB, E	H
AP7444b	GML	WB, E	H
AP1101a	HDAC1	WB, E	H
AP1103a	HDAC3	WB, IHC, E	H, M
AP7539b	HIPK2	IHC, E	H
AP7540b	HIPK3	IHC, E, WB†	H
AP2184c	HRD1	WB, IHC, E	H
AP1311a	Hrk BH3	IHC, E	H
AP2501a	HSF1	WB, E	H
AP2502a	HSF2	WB, IHC, E	H
AP1335a	HSP70	WB, IHC, E	H, M
AP7199b	HSPB1	WB, IHC, E	H
AP7199c	HSPB1	WB, IHC, E	H
AP1331a	HtrA1	WB, E	H, M
AP1331b	HtrA1	WB, IHC, E	H
AP1333b	HtrA2 (OMI)	WB, IHC, E	H
AP1332b	HtrA3	WB, IHC, E	H
AP1332a	HtrA3	WB, IHC, E	H, R
AP7649a	IGF1R	WB, IHC, E	H
AP2506a	IKBa Sumoylation Site	WB, E	H
AP8110a	IKK gamma	WB, IHC, E	H
AT2523a	IL6ST	WB, E	H
AP7419a	JUND	WB, E	H
AP1572a	KChIP3	IHC, E	H
AP7576a	LGALS1	WB, E	H
AP7712a	LSK	WB, IHC, E	H, M
AP6180a	MAGEH1	WB, IHC, E	H
AP7250b	MAPK1	WB, IHC, E	H
AP7827a	MAX	IHC, E	H
AP1312a	Mcl-1 BH3	WB, IHC, E	H, M
AP1253d	MDM2	WB, E	H
AP1253a	Mdm2	WB, IHC, E	H, M
AP7911a	MEKK5	IHC, E	H
AP7920a	MLK2	WB, IHC, E	H
AP8068c	MLKLAK	WB, IHC, E	H
AT2884a	MOAP1	WB, E	H
AP1307d	Mouse BID	WB, E	M
AP7990a	Mouse TNFR1	IHC, E	H
AP7922a	MST1	WB, IHC, E	H
AP7923a	MST2	WB, IHC, E	H, M, R, Pr
AP7925a	MST4	WB, IHC, E	H
AP2500a	Myb Sumoylation Site	IHC, E	H

Apoptosis Antibodies

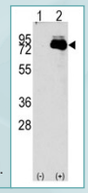
CATALOG #	TARGET	VALIDATION	SPECIFICITY
AT2991a	NDRG1	WB, IHC, E	H
AP8077a	NEK6	WB, E	H, M
AP1980b	NFKB1	WB, E	H
AP7981a	NFKBIA	IHC, E	H
AP1321a	NIP3 BH3	WB, IF, IHC, E	H, M
AP8080a	NME1	WB, IHC, E	H
AP7156a	NME3	WB, IHC, E	H
AP8082c	NME5	WB, IHC, E	H, M
AP8083a	NME6	WB, E	H
AP8157b	NPK	WB, E	H, M
AP8157a	NPK	WB, IHC, E	H
AP6223a	NRG2	IHC, E	H
AP7158a	NUAK2	WB, E	H
AP2510a	NYREN18	WB, IHC, E	H, M
AP7926d	PAK1	WB, IHC, E	H
AP1299a	Pan SUMO	WB, IHC, E	H
AT3246a	PDCD6	WB, IF, E	H
AP2710c	PHB	WB, E	H
AP2710a	PHB1	WB, E	H
AP7799a	PHLPP2	IHC, E	H
AP1242a	PIAS1	WB, IHC, E	H
AP1244a	PIAS3	WB, IHC, E	H
AP1280b	PIASny	WB, E	H
AP1248a	PIASx1	WB, IHC, E	H
AP1247a	PIASx1/2	WB, IHC, E	H
AP1249a	PIASy1	WB, IHC, E, IP†	H
AP1251a	PIASz	WB, IHC, E	H
AP1252a	PIASz1	IHC, E	H
AP8028a	PIK3R2	WB, IHC, E	H
AP7932a	PIM1	WB, IHC, E	H
AP7015a	PKC alpha	WB, IHC, E	H
AP7019a	PKC epsilon	WB, IHC, E	H
AP7028a	PKC zeta	WB, IHC, E	H
AP2504a	PML Sumoylation Site	IHC, E	H
AP8459a	PPM1F	WB, IHC, E	H
AP7581a	PPP1R13B	IHC, E	H
AP8462a	PPP2CA/B	WB, IHC, E	H
AP7260a	PRKAA1	WB, IHC, E	H
AP7261a	PRKCA	WB, E	H, M
AP8151a	PRKR	WB, IHC, E	H, M
AP7744a	PRKRA	WB, E	H
AP1001b	PRMT1	WB, E	H
AP1007d	PRMT5	WB, IHC, E	H
AP6231a	PSEN1	WB, IHC, E	H, M
AP6304a	PSN1	WB, E	H
AP6304b	PSN1/2	WB, E	H
AP6305b	PSN2	WB, E	H
AP6304c	PSN2/1	WB, E	H, M
AP8436a	PTEN	WB, IHC, E	H
AP1317a	Puma BH3 domain	WB, IHC, E	H, M
AP1318a	Rad9 BH3	WB, IHC, E	H, M
AP7816a	RAF1	WB, IHC, E	H
AP7816d	RAF1	WB, IHC, E	H
AP2503a	Ran-GTPase Sumoylaion Site	WB, E	H
AP7817b	RIPK1	WB, IHC, E	H
AP7818b	RIPK2	WB, IHC, E	H, M
AP7819b	RIPK3	WB, IHC, E	H, M
AP1230a	SENP1	WB, IHC, E	H
AP1233a	SENP2	WB, IHC, E	H
AP1235a	SENP3	WB, IHC, E	H

