

Apoptosis, Cell Viability & Oxidative Stress

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Caspase Assays

Mitochondrial Apoptosis Assays

Apoptotic DNA Ladders

TUNEL Assays

Apoptosis siRNA Vectors

Apoptosis Inducers

Autophagy

Cell Proliferation Assays

LDH Cytotoxicity Assays

Senescence Assays

ADP & ATP Assays

SOD Assays

Glutathione Assays

HDAC Assays

NAD(P)/NAD(P)H Assays

Many more...





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Apoptotic Cell Isolation Kit
Apoptosis siRNA Vectors
Non-Caspase Proteases (Calpain, Cathepsins & Granzyme B)

Cell Viability & Senescence

Quick Cell proliferation Assay kits
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Bioluminescence Cytotoxicity Assay Kit
Senescence Detection Kit
Live-Dead Cell Staining Kit
ADP, ATP, ATP/ADP Ratio Assay Kits

Antibodies

Bcl-2 Family	IFN family
Calpain	Lamin A/B
Caspases	p53
Cathepsins	PARP
Cytochrome c	Perforin
DFFs	RANKL
FADD	TGF-beta
Fas & FasL	TNFs
GDFs	TRADD
Granzyme B	
Hsp Family	

Autophagy

Antibodies

AMPKalpha
APG/ATG
ATG
Bad
Beclin
DRAM
FKBP12
LAMP-1
PCNA
Presenilin

Inducers

Amiodarone Hydrochloride
Dorsomorphin
Rottlerin
SMER28

Inhibitors

ATM Kinase Inhibitor, KU-55933
Bafilomycin A1
Chloroquine Diphosphate
Gö 6976
Spautin-1

Oxidative Stress

Assay Kits

ADP Colorimetric/Fluorometric
Aldehyde Dehydrogenase Activity
Ascorbic Acid
Ascorbic Acid II (FRASC)
ATP Colorimetric/Fluorometric
Catalase Activity
L-Carnitine
Creatine
Creatinine
DNA Damage Quantification
Ethanol
Glutamate
Glutathione (GSH/GSSG/Total)
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Glutathione Peroxidase Activity
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GST Colorimetric Activity
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HAT Activity Activity
HDAC Colorimetric Activity
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HDAC Inhibitor Drug Screening
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Lactate
Lactate II
Lactate Dehydrogenase (LDH) Activity
Lipid Peroxidation (MDA)
Malate
MMP-1 Inhibitor Screening
MMP-3 Activity
MMP-3 Inhibitor Screening
Myeloperoxidase Colorimetric Activity
Myeloperoxidase Fluorometric Activity
NAD/NADH Quantitation
NADP/NADPH Quantitation
Neutrophil Elastase Inhibitor Screening
Nitric Oxide Colorimetric
Nitric Oxide Fluorometric
NQO1 (human intracellular) ELISA
Oxaloacetate
Peroxidase Activity
Sarcosine
Sialic Acid (NANA)
Beta-Secretase Activity

SIRT2 Inhibitor Screening
SOD Activity
Thioredoxin Reductase
Thioredoxin Reductase Activity
Total Antioxidant Capacity (TAC)
Uric Acid
Xanthine Oxidase Activity

Antibodies

Apo
c-Jun
Catalase
Cox
Cytochrome p450
eNOS
HATs
HDACs
Heme Oxygenase
Hsp
Myeloperoxidase
Nitrotyrosine
SOD-1

Enzymes

Catalase
HATs
HDACs
Hsp
Lactoferrin
Myeloperoxidase
PDI
RANTES
Sirtuin

Antioxidants

Caffeic Acid
Carnosic
Curcumin
Ebselen
Genistein
Piceatannol

Apoptosis – a Brief Review

Apoptosis or programmed cell death is a highly regulated process that allows a cell to self-degrade in order to eliminate unwanted or dysfunctional cells. Apoptosis can occur during development, aging, immune reactions, or when cells are damaged by disease or toxic agents like irradiation drugs and cancer chemotherapy.

Many important changes occur in an apoptotic cell including cell shrinkage, cytoplasm condensation, DNA fragmentation and plasma membrane blebbing, leading to separation of cell fragments into apoptotic bodies, followed by phagocytosis of apoptotic bodies by macrophages or parenchymal cells. Apoptosis is distinctly different from necrotic cell death where there is cell swelling, membrane rupture leading to cell lysis, ATP depletion, minimal DNA fragmentation and affecting entire tissues or groups of cells.

BioVision's apoptosis assays are designed to help the researcher to address Apoptosis by detecting various biochemical changes occurring in different stages of apoptosis and in different areas of the cell (e.g., Membrane, Cytoplasm, Mitochondria, and Nuclei).

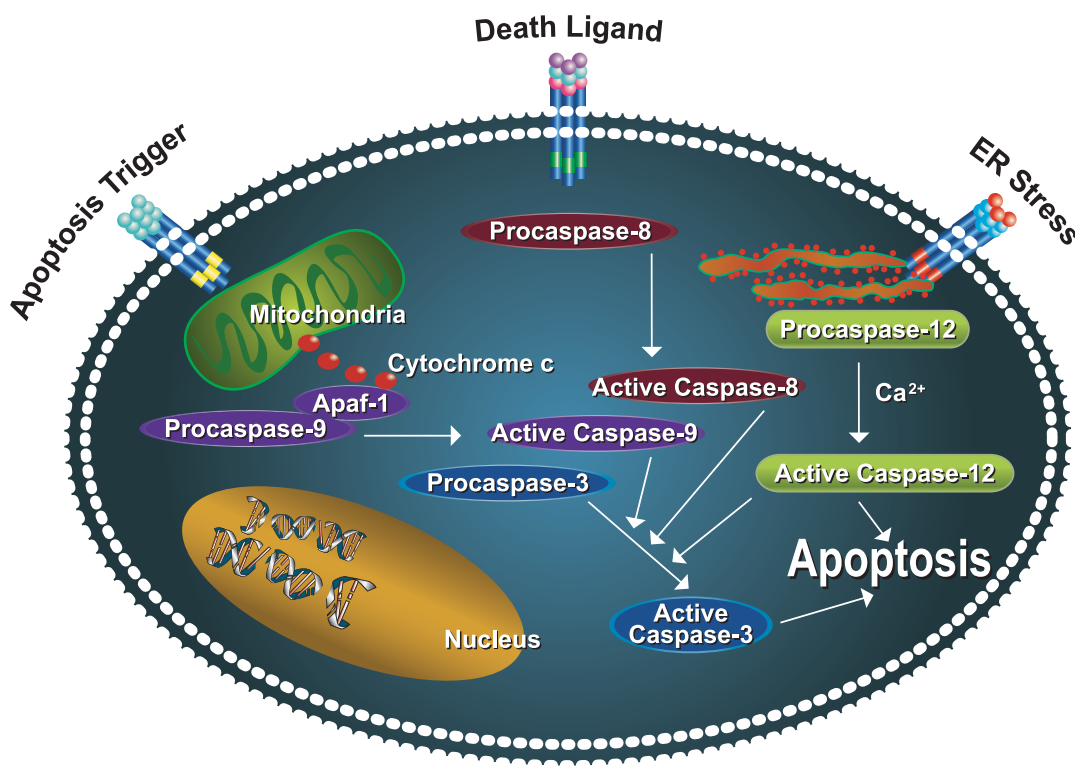
Annexin V apoptosis kits are designed to detect the membrane mediated apoptosis. Annexin V is a recombinant protein that has a high affinity to Phosphatidyl Serine (PS) which translocates from the inner leaflet of the plasma membrane to the outer layer. Phagocytes recognize this mark on the cell surface and thus clear them.

Caspases play a central role in apoptosis. Fourteen different caspases have been identified and categorized as initiator caspases (2, 8, 9, 10), effector caspases (3, 6, 7) and inflammatory caspases (1, 4, 5). An apoptotic trigger leads to activation of the initiator caspases, which in turn initiates a caspase cascade amplifying

the apoptotic signal. Caspase 3 is one of the critical executioner caspases cleaving substrates including PARP, cytokeratins, alpha fodrin and responsible for the apoptotic outcomes in the cell like exposure of PS on the outer plasma membrane, DNA fragmentation and structural protein degradation.

Non-receptor mediated stimuli (e.g., exposure to toxins, radiation, hyperthermia, viral infections and free radicals) activate mitochondrial initiated apoptosis events. These changes lead to opening of mitochondrial permeability transition pore (MPT), loss of transmembrane potential and release of two pro-apoptotic proteins (cytochrome c and SMAC/ DIABLO) from the intermembrane space into the cytosol. This results in the activation of the caspase dependent pathway. "Apoptosome" is formed by a complex of cytochrome c, Apaf-1 and procaspase-9 which subsequently activates Caspase 9 which in turn activates caspase 3 leading to down-stream apoptosis. In addition, Bcl-2 family of proteins also regulates mitochondrial mediated apoptosis and can be pro- (Bcl-10, Bax, Bak, Bid, Bad, Bim, Bik, and Blk) or anti- apoptotic (Bcl-2, Bcl-x, Bcl-XL, Bcl-XS, Bcl-w, BAG). They regulate apoptosis by determining the release of cytochrome c from mitochondria to cytosol. Each Bcl-2 family member has its own significance in deciding whether the cell commits to apoptosis or aborts it.

Apoptosis DNA fragmentation represents a late stage of apoptosis and also occurs in certain stages of necrosis. Activation of endogenous endonucleases leads to subsequent cleavage of chromatin DNA into internucleosomal fragments of 180 bp and multiples thereof. BioVision's apoptotic DNA ladder and TUNEL assays are designed to conveniently detect DNA fragmentation by gel electrophoresis, flow cytometry or fluorescence microscopy.



Apoptosis Products Overview

Apoptosis, or programmed cell death, plays an important role in many physiological and diseased conditions. Detection of apoptotic cells, monitoring the cell's progression to apoptosis, and developing drugs that regulate the apoptotic pathways are the essential parts of basic research. BioVision has developed various assays that can detect apoptosis at the early, middle, and late stages in apoptotic cascade, and detect apoptotic events that occur in different areas of the cell, including the plasma membrane, cytoplasm, mitochondria, and nucleus.

Membrane-Mediated Apoptosis	• Annexin V-FITC Apoptosis Kit & Bulk Reagents 7 • Annexin V-EGFP Apoptosis Kit & Bulk Reagents 7 • Annexin V-Cy3 Apoptosis Kit & Bulk Reagents 7 • Annexin V-Cy5 Apoptosis Kit & Bulk Reagents 7 • Annexin V-PE Apoptosis Kit & Bulk Reagents 7 • Annexin V-PE/Cy5 Apoptosis Kit & Bulk Reagents 7 • Annexin V- Biotin Apoptosis Kit and Bulk Reagents 7 • Annexin V, Unlabeled Reagents 7 • Annexin V Binding Buffers & Propidium Iodide Solution 7
Cytoplasm-Mediated Apoptosis	• CaspGLOW™ Caspase-2,-3,-8,-9,-12 & Multi-Caspases Staining Kits 8 • Caspase (1-12) Fluorometric & Colorimetric Assay Kits 10 • Caspase Inhibitor (1-10) Drug Screening Kits 9 • CaspSCREEN™ & CaspSELECT™ Caspase Assay Kits 11 • Pro- and Active Recombinant Human, Mouse, & Rat Caspases (1-10) 12 • Ready-to-use Caspase Substrates & Sets 15, 16 • Ready-to-use Caspase Inhibitors & Sets 13, 14 • GeneBlocker™ siRNA Expression Vectors for key apoptotic Genes 24 • Anti-Caspase (1-12) Polyclonal & Monoclonal Antibodies 17
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Cell Proliferation & Oxidative Stress	• ADP/ATP Detection Kits 20 • Anti-Oxidant & Ascorbic Acid Assay Kits 36 • Catalase, Ethanol & Uric Acid Assay Kits 36, 38 • Cell Proliferation, Senescence & Cytotoxicity Assay Kits 28, 29 • Creatin, Creatinin Assay Kits 36 • DNA Damage Quantification Kit 36 • β-Secretase Activity Assay Kit 37 • Glutamate & Xanthine Oxidase Assay Kits 36, 38 • Glutathione, GST, & Nitric Oxide Detection Kits 36, 37 • HDAC & HAT Fluorometric & Colorimetric Assay Kits 36, 37 • Hydrogen Peroxide & Malate Assay Kits 37 • Lactate, Sarcosine & MPO Assay Kits 37 • Lipid Peroxidation, Peroxidase Assay Kits 37 • NQ01, SIRT2, MMPs Assay Kits 37 • SOD and NAD(P)/NAD(P)H Detection Kits 37 • Thioredoxin Reductase Assay Kits 37

Apoptosis Assay Selection Guide

Many assays exist to measure apoptosis, cell death and cell proliferation. However, if you have only recently become interested in this area, you may find the diversity of assays for measuring apoptosis, cell death, and cell proliferation bewildering. Here we present the frequently asked questions and answers to help you choose the best assays for your purposes.

Select assays based on sample types

My sample is...	Product	Cat#	Page#
Live Cells (Suspension or Adherent)	Annexin V Apoptosis Assay Kits	K101-K202	7
	CaspGlow Caspase Assay Kits.	K172-K199	8
	MitoCapture Apoptosis Assay Kit	K250	18
Cell Lysate (Fresh or Frozen)	Caspase (1-12) Fluorometric Assay Kits	K105-K139	10
	Caspase (1-10) Colorimetric Assay Kits	K106-K127	10
Tissue Lysate (Fresh or Frozen)	Caspase (1-12) Fluorometric Assay Kits	K105-K139	10
	ADP, ATP & ADP/ATP Ratio Assay Kits	K354, K355, K255, K791	20
Tissue Sections (Frozen of paraffin)	Apo-BrdU-IHC	K403	22
	Active Caspase-3 Antibody	3015	17

Measure apoptosis in different areas of the cell

I want to measure...	Product	Cat#	Page#
Mitochondrial Changes	MitoCapture Assay Kit	K250	18
	Cytochrome c Releasing Apoptosis Assay Kit.	K257	19
Membrane Changes	Annexin V Assay Kits	K101-K202	7
Nuclear Changes	DNA Ladder Assay Kits	K120, K130, K170	21
	TUNEL Assay Kits.	K401-K404	22
Cytosol Changes	Caspase Colorimetric & Fluorometric Assay Kits.	K105-K139	10
	CaspGLOW™ Caspase Assay Kits.	K172-K199	8

Select assays based on specific purpose

My purpose is to...	Product	Cat#	Page#
Measure Cytochrome c Release	Cytochrome c Releasing Apoptosis Assay Kit.	K257	19
Screen Caspase Inhibitors	Caspase Inhibitor Screening Kits.	K151-K160	9
Block Apoptotic Gene Expression	siRNA Apoptotic Gene Expression Vectors	9500-9518	24
Study Apoptosis Related Non-Caspase Proteases	Calpain Assay Kit.	K240	25
	Cathepsin Assay Kits	K140-K145	26
Isolate Apoptotic Cells	Apoptotic Cell Isolation Kit	K258	23
Induce Apoptosis	Ready-to-use Apoptosis Inducers	K121	23
Differentiate between Apoptosis & Necrosis	Annexin V-FITC Apoptosis Kit.	K101	7
	Annexin V-EGFP Apoptosis Kit	K104	7

Annexin V Apoptosis Kits & Reagents

BioVision offers high quality Annexin V products for fast detection of apoptosis in living cells. Annexin V conjugates are specially engineered to produce enhanced fluorescence signals and photostability, which perform considerably better than other similar products in the market. Annexin V assay is simple, takes only 10 minutes. Results can be analyzed by flow cytometry or fluorescence microscopy.

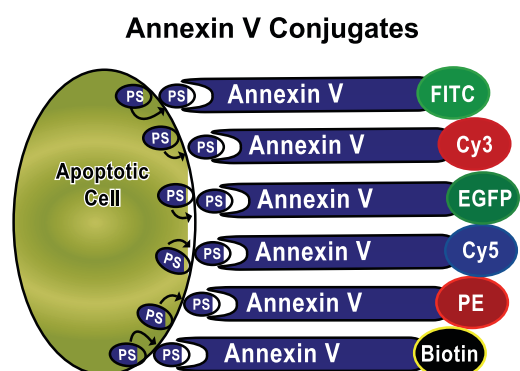


Fig.1. Various Annexin V conjugates available from BioVision

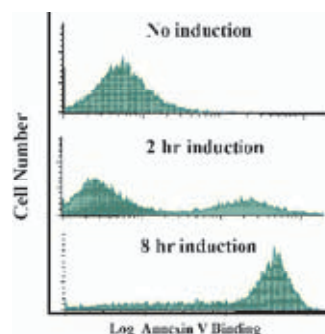
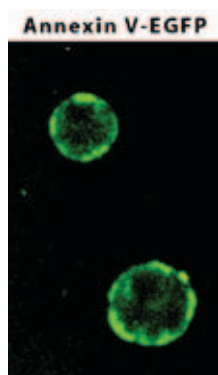


Fig. 2. Detection of Apoptosis with Annexin V-EGFP. Apoptosis was induced in Jurkat cells by camptothecin (2 mM) for various times as indicated. Cells were collected and incubated with Annexin V-EGFP for 5 minutes according to the kit instructions. Results were analyzed by fluorescence microscopy (left panel) and flow cytometry (right panel).

Annexin V Apoptosis Kits	Cat. #	Size
Annexin V-Biotin Apoptosis Detection Kit	K109-25, K109-100, K109-400	25 assays, 100 assays, 400 assays
Annexin V-Cy3 Apoptosis Detection Kit	K102-25, K102-100, K102-400	25 assays, 100 assays, 400 assays
Annexin V-Cy3 Apoptosis Detection Kit Plus	K202-25, K202-100, K202-400	25 assays, 100 assays, 400 assays
Annexin V-Cy5 Apoptosis Detection Kit	K103-25, K103-100, K103-400	25 assays, 100 assays, 400 assays
Annexin V-EGFP Apoptosis Detection Kit	K104-25, K104-100, K104-400	25 assays, 100 assays, 400 assays
Annexin V-FITC Apoptosis Detection Kit	K101-25, K101-100, K101-400	25 assays, 100 assays, 400 assays
Annexin V-FITC Apoptosis Detection Kit Plus	K201-25, K201-100, K201-400	25 assays, 100 assays, 400 assays
Annexin V-PE Apoptosis Detection Kit	K128-25, K128-100, K128-400	25 assays, 100 assays, 400 assays
Annexin V-PE Apoptosis Detection Kit Plus	K203-25, K203-100, K203-400	25 assays, 100 assays, 400 assays
Annexin V-PE-Cy5 Apoptosis Detection Kit	K129-25, K129-100, K129-400	25 assays, 100 assays, 400 assays

Annexin V Reagents	Cat. #	Size
Annexin V, Unlabeled Reagent	1005-100, 1005-1000, 1005-5000	100 µg, 1 mg, 5 mg
Annexin V-Biotin Reagent	1003-100, 1003-1000	100 µg, 1 mg
Annexin V-Cy3 Reagent	1002-200, 1002-1000	200 assays, 1000 assays
Annexin V-Cy5 Reagent	1013-200, 1013-1000	200 assays, 1000 assays
Annexin V-EGFP Reagent	1004-200, 1004-1000	200 assays, 1000 assays
Annexin V-FITC Reagent	1001-200, 1001-1000	200 assays, 1000 assays
Annexin V-PE Reagent	1014-200, 1014-1000	200 assays, 1000 assays
Annexin V-PE/Cy5 Reagent	1015-200, 1015-1000	200 assays, 1000 assays
1X Annexin V Binding Buffer	1035-100	100 ml
10X Annexin V Binding Buffer	1006-100	100 ml
Propidium Iodide (1 mg/ml)	1056-1	1 ml

CaspGLOW™ Active Caspase Staining Kits

CaspGLOW™ In Situ Caspase Staining Kits provide simple and sensitive tools for detecting activated caspases in situ in living cells. The assay utilizes potent caspase inhibitors conjugated to FITC or rhodamine as the fluorescence in situ markers. The caspase inhibitors are cell permeable, nontoxic, and irreversibly bind to the activated caspases in apoptotic cells. With the FITC or rhodamine labels, activated caspases in apoptotic cells can directly be visualized by fluorescence microscopy, or analyzed by flow cytometry or fluorescence plate reader. Caspase inhibitors without FITC or rhodamine labels were also included in the kits as negative controls.

