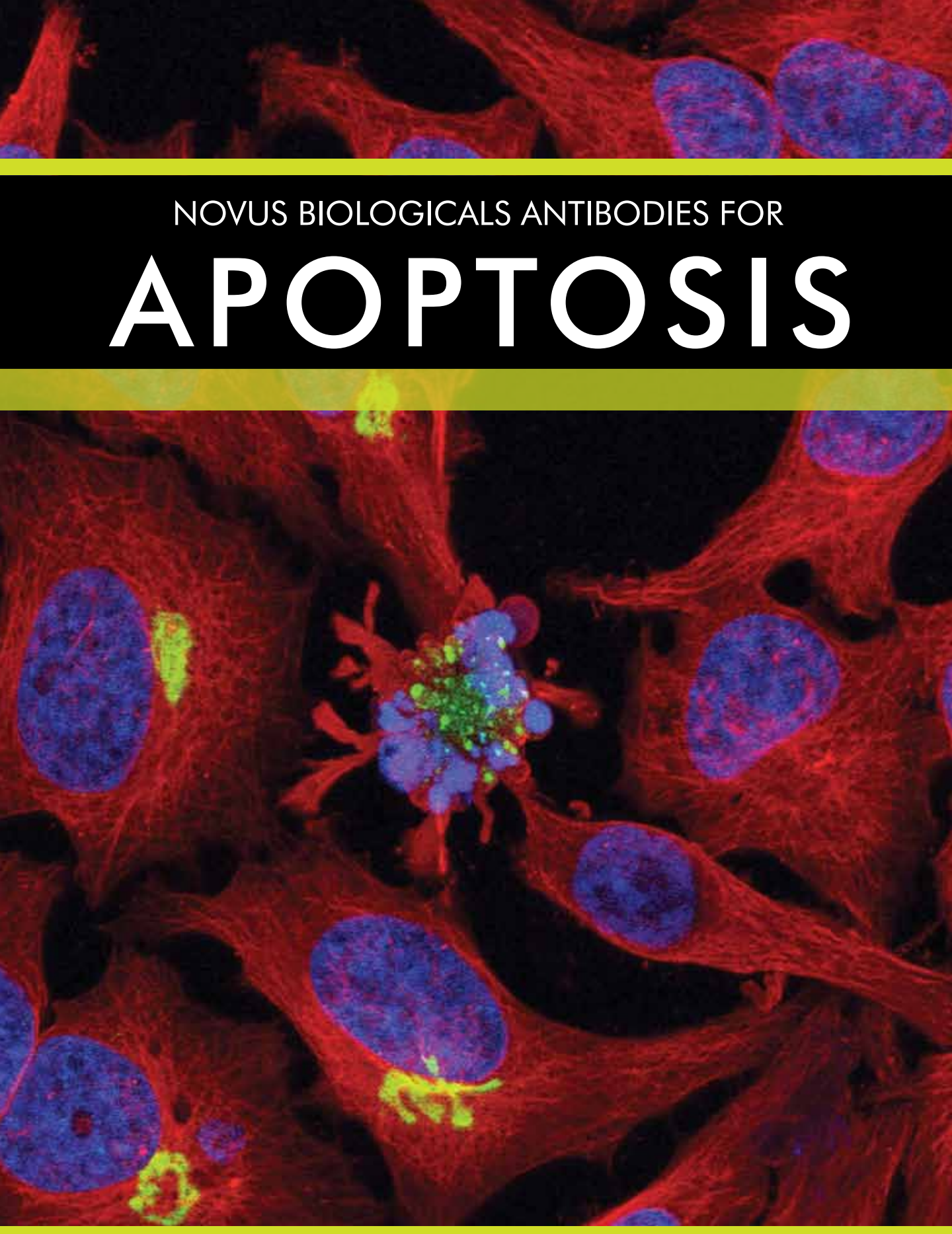
NOVUS BIOLOGICALS ANTIBODIES FOR

APOPTOSIS



NOVUS BIOLOGICALS®

Today's Research. Tomorrow's Discovery.

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Application Key

ChIP - Chromatin Immunoprecipitation

ELISA - Enzyme-linked Immunosorbent Assay

FACS - Fluorescent Activated Cell Sorting

ICC - Immunocytochemistry

IF - Immunofluorescence

IHC - Immunohistochemistry

IHC-P - Immunohistochemistry Paraffin

IP - Immunoprecipitation

PLA - Proximity ligation assay

WB - Western Blot

Reactivity Key

Bv - Bovine

Ca - Canine

Dr - Drosophila

Eq - Equine

Fe - Feline

Hu - Human

Ma - Mammal

Mk - Monkey

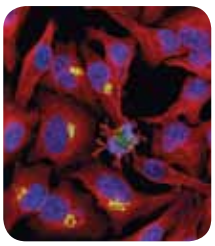
Mu - Mouse

Po - Porcine

Rb - Rabbit

Rt - Rat

Sh - Sheep



Cover Image: Cultured HeLa cells labeled for tubulin (red) and counter-stained with DAPI (blue) with some cells expressing Golgi-targeted GFP. The center cells have undergone apoptosis.

Making Your Success Our Goal

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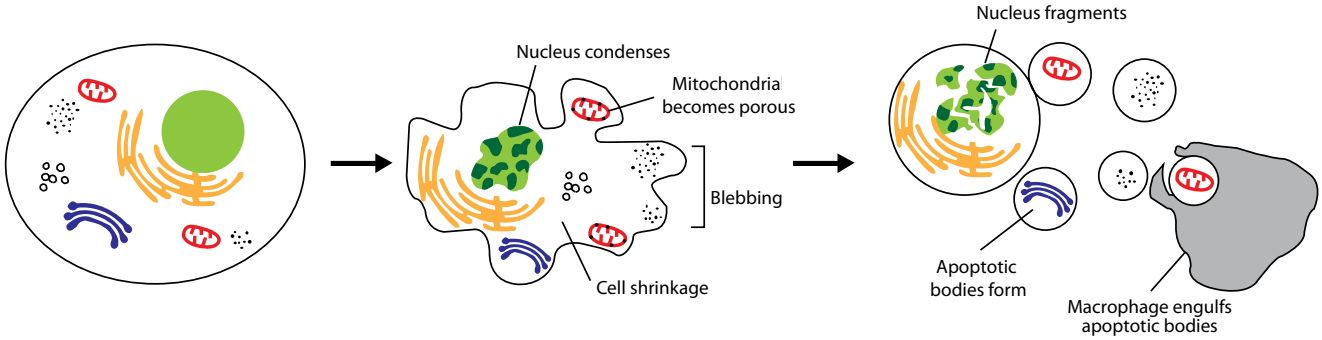
Apoptosis

Apoptosis is a cell death mechanism characterized by depolymerization of cytoskeleton, cell shrinkage, chromatin condensation, nuclear fragmentation and translocation of phosphatidylserine to the cell surface. Apoptosis arises from a number of stimuli that initiate multiple signaling pathways which lead to caspase cascade activation and cell death. Increases in apoptotic activity are hallmarks of several disease states including AIDS, neurodegenerative disorders, insulin-dependent diabetes, myocardial infarction and atherosclerosis. Novus Biologicals offers a variety of tools for the study of apoptosis and its signaling pathways.



