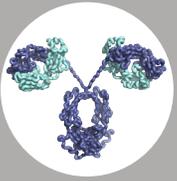


# Mitochondria

Antibodies



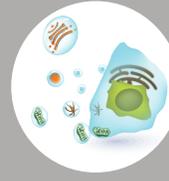
cDNA



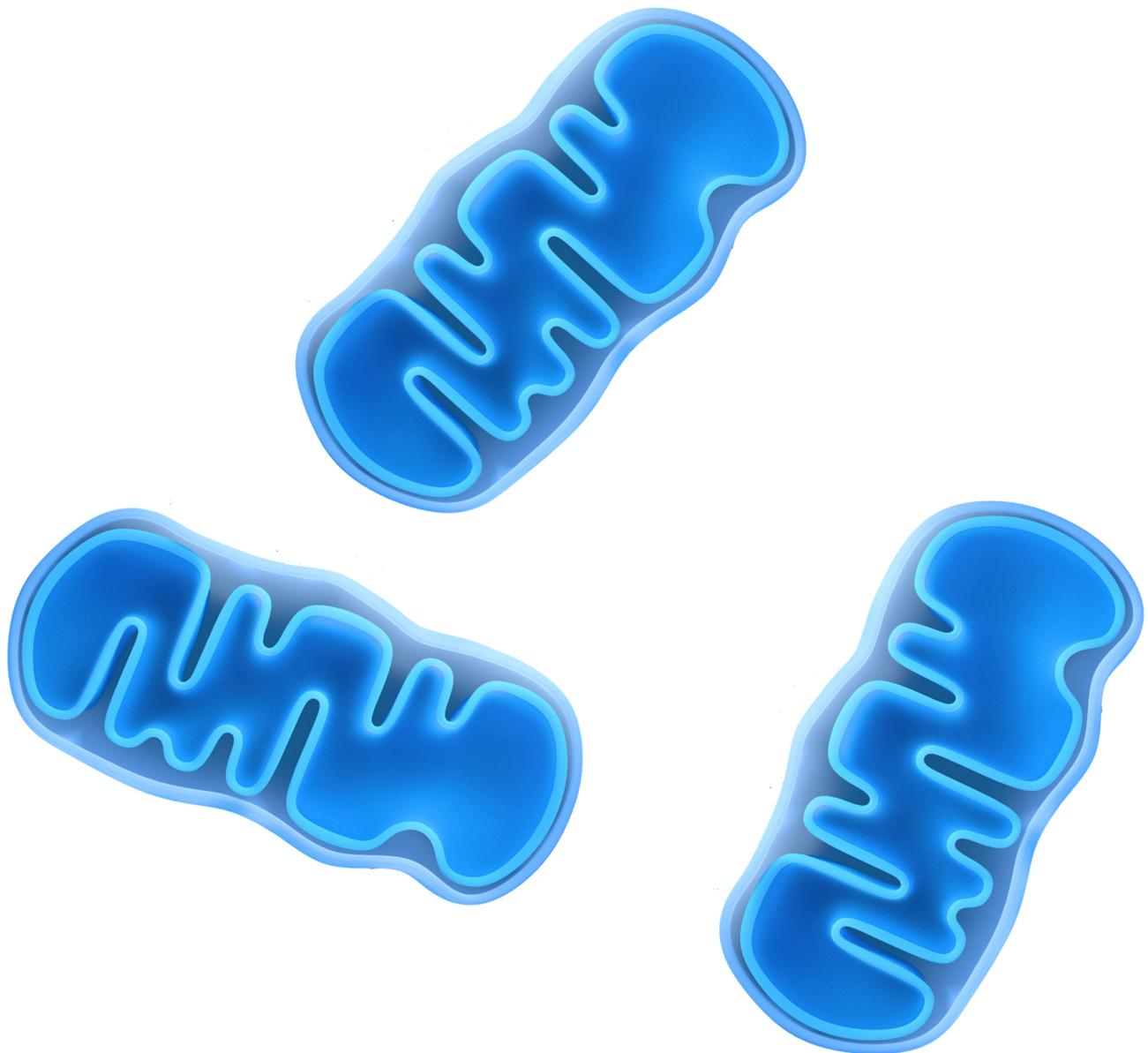
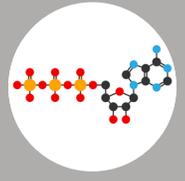
Autophagy



Apoptosis



Metabolism



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# Mitochondria Assays and Reagents

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Founded in 1987, AMSBIO (AMS Biotechnology) is recognized today as a leading company contributing to the acceleration of discovery through the provision of cutting-edge life science technology products and services for research and development in the medical, nutrition, cosmetics and energy industries. The AMSBIO range includes specialist antibodies, peptides and recombinant proteins. In addition, the company is able to draw upon in-depth expertise in extracellular matrices to provide elegant solutions for studying cell motility, migration, invasion and proliferation. Widely acknowledged as experts in cell culture, AMSBIO partners with clients in tailoring cell systems to enhance screening outcomes and eventual prognosis. With a range of molecular detection reagents, and a significant Biorepository the company can also provide tissue DNA, RNA, protein and microarray products. Key research areas for these products include: Oncology, Regenerative Medicine, Environmental Analysis, Cytotoxicity Screening, Glycomics and Stem Cell Biology.

## Mitochondria Isolation Kit

As new discoveries of human disorders are being related to mitochondrial dysfunction, there is an increasing need for an effective method to isolate intact mitochondria from tissues and cultured cells. The key steps for isolating mitochondria from any tissue or cell are always the same:

- (i) Rupture of cells by mechanical and/or chemical means
- (ii) Differential centrifugation at low speed to remove debris and extremely large cellular organelles followed by centrifugation at a higher speed to isolate mitochondria which are collected.

AMSBIO's Mitochondria Isolation Kit can be used for not only intact mitochondria isolation, but also mitochondrial protein extraction.

### BENEFITS

- ✓ Easy and fast – Procedures can be performed within an hour, no ultra centrifugation needed
- ✓ Reliable – Super-quality and highly reproducible isolation of mitochondria
- ✓ Efficient – Provide the highest possible yield of intact and enzymatically active mitochondria

### APPLICATIONS

- ✓ Isolating intact and enzymatically active mitochondria from tissues & cultured cells
- ✓ Isolating mitochondria proteins from tissues and cultured cells

Cat No.	Description	Pack Size
KC010100	Mitochondria Isolation Kit	One kit consists of reagents enough to perform 100 isolations (enriching mitochondria from 10 - 20 grams tissue or from 1x10 <sup>10</sup> - 5x10 <sup>10</sup> cells).

### COMPONENTS

#### KC010100-1

- ✓ Mitochondria Isolation Buffer (5x) - 50ml

#### KC010100-2

- ✓ Mitochondria Storage Buffer - 10ml

#### KC010100-3

- ✓ Lysis Buffer - 10ml

#### KC010100-4

- ✓ Protease Inhibitor cocktail (50x) - 200ml

### STORAGE

Store at -20°C (The Lysis Buffer can be stored at 2-8°C after it is thawed).

## Mitochondria/Cytosol Fractional Kit

The Mitochondria/Cytosol Fractionation Kit provides unique formulations of reagents for effective isolation of a highly enriched mitochondrial fraction from cytosolic fraction of mammalian cells including both apoptotic and non-apoptotic cells. The enriched mitochondrial and cytosolic fractions can be used for studying apoptotic and signal transduction pathways to detect translocation of factors interested between the two fractions by Western blotting, ELISA, or other assays. Procedures are simple and easy to perform; no ultracentrifugations and toxic chemicals are involved.

### BENEFITS

- ✓ Easy and fast – The procedure will only take 3-4 hours.
- ✓ Simple - The fractionation procedure is simple and straightforward.  
No ultracentrifugations are required.
- ✓ Safe – No toxic chemicals are involved.

Cat No.	Description	Pack Size
K256-25	Mitochondria/Cytosol Fractional Kit	25 Isolations
K256-100	Mitochondria/Cytosol Fractional Kit	100 Isolations

## Mitochondrial DNA Isolation Kit

Mitochondria are semiautonomous organelles which functions in aging process, apoptosis, anti-HIV drugs, and cancers. Mitochondrial DNA (mtDNA) has a very high mutation rate and the mutations on mtDNA appear to be related to certain diseases such as diabetes, Alzheimer's disease, and muscle disorders. Isolation and quantification of mtDNA are often required to study the relationships between the diseases and mtDNA. AMSBIO's Mitochondrial DNA Extraction Kit provides convenient tools for isolating mtDNA from a variety of cells and tissues in high yield and purity, without contaminations from genomic DNA. The purified mtDNA can be used for a variety of studies such as enzyme manipulations, Southern blotting, cloning, PCR analysis, and amplifications.

Cat No.	Description	Pack Size
K280-50	Mitochondrial DNA Isolation Kit	50 Assays

### BENEFITS

- ✓ Simple- Procedure takes less than 2 hours
- ✓ Fast - The procedure is fast and convenient

### APPLICATIONS

- ✓ Sample type: Mammalian Cell culture (adherent and suspension), fresh and frozen tissues
- ✓ Enzyme manipulators, southern blotting, cloning, PCR analysis and amplifications

### COMPONENTS

**K280-50-1**

- ✓ 5X Cytosol Extraction Buffer

**K280-50-2**

- ✓ Mitochondrial Lysis Buffer

**K280-50-3**

- ✓ Enzyme B Mix (lyophilized)

**K280-50-4**

- ✓ TE Buffer

### STORAGE

Store at -20°C

## Mitochondria Activity Assay (Cytochrome C Oxidase Activity Assay) Kit

Mitochondrial activity in an isolated subcellular fraction can be measured by assaying for mitochondrial specific enzymes. This mitochondria activity assay kit is designed for measuring the mitochondria-specific cytochrome c oxidase activity in soluble and membrane bound mitochondria samples. The enzyme cytochrome c oxidase (EC 1.9.3.1) is a large transmembrane protein located in the inner membrane of the mitochondria and is the terminal electron acceptor in the electron transfer chain, taking 4 reducing equivalents from cytochrome c and converting molecular oxygen to water. In the process, it translocates protons, helping to establish a chemiosmotic potential that the ATP synthase then uses to synthesize ATP:



Cytochrome c has a sharp absorption band at 550 nm in the reduced state. Upon oxidation, this band becomes weaker and broader. This colorimetric assay is based on observation of the decrease in absorbance at 550 nm of ferrocytochrome c caused by its oxidation to ferricytochrome c by cytochrome c oxidase. It is typical to determine the extent of reduction of cytochrome c by measuring the difference in absorbances at 550 nm and 565 nm. In this assay, cytochrome c is reduced with dithiothreitol (DTT) and reoxidized by the active cytochrome c oxidase. At 550 nm reduced cytochrome c (ferrocytochrome c) has a different extinction coefficient than oxidized cytochrome c (ferricytochrome c). The difference ( $\epsilon \Sigma \text{mM}$ ) is 21.84. The activity of the enzyme is characterized by two kinetic phases: an initial fast phase and a following slow phase. In this assay, we measure the initial fast reaction rate during the first 45 seconds of reaction.