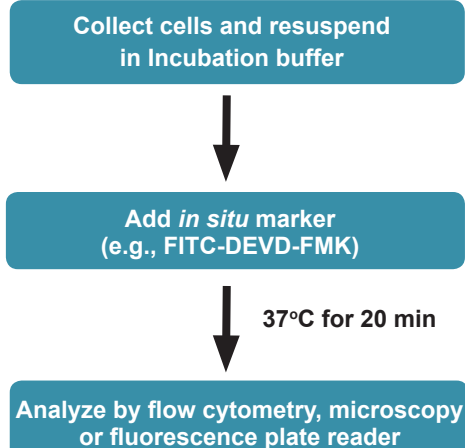


Fig. 3. Flow Chart of CaspGLOW™ Assay Procedure.

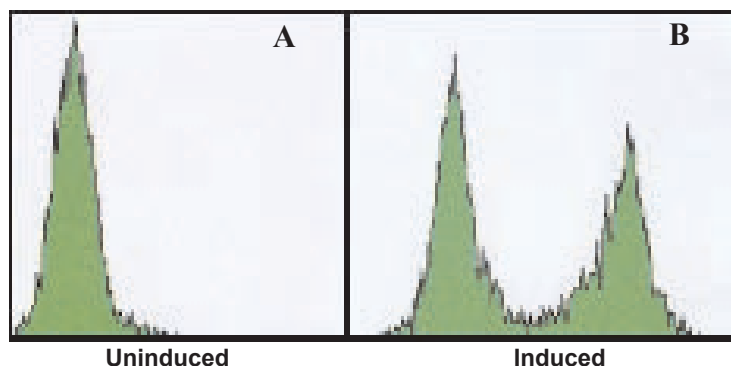


Fig. 4. Detection of Caspase-3 Activation Using CaspGLOW™ Fluorescein Caspase-3 Staining Kit. Apoptosis was induced in Jurkat cells with (B) or without (A) camptothecin for 6 hours. Cells were collected and incubated with CaspGLOW™ *in situ* marker, FITC-DEVD-FMK, for 20 minutes according to the kit instructions. Results were analyzed by flow cytometry.

Products	Marker	Cat. #	Size
CaspGLOW™ Fluorescein Active Caspase Staining Kit	FITC-VAD-FMK	K180-25, K180-100	25 assays, 100 assays
CaspGLOW™ Red Active Caspase Staining Kit	Red-VAD-FMK	K190-25, K190-100	25 assays, 100 assays
CaspGLOW™ Fluorescein Active Caspase-2 Staining Kit	FITC-VDVAD-FMK	K182-25, K182-100	25 assays, 100 assays
CaspGLOW™ Fluorescein Active Caspase-3 Staining Kit	FITC-DEVD-FMK	K183-25, K183-100	25 assays, 100 assays
CaspGLOW™ Red Active Caspase-3 Staining Kit	Red-DEVD-FMK	K193-25, K193-100	25 assays, 100 assays
CaspGLOW™ Fluorescein Active Caspase-8 Staining Kit	FITC-IETD-FMK	K188-25, K188-100	25 assays, 100 assays
CaspGLOW™ Red Active Caspase-8 Staining Kit	Red-IETD-FMK	K198-25, K198-100	25 assays, 100 assays
CaspGLOW™ Fluorescein Active Caspase-9 Staining Kit	FITC-LEHD-FMK	K189-25, K189-100	25 assays, 100 assays
CaspGLOW™ Red Active Caspase-9 Staining Kit	Red-LEHD-FMK	K199-25, K199-100	25 assays, 100 assays
CaspGLOW™ Fluorescein Active Caspase-12 Staining Kit	FITC-ATAD-FMK	K172-25, K172-100	25 assays, 100 assays

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(Cat. No. K820)

- Highly sensitive
- Non-radioactive
- Superior Signal
- Clear Background
- Enhanced luminol-based chemiluminescent substrate

Caspase Inhibitor Drug Screening Kits

Caspases have been shown to play a crucial role in apoptosis induced by various deleterious and physiological stimuli. Inhibition of caspases has been shown to delay apoptosis, implicating a potential role in drug screening efforts. BioVision offers a full line of Caspase Inhibitor Drug Screening Kits for effective screening of caspase inhibitors using fluorometric methods. The assays utilize peptide substrates consisting of the consensus cleavage sequence for each caspase, labeled with AFC (7-amino-4-trifluoromethyl coumarin). Active caspases (provided in the kits) cleave the synthetic substrates to release free AFC which can then be quantified using a microtiter plate reader. Compounds to be screened can directly be added to the reaction and the level of inhibition of caspases can then be determined. The assays are simple, straightforward, and can be performed directly in microtiter plates. Assay conditions for each caspase have been optimized to obtain the maximal activity. Each kit contains 100 units of active caspases, sufficient for screening 100 samples.

Kit Components: Caspase Substrate (100 assays), Reaction Buffer (10 ml), Active Caspase (100 assays), Caspase Inhibitor (10 controls), DTT (400 µl) and a User Manual

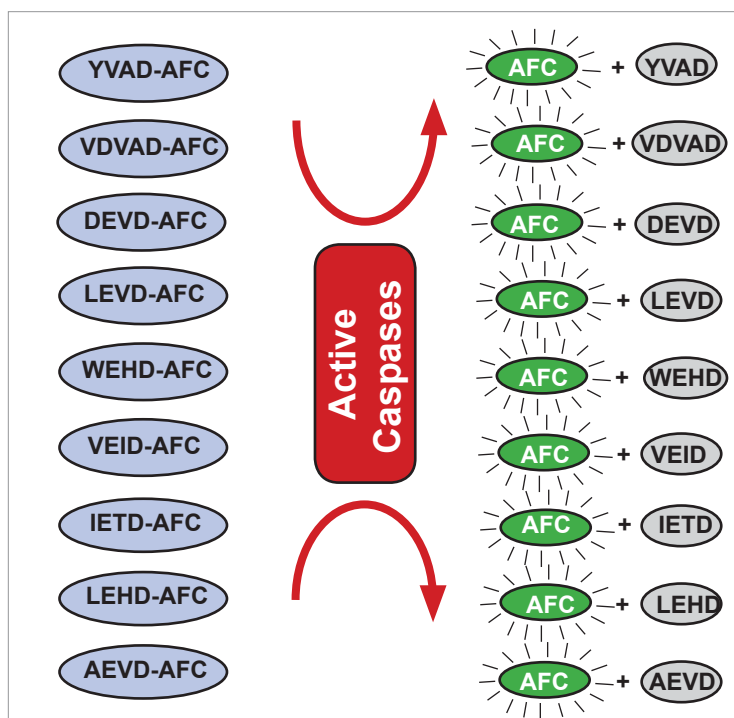


Fig. 5. Fluorometric Methods for Detecting Caspase Activity. Fluorometric substrates are labeled with AFC. Active caspases provided in each kit will cleave each individual substrate to generate free AFC, whereas compounds that inhibit caspases will inhibit the cleavage resulting in low or no fluorescence signal.

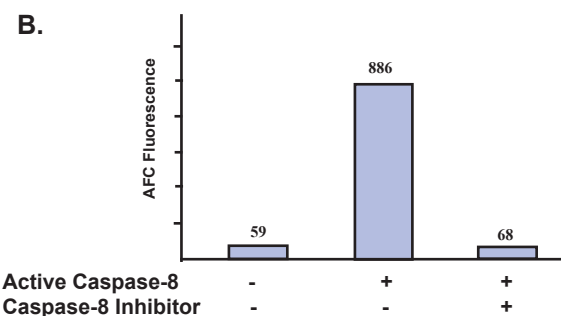
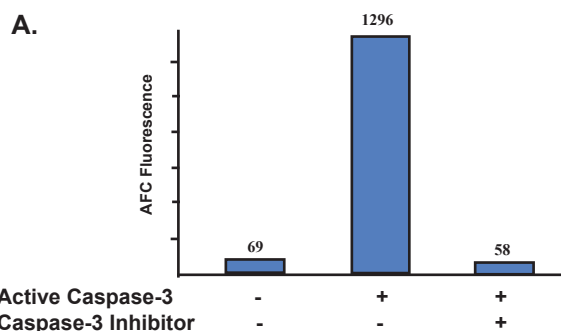


Fig. 6. Inhibition of Caspase Activity by Caspase Inhibitors. Caspase assays were performed using 1 unit of active caspase-3 (A) or -8 (B) in the presence and absence of caspase-3 (Z-DEVD-FMK) or -8 (Z-IETD-FMK) inhibitor as indicated. Caspase-3 and -8 activities were analyzed in 96-well plate by fluorescence plate reader.

Product	Cat. #	Size
Caspase-1 Inhibitor Drug Screening Kit	K151-100	100 assays
Caspase-2 Inhibitor Drug Screening Kit	K152-100	100 assays
Caspase-3 Inhibitor Drug Screening Kit	K153-100	100 assays
Caspase-4 Inhibitor Drug Screening Kit	K154-100	100 assays
Caspase-5 Inhibitor Drug Screening Kit	K155-100	100 assays
Caspase-6 Inhibitor Drug Screening Kit	K156-100	100 assays
Caspase-7 Inhibitor Drug Screening Kit	K157-100	100 assays
Caspase-8 Inhibitor Drug Screening Kit	K158-100	100 assays
Caspase-9 Inhibitor Drug Screening Kit	K159-100	100 assays
Caspase-10 Inhibitor Drug Screening Kit	K160-100	100 assays

Caspase Fluorometric and Colorimetric Assay Kits

BioVision offers convenient kits for quantification of caspase activity in cell lysates. The assays utilize synthetic peptide substrates labeled with either AFC (fluorometric assay) or pNA (colorimetric assay). Activated caspases in apoptotic cells cleave the synthetic substrates to release free AFC or pNA, which is then quantified using fluorometer or spectrophotometer, respectively. Caspase assays are simple, straightforward, and can be adapted for 96-well plates.

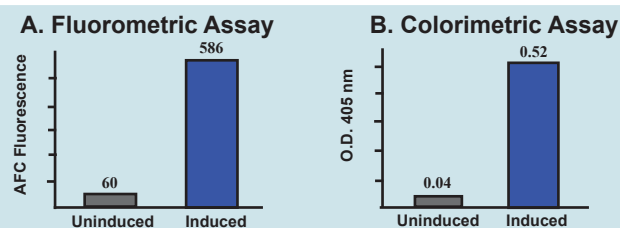


Fig. 7. Fluorometric and Colorimetric Assays of Caspase-3 Activity. Apoptosis was induced in Jurkat cells with camptothecin for 6 hours. Caspase assays were performed according to the kit manuals.

Kit Components: Cell Lysis Buffer, 2X Reaction Buffer, Caspase Substrate, DTT and a User Manual

Product	Cat. #	Size
Caspase-1 Fluorometric Assay Kit	K110-25, K110-100, K110-200, K110-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-1 Colorimetric Assay Kit	K111-25, K111-100, K111-200, K111-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-2 Fluorometric Assay Kit	K116-25, K116-100, K116-200, K116-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-2 Colorimetric Assay Kit	K117-25, K117-100, K117-200, K117-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-3 Fluorometric Assay Kit	K105-25, K105-100, K105-200, K105-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-3 Colorimetric Assay Kit	K106-25, K106-100, K106-200, K106-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-4 Fluorometric Assay Kit	K126-25, K126-100, K126-200, K126-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-4 Colorimetric Assay Kit	K127-25, K127-100, K127-200, K127-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-5 Fluorometric Assay Kit	K122-25, K122-100, K122-200, K122-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-5 Colorimetric Assay Kit	K123-25, K123-100, K123-200, K123-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-6 Fluorometric Assay Kit	K114-25, K114-100, K114-200, K114-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-6 Colorimetric Assay Kit	K115-25, K115-100, K115-200, K115-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-8 Fluorometric Assay Kit	K112-25, K112-100, K112-200, K112-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-8 Colorimetric Assay Kit	K113-25, K113-100, K113-200, K113-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-9 Fluorometric Assay Kit	K118-25, K118-100, K118-200, K118-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-9 Colorimetric Assay Kit	K119-25, K119-100, K119-200, K119-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-10 Fluorometric Assay Kit	K124-25, K124-100, K124-200, K124-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-10 Colorimetric Assay Kit	K125-25, K125-100, K125-200, K125-400	25 assays, 100 assays, 200 assays, 400 assays
Caspase-12 Fluorometric Assay Kit	K139-25, K139-100	25 assays, 100 assays

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CaspSCREEN™ Apoptosis Detection Kit

20 minutes procedure • Highly sensitive • Screen caspase activity by flow cytometry

This CaspSCREEN™ Apoptosis Assay Kit provides a convenient means for detecting the activation of caspases by flow cytometry in living cells. The assay is based on the cleavage of (aspartyl)2-Rhodamine 110 (D₂R), a reported substrate for members of caspase family proteases. The caspase substrate D₂R is nonfluorescent, however, upon cleavage of the substrate by cellular activated caspases, the released rhodamine 110 gives rise to fluorescence that can be measured by flow cytometry at excitation of 488 nm and emission of 530 nm. The kit includes the D₂R reagent, DTT and the optimal incubation buffer together with an application protocol.

Kit Components: D₂R Reagent, DTT, D₂R Incubation Buffer and a User Manual.

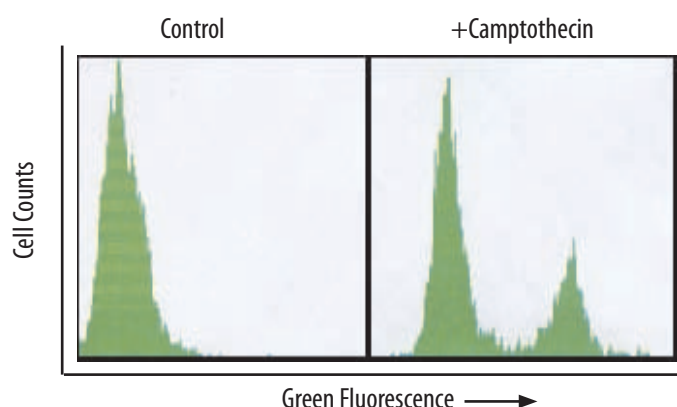


Fig. 8. Analysis of Apoptosis by CaspSCREEN™ Apoptosis Detection Kit. Apoptosis was induced in Jurkat cells by camptothecin (2 μ M) for 4 hours. Cells were collected and incubated with D₂R for 15 minutes according to the kit instructions. Results were analyzed by flow cytometry using the FL1 channel.

Product	Cat. #	Size
CaspSCREEN™ Flow Cytometric Apoptosis Detection Kit	K200-25, K200-100	25 assays, 100 assays

CaspSELECT™ Caspase Immunoassay Kits

Enzyme immunoassay in microplate • Accurate, quantitative, and specific • Detect caspase-3 or -7 specific activity

Caspase-3 and -7 share the same target substrate sequence (DEVD) and thus it is difficult to assess the cleavage activity attributed by each of the caspases in vitro. The CaspSELECT™ Caspase-3 & -7 Immunoassay Kits allow quantification of the specific activity of caspase-3 and -7, respectively. The assay utilizes caspase-3 or -7 specific antibody to capture the activated caspase-3 or -7 in cell lysate. Specific activity of caspase-3 or -7 can then be analyzed using the common caspase-3/7 substrate DEVD-AFC. The assay system ensures detection of only caspase-3 or caspase-7 specific activity in apoptotic samples. Other caspases and non-specific proteases are not detected.

Kit Components: Cell Lysis Buffer, Coating Buffer, Anti-Caspase-3 or -7 Antibody, Blocking Buffer, Incubation Buffer, DTT, DEVD-AFC Substrate, Positive Control, Microtiter Plate 12 x 8 wells, Adhesive Plate Cover and a User Manual

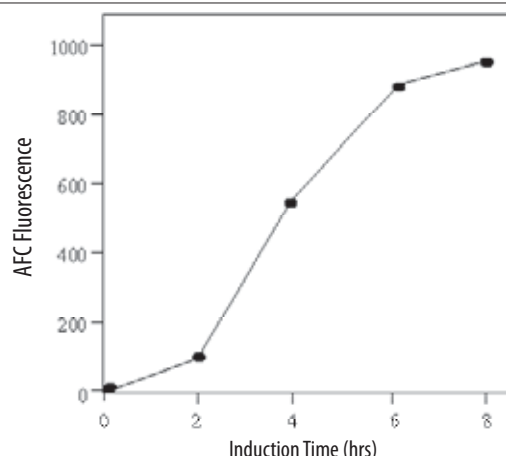


Fig. 9. Time-Dependent Induction of Caspase-3 Specific Activity Analyzed by CaspSELECT™ Caspase-3 Immunoassay Kit. Apoptosis was induced by camptothecin (2 μ M) for various hours as indicated. Caspase-3-specific activity was analyzed using CaspSELECT™ Caspase-3 Immunoassay Kit according to the kit instructions.

Product	Cat. #	Size
CaspSELECT™ Caspase-3 Immunoassay Kit	K163-100	100 assays
CaspSELECT™ Caspase-7 Immunoassay Kit	K167-100	100 assays

Active Recombinant Caspases & Procaspsases

BioVision offers high quality human, mouse, and rat recombinant active and pro-caspases that were expressed in *E. coli* and purified. Active caspases are useful to study enzyme regulation and kinetics, screen caspase inhibitors, determine target substrates, and as positive controls in caspase activity assays and Western blot analyses. One unit of the active enzyme is sufficient to cleave 1 nmol of the corresponding caspase substrate per hour at 37°C and is sufficient for one caspase activity assay. Procaspase-3, 7, and 9 are also available for studying caspase activation pathways.

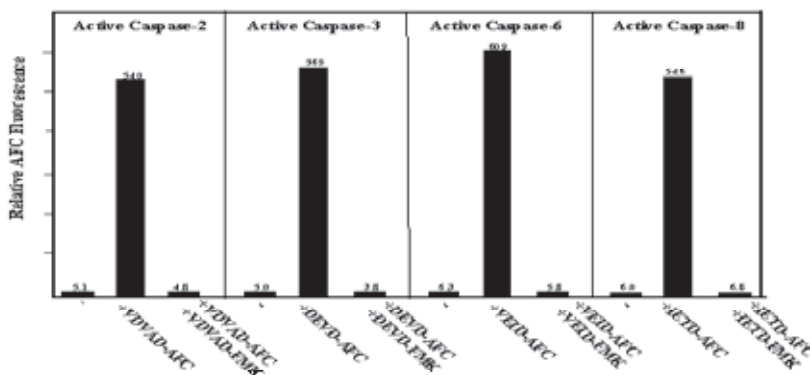


Fig. 10. Active Caspases Effectively Cleave Peptide Substrates. Activity of the active human caspase-2,-3,-6,-8 were determined by their ability to cleave the fluorometric substrate of each caspase, as indicated. The cleavage was effectively inhibited by the corresponding peptide inhibitors, as indicated.