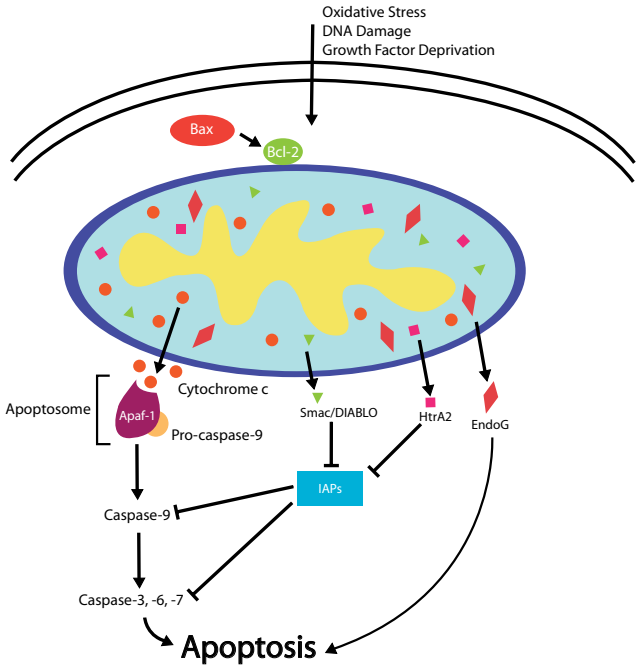
Important Apoptosis Markers from Novus Biologicals

Catalog#	Product	Host	Type	Application	Species	References
NB100-56074	APAF1	Rabbit	Polyclonal	WB, IHC-Fr, IHC-P, IP	Hu, Mu, Rt, Ge	
NBP1-19710	Bax	Rabbit	Polyclonal	WB, IF, IHC-P	Hu, Mu, Rt	
NB200-572	Bcl2 (8C8)	Mouse	Monoclonal	WB, IHC-Fr, IHC-P	Hu, Mk	
NB100-92482	Bcl2 [p Ser70]	Rabbit	Polyclonal	ELISA, IHC-P, IP	Hu, Rt	
NBP1-27972	cIAP2	Rabbit	Polyclonal	WB, ICC, IF, IHC-P	Hu	2
NB500-210	Caspase 3 (CPP32 4-1-18)	Mouse	Monoclonal	IHC, WB	Hu, Rt	7
NB500-206	Caspase 7 (Mch3 1-1-11)	Mouse	Monoclonal	WB	Hu, Mu, Rt	1
NB500-208	Caspase 8 (FLICE 4-1-20)	Mouse	Monoclonal	WB	Hu	
NB500-209	Caspase 9 (LAP6 96-2-22)	Mouse	Monoclonal	WB	Hu	1
NB100-56118	Caspase 9	Rabbit	Polyclonal	WB, IHC-Fr, IHC-P, IP	Hu, Mu, Rt, Ca, Ge	4
NB100-91732	Cytochrome C	Rabbit	Polyclonal	WB, ELISA, IF, IHC-P	Hu, Mu, Rt	
NBP1-49252	HtrA2	Rabbit	Polyclonal	WB, FACS	Hu, Mu, Rt	
NB100-617	KAT3B/p300 (RW109)	Mouse	Monoclonal	WB, IF, IP	Hu, Mk, Mu, Rt	3
NB100-56145	Livin	Rabbit	Polyclonal	WB, IHC-P, IP	Hu, Mu, Rt	
NB100-91863	MDM2	Rabbit	Polyclonal	WB, IF, IHC-P	Hu	
NBP1-77395	NFkB p105/p50	Rabbit	Polyclonal	WB, ICC, IF, IHC-P	Hu, Mu	
NB100-524	NOD2 (2D9)	Mouse	Monoclonal	WB, IHC-P, IP	Hu, Mk	9
NBP1-78292	Notch1	Rabbit	Polyclonal	WB, IHC-P	Hu, Mu	
NB100-91914	p53 Antibody	Rabbit	Polyclonal	WB, IF, IHC-P	Hu	
NB100-61616	PARP	Rabbit	Polyclonal	WB, IHC-P	Hu	
NB500-261	PUMA	Rabbit	Polyclonal	WB	Hu	1
NB500-213	Smac (78-1-118)	Mouse	Monoclonal	WB, IP	Hu, Mu, Rt	6
NB500-201	Survivin	Rabbit	Polyclonal	WB, ChIP, ICC, IF, IHC-P, IP	Hu, Mu, Rt, Ca, Fe	117
NB500-238	Survivin (60.11)	Mouse	Monoclonal	WB, ICC, IF, IHC, IHC-P	Hu, Mu, Rt	14
NB100-92110	TNF Receptor I	Rabbit	Polyclonal	ELISA, IHC-P	Hu, Mu, Rt	
NB100-65024	TNF Receptor II (2/220)	Mouse	Monoclonal	WB, ELISA, Func, IHC-Fr	Hu	
NB110-58347	TOM70	Rabbit	Polyclonal	WB	Hu, Mu, Rt	1
NBP1-39980	TRAIL-R2	Rabbit	Polyclonal	WB, FACS, ICC, IHC-P	Hu	

Mitochondrial Mediated Pathway

This pathway is initiated within the cell and results in increased mitochondrial permeability leading to release of pro-apoptotic molecules such as Cytochrome C into the cytoplasm. Major triggers include genetic damage, hypoxia, growth factor deprivation, high concentrations of cytosolic Ca^{2+} and oxidative stress. This pathway is regulated by the Bcl2 protein family which has three groups. The first group includes anti-apoptotic proteins that contain all four Bcl2 homology (BH) domains (e.g. Bcl2, BCL2L1, Mcl1, BCL2L2 and BCL2A1). The second group contains pro-apoptotic proteins made up of the BH-3 only proteins (e.g. Bid, Bim, PUMA, Noxa, Bad, Bmf, Hrk, and Bik). The third group contains all four BH domains and is also pro-apoptotic in nature (e.g. Bax, Bak, and Bok). Other released factors include apoptosis inducing factor (AIF), Endo G, Smac, DIABLO and HtrA2.

Once released, the Cytochrome C binds and activates APAF1 to form a caspase-activating complex called the apoptosome. This complex activates Caspase 9, which in turn triggers the activation of effector caspases. On the other hand, Smac/DIABLO or HtrA2 promotes caspase activation by binding to inhibitor of apoptosis proteins (IAPs) which subsequently leads to disruption in the interaction of IAPs with Caspase 3 or 9. [PMIDs: 22399377, 21773978]



Related Antibodies

- APAF1
- Bad
- Bak
- Bax
- Bcl2
- BCL2A1
- BCL2L1
- BCL2L12
- Bid
- Bik
- Bim
- Bmf
- Bok
- Cytochrome C
- DIABLO
- Endo G
- Hrk
- HtrA2
- MCL1
- Noxa
- PUMA
- Smac

APAF1 Antibody
NBP1-89050

Immuno-fluorescent analysis of human cell line U-2 OS using NBP1-89050.

Species: Hu
Applications: IF, IHC-P

Bad Antibody
NBP1-88698

Immuno-histochemical analysis of human kidney using NBP1-88698.

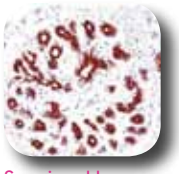
Species: Hu
Applications: WB, IF, IHC-P

Bak (AT8B4) Antibody
NBP1-74026

Immuno-fluorescent analysis of of human HeLa cells using NBP1-74026.

Species: Hu, Mu
Applications: WB, ELISA, IF

Bax (SP47) Antibody
NBP1-49811



Immuno-histochemical analysis of human breast using NBP1-49811.

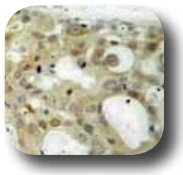
Species: Hu
Applications: IHC-P

Bcl2 Antibody
NB100-92142

Immuno-histochemical analysis of human colon carcinoma tissue using NB100-92142.

Species: Hu, Mu, Rt
Applications: WB, IF, IHC-P

Bcl2 Antibody
NBP1-61819



Immuno-histochemical analysis of human breast cancer carcinoma tissue using NBP1-61819.

Species: Hu
Applications: WB, ELISA, IHC

Mitochondrial Mediated Pathway

Customer Review

★★★★☆

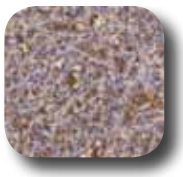
Noxa Antibody (114C307.1) (NB600-1159)
Application: Western Blot
Sample Tested: WEHI 7.2 mouse T cell lymphoma cell lysate
Species: Mouse

BCL2L12 Antibody
NBP1-86025

Immuno-histochemical analysis of human testis using NBP1-86025.

