

# Caspase-9 Fluorometric Assay Kit

(Catalog #K118-25, -100, -200, -400; Store kit at -20° C)

## I. Introduction:

Activation of ICE-family proteases/caspases initiates apoptosis in mammalian cells. The **Caspase-9 Fluorometric Assay Kit** provides a simple and convenient means for assaying the activity of caspases that recognize the sequence LEHD. The assay is based on detection of cleavage of substrate LEHD-AFC (AFC: 7-amino-4-trifluoromethyl coumarin). LEHD-AFC emits blue light ( $\lambda_{max} = 400$  nm); upon cleavage of the substrate by caspase-9 or related caspases, free AFC emits a yellow-green fluorescence ( $\lambda_{max} = 505$  nm), which can be quantified using a fluorometer or fluorescence microtiter plate reader. Comparison of the fluorescence of AFC from an apoptotic sample with an uninduced control allows determination of the fold increase in caspase-9 activity.

## II. Kit Contents:

Components	K118-25	K118-100	K118-200	K118-400	Part Number
	25 assays	100 assays	200 assays	400 assays	
Cell Lysis Buffer	25 ml	100 ml	100 ml	100 ml	K118-XX(X)-1
2X Reaction Buffer	2 ml	4 x 2 ml	16 ml	32 ml	K118-XX(X)-2
LEHD-AFC (1 mM)	125 $\mu$ l	0.5 ml	2 x 0.5 ml	2 x 1 ml	K118-XX(X)-3
DTT (1 M)	100 $\mu$ l	0.4 ml	0.4 ml	0.4 ml	K118-XX(X)-4

## III. Caspase-9 Assay Protocol:

### A. General Considerations

- Aliquot enough 2X Reaction Buffer for the number of assays to be performed. Add DTT to the 2X Reaction Buffer immediately before use (10 mM final concentration: add 10  $\mu$ l of 1.0 M DTT stock per 1 ml of 2X Reaction Buffer).
- Protect LEHD-AFC from light.
- We recommend using a flat bottom, opaque, white or black 96-well plate for enhanced sensitivity.

### B. Assay Procedure

1. Induce apoptosis in cells by desired method. Concurrently incubate a control culture *without* induction.
2. Count cells and pellet  $1-5 \times 10^6$  cells or use 50-200  $\mu$ g cell lysates if protein concentration has been measured.
3. Resuspend cells in 50  $\mu$ l of chilled Cell Lysis Buffer. Incubate cells on ice for 10 minutes.
4. Add 50  $\mu$ l of 2X Reaction Buffer (containing 10 mM DTT) to each sample. Add 5  $\mu$ l of the 1 mM LEHD-AFC substrate (50  $\mu$ M final concentration) and incubate at 37° C for 1-2 hour.
5. Read samples in a fluorometer equipped with a 400-nm excitation filter and 505-nm emission filter. For a plate-reading set-up, transfer the samples to a 96-well plate. You may also perform the entire assay directly in a 96-well plate.

Fold-increase in Caspase-9 activity can be determined by comparing these results with the level of the uninduced control.

## V. Related Products:

### Apoptosis Detection Kits & Reagents

- Annexin V Kits & Bulk Reagents
- Caspase Assay Kits & Reagents
- Mitochondrial Apoptosis Kits & Reagents
- Nuclear Apoptosis Kits & Reagents
- Apoptosis Inducers and Apoptosis siRNA Vectors

### Cell Fractionation System

- Mitochondria/Cytosol Fractionation Kit
- Nuclear/Cytosol Fractionation Kit
- Membrane Protein Extraction Kit
- Cytosol/Particulate Rapid Separation Kit
- Mammalian Cell Extraction Kit
- FractionPREP Fractionation System

### Cell Proliferation & Senescence

- Quick Cell Proliferation Assay Kit
- Senescence Detection Kit
- High Throughput Apoptosis/Cell Viability Assay Kits
- LDH-Cytotoxicity Assay Kit
- Bioluminescence Cytotoxicity Assay Kit
- Live/Dead Cell Staining Kit

### Cell Damage & Repair

- HDAC Fluorometric & Colorimetric Assays & Drug Discovery Kits
- HAT Fluorometric & Colorimetric Assays & Drug Discovery Kits
- DNA Damage Quantification Kit
- Glutathione & Nitric Oxide Fluorometric & Colorimetric Assay Kits

### Signal Transduction

- cAMP & cGMP Assay Kits
- Akt & JNK Activity Assay Kits
- Beta-Secretase Activity Assay Kit

### Adipocyte & Lipid Transfer

- Recombinant Adiponectin, Survivin, & Leptin
- CETP & PLTP Activity Assay & Drug Discovery Kits
- Total Cholesterol Quantification Kit