### BENEFITS

- ✓ Sensitive - Detect cytochrome c oxidase activity as low as 0.35 milliunit.
- ✓ Simple - Colorimetric based assay facilitates the easy measurement of mitochondria integrity and activity

### APPLICATIONS

- ✓ Detects the presence of mitochondria in subcellular fractions
- ✓ Measure the activity of mitochondria in subcellular fractions
- ✓ Measure the integrity of mitochondria outer membrane

#### K280-50-1

- ✓ Enzyme Assay Buffer (5x) - 25ml

#### K280-50-1

- ✓ Enzyme Dilution Buffer (2x) - 20ml

#### K280-50-1

- ✓ Cytochrome C - 1 bottle

#### K280-50-1

- ✓ Cytochrome C Reducing (DTT) solution (10x) - 400µl

#### K280-50-1

- ✓ n-Dodecyl β-D-Maltoside solution (100x) - 200µl

#### K280-50-1

- ✓ Cytochrome C Oxidase Positive Control - 200µl

### STORAGE

Store at -20°C

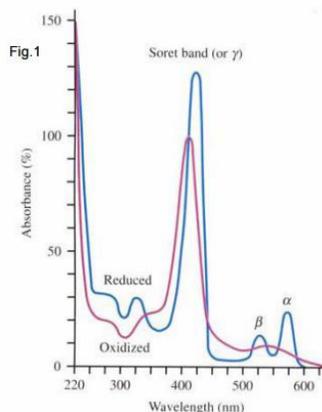


Fig. 1 Absorption spectra of oxidized and reduced horse cytochrome C. Units are absorbance in percent, normalized to the Soret band of the oxidized form.

Fig.2 Cytochrome C Oxidase Activity Assay

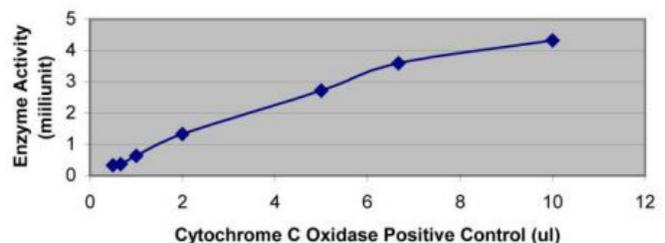


Fig. 2 The activity assay of cytochrome c oxidase positive control at various amounts using BioChain's Mitochondria Activity Assay (Cytochrome C Oxidase Activity Assay) Kit. The linear range is achieved when the activity is between 0.35 milliunit and 3.5 milliunit.

## StayBrite™ Highly Stable Luciferase/Luciferin Reagent

This Highly Stable Luciferase/Luciferin Reagent utilizes a genetically modified variant derived from the Luciferase of *Diaphanes pectinealis* (Chinese Firefly) endemic to Yunnan province, China. The luciferase (rLucHS) has been modified to provide enhanced stability compared to the normal phenotype of *Photinus pyralis*, as well as a broader and more physiologically relevant effective pH range. At all pHs below ~8.2, rLucHS is significantly more active than commercial *Photinus pyralis* luciferase and is stable for weeks at room temperature and >60 minutes at 37°C. The specific activity of rLucHS is ~ 5x10<sup>11</sup> RLU/mg protein. This reagent has application to measure ATP levels in a wide variety of biological samples such as cells, tissues and fermentation broth, etc.

### BENEFITS

- ✓ Simple procedure – Takes 20 – 30 minutes
- ✓ Fast - convenient
- ✓ Stable – for >10 hours at room temperature and >60 minutes at 37°C

### APPLICATIONS

- ✓ The activity profile shows a linear detection range for ATP values as low as 10 fmol/assay (1 nM)

Description	Cat No.	Pack Size
StayBrite™ Highly Stable Luciferase/ Luciferin Reagent	K790-100	100 Assays
	K790-1000	1000 Assays
	K790-10000	10000 Assays

### STORAGE

Store at -20°C

## StayBrite™ Highly Stable ATP Bioluminescence Assay Kit

Adenosine-5'-triphosphate (ATP) plays an important role in living systems. It has also been used as an indicator to monitor many biological processes and disease stages, etc. An accurate and reliable detection of ATP level has wide applications. Luciferase/Luciferin has been used to sensitively measure ATP levels. Conventional Luciferase/Luciferin ATP detection systems, however, are unstable. Luciferase loses activity rapidly. We have developed a highly stable Luciferase (rLucHS), which is a genetically modified variant derived from the Luciferase of *Diaphanes pectinealis* (Chinese Firefly) endemic to Yunnan province, China. Compared to the normal phenotype of *Photinus pyralis*, the rLucHS provides enhanced stability, excellent sensitivity, and a broader and more physiologically relevant effective pH range. At all pH's below ~8.2, rLucHS is significantly more active than *Photinus* luciferase and is stable for weeks at room temperature and >60 minutes at 37°C. The activity profile shows a linear detection range for ATP values as low as 10 fmol/assay (1 nM). The specific activity of rLucHS is ~ 5x10<sup>11</sup> RLU/mg protein. The assay can be fully automated for high throughput (1 second/sample) and is extremely sensitive. The high sensitivity of this assay is ideal for detecting ATP production or consumption in various enzymatic reactions.

### BENEFITS

- ✓ Simple procedure; takes ~ 20-30 minutes
- ✓ Fast - convenient
- ✓ Stable for >10 hours at room temperature and >60 minutes at 37°C.
- ✓ The stable reagent provides more accuracy than any other ATP assay kits.

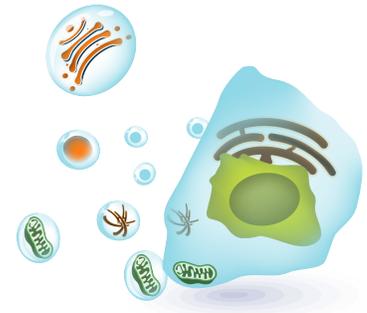
### APPLICATIONS

- ✓ The activity profile shows a linear detection range for ATP values as low as 10 fmol/assay (1 nM).

Description	Cat No.	Pack Size
StayBrite™ Highly Stable ATP Bioluminescence Assay Kit	K790-100	100 Assays
	K790-1000	1000 Assays

### STORAGE

Store at -20°C



## Cytochrome C Release

### Cytochrome C Releasing Apoptosis Assay Kit

Cytochrome c plays 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 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. AMSBIO'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 unique formulations of reagents to isolate a highly enriched mitochondria fraction from cytosol. Cytochrome c releasing from mitochondria into cytosol is then determined by Western blotting using the cytochrome c antibody provided in the kit.

#### BENEFITS

- ✓ Simple - no ultracentrifugation required and no toxic chemicals are involved.
- ✓ Fast - takes >3 hours

#### APPLICATIONS

- ✓ Detection method: Western blotting
- ✓ Sample type: Mammalian Cells and Tissues
- ✓ Detecting cytochrome c translocation from mitochondria into cytosol during apoptosis
- ✓ Easy-to-use procedure and reagents for separating a mitochondria-enriched fraction from cytosol.

#### Ordering Information:

Cat No.	Description	Pack Size
K257-100	Cytochrome C Releasing Apoptosis Assay Kit	100 Assays

#### COMPONENTS

K257-100-1	K257-100-2	K257-100-3	K257-100-4	K257-100-5
✓ Mitochondria Extraction Buffer	✓ 5X Cytosol Extraction Buffer	✓ DTT (1M)	✓ 500X Protease Inhibitor Cocktail	✓ Anti-Cytochrome c mouse mAb (0.2 mg/ml)

#### STORAGE

Store at -20°C

# Mitochondrial Membrane Potential ( $\Delta\Psi_m$ )

## DePsipher™ Mitochondrial Potential Assay

The mitochondrial permeability transition is an important event in the apoptotic process in which the electrochemical gradient ( $\Delta\Psi_m$ ) across the mitochondrial membrane collapses. In some apoptotic pathways, the collapse is thought to occur through the formation of pores in the mitochondria, possibly involving Bax insertion and dimerization, and is accompanied by the release of cytochrome c into the cytoplasm.

The DePsipher™ Kit uses a unique cationic dye (5,5',6,6'-tetrachloro-1,1',3,3'-tetraethylbenzimidazolylcarbocyanine iodide) to indicate loss of mitochondrial potential. The dye readily enters cells and fluoresces brightly red in its multimeric form within healthy mitochondria. In apoptotic cells, the mitochondrial membrane potential collapses, and the DePsipher™ reagent cannot accumulate within the mitochondria. In these cells, DePsipher™ remains in the cytoplasm as a green fluorescent monomeric form. Apoptotic cells, showing primarily green fluorescence, are easily differentiated from healthy cells which show red fluorescence. The aggregate red form has absorption/emission maxima of 585/590 nm, and the green monomeric form has absorption/emission maxima of 510/527 nm. Both apoptotic and healthy cells can be visualized simultaneously by epifluorescence microscopy using a wide band-pass filter.

The DePsipher™ reagent is easy to use. Simply resuspend the reagent in Reaction Buffer or culture media (with or without the Stabilizer Solution), add to your cells, incubate for 15 to 20 minutes, wash and analyze by flow cytometry or microscopy. Visualization by microscopy allows a rapid inspection and qualification of apoptosis. Flow cytometric analysis allows easy quantitation of cell death as evidenced by mitochondrial potential breakdown.

### BENEFITS

- ✓ Simple - Just add DePsipher™ reagent to media or reaction buffer.
- ✓ Unique - Stabilizer Solution improves results.
- ✓ Fast - Takes only 20 minutes.
- ✓ Flexible - View cells by epifluorescence or confocal microscopy, or analyze cells by flow cytometry.

### APPLICATIONS

- ✓ Flow cytometry
- ✓ Epifluorescence microscopy
- ✓ Confocal microscopy

### COMPONENTS

**6300-100-01**

- ✓ DePsipher 100 $\mu$ l

**6300-100-02**

- ✓ 10X Reaction Buffer - 2x 30ml

**6300-100-03**

- ✓ Stabilizer Solution - 5ml

Cat No.	Description	Pack Size
6300-100-K	DePsipher™ Mitochondrial Potential Assay	100 Tests

### STORAGE

Store at -20°C and 4°C.

## MitoShift™ Mitochondrial Potential Assay

Cellular energy produced during mitochondrial respiration is stored as an electrochemical gradient across the mitochondrial membrane, called delta-psi. This membrane potential enables the cell to drive the synthesis of ATP and its disruption is associated with a variety of cellular phenomena, including apoptosis. There are several analysis compatible with tetramethylrhodamine ethyl ester. Researchers use MitoShift (TMRE) to evaluate shifts in the delta-psi at the single mitochondrion level, by confocal microscopy. As the mitochondrial potential collapses, there is an outward flow of the dye along the altered pH gradient, leaving the mitochondria fluorescence free.

MitoShift can also be used in conventional fluorescence microscopy. The dye appears associated with mitochondria in healthy cells, generally in the perinuclear as a red-orange punctate fluorescence. Finally, in late apoptotic cells or cells that have lost their cellular membrane integrity, the dye is released in the media and the fluorescence is lost. This feature allows the use of MitoShift with flow cytometry to discriminate necrotic or late apoptotic cells from healthy cells.

### BENEFITS

- ✓ Simple - Just add MitoShift to media or reaction buffer .
- ✓ Unique - Stabilizer Solution included for sensitive cells.
- ✓ Rapid - Takes a few minutes of hands-on-time.

### APPLICATIONS

- ✓ Flow cytometry
- ✓ Epifluorescence microscopy
- ✓ Confocal microscopy

### COMPONENTS

**6305-100-01**

- ✓ MitoShift (1mM) - 100µl

**6305-100-02**

- ✓ Valinomycin - 100µl

Cat No.	Description	Pack Size
6305-100-K	MitoShift™ Mitochondrial Potential Assay	100 Tests

### STORAGE

Store components at 4°C.