Species: Hu
Applications: WB, IHC-P

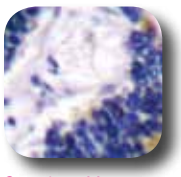
Bid Antibody
NBP1-86187



Immuno-histochemical analysis of human spleen using NBP1-86187.

Species: Hu
Applications: WB, IHC-P

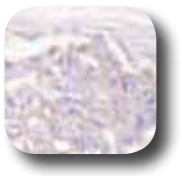
Bik Antibody
NB100-91678



Immuno-histochemical analysis of human lung carcinoma tissue using NB100-91678.

Species: Hu
Applications: WB, ELISA, IF, IHC-P

Bim Antibody
NBP1-67508



Immuno-histochemical analysis of human breast carcinoma tissue using NBP1-67508.

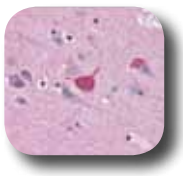
Species: Hu, Mu
Applications: WB, ELISA, IHC

Bmf Antibody
NBP1-84660

Immuno-histochemical analysis of human corpus, uterine using NBP1-84660.

Species: Hu
Applications: WB, IHC-P

Bok Antibody
NBP1-71999



Immuno-histochemical analysis of human brain cortex using NBP1-71999.

Species: Hu
Applications: IHC-P

Cytochrome C (7H8.2C12) Antibody
NB100-56503

Western blot analysis of of HeLa cell lysate using NB100-56503.

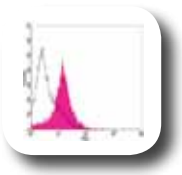
Species: Hu, Mu, Rt, Ca, Dr, Eq, Ma, Po, Rb
Applications: WB, FACS, ICC, IF, IHC-P

Endo G Antibody
NBP1-49361

FACS analysis of Ramos cells using NBP1-49361.

Species: Hu, Mu
Applications: WB, FACS

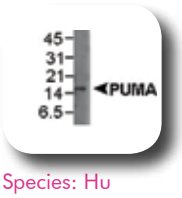
HtrA2 Antibody
NBP1-49252



Flow cytometric analysis of Ramos cells using NBP1-49252.

Species: Hu, Mu, Rt
Applications: WB, FACS

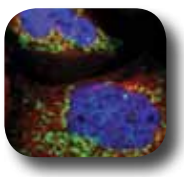
PUMA Antibody
NB500-261



Western blot analysis of the beta isoform of PUMA in HL-60 whole cell lysate using NB500-261.

Species: Hu
Applications: WB

Smac Antibody
NBP1-84262



Immuno-fluorescent analysis showing postivity in mitochondria using NBP1-84262.

Species: Hu
Applications: WB, IF, IHC-P

Product Citations

[Bad Antibody NB100-91672] Mahalingam D, Espitia CM, Medina EC, et al. Targeting PIM kinase enhances the activity of sunitinib in renal cell carcinoma. British Journal of Cancer. 2011 Oct 20. [PMID: 22015557]

[Bim Antibody NB120-15185] Cash TP, Gruber JJ, Hartman TR, Henske EP, Simon MC. Loss of the Birt-Hogg-Dubé tumor suppressor results in apoptotic resistance due to aberrant TGFß-mediated transcription. Oncogene. Jun 2;30(22):2534-46. 2011. [PMID: 21258407]

[Cytochrome C (7H8.2C12) Antibody NB100-56503] Zhang W, Wang X, Chen T. Resveratrol induces apoptosis via a Bak-mediated intrinsic pathway in human lung adenocarcinoma cells. Cellular Signaling. May 2012;24(5):1037-1046. [PMID: 22245142]

[PUMA Antibody NB100-56370] Kim DH, Jung YJ, Lee JE, et al. SIRT1 activation by resveratrol ameliorates cisplatin-induced renal injury through deacetylation of p53. Am J Physiol Renal Physiol. 2011 Aug;301(2):F427-35. [PMID: 21593185]

[Smac (78-1-118) Antibody NB500-213] Wang X, Sirianni A, Pei Z, et al. The Melatonin MT1 Receptor Axis Modulates Mutant Huntingtin-Mediated Toxicity. The Journal of Neuroscience: 2011 Oct 12;31(41):14496-14507. [PMID: 21994366]

Inhibitor of Apoptosis Proteins (IAPs)

The inhibitor of apoptosis proteins are a group of structurally and functionally similar proteins that regulate apoptosis, cytokinesis and signal transduction. They are characterized by the presence of a baculovirus IAP repeat (BIR) protein domain. To date eight IAPs have been identified, namely, NAIP (BIRC1), cIAP1 (BIRC2), cIAP2 (BIRC3), XIAP (BIRC4), Survivin (BIRC5), BIRC6, Livin (BIRC7) and BIRC8. IAPs are endogenous inhibitors of caspases and they can inhibit caspase activity by promoting degradation of active caspases or by keeping the caspases away from their substrates. [PMID: 21773978]

Survivin

Survivin appears to be situated at the crossroads of cell death and cell division, governing a checkpoint involved in cytokinesis, while also suppressing apoptosis. Therapeutic modulation of Survivin is critically regulated by interaction with prominent cell-signalling and growth factor proteins including HIF-1 alpha, HSP90, PI3K/AKT, mTOR, ERK, p53, PTEN, Bcl2, Ras, EGFR, and VEGF.

Survivin Antibody
NB500-201

Telophase with accumulation of survivin in the midbodies of two daughter cells. Survivin detection using NB500-201.

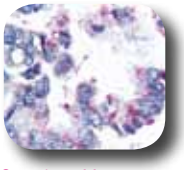
Species: Ca, Hu, Mu, Rt, Fe
Applications: ChIP, IF, IP, WB, ICC, IHC-P

Survivin (60.11) Antibody
NB500-205

Western blot analysis of rat aorta smooth muscle cell lysate using NB500-205.

Species: Hu, Mu, Rt
Applications: FACS, ICC, IF, IP, WB

Survivin (32.1) Antibody
NB500-237



Immunohisto-chemical analysis of human lung cancer using NB500-237.

Species: Hu
Applications: IHC, IF, WB, IHC-P

Customer Reviews

★★★★★

Survivin Antibody (NB500-201)
Application: Western Blot
Sample Tested: HeLa whole cell lysate
Species: Human
Sample Pretreatment: RIPA buffer

★★★★☆

Survivin Antibody (60.11) (NB500-238)
Application: Western Blot
Sample Tested: Mouse heart
Species: Mouse
Sample Pretreatment: Heart lysate

★★★★☆

Survivin [p Thr34] Antibody (NB500-236)
Application: Western Blot
Sample Tested: Cancer cells
Species: Mouse

cIAP

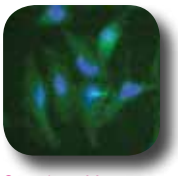
The two isoforms of cIAP (cIAP1 and cIAP2) are apoptotic suppressors that are structurally related to XIAP. The cIAPs can associate with the death receptor TNF-R2, and mediate the ubiquitinization of TRAF2 following the binding of TNF-alpha by its receptor. HtrA2 is a negative regulator of cIAP that inhibits its activity by catalytically cleaving cIAP. Another negative regulator, Smac/DIABLO, acts by enhancing the auto-ubiquitization activity of cIAP.

cIAP1 Antibody
NBP1-90133

Immuno-histochemical analysis of human kidney using NBP1-90133.

Species: : Hu
Applications: WB, IHC-P

cIAP2 Antibody
NBP1-27972



Immuno-cytochemical in Hela cells detected with a Dylight 488 labeled secondary antibody (Green) using NBP1-27972.

