

Autophagy Signaling Pathway

Autophagy

Autophagy is a process of bulk protein degradation through an autophagosome-lysosomal pathway. Autophagy can be divided into multiple subtypes: macroautophagy and microautophagy, specific and non-specific autophagy, as well as pexophagy, mitophagy and chaperone-mediated autophagy. Autophagy is important for differentiation, survival during nutrient deprivation and normal growth control. Links to cancer, hypoxia, and neurodegeneration have brought autophagy to the forefront of scientific studies in recent years. It now appears that autophagy's ubiquitous role in cellular maintenance may mean that it plays some role in almost all diseases.

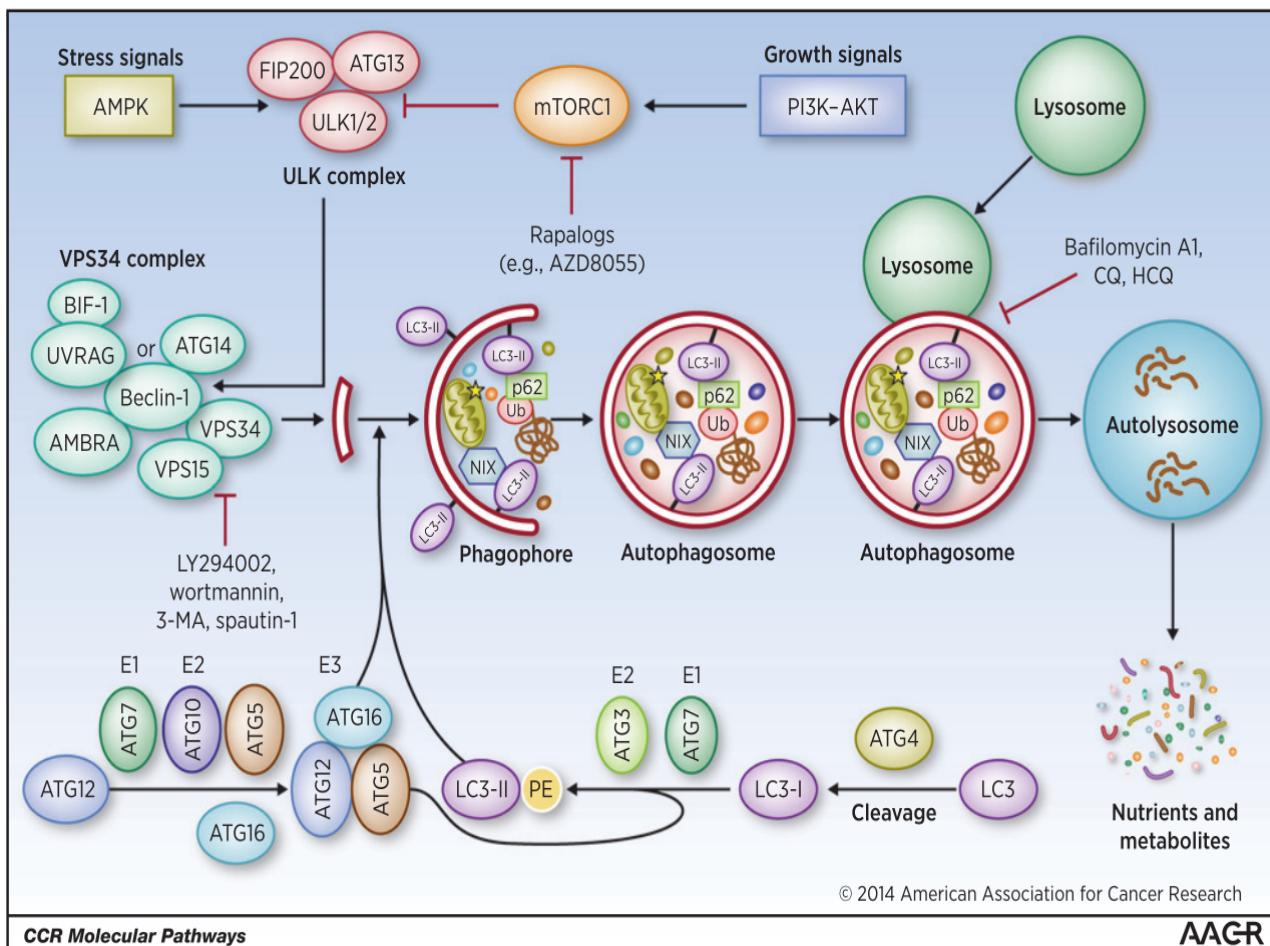


Figure . The autophagic process. (Michelle Cicchini, 2014)