Product	Cat. #	Size
Caspase-1, human active form	1081-25, 1081-100	25 units, 100 units
Caspase-1, mouse active form	1181-25, 1181-100	25 units, 100 units
Caspase-2, human active form	1082-25, 1082-100	25 units, 100 units
Caspase-3, human active form	1083-5, 1083-10, 1083-25, 1083-100	5 µg, 10 µg, 25 units, 100 units
Caspase-3, mouse active form	1183-25, 1183-100	25 units, 100 units
Caspase-3, mouse proform	1183P-5	5 µg
Caspase-3, rat active form	1283-25, 1283-100	25 units, 100 units
Caspase-4, human active form	1084-25, 1084-100	25 units, 100 units
Caspase-5, human active form	1085-25, 1085-100	25 units, 100 units
Caspase-6, human active form	1086-25, 1086-100	25 units, 100 units
Caspase-7, human active form	1087-25, 1087-100	25 units, 100 units
Caspase-8, human active form	1088-25, 1088-100	25 units, 100 units
Caspase-8, mouse active form	1188-25, 1181-100	25 units, 100 units
Caspase-9, human active form	1089-25, 1089-100	25 units, 100 units
Caspase-9, human proform	1089P-50	50 µg
Caspase-10/a, human active form	1090A-25, 1090A-100	25 units, 100 units
Caspase-10/b, human active form	1090B-25, 1090B-100	25 units, 100 units

Active Recombinant Caspases Sets

Product	Cat. #	Size
Active Human Caspases, Group I Contains active human caspase-1,-4,-5	K241-3-25	3 x 25 units
Active Human Caspases, Group II Contains active human caspase-2,-3,-7	K242-3-25	3 x 25 units
Active Human Caspases, Group III Contains active human caspase-6,-8,-9,-10	K243-4-25	4 x 25 units
Active recombinant Caspase Set I contains active human caspase-3,-6,-7,-8	K230-4-25	4 x 25 units
Active recombinant Caspase Set II contains active human caspase-1,-2,-9,-10	K231-4-25	4 x 25 units

Active Recombinant Caspases Sets...Cont.

Active Recombinant Caspase Set III

Contains active human caspase-1,-2,-3,-6,-7,-8,-9,-10

K232-8-25

8 x 25 units

Active Recombinant Caspase Set IV

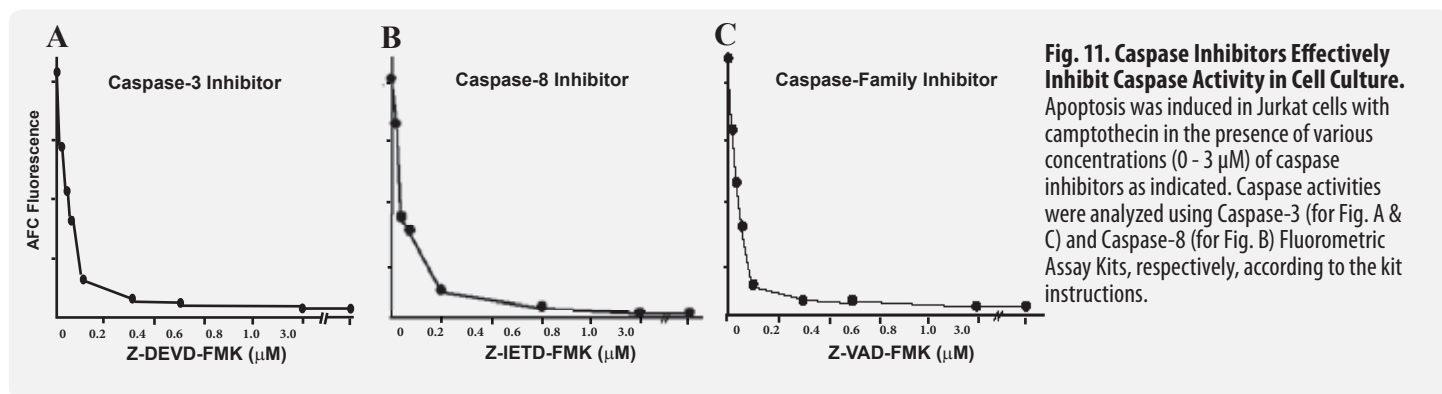
Contains active human caspase-1,-2,-3,-4,-5,-6,-7,-8,-9,-10

K233-10-25

10 x 25 units

Ready-to-use Caspase Inhibitors

BioVision provides potent, ready-to-use caspase inhibitors that are synthesized using a proprietary technology. These inhibitors are cell-permeable, nontoxic, and irreversibly bind to activated caspases to block apoptosis. For cell cultures, the 2 mM caspase inhibitors can be used at 1000X dilutions (e.g., Add 1 μ l to 1 ml of culture medium). For *in vivo* injections, the 10 mM caspase inhibitors are provided. Caspase Inhibitor Sets in the ready-to-use form are also available, providing more convenience for researchers to study multiple apoptosis-inhibiting processes.



Product	Cat. #	Conc.	Size
Biotin-DEVD-FMK	1124-20C	10 mM	20 μ l
Biotin-IETD-FMK	1121-20C	10 mM	20 μ l
Biotin-VAD-FMK	1123-20C	10 mM	20 μ l
Caspase-1 Inhibitor, Z-YVAD(OMe)-FMK	1012-100, 1012-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-2 Inhibitor, Z-VD(OMe)VAD(OMe)-FMK	1073-100, 1073-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-3 Inhibitor, Z-D(OMe)E(OMe)VD(OMe)-FMK	1009-100, 1009-20C	2 mM, 10 mM	100 μ l, 20 μ l
EZSolution™ Q-DEVD-OPh	1178-1	10 mM	1 mg
Caspase-4 Inhibitor, Z-LE (OMe)VD(OMe)-FMK	1108-100, 1108-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-5 Inhibitor, Z-WE(OMe)HD(OMe)-FMK	1100-100, 1100-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-6 Inhibitor, Z-VE(OMe)ID (OMe)-FMK	1011-100, 1011-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-8 Inhibitor, Z-IE(OMe)TD(OMe)-FMK	1064-100, 1064-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-9 Inhibitor, Z-LE(OMe)HD(OMe)-FMK	1074-100, 1074-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-10 Inhibitor, Z-AE(OMe)VD(OMe)-FMK	1112-100, 1112-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-12 Inhibitor, Z-ATAD(OMe)-FMK	1079-100, 1079-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-13 Inhibitor, Z-LE(OMe)E(OMe)D(OMe)-FMK	1115-100, 1115-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase-Family Inhibitor, Z-VAD(OMe)-FMK	1010-100, 1010-20C	2 mM, 10 mM	100 μ l, 20 μ l
Caspase Inhibitor Boc-D-FMK	1120-20C	10 mM	20 μ l
FMK Negative Control, Z-FA-FMK	1122-100, 1122-20C	2 mM, 10 mM	100 μ l, 20 μ l
EZSolution™ Q-VD-OPh	1173-1	10 mM	1 mg
EZSolution™ Q-VD-OPh, Negative Control	1174-1	10 mM	1 mg

Ready-to-use Caspase Inhibitors Sets

Product	Cat. #	Conc.	Size
Caspase-Family Inhibitor Set <i>Contains 25 µl of Caspase-1,-3,-6,-8, & Caspase-Family Inhibitors.</i>	K107-5-25	2 mM	5 x 25 µl
Caspase-Family Inhibitor Set II <i>Contains 25 µl of Caspase-1,-2,-3,-6,-8,-9 & Caspase-Family Inhibitors.</i>	K108-7-25	2 mM	7 x 25 µl
Caspase-Family Inhibitor Set III <i>Contains 25 µl of Caspase-1,-2,-3,-5,-6,-8,-9, & Caspase-Family Inhibitors.</i>	K210-8-25	2 mM	8 x 25 µl
Caspase-Family Inhibitor Set IV <i>Contains 25 µl each of Caspase-1,-2,-3,-4,-5,-6,-8,-9,-10,-13 & Caspase-Family Inhibitors & FMK Negative Control</i>	K220-12-25	2 mM	12 x 25 µl

Bulk Caspase Inhibitors

Bulk caspase FMK inhibitors (in powder form) are available from BioVision. These high quality inhibitors are potent, cell-permeable, non-toxic, and irreversibly bind to activated caspases to block apoptosis. These inhibitors are offered to researchers at the lowest price, and best quality in comparison to other similar products on the market.

BioVision is now offering this “new generation” of caspase inhibitors, Q-VD-OPh. This inhibitor has higher potency and longer stability than the FMK inhibitors, which makes it ideal for both *in vivo* and cell culture studies. Bulk discounts are also available (Please request by email at sales@biovision.com).

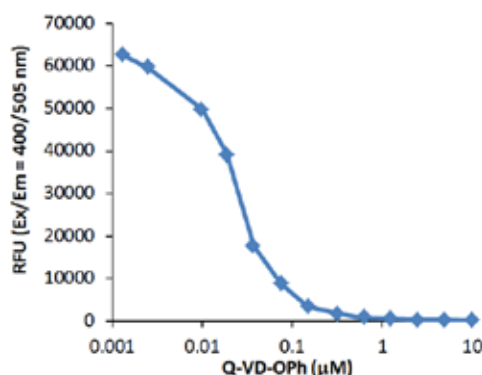
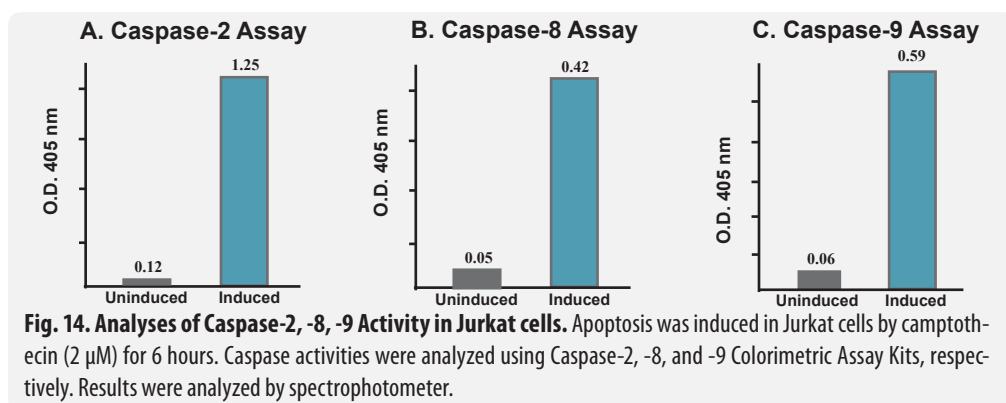
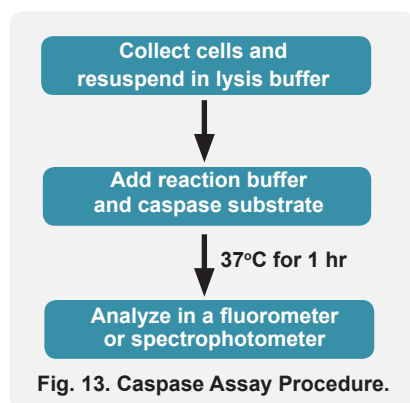


Fig.12. Inhibition of Caspase-3 activity by next generation caspase inhibitor, Q-VD-OPh: Different concentrations of inhibitor Q-VD-OPh were tested to check the inhibition of Caspase-3 activity. Active Caspase-3 was incubated with the inhibitor Q-VD-OPh for 7 min prior to addition of synthetic peptide substrate DEVD-AFC. Fluorescence was measured at Ex/Em = 400/505 nm.

FMK Inhibitors	Inhibitor to	Cat. #	Size
Z-VAD(OMe)-FMK	Pan Caspases	1140-1, 1140-5	1 mg, 5 mg
Z-YVAD(OMe)-FMK	Caspase-1	1141-1, 1141-5	1 mg, 5 mg
Z-VD(OMe)VAD(OMe)-FMK	Caspase-2	1142-1, 1142-5	1 mg, 5 mg
Z-D(OMe)E(OMe)VD(OMe)-FMK	Caspase-3/7	1143-1, 1143-5	1 mg, 5 mg
Z-LE(OMe)VD(OMe)-FMK	Caspase-4	1144-1, 1141-5	1 mg, 5 mg
Z-VE(OMe)ID(OMe)-FMK	Caspase-6	1146-1, 1146-5	1 mg, 5 mg
Z-IE(OMe)TD(OMe)-FMK	Caspase-8	1148-1, 1148-5	1 mg, 5 mg
Z-LE(OMe)HD(OMe)-FMK	Caspase-9	1149-1, 1149-5	1 mg, 5 mg
Boc-D(OMe)-FMK	Pan Caspases	1160-1, 1160-5	1 mg, 5 mg
Q-VD-OPh	Pan Caspases	1170-1, 1170-3, 1170-5	1 mg, 3 mg, 5 mg
Q-VD-OPh Negative Control		1171-1, 1171-3, 1171-5	1 mg, 3 mg, 5 mg
Caspase-3 Inhibitor Q-DEVD-OPh	Caspase-3	1175-1, 1175-3, 1175-5	1 mg, 3 mg, 5 mg
Caspase-8 Inhibitor, Q-IETD-OPh	Caspase-8	1176-1, 1176-3, 1176-5	1 mg, 3 mg, 5 mg
Caspase-9 Inhibitor, Q-LEHD-OPh	Caspase-9	1177-1, 1177-3, 1177-5	1 mg, 3 mg, 5 mg

Ready-to-use Caspase Substrates

BioVision provides bulk caspase substrates in the ready-to-use form for both fluorometric and colorimetric assays of caspase activity. These reagents offer an economical way for researchers to perform large amounts of caspase assays. Caspase Substrate Sets in the ready-to-use form are also available, providing more convenience for assaying multiple caspases in the same experiment. Optimized assay buffers, control cell lysates, caspase inhibitors, and recombinant active and procaspases, etc. are also available separately.



Product	Cat. #	Size
Caspase-1 Fluorometric Substrate, YVAD-AFC	1103-200, 1103-1000	200 assays, 1000 assays
Caspase-1 Colorimetric Substrate, YVAD-pNA	1104-200, 1104-1000	200 assays, 1000 assays
Caspase-2 Fluorometric Substrate, VDVAD-AFC	1071-200, 1071-1000	200 assays, 1000 assays
Caspase-2 Colorimetric Substrate, VDVAD-pNA	1072-200, 1072-1000	200 assays, 1000 assays
Caspase-3 Fluorometric Substrate, DEVD-AFC	1007-200, 1007-1000	200 assays, 1000 assays
Caspase-3 Colorimetric Substrate, DEVD-pNA	1008-200, 1008-1000	200 assays, 1000 assays
Caspase-4 Fluorometric Substrate LEVD-AFC	1109-200, 1109-1000	200 assays, 1000 assays
Caspase-4 Colorimetric Substrate LEVD-pNA	1110-200, 1110-1000	200 assays, 1000 assays
Caspase-5 Fluorometric Substrate, WEHD-AFC	1101-200, 1101-1000	200 assays, 1000 assays
Caspase-5 Colorimetric Substrate, WEHD-pNA	1102-200, 1102-1000	200 assays, 1000 assays
Caspase-6 Fluorometric Substrate, VEID-AFC	1069-200, 1069-1000	200 assays, 1000 assays
Caspase-6 Colorimetric Substrate, VEID-pNA	1070-200, 1070-1000	200 assays, 1000 assays
Caspase-8 Fluorometric Substrate, IETD-AFC	1062-200, 1062-1000	200 assays, 1000 assays
Caspase-8 Colorimetric Substrate, IETD-pNA	1063-200, 1063-1000	200 assays, 1000 assays
Caspase-9 Fluorometric Substrate, LEHD-AFC	1075-200, 1075-1000	200 assays, 1000 assays
Caspase-9 Colorimetric Substrate, LEHD-pNA	1076-200, 1076-1000	200 assays, 1000 assays
Caspase-10 Fluorometric Substrate, AEVD-AFC	1113-200, 1113-1000	200 assays, 1000 assays
Caspase-10 Colorimetric Substrate, AEVD-pNA	1114-200, 1114-1000	200 assays, 1000 assays
Caspase-12 Fluorometric Substrate, ATAD-AFC	1117-200, 1117-1000	200 assays, 1000 assays
Caspase-13 Fluorometric Substrate LEED-AFC	1116-200, 1116-1000	200 assays, 1000 assays

Ready-to-use Caspase Substrates Sets

Product	Cat. #	Size
Caspase Colorimetric Substrate Set <i>Contains ready-to-use caspase-1, -2, -3, -5, -6, -8, -9 pNA substrates</i>	K132-7-25	7 x 25 assays
Caspase Colorimetric Substrate Set Plus <i>Contains caspase-1, -2, -3, -5, -6, -8, -9 pNA substrates and all buffers</i>	K136-7-25	7 x 25 assays
Caspase Colorimetric Substrate Set II <i>Contains ready-to-use caspase-1, -2, -3, -4, -5, -6, -8, -9, -10 pNA substrates</i>	K134-9-25	9 x 25 assays
Caspase Colorimetric Substrate Set II Plus <i>Contains caspase-1, -2, -3, -4, -5, -6, -8, -9, -10 pNA substrates and all buffers</i>	K138-9-25	9 x 25 assays
Caspase Fluorometric Substrate Set <i>Contains ready-to-use caspase-1, -2, -3, -5, -6, -8, -9 AFC substrates</i>	K131-7-25	7 x 25 assays
Caspase Fluorometric Substrate Set Plus <i>Contains caspase-1, -2, -3, -5, -6, -8, -9 AFC substrates and all buffers</i>	K135-7-25	7 x 25 assays
Caspase Fluorometric Substrate Set II <i>Contains ready-to-use caspase-1, -2, -3, -4, -5, -6, -8, -9, -10 AFC substrates</i>	K133-9-25	9 x 25 assays
Caspase Fluorometric Substrate Set II Plus <i>Contains caspase-1, -2, -3, -4, -5, -6, -8, -9, -10 AFC substrates and all buffers</i>	K137-9-25	9 x 25 assays

Caspase Assay Buffers and Control Lysates

Product	Cat. #	Size
Cell Lysis Buffer Buffer for lysis of mammalian tissues and cells for caspase activity assays.	1067-100 1067-400	100 ml 400 ml
2X Reaction Buffer Optimized reaction buffer for caspase activity assay reactions.	1068-20 1068-80	20 ml 80 ml
Dilution Buffer Supplemental buffer for colorimetric caspase assays.	1066-100 1066-500	100 ml 500 ml
Jurkat Cell Lysate, Uninduced Negative control lysate for caspase activity assays.	1106-400 1106-1000	0.4 mg 1.0 mg
Jurkat Cell Lysate, Camptothecin Induced Positive control lysate for caspase activity assays.	1107-400 1107-1000	0.4 mg 1 mg
HeLa Nuclear Extract Contains nuclear extract from Hela cells.	1641-1000	1 mg
DTT (Dithiothreitol, 1 M) Contains 1 M solution of DTT in H ₂ O.	1201-1	1 ml
AFC Standard (7-Amino-4-trifluoromethylcoumarin)	1077-100	100 mg
pNA Standard (p-Nitroaniline)	1078-100	100 mg
(Asp)2-Rhodamine 110 (D₂R) Fluorescent substrate for analyzing caspase activity by flow cytometry	1131-1	1 mg
JC-1 [5,5',6,6'-Tetrachloro-1,1',3,3'-tetraethylbenzimidazolylcarbocyanine iodide] Fluorescent probe for analyzing mitochondrial transmembrane potential	1130-5	5 mg