Species: Hu
Applications: WB, ICC, IF, IHC-P

cIAP2 Antibody
NBP1-90132

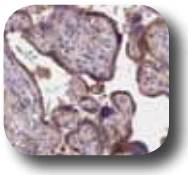
Immuno-histochemical analysis of human tonsil using NBP1-90132.

Species: Hu
Applications: WB, IHC-P

NAIP

Neuronal apoptosis inhibitor protein (NAIP) was the first human IAP protein identified. Unlike other IAPs, NAIP requires ATP to bind cas-pase-9 and is not inhibited by the IAP-inhibiting molecule Smac/DIABLO, suggesting that NAIP is unique among the IAPs in its regula-tory activity.

NAIP Antibody
NBP1-88596



Immuno-histochemical analysis of human placenta using NBP1-88596.

Species: Hu
Applications: IHC-P

Inhibitor of Apoptosis Proteins (IAPs)

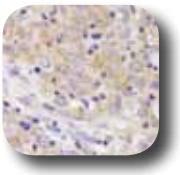
BIRC6

Research suggests that BIRC6 inhibits apoptosis by interfering with the activation of ICE-like proteases. BIRC6, which contains a single BIR domain and an ubiquitin-conjugating enzyme domain, is expressed in multiple cancer cell lines.

BIRC8

BIRC8 (ILP-2) potentially inhibits apoptosis that is induced by overexpression of Bax or by co-expression of Caspase 9 with APAF1. A processed form of Caspase 9 can be co-precipitated from cells, with BIRC8, suggesting a physical interaction between BIRC8 and Caspase 9.

BIRC6 Antibody
NB110-40730



Immuno-histochemical analysis of human metastatic lymph node using NB110-40730.

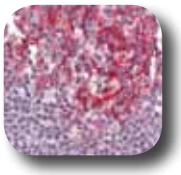
Species: Hu
Applications: IHC-P

BIRC6 Antibody
NB300-264

Immuno-histochemical analysis of human ovarian tumor using NB300-264.

Species: Hu
Applications: WB, IHC-P, IP, PLA

BIRC8 Antibody
NBP1-03071



Immunohisto-chemical analysis of human small intestine, Peyer's patch using NBP1-03071.

Species: Hu, Mu, Rt
Applications: WB, ICC, IHC-P

Livin

Livin has two isoforms (Livin alpha and Livin beta) that have varying functions and tissue distributions. Livin alpha protects cells from apoptosis induced by staurosporine, whereas Livin beta protects cells from apoptosis induced by etoposide.

Livin Antibody
NBP1-33755

Immuno-fluorescent analysis of paraformaldehyde-fixed HeLa, using NBP1-33755.

Species: Hu
Applications: WB, IF, IHC-P

Livin Antibody
NB100-56145

Immuno-histochemical analysis of human tonsil using NB100-56145.

Species: Hu, Mu, Rt
Applications: IP, WB, IHC-P

Livin Antibody
NBP1-76711

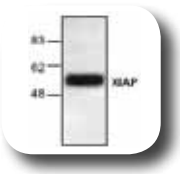
Immuno-histochemical analysis of human small intestine tissue using NBP1-76711.

Species: Hu
Applications: WB, ELISA, IHC-P

XIAP

The X-linked inhibitor of apoptosis protein (XIAP) functions by directly binding Caspase 3, Caspase 7 and Caspase 9, thus causing their inhibition and blockage of the apoptosis signaling pathway. XIAP is specifically cleaved by Caspase 3 during apoptosis, and partially loses its function.

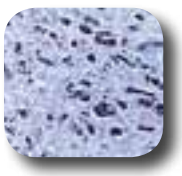
XIAP Antibody
NB600-872



Western blot analysis of XIAP expression in Jurkat cell lysate using NB600-872.

Species: Hu, Mu, Rt
Applications: ICC, IF, IHC-P, IP, WB

XIAP Antibody
NB100-56183



Immuno-histochemical analysis of human breast carcinoma using NB100-56183.

Species: Hu, Mu, Rt
Applications: IP, WB, IHC-P

XIAP Antibody
NBP1-61432

Immuno-histochemical analysis of human skeletal muscle tissue using NBP1-61432.

Species: Hu, Mu, Rt
Applications: WB, ELISA, IHC

Visit www.novusbio.com/support.html for videos, FAQs and protocols for your most common antibody applications.

Death Receptor Signaling Pathway

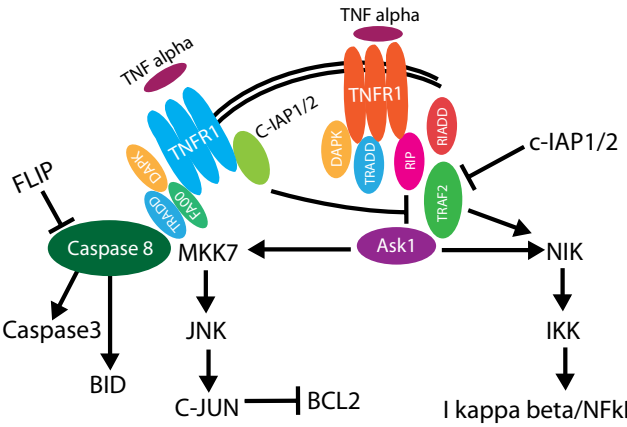
The extrinsic death receptor pathway begins when death ligands bind to a death receptor. The best known death receptors is the type 1 TNF receptor (TNFR1) and a related protein called Fas (CD95) and their ligands. These death receptors recruit adapter proteins such as TNF receptor-associated death domain (TRADD) and Fas-associated death domain (FADD), as well as cysteine proteases like Caspase 8. Binding of the death ligand to the death receptor results in the formation of a binding site for an adaptor protein and the whole ligand-receptor-adaptor protein complex is known as the death-inducing signalling complex (DISC). DISC then initiates the assembly and activation of pro-Caspase 8. The activated form of the enzyme, Caspase 8, is an initiator caspase,which initiates apoptosis by cleaving other downstream or executioner caspases. [PMID: 21773978]

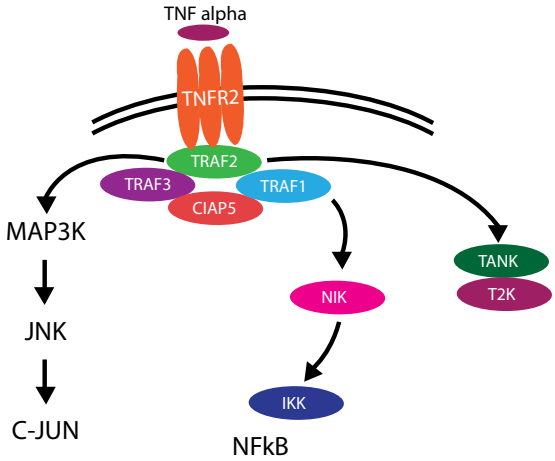
TNF Receptor 1

The TNF-R1 protein is the main regulator of programmed cell death. This receptor can activate numerous pathways either causing inhibition of Bcl2, which allows for induction of mitochondrial mediated apoptosis, or activating the NFkB pathway, which promotes cell survival.

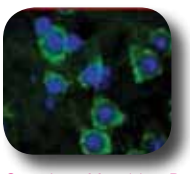
TNF Receptor 2

The TNF-R2 protein does not appear to play a direct role in apoptosis. However, it may aid in responding to endogenously produced TNF, thus modulating TNF-R1 signaling. TNF-R2 may also enhance apoptosis by selectively depleting TRAF2 and IAP proteins.





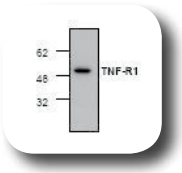
TNF Receptor I Antibody
NBP1-67731



Immuno-cytochemical analysis of mouse brain tissue using NBP1-67731.