Apoptosis Antibodies

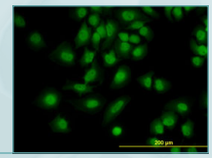
Immunoperoxidase of monoclonal antibody to NDRG1 on formalin-fixed paraffin-embedded human endometrium.



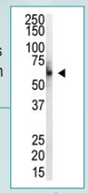
Western blot analysis of NUAK2 antibody. 293 cell lysates either nontransfected or transiently transfected.



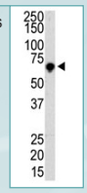
IF of monoclonal antibody to PDCD6 on HeLa cell.



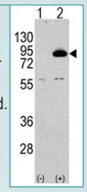
Western blot analysis of PIASy1 antibody in HL-60 cell lysate.



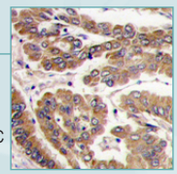
Western blot analysis of PIAS3 polyclonal antibody in bacterial extract lysate.



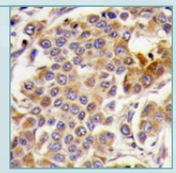
Western blot analysis of PIK3R2 antibody. 293 cell lysates either nontransfected or transiently transfected.



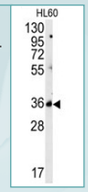
Formalin-fixed and paraffin-embedded human lung carcinoma tissue reacted with PKC zeta antibody.



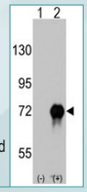
Formalin-fixed and paraffin-embedded human breast carcinoma tissue reacted with PRKAA1-pS487 antibody.



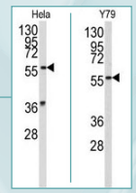
Western blot analysis of PRKRA antibody in HL60 cell line lysates.



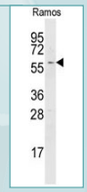
Western blot analysis of RAF1 antibody. 293 cell lysates either nontransfected or transiently transfected.



Western blot analysis of SENP3 antibody in Hela and Y79 cell line lysates.



Western blot analysis of RIPK2 antibody in Ramos cell line lysates.



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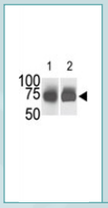
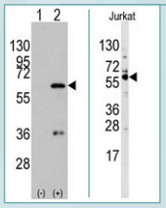
CliniSciences Group

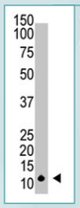
Apoptosis Antibodies



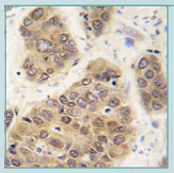
Western blot analysis of SphK2 antibody (Lane 1) to detect c-myc-tagged SphK2 in transfected 293 cell lysate (a c-myc antibody is used as control in Lane 2.



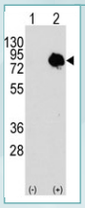
Left: Western blot analysis of STK4 antibody. 293 cell lysates either nontransfected or transiently transfected. Right: Western blot analysis of STK4 antibody in Jurkat cell line lysates.



