

GFP- LC3 Expression Vector

CATALOG NUMBER: CBA-401

STORAGE: -80°C

QUANTITY: Set of 2 vectors

Components

1. pCMV-GFP Control Vector (Part No. 140101): One tube containing 100 µL of bacterial glycerol stock
2. pCMV-GFP-LC3 Expression Vector (Part No. 140102): One tube containing 100 µL of bacterial glycerol stock

Background

Autophagy is a lysosomal degradation pathway for cytoplasmic material, which is activated during stress conditions such as amino acid starvation or viral infection. Mammalian cells use autophagy during short periods of starvation to degrade nonessential cellular components in order to liberate nutrients for vital biosynthetic reactions. Recent results have shown that autophagy also contributes to development, growth regulation and cancer, as well as longevity.

After induction by a stress signal such as amino acid starvation, the first step in autophagy is the formation of an autophagosome. A well published autophagosome marker protein, MAP LC3, was originally identified as a microtubule associated protein and named 'microtubule-associated- protein-light-chain-3'. LC3 is a small 16-18 kDa protein that is soluble in nonstarved cells, but becomes peripherally membrane-associated during amino acid starvation. By immunoelectron microscopy, LC3 has been shown to associate to the inner and outer limiting membranes of autophagosomes, and the membrane association is mediated by a covalent conjugation to a lipid, phosphatidylethanolamine. In Western blots, two forms of LC3 are seen, LC3I and LC3II. LC3I is found in the soluble fraction, and LC3II in the pelletable membrane fraction. Both LC3I and LC3II are seen in nonstarved cells, but during autophagy induction the proportion of LC3II increases. GFP-tagged LC3 expression might be useful as an autophagy assay.

pCMV-GFP-LC3 is a simple mammalian expression vector in which human LC-3B gene is fused in frame with GFP in the expression vector (Figure 1). A GFP vector without LC3 gene is also provided as a control. Both vectors contain kanamycin and neomycin resistance genes as selection markers.

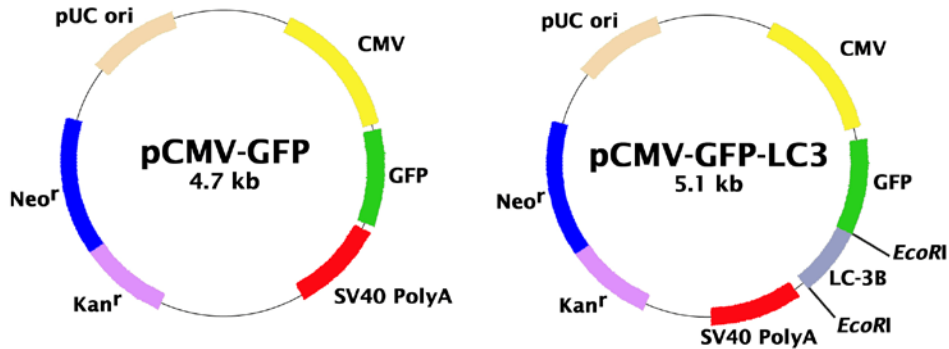


Figure 1. pCMV-GFP control vector and pCMV-GFP-LC3 expression vector maps
Note: Bacterial culture should be done in medium containing 30 µg/mL Kanamycin.

Human LC-3B Sequence in pCMV-GFP-LC3 vector:

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atgccgtcggagaagaccttcaagcagcggccaccttcgaacaaagagtagaagatgtc
M P S E K T F K Q R R T F E Q R V E D V
cgacttattcgagagcagcatccaacccaaaatcccgggtgataatagaacgatacaagggt
R L I R E Q H P T K I P V I I E R Y K G
gagaagcagcttctgttctggataaaaacaaagttccttgtacctgacctgtcaacatg
E K Q L P V L D K T K F L V P D H V N M
agtgagctcatcaagataattagaaggcgttacagctcaatgctaatacaggccttcttc
S E L I K I I R R R L Q L N A N Q A F F
ctgttggatgaacggacacagcagcagcgtctccacaccaatctcagaggtgtatgag
L L V N G H S M V S V S T P I S E V Y E
agtgagaaagatgaagatggattcctgtacatggctctatgcctcccaggagacgttcggg
S E K D E D G F L Y M V Y A S Q E T F G
atgaaattgtcagtgtaa
M K L S V -

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References

1. Kabeya, Y., Mizushima, N., Ueno, T., Yamamoto, A., Kirisako, T., Noda, T., Kominami, E., Ohsumi, Y., and Yoshimori, T. (2000) *EMBO J.* **19**, 5720-5728.
2. Mizushima, N., Yamamoto, A., Matsui, M., Yoshimori, T., and Ohsumi, Y. (2004) *Mol. Biol. Cell* **15**, 1101-1111.

Recent Product Citations

1. Pi, H. et al. (2017). Enhancing lysosomal biogenesis and autophagic flux by activating the transcription factor EB protects against cadmium-induced neurotoxicity. *Sci Rep.* **7**:43466. doi: 10.1038/srep43466.
2. Ock, C.Y. et al. (2016). Genetic ablation or pharmacologic inhibition of autophagy mitigated NSAID-associated gastric damages. *J. Mol. Med.* doi:10.1007/s00109016-1491-3.
3. Li, M. et al. (2016). Melatonin antagonizes cadmium-induced neurotoxicity by activating the transcription factor EB-dependent autophagy-lysosome machinery in mouse neuroblastoma cells. *J Pineal Res.* doi:10.1111/jpi.12353.

4. Yao, F. et al. (2015). Apelin-13 impedes foam cell formation by activating class III PI3K/Beclin-1-mediated autophagic pathway. *Biochem Biophys Res Commun.* doi:10.1016/j.bbrc.2015.09.045.
5. Pi, H. et al. (2015). SIRT3-SOD2-mROS-dependent autophagy in cadmium-induced hepatotoxicity and salvage by melatonin. *Autophagy.* **11**:1037-51.
6. He, Z. et al. (2015). Atorvastatin induces autophagic cell death in prostate cancer cells in vitro. *Mol Med Rep.* doi: 10.3892/mmr.2015.3334.
7. Li, B. H. et al. (2014). TRPV1 activation impedes foam cell formation by inducing autophagy in oxLDL-treated vascular smooth muscle cells. *Cell Death Dis.* **5**:e1182.
8. Meng, X. et al. (2014). Attenuation of A β 25-35-induced parallel autophagic and apoptotic cell death by gypenoside XVII through the estrogen receptor-dependent activation of Nrf2/ARE pathways. *Toxicol Appl Pharmacol.* **279**:63-75.
9. Chen, W. et al. (2012). Andrographolide induces autophagic cell death in human liver cancer cells through cyclophilin d-mediated mitochondrial permeability transition pore. *Carcinogenesis.* 10.1093/carcin/bgs264.
10. Cina, D.P. et al. (2012). Inhibition of MTOR disrupts autophagic flux in podocytes. *J. Am. Soc. Nephrol.* **23**: 412-420.
11. Tu, S.P. et al. (2011). IFN- γ inhibits gastric carcinogenesis by inducing epithelial cell autophagy and T-Cell apoptosis. *Cancer Res.* **71**:4247-4259.

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