## Mitochondrial Apoptosis Detection Fluorometric Kit

Disruption of the mitochondrial transmembrane potential is one of the earliest intracellular events that occur following induction of apoptosis. The MitoCapture™ Apoptosis Detection Kit provides a simple, fluorescent-based method for distinguishing between healthy and apoptotic cells by detecting the changes in the mitochondrial transmembrane potential. The kit utilizes MitoCapture™, a cationic dye that fluoresces differently in healthy vs apoptotic cells. In healthy cells, MitoCapture accumulates and aggregates in the mitochondria, giving off a bright red fluorescence. In apoptotic cells, MitoCapture cannot aggregate in the mitochondria due to the altered mitochondrial transmembrane potential, and thus it remains in the cytoplasm in its monomer form, fluorescing green. The fluorescent signals can be easily detected by fluorescence microscopy using a band-pass filter (detects FITC and rhodamine) or analyzed by flow cytometry using FITC channel for green monomers (Ex/Em = 488/530+ 30 nm) and (optional) PI channel for red aggregates (Em = 488/590+ 42 nm).

### BENEFITS

- ✓ Simple – One-step procedure. Takes only 30 minutes.
- ✓ Fast – convenient

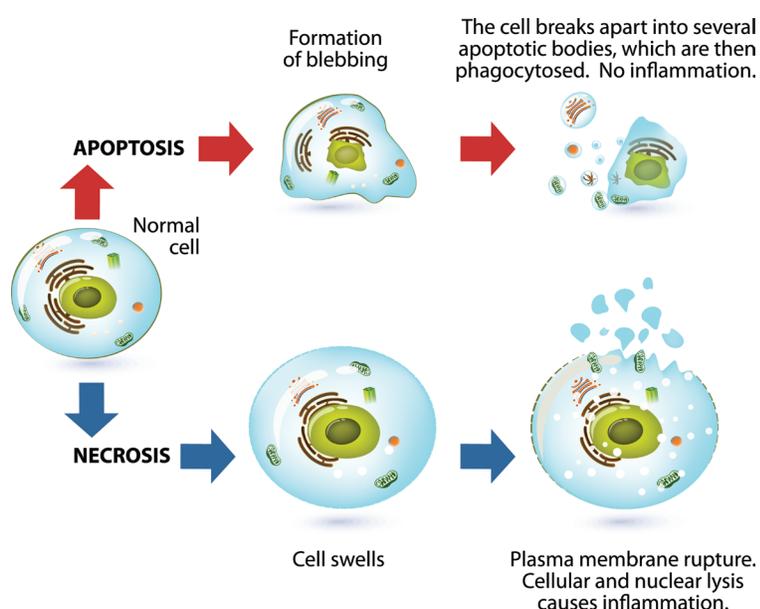
### APPLICATIONS

- ✓ 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.
- ✓ It is highly sensitive and detects apoptosis in living cells.

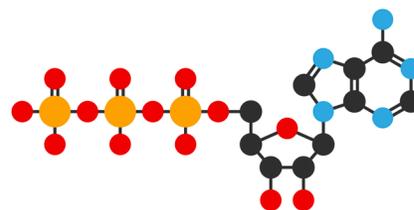
Cat No.	Description	Pack Size
K250-25	Mitochondrial Apoptosis Detection Fluorometric Kit	25 Isolations
K250-100		100 Assays

### STORAGE

-20°C



## ADP/ATP



### ApoSENSOR™ : ADP/ATP Ratio Bioluminescence Assay Kit

The changes in ADP/ATP ratio have been used to differentiate the 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. The ApoSENSOR™ ADP/ATP Ratio Assay kit utilizes bioluminescent detection of the ADP and ATP levels for a rapid screening of apoptosis, necrosis, growth arrest, and cell proliferation simultaneously in mammalian cells. The assay utilizes the enzyme luciferase to catalyze the formation of light from ATP and luciferin, and the light can be measured using a luminometer or Beta Counter. ADP level is measured by its conversion to ATP that is subsequently detected using the same reaction. The assay can be fully automatic for high throughput and is highly sensitive (detects 100 mammalian cells/well).

#### BENEFITS

- ✓ Simple – One-step procedure. Takes only 30 minutes.
- ✓ Fast - convenient.
- ✓ The ADP/ATP ratio assay offers highly consistent results and with excellent correlation to other apoptosis markers (e.g. TUNEL-based assays and caspase assays). In addition the assay can be fully automatic for high throughput (10 seconds/sample) and is highly sensitive (detects 10-100 cells/well).

Cat No.	Description	Pack Size
K255-200	ApoSENSOR™	200 Assays

### ATP Cell Viability Bioluminescence Assay Kit

Cell death (especially apoptosis) is an energy-dependent process that requires ATP. As ATP levels fall to a point where the cell can no longer perform basic metabolic functions, the cell will die. A typical apoptotic cell exhibits a significant decrease in ATP level. Therefore, loss of ATP level in cell has been used as an indicator of cell death. In contrast, cell proliferation has been recognized by increased levels of ATP. The ApoSENSOR™ Cell Viability Assay Kit utilizes bioluminescent detection of the ATP levels for a rapid screening of apoptosis and cell proliferation simultaneously in mammalian cells. The assay utilizes luciferase to catalyze the formation of light from ATP and luciferin, and the light can be measured using a luminometer or Beta Counter.

#### BENEFITS

- ✓ Simple – One-step procedure. Takes only 30 minutes.
- ✓ Fast - convenient
- ✓ The assay can be done directly in culture plates requiring no harvest/washing/ or sample preparations. The assay can be fully automatic for high throughput (10 seconds/sample) and is highly sensitive (detects 10-100 mammalian cells/well).

Cat No.	Description	Pack Size
K254-100	ApoSENSORTM ATP Cell Viability Bioluminescence Assay Kit	100 Assays
K254-1000		1000 Assays

## Main Regulators of the Mitochondrial Apoptotic Pathway

**Bax**, a 21 kDa eukaryotic protein plays an important role in the regulation of cell death in a number of eukaryotic cells. The over-expression of Bax has been shown to accelerate cell death. The ratio of Bax to other Bcl-2 family members, and its subcellular distribution is thought to help regulate the process of programmed cell death.

The **Bcl-2** family of proteins plays a crucial role in the regulation of cell death in many eukaryotic systems. The overexpression of Bcl-2 has been shown to promote cell survival and the ratio of Bcl-2 to other Bcl-2 family members is believed to modulate the apoptotic process.

**Bcl-XL** is a 28 kDa protein associated with cell survival. Bcl-X is reported in two forms, Bcl-XL and Bcl-XS. The short form is reported to inhibit the survival promoting activity of the long form. Bcl-XS is a splice variant at the RNA level, but its functional role is not clear.

**Cytochrome c** is a well-characterized mitochondrial protein involved in cellular energy metabolism. When released into the cytosol, cytochrome c can activate the caspases responsible for apoptosis through interaction with protease activating factors. The precursor of cytochrome c, apocytochrome c, is synthesized in the cytoplasm. Upon translocation into the mitochondria, cytochrome c refolds and acquires a heme moiety required for functionality in the mitochondrial respiration chain. The heme-bound form of cytochrome c is called holocytochrome c.

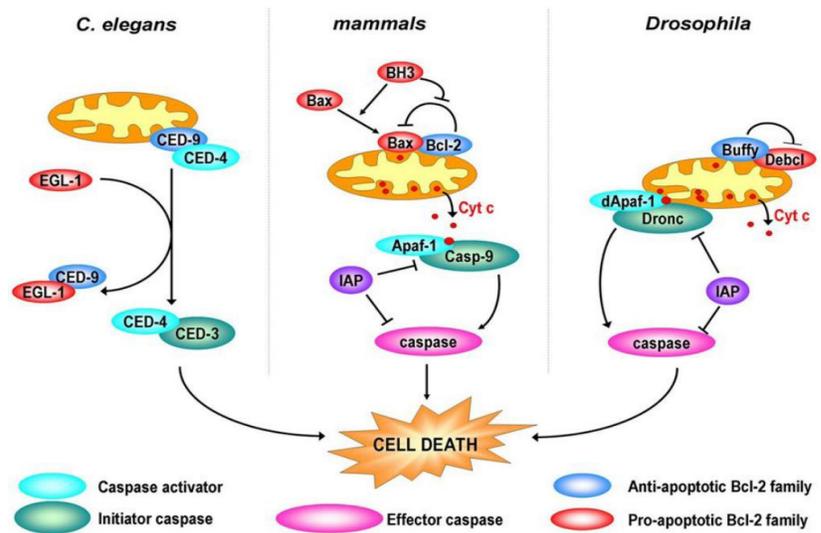


Image: Colin et al (2009) Frontiers in Bioscience 14: 4127-4137

**Peripheral-type benzodiazepine receptor (PBR)** is a ubiquitous protein involved in the regulation of cholesterol transport from the outer to inner mitochondrial membrane. Thought to play a role in the formation of the mitochondrial permeability transition (PT) pore involved in apoptotic mechanisms, PBR is also present in abundance in tumors, in aggressive breast cancer cell lines, and in metastatic human breast tumor biopsy sections.

### KEY : Antibodies to Mitochondria /Apoptosis Related Proteins Table

IHC = Immunohistochemistry	R = Rat
ICC = Immunochemistry	B = Bovine
WB = Western Blotting	P = Pig
IP = Immunoprecipitation	Eq = Horse
E = ELISA	S = Monkey
N = Neutralizing	Ha = Hamster
Mm = Mammalian	E.c = E.coli
M = Mouse	D = D.Melanogaster
U = Species Independent	Y = Yeast
C = Chicken	H = Human
FB = Free Base	X = X. laevis
D = Dog	† = Data may not yet be available for each antibody for all
	* In cells systems that overexpress Bax