Species: Hu, Mu, Rt
Applications: ELISA, IHC, IHC-Fr

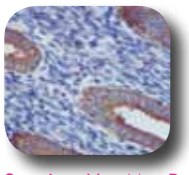
TNF Receptor I Antibody
NBP1-45906



Western blot analysis in rat brain tissue lysate using NBP1-45906.

Species: Hu, Mu, Rt, Bv, Ca, Mk, Po, Rb, Sh
Applications: WB, IHC-P

TNF Receptor II (EPR1653) Antibody
NBPI-95663



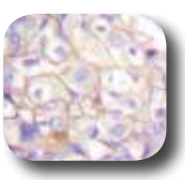
Immuno-histochemical analysis of uterus tissue using NBP1-95663.

Species: Hu, Mu, Rt
Applications: WB, FACS, ICC, IHC-P, IP

FAS

The FAS (CD95) death receptor belongs to the TNF superfamily resulting in a different mechanism than the TNF receptors. Upon binding its corresponding Fas ligand, the FAS receptor complexes into the death inducing signaling complex, which serves to attract FADD and other proteins that affect apoptotic pathways within the cell.

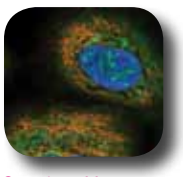
FAS Antibody
NB100-92093



Immuno-histochemical analysis of human breast carcinoma tissue using NB100-92093.

Species: Hu
Applications: WB, ELISA, IHC-P

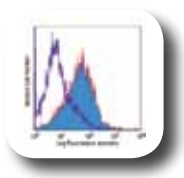
FAS Antibody
NBP1-89034



Immuno-fluorescent analysis showing positivity in nucleus, plasma membrane & cytoplasm using NBP1-89034.

Species: Hu
Applications: WB, IF, IHC-P

Fas Ligand (NOK-1) Antibody
NB100-77833



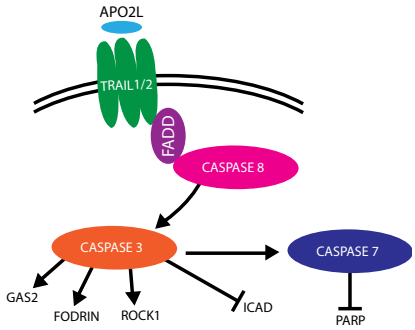
Flow cytometric analysis of transfected cells followed by biotinylated anti-mouse IgG and Sav-PE using NB100-77833.

Species: Hu
Applications: FACS, ICC, IF, IP

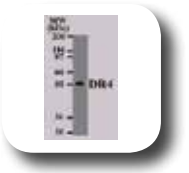
Death Receptor Signaling Pathway

TRAIL

TRAIL receptors can induce both apoptosis and the NFkB pathway. TRAIL-R1 and TRAIL-R2 both contain a death domain. TRAIL-R3 and TRAIL-R4 inhibit the signaling of TRAIL-R1 and TRAIL-R2. This pathway is of particular interest because the receptors can be targeted by monoclonal antibodies and TRAIL ligands which is enough to induce apoptosis in tumor cells; normal cells seem to be resistant to the induction.



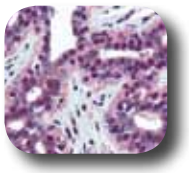
TRAIL-R1 (32A1380) Antibody
NB100-56747



Western blot analysis of 15 ug of total cell lysate from Daudi cells using NB100-56747.

Species: Hu
Applications: WB, FACS

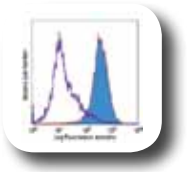
TRAIL-R2 Antibody
NBP1-39980



Immuno-histochemical analysis of human breast tissue using NBP1-39980.

Species: Hu
Applications: FACS, ICC, IHC-P, WB

TRAIL-R3 (DJR3) Antibody
NB100-77842



Flow cytometric analysis of human peripheral blood granulocytes stained using NB100-77842.

Species: Hu
Applications: FACS

Death Receptor Associating Proteins

A commonality among the death receptor associating proteins is that they each contain a highly conserved set of 80 amino acids, which are known collectively as the death domain. This portion of the protein is capable of affiliating with the corresponding domain of the death receptors. Upon binding the receptor, other proteins are recruited and apoptotic pathways are triggered.

Death Receptor Associating Antibodies

- ASK1
- DAP Kinase 1
- DAP Kinase 2
- Daxx
- FADD
- RIPK1
- RAIDD
- TRAF2

DAP1 Antibody
NBP1-91031

Immuno-histochemical analysis of human prostate using NBP1-91031.

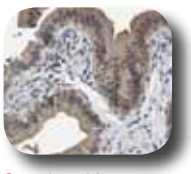
Species: Hu
Applications: IHC-P

DAP Kinase 2 Antibody
NBP1-61594

Immuno-histochemical analysis of human skeletal muscle uisng NBP1-61594.

Species: Hu, Mu, Rt
Applications: ELISA, IHC

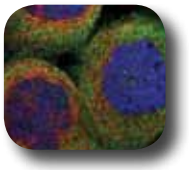
FADD Antibody
NBP1-81831



Immuno-histochemical analysis of human gall bladder using NBP1-81831.

Species: Hu
Applications: WB, IHC-P

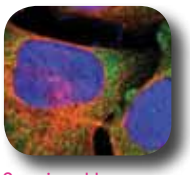
RIPK1 Antibody
NBP1-87128



Immuno-fluorescent analysis showing positivity in cytoplasm using NBP1-87128.

Species: Hu
Applications: WB, IF, IHC-P

TRAF2 Antibody
NBP1-86913



Immuno-fluorscent analysis showing positivity in cytoplasm using NBP1-86913.

Species: Hu
Applications: WB, IF, IHC-P

Product Citations

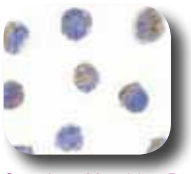
[ASK1 [p Ser966] Antibody NB100-92474, ASK1 [p Ser966] Antibody NBP1-19963 and ASK1 Antibody NBP1-61805] Goldberg H, Whiteside C, Fantus IG. O-linked ß-N-acetylglucosamine supports p38 MAPK activation by high glucose in glomerular mesangial cells. Am J Physiol Endocrinol Metab. 2011 Oct;301(4):E713-26. [PMID: 21712532]

[Daxx Antibody NBP1-03157] Piñeiro D, Ramajo J, Bradrick SS, Martínez-Salas E. Gemin5 proteolysis reveals a novel motif to identify L protease targets. Nucleic Acids Res. 2012 Feb 22. [PMID: 22362733]

Apoptosis Inducing Factor

In addition to the mitochondrial mediated pathway of apoptosis and death receptor signaling pathway of apoptosis, a third mechanism is present. Unlike the intrinsic and extrinsic pathways, this mechanism functions without caspases. Apoptosis-inducing factor (AIF) is a flavoprotein localized to the mitochondrial membrane. When a cell receives a death signal, often triggered by reactive oxygen species, AIF is released from the mitochondria and translocates to the nucleus where it binds to DNA and triggers apoptosis. Unlike Cytochrome C, AIF acts in a caspase-independent fashion.

AIF Antibody
NBP1-77294



Immuno-histochemical analysis of K562 cells using NBP1-77294.

Species: Hu, Mu, Rt
Applications: WB, ELISA, ICC

AIF Antibody
NB100-66028

Western blot analysis in K562 cell lysate with NB100-66028.

Species: Hu
Applications: WB

AIF Antibody
NB100-66560

Immuno-histochemical analysis of human retina using NB100-66560.

Species: Hu
Applications: WB, IHC-P

Apoptosis Related ELISA Kits

Novus offers sandwhich ELISA kits with the capture polyclonal antibody pre-coated onto a 96-well plate. Mulitple ELISA kits are are available for a specific target to ensure optimal results.