Caspase & Related Antibodies

Product	Cat. #	Size	Host	Species	Application
AIF	3202-100	100 µg	Rb	hu/ms/rt	WB
Apaf-1	3018-100	100 µg	Rb	hu/ms/rt/bv/rb/mk/hm/gp	WB
Bid	3172-100	100 µg	Rb	hu	WB/IP/IHC
Bid	3272-100	100 µg	Rb	ms	WB
Caspase-1	3019-100	100 µg	Rb	hu/ms/rt	WB/IP/IF
Caspase-2	3027-100	100 µg	Rb	hu/ms/rt	WB
Caspase-3 (Active)	3015-100	100 µg	Rb	hu/ms/rt	WB/IHC
Caspase-3	3138-100	100 µg	Rb	hu/ms/rt	WB
Caspase-3 (Clone C33)	3004-100	100 µg	Ms	hu/ms/rt	WB
Caspase-4 (Clone D44)	3328-100	100 µg	Ms	hu	WB/IF
Caspase-4	3028-100	100 µg	Rb	hu/ms/rt	WB
Caspase-5	3029-100	100 µg	Rb	hu/ms/rt/mk/bv/hm/rb	WB
Caspase-6 (Active)	3156-100	100 µg	Rb	hu/ms/rt	WB/IF
Caspase-6	3256-100	100 µg	Rb	hu/ms/rt	WB
Caspase-7 (Active)	3147-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
Caspase-7	3135-100	100 µg	Rb	hu/ms/rt	WB
Caspase-7 (Clone B4-G2)	3010-100	100 µg	Ms	hu/ms/rt	WB/IP
Caspase-8	3158-100	100 µg	Rb	hu	WB/IHC
Caspase-8 (Active)	3259-100	100 µg	Rb	ms, rt	WB
Caspase-8 (Active) (Clone C502S)	3258-100	100 µg	Ms	hu	WB/IP
Caspase-8	3020-100	100 µg	Rb	hu/bv/ms/rt/mk	WB
Caspase-9	3016-100	100 µg	Rb	hu/ms/rt/hm/bv/pg/rb	WB
Caspase-9 (Active)	3149-100	100 µg	Rb	hu	WB/IP/ICC
Caspase-9	3136-100	100 µg	Rb	hu/ms/rt	WB
Caspase-9 (Active)	3151-100	100 µg	Rb	rt	WB/IHC/ICC
Caspase-9	3409-100	100 µg	Rb	ms/rt	WB
Caspase-10	3410-200	100 µg	Rb	hu/ms/rt	WB
Caspase-11	3021-100	100 µg	Rb	ms/rt	WB
Caspase-12	3282-100	100 µg	Rb	hu/ms/rt	WB
Cytochrome c	3025-100	100 µg	Rb	hu/ms/rt/ck/dg/bv/hr/mk/pg/rb/ye/zf/sp	WB/IP
Cytochrome c (Clone 7H8.2C12)	3026-100	100 µg	Ms	hu/ms/rt	WB
Cytochrome c	3352-100	100 µg	Rb	rt	WB
Cytochrome c	3353-100	100 µg	Rb	ms/bv	WB
Cytochrome p450	3084R-100	100 µg	Rb	hu/ms/rt/dg	WB
Lamin A	3267-100	100 µg	Rb	hu/ms/rt	WB/IHC
Lamin B1	3807-100	100 µg	Rb	hu/ms/rt	WB
Lamin B1 (Clone ZL-5)	3046-100	100 µg	Ms	hu/ms/rt/ck	WB/IP/IF/E
PARP	3002-100	100 µg	Rb	hu	WB
PARP (Clone 7A10)	3023-100	100 µl	Ms	hu	WB, ICC
PARP (Clone 10H)	3000-100	100 µg	Ms	all	WB/IP/ICC/E
PARP (Cleaved)	3140-100	100 µg	Rb	hu	WB/ICC
PARP (Cleaved)	3141-100	100 µg	Rb	ms	WB/ICC
PARP (Cleaved)	3142-100	100 µg	Rb	rt	WB/IHC
PBR	3044-100	100 µg	Rb	hu/ms/rt	WB/IHC

MitoCapture™ Apoptosis Detection Kit

Disruption of mitochondrial transmembrane potential is one of the earliest intracellular events that occur upon induction of apoptosis. The MitoCapture™ Mitochondrial Apoptosis Detection Kit provides a simple and sensitive *in vitro* assay for detecting the mitochondrial changes in apoptosis. The assay utilizes a novel cationic dye, MitoCapture™, that fluoresces differently in healthy versus apoptotic cells. In healthy cells, MitoCapture™ accumulates and aggregates in the mitochondria, fluorescing bright red. In apoptotic cells, a shift in mitochondrial transmembrane potential prevents the dye from accumulating in the mitochondria. Instead, it remains in the cytoplasm in its monomeric form, fluorescing green. The green fluorescent signals can easily be detected by fluorescence microscopy or flow cytometry. Assay takes less than 30 minutes.

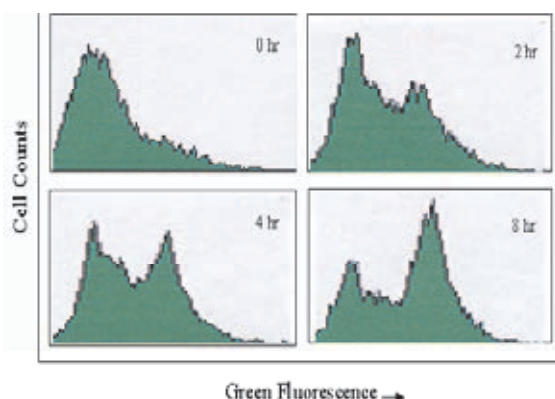


Fig.15: MitoCapture™ Effectively Detects Disruption of Mitochondrial Transmembrane Potential in Apoptotic Cells. Apoptosis was induced in Jurkat cells by 2 μ M camptothecin for various hours as indicated. Cells were incubated with MitoCapture™ for 15 minutes. Results were analyzed by flow cytometry using the FITC channel.

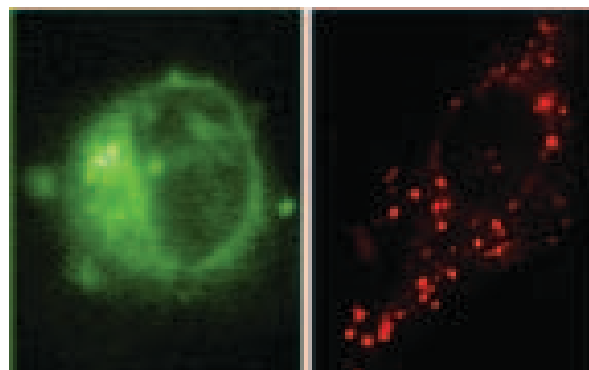


Fig. 16: Detection of Change in Mitochondrial Transmembrane Potential by MitoCapture™ and Fluorescence Microscopy. The photograph shows examples of cells scored for intact and apoptotic cells using MitoCapture™ probe. The apoptotic cell (left panel) shows diffused green fluorescence, whereas the normal control cell (right panel) shows punctate red fluorescence. Ref. J. Biol. Chem. 276:35891-35899, 2001.

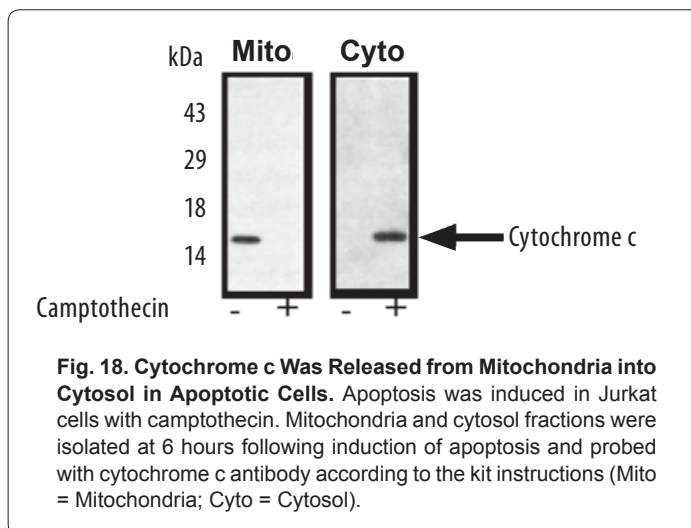
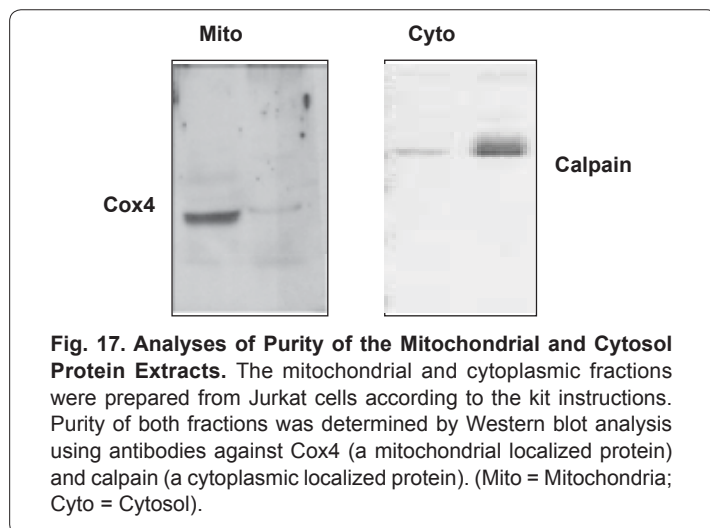
Product	Cat. #	Size
MitoCapture™ Mitochondrial Apoptosis Detection Kit	K250-25, K250-100	25 assays, 100 assays

Selected Bcl-2 Family Antibodies

Antibody to	Cat. #	Size	Host	Species	Applications
Bad	3030-100	100 μ g	Rb	hu/ms/rt/mk	WB/IP/IHC
Bax	3032-100	100 μ g	Rb	hu/ms/rt/mk	WB/IP
Bax (Clone 6036A7)	3331-100	100 μ g	Ms	hu/ms/rt	WB
Bcl-2 (Clone Bcl-2/100)	3195-100	100 μ g	Ms	hu	WB/IP/IHC/FC
Bcl-2	3033-100	100 μ g	Rb	hu/ms/rt	WB/IP/IHC
Bcl-3	3407-100	100 μ g	Rb	hu/ms/rt	WB/IP/IHC
Bcl-6	3408-100	100 μ g	Rb	hu/ms/rt	WB/IP/IHC
Bcl-B	3695-100	100 μ g	Rb	hu/rt	WB
Bcl-Rambo	3671-100	100 μ g	Rb	hu/ms/rt	WB
Bcl-xL	3312-100	100 μ g	Rb	hu/ms/rt	WB/IP
Beclin 1	3663-100	100 μ g	Rb	hu/ms/pg	WB
Bl-1	3347R-100	100 μ g	Rb	hu/ms/rt	WB
Bid	3172-100	100 μ g	Rb	hu	WB/IP/IHC
Bid	3272-100	100 μ g	Rb	ms	WB/IP/IHC
BIF	3704-100	100 μ g	Rb	hu/ms/rt	WB/IHC
BIK	3703-100	100 μ g	Rb	hu/ms/rt	WB
Bim/Bod	3124-100	100 μ g	Rb	hu/ms/rt	WB
Bin1	3672-100	100 μ g	Rb	hu/ms/rt	WB
BLK	3175-100	100 μ g	Rb	ms	WB
Bmf	3334R-100	100 μ g	Rb	hu/ms/rt	WB
Bok	3043-100	100 μ g	Rb	hu/ms/rt	WB

Cytochrome c Releasing Apoptosis Assay

Cytochrome c has been shown to play an important role in apoptosis. The protein is located in the space between the inner and outer mitochondrial membranes. An apoptotic stimulus triggers the release of cytochrome c from the mitochondria into the cytosol where it binds to Apaf-1. The cytochrome c/Apaf-1 complex activates caspase-9, which then activates caspase-3 and other downstream caspases. BioVision's Cytochrome c Releasing Apoptosis Assay Kit provides an effective means for detecting cytochrome c translocation from mitochondria into cytosol during apoptosis. The kit provides an easy-to-use procedure and reagents for separating a mitochondria-enriched fraction from cytosol. Cytochrome c released from mitochondria into cytosol is then determined by Western blotting using the cytochrome c antibody provided with the kit. The procedure is simple, straightforward, and no ultracentrifugations are required. Kit provides optimal reagents and antibodies for 100 assays.



Product	Cat. #	Size
Cytochrome c Apoptosis Assay Kit	K257-100	100 assays
Mitochondria/Cytosol Fractionation Kit	K256-100	100 assays
Nuclear/Cytosol Fractionation Kit	K266-100	100 assays

Cytochrome c Related Apoptosis Reagents

Product	Cat. #	Size
Apaf-1 Antibody (hu/ms/rt/bv/rb/mk/hm/gp, WB)	3018-100	100 µg
ATP Solution (100 mM)	2121-100	100 µl
Caspase-9 Enzyme (active, recombinant, human)	1089-25	25 assays
Caspase-9 Enzyme (active, recombinant, human)	1089-100	100 assays
Caspase-9 Antibody (ms/rt, WB)	3409-100	100 µg
Caspase-9 (Active) Antibody (hu, WB/IP/ICC)	3149-100	100 µg
Caspase-9 Antibody (hu/ms/rt/bv/hm/rb/pg, WB)	3016-100	100 µg
Cytochrome c (95% pure, without TCA)	2120-100	100 mg
Cytochrome c Antibody (hu/ms/rt/bv/ck/dg/hr/mk/pg/rb/sp/ye/zf, WB/IP)	3025-100	100 µg
Cytochrome c Antibody (hu/ms/rt, WB)	3026-100	100 µg
Cytochrome c Antibody (rt, WB)	3352-100	100 µg
Cytochrome c Antibody (ms/bv, WB)	3353-100	100 µg
Cytochrome p450 Antibody (hu/ms/rt, WB/IHC)	3084-100	100 µg
JC-1 [5,5',6,6'-Tetrachloro-1,1',3,3'-tetraethylbenzimidazolylcarbocyanine iodide]	1130-5	5 mg
Mcl-1 Antibody (hu/ms/rt/mk/rb/pg/ct/dg, WB/IP/IHC)	3035-100	100 µg
PBR Antibody (hu/ms/rt, WB/IHC)	3044-100	100 µg

ATP & ADP Assay Kits

ATP is the primary energy currency of living systems. Virtually all energy requiring processes utilize the chemical energy stored in the phosphate bond of ATP. ATP is formed exclusively in the mitochondria and a variety of pathological diseases can affect ATP formation in the mitochondria. Changes in ADP and ATP level have been observed in different modes of cell death and viability. Increased levels of ATP and decreased levels of ADP have been recognized in proliferating cells. In contrast, decreased levels of ATP and increased levels of ADP are recognized in apoptotic cells. The decrease in ATP and increase in ADP are much more pronounced in necrosis than apoptosis. Scientists at BioVision have developed various ATP and ADP Assay Kits. These assays are simple, sensitive and accurate. Results can be analyzed by colorimetric, fluorometric or luminescent methods.

Cell Fate	ADP Level	ATP
Proliferation	Very Low	High
Growth Arrest	Low	Slightly Higher
Apoptosis	Slightly Higher	Low
Secondary Necrosis	Much Higher	Low
Primary Necrosis	Much Higher	Very Low

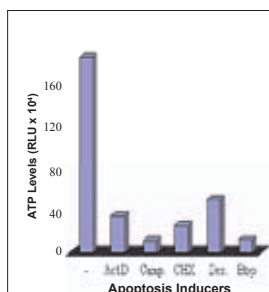


Fig. 19. Detection of ATP Level in Jurkat Cells. Apoptosis was induced with various chemical inducers as indicated. ATP levels were analyzed using the ApoSENSOR™ Cell Viability Assay Kit (K254) according to the kit instructions. ATP levels decrease dramatically following treatments with toxic chemicals.

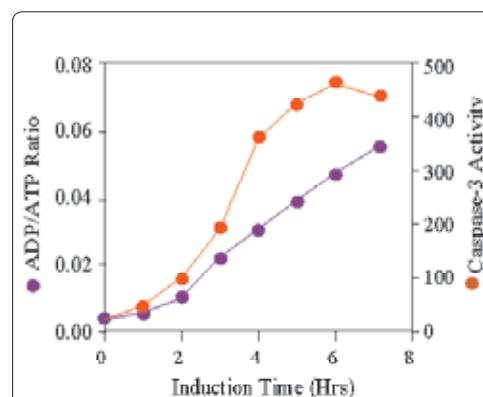


Fig. 20. Time-Dependent Induction of Apoptosis Analyzed by ADP/ATP Ratio Assay in Comparison to Caspase-3 Activity Assay. Apoptosis was induced in Jurkat cells with camptothecin for various hours as indicated. ADP/ATP ratios were analyzed by the ApoSENSOR™ ADP/ATP Ratio Assay Kit using 1000 cells per assay. Caspase-3 activity was determined using the Caspase-3 Fluorometric Assay Kit (K105-100) according to the kit instructions.

Product	Cat. #	Size
ApoSENSOR™ Cell Viability Assay Kit	K254-200, K254-1000	200 assays, 1000 assays
ApoSENSOR™ ADP/ATP Ratio Assay Kit	K255-200	200 assays
ATP Colorimetric/Fluorometric Assay Kit	K354-100	100 assays
ADP Colorimetric/Fluorometric Assay Kit	K355-100	100 assays
StayBrite™ Highly Stable ATP Assay Kit	K791-100, K791-1000	100 assays, 1000 assays

**Whole range of
Loading Control Antibodies
Publication-Quality!**

- Beta-Actin (3662, 3850, 3598)
- GAPDH (3777)
- Tubulin (3708)
- Cox-4 (3638)
- VDAC/Porin (3594)
- Histone H3 (3623)

Apoptotic DNA Ladder Detection Kits

BioVision offers three novel Apoptotic DNA Ladder Detection Kits. Quick Apoptotic DNA Ladder Detection Kit (K120-50) offers fast detection of DNA fragmentation in apoptotic cells. Unlike other similar kits on the market which require 1-2 days to prepare nucleic acids, the new procedure requires less than 90 minutes to prepare chromosomal DNA in a single tube. The new procedure increases recovery of small fragmented DNA, and therefore improves detection sensitivity. Enhanced Apoptotic DNA Ladder Detection Kit (K130-50) incorporates a proprietary buffer system and a highly sensitive staining dye, which dramatically increases the sensitivity of detection. The newly released Apoptotic DNA Ladder Isolation Kit (K170-50) can specifically extract DNA ladder, giving the highest sensitivity. The kit can detect apoptotic DNA ladder from both tissue and cells with as little as 5% apoptotic cell population. DNA ladders can easily be visualized by agarose gel electrophoresis.