## Antibodies to Mitochondria /Apoptosis Related Proteins

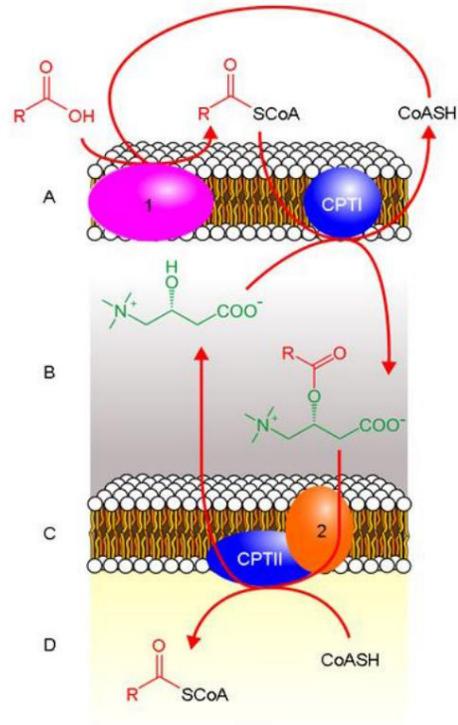
Cat. No.	Description	Clone	Specificity	IHC	ICC	WB	IP	E	N
2280-MC-100	Bax	YTH-5B7	M	IHC*	ICC	WB	IP		
2281-MC-100	Bax	YTH-6A7	H, M, R	IHC*	ICC	WB	IP		
2282-MC-100	Bax	YTH-2D2	H	IHC*		WB	IP		
2290-MC-100	Bcl-2	YTH-10C4	M, R			WB	IP		
2291-MC-100	Bcl-2	YTH-8C8	H			WB	IP		
2300-MC-100	Bcl-XL	Yth-2H12	H, M, R	IHC	ICC	WB	IP		
4360-MC-100	BPDE	8E11	U					E	
2305-PC-020	Cleaved Caspase 3		H, M		ICC	WB	IP		
2305-PC-100	Cleaved Caspase 3		H,M		ICC	WB	IP		
6370-MC-100	Cytochrome c		H, M, R, B, P, eq			WB			
2275-PC-020	G3PDH		H,M			WB	IP		
2275-PC-100	G3PDH		H,M			WB	IP		
6361-PC-100	PBR		H, M, R	IHC	ICC	WB			
6362-PC-100	PBR		M	IHC	ICC	WB			
3030-100	Bad		H, M, R, S	IHC		WB	IP		
3032-100	Bax		H, M, R, S			WB	IP		
3331-100	Bax	6036A7	H, M, R,			WB			
3033-100	Bcl-2		H, M, R,	IHC		WB	IP		
3195-100	Bcl-2	Bcl-2/100	H	IHC			IP		
3407-100	Bcl-3		H, M, R,	IHC		WB	IP		
3408-100	Bcl-6		H, M, R,	IHC		WB	IP		
3695-100	Bcl-B		H			WB			
3671-100	Bcl-Rambo		H, M, R,			WB			
3312-100	Bcl-xL		H, M, R,			WB	IP		
3663-100	Beclin-1		H, M			WB			
3347R-100	Bl -1		H, M, R			WB			
3172-100	Bid		H	IHC		WB			
3272-100	Bid		M			WB			
3704-100	BIF-1		H, M, R,			WB			
3703-100	BIK		H, M, R,			WB			
3214-100	Bim/Bod		H, M, R,			WB			
3672-100	Bin 1		H, M, R,			WB			
3175-100	BLK		M			WB			
3043-100	Bok		M, R			WB			
3352-100	Cytochrome c		R			WB			
3353-100	Cytochrome c		M, B			WB			
3025-100	Cytochrome c		H, M, R, B, C, D			WB	IP		
3176-100	Hrk		H			WB			
3035-100	Mcl-1		H, M, R, S	IHC		WB	IP		
3665-100	Noxa	YTH-5B7	H, M, R			WB			
3044-100	PBR	YTH-6A7	H, M, R	IHC		WB			
3269-100	Phospho-Bad	YTH-2D2	H, M, R			WB	IP		

# Mitochondrial Shuttles

## Malate/Aspartate Shuttle

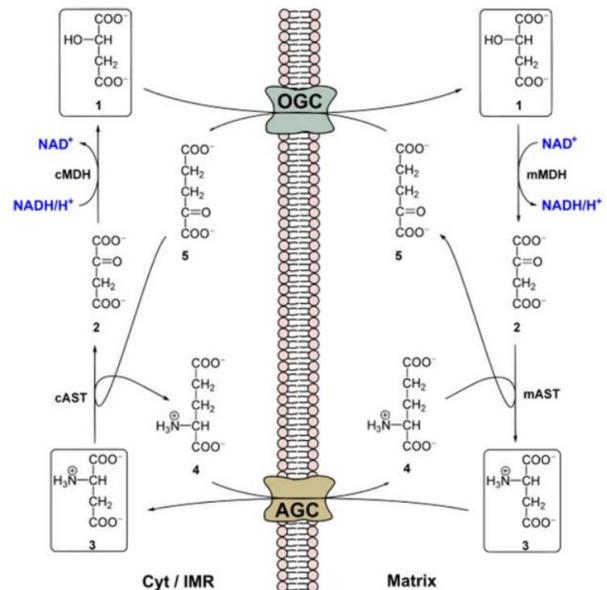
Aspartate is a metabolite in the urea cycle, participates in gluconeogenesis and transports reducing equivalents between the the cytosol and the mitochondria via the malate-aspartate shuttle. AMSBIO's Aspartate Assay Kit provides a simple, convenient assay to measure aspartate in a variety of samples. In the assay, aspartate is converted to pyruvate which is oxidized with the conversion of a probe into a highly colored (570 nm) and fluorescent (Ex/Em 535/587 nm) species proportional to the amount of aspartate in samples. Aspartate can be quantified in the range between 0.1–10 nmoles/well (2-200 μM).

Cat No.	Description	Pack Size
K552-100	Aspartate Colorimetric/Fluorometric Assay Kit	100 Assays



## Carnitine/Acylcarnitine Shuttle

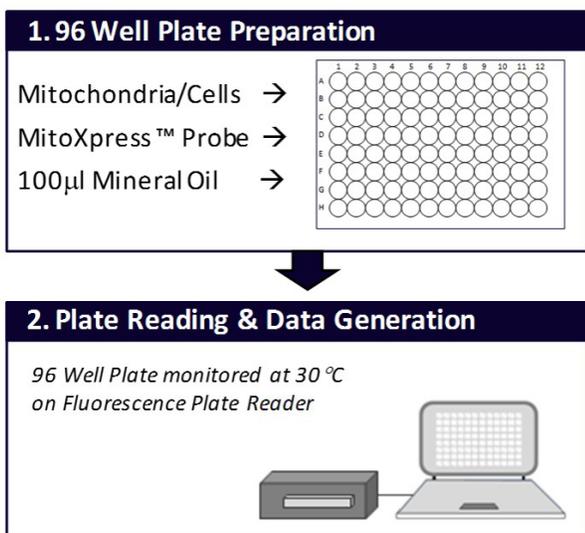
Carnitine is a quaternary ammonium compound biosynthesized from the amino acids lysine and methionine. It is required for transport of fatty acids into the mitochondrial matrix via the carnitine/acylcarnitine shuttle where β-oxidation occurs, acetate is generated and the acetate utilized in the TCA cycle for the generation of energy. Carnitine exists in two stereoisomers: only L-carnitine is biologically active. AMSBIO's L-Carnitine Assay Kit is a simple convenient means of measuring free L-Carnitine in biological samples such as serum. The assay transfers an acetyl group from CoA to carnitine and the free CoA formed is further processed with subsequent oxidation of the Oxi-Red probe to give fluorescence (Ex/Em 535 nm 587 nm) and absorbance (570 nm). The normal range for serum L-Carnitine is ~20-100 μM. The detection sensitivity is ~1 μM for the fluorometric assay and ~10 μM for the colorimetric assay.



Cat No.	Description	Pack Size
K642-100	L-Carnitine Colorimetric/Fluorometric Assay Kit	100 Assays

## MitoXpress® Xtra Oxygen Consumption Assay

Mitochondrial dysfunction is implicated in numerous disease states and is also a major mechanism of drug-induced toxicity. Oxygen consumption is one of the most informative and direct measures of mitochondrial function. Traditional methods of measuring oxygen consumption are hampered by the limitations of low throughput and high complexity. The MitoXpress®-Xtra assay solves these limitations by allowing convenient, plate-based analysis of mitochondrial function.



The assay employs MitoXpress®, one of a family of phosphorescent oxygen sensitive probes developed by Luxcel. The assay is based on the ability of O<sub>2</sub> to quench the excited state of the MitoXpress® probe. As the test material respire (e.g., isolated mitochondria, cell populations, small organisms, tissues and enzymes), O<sub>2</sub> is depleted in the surrounding solution/environment, which is seen as an increase in probe phosphorescence signal. Changes in oxygen consumption reflecting changes in mitochondrial activity are seen as changes in MitoXpress® probe signal over time. The assay is non-chemical and reversible, a decrease in oxygen consumption (an increase in O<sub>2</sub> levels) is seen as a decrease in probe signal.

MitoXpress® is analysed on standard fluorescent plate readers using standard 96- and 384-well microtitre plates. MitoXpress® assays combine the high data quality and information content of the oxygen electrode approach, with the throughput and convenience of microtitre plate based assays. These capabilities facilitate analysis of the effect of dose, substrate or ADP on observed toxicity; parameters which are critical to the determination of mechanism of action. They also allow easy IC<sub>50</sub> generation and the application of structure-activity relationship approaches.

### BENEFITS

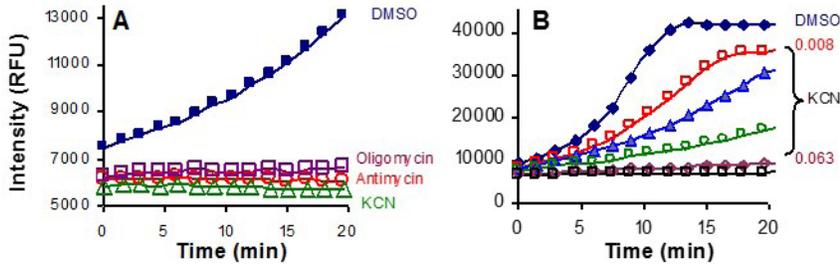
- ✓ Can be combined with other assays for multiparametric analysis
- ✓ Non-chemical, reversible reaction
- ✓ No need for expensive, specialized equipment
- ✓ Compatible with numerous plate readers and standard microtitre plates
- ✓ Suitable for high-throughput

### APPLICATIONS

- ✓ Mitochondrial Toxicity
- ✓ Mitochondrial Dysfunction
- ✓ Drug Screening
- ✓ Cardiotoxicity
- ✓ Hepatotoxicity
- ✓ 3D Cultures
- ✓ Microbial Metabolism

## ISOLATED MITOCHONDRIA

MitoXpress® Xtra allows highly sensitive high-throughput detection of mitochondrial dysfunction in isolated mitochondria. Use of a 96-well plate format allows screening of 200 compounds per day at a single dose, or acquisition of dose response characteristics for 25 compounds per day. This capability represents a fundamental shift in the capacity for mitochondrial toxicity testing in drug discovery programs, without compromising data quality or information content.



Monitoring the effect of a panel of classical ETC inhibitors on mitochondrial function using MitoXpress™ Xtra, and B) dose dependent inhibition of mitochondrial function by KCN. This data was kindly provided by Pfizer Drug Safety Research and Development (DSRD) group, San Diego, CA .

## CELL BASED SCREENING

MitoXpress® Xtra allows detailed evaluation of mechanisms of drug toxicity, adding significantly to the portfolio of information available for compound evaluation.

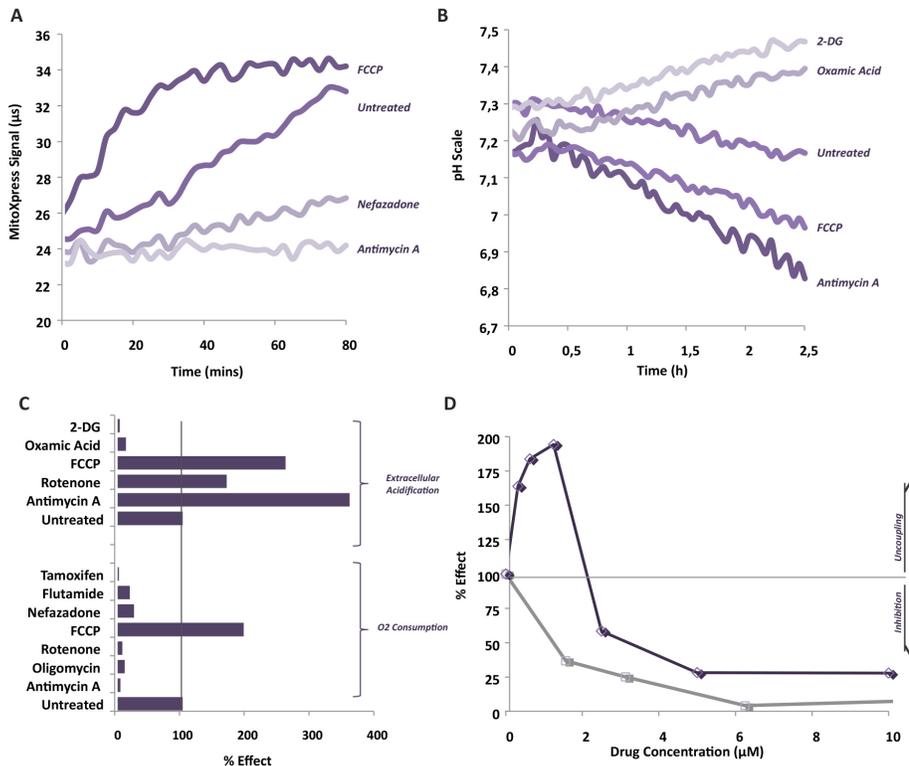
Mitochondrial Toxicity Assay in Stem Cell-Derived Cor.4U® Cardiomyocytes

A) Kinetic oxygen consumption profiles of Cor.4U® cardiomyocytes are detected by using the MitoXpress®-Xtra assay. Cor.4U® cells were seeded at 40,000 cells /well on fibronectin coated plates and cultured for 4-5 days prior to measurement. Treatments shown are FCCP (1.25µM), Antimycin A (1µM) and Nefazadone (1.56µM) versus untreated vehicle control sample, and show increase/decrease effect on O<sub>2</sub> consumption.