Catalog#	Target	Unit Size
KA1868	Active Caspase 3	1 Kit
KA0184	Active/cleaved Caspase 8	1 Kit
KA0185	Active/cleaved Caspase 9	1 Kit
KA2145	ADAM17	1 Kit
KA2152	AKT1*	1 Kit
KA0454	Albumin*	1 Kit
KA1694	ANGPTL4	1 Kit
KA0150	Annexin A5	1 Kit
NBP1-92656	Annexin V*	1 Kit
KA1031	ApoE	1 Kit
KA0042	APOJ / Clusterin	1 Kit
NBP1-91188	Bcl2*	1 Kit
KA1040	Bradykinin*	1 Kit
NBP1-83733	Caspase 8	1 Kit
NBP1-83734	Caspase 9	1 Kit
NBP1-91278	CD137*	1 Kit
KA0446	CD14	1 Kit
NBP1-91279	CD28*	1 Kit
NBP1-91185	CD30*	1 Kit
NBP1-91264	CD40*	1 Kit
KA0144	CD40 Ligand*	1 Kit
KA1073	CD5L	1 Kit
KA2195	CVID	1 Kit
NBP1-91263	Cytochrome C	1 Kit
KA0148	Fas*	1 Kit
KA0159	Fas Ligand*	1 Kit
KA0993	Galectin 1	1 Kit

Catalog#	Target	Unit Size
KA1717	Galectin 7	1 Kit
KA0168	Galectin-3*	1 Kit
KA0984	GDNF*	1 Kit
KA1720	GITR*	1 Kit
KA1721	GITRL	1 Kit
KA0186	Granzyme A*	1 Kit
KA0187	Granzyme B/H	1 Kit
NBP1-83736	GZMB	1 Kit
KA2209	IGF1 Receptor	1 Kit
BEK-2032-2P	IGFBP3*	1 Kit
KA0275	IL1 alpha*	1 Kit
KA1502	IL1 beta*	1 Kit
KA0125	IL10*	1 Kit
KA1396	IL17*	1 Kit
KA0522	IL2RA/CD25*	1 Kit
KA0539	Inhibin beta A*	1 Kit
KA0126	Interferon alpha 2*	1 Kit
KA2214	Interleukin-24	1 Kit
BEK-2055-2P	Laminin*	1 Kit
BEK-2059-2P	MCP1*	1 Kit
KA0393	MMP2*	1 Kit
KA0404	Neurotrophin 3*	1 Kit
KA2219	Notch1	1 Kit
KA0312	Osteopontin*	1 Kit
BEK-2082-2P	Osteoprotegerin*	1 Kit
NBP1-91257	p53	1 Kit
KA0924	Parathyroid Hormone	1 Kit

Catalog#	Target	Unit Size
KA1972	PIG3	1 Kit
KA1834	Prolactin Receptor	1 Kit
KA1840	Protein C*	1 Kit
KA0496	Prothrombin	1 Kit
KA0037	S100B	1 Kit
KA2174	STAT1*	1 Kit
KA0441	Survivin	1 Kit
BEK-2121-2P	Survivin	1 Kit
KA0151	TGF beta 1*	1 Kit
KA0153	TGF beta 2	1 Kit
KA2222	TGF beta 3	1 Kit
KA0511	Thrombin	1 Kit
KA0420	TIMP3*	1 Kit
KA0438	TNF beta*	1 Kit
KA0114	TNF p55*	1 Kit
KA0270	TNF Receptor I*	1 Kit
NBP1-88105	TNF Receptor II*	1 Kit
NBP1-82419	TNFSF13	1 Kit
KA1499	TNFSF13B	1 Kit
KA1741	TNFSF14	1 Kit
KA2196	TNFSF15	1 Kit
KA0174	TNFSF8*	1 Kit
KA0990	TRAIL*	1 Kit
KA0509	Transferrin*	1 Kit
KA2074	Troponin I Type 3 (cardiac)	1 Kit
KA2198	TWEAK*	1 Kit
KA1818	TWEAK	1 Kit

* Multiple ELISA Kits are available for this target. See **www.novusbio.com** for more information.

Caspases

Caspases are a family of enzymatic proteins known as cysteine proteases and exist within the cell as inactive pro-caspases. This family can be divided into three classes: initiator caspases, effector caspases and cytokine processors. Initiator caspases (Caspase 2, 8, 9, 10) are the first to be activated, which then cleave and activate the effector caspases (Caspase 3, 6, 7). Effector caspases cleave, degrade and activate other protein substrates within the cell, such as cytoskeletal proteins, to trigger apoptosis. Some caspases (Caspase 1, 4, 5, 11, 12, 13, 14) have a specialized role in inflammation and their activation leads to the processing of pro-inflammatory cytokines. The caspase cascade can be activated by numerous mechanisms, including delivery of granzyme B, apoptosome formation and death cell receptors. Caspase activation leads to characteristic morphological changes of the cell, such as shrinkage, DNA fragmentation, plasma membrane blebbing and chromatin condensation. [PMID: 21773978]

Caspase Antibodies

- Active Caspase 2
- Active Caspase 3
- Caspase 1
- Caspase 2
- Caspase 3
- Caspase 4
- Caspase 5
- Caspase 6
- Caspase 7
- Caspase 8
- Caspase 9
- Caspase 9/Procaspase 9
- Caspase 10
- Caspase 11
- Caspase 12
- Caspase 13
- Caspase 14

Caspase-3 (CPP32 4-1-18) Antibody NB500-210

Western blot analysis of HEK293 cell extract using NB500-210. Lanes 1 and 2 contain inactive and active Capsase, respectively.

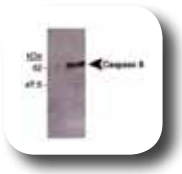
Species: Hu, Rt
Applications: IHC, WB

Caspase 7 (Mch3 1-1-11) Antibody NB500-206

Western blot analysis on HeLa whole cell lysate using NB500-206.

Species: Hu, Mu, Rt
Applications: WB

Caspase 8 (FLICE 4-1-20) Antibody NB500-208



Western blot analysis on HEK293 cell extract using NB500-208. (Lanes 1 and 2 contain inactive and active Caspase 8, respectively.

Species: Hu
Applications: WB

Caspase 9 (LAP6 96-2-22) Antibody NB500-209

Western blot analysis in active 293 cell lysate using NB500-209. Lane 1: inactive 293 cell lysate.

Species: Hu
Applications: WB

Customer Reviews

★★★★★

Caspase 3 (CPP32 4-1-18) Antibody (NB500-210)
Application: Western Blot
Sample Tested: Human Hepatoblastoma
Species: Human

★★★★★

Caspase 9 (LAP6 96-2-22) Antibody (NB500-209)
Application: Western Blot
Sample Tested: COLO-205 Cell Line
Species: Human

★★★★☆

Caspase 9 (LAP6 96-2-22) Antibody (NB500-209)
Application: Western Blot
Sample Tested: Human cell
Species: Human
Sample Pretreated: Anti-cancer drug

Product Citations

[Active Cleaved Caspase 3 Antibody NB600-1235] Jee D, Lee WK. Inhibitory Effect of intravitreal Injection of Bevacizumab on Nerve Growth Factor. Current Eye Research. 2011 Oct 31. [PMID: 22040304]