K120 Kit Components

TE Lysis Buffer
Enzyme A Solution
Enzyme B (Lyophilized)
Ammonium Acetate Solution
DNA Suspension Buffer
User Manual

K130 Kit Components

TE Lysis Buffer
Enzyme B (Lyophilized)
Ammonium Acetate Solution
DNA Suspension Buffer
Staining Dye (10000X)
User Manual

K170 Kit Components

DNA Ladder Extraction Buffer
Enzyme A Solution
Enzyme B (Lyophilized)
Ammonium Acetate Solution
DNA Suspension Buffer
User Manual

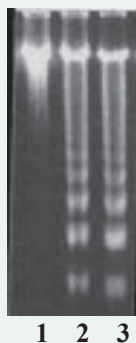
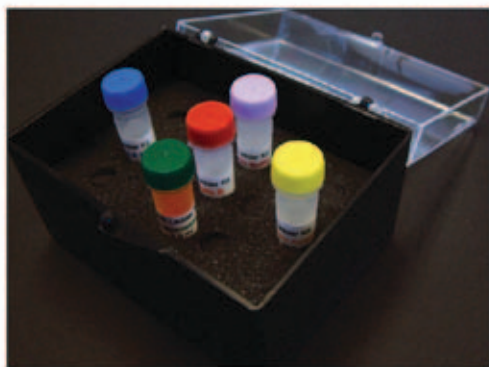


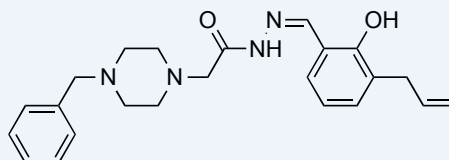
Fig. 21. Quick Detection of Apoptotic DNA Ladder in Jurkat Cells. Apoptosis was induced in Jurkat cells with camptothecin (2 μ M) for 0 hr (Lane 1), 6 hrs (Lane 2) and 12 hrs (Lane 3). Chromosomal DNA was prepared using the Quick Apoptotic DNA Ladder Detection Kit according to the kit instructions. 20 μ l of each sample was electrophoresed on a 1.2% agarose/EtBr gel.

Product	Cat. #	Size
Quick Apoptotic DNA Ladder Detection Kit	K120-50	50 assays
Enhanced Apoptotic DNA Ladder Detection Kit	K130-50	50 assays
Apoptotic DNA Ladder Isolation Kit	K170-50	50 assays

PAC-1 [1654-10] [10 mg]

Procaspase-activating compound 1 (PAC-1) directly activates procaspase-3 to caspase-3, a transformation that allows induction of apoptosis even in cells that have defective apoptotic machinery. In cancer cells, PAC-1 had an IC_{50} value of 3 nM for induction of cell death, whereas in cells from adjacent normal tissue had IC_{50} values of 3.2-8.5 μ M.

- ▶ **CAS Number:** 315183-21-2
- ▶ **Molecular Formula:** $C_{23}H_{28}N_4O_2$
- ▶ **Molecular Weight:** 392.49
- ▶ **Appearance:** White solid
- ▶ **Purity:** $\geq 95\%$ by HPLC



TUNEL-based DNA Fragmentation Assay Kits

BioVision offers four TUNEL-based In Situ DNA Fragmentation Assay Kits. All kits provide complete components including positive and negative control cells or slides for convenient detection of DNA fragmentation in cultured cells and tissue sections. The Apo-BrdU™ assay uses two-color TUNEL method for detecting DNA strand breaks in apoptotic cells by flow cytometer. The incorporation of BrdU in the procedure provides greater sensitivity than biotinylated or digoxigenylated methods. The Apo-BrdU-Red™ utilizes the same principle, but designed for GFP containing cells. The new addition of ApoBrdU-IHC™ provides a complete kit for detecting DNA fragmentation by dual color immunohistochemistry (IHC). The Apo-DIRECT™ assay offers a simple one-step labeling of apoptotic cells which can be analyzed by flow cytometry.

Apo-BrdU™

Kit Components

- Positive control cells
- Negative control cells
- Wash buffer
- Reaction buffer
- TdT enzyme
- Br-dUTP
- Rinsing buffer
- Anti-BrdU-FITC or Red mAb
- PI/RNase Staining buffer

Apo-BrdU-IHC™

Kit Components

- Positive control slides
- Negative control slides
- Blocking buffer
- H₂O₂/Urea Tablets
- Proteinase K
- DAB Tablets
- TdT enzyme
- Br-dUTP
- 200X Conjugate
- 5X Reaction buffer
- Biotin-BrdU mAb
- Methyl Green

Apo-DIRECT™

Kit Components

- Positive control cells
- Negative control cells
- Wash buffer
- Reaction buffer
- TdT enzyme
- FITC-dUTP
- Rinsing buffer
- PI/RNase Staining buffer

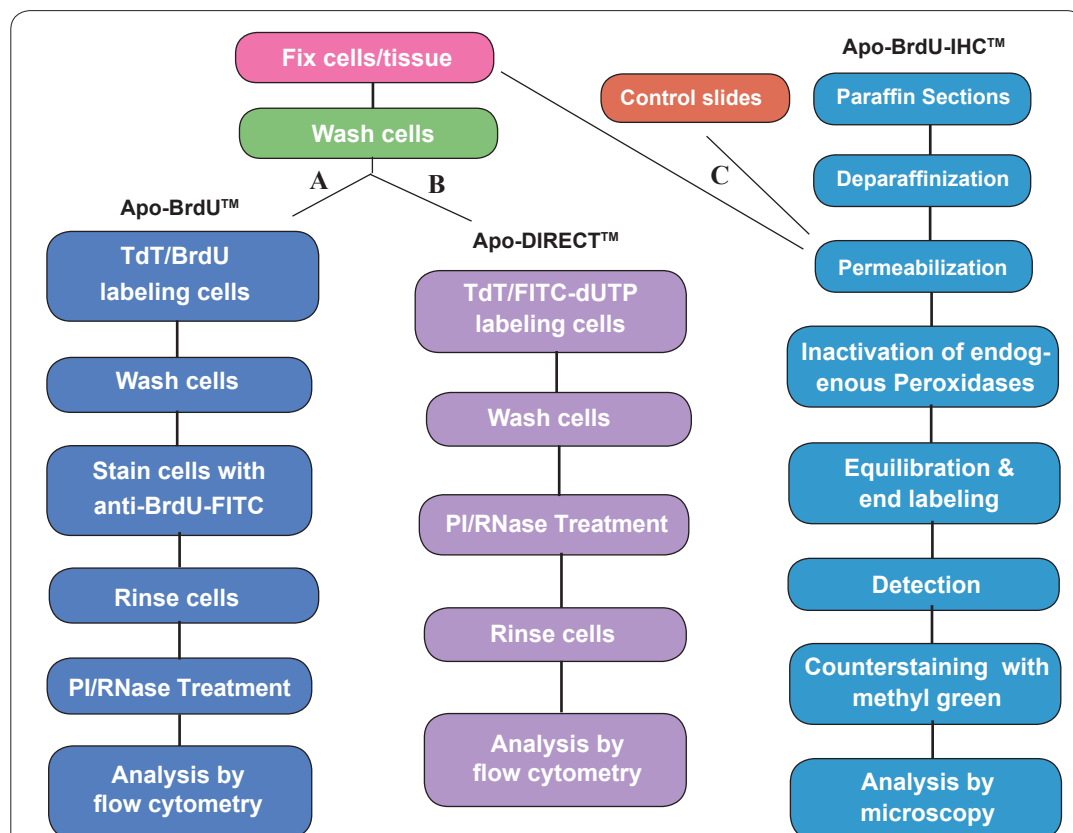


Fig. 22. Flow Chart of Apo-BrdU™ (A), Apo-DIRECT™ (B), and Apo-BrdU-IHC™ (C) DNA Fragmentation Assay Procedures.

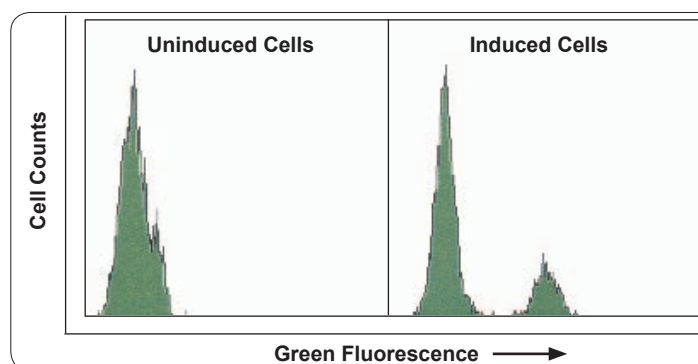
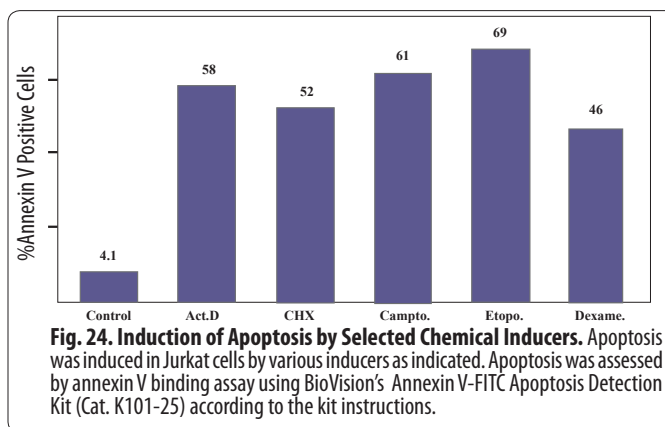


Fig. 23. Detection of Apoptotic Cells Using Apo-BrdU™ Kit by Flow Cytometer. Apoptosis was induced in Jurkat cells with camptothecin (2 μ M) for 8 hours. Control cells (uninduced) and induced cells were both collected, labeled with ApoBrdU according to the kit instructions. Results were analyzed by flow cytometry.

Product	Cat. #	Size
ApoBrdU™ DNA Fragmentation Assay Kit	K401-60	60 assays
ApoBrdU-Red™ DNA Fragmentation Kit	K404-60	60 assays
ApoBrdU-IHC™ DNA Fragmentation Assay Kit	K403-50	50 assays
ApoDIRECT™ DNA Fragmentation Assay Kit	K402-50	50 assays

Ready-to-use Apoptosis Inducers & Sets

BioVision provides high quality apoptosis inducers and sets in the ready-to-use form. These inducers can be used to induce apoptosis in cell cultures at 1000X dilutions (e.g., Add 1 µl to 1 ml of culture medium). These selected apoptosis inducers have been well characterized that disrupt mitochondrial transmembrane potential, activate caspases, induce phosphatidyl-serine (PS) exposure, DNA fragmentation, and other apoptotic characteristics. All inducers are ideally suited for use with various BioVision's apoptosis detection systems. Many high quality growth factors and cytokines that are involved in apoptosis, as well as other chemicals in powder form are also available separately.



Product	Cat. #	Size
Actinomycin D (10 mM)	1036-50	50 µl
Camptothecin (2 mM)	1039-1	1 ml
Cycloheximide (100 mM)	1041-1	1 ml
Dexamethasone (10 mM)	1042-1	1 ml
Etoposide (100 mM)	1043-100	100 µl
Ready-to-use Apoptosis Inducer Set	K121-5	5 ready-to-use apoptosis inducers

Apoptotic Cell Isolation

This Apoptotic Cell Isolation Kit provides a simple and efficient means for isolating/removing apoptotic cells from normal culture using Annexin V magnetic beads (MagBeads). Annexin V is a Ca^{2+} -dependent phospholipid binding protein, with high affinity for phosphatidylserine (PS). In early apoptosis, PS is redistributed from the inner surface to the outer surface of plasma membrane. Once on the cell surface, PS becomes available for binding to annexin V. Binding of Annexin V-biotin to apoptotic cells followed by binding of the biotin to streptavidin-MagBeads enables separation of apoptotic cells from normal cells. The bound apoptotic cells can then be released from the MagBeads using the Elution Buffer provided in the kit. The separated apoptotic cells and normal cells can be used in a variety of downstream assays. The kit has also been successfully used to remove dying cells from normal culture.

K258 Kit Components

Annexin V-Biotin
1X Binding Buffer
Streptavidin-MagBeads
Apoptotic Cell Releasing Buffer
User Manual

Collect cells and incubate with annexin V-biotin for 5 min



Add streptavidine-MagBeads and incubate for 15 min



Magnetic separation of apoptotic cells from normal cells



Release of apoptotic cells from MagBeads

Fig. 25. Apoptotic Cell Isolation Procedure.

Product	Cat. #	Size
Apoptotic Cell Isolation Kit	K258-30	30 isolations

GeneBlocker™ siRNA Apoptosis Vectors

Small interfering RNAs (siRNAs) are short, double-stranded RNA molecules that can target and degrade specific complementary mRNAs. The target gene-specific degradation is an effective means of gene suppression and is therefore used to block gene functions in mammalian cells. Recent studies have demonstrated the use of vectors expressing functional siRNAs to enable long-term knockdown studies. BioVision's newly developed GeneBlocker™ pGB siRNA mammalian expression vectors are specially designed to provide efficient, long-term suppression of a target gene in cultured mammalian cells and *in vivo*. The pGB expression vector has been optimized for suppressing expression of target genes in mammalian cells by using the human U6 promotor (a RNA polymerase III promotor) which generates large amounts of siRNA in mammalian cells. The pGB expression vector provides neomycin resistance marker for the selection of stable cell lines, permitting long term suppression of the target gene. BioVision currently offers four siRNA expression vectors targeting to different caspases. The GeneBlocker™ negative control siRNA vector and pGB cloning vector for cloning in your own insert are also available.

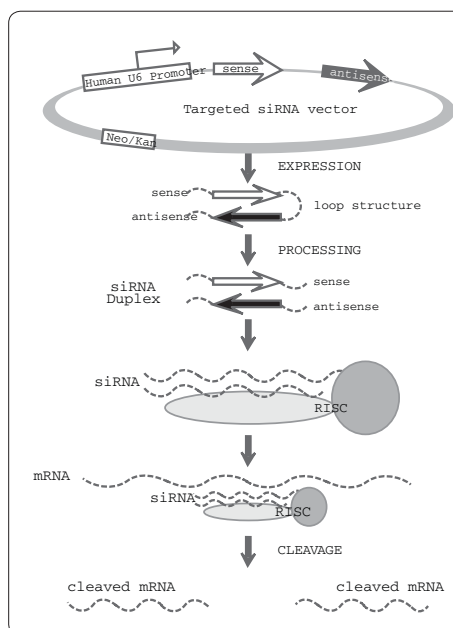


Fig. 26. Schematic Diagram of the RNA Interference Mechanism. Once processed, the vector expressed siRNA is incorporated into a multi-protein nuclease complex known as the RNA-induced silencing complex (RISC). Homology between the sense portion of the siRNA sequence and the mRNA enables the nuclease enzyme to bind and cleave the caspase transcript into small pieces, which are degraded by the cell's machinery.

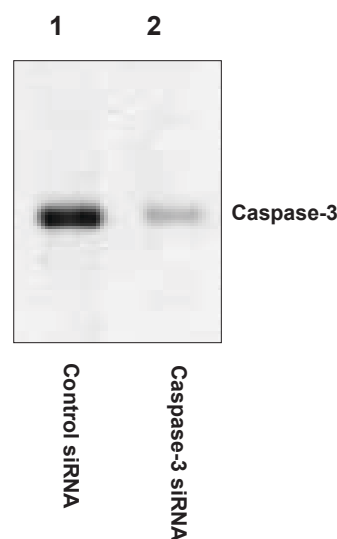
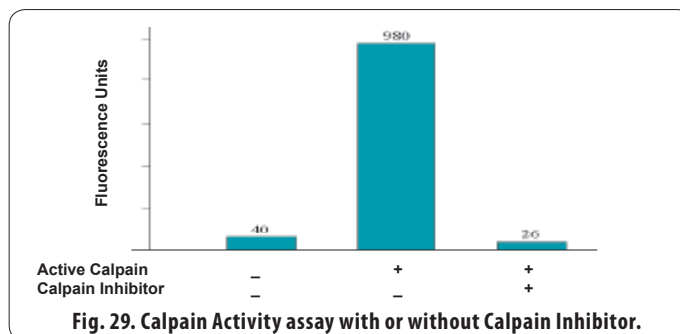
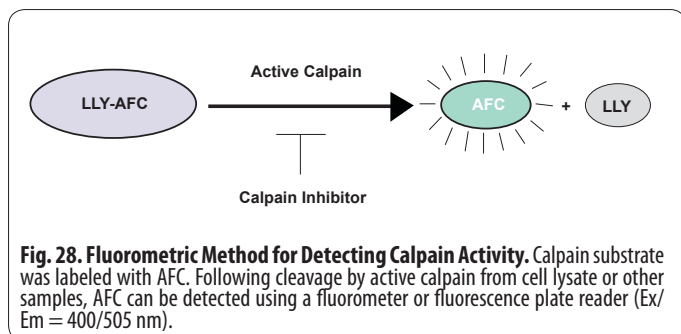


Fig. 27. GeneBlocker™ siRNA Vector Blocks Caspase Expression in NIH3T3 Cells. 1 µg caspase-3 siRNA vector, pGB-Caspase-3, was transfected into NIH3T3 cells using Lipofectamine according to the manufacturer's instructions. pGB-Control Vector with a siRNA sequence that has no homology to mammalian genes was also transfected into NIH3T3 cells as a negative control. Western blotting was performed with equal amounts of total protein and probed with a caspase-3 polyclonal antibody (BioVision, Cat. 3138-100). Caspase-3 expression was reduced significantly in Caspase-3 siRNA-transfected cells versus control siRNA transfected cells.

Product	Cat. #	Size
GeneBlocker™ siRNA Cloning Vector (pGB)	9500-20	20 µg
GeneBlocker™ Negative Control siRNA Vector (pGB-Control)	9500C-20	20 µg
GeneBlocker™ pGB AIF siRNA Vector Mix	9511-20, 9511-60	20 µg, 60 µg
GeneBlocker™ pGB BAD siRNA Vector Mix	9512-20, 9512-60	20 µg, 60 µg
GeneBlocker™ pGB BAX siRNA Vector Mix	9513-20, 9513-60	20 µg, 60 µg
GeneBlocker™ pGB Bcl-2 siRNA Vector Mix	9514-20, 9514-60	20 µg, 60 µg
GeneBlocker™ pGB BID siRNA Vector Mix	9515-20, 9515-60	20 µg, 60 µg
GeneBlocker™ Caspase-1 siRNA Vector Mix	9501-20, 9501-60	20 µg, 60 µg
GeneBlocker™ Caspase-3 siRNA Vector Mix	9503-20, 9503-60	20 µg, 60 µg
GeneBlocker™ Caspase-8 siRNA Vector Mix	9508-20, 9508-60	20 µg, 60 µg
GeneBlocker™ Caspase-9 siRNA Vector Mix	9509-20, 9509-60	20 µg, 60 µg
GeneBlocker™ pGB CIAP-1 siRNA Vector Mix	9516-20, 9516-60	20 µg, 60 µg
GeneBlocker™ pGB CIAP-2 siRNA Vector Mix	9517-20, 9517-60	20 µg, 60 µg
GeneBlocker™ pGB Hsp90 siRNA Vector Mix	9518-20, 9518-60	20 µg, 60 µg

Calpains

Calpain, a cytosolic calcium-dependent cysteine protease, is involved in many forms of physiological and pathological processes (e.g. apoptosis). The Calpain Activity Assay Kit provides a simple and convenient means for analyzing the activated calpain activity in apoptotic and other samples. The assay is based on fluorometric detection of the cleavage of calpain substrate Ac-LLY-AFC. Ac-LLY-AFC emits blue light ($\lambda_{\text{max}} = 400 \text{ nm}$); upon cleavage of the substrate by calpain or related proteases, free AFC emits a yellow-green fluorescence ($\lambda_{\text{max}} = 505 \text{ nm}$), which can be quantified using a fluorometer or a fluorescence plate reader. Comparison of the fluorescence of AFC from a treated sample with a normal control allows determination of the fold increase in calpain activity. The proprietary Calpain Extraction Buffer provided in the kit specifically extracts activated calpain from cytosol, but not other proteases in lysosomes. The kit also provides active calpain as the positive control and calpain inhibitor as the negative control. Active calpain, calpain inhibitor, and anti-calpain antibody are also available separately.