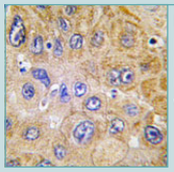
Western blot analysis of SUMO3 antibody in Jurkat cell lysate.



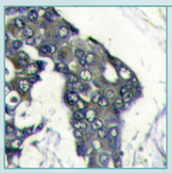
Formalin-fixed and paraffin-embedded human hepatocarcinoma tissue reacted with SUMO4 antibody.



Western blot analysis of TGM2 antibody. 293 cell lysates either nontransfected or transiently transfected.



Formalin-fixed and paraffin-embedded human hepatocarcinoma tissue reacted with THY1 antibody.



Formalin-fixed and paraffin-embedded human breast carcinoma reacted with VEGF antibody.

Apoptosis Antibodies

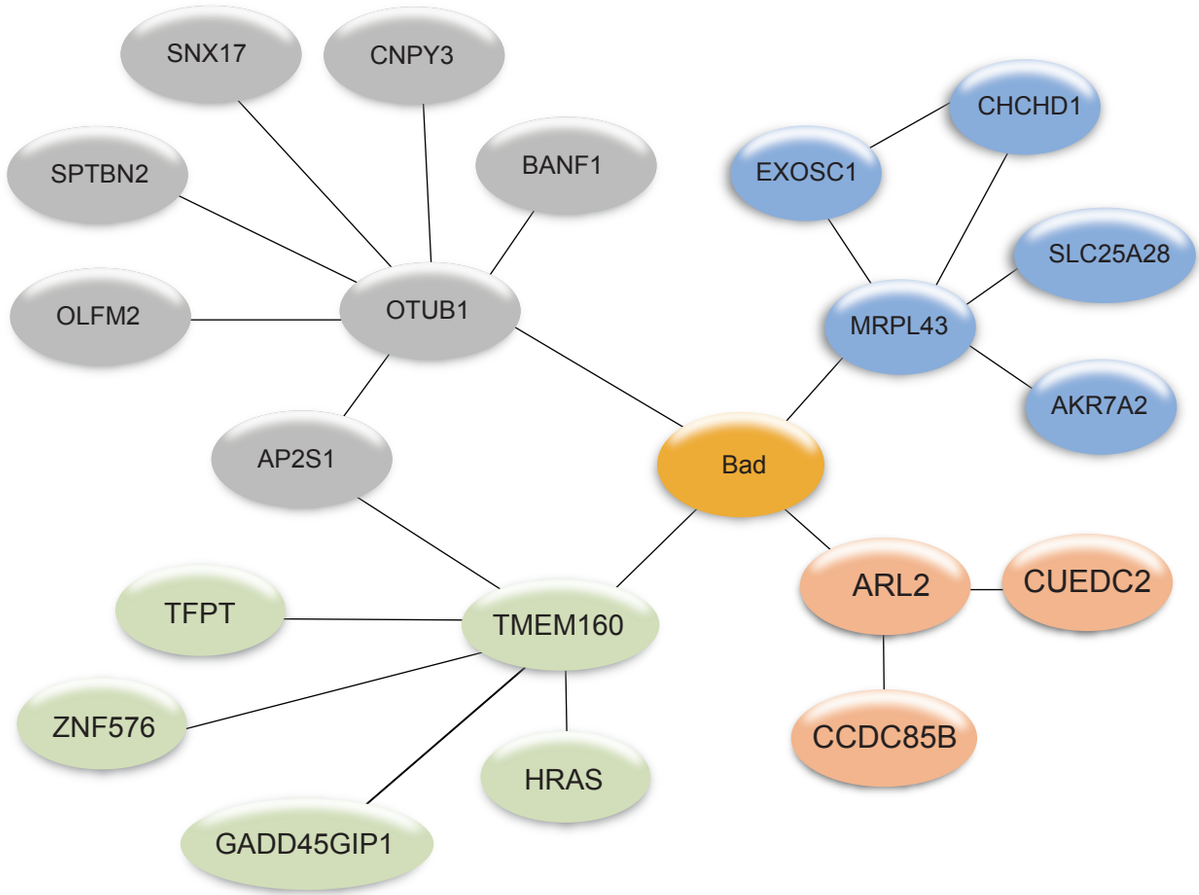
CATALOG #	TARGET	VALIDATION	SPECIFICITY
AP1239a	SENP6	WB, IHC, E	H
AP1241a	SENP7	WB, E	H, M
AP1259a	SENP8	WB, E	H, M
AP7056a	SGK	WB, E	H, M
AP7951a	SLK	WB, IHC, E	H
AP2053b	SLUG	WB, E	H
AP7238a	SPHK2	WB, IHC, E	H
AP2183b	SQSTM1 (p62)	WB, IF, IHC, E	H
AP7258a	STK4	WB, E	H
AM1200a	SUMO1	WB, E	H
AP1221a	SUMO1	WB, IHC, E	H
AP1222a	SUMO1	WB, IHC, E, IF†	H
AP1282a	SUMO2	WB, IHC, E	H
AP1223e	SUMO2/3	WB, IHC, E	H
AP1224a	SUMO2/3	WB, IHC, E	H, M
AM1201a	SUMO3	WB, E	H
AP1225a	SUMO3	WB, IHC, E	H
AP1264a	SUMO4	WB, IHC, E	H
AP1281a	SUV39H2	WB, IHC, E	H
AP7969c	TAO1	IHC, E	H
AP7682a	TAO2	WB, IHC, E	H
AP7954a	TAOK2	IHC, E	H
AP2047a	TDGF1	WB, IHC, E	H
AP7821c	TESK2	WB, IHC, E	H, M
AP7826c	TGM2	WB, E	H
AT4231a	THAP1	WB, E	H
AP2050a	THY1	WB, IHC, E	H
AP1502a	TLR2	IHC, E	H
AP7825b	TRAF2	WB, E	H
AP1337a	TrX	WB, E	H
AP1338a	Trx2	WB, E	H
AP1336b	TrxL	WB, IHC, E	H
AM7679b	TYRO3	WB, IHC, E	H
AM1261a	UBC9	WB, E	H
AP2106a	UBCE7IP1	WB, E	H, M
AP2106b	UBCE7IP1	WB, IHC, E	H, M
AP2111a	UBE4B	WB, IHC, E	H, M
AP6290a	VEGF1	WB, IHC, E	H
AP7823b	ZAK	IHC, E	H