### Molecular Biology & Reporter Assays

- siRNA Expression Vectors
- Cloning Insert Quick Screening Kit
- Mitochondrial & Genomic DNA Isolation Kits
- 5 Minutes DNA Ligation Kit
- 20 Minutes Gel Staining/Destaining Kit
- $\beta$ -Galactosidase Staining Kit & Luciferase Reporter Assay Kit

**FOR RESEARCH USE ONLY! Not to be used on humans.**

## GENERAL TROUBLESHOOTING GUIDE FOR CASPASE COLORIMETRIC AND FLUOROMETRIC KITS:

Problems	Cause	Solution
Assay not working	<ul style="list-style-type: none"> <li>Cells did not lyse completely</li> <li>Experiment was not performed at optimal time after apoptosis induction</li> <li>Plate read at incorrect wavelength</li> <li>Old DTT used</li> </ul>	<ul style="list-style-type: none"> <li>Resuspend the cell pellet in the lysis buffer and incubate as described in the datasheet</li> <li>Perform a time-course induction experiment for apoptosis</li> <li>Check the wavelength listed in the datasheet and the filter settings of the instrument</li> <li>Always use freshly thawed DTT in the cell lysis buffer</li> </ul>
High Background	<ul style="list-style-type: none"> <li>Increased amount of cell lysate used</li> <li>Increased amounts of components added due to incorrect pipetting</li> <li>Incubation of cell samples for extended periods</li> <li>Use of expired kit or improperly stored reagents</li> <li>Contaminated cells</li> </ul>	<ul style="list-style-type: none"> <li>Refer to datasheet and use the suggested cell number to prepare lysates</li> <li>Use calibrated pipettes</li> <li>Refer to datasheet and incubate for exact times</li> <li>Always check the expiry date and store the individual components appropriately</li> <li>Check for bacterial/ yeast/ mycoplasma contamination</li> </ul>
Lower signal levels	<ul style="list-style-type: none"> <li>Cells did not initiate apoptosis</li> <li>Very few cells used for analysis</li> <li>Use of samples stored for a long time</li> <li>Incorrect setting of the equipment used to read samples</li> <li>Allowing the reagents to sit for extended times on ice</li> </ul>	<ul style="list-style-type: none"> <li>Determine the time-point for initiation of apoptosis after induction (time-course experiment)</li> <li>Refer to datasheet for appropriate cell number</li> <li>Use fresh samples or aliquot and store and use within one month for the assay</li> <li>Refer to datasheet and use the recommended filter setting</li> <li>Always thaw and prepare fresh reaction mix before use</li> </ul>
Samples with erratic readings	<ul style="list-style-type: none"> <li>Uneven number of cells seeded in the wells</li> <li>Samples prepared in a different buffer</li> <li>Adherent cells dislodged and lost at the time of experiment</li> <li>Cell/ tissue samples were not completely homogenized</li> <li>Samples used after multiple freeze-thaw cycles</li> <li>Presence of interfering substance in the sample</li> <li>Use of old or inappropriately stored samples</li> </ul>	<ul style="list-style-type: none"> <li>Seed only equal number of healthy cells (correct passage number)</li> <li>Use the cell lysis buffer provided in the kit</li> <li>Perform experiment gently and in duplicates/triplicates; apoptotic cells may become floaters</li> <li>Use Dounce homogenizer (increase the number of strokes); observe efficiency of lysis under microscope</li> <li>Aliquot and freeze samples, if needed to use multiple times</li> <li>Troubleshoot as needed</li> <li>Use fresh samples or store at correct temperatures until use</li> </ul>
Unanticipated results	<ul style="list-style-type: none"> <li>Measured at incorrect wavelength</li> <li>Cell samples contain interfering substances</li> </ul>	<ul style="list-style-type: none"> <li>Check the equipment and the filter setting</li> <li>Troubleshoot if it interferes with the kit (run proper controls)</li> </ul>
General issues	<ul style="list-style-type: none"> <li>Improperly thawed components</li> <li>Incorrect incubation times or temperatures</li> <li>Incorrect volumes used</li> <li>Air bubbles formed in the well/tube</li> <li>Substituting reagents from older kits/ lots</li> <li>Use of a different 96-well plate</li> </ul>	<ul style="list-style-type: none"> <li>Thaw all components completely and mix gently before use</li> <li>Refer to datasheet &amp; verify the correct incubation times and temperatures</li> <li>Use calibrated pipettes and aliquot correctly</li> <li>Pipette gently against the wall of the well/tubes</li> <li>Use fresh components from the same kit</li> <li>Fluorescence: Black plates; Absorbance: Clear plates</li> </ul>

**Note:** The most probable cause is listed under each section. Causes may overlap with other sections.