Calpain Assay Kits

Product	Cat. #	Size
Calpain Activity Assay Kit	K240-100	100 assays
Calpain 1 Inhibitor Screening Kit	K244-100	100 assays

Calpains Antibodies, Enzymes and Substrates

Product	Cat. #	Size
Active Human Calpain I	1134-100	100 µg
Calpain I Antibody	3189-100	100 µg
Calpain-2 Antibody	3372-100	100 µl
Suc-Leu-Leu-Val-Tyr-AMC	1833-5	5 mg

Calpain Inhibitors

Product	Cat. #	Size
Calpain Inhibitor I, ALLN	1834-5, 1834-25	5 mg, 25 mg
Calpain Inhibitor II, ALLM	1835-5, 1835-25	5 mg, 25 mg
Calpain Inhibitor Z-LLY-FMK	1125-20C	20 µl
MDL 28170	2195-10, 2195-50	10 mg, 50 mg
PD 150,606	1906-5, 1906-25	5 mg, 25 mg

Cathepsins

Apoptosis can be mediated by mechanisms other than the traditional caspase-mediated cleavage cascade. There is growing recognition that alternative proteolytic enzymes such as the lysosomal cathepsin proteases may initiate or propagate proapoptotic signals, but it is currently unclear how cathepsins mediate apoptosis. Cathepsins are lysosomal enzymes that are also used as sensitive markers in various toxicological investigations. BioVision's newly developed Cathepsin Activity Assay kits are fluorescence-based assays that utilize the preferred substrate sequence for each cathepsin, labeled with AFC (amino-4-trifluoromethyl coumarin). Cell lysates or other samples that contain cathepsins will cleave the synthetic substrate to release free AFC. The released free AFC can easily be quantified using a fluorometer or fluorescence plate reader. The cathepsin assays are simple, straightforward, and can be adapted to 96-well plate assays. Assay conditions have been optimized to obtain the maximal activity. Active cathepsins, cathepsin inhibitors and cathepsin antibodies are also available.

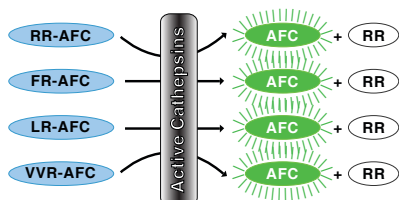


Fig. 30. Fluorometric Method for Detecting Cathepsin Activity. Each cathepsin substrate was labeled with AFC. RR-AFC, LR-AFC, FR-AFC and VVR-AFC are the substrates for cathepsin-B, -K, -L, and -S respectively. Following cleavage by active cathepsins from cell lysate or other samples, AFC can be detected using a fluorometer or fluorescence plate reader (Ex/Em = 400/505 nm).

Collect cells and resuspend in lysis buffer

Add Reaction buffer and Cathepsin substrate

37°C for 1 hr

Analyze in a fluorometer or fluorescence plate reader

Fig. 31. Cathepsin Assay Procedure

Cathepsin Assay Kits

Product	Cat. #	Size
Cathepsin B Activity Assay Kit	K140-100	100 assays
Cathepsin D Activity Assay Kit	K143-100	100 assays
Cathepsin D Inhibitor Screening Kit	K148-100	100 assays
Cathepsin G Activity Assay Kit	K146-100	100 assays
Cathepsin H Activity Assay Kit	K145-100	100 assays
Cathepsin K Activity Assay Kit	K141-100	100 assays
Cathepsin L Activity Assay Kit	K142-100	100 assays
Cathepsin S Activity Assay Kit	K144-100	100 assays

Cathepsins

Product	Cat. #	Size
Cathepsin B (active, human)	1021-5	5 µg
Cathepsin D (active, human)	1022-5	5 µg
Cathepsin H (active, human)	1023-5	5 µg
Cathepsin L, human recombinant	1135-5, 1135-100, 1135-1000	5 µg, 100 µg, 1 mg
Cathepsin S (active, human)	1025-5	5 µg

Cathepsin Antibodies

Antibody to	Cat. #	Size	Host	Species	Application
Cathepsin B	3190-100	100 µg	Rb	hu/ms/rt	WB/IHC/FC
Cathepsin D	3191R-100	100 µg	Rb	hu/ms/rt	WB/IP
Cathepsin F	3371-100	100 µg	Rb	hu/ms/rtg	WB
Cathepsin G	3370-200	200 µl	Rb	hu	WB

Cathepsin Antibodies...Cont.

Antibody to	Cat. #	Size	Host	Species	Application
Cathepsin H	3367-100	100 µg	Gt	hu/ms/rt	WB/IHC/IP
Cathepsin K	3368-100	100 µg	Rb	hu/rt/ms	WB/IP/IHC
Cathepsin K	3588-100	100 µg	Rb	hu/ms/rt/ck/rb/pg	WB/IP/IHC
Cathepsin L	3192-100	100 µg	Rb	hu/ms/rt	WB
Cathepsin L (Cleaved)	3741-100	100 µg	Rb	hu/ms/rt	WB/IHC
Cathepsin S	3366-100	100 µg	Gt	hu/ms/rt	WB/IP/IHC
Cathepsin S	3366R-100	100 µg	Rb	hu	WB
Cathepsin V (Clone BV55-1)	3411-100	100 µg	Ms	hu	WB/IHC
Cathepsin V	3712-100	100 µg	Rb	hu/ms/rt	WB
Cathepsin W (Clone BV39-2B)	3412-100	100 µg	Ms	hu	WB/IHC

Cathepsin Inhibitors

Product	Cat. #	Size
Biotin-VAD(OMe)-FMK	1123-20C	20 µl
Biotin-D(OMe)E(OMe)VD(OMe)-FMK	1124-20C	20 µl
Calpain Inhibitor Z-LLY-FMK	1125-20C	20 µl
Cathepsin B&L Inhibitor Z-Phe-Phe-FMK	1126-20C	20 µl
Cathepsin G Inhibitor	1982-1	1 mg
EMAP-II Inhibitor Z-ASTD(OMe)-FMK	1127-20C	20 µl
Z-FA-FMK	1986-1, 1986-5	1 mg, 5 mg

Granzyme B

Granzyme B (GZMB) is a serine protease that plays critical role in protecting organisms against intracellular infections. GZMB is stored in the granules of activated cytotoxic T-lymphocytes (CTLs) and natural killer (NK) cells. With its unique substrate specificity (GZMB prefers an aspartic acid residue at the P1 site of its substrates); GZMB processes and activates various procaspases thereby inducing apoptosis in the target cell. Granzyme B Inhibitor Screening Kit provides a rapid, simple, sensitive and reliable test suitable for high throughput screening of Granzyme B inhibitors. The assay is based on the detection of cleavage of GZMB substrate Ac-IEPD-AFC. Upon cleavage of the substrate by GZMB, free AFC emits a yellow-green fluorescence, which can be quantified fluorometrically at Ex/Em = 380/500 nm. In the presence of potent Granzyme B inhibitor, the hydrolyzation of substrate will be impeded. The kit comes with the inhibitor control (Ac-IEPD-CHO) to compare the efficacy of test inhibitors. Active Granzyme B, Granzyme B inhibitors and anti-Granzyme B antibody are also available separately.

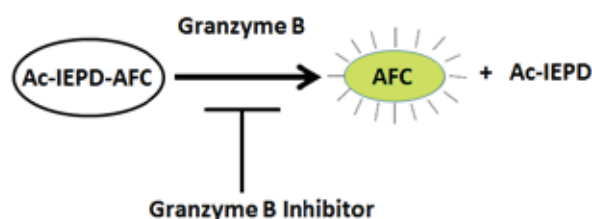


Fig. 32. Schematic representation of Fluorometric method to screen Granzyme B inhibitors.

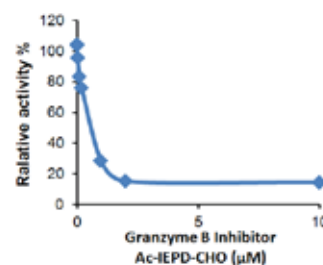


Fig. 33. Inhibition of Granzyme B Activity by Ac-IEPD-CHO. The enzyme was incubated with the inhibitor for 5 minutes prior to addition of substrate.

Granzyme B Assay Kits

Product	Cat. #	Size
Granzyme B Assay Kit	K168-100	100 assays
Granzyme B inhibitor Screening Assay Kit	K169-100	100 assays

Granzyme B Antibodies

Antibody to	Cat. #	Size	Host	Species	Application
Granzyme B Antibody	3073R-100	100 µg	Rb	hu/ms/rt	WB
Granzyme B Antibody (Clone B18.1)	3073-100	100 µg	Ms	hu	WB/IP/IHC/FC

Granzyme B Active Enzymes

Product	Cat. #	Size
Granzyme B, human recombinant (E. coli)	1118-5	5 µg
Granzyme B, human recombinant (Insect)	4728-5	5 µg
Granzyme B, mouse recombinant (Insect)	7608-5	5 µg

Granzyme B Inhibitors

Product	Cat. #	Size
Granzyme B Inhibitor Ac-IEPD-CHO	1119-1	1 mg
Granzyme B Inhibitor Z-AAD-CH2Cl	1128-20C	20 µl

Cell Viability (proliferation & death)

Quick Cell Proliferation Assay Kit

This fast, sensitive cell proliferation assay uses a water-soluble tetrazolium salt WST-1 to measure cell proliferation in response to growth factors, cytokines, mitogens, and nutrients, etc. The method is so simple, requiring no washing, harvesting, or solubilization, and is faster and more sensitive than MTT, XTT, or MTS-based assays (Fig. 31). The VisionBlue™ Quick cell viability assay provides by far the most sensitive assay for cell proliferation on the market. (K301, K302, K303)

Senescence Detection Kit

Senescence is thought to be a tumor suppressive mechanism and an underlying cause of aging. Senescence represents an arrested state in which the cells remain viable, but not stimulated to divide by serum or passage in culture. The Senescence Detection Kit is designed to histochemically detect specific senescence marker in cultured cells and tissue sections. The specific marker is only present in senescent cells and is not found in presenescent, quiescent or immortal cells. (K320)

Bioluminescence Cytotoxicity Assay Kit

The highly sensitive cytotoxicity assay measures the Adenylate Kinase (AK) released from damaged mammalian cells. AK actively phosphorylates ADP to form ATP, which is then measured on a luminometer via luciferase catalyzed reaction. Detects as few as 10 cells/assay in 96-well plate. Results can be obtained in 10 min. (K312)

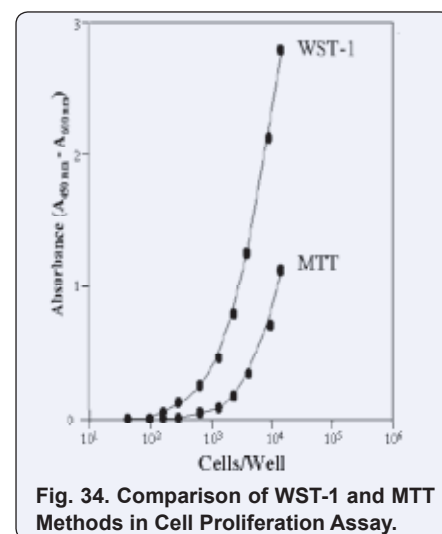


Fig. 34. Comparison of WST-1 and MTT Methods in Cell Proliferation Assay.

Cell Viability (proliferation & death)

LDH-Cytotoxicity Assay Kit

The assay is based on measurement of activity of lactate dehydrogenase (LDH), a stable enzyme normally found in the cytosol of all cells but rapidly releases into the supernatant upon damage of plasma membrane. It provides a convenient, nonradioactive alternative to the [³H]-thymidine and the [⁵¹Cr] release assays. The assay is fast and sensitive. Results can be analyzed by spectrophotometry at 500 nm. (K311, K313, K726)

Live-Dead Cell Staining Kit

The Live-Dead Cell Staining Kit provides ready-to-use staining reagents and incubation buffer for distinguishing between live and dead cells in mammalian culture. Kit contains Live-dye™ (a cell-permeable green fluorescent dye with Ex/Em = 490/515 nm) for staining live cells, and propidium iodide (PI, Ex/Em = 488/615 nm) for staining dead cells. Stained live and dead cells can easily be visualized by fluorescence microscopy. (K501)

High Throughput Cell Viability Assays

This ApoSENSOR™ Cell Viability Assay Kit utilizes bioluminescent as well as Colorimetric/Fluorometric detection of the ATP level for a rapid screening of apoptosis and cell viability in mammalian cells (Fig. 32). The ApoSENSOR™ ADP/ATP Ratio Kit detects changes in the ratio of ADP and ATP to differentiate between apoptosis, necrosis, and cell proliferation, simultaneously. Both assays can be done directly in culture plates, and can be fully automatic for high throughput (detects as little as 10-100 mammalian cells/well). (K254, K255, K354, K355, K791)

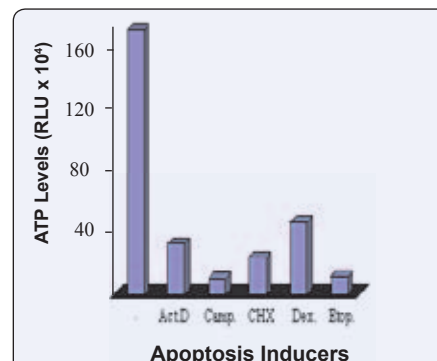


Fig. 35. Detection of ATP Level in Jurkat Cells. Apoptosis was induced with various chemical inducers as indicated. ATP levels were analyzed using the ApoSENSOR™ Cell Viability Assay Kit according to the kit instructions. ATP levels decrease dramatically following treatments with toxic chemicals.

Cell Viability (proliferation & death) Assay Kits

Product	Cat. #	Size
ApoSENSOR™ ADP/ATP Ratio Assay Kit	K255-200	200 assays
ApoSENSOR™ Cell Viability Assay Kit	K254-200, K254-1000	200 assays, 1000 assays
ADP Colorimetric/Fluorometric Assay Kit	K355-100	100 assays
ATP Colorimetric/Fluorometric Assay Kit	K354-100	100 assays
Bioluminescence Cytotoxicity Assay kit	K312-500	500 assays
LDH Quantification Kit	K726-100	100 assays
LDH-Cytotoxicity Assay Kit	K311-400	400 assays
LDH-Cytotoxicity Assay Kit II	K313-500	500 assays
Live-Dead Cell Staining Kit	K501-100	100 assays
Quick Cell Proliferation Assay Kit	K301-500, K301-2500	500 assays, 2500 assays
Quick Cell Proliferation Assay Kit Plus	K302-500, K302-2500	500 assays, 2500 assays
Senescence Detection Kit	K320-250	250 assays
StayBrite™ Highly Stable ATP Assay Kit	K791-100 / K791-1000	100 assays, 1000 assays
VisionBlue Quick Cell Viability Assay	K303-500, K303-2500	500 assays, 2500 assays

Cell Viability (proliferation & death) Reagents

Product	Cat. #	Size
Ready-to-use Cell Proliferation Reagent, WST-1	K304-2500	2500 assays
StayBrite™ D-Luciferin, Sodium Salt	7902-100, 7902-1G, 7902-10G	100 mg, 1 g, 10 g
StayBrite™ Highly Stable Luciferase	7901-150	150 µg
StayBrite™ Highly Stable Luciferase/Luciferin Reagent	K790-100, K790-1000, K790-10000	100 assays, 1000 assays, 10000 assays
WST-1	2198-10, 2198-30	10 mg, 30 mg
WST-8	2049-10, 2049-30	10 mg, 30 mg

Apoptosis Antibodies

Antibody to	Ct. #	Size	Host	Species	Applications
A1	3401-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
ADAM10	3201-100	100 µg	Rb	hu/rt/bv	WB/IF
AIF	3202-100	100 µg	Rb	hu/ms/rt	WB
Apaf-1	3018-100	100 µg	Rb	hu/ms/rt/bv/rb/mk/hm/gp	WB
ASC/TMS1	3291-100	100 µg	Rb	hu/rt	WB
Bcl-3	3407-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
Bcl-6	3408-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
Bcl-B	3695-100	100 µg	Rb	hu/rt	WB
Bcl-Rambo	3671-100	100 µg	Rb	hu/ms/rt	WB
Bcl-xL	3312-100	100 µg	Rb	hu/ms/rt	WB/IP
BI-1	3347R-100	100 µg	Rb	hu/ms/rt	WB
BIF	3704-100	100 µg	Rb	hu/ms/rt	WB/IHC
BIK	3703-100	100 µg	Rb	hu/ms/rt	WB
Bim/Bod	3124-100	100 µg	Rb	hu/ms/rt	WB
Bin1	3672-100	100 µg	Rb	hu/ms/rt	WB
BLAME	3895-100	100 µg	Rb	hu/ms/rt	WB
BLCAM	3363-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
BLK	3175-100	100 µg	Rb	ms	WB
BLM	3769-100	100 µl	Rb	hu	WB/IP
Bmf	3334R-100	100 µg	Rb	hu/ms/rt	WB
BMI-1	3930-100	100 µg	Rb	hu/ms/rt/bv/dg/ct	WB
Bok	3043-100	100 µg	Rb	hu/ms/rt	WB
Brk	3847-100	100 µg	Rb	hu	WB
BTF	3743-100	100 µl	Rb	hu/ms	WB/IP
Calpain I	3189-100	100 µg	Rb	hu/ms/rt/bv/pg/rb	WB
Calpain-2	3372-100	100 µl	Rb	hu/ms/rt	WB
Caspase-1	3019-100	100 µg	Rb	hu/ms/rt	WB/IP/IF
Caspase-2	3027-100	100 µg	Rb	hu/ms/rt	WB
Caspase-3 (Clone C33)	3004-100	100 µg	Ms	hu/ms/rt	WB
Caspase-3 (Active)	3015-100	100 µg	Rb	hu/ms/rt	WB/IHC
Caspase-3	3138-100	100 µg	Rb	hu/ms/rt	WB
Caspase-4	3028-100	100 µg	Rb	hu/ms/rt	WB
Caspase-4 (Clone D44)	3328-100	100 µg	Ms	hu	WB/IF
Caspase-5	3029-100	100 µg	Rb	hu/ms/rt/mk/hm/bv	WB
Caspase-6 (Active)	3156-100	100 µg	Rb	hu/ms/rt	WB/IF
Caspase-6	3256-100	100 µg	Rb	hu/ms/rt	WB
Caspase-7 (Active)	3147-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
Caspase-7 (Clone B4-G2)	3010-100	100 µg	Ms	hu/ms/rt	WB/IP
Caspase-7	3135-100	100 µg	Rb	hu/ms/rt	WB
Caspase-8 (Active) (Clone C502S)	3258-100	100 µg	Ms	hu	WB/IP
Caspase-8 (Active)	3259-100	100 µg	Rb	ms/rt	WB
Caspase-8	3020-100	100 µg	Rb	ms/rt/bv/mk	WB
Caspase-8	3158-100	100 µg	Rb	hu	WB/IHC
Caspase-9 (Active)	3149-100	100 µg	Rb	hu	WB/IP/ICC

Apoptosis Antibodies...Cont.