Additional Apoptosis Products

CATALOG #	TARGET	SPECIFICITY
SP1001b	A1/Bfl-1 BH3 Domain Mutant Peptide	H
SP1001a	A1/Bfl-1 BH3 Domain Peptide	H
SP1014b	BNIP3L BH3 Domain Mutant Peptide	H
SP1014a	BNIP3L BH3 Domain Peptide	H
SP1002b	Bad BH3 Domain Mutant Peptide	H
SP1002a	Bad BH3 Domain Peptide	H
SP1003b	Bak BH3 Domain Mutant Peptide	H
SP1003a	Bak BH3 Domain Peptide	H
SP1004b	Bax BH3 Domain Mutant Peptide	H
SP1004c	Bax BH3 Domain Mutant Peptide 2	H
SP1004a	Bax BH3 Domain Peptide	H
SP1005b	Bcl-2 BH3 Domain Mutant Peptide	H
SP1005c	Bcl-2 BH3 Domain Mutant Peptide 2	H
SP1005a	Bcl-2 BH3 Domain Peptide	H
SP1006b	Bcl-G BH3 Domain Mutant Peptide	H
SP1006a	Bcl-G BH3 Domain Peptide	H
SP1007b	Bcl-rambo BH3 Domain Mutant Peptide	H
SP1007a	Bcl-rambo BH3 Domain Peptide	H