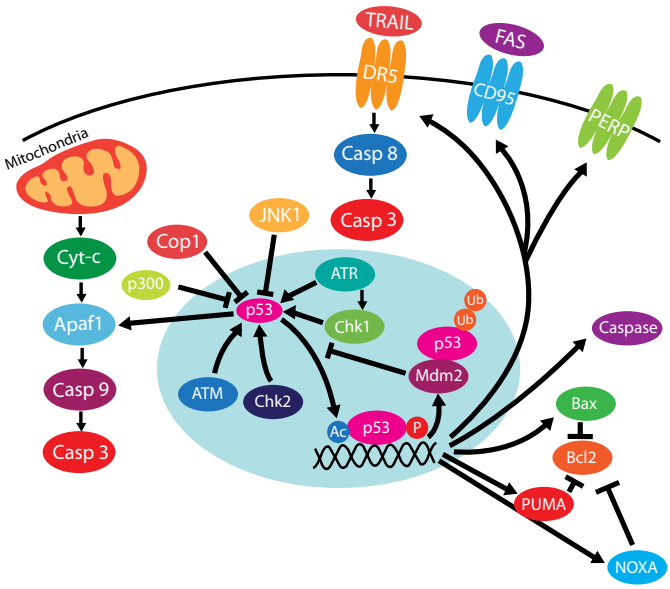
[Caspase 8 Antibody NB100-56116] Zhang X, Chen W, De Paiva CS, et al. Interferon-gamma Exacerbates Dry Eye Induced Apoptosis in Conjunctiva via Dual Apoptotic Pathways. Invest Ophthalmol Vis Sci. 2011 Aug 9;52(9):6279-85. [PMID: 21434767]

[Caspase 9 Antibody NB100-56118] Yang F, Wu W, Cao L, et al. Pathways of macrophage apoptosis within the interface membrane in aseptic loosening of prostheses. Biomaterials. 2011 Aug 25. [PMID: 21872327]

[Caspase 11 (17D9) Antibody NB120-10454] Kayagaki N, Warming S, Lamkanfi M, et al. Non-canonical inflammasome activation targets caspase-11. Nature. 2011 Oct 16. [PMID: 22002608]

p53 and Apoptosis

The p53 protein, also called tumor protein 53, is one of the best known tumor suppressor proteins. It is not only involved in the induction of apoptosis but it is also a key player in cell cycle regulation, development, differentiation, gene amplification, DNA recombination, chromosomal segregation and cellular senescence. Defects in the p53 tumor suppressor gene have been linked to more than 50% of human cancers. Recent studies show that some target genes of p53 involved in apoptosis and cell cycle regulation are aberrantly expressed in melanoma cells, leading to abnormal activity of p53 and contributing to the proliferation of these cells. [PMID: 21773978] p53 can be induced by internal and external stress signals, such as DNA damage, oxidative stress, loss of normal cellular contacts, and radiation.



p53 Associated Antibodies

- ATM
- ATR
- Chk1
- Chk2
- COP1
- DDR1
- JNK1
- KAT3B/p300
- MDM2
- Notch
- Noxa
- PERP
- PIG3
- PUMA

Customer Reviews

★★★★★

KAT3B/p300 Antibody (NB500-161)
Application: ChIP
Sample Tested: Hypoxic hela cell
Species: Human

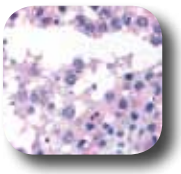
★★★★☆

MDM2 Antibody (SMP14) (NB100-2736)
Application: Western Blot
Sample Tested: Hela whole cell lysate
Species: Human

★★★★★

p53 (PAb 240) Antibody (NB200-103)
Application: Western Blot
Sample Tested: Whole Cell Lysate of MCF-7 and HeLa cells
Species: Human
Sample Pretreated: RIPA buffer

ATM Antibody
NB100-104



Immuno-histochemical analysis of testis using NB100-104.

Species: Hu
Applications: WB, IF, IHC, IHC-P, IP

ATM (5C2) Antibody
NB100-220

Western blot analysis of ATM in Raji whole cell extract (lane 1) and T24 syncronized cell lysate (lane 2) using NB100-220.

Species: Hu, Mk, Mu, Rt
Applications: ICC, IF, WB

ATR Antibody
NBP1-62151

Immuno-histochemical analysis of human colon carcinoma using NBP1-62151.

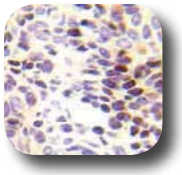
Species: Hu
Applications: ELISA, IHC

ATR Antibody
NB100-322

Western blot analysis of HeLa and U205 cell lysates using NB100-322.

Species: Hu, Mu
Applications: WB, IP, PLA

Chk1 Antibody
NBP1-20056



Immuno-histochemical analysis of human lung adenocarcinoma tissue using NBP1-20056.

Species: Hu, Mu, Rt
Applications: WB, IF, IHC, IHC-P

Chk2 (5C4) Antibody
NBP1-47695

Immuno-histochemical analysis of colon tissue using NBP1-47695.

Species: Hu, Ca
Applications: WB, IHC-P

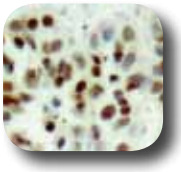
p53 and Apoptosis

KAT3B/p300 (RW109) Antibody
NB100-617

Western blot analysis in a HeLa nuclear extract using NB100-617.

Species: Hu, Mu, Rt, Mk
Applications: WB, IF, IP

p53 Antibody
NB100-91914



Immuno-histochemical analysis of human breast carcinoma tissue using NB100-91914.

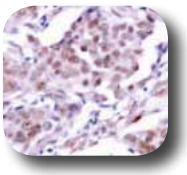
Species: Hu
Applications: WB, IF, IHC-P

p53 (PAb 1801) Antibody
NB200-104

Western blot using NB200-104. Lane A: 293T cell lysate
Lane B: A-431 cell lysate

Species: Hu
Applications: WB, ELISA, FACS, IHC-Fr, IHC-P, IP, RIA

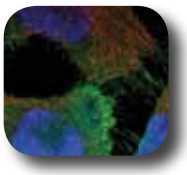
p53 [p Ser15] Antibody
NB100-92601



Immuno-histochemical analysis of human breast carcinoma tissue using NB100-92601.

Species: Hu, Mu, Rt
Applications: WB, ELISA, IHC, IHC-P

PERP Antibody
NBP1-85173



Immuno-fluorescent staining of human cell line U-251MG shows positivity in plasma membrane & cell junctions.

Species: Hu
Applications: IF, IHC-P

PIG3 Antibody
NBP1-87274

Immuno-histochemical analysis of human kidney using NBP1-87274.

Species: Hu
Applications: WB, IHC-P

Product Citations

[ATM Antibody NB100-104] Wang SC, Wu CC, Wei YY, et al. Inactivation of ataxia telangiectasia mutated gene can increase intracellular reactive oxygen species levels and alter radiation-induced cell death pathways in human glioma cells. Int J Radiat Biol. 2011 Jan 4. [PMID: 21204616]

[ATM Antibody NB100-270] Dixon BP, Henry J, Siroky BJ, Chu A, Groen PA, Bissler JJ. Cell cycle control and DNA damage response of conditionally immortalized urothelial cells. PLoS One. 2011 Jan 28;6(1). [PMID:21305048]

[ATM (2C1) Antibody NB100-309] Li R, Yang Y-G, Gao Y, et al. A distinct response to endogenous DNA damage in the development of Nbs1-deficient cortical neurons. Cell Research. 2012 Jan 3. [PMID: 22212482]

[ATM (5C2) Antibody NB100-220] Hou YY, Toh MT, Wang X. NBS1 deficiency promotes genome instability by affecting DNA damage signaling pathway and impairing telomere integrity. Cell Biochemistry and Function. 2011 Dec 9. [PMID: 22161642]

[ATOX1 Antibody NBP1-06611] Palm ME, Weise CF, Lundin C et al. Cisplatin binds human copper chaperone Atox1 and promotes unfolding in vitro. Proc Natl Acad Sci U S A. 2011 Apr 26;108(17):6951-6. [PMID 21482801]

[ATP7b Antibody NB100-360] Ip V, Liu JJ, Mercer JF et al. Differential expression of ATP7A, ATP7B and CTR1 in adult rat dorsal root ganglion tissue. Mol Pain. 2010 Sep 13;6(1):53. [PMID: 20836889] (IHC-F/IF, Rat)

[ATR [p Ser428] Antibody NBP1-48575] Shrotriya S, Deep G, Gu M, et al. Generation of reactive oxygen species by grape seed extract causes irreparable DNA damage leading to G2/M arrest and apoptosis selectively in head and neck squamous cell carcinoma cells. Carcinogenesis. 2012 Jan 19. [PMID: 22266465]

[ATR Antibody NB100-322] Li R, Yang Y-G, Gao Y, et al. A distinct response to endogenous DNA damage in the development of Nbs1-deficient cortical neurons. Cell Research. 2012 Jan 3. [PMID: 22212482]

[ATR Antibody NB100-323] Yang YN, Chou KM, Pan WY, Chen YW, Tsou TC, Yeh SC, Cheung CH, Chen LT, Chang JY. Enhancement of non-homologous end joining DNA repair capacity confers cancer cells resistance to the novel selenophene compound, D-501036. Cancer Lett. 2011 Oct 1;309(1):110-8.

