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Product Information

Caspase 7 human
recombinant, expressed in *E. coli*

Catalog Number **C2979**
Storage Temperature –20 °C

Synonyms: Mch-3, ICE-LAP3, CMH-1

Product Description
Caspase 7 human, recombinant, was produced from the sequences corresponding to amino acids 24-198 and 207-303 of human caspase 7 and expressed in *E. coli*. Purified caspase 7 subunits were mixed and refolded. Characterization by size exclusion chromatography indicates that the enzyme is approx. 56 kDa. By immunoblotting, recombinant active caspase 7 migrates as two major polypeptides (20 kDa and 10 kDa). Two minor polypeptides derived from the large subunit are also present.

Caspase 7 (Mch-3, ICE-LAP3, CMH-1) is a member of the CED-3 subfamily of the caspase family of cysteine proteases that play an essential role in the execution phase of apoptosis. These enzymes share a dominant primary specificity for cleaving bonds following aspartic acid residues. "Initiator" caspases (such as caspase 8) activate "effector" caspases (e.g. caspase 3 and caspase 7). The effector caspases then cleave cellular substrates ultimately leading to the morphological changes of apoptosis.[1-3]

Caspases are synthesized as inactive proenzymes. The precursor proteins contain N-terminal pro-sequences of various lengths followed by the p20 and p10 subunits. Caspases are activated by cleavage at specific Asp residues to produce two subunits of approximately 20 kDa (p20) and 10 kDa (p10), which together form the heterodimeric active protease.[2-5] In some cases, these subunits are separated by a linker that may be involved in regulation of the activation of the caspase. All caspases contain an active-site pentapeptide of general structure QACXG (where X is R, Q or G). The amino acids Cys-285 and His-237 involved in catalysis, and those involved in forming the P1 carboxylate binding pocket (Arg-179, Gln-283, Arg-341 and Ser-347) are conserved in all caspases, except for the substitution of Thr for Ser-347 in caspase-8. This explains the absolute requirement for an Asp in the P1 position. Residues forming the P2–P4 binding pocket are not well conserved. This suggests they may determine the substrate specificities of the caspases. Evidence suggests that not all caspases are required for cell death, and some caspases appear to be more important than others.[2]

Granzyme B, is a serine protease that cleaves after aspartic residues and plays an essential role in cytotoxic T lymphocyte (CTL)-mediated cell killing. It is essential for the rapid induction of DNA fragmentation and apoptosis in target cells.[6] Granzyme B cleaves and activates caspase 3 and has more recently been found to specifically cleave caspase 7 at Asp^{198}-Ser^{199}, activating the cysteine protease.[7] The activation of caspase 7 by granzyme B *in vitro* suggests that, like caspase 3, caspase 7 may play a role in CTL-mediated cell killing.[7] Once activated, caspase 7 is translocated to the mitochondrial and microsomal fractions.[8] This is unlike caspase-3 which appears to be primarily confined to the cytoplasm. In addition, caspase 7 is also cleaved by caspases 3, 9, and 10.[9]

Like caspase 3, caspase 7 preferentially cleaves PARP [poly(ADP-ribose) polymerase, a DNA repair enzyme], and the peptide substrate Ac-DEVD-AMC, but does not cleave AC-YVAD-AMC or pro-IL-1β. A potent inhibitor of both caspase 3 and caspase 7 is the competitive peptide aldehyde inhibitor Ac-DEVD-CHO. In contrast, Ac-YVAD.CHO and CrmA are poor inhibitors of both of these enzymes. Since caspase 3 and caspase 7 are both functionally similar and have similar substrate specificities, cleavage of PARP during apoptosis may reflect the combined action of both enzymes.[10] Other substrates of caspase 7 include sterol regulatory element binding proteins (SREBPs)[11] and the kinesin receptor kinectin.[12]

Caspase 7 is constitutively expressed in many fetal and adult tissues, with the lowest expression in the brain.[13]

Reagent
The product is supplied as a 0.2 µm filtered solution in HEPES, NaCl, DTT and sucrose without carrier protein.

Precautions and Disclaimer
For R&D use only. Not for drug, household, or other uses.

Storage/Stability
Store at −20 °C. Enzyme is stable for 4 hours at 2−8 °C but loses activity at room temperature. Repeated freezing and thawing is not recommended. Storage in frost-free freezers is not recommended.

Product Profile
Purity: ≥ 95% (SDS-PAGE)
Activity: ≥ 1,500 units/mg protein
Unit Definition: One unit will hydrolyze one nmol of Ac-Asp-Glu-Val-Asp-AFC per minute at pH 7.5 at 25 °C.

Related Products
Substrates:

- N-Acetyl-Asp-Glu-Val-Asp 7-amido-4-trifluoromethylcoumarin (Ac-DEVD-AFC), Catalog Number A0466;
- N-Acetyl-Asp-Glu-Val-Asp 7-amido-4-methylcoumarin (Ac-DEVD-AM), Catalog Number A1086;
- N-Acetyl-Asp-Glu-Val-Asp p-nitroanilide (Ac-DEVD-pNA), Catalog Number A2559

Inhibitors:

- N-Acetyl-Asp-Glu-Val-Asp-al (Ac-DEVD-CHO), Catalog Number A0835;
- N-CBZ-Asp(Ome)-Glu(OMe)-Val-Asp(OMe) fluoromethyl ketone (Z-DEVD-FMK), Catalog Number C0605

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