Apoptosis Co-Expression Network

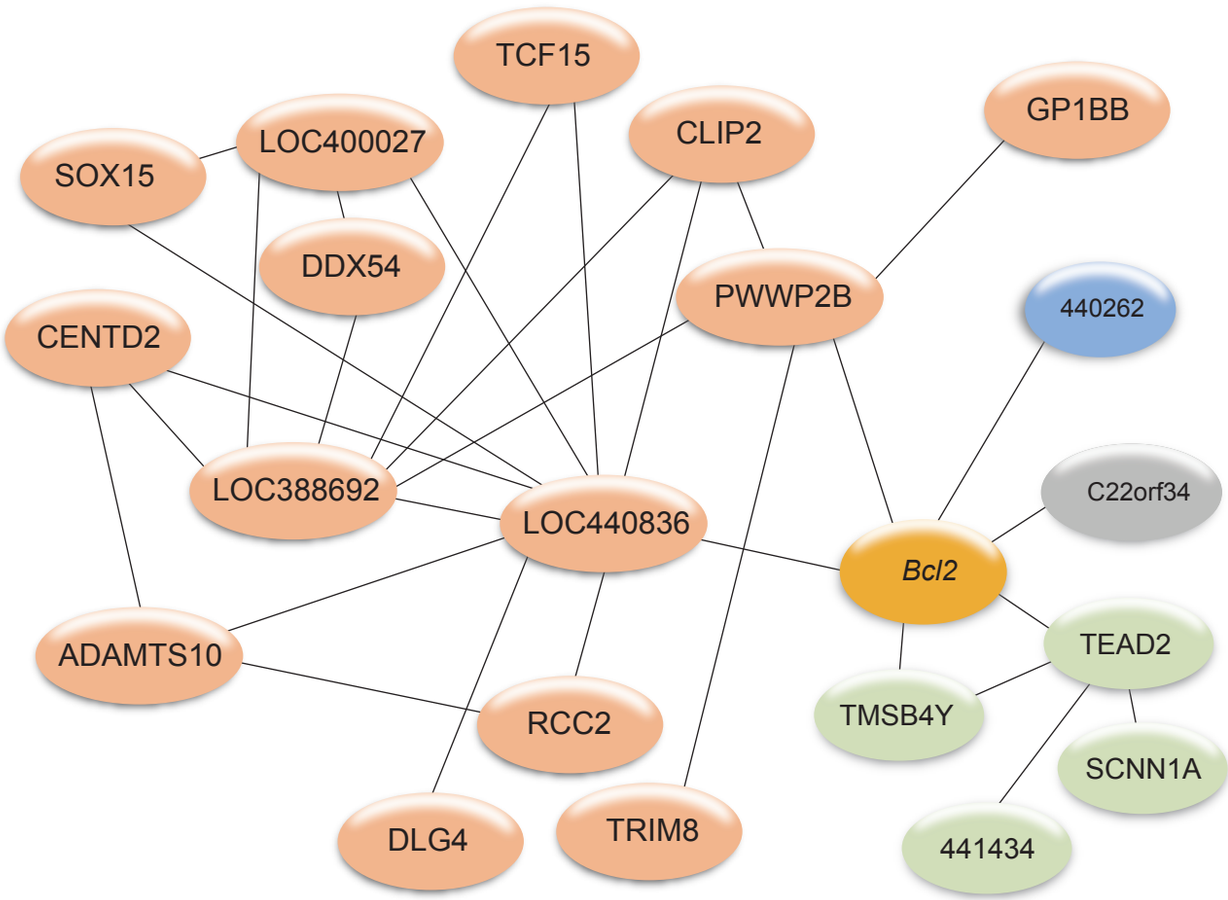
This Bad co-expression network is based on GeneChip data NCBI GEO.



Abgent's Gene Network Discovery Team has developed a powerful technology to perform sophisticated nearest-neighbor analysis of protein associations via large-scale mining of GeneChip data. The result is a concise visual representation of the collective findings of scores of independent scientists. Presented above is the human gene network centered on Bad, an important apoptosis protein. Contact your local distributor today for a free custom network production centered on your gene of interest!

Apoptosis Co-Expression Network

This Bcl2 co-expression network is based on GeneChip data NCBI GEO.



Abgent's Gene Network Discovery Team has developed a powerful technology to perform sophisticated nearest-neighbor analysis of protein associations via large-scale mining of GeneChip data. The result is a concise visual representation of the collective findings of scores of independent scientists. Presented above is the human gene network centered on Bcl2, an important apoptosis protein. Contact Abcepta today for a free custom network production centered on your gene of interest!

BH3 Domains in Apoptosis

Bcl-2 protein contacts regulate key aspects of apoptosis [1-3]. Corruption of apoptotic instructions is associated with a large subset of human diseases, ranging from cancer and cardiovascular to neurodegenerative diseases, and many others [4,5]. Understanding regulation of apoptosis is critical to pharmaceutical intervention. The BH3 domain of Bcl-2 family members is key to Bcl-2 regulatory function.

Bcl-2 family proteins play pivotal roles in apoptosis

Founding family member Bcl-2 is overexpressed in 50% of all cancers, including ~70% of breast cancers, ~30%-60% of prostate cancers, ~90% of colorectal cancers, ~60% of gastric cancers, ~100% of small-cell lung carcinomas, ~20% of non-small-cell lung cancers, ~30% of neuroblastomas, and ~80% of B cell lymphomas [7,8]. Bcl-2's ability to impair apoptosis induction by traditional cytotoxic (chemotherapeutic) drugs is well-established [6]. Tumor cells gain resistance to therapy by reducing expression of pro-apoptotic Bcl-2 protein family members like Bax. Bcl-2 antisense oligonucleotides inhibit non-Hodgkins lymphoma in humans and enhance tumor cell susceptibility to chemotherapeutics [9].