Antibody to	Ct. #	Size	Host	Species	Applications
Caspase-9 (Active)	3151-100	100 µg	Rb	rt	WB/IHC/ICC
Caspase-9	3016-100	100 µg	Rb	hu/ms/rt/hm/bv/rb/pg	WB
Caspase-9	3136-100	100 µg	Rb	hu/ms/rt	WB
Caspase-9	3409-100	100 µg	Rb	ms/rt	WB
Caspase-10	3410-200	200 µg	Rb	hu/ms/rt	WB
Caspase-11	3021-100	100 µg	Rb	ms/rt	WB
Caspase-12	3282-100	100 µg	Rb	hu/ms/rt	WB
Cathepsin B	3190-100	100 µg	Rb	hu/ms/rt	WB/IHC
Cathepsin D	3191R-100	100 µg	Rb	hu/ms/rt	WB/IP
Cathepsin F	3371-100	100 µl	Rb	hu/ms/rt	WB
Cathepsin G	3370-200	200 µl	Rb	hu	WB
Cathepsin H	3367-100	100 µg	Goat	hu/ms/rt	WB/IP/IHC
Cathepsin K	3588-100	100 µg	Rb	hu/ms/rt/ck/rb/pg	WB/IP/IHC
Cathepsin K	3368-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
Cathepsin L	3192-100	100 µg	Rb	hu/ms/rt	WB
Cathepsin L (Cleaved)	3741-100	100 µg	Rb	hu/ms/rt	WB/IHC
Cathepsin S	3366-100	100 µg	Goat	hu/ms/rt	WB/IP/IHC
Cathepsin S	3366R-100	100 µg	Rb	hu	WB
Cathepsin V (Clone BV55-1)	3411-100	100 µg	Ms	hu	WB/IHC
Cathepsin V	3712-100	100 µg	Rb	hu/ms/rt	WB
Cathepsin W (Clone BV39-2B)	3412-100	100 µg	Ms	hu	WB/IHC
CD40	3072-100	100 µg	Rb	hu/ms/rt/mk/pg/horse/dg	WB
CD40L	3178-100	100 µg	Rb	hu/ms/rt	WB
CD40L	5015-100	100 µg	Rb	hu/ms/rt	WB
cIAP-1	3180A-100	100 µg	Rb	hu/ms/rt	WB
cIAP-1/HIAP-2	3180-100	100 µg	Rb	hu/ms/rt	WB
cIAP-2/HIAP-1	3181-100	100 µg	Rb	hu/ms/rt	WB/IHC
Cytochrome c	3025-100	100 µg	Rb	hu/ms/rt/bv/ck/dg/hr/mk/pg/rb/sp/ye/zf	WB/IP
Cytochrome c (Clone 7H8.2C12)	3026-100	100 µg	Ms	hu/ms/rt	WB
Cytochrome c	3352-100	100 µg	Rb	rt	WB
Cytochrome c	3353-100	100 µg	Rb	ms/bv	WB
DEDAF	3313-100	100 µg	Rb	hu/ms/rt	WB
DFF40	3049-100	100 µg	Rb	hu/ms/rt	WB/IHC
DFF45	3048-100	100 µg	Rb	ms/rt	WB
DFF45 (Clone 6B8SG)	3050-100	100 µg	Ms	hu	WB
Dicer	3697-100	100 µg	Rb	hu/ms/rt	WB
DNase I	3214-100	100 µg	Rb	bv	WB
EndoG	3336R-100	100 µg	Rb	hu/ms/rt	WB
FADD	3039-100	100 µg	Rb	hu/ms/rt/mk	WB/IP
FADD (Clone T1B)	3008-100	100 µg	Ms	hu/ms/dg	WB
FAF1	3346-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
FAK	3399-100	100 µg	Rb	hu/ms/rt	WB/IP/ICC
Fas Ligand (Clone I-6060)	3330-100	100 µg	Ms	hu	WB/IP/IHC
FasL	3345R-100	100 µg	Rb	ms/rt	WB

Apoptosis Antibodies...Cont.

Antibody to	Ct. #	Size	Host	Species	Applications
Fas/Apo1	3070R-100	100 µg	Rb	hu/ms/rt	WB
FLIP (c-)	3058-100	100 µg	Rb	hu/ms/rt	WB/IF
Fodrin (alpha)	3266-100	100 µg	Rb	hu/ms/rt/ck	WB/IHC
GADD153	3421-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
GDF-3	5757-100	100 µg	Rb	hu	WB
GDF-9	5872-100	100 µg	Rb	hu	WB
Granzyme B (Clone B18.1)	3073-100	100 µg	Ms	hu	WB/IP/FC
Granzyme B	3073R-100	100 µg	Rb	hu/ms/rt	WB
Histone H2A	3621-100	100 µg	Rb	hu/ms/rt/ck	WB/IP/IHC
Histone H2B	3622-100	100 µg	Rb	hu/ms/rt	WB/IP
Histone H3	3623-100	100 µg	Rb	hu/ms/rt	WB/IHC
Holocytochrome c (Clone 2CYZ-702)	3187-100	100 µg	Ms	hu/ms/rt	WB/IP
Hrk	3176-100	100 µg	Rb	hu	WB
Hsc70	3095-100	100 µg	Rb	hu/ms/rt/mk/hm/pg/sp/bv	WB/IHC
HSF1	3812-100	100 µg	Rb	hu/ms	WB
IFN alpha	5595R-100	100 µg	Rb	hu	WB
IFN alpha	5596-100	100 µl	Rb	ms	WB/NL
IFN gamma	5117-100	100 µg	Rb	ms	WB/NL/E
IFN gamma	5116-200	200 µg	Rb	hu	WB
IRAK-4	3580-100	100 µg	Rb	hu	WB
Lamin A	3267-100	100 µg	Rb	hu/ms/rt	WB/IHC
Lamin B1	3807-100	100 µg	Rb	hu/ms/rt	WB
Lamin B1 (Clone ZL-5)	3046-100	100 µg	Ms	hu/ms/rt/ck	WB/IP/IF/E
LIGHT	5607-100	100 µg	Rb	hu	WB
MAPKAPK-2	3100-100	100 µg	Rb	hu/ms/rt/dg/bv/hm	WB/IP
Mcl-1	3035-100	100 µg	Rb	hu/ms/rt/mk/rb/pg/ct/dg	WB/IP/IHC
MGMT	3820-100	100 µg	Rb	ms/rt	WB
NAIP	3228-100	100 µg	Rb	hu	WB
NFκB p50	3354R-100	100 µg	Rb	hu/ms/rt	WB
NFκB p65	3038-100	100 µg	Rb	hu/ms/rt	WB/ICC
NFκB p65 (Clone 2A12A7)	3012-100	100 µg	Ms	hu/ms/rt	WB/IP/IHC
NIK	3193R-100	100 µg	Rb	hu/ms/rt/dg/hr	WB
Noxa	3665-100	100 µg	Rb	hu/ms/rt	WB
p53 (Clone C6A5)	3036-100	100 µg	Ms	hu/ms/rt	WB/IP/IHC/ICC
p53	3036R-100	100 µg	Rb	hu/ms/rt/dg/rb	WB
p53 (Phospho)	3515-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
p53DINP1	3340-100	100 µg	Rb	hu/ms/rt	WB/IHC
PARP (Cleaved)	3140-100	100 µg	Rb	hu	WB/ICC
PARP (Cleaved)	3141-100	100 µg	Rb	ms	WB/ICC
PARP (Cleaved)	3142-100	100 µg	Rb	rt	WB/ICC
PARP	3002-100	100 µg	Rb	hu	WB
PARP Antibody (Clone 10H)	3000-100	100 µg	Ms	all	WB/IP/ICC/E
PARP Antibody (Clone 7A10)	3023-100	100 µl	Ms	hu	WB/ICC
PAX6	3636R-100	100 µg	Rb	hu/ms/rt	WB

Apoptosis Antibodies...Cont.

Antibody to	Ct. #	Size	Host	Species	Applications
PBR	3044-100	100 µg	Rb	hu/ms/rt	WB/IHC
Perforin (Clone δG9)	3188-100	100 µg	Ms	hu	IP/IHC/ICC/FC
Perforin	3188R-100	100 µg	Rb	hu/ms/rt	WB
Perforin	3287-100	100 µg	Rb	ms/rt	WB
Raf1	3116-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
RAIDD	3037-100	100 µg	Rb	hu/ms/rt	WB
RANKL	5318R-100	100 µg	Rb	hu	WB
RANKL	5557-100	100 µg	Rb	ms	WB
ROCK-1 (cleaved) (Clone 12M03)	3545-100	100 µg	Ms	hu/ms	WB
SLC	5534-100	100 µg	Rb	rt	WB
Smac/DIABLO	3298-100	100 µg	Rb	hu/ms/rt/dm	WB/IHC
SODD	3221-100	100 µg	Rb	hu/ms/rt	WB
TANK	3348-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
TGF-beta1	5559-100	100 µg	Rb	hu/ms/rt/pg	WB/IHC
TGF-beta2	5340-100	100 µg	Rb	hu	WB
TGF-beta2	5343R-100	100 µg	Rb	hu/ms/rt/bv/ck/pg/x	WB
TGF-beta3	5344R-100	100 µg	Rb	hu/ms/rt	WB
TGF-beta Receptor I	5636R-100	100 µg	Rb	hu/ms/rt/pg/bv	WB
TGF-beta Receptor II	5639-100	100 µg	Rb	hu/ms/rt	WB
TGF-beta Receptor III	5642-100	100 µg	Gt	hu	WB
TNF-alpha	3052R-100	100 µg	Rb	hu	WB/NL
TNF-alpha	3053R-100	100 µg	Rb	ms	WB
TNF-alpha	3054-100	100 µg	Rb	rt	WB/NL
TNF-beta	5345-100	100 µg	Rb	hu	WB/NL
TNF-R1	5348-100	100 µg	Rb	hu	WB
TNF-R1	3125-100	100 µg	Rb	hu/ms/rt/hm/bv/rb/mk/sp/pg/dg	WB/IHC
TRADD	3561-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
TRAF3	3563-100	100 µg	Rb	hu/ms/rt/pg/sp/mk/bv	WB
TRAF6	3566R-100	100 µg	Rb	hu/ms/rt/bv/mk/pg/hm	WB
TRAIL	3045-100	100 µg	Rb	hu	WB/NL/E
TRAIL	5354-100	100 µg	Rb	hu	WB
TrkA	3194-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
TrkB	3593-100	100 µg	Rb	hu/ms/rt/ck	WB/IF
TROY/TAJ	3562R-100	100 µg	Rb	ms	WB
TUCAN/CARD8	3705-100	100 µg	Rb	hu/ms/rt	WB
TweakR	3564-100	100 µg	Rb	hu	WB
Wee1	3120-100	100 µg	Rb	hu/ms/rt	WB/IP
XAF-1	3696-100	100 µg	Rb	hu	WB
XIAP	3183-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC

Autophagy

Autophagy works as a cellular housekeeper by eliminating defective proteins and organelles, preventing abnormal protein accumulation, and removal of intracellular pathogens. This enables the reuse of intracellular constituents such as an amino acid pool during periods of starvation and regulates cellular homeostasis, cell death/survival, and lipid metabolism. These functions are critical for autophagy-mediated protection against aging, cancer, neurodegenerative diseases, and infection.

Autophagy is divided into three main forms: microautophagy, chaperone-mediated autophagy and macroautophagy. In microautophagy and the mammalian-specific chaperone-mediated autophagy the lysosome directly engulfs small portions of cytosol or receives chaperone-associated cargoes, respectively. Macroautophagy involves the autophagosome, a double-membrane-bound vesicle, which fuses with a lysosome to form the autophagolysosome, which is responsible for the turnover of organelles (e.g., mitochondria) and portions of cytosol.

Defects in the autophagic response have been linked to a significant number of human pathological conditions. Many neurodegenerative conditions like Huntington's disease, Parkinson's disease, Amyotrophic lateral sclerosis and Alzheimer's disease are due to defects in the autophagic response. Autophagy is a crucial process in oncogenesis and cancer progression. Several autophagy-related proteins have tumor suppressor activities (Beclin-1, Atg5, Bif-1, Atg4C, and UVRAG).

BioVision offers wide range of autophagy inducers and inhibitors as well as antibodies against autophagy related proteins.

Autophagy Antibodies

Antibody to	Ct. #	Size	Host	Species	Applications
AMPK α	3113-100	100 μ g	Rb	hu	E/WB/IHC
AMPK α 1	3110-100	100 μ g	Rb	hu/ms	E/WB
AMPK α 1	3951-100	100 μ g	Rb	hu/ms/rt	WB
AMPK α 2	3169-100	100 μ g	Rb	hu/ms	E/WB
AMPK α 2	3117-100	100 μ g	Rb	hu	E/WB/IHC
APG5/ATG5	3886-100	100 μ g	Rb	hu/ms/rt/pg/bv	WB
APG7/ATG7	3907-100	100 μ g	Rb	hu/ms/rt/ye	WB
APG10/ATG10	3910-100	100 μ g	Rb	hu/ms/rt	WB
APG12/ATG12	3912-100	100 μ g	Rb	hu/ms/rt	WB
APG16/ATG16	3916-100	100 μ g	Rb	hu/ms/rt	WB
ATG3 (Center)	5061-100	100 μ g	Rb	hu/ms/rt	WB/IHC/E
ATG5 (NT)	5062-100	100 μ g	Rb	hu/ms/rt	WB/IHC/E
ATG5 (NT-R)	5063-100	100 μ g	Rb	hu/ms/rt	WB/IHC/E
ATG9A (CT)	5064-100	100 μ g	Rb	hu/ms/rt	WB/ICC/E
ATG9B (CT)	5065-100	100 μ g	Rb	hu/ms/rt	WB/ICC/E
ATG12 (Center)	5067-100	100 μ g	Rb	hu/ms/rt	WB/IHC/E
ATG12 (NT)	5068-100	100 μ g	Rb	hu/ms/rt	WB/IHC/E
ATG13 (CT)	5069-100	100 μ g	Rb	hu/ms/rt	WB/IHC/E
ATG16 (Center)	5070-100	100 μ g	Rb	hu/ms/rt	WB/ICC/E
ATG16 (NT)	5071-100	100 μ g	Rb	hu/ms/rt	WB/ICC/E
ATG101 (Center)	5066-100	100 μ g	Rb	hu/ms/rt	WB/IHC/E
Bad	3030-100	100 μ g	Rb	hu/ms/rt/mk	WB/IP/IHC
Bad (Phospho)	3269-100	100 μ g	Rb	hu/ms/rt	WB/IP
Bax	3032-100	100 μ g	Rb	hu/ms/rt/mk	WB/IP
Bax (Clone 6036A7)	3331-100	100 μ g	Ms	hu/ms/rt	WB
Bcl-2 (Clone Bcl-2/100)	3195-100	100 μ g	Ms	hu	WB/IP/IHC/FC
Bcl-2	3033-100	100 μ g	Rb	hu/ms/rt	WB/IP/IHC
Beclin 1	3663-100	100 μ g	Rb	hu/ms/pg	WB
Beclin-1 (CT)	5072-100	100 μ g	Rb	hu/ms	WB/ICC/E
Beclin-1 (NT)	5073-100	100 μ g	Rb	hu/ms/rt	WB/IHC/E
Bid	3172-100	100 μ g	Rb	hu	WB/IP/IHC

Autophagy Antibodies...Cont.

Antibody to	Cat. #	Size	Host	Species	Applications
Bid	3272-100	100 µg	Rb	ms	WB/IP/IHC
Bnip3L/Nix	3205-100	100 µg	Rb	hu/ms	WB/IHC
Calreticulin (Clone S75)	3076-100	100 µg	Ms	hu/mk	WB/IHC/IP
Calreticulin	3077-100	100 µg	Rb	hu/ms/rt	WB/IHC
DRAM (CT)	5074-100	100 µg	Rb	hu/ms/rt	WB/IHC/E
DRAM (NT)	5075-100	100 µg	Rb	hu/ms/rt	WB/IHC/E
Elk-1	3387-100	100 µg	Rb	hu/ms/rt	WB
Elk-1 (Phospho)	3388-100	100 µg	Rb	hu/ms/rt	WB
FKBP12	3635-100	100 µg	Rb	hu/ms/rt/bv/rb	WP/IHC/IP
IRS (Ser616) (Phospho) (Clone HR-B1)	3105-100	100 µg	Ms	hu	Indirect E/WB
IRS-1	3424-100	100 µg	Rb	hu/ms/rt/mk/hr/dg/pg	WB
LAMP-1 (Center)	5077-100	100 µg	Rb	hu/ms/rt	WB/IF/E
LAMP-1 (CT)	5078-100	100 µg	Rb	hu/ms	WB/ICC/E
Mek1	3196-100	100 µg	Rb	hu/ms	WB/IP
Mek1/2	3518-100	100 µl	Rb	hu/ms/rt	WB
Mek1/2 (Phospho)	3519-100	100 µl	Rb	hu/ms/rt	WB/ICC
mTOR	3786-100	100 µl	Rb	hu/ms/rt	WB
PCNA	3350R-100	100 µg	Rb	hu/ms/rt/bv/hm	WB/IP/IHC
PDK1	3449-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
PIST (Center)	5081-100	100 µg	Rb	hu/ms	WB/IHC/E
PIST (CT)	5080-100	100 µg	Rb	hu/ms/rt	WB/IHC/E
Presenilin 1	3481-100	100 µg	Rb	hu/ms/rt	WB
Presenilin 2	3482-100	100 µg	Rb	hu/ms/rt	WB/IHC/IP
PTEN	3479-100	100 µg	Rb	hu/ms/rt	WB/IP
TAB2 (CT)	5083-100	100 µg	Rb	hu	IHC/E
TAB3 (NT)	5084-100	100 µg	Rb	hu	IHC/E

Autophagy Inducers

Product	Cat. #	Size
Amiodarone Hydrochloride	1828-100, 1828-500	100 mg, 500 mg
Dorsomorphin	1686-5	5 mg
Rottlerin	1827-10	10 mg
SMER28	1856-5, 1856-25	5 mg, 25 mg

Autophagy Inhibitors

Product	Cat. #	Size
ATM Kinase Inhibitor, KU-55933	1685-5	5 mg
Bafilomycin A1	1829-50, 1829-250	50 µg, 250 µg
Chloroquine Diphosphate	1825-100, 1825-500	100 mg, 500 mg
Gö 6976	1711-500	500 µg
EZSolution™ Gö 6976	1785-500	500 µg
Spautin-1	2037-5, 2037-25	5 mg, 25 mg

Oxidative Stress

Oxidative stress represents an imbalance between the production of reactive oxygen species and a biological system's ability to readily detoxify the reactive intermediates or to repair the resulting damage. All forms of life maintain a reducing environment within their cells. This reducing environment is preserved by enzymes that maintain the reduced state through a constant input of metabolic energy. Disturbances in this normal redox state can cause toxic effects through the production of peroxides and free radicals that damage all components of the cell, including proteins, lipids, and DNA. In humans, oxidative stress is involved in many diseases, such as atherosclerosis, Parkinson's disease, heart failure, myocardial infarction, Alzheimer's disease, fragile X syndrome and chronic fatigue syndrome. Reactive oxygen species can be beneficial, as they are used by the immune system as a way to attack and kill pathogens. Reactive oxygen species are also used in cell signaling. BioVision offers a variety of products for Oxidative Stress Research including assay kits, antibodies, antioxidants, etc.

