PRODUCT INFORMATION

ApoE3 (human, recombinant)

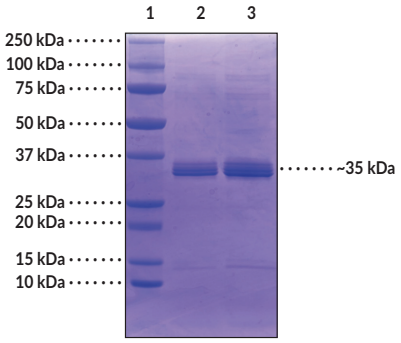
Item No. 37226

Overview and Properties

Synonym:	Apolipoprotein E3
Source:	Active recombinant human C-terminal His-tagged ApoE3 expressed in HEK293 cells
Amino Acids:	19-317
Uniprot No.:	P02649
Molecular Weight:	37.7 kDa
Storage:	-80°C (as supplied)
Stability:	≥6 months
Purity:	≥90% estimated by SDS-PAGE
Supplied in:	50 mM HEPES, pH 7.4, with 150 mM sodium chloride and 10% glycerol
Protein Concentration:	***batch specific*** mg/ml

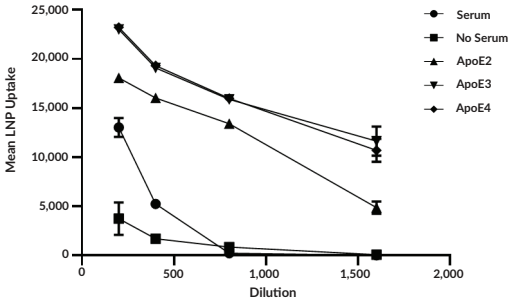
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Images

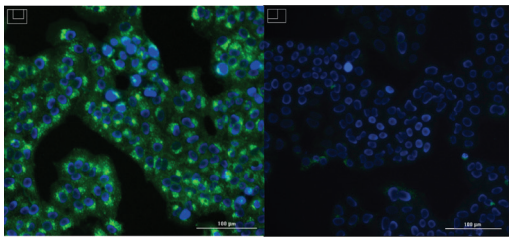


Lane 1: MW Markers
Lane 2: ApoE3 (2 µg)
Lane 3: ApoE3 (4 µg)

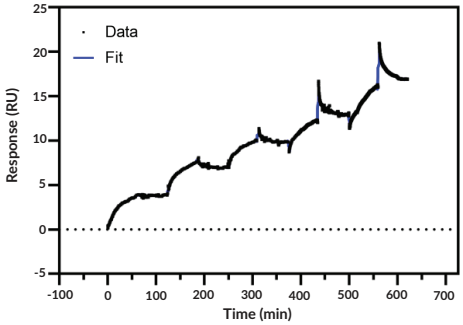
SDS-PAGE Analysis of ApoE3. This protein has a calculated molecular weight of 37.7 kDa.



Fluorescent lipid nanoparticles with SM-102 (LNP-102; Item No. 33474) were diluted in media with 10% serum, no serum, or different ApoE proteins (Item Nos. 37225, 37226, or 37227) at 1 µg/ml. A549 lung epithelial cells were incubated with diluted SM-102 samples, washed, and stained with Hoeschst 33342 dye for nuclei. The cells were imaged on a Cytation V imaging plate reader and analyzed for mean per-cell BODIPY fluorescence, as a measure of LNP uptake.



ApoE3 activity in cell-based assay. ApoE3 (left) increases the uptake of SM-102 (LNP-102; Item No. 33474) compared with no serum (right).



ApoE3 Specifically Binds TREM3. ApoE3 binds TREM3 with nanomolar affinity. TREM2 (Fc-tagged) was captured on a Protein G Chip S series and SPR analysis was used to determine ApoE3 binding affinity on a Biacore™ T200, using single-cycle kinetics with five concentrations of ApoE3.

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Description

ApoE is a member of the superfamily of amphiphilic exchangeable apolipoproteins and a lipid carrier protein with a major role in lipid homeostasis.[1,2] It is expressed in astrocytes, hepatocytes, monocytes, macrophages, and kidney cells and exists as three major polymorphic alleles, ApoE2, ApoE3, and ApoE4, which occur in the United States population with frequencies of approximately 7, 79, and 14%, respectively. ApoE is composed of an N-terminal domain, which contains sequences for binding to members of the LDL receptor family, and a C-terminal domain, containing the major lipid-binding region, linked by an unstructured hinge region, which facilitates domain mobility essential to protein function.[1] Upon lipid binding, ApoE undergoes a conformational change that orients the α-helices of the C-terminal domain perpendicular to the acyl chains of the bound lipids to stabilize the bound lipids and facilitates recognition and binding to LDL receptors by the N-terminal domain. ApoE isoforms vary at amino acids 130 and 176 (112 and 158, respectively, in the mature protein) with ApoE2 containing cysteine at 130 and 176, ApoE3 containing cysteine at 130 and arginine at 176, and ApoE4 containing arginine at 130 and 176. ApoE3 forms homodimers *via* disulfide bond formation. ApoE3 is more efficient than ApoE4, but less efficient than ApoE2, at promoting cholesterol efflux in astrocytes, and *APOE3*-expressing astrocytes accumulate fewer but larger lipid droplets than astrocytes expressing *APOE4*.[3,4] Unlike the increased risk of Alzheimer's disease associated with the ApoE4 variant, ApoE3 is neutral with respect to Alzheimer's disease risk, and ApoE3 with a valine-to-glutamine substitution at position 236 (ApoE3^{V236E}) is associated with a reduced risk for the disease.[5] Cayman's ApoE3 (human, recombinant) protein can be used for cell-based assays.

References

1. Lanfranco, M.F., Ng, C.A., and Rebeck, G.W. ApoE lipidation as a therapeutic target in Alzheimer's disease. *Int. J. Mol. Sci.* **21(17)**, 6336 (2020).
2. Petros, A.M., Korepanova, A., Jakob, C.G., *et al.* Fragment-based discovery of an apolipoprotein E4 (apoE4) stabilizer. *J. Med. Chem.* **62(8)**, 4120-4130 (2019).
3. Michikawa, M., Fan, Q.W., Isobe, I., *et al.* Apolipoprotein E exhibits isoform-specific promotion of lipid efflux from astrocytes and neurons in culture. *J. Neurochem.* **74(3)**, 1008-1016 (2000).
4. Farmer, B.C., Kluemper, J., and Johnson, L.A. Apolipoprotein E4 alters astrocyte fatty acid metabolism and lipid droplet formation. *Cells* **8(2)**, 182 (2019).
5. Medway, C.W., Abdul-Hay, S., Mims, T., *et al.* ApoE variant p.V236E is associated with markedly reduced risk of Alzheimer's disease. *Mol. Neurodegener.* **9**, 11 (2014).

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