Pro-apoptotic members, including Bax, Bak, Bid, and Bim, trigger release of death-inducing proteins from mitochondria while anti-apoptotic members such as Bcl-2 and Bcl-xL inhibit release. These death-inducing proteins work through pathways including caspase activation and DNA fragmentation [8,10]. Homo- and heterodimerization events are critical to function [11].

BH3 domain interaction is the key regulatory element in Bcl-2 family member proteins

There are four homologous motifs within the Bcl-2 family: BH1, BH2, BH3, and BH4. The BH3 domain is critical for Bcl-2 family heterodimerization and death-promoting activity. Bid, Bcl-2, and Bcl-xL cleavage exposes the BH3 domain and recruits these molecules to mediate apoptosis. Some Bcl-2 family members, including Bik, Bid, and Hrk, contain only the BH3 domain [12-14]. Deletion of BH3 domains from this subfamily abolishes both ability to promote cell death and heterodimerization with anti-apoptotic proteins. Overexpression of Bak BH3 domain fragments induces mammalian cell death [15].

The Bcl-xL structure reveals a receptor-like hydrophobic groove formed by the BH1, BH2, and BH3 domains, binding epitopes located on dimerizing partner proteins. The BH3 domain inserts into the surface pocket on Bcl-xL, similar to a peptide ligand. Death agonists such as Bax, Bak and Bad, insert via BH3 domains into the groove of Bcl-2 or Bcl-xL and promote apoptosis. A Bcl-xL:Bak complex structure confirms the critical nature of BH3 contacts [16].

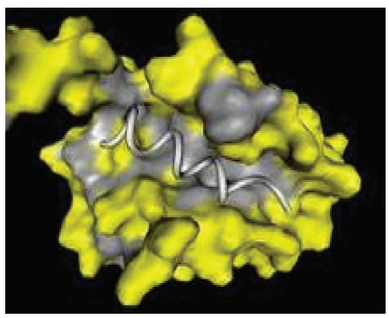
BH3 domain-based interactions delineate key apoptotic pathways

Functional and structural evidence suggests that BH3 domains are pivotal to Bcl-2 regulated apoptosis. BH3 peptides that bind the Bcl-2 pocket block functional protein-protein interactions, implying that secondary and tertiary domain structure is retained in peptidic versions.

BH3 of Bak, Bax, or Bid induce apoptosis by causing rapid activation of caspases, whereas a Bak BH3 mutant peptide containing an Ala substitution at Leu-78, which is critical for Bcl-xL binding, shows no effect [16]. Bak, Bax, and Bad BH3 peptides block heterodimerization of Bcl-xL with cell death agonists in a dose-dependent manner in an in vitro assay [17,18]. Bad BH3 peptides are more potent than other Bcl-2 family BH3 domains in blocking protein-protein interactions of Bcl-xL [17]. Bad and Bax BH3 peptides block Bcl-2: Bak association and induce apoptosis in prostate carcinoma cells, which is blocked by caspase inhibitors [19].

The structure reveals a hydrophobic surface pocket on Bcl-xL formed by the BH1-3 domains bound by the Bak BH3 domain peptide in helical conformation.

Inhibitors of Bcl-2 protein-protein interactions may provide useful leads for drug design. Nonpeptidic small molecules that target BH3 binding are valuable as probes for mapping Bcl-2 family protein binding pockets and as leads for new therapeutic agents. Abnormal Bcl-2 gene expression is found in ~50% of all cancers [17,18]. Bcl-2 protein levels correlate with resistance to chemotherapeutic and radiation therapies [6,10]. Bcl-2 protein inhibitors may be more selective than conventional cytotoxic chemotherapies, since Bcl-2 is low in most normal cell types. Antisense oligonucleotides targeted against the Bcl-2 gene specifically inhibit non-Hodgkins lymphoma in humans, validating Bcl-2 as a therapeutic target [9]. Pro-apoptotic proteins such as Bax and Bad are attractive targets for diseases where the goal is to prevent excessive cell death, such as cardiovascular and neurodegenerative diseases.



High affinity of a Bak BH3 peptide for Bcl-xL was explained by the NMR structure of a Bcl-xL:Bak BH3 peptide complex (see figure, [16]). A crystal structure of Bcl-xL in complex with a peptide derived from the BH3 domain of Bak has been solved [16,20-21].

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