Oxidative Stress Assay Kits

Product	Cat. #	Size
ApoSENSOR™ ADP/ATP Ratio Assay Kit	K255-200	200 assays
ADP Colorimetric/Fluorometric Assay Kit	K355-100	100 assays
Alcohol Dehydrogenase Activity Assay Kit	K787-100	100 assays
PicoProbe™ Aldehyde Dehydrogenase Activity Assay Kit	K741-100	100 assays
Aldehyde Dehydrogenase Activity Colorimetric Assay Kit	K731-100	100 assays
Ammonia Assay Kit	K370-100	100 assays
Ammonia Assay Kit II (Modified Berthelot)	K470-100	100 assays
Total Antioxidant Capacity (TAC) Assay Kit	K274-100	100 assays
Ascorbic Acid Assay Kit	K661-100	100 assays
Ascorbic Acid Assay Kit II (FRASC)	K671-100	100 assays
StayBrite™ Highly Stable ATP Assay Kit	K791-100, K791-1000	100 assays, 1000 assays
ATP Colorimetric/Fluorometric Assay Kit	K354-100	100 assays
Catalase Activity Assay Kit	K773-100	100 assays
L-Carnitine Assay Kit	K642-100	100 assays
Creatine Assay Kit	K635-100	100 assays
Creatinine Assay Kit	K625-100	100 assays
DNA Damage Quantification Kit	K523-25	25 assays
DPP4 Activity Assay Kit	K779-100	100 assays
DPP4 Inhibitor Screening Kit	K780-100	100 assays
Ethanol Assay Kit	K620-100	100 assays
FAD Assay Kit	K357-100	100 assays
Formate Assay Kit	K653-100	100 assays
Fumarate Assay Kit	K633-100	100 assays
Gamma Glutamyl Transferase (GGT) Activity Colorimetric Assay Kit	K784-100	100 assays
Gamma Glutamyl Transferase (GGT) Activity Fluorometric Assay Kit	K785-100	100 assays
Glutamate Assay Kit	K629-100	100 assays
Glutamate Dehydrogenase (GDH) Activity Assay Kit	K729-100	100 assays
Glutathione (GSH/GSSG/Total) Assay Kit	K264-100	100 assays
Glutathione Colorimetric Detection Kit	K261-100	100 assays
Glutathione Fluorometric Detection Kit	K251-100	100 assays
Glutathione Peroxidase Activity Assay Kit	K762-100	100 assays
Glutathione Reductase Activity Assay Kit	K761-100	100 assays
GST Colorimetric Activity Assay Kit	K263-100	100 assays
GST Fluorometric Activity Assay Kit	K260-100	100 assays
HAT Activity Assay Kit	K332-100	100 assays

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Oxidative Stress Assay Kits...Cont.

Product	Cat. #	Size
InSitu HDAC Activity Fluorometric Assay Kit	K339-100	100 assays
HDAC Colorimetric Activity Assay Kit	K331-100	100 assays
HDAC Fluorometric Activity Assay Kit	K330-100	100 assays
HDAC Inhibitor Drug Screening Kit	K340-100	100 assays
HDAC3 Activity Assay Kit	K343-100	100 assays
HDAC8 Activity Assay Kit	K348-100	100 assays
Hemin Assay Kit	K672-100	100 assays
Hydrogen Peroxide Assay Kit	K265-100	100 assays
beta-Hydroxybutyrate (β -HB) Assay Kit	K632-100	100 assays
Inosine Assay Kit	K712-100	100 assays
Iron Assay Kit	K390-100	100 assays
Isocitrate Assay Kit	K656-100	100 assays
Isocitrate Dehydrogenase Activity Assay Kit	K756-100	100 assays
Alpha-Ketoglutarate Assay Kit	K677-100	100 assays
Lactate Assay Kit	K607-100	100 assays
Lactate Assay Kit II	K627-100	100 assays
Lactate Dehydrogenase (LDH) Activity Assay Kit	K726-500	500 assays
Lipid Peroxidation (MDA) Assay Kit	K739-100	100 assays
Magnesium Assay Kit	K385-100	100 assays
Malate Assay Kit	K637-100	100 assays
MMP-1 Inhibitor Screening Kit	K794-100	100 assays
MMP-3 Activity Assay Kit	K783-100	100 assays
MMP-3 Inhibitor Screening Kit	K793-100	100 assays
Myeloperoxidase (MPO) Colorimetric Activity Assay Kit	K744-100	100 assays
Myeloperoxidase (MPO) Fluorometric Activity Assay Kit	K745-100	100 assays
NAD/NADH Quantitation Kit	K337-100	100 assays
NADP/NADPH Quantitation Kit	K347-100	100 assays
Neutrophil Elastase Inhibitor Screening Kit	K782-100	100 assays
Nickel Assay Kit	K510-100	100 assays
Nitric Oxide Colorimetric Assay Kit	K262-100	100 assays
Nitric Oxide Fluorometric Assay Kit	K252-100	100 assays
NQO1 (human intracellular) ELISA Kit	K4926-100	100 assays
Oxaloacetate Assay Kit	K659-100	100 assays
PAH (p-Aminohippuric Acid) Assay Kit	K860-100	100 assays
Peroxidase Activity Assay Kit	K772-100	100 assays
Protease Activity Assay Kit	K781-100	100 assays
Protein Carbonyl Content Assay Kit	K830-100	100 assays
Sarcosine Assay Kit	K636-100	100 assays
Sialic Acid (NANA) Assay Kit	K566-100	100 assays
Beta-Secretase Activity Assay Kit	K360-100	100 assays
SIRT2 Inhibitor Screening Assay Kit	K322-100	100 assays
SOD Activity Assay Kit	K335-100	100 assays
Thioredoxin Reductase Assay Kit	K763-100	100 assays
Thioredoxin Reductase Activity Assay Kit	K763-100	100 assays

Oxidative Stress Assay Kits...Cont.

Product	Cat. #	Size
Urea Assay Kit	K375-100	100 assays
Uric Acid Assay Kit	K608-100	100 assays
Xanthine Oxidase Activity Assay Kit	K710-100	100 assays

Oxidative Stress Related Antibodies

Antibody to	Cat. #	Size	Host	Species	Application
ApoE2	5760-100	100 µg	Rb	hu	WB
ApoE3	5696-100	100 µg	Rb	hu	WB
ApoE4	5699-100	100 µg	Rb	hu	WB
Calnexin	3811-100	100 µg	Rb	hu/ms/rt/dg	WB
Catalase	3806-100	100 µg	Rb	hu	WB
Cox-1	3361-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
Cox-2	3362R-100	100 µg	Rb	hu/bv/sp/hr	WB
Cox-3	3687-100	100 µg	Rb	ms	WB
Cox-4	3638-100	100 µg	Rb	hu/ms/rt	WB/IHC
Cytochrome p450	3084R-100	100 µg	Rb	hu/ms/rt/dg	WB
eNOS	3426R-100	100 µg	Rb	hu/ms/rt/pg/sp/mk/bv	WB
GST-Tag	3997-100	100 µg	Rb	all	WB/IHC
HAT-1	3689-100	100 µg	Rb	hu/ms/rt	WB
HAT-2	3692-100	100 µg	Rb	hu	WB
HAT-3	3707-100	100 µg	Rb	hu	WB
HDAC1	3601-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
HDAC2	3602-100	100 µg	Rb	hu/ms/rt/ck/hm/dg	WB/ICC
HDAC3	3603-100	100 µg	Rb	hu/ms/rt/ck	WB/IHC
HDAC4	3604-100	100 µg	Rb	hu/ms/rt	WB
HDAC4	3604A-100	100 µg	Rb	hu/ck	WB/IHC
HDAC5	3605-100	100 µg	Rb	hu/ms/rt	WB/IHC/IP
HDAC6	3606-100	100 µg	Rb	hu/ms/rt	WB/IHC
HDAC7	3607-100	100 µg	Rb	hu/ms/rt	WB/IHC/IP
HDAC8	3608-100	100 µg	Rb	hu/ms/rt	WB/IHC/IP
HDAC8	5618-100	100 µg	Rb	hu	WB
HDAC9	3609-100	100 µg	Rb	hu/ms/rt	WB/IP/IF
HDAC10	3610-100	100 µg	Rb	hu/ms/rt	WB
HDAC11	3611P-100	100 µg	Rb	hu/ms/rt	WB
Heme Oxygenase-1	3391-100	100 µg	Rb	hu/ms/rt/mk/hm/rb/bv	WB/IP/IHC
Heme Oxygenase-2	3392-100	100 µg	Rb	hu/ms/rt/mk/hm	WB/IP/IHC
Hsp27	3092-100	100 µg	Rb	hu/mk	WB/IP/ICC/E
Hsp27	3093-100	100 µg	Rb	rt	WB
Hsp47	3496-100	100 µg	Rb	hu/ms/rt/ck	WB/IP/IHC
Hsp60	3094R-100	100 µg	Rb	hu/ms/rt	WB
Hsp70 (Clone S5)	3096-100	100 µg	Ms	hu/ms/rt/mk/hm/rb/bv/gp/dg/sp/ck/	WB/IP/IHC
Hsp70	3097-100	100 µg	Rb	hu/ms/rt/mk/hm/rb/bv/pg/dg/ck	WB
Hsp70	5859-100	100 µg	Rb	hu	WB

Oxidative Stress Related Antibodies...Cont.

Antibody to	Cat. #	Size	Host	Species	Application
Hsp90 (Clone S88)	3098-100	100 µg	Ms	hu/ms/rt/mk/rb/bv/gp/dg/ck/pg/sp	WB/IP/IHC
Hsp90	3389-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
Hsp90	5858-200	200 µg	Rb	hu/ms/rt	WB/IP/IHC
Hsp105	3390-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC
Phospho-JNK/SAPK	3589-100	100 µg	Rb	hu/ms/rt	WB/IP/IHC/ICC
Phospho-c-Jun (Ser73)	3502-100	100 µg	Rb	hu/ms/rt	WB/IHC
c-Jun	3009-100	100 µg	Rb	hu	WB
c-Jun	3702-100	100 µg	Rb	hu/ms/rt	WB/IHC
Myeloperoxidase (MPO)	3831-100	100 µg	Rb	hu/ms/rt	WB
Nitrotyrosine	5416-50	50 µg	Rb	all	WB/E
3-Nitrotyrosine (Clone 39B6)	5412-100	100 µg	Ms	all	WB/E/IHC/IP
Nitrotyrosine (Clone 7A5)	5413-50	50 µg	Ms	hu/ms/rt/dg	WB/E
Nitrotyrosine (Clone HM11)	5414-50	50 µg	Ms	all	WB/E/IHC
Nitrotyrosine (Clone NOY-7A5)	5415-50	50 µg	Ms	all	WB
PDI (Protein Disulfide Isomerase)	5601-100	100 µg	Rb	hu/rt/ms	WB
RANTES	5323-100	100 µg	Rb	ms/rt	WB
SOD-1	3458-100	100 µg	Rb	hu/ms/rt/hr/gp	WB/IP/IHC

Oxidative Stress Related Proteins

Product	Cat. #	Size
ApoE2, human recombinant	4760-50, 100, 500, 1000, 5000	50 µg, 100 µg, 500 µg, 1 mg, 5 mg
ApoE3, human recombinant	4696-50, 100, 500, 1000, 5000	50 µg, 100 µg, 500 µg, 1 mg, 5 mg
ApoE4, human recombinant	4699-50, 100, 500, 1000, 5000	50 µg, 100 µg, 500 µg, 1 mg, 5 mg
Catalase, Human Erythrocytes	4712-1000	1 mg
FGF-18, human recombinant	4082-25, 100, 1000	25 µg, 100 µg, 1 mg
Active GST Protein	1243-1	1 mg
HAT (P/CAF), human recombinant	1137-100	100 µg
HDAC3, human recombinant	7613-250, 1000	250 units, 1000 units
HDAC8, human recombinant	7618-20, 100, 1000	20 µg, 100 µg, 1 mg
Heat Shock Protein 20, human recombinant	4847-10	10 µg
Heat Shock Protein 22, human recombinant	4850-10	10 µg
Heat Shock Protein 27, human recombinant	4853-10	10 µg
Heat Shock Protein 65, mycobacterium recombinant	4856-10	10 µg
Heat Shock Protein 70, human recombinant	4859-25, 100, 1000	25 µg, 100 µg, 1 mg
Heat Shock Protein 90, human recombinant	4858-25, 100, 1000	25 µg, 100 µg, 1 mg
Heat Shock Protein 90 (Hsp90 beta) (N-term His-tag), human recombinant	4858H-25, 100, 1000	25 µg, 100 µg, 1 mg
c-Jun, (1-79)-GST Fusion Protein	7001-100	100 µg
Lactoferrin, Human Neutrophil	4092-100	100 µg
Myeloperoxidase, Human Neutrophil	4744-100	100 µg
Protein Disulfide Isomerase (PDI), human recombinant	7601-100, 1000, 5000	100 µg, 1 mg, 5 mg
RANTES, human recombinant	4321-20, 1000	20 µg, 1 mg
RANTES, murine recombinant	4322-20, 1000	20 µg, 1 mg
RANTES, rat recombinant	4323-20, 100, 1000	20 µg, 100 µg, 1 mg
Sirtuin 2, human recombinant	7632-20, 100, 1000	20 µg, 100 µg, 1 mg

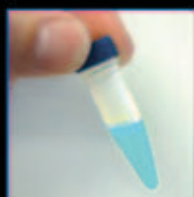
Antioxidants

Product	Cat. #	Size
Caffeic Acid	2006-100, 500	100 mg, 500 mg
Carnosic Acid	2075-5, 25	5 mg, 25 mg
Celastrol	1940-5, 25	5 mg, 25 mg
Curcumin, <i>Curcuma longa</i> (High Purity)	1850-10, 50	10 mg, 50 mg
Deferoxamine Mesylate	1883-500, 1000	500 mg, 1 g
(-)-Epigallocatechin gallate	1841-50	50 mg
FeTPPS	2065-25, 100	25 mg, 100 mg
Genistein	1533-10, 100	10 mg, 100 mg
Genistin	1535-10	10 mg
IPAM	1817-100, 500, 1000	100 mg, 500 mg, 1 g
Luteolin	2005-5, 25	5 mg, 25 mg
MnTBAP Chloride	2058-10, 50	10 mg, 50 mg
MnTMPyP Pentachloride	2056-10, 50	10 mg, 50 mg
Naringenin	1772-250, 1000	250 mg, 1 g
Oxidized Glutathione (GSSG)	1241-1	1 g
Piceatannol	2072-5, 25	5 mg, 25 mg
Piperlongumine	1919-10, 50	10 mg, 50 mg
Piperlonguminine	1988-10, 50	10 mg, 50 mg
Pterostilbene	2073-5, 25	5 mg, 25 mg
Quercetin, Dihydrate	1773-250, 1000	250 mg, 1 g
Reduced Glutathione (GSH)	1242-1	1 g
Rosmarinic Acid	1843-50, 250	50 mg, 250 mg
Resveratrol	1758-100, 500	100 mg, 500 mg
Rhapontigenin	2074-1, 5	1 mg, 5 mg
Skyrin, <i>Talaromyces</i> sp.	2043-1	1 mg
Tiliroside	1879-1, 5	1 mg, 5 mg
Trolox	2076-50, 250	50 mg, 250 mg

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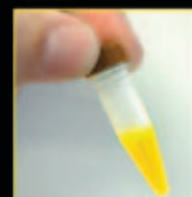
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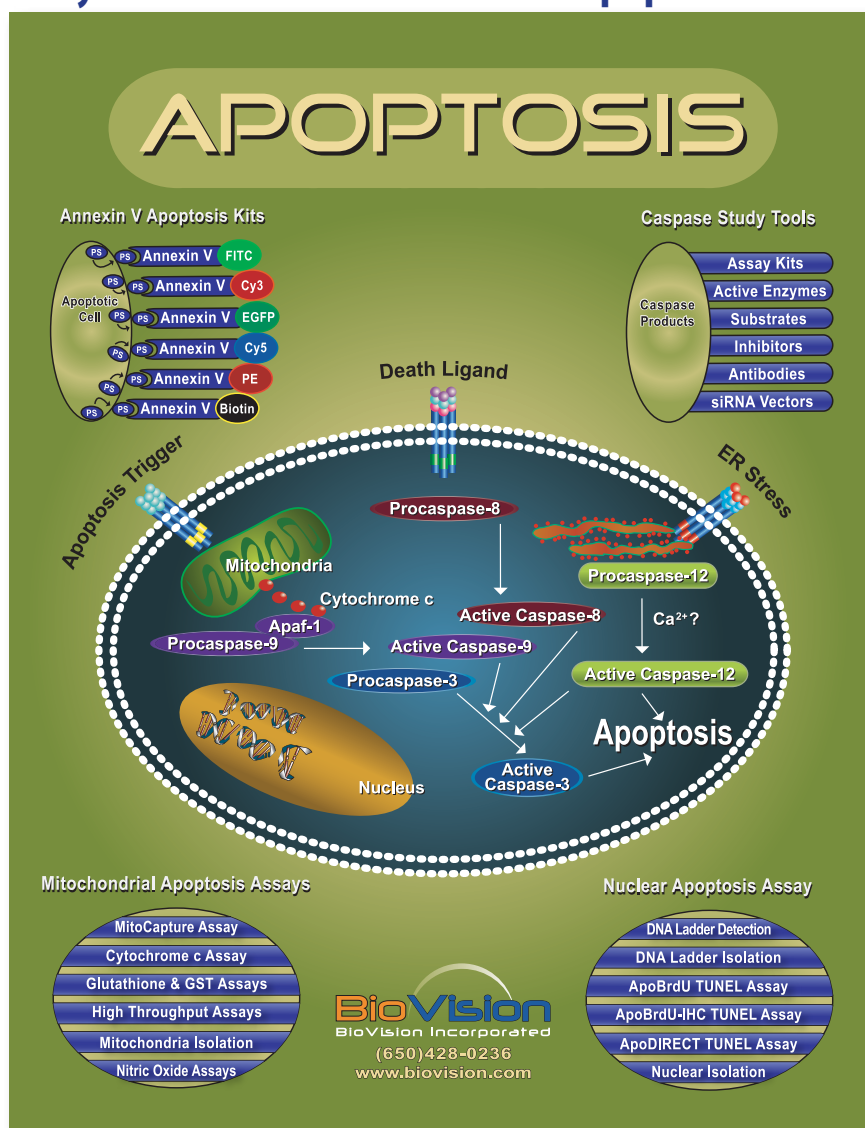
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