Upon deprivation of nutrients or growth factors, activation of AMPK and/or inhibition of mTOR lead to activation of ULK, which phosphorylates Beclin-1, leading to VPS34 activation and phagophore formation. ULK functions in a complex with FIP200 and ATG13, whereas VPS34 function requires a regulatory subunit, VPS15(p150), and Beclin-1, which further mediates the association of other regulatory factors such as AMBRA, ATG14, UVrag, and BIF1. Multiple ATG proteins such as ATG5 and ATG7 constitute two "ubiquitin-like conjugation systems" that catalyze the formation of phosphatidylethanolamine (PE)-conjugated LC3 (LC3-II) and direct its proper incorporation into the phagophore membrane, where it serves as docking site of adaptor proteins (and bound cargos). The closure of an elongated phagophore marks the formation of a mature autophagosome, which eventually fuses with a lysosome, leading to cargo degradation and recycling of nutrients and metabolites.

Cloud-Clone could provide multiple proteins, antibodies and ELISA kits of Autophagy signaling pathway, which can be used in testing human, mouse, rat, porcine, caprine, etc.. At present, more than 300 citations have been published using Cloud-Clone Autophagy signaling pathway related products.

1.Excellent Citations of Autophagy Signaling Pathway (Excerpts)

Targets	Core No.	Species	Magazine	IF	Pubmed ID	Institute
BECN1	J557	Human	European Respiratory Journal	12.242	29402890	French National Institute of Health and Medicine
CTSD	B280	Human	American Journal of Gastroenterology	10.231	25732418	Department of Molecular Genetics, Faculty of Medicine, Maastricht University
CTSL	A306	Rat	Hypertension	6.823	21357272	Switzerland Actelion Pharmaceuticals Ltd
Bcl2	A778	Rat	Microchimica Acta	5.705	26897372	Department of Pharmacy, School of Medicine and Health Sciences, National Health University of Thailand
HIF1a	A798	Human	Molecular Neurobiology	5.076	30209641	Molecular Identification and Biosensing Center, School of Life Sciences, Shanghai University
ATG5	L221	Human	Frontiers in Cellular Neuroscience	4.3	29326554	State Population and Family Planning Commission of the State Population and Family Planning Commission and Shanghai Institute of Family Planning Science
PKBa	C231	Mouse	Cell and Tissue Research	3.043	25673209	Department of Biomedical Sciences and Morphological and Functional Images, University of Messina
MAP2K1	D559	Human	PLoS One	2.766	27824861	Centre of the School of Women's Science and Medicine, King's University, Saudi Arabia
ERK1	B357	Rat	Graefe's Archive for Clinical and Experimental Ophthalmology	2.249	27538909	Department of Ophthalmology, Beijing Friendship Hospital

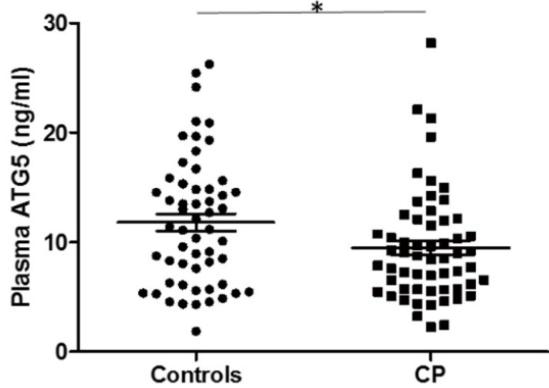


Figure . Plasma **ATG5** concentrations in patients with controls and CP.(Jianhua Xu, 2017)
(Product No.: SEL221Hu Sample type: plasma)