[Chk1 Antibody NB100-464] Karnani N, Dutta A. The effect of the intra-S-phase checkpoint on origins of replication in human cells. Genes Dev. 2011 Mar 15;25(6):621-33. [PMID 21406556]

[Chk2 [p Thr68] Antibody NBP1-19970] Taniai E, Hayashi H, Yafune A, et al. Cellular distribution of cell cycle-related molecules in the renal tubules of rats treated with renal carcinogens for 28 days: relationship between cell cycle aberration and carcinogenesis. Arch Toxicol. 2012 Mar 13. [PMID: 22411273]

[KAT3B/p300 Antibody NB500-161] Luo W, Hu H, Chang R, et al. Pyruvate Kinase M2 is a PHD3-Stimulated Coactivator for Hypoxia-Inducible Factor 1. Cell. 2011 May 27;145(5):732-44. [PMID: 21620138]

[Notch1 Antibody NB300-251] Sciacca S, Pilato M, Mazzoccoli G, Pazienza V, Vinciguerra M. Anti-correlation between longevity gene SirT1 and Notch signaling in ascending aorta biopsies from patients with bicuspid aortic valve disease. Heart Vessels. 2012 Feb 28. [PMID: 22370592]

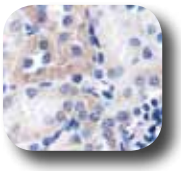
[PUMA Antibody NB100-56370] Kim DH, Jung YJ, Lee JE, et al. SIRT1 activation by resveratrol ameliorates cisplatin-induced renal injury through deacetylation of p53. Am J Physiol Renal Physiol. 2011 Aug;301(2):F427-35. [PMID: 21593185]

Additional Apoptosis Related Antibodies

NFkB in Apoptosis

NFkB is a family of transcription factors that consists of homo and heterodimers of NFKB p105/p50 and NFKB p65 subunits. NFkB controls a variety of cellular events including development and immune responses. NFkB has anti-apoptotic properties and regulates apoptosis through interactions with TNF and IAP family proteins.

NFkB p105/p50 Antibody
NBP1-77395



Immuno-histochemical analysis in mouse kidney using NBP1-77395.

Species: Hu, Mu
Applications: WB, ICC, IF, IHC-P

NFkB p65 Antibody
NBP1-96139

Immuno-histochemical analysis in mouse brain using NBP1-96139.

Species: Hu, Mu, Mk
Applications: WB, ICC, IF, IHC-P

NFkB p65 (27F9.G4) Antibody
NBP1-77815

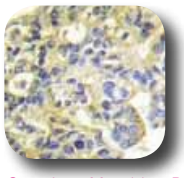
Immuno-histochemical analysis in human tissues using NBP1-77815.

Species: Hu
Applications: WB, ELISA, IF, IHC-P

PI3K/AKT Pathway in Apoptisis

The PI3K/AKT pathway plays a role in various cell cycle functions as well as apoptosis, breast cancer and lung cancer. PI3K is down regulated by PTEN while AKT in turn inhibits the pro-apoptotic proteins Bad, Bax, Caspase 9, GSK3 and FOXO1.

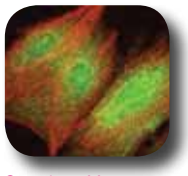
PI 3 Kinase p85 alpha Antibody
NBP1-61781



Immuno-histochemical analysis of human breast carcinoma tissue using NBP1-61781.

Species: Hu, Mu, Rt
Applications: WB, ELISA, IF, IHC-P

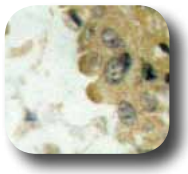
AKT1 [p Ser473] Antibody
NB600-590



Immuno-fluorescent analysis of cardiomyocytes using NB600-590.

Species: Hu
Applications: WB, ELISA, ICC, IF, IHC-P

AKT2 Antibody
NBP1-19832



Immuno-histochemical analysis of human lung carcinoma tissue using NBP1-19832.

Species: Hu, Mu, Rt
Applications: WB, IF, IHC-P

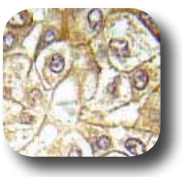
ERK pathways in Apoptisis

MAP kinases, also known as extracellular signal-regulated kinases (ERKs), act in a signaling cascade that regulates various cellular processes such as proliferation, differentiation and cell cycle progression in response to a variety of extracellular signals. ERK1/2 functions as an inhibitor of apoptosis and is induced by activation of Fas, TNF-R1, and TRAIL. [PMID:11278665]

Notch in Apoptosis

Notch1 is a single-pass transmembrane protein that serves as the receptor for the Delta1, Jagged1 and Jagged2 ligands. The Notch1 pathway plays a pivotal role in development, including cell-fate determination, proliferation and cell contact-dependent signaling. Although the function of Notch in apoptosis regulation has not been fully elucidated, numerous studies have shown that increased Notch activity leads to up-regulation of many apoptosis related genes.

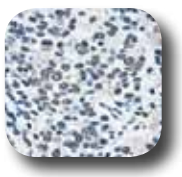
ERK1 [p Thr202, p Tyr204] Antibody
NBP1-19924



Immuno-histochemical analysis of human breast carcinoma tissue using NBP1-19924.

Species: Hu, Mu, Rt
Applications: WB, IHC-P

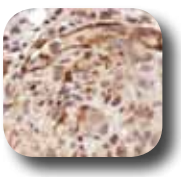
ERK2 (9E9) Antibody
NBP1-47846



Immuno-histochemical of bladder tissue using NBP1-47846.

Species: Hu, Rt
Applications: WB, IHC-P

Notch1 Antibody
NBP1-78292



Immuno-histochemical analysis of human kidney carcinoma using NBP1-78292.

Species: Hu, Mu
Applications: WB, IHC-P

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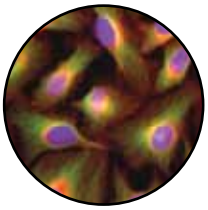
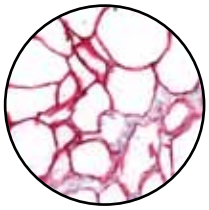


Secondary Antibodies, Lysates, Peptides, Proteins & RNAIs

Visit www.novusbio.com and select your primary antibody of interest to see all of the related support products.



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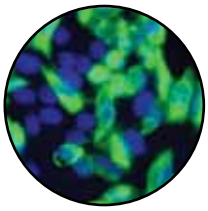

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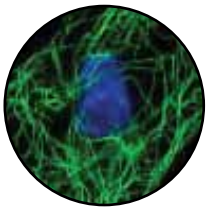
Epitope tagging is a powerful tool for the detection and purification of expressed proteins, and Novus Biologicals offers a wide range of epitope tag specific antibodies for a variety of immunological applications.



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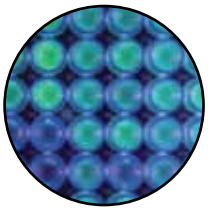

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