B) Extracellular acidification profiles of Cor.4U® cardiomyocytes are detected by using pH-Xtra®. Cells were cultured as above. A decrease in pH due to extracellular acidification is evident in the untreated sample due to glycolytic flux and this flux is clearly perturbed as a result of treatment with compound. The ETC inhibitors Antimycin (1 µM) and uncoupler FCCP (2.5 µM) both cause increased glycolytic flux as the cells attempt to maintain ATP supply. Oxamic acid (25mM) a known inhibitor of LDH inhibits extracellular acidification rate, as expected while 2-DG (25 mM) shows competitive inhibition with available glucose and thus restricts glycolytic flux and, as a result reduces extracellular acidification.

C) Single concentration treatment of multiple drugs across both the MitoXpress®-Xtra oxygen consumption and the pH-Xtra® glycolysis assay. The calculated % effect of the response compared to the untreated control is presented. Additional compounds were also included such as the antiandrogen, flutamide, a known Complex I inhibitor and the antiestrogen Tamoxifen, also a known mitochondrial modulator. These data again show that detailed information on the implications of drug treatment on cardiomyocyte mitochondrial function can be generated immediately post treatment.

D) Sample Dose Response Graph for the MitoXpress® Xtra oxygen consumption assay showing treatment of FCCP (uncoupler) and Nefazadone (inhibitor).



# MitoXpress® Intra Oxygen Concentration Assay

Molecular oxygen is the key substrate of aerobic metabolism. Knowledge of cell oxygenation is therefore central to a detailed understanding of the cellular metabolic response to a particular treatment or manipulation. Intracellular measurements have proven very difficult to date, requiring the use of invasive, laborious, low-throughput, technically challenging techniques which in turn have limited the use of such measurements within biological research.

Now for the first time, molecular O<sub>2</sub> can be conveniently monitored within the cell monolayer on a plate reader in a non-invasive, high-throughput manner and in real-time. This is achieved using the new MitoXpress®-Intra probe and provides a powerful tool for the detailed investigation to this most critical of biological parameters.

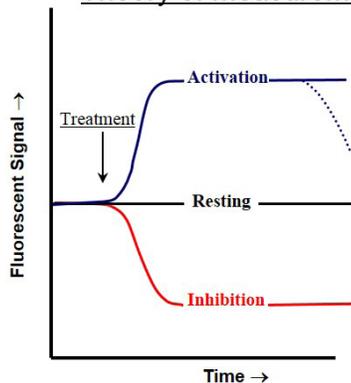
MitoXpress®-Intra is a powerful tool for the monitoring of cell oxygenation, mitochondrial function and the metabolic implications of cell signalling; having been shown to facilitate the real-time assessment of transient changes in cell respiration, oxygen gradients and physiological responses across a range of cell models. Specifically, it facilitates the measurement of cellular oxygenation; a critical parameter across many fields of research including hypoxia and cancer metabolism. Mitochondrial toxicity = decrease in O<sub>2</sub> consumption, a resultant increase in acidification due to glycolytic compensation.

Non-Specific mitochondrial insult leads to a decrease in oxygen consumption without subsequent acidification as well as significant ATP depletion

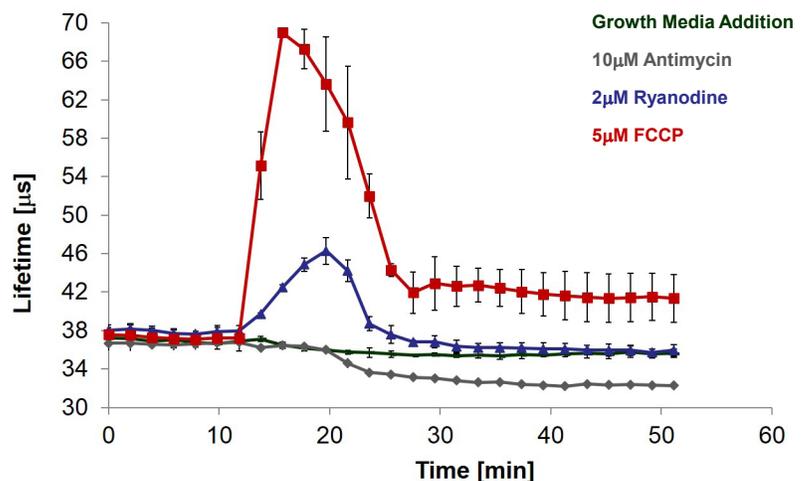
## BENEFITS

- ✓ Self penetrating ability with high self-loading efficiency
- ✓ Suitable for a range of cell types
- ✓ Plate reader compatible allowing the analysis of multiple samples
- ✓ Can be used in parallel with MitoXpress® Xtra
- ✓ Does not require specialised imaging equipment
- ✓ Complements other intracellular parameters such as ROS and mitochondrial membrane potential

### Theory of measurement



Diagrammatic representation of MitoXpress® Intra probe profiles in response to drug treatment.



Kinetic analysis of metabolic responses

## pH-Xtra™ Glycolysis Assay

The pH-Xtra™ Glycolysis Assay is an easy to use, highly flexible 96 or 384-well fluorescence plate reader-based approach for the direct, real-time, kinetic analysis of extracellular acidification rates (ECA / ECAR). As lactate production is the main contributor to this acidification, ECA measurements are a convenient and informative measure of cellular glycolytic flux. Such measurements offer an important insight into the central role played by altered glycolytic activity in a wide array of physiological and pathophysiological processes, including cellular adaptation to hypoxia and ischemia, and the development and progression of tumorigenesis.

The pH-Xtra™ reagent is chemically stable and inert, water soluble and cell impermeable. It exhibits a positive signal response (increased signal with increased acidification) across the biological range (pH6 – 7.5), which coupled with its spectral and response characteristics, make pH-Xtra™ the ideal choice for flexible, high-throughput assessment of ECA. This performance facilitates sensitive robust microtitre-plate based measurements, thereby overcoming many of the problems associated with the more cumbersome potentiometric pH approach. Rates of extracellular acidification are calculated from changes in fluorescence signal over time and as the measurement is non-destructive and fully reversible (pH-Xtra™ reagent is not consumed), measurement of time courses and multiple drug treatments are possible.

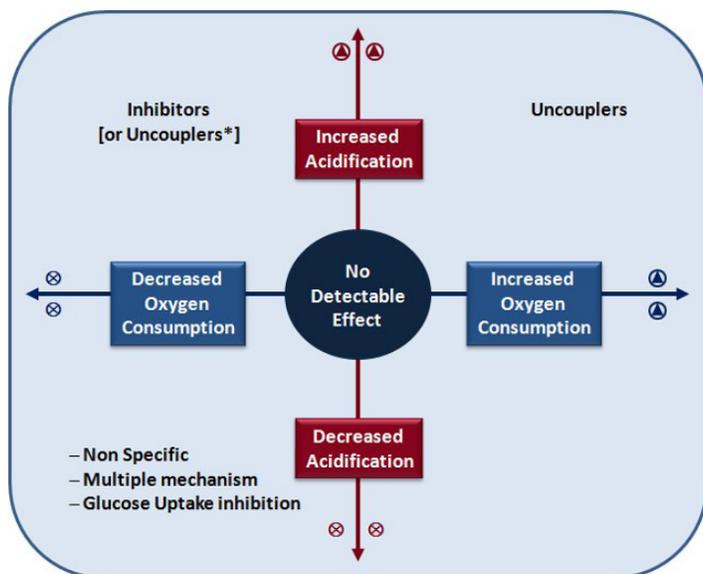
The flexible plate reader format also allows multiparametric or multiplex combinations with other products, and with other commonly available reagents, thereby facilitating parallel kinetic measurements of parameters such as ECA, mitochondria membrane potential ( $\Delta\Psi_m$ ),  $O_2$  consumption or ROS generation, followed by the end point measure of parameters such as ATP content or cell membrane integrity, all on the same test cells. For example, the combination of MitoXpress Xtra® and pH-Xtra™ allows the simultaneous real-time measurement of the interplay between mitochondrial respiration and glycolysis. This facilitates the determination of a cell's metabolic phenotype and the quantification of perturbations in the balance between glycolysis and oxidative phosphorylation under various stimuli or pathological states.

### BENEFITS

- ✓ Multiparametric or multiplex assays
- ✓ Non-chemical, reversible reaction
- ✓ No need for expensive, specialized equipment
- ✓ Compatible with numerous plate readers and standard microtitre plates
- ✓ Suitable for time course experiments
- ✓ Multiple drug treatments possible

### FOR USE WITH:

- ✓ Adherent Cells
- ✓ Suspension Cells
- ✓ Permeabilized Cells
- ✓ 3D Cultures - tissues, spheroids, scaffolds

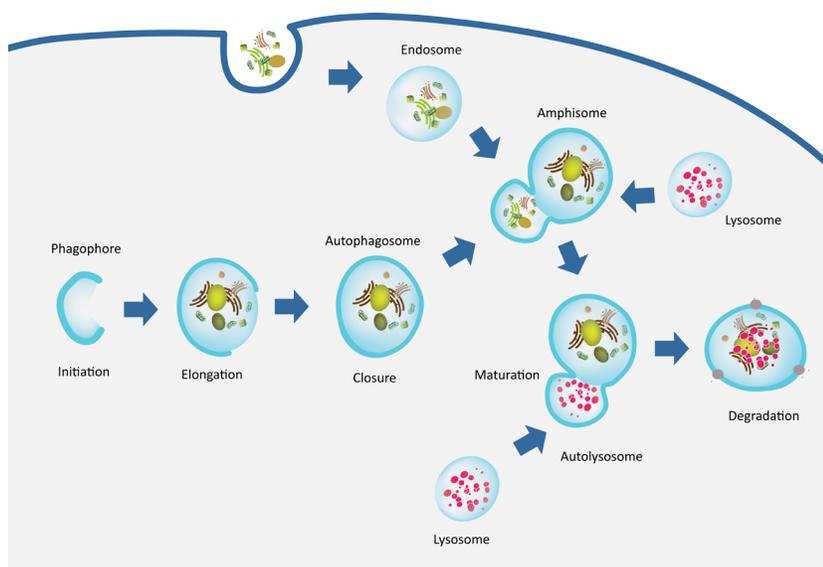


Schematic of a simple potential data analysis approach using 'Energy Budget' measurements

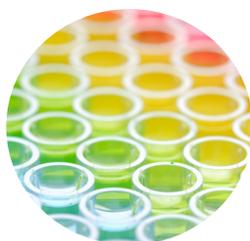
Mitochondrial toxicity results in a decrease in  $O_2$  consumption, a resultant increase in acidification due to glycolytic compensation. Non-Specific mitochondrial insult leads to a decrease in oxygen consumption without subsequent acidification as well as significant ATP depletion

Cat. No	Description	Packsize
MX-200	MitoXpress® Xtra HS Oxygen Consumption Assay (HS Method)	1 x vial of lyophilised, water soluble MitoXpress® probe 1 x 15 ml bottle of HS Mineral Oil
MX-200/4		4 x vials of lyophilised, water soluble MitoXpress® probe 4 x 15 ml bottle of HS Mineral Oil
MX-300	MitoXpress® Intra Intracellular Oxygen Concentration Assay	1 x vial of lyophilised, water soluble cell-penetrating probe
MX-300/5		5 x vial of lyophilised, water soluble cell-penetrating probe
PH-200	pH-Xtra™ Glycolysis Assay (Extracellular Acidification + pH)	1 x vial of lyophilised, water soluble pH probe 1 x respiration buffer tablet
PH-200/4		4 x vial of lyophilised, water soluble pH probe 4 x respiration buffer tablet

# Autophagy



From the hallmark autophagy antibody APG8 (MAPLC3) to autophagy antibodies such as LAMP and APG1, count on amsbio to find the most relevant, qualified antibodies for autophagy research. This expanding collection includes many antibodies targeting autophagic proteins. Expand the scope of your research with our antibody sampler kits. Sampler kits offer an affordable way to purchase multiple validated antibodies from our comprehensive antibody product lines. Assemble a collection of antibodies to your pathway of interest, or economically screen for the antibody that is perfect for your application.



## Antibodies, Kits and Proteins

### ELISA Kits

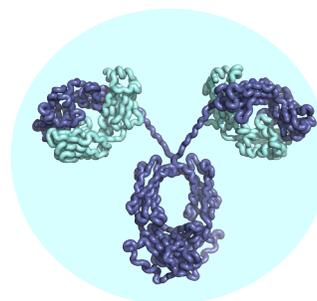
Cat No.	Description
AMS.E2478h	Human Autophagy Related Protein 12 Elisa Kit
AMS.E15032b	Bovine ELISA Kit FOR Autophagy protein 5
AMS.E15032p	Pig ELISA Kit FOR Autophagy protein 5
AMS.E15032r	Rat ELISA Kit FOR Autophagy protein 5
AMS.E15032m	Mouse ELISA Kit FOR Autophagy protein 5
AMS.E3508m	Mouse ELISA Kit FOR DNA damage-regulated autophagy modulator protein 1
AMS.E15032h	Human ELISA Kit FOR Autophagy protein 5
AMS.E3508h	Human ELISA Kit FOR DNA damage-regulated autophagy modulator protein 1

### Purified Recombinant Proteins

Cat No.	Description
TP301629	Homo sapiens beclin 1, autophagy related (BECN1)
TP303453	Homo sapiens ATG3 autophagy related 3 homolog (S. cerevisiae) (ATG3)
TP305955	Homo sapiens ATG4 autophagy related 4 homolog C (S. cerevisiae) (ATG4C), transcript variant 8
TP310563	Homo sapiens ATG5 autophagy related 5 homolog (S. cerevisiae) (ATG5)
TP315079	Homo sapiens ATG7 autophagy related 7 homolog (S. cerevisiae) (ATG7), transcript variant 1
TP316453	Homo sapiens ATG4 autophagy related 4 homolog B (S. cerevisiae) (ATG4B), transcript variant 2
TP322513	Homo sapiens ATG9 autophagy related 9 homolog A (S. cerevisiae) (ATG9A), transcript variant 2

## Antibodies

Cat No.	Description
TA324327	Mouse monoclonal LC3 Antibody (APG8)
TA503161	Purified ATG3 mouse monoclonal antibody,clone 2C12
TA502643	Purified BECN1 mouse monoclonal antibody, clone 1F1
TA503384	Purified ATG3 mouse monoclonal antibody,clone 2B9
TA503383	Purified ATG3 mouse monoclonal antibody,clone 3H1
TA503370	Purified ATG3 mouse monoclonal antibody,clone 4F6
TA503346	Purified ATG3 mouse monoclonal antibody,clone 3H2
TA503301	Purified ATG3 mouse monoclonal antibody,clone 3C6
TA503299	Purified ATG3 mouse monoclonal antibody,clone 3G3
TA502674	Purified BECN1 mouse monoclonal antibody, clone 1E1
TA502619	Purified BECN1 mouse monoclonal antibody, clone 2A7
TA502618	Purified BECN1 mouse monoclonal antibody, clone 2D4
TA502617	Purified BECN1 mouse monoclonal antibody, clone 4A10
TA502616	Purified BECN1 mouse monoclonal antibody, clone 3C3
TA502615	Purified BECN1 mouse monoclonal antibody, clone 2C5
TA502527	Purified BECN1 mouse monoclonal antibody, clone 3F3
TA502517	Purified BECN1 mouse monoclonal antibody, clone 3H8
TA307833	Rabbit monoclonal antibody against Atg12(clone EPR4799)
TA307830	Rabbit monoclonal antibody against Atg12(clone EPR4800)
TA307809	Rabbit monoclonal antibody against Atg5(clone EPR4797)
TA307270	Rabbit monoclonal antibody against Atg5(clone EPR1755(2))
TA307050	Rabbit monoclonal antibody against ATG9A(clone EPR2450(2))
TA307022	Rabbit monoclonal antibody against ATG4A(clone EPR4122)
TA306727	Chicken Polyclonal ATG5 Antibody
TA306559	Rabbit Polyclonal Ambra1 Antibody



## Antibodies

Cat No.	Description
TA306558	Rabbit Polyclonal Ambra1 Antibody
TA306517	Rabbit Polyclonal ATG5 Antibody
TA306514	Rabbit Polyclonal ATG16 Antibody
TA306513	Rabbit Polyclonal ATG16 Antibody
TA306512	Rabbit Polyclonal ATG12 Antibody
TA306511	Rabbit Polyclonal ATG12 Antibody
TA306501	Rabbit Polyclonal ATG10 Antibody
TA306391	Rabbit Polyclonal DRAM Antibody
TA306390	Rabbit Polyclonal DRAM Antibody
TA306258	Rabbit Polyclonal APG7 Antibody
TA306257	Rabbit Polyclonal APG7 Antibody
TA306256	Rabbit Polyclonal Beclin-1 Antibody
TA306255	Rabbit Polyclonal Beclin-1 Antibody
TA301543	Rabbit Polyclonal Antibody against LC3B
TA301542	Rabbit Polyclonal Antibody against LC3
TA301541	Rabbit Polyclonal Antibody against LC3
TA301481	Rabbit Polyclonal Antibody against ATG5
TA301471	Rabbit Polyclonal Antibody against Beclin 1
TA301470	Rabbit Polyclonal Antibody against Beclin 1
TA301006	Rabbit Monoclonal Antibody against MAP1LC3A (Clone EPR1754)
TA300953	Rabbit Monoclonal Antibody against MAP1LC3A (Clone EP1983Y)
TA300950	Rabbit Monoclonal Antibody against ATG7 (Clone EP1759Y)
TA300923	Rabbit Monoclonal Antibody against BECN1 (Clone EPR1733Y)

## Protein Antigen Standards

Cat No.	Description
LY401239	Beclin 1, autophagy related (BECN1) (transient overexpression lysate)
LY401486	ATG12 autophagy related 12 homolog ( <i>S. cerevisiae</i> ) (ATG12) (transient overexpression lysate)
LY401532	ATG5 autophagy related 5 homolog ( <i>S. cerevisiae</i> ) (ATG5) (transient overexpression lysate)
LY401928	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 1 (transient overexpression lysate)
LY402672	DNA-damage regulated autophagy modulator 1 (DRAM1) (transient overexpression lysate)
LY403599	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C), transcript variant 8 (transient overexpression lysate)
LY403600	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 2 (transient overexpression lysate)
LY409886	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C), transcript variant 7 (transient overexpression lysate)
LY410477	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 2 (transient overexpression lysate)
LY410699	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 1 (transient overexpression lysate)
LY411357	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 2 (transient overexpression lysate)
LY411559	ATG3 autophagy related 3 homolog ( <i>S. cerevisiae</i> ) (ATG3) (transient overexpression lysate)
LY413575	Autophagy/beclin-1 regulator 1 (AMBRA1) (transient overexpression lysate)
LY415627	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 1 (transient overexpression lysate)
LY421380	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 1 (transient overexpression lysate)
LY425839	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 1 (transient overexpression lysate)
LY427366	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 3 (transient overexpression lysate)
LY429376	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 1 (transient overexpression lysate)



## cDNA Clones

### Native ORF clone of Rat (cDNA)

Cat No.	Description
RN200235	Beclin 1, autophagy related (Becn1), transcript variant 1 as transfection-ready DNA
RN201285	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (Atg9a) as transfection-ready DNA
RN204962	ATG3 autophagy related 3 homolog ( <i>S. cerevisiae</i> ) (Atg3) as transfection-ready DNA
RN205143	ATG5 autophagy related 5 homolog ( <i>S. cerevisiae</i> ) (Atg5) as transfection-ready DNA
RN205151	ATG2 autophagy related 2 homolog A ( <i>S. cerevisiae</i> ) (Atg2a) as transfection-ready DNA
RN205679	ATG12 autophagy related 12 homolog ( <i>S. cerevisiae</i> ) (Atg12) as transfection-ready DNA
RN207459	Similar to Cysteine protease ATG4A (Autophagy-related protein 4 homolog A) (Autophagin-2) (Autophagy-related cysteine endopeptidase 2) (AUT-like 2 cysteine endopeptidase as transfection-ready DNA
RN207522	Autophagy-related 10 ( <i>S. cerevisiae</i> ) (Atg10) as transfection-ready DNA
RN207526	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (Atg7) as transfection-ready DNA
RN208452	ATG4 autophagy related 4 homolog D ( <i>S. cerevisiae</i> ) (Atg4d) as transfection-ready DNA
RN209013	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (Atg16l1) as transfection-ready DNA
RN211124	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (Atg4b) as transfection-ready DNA
RN215363	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (Atg4c) as transfection-ready DNA

## Myc-DDK-tagged ORF clone of Rat (cDNA)

Cat No.	Description
RR200235	Beclin 1, autophagy related (Becn1), transcript variant 1 as transfection-ready DNA
RR201285	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (Atg9a) as transfection-ready DNA
RR204962	ATG3 autophagy related 3 homolog ( <i>S. cerevisiae</i> ) (Atg3) as transfection-ready DNA
RR205143	ATG5 autophagy related 5 homolog ( <i>S. cerevisiae</i> ) (Atg5) as transfection-ready DNA
RR205151	ATG2 autophagy related 2 homolog A ( <i>S. cerevisiae</i> ) (Atg2a) as transfection-ready DNA
RR205679	ATG12 autophagy related 12 homolog ( <i>S. cerevisiae</i> ) (Atg12) as transfection-ready DNA
RR207459	Similar to Cysteine protease ATG4A (Autophagy-related protein 4 homolog A) (Autophagin-2) (Autophagy-related cysteine endopeptidase 2) (AUT-like 2 cystein as transfection-ready DNA
RR207522	Autophagy-related 10 ( <i>S. cerevisiae</i> ) (Atg10) as transfection-ready DNA
RR207526	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (Atg7) as transfection-ready DNA
RR208452	ATG4 autophagy related 4 homolog D ( <i>S. cerevisiae</i> ) (Atg4d) as transfection-ready DNA
RR209013	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (Atg16l1) as transfection-ready DNA
RR211124	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (Atg4b) as transfection-ready DNA
RR215363	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (Atg4c) as transfection-ready DNA

## Mouse cDNA

Cat No.	Description
MC200283	Beclin 1, autophagy related (Becn1) as transfection-ready DNA
MC200308	Autophagy-related 5 (yeast) (Atg5) as transfection-ready DNA
MC201069	Autophagy-related 3 (yeast) (Atg3) as transfection-ready DNA
MC202125	VDNA-damage regulated autophagy modulator 2 (Dram2), transcript variant 1 as transfection-ready DNA
MC203326	Autophagy-related 7 (yeast) (Atg7) as transfection-ready DNA
MC203381	Autophagy-related 4D (yeast) (Atg4d) as transfection-ready DNA
MC203435	Autophagy-related 12 (yeast) (Atg12) as transfection-ready DNA
MC206078	Autophagy-related 4C (yeast) (cDNA clone MGC:67363 IMAGE:6827140) as transfection-ready DNA
MC206905	Autophagy-related 10 (yeast) (cDNA clone MGC:30984 IMAGE:5249268) as transfection-ready DNA
MC208093	Autophagy-related 4A (yeast) (Atg4a) as transfection-ready DNA
MC210405	Autophagy-related 4B (yeast) (Atg4b) as transfection-ready DNA
MC210437	Autophagy-related 10 (yeast) (Atg10) as transfection-ready DNA
MC211216	DNA-damage regulated autophagy modulator 1 (Dram1) as transfection-ready DNA
MC216889	VATG14 autophagy related 14 homolog ( <i>S. cerevisiae</i> ) (Atg14) as transfection-ready DNA
MC218115	Autophagy-related 16-like 1 (yeast) (cDNA clone MGC:61241 IMAGE:6813377) as transfection-ready DNA
MC218655	Autophagy-related 9A (yeast) (cDNA clone MGC:105176 IMAGE:6840050) as transfection-ready DNA
MC219638	Autophagy-related 16-like 1 (yeast) (Atg16l1), transcript variant 2 as transfection-ready DNA
MC219837	Autophagy related 16 like 2 ( <i>S. cerevisiae</i> ) (Atg16l2) as transfection-ready DNA
MC222029	Autophagy-related 9A (yeast) (Atg9a) as transfection-ready DNA
MC222662	ATG9 autophagy related 9 homolog B ( <i>S. cerevisiae</i> ) (Atg9b) as transfection-ready DNA
MC223952	Autophagy/beclin 1 regulator 1 (Ambra1), transcript variant 2 as transfection-ready DNA
MC224192	Autophagy/beclin 1 regulator 1 (Ambra1), transcript variant 1 as transfection-ready DNA
MC225033	ATG2 autophagy related 2 homolog A ( <i>S. cerevisiae</i> ) (Atg2a) as transfection-ready DNA
MC225159	ATG2 autophagy related 2 homolog B ( <i>S. cerevisiae</i> ) (Atg2b) as transfection-ready DNA

## GFP-tagged ORF clone of Mouse (cDNA)

Cat No.	Description
MG200886	Autophagy-related 12 (yeast) (Atg12) in a GFP expression vector
MG202364	Autophagy-related 10 (yeast) (cDNA clone MGC:30984 IMAGE:5249268) in a GFP expression vector
MG203691	Autophagy-related 5 (yeast) (Atg5) in a GFP expression vector
MG204475	Autophagy-related 3 (yeast) (Atg3) in a GFP expression vector
MG206129	Autophagy-related 4B (yeast) (Atg4b) in a GFP expression vector
MG206212	Autophagy-related 4A (yeast) (Atg4a) in a GFP expression vector
MG207307	Autophagy-related 4C (yeast) (cDNA clone MGC:67363 IMAGE:6827140) in a GFP expression vector
MG207595	Autophagy-related 4D (yeast) (Atg4d) in a GFP expression vector
MG208753	Autophagy-related 9A (yeast) (cDNA clone MGC:105176 IMAGE:6840050) in a GFP expression vector
MG209513	Autophagy-related 16-like 1 (yeast) (cDNA clone MGC:61241 IMAGE:6813377) in a GFP expression vector
MG210108	Autophagy-related 7 (yeast) (Atg7) in a GFP expression vector
MG215863	Autophagy related 16 like 2 ( <i>S. cerevisiae</i> ) (Atg16l2) as transfection-ready DNA
MG215908	Autophagy/beclin 1 regulator 1 (Ambra1) transcript variant 1 as transfection-ready DNA
MG217481	Autophagy/beclin 1 regulator 1 (Ambra1) transcript variant 2 as transfection-ready DNA
MG217776	ATG9 autophagy related 9 homolog B ( <i>S. cerevisiae</i> ) (Atg9b) as transfection-ready DNA
MG218120	VDNA-damage regulated autophagy modulator 2 (Dram2) transcript variant 2 as transfection-ready DNA
MG218358	ATG2 autophagy related 2 homolog B ( <i>S. cerevisiae</i> ) (Atg2b) as transfection-ready DNA
MG218897	Autophagy-related 10 (yeast) (Atg10) as transfection-ready DNA
MG220640	DNA-damage regulated autophagy modulator 1 (Dram1) as transfection-ready DNA
MG222440	VATG14 autophagy related 14 homolog ( <i>S. cerevisiae</i> ) (Atg14) as transfection-ready DNA
MG222915	Autophagy-related 16-like 1 (yeast) (Atg16l1) transcript variant b as transfection-ready DNA
MG223616	Autophagy-related 4C (yeast) (Atg4c) transcript variant 1 as transfection-ready DNA
MG226916	Autophagy-related 9A (yeast) (Atg9a) as transfection-ready DNA

## Myc-DDK-tagged ORF clone of Mouse (cDNA)

Cat No.	Description
MR200886	Autophagy-related 12 (yeast) (Atg12) as transfection-ready DNA
MR201603	VDNA-damage regulated autophagy modulator 2 (Dram2), transcript variant 1 as transfection-ready DNA
MR202364	Autophagy-related 10 (yeast) (cDNA clone MGC:30984 IMAGE:5249268) as transfection-ready DNA
MR203691	Autophagy-related 5 (yeast) (Atg5) as transfection-ready DNA
MR204475	Autophagy-related 3 (yeast) (Atg3) as transfection-ready DNA
MR206129	Autophagy-related 4B (yeast) (Atg4b) as transfection-ready DNA
MR206212	Autophagy-related 4A (yeast) (Atg4a) as transfection-ready DNA
MR207162	Beclin 1, autophagy related (Becn1) as transfection-ready DNA
MR207307	Autophagy-related 4C (yeast) (Atg4c), transcript variant 2 as transfection-ready DNA
MR207595	Autophagy-related 4D (yeast) (Atg4d) as transfection-ready DNA
MR207683	ATG13 autophagy related 13 homolog (S. cerevisiae) (Atg13) as transfection-ready DNA
MR208753	Autophagy-related 9A (yeast) (cDNA clone MGC:105176 IMAGE:6840050) as transfection-ready DNA
MR209513	Autophagy-related 16-like 1 (yeast) (cDNA clone MGC:61241 IMAGE:6813377) as transfection-ready DNA
MR210108	Autophagy-related 7 (yeast) (Atg7) as transfection-ready DNA
MR212097	ATG2 autophagy related 2 homolog A (S. cerevisiae) (Atg2a) as transfection-ready DNA
MR215863	Autophagy related 16 like 2 (S. cerevisiae) (Atg16l2) as transfection-ready DNA
MR215908	Autophagy/beclin 1 regulator 1 (Ambra1), transcript variant 1 as transfection-ready DNA
MR217481	Autophagy/beclin 1 regulator 1 (Ambra1), transcript variant 2 as transfection-ready DNA
MR217776	ATG9 autophagy related 9 homolog B (S. cerevisiae) (Atg9b) as transfection-ready DNA
MR218120	VDNA-damage regulated autophagy modulator 2 (Dram2), transcript variant 2 as transfection-ready DNA
MR218358	ATG2 autophagy related 2 homolog B (S. cerevisiae) (Atg2b) as transfection-ready DNA
MR218897	Autophagy-related 10 (yeast) (Atg10) as transfection-ready DNA
MR220640	DNA-damage regulated autophagy modulator 1 (Dram1) as transfection-ready DNA
MR222440	VATG14 autophagy related 14 homolog (S. cerevisiae) (Atg14) as transfection-ready DNA
MR222915	Autophagy-related 16-like 1 (yeast) (Atg16l1), transcript variant 2 as transfection-ready DNA
MR223616	Autophagy-related 4C (yeast) (Atg4c), transcript variant 1 as transfection-ready DNA
MR226916	Autophagy-related 9A (yeast) (Atg9a) as transfection-ready DNA

## Human cDNA

Cat No.	Description
SC102914	ATG4 autophagy related 4 homolog D ( <i>S. cerevisiae</i> ) (ATG4D) as transfection-ready DNA
SC106354	Similar to Apg12 (autophagy 12, <i>S. cerevisiae</i> )-like, clone MGC:9094 IMAGE:3864058, complete cds as transfection-ready DNA
SC107170	DNA-damage regulated autophagy modulator 2 (DRAM2) as transfection-ready DNA
SC111887	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C), transcript variant 2 as transfection-ready DNA
SC112271	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 2 as transfection-ready DNA
SC113578	DNA-damage regulated autophagy modulator 1 (DRAM1) as transfection-ready DNA
SC113821	ATG2 autophagy related 2 homolog B ( <i>S. cerevisiae</i> ) (ATG2B) as transfection-ready DNA
SC115281	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 1 as transfection-ready DNA
SC116085	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 1 as transfection-ready DNA
SC117215	ATG12 autophagy related 12 homolog ( <i>S. cerevisiae</i> ) (ATG12), transcript variant 1 as transfection-ready DNA
SC117750	Beclin 1, autophagy related (BECN1) as transfection-ready DNA
SC124770	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A), transcript variant 3 as transfection-ready DNA
SC125736	Autophagy/beclin-1 regulator 1 (AMBRA1) as transfection-ready DNA
SC126496	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C), transcript variant 1 as transfection-ready DNA
SC127733	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 3 as transfection-ready DNA
SC127887	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 2 as transfection-ready DNA
SC128244	ATG5 autophagy related 5 homolog ( <i>S. cerevisiae</i> ) (ATG5) as transfection-ready DNA
SC304232	ATG2 autophagy related 2 homolog A ( <i>S. cerevisiae</i> ) (ATG2A) as transfection-ready DNA
SC305622	ATG16 autophagy related 16-like 2 ( <i>S. cerevisiae</i> ) (ATG16L2) as transfection-ready DNA
SC306912	ATG9 autophagy related 9 homolog B ( <i>S. cerevisiae</i> ) (ATG9B) as transfection-ready DNA
SC309635	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 2 as transfection-ready DNA
SC313005	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A), transcript variant 2 as transfection-ready DNA
SC313299	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A), transcript variant 1 as transfection-ready DNA
SC313704	ATG14 autophagy related 14 homolog ( <i>S. cerevisiae</i> ) (ATG14) as transfection-ready DNA
SC313762	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 2 as transfection-ready DNA
SC315623	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 1 as transfection-ready DNA
SC317783	ATG4 autophagy related 4 homolog D ( <i>S. cerevisiae</i> ) (ATG4D) as transfection-ready DNA
SC318013	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 2 as transfection-ready DNA
SC318045	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 1 as transfection-ready DNA
SC318705	ATG2 autophagy related 2 homolog B ( <i>S. cerevisiae</i> ) (ATG2B) as transfection-ready DNA
SC318729	Ectopic P-granules autophagy protein 5 homolog ( <i>C. elegans</i> ) (EPG5) as transfection-ready DNA
SC319062	ATG13 autophagy related 13 homolog ( <i>S. cerevisiae</i> ) (ATG13), transcript variant 2 as transfection-ready DNA
SC319569	ATG3 autophagy related 3 homolog ( <i>S. cerevisiae</i> ) (ATG3) as transfection-ready DNA
SC321673	DNA-damage regulated autophagy modulator 1 (DRAM1) as transfection-ready DNA
SC322562	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 2 as transfection-ready DNA
SC324265	Beclin 1, autophagy related (BECN1) as transfection-ready DNA
SC324798	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 3 as transfection-ready DNA
SC325273	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 2 as transfection-ready DNA
SC326018	ATG13 autophagy related 13 homolog ( <i>S. cerevisiae</i> ) (ATG13), transcript variant 1 as transfection-ready DNA
SC326118	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 3 as transfection-ready DNA

## Myc-DDK-tagged ORF clone of Human (cDNA)

Cat No.	Description
RC200289	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 1 as transfection-ready DNA
RC201629	Beclin 1, autophagy related (BECN1) as transfection-ready DNA
RC201825	ATG13 autophagy related 13 homolog ( <i>S. cerevisiae</i> ) (ATG13), transcript variant 2 as transfection-ready DNA
RC202012	ATG12 autophagy related 12 homolog ( <i>S. cerevisiae</i> ) (ATG12), transcript variant 1 as transfection-ready DNA
RC203453	ATG3 autophagy related 3 homolog ( <i>S. cerevisiae</i> ) (ATG3) as transfection-ready DNA
RC204574	DNA-damage regulated autophagy modulator 1 (DRAM1) as transfection-ready DNA
RC205955	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C), transcript variant 2 as transfection-ready DNA
RC206255	Autophagy/beclin-1 regulator 1 (AMBRA1) as transfection-ready DNA
RC206405	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 2 as transfection-ready DNA
RC209627	ATG4 autophagy related 4 homolog D ( <i>S. cerevisiae</i> ) (ATG4D) as transfection-ready DNA
RC210563	ATG5 autophagy related 5 homolog ( <i>S. cerevisiae</i> ) (ATG5) as transfection-ready DNA
RC210687	ATG2 autophagy related 2 homolog A ( <i>S. cerevisiae</i> ) (ATG2A) as transfection-ready DNA
RC212340	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 2 as transfection-ready DNA
RC213085	DNA-damage regulated autophagy modulator 2 (DRAM2) as transfection-ready DNA
RC214650	ATG2 autophagy related 2 homolog B ( <i>S. cerevisiae</i> ) (ATG2B) as transfection-ready DNA
RC215079	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 1 as transfection-ready DNA
RC215833	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A), transcript variant 2 as transfection-ready DNA
RC216088	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C), transcript variant 1 as transfection-ready DNA
RC216453	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 2 as transfection-ready DNA
RC216728	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 1 as transfection-ready DNA
RC218030	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A), transcript variant 1 as transfection-ready DNA
RC219254	Ectopic P-granules autophagy protein 5 homolog ( <i>C. elegans</i> ) (EPG5) as transfection-ready DNA
RC219270	ATG16 autophagy related 16-like 2 ( <i>S. cerevisiae</i> ) (ATG16L2) as transfection-ready DNA
RC220325	ATG14 autophagy related 14 homolog ( <i>S. cerevisiae</i> ) (ATG14) as transfection-ready DNA
RC222513	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 2 as transfection-ready DNA
RC222568	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 1 as transfection-ready DNA
RC224817	ATG9 autophagy related 9 homolog B ( <i>S. cerevisiae</i> ) (ATG9B) as transfection-ready DNA
RC225262	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 3 as transfection-ready DNA
RC226545	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 3 as transfection-ready DNA
RC226897	ATG13 autophagy related 13 homolog ( <i>S. cerevisiae</i> ) (ATG13), transcript variant 1 as transfection-ready DNA
RC227990	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 2 as transfection-ready DNA
RC231237	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 3 as transfection-ready DNA
RC231272	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 5 as transfection-ready DNA
RC231296	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 4 as transfection-ready DNA
RC501825	ATG13 autophagy related 13 homolog ( <i>S. cerevisiae</i> ) (ATG13), transcript variant 2 as 500 ug transfection-ready DNA
RC502012	ATG12 autophagy related 12 homolog ( <i>S. cerevisiae</i> ) (ATG12), transcript variant 1 as 500 ug transfection-ready DNA
RC503453	ATG3 autophagy related 3 homolog ( <i>S. cerevisiae</i> ) (ATG3) as 500 ug transfection-ready DNA
RC504574	DNA-damage regulated autophagy modulator 1 (DRAM1) as 500 ug transfection-ready DNA
RC506405	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 2 as 500 ug transfection-ready DNA
RC510563	ATG5 autophagy related 5 homolog ( <i>S. cerevisiae</i> ) (ATG5) as 500 ug transfection-ready DNA
RC515079	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 1 as 500 ug transfection-ready DNA
RC516728	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 1 as 500 ug transfection-ready DNA
RC522513	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 2 as 500 ug transfection-ready DNA

## GFP-tagged ORF clone of Human (cDNA)

Cat No.	Description
RG200289	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 1 as transfection-ready DNA
RG201629	Beclin 1, autophagy related (BECN1) as transfection-ready DNA
RG201825	ATG13 autophagy related 13 homolog ( <i>S. cerevisiae</i> ) (ATG13), transcript variant 2 as transfection-ready DNA
RG202012	ATG12 autophagy related 12 homolog ( <i>S. cerevisiae</i> ) (ATG12), transcript variant 1 as transfection-ready DNA
RG203453	ATG3 autophagy related 3 homolog ( <i>S. cerevisiae</i> ) (ATG3) as transfection-ready DNA
RG204574	DNA-damage regulated autophagy modulator 1 (DRAM1) as transfection-ready DNA
RG205955	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C), transcript variant 2 as transfection-ready DNA
RG206255	Autophagy/beclin-1 regulator 1 (AMBRA1) as transfection-ready DNA
RG206405	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 2 as transfection-ready DNA
RG209627	ATG4 autophagy related 4 homolog D ( <i>S. cerevisiae</i> ) (ATG4D) as transfection-ready DNA
RG210563	ATG5 autophagy related 5 homolog ( <i>S. cerevisiae</i> ) (ATG5) as transfection-ready DNA
RG210687	ATG2 autophagy related 2 homolog A ( <i>S. cerevisiae</i> ) (ATG2A) as transfection-ready DNA
RG212340	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 2 as transfection-ready DNA
RG213085	DNA-damage regulated autophagy modulator 2 (DRAM2) as transfection-ready DNA
RG214650	ATG2 autophagy related 2 homolog B ( <i>S. cerevisiae</i> ) (ATG2B) as transfection-ready DNA
RG215079	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 1 as transfection-ready DNA
RG215833	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A), transcript variant 2 as transfection-ready DNA
RG216088	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C), transcript variant 1 as transfection-ready DNA
RG216453	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B), transcript variant 2 as transfection-ready DNA
RG216728	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 1 as transfection-ready DNA
RG218030	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A), transcript variant 1 as transfection-ready DNA
RG219254	Ectopic P-granules autophagy protein 5 homolog ( <i>C. elegans</i> ) (EPG5) as transfection-ready DNA
RG219270	ATG16 autophagy related 16-like 2 ( <i>S. cerevisiae</i> ) (ATG16L2) as transfection-ready DNA
RG220325	ATG14 autophagy related 14 homolog ( <i>S. cerevisiae</i> ) (ATG14) as transfection-ready DNA
RG222513	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 2 as transfection-ready DNA
RG222568	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A), transcript variant 1 as transfection-ready DNA
RG224817	ATG9 autophagy related 9 homolog B ( <i>S. cerevisiae</i> ) (ATG9B) as transfection-ready DNA
RG225262	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10), transcript variant 3 as transfection-ready DNA
RG226545	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 3 as transfection-ready DNA
RG226897	ATG13 autophagy related 13 homolog ( <i>S. cerevisiae</i> ) (ATG13), transcript variant 1 as transfection-ready DNA
RG227990	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7), transcript variant 2 as transfection-ready DNA
RG231237	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 3 as transfection-ready DNA
RG231272	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 5 as transfection-ready DNA
RG231296	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1), transcript variant 4 as transfection-ready DNA

### 3`UTR clone (cDNA)

Cat No.	Description
SC202821	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C) transcript variant 8 for miRNA target validation
SC202823	ATG4 autophagy related 4 homolog C ( <i>S. cerevisiae</i> ) (ATG4C) transcript variant 7 for miRNA target validation
SC203259	ATG16 autophagy related 16-like 2 ( <i>S. cerevisiae</i> ) (ATG16L2) for miRNA target validation
SC204173	ATG3 autophagy related 3 homolog ( <i>S. cerevisiae</i> ) (ATG3) for miRNA target validation
SC205161	ATG4 autophagy related 4 homolog D ( <i>S. cerevisiae</i> ) (ATG4D) for miRNA target validation
SC206014	ATG2 autophagy related 2 homolog A ( <i>S. cerevisiae</i> ) (ATG2A) for miRNA target validation
SC208275	Beclin 1 autophagy related (BECN1) for miRNA target validation
SC210388	DNA-damage regulated autophagy modulator 2 (DRAM2) for miRNA target validation
SC211553	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A) transcript variant 2 for miRNA target validation
SC211554	ATG4 autophagy related 4 homolog A ( <i>S. cerevisiae</i> ) (ATG4A) transcript variant 1 for miRNA target validation
SC212128	Autophagy/beclin-1 regulator 1 (AMBRA1) for miRNA target validation
SC212355	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A) transcript variant 2 for miRNA target validation
SC212356	ATG9 autophagy related 9 homolog A ( <i>S. cerevisiae</i> ) (ATG9A) transcript variant 1 for miRNA target validation
SC213988	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1) transcript variant 2 for miRNA target validation
SC213989	ATG16 autophagy related 16-like 1 ( <i>S. cerevisiae</i> ) (ATG16L1) transcript variant 1 for miRNA target validation
SC214032	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10) transcript variant 2 for miRNA target validation
SC214033	ATG10 autophagy related 10 homolog ( <i>S. cerevisiae</i> ) (ATG10) transcript variant 3 for miRNA target validation
SC215574	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B) transcript variant 1 for miRNA target validation
SC215883	ATG4 autophagy related 4 homolog B ( <i>S. cerevisiae</i> ) (ATG4B) transcript variant 2 for miRNA target validation
SC216187	ATG9 autophagy related 9 homolog B ( <i>S. cerevisiae</i> ) (ATG9B) for miRNA target validation
SC217570	ATG5 autophagy related 5 homolog ( <i>S. cerevisiae</i> ) (ATG5) for miRNA target validation
SC218570	DNA-damage regulated autophagy modulator 1 (DRAM1) for miRNA target validation
SC219776	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7) transcript variant 1 for miRNA target validation
SC219777	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7) transcript variant 2 for miRNA target validation
SC219778	ATG7 autophagy related 7 homolog ( <i>S. cerevisiae</i> ) (ATG7) transcript variant 3 for miRNA target validation
SC221045	ATG12 autophagy related 12 homolog ( <i>S. cerevisiae</i> ) (ATG12) for miRNA target validation
SC221873	ATG2 autophagy related 2 homolog B ( <i>S. cerevisiae</i> ) (ATG2B) for miRNA target validation



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