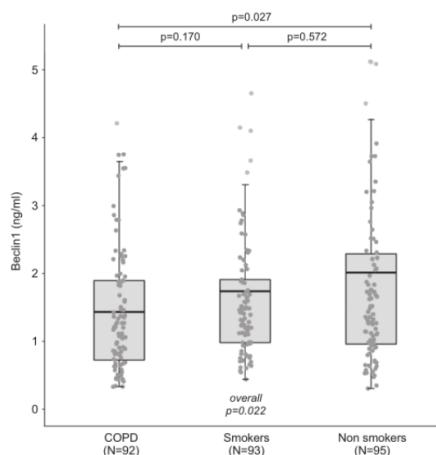


Figure . Beclin1 (**BECN1**) levels according to the study groups. (Frédéric Schlemmer, 2017)
(Product No.: SEJ557Hu Sample type: serum)

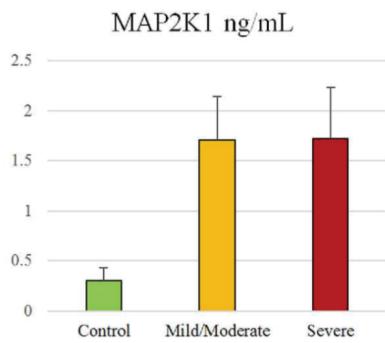


Figure . **MAP2K1** was measured using a Sandwich enzyme immunoassay ELISA kit. (Afaf El-Ansary, 2016)
(Product No.: SED559Hu Sample type: plasma)

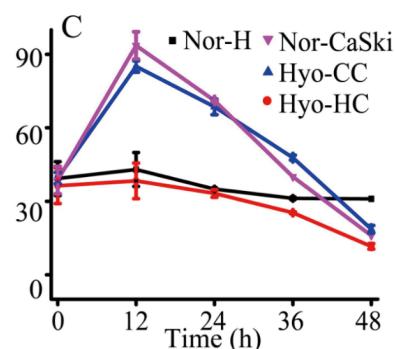


Figure . **HIF-1 α** protein expression from the far chamber. (Xuexia Lin, 2015)
(Product No.: SEA798Hu Sample type: cell line)

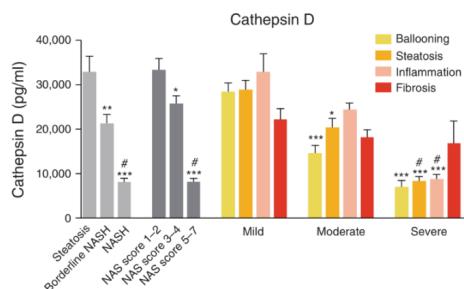


Figure . Cathepsin D(**CTSD**) levels were analyzed in children with NAFLD divided by biopsy-proven steatosis, borderline nonalcoholic steatohepatitis (NASH), and NASH (light-grey bars) or divided upon the NAS score (dark-grey bars). (Sofie M.A. Walenbergh , MSc, 2015)
(Product No.: SEB280Hu Sample type: plasma)

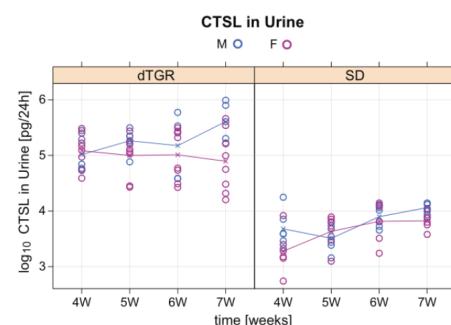


Figure . Measurements of protein levels of **CTSL** from weeks 4 to 7 in urine samples of dTGR males and dTGR females, as well as SD rats. (Yasmina Bauer, 2011)
(Product No.: SEA306Ra Sample type: urine)

2.Citation Statistics of Autophagy Signaling Pathway Related Products (Excerpts)

High Mobility Group Protein 1 (HMGB1)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Dog, Porcine	111

Excerpt:

1. Wang C, Peng G, Huang H, et al. Blocking the feedback loop between neuroendocrine differentiation and macrophages improves the therapeutic effects of enzalutamide (MDV3100) on prostate cancer[J]. Clinical Cancer Research, 2018, 24(3): 708-723. (IF=10.199)
2. Salaroglio I C, Panada E, Moiso E, et al. PERK induces resistance to cell death elicited by endoplasmic reticulum stress and chemotherapy[J]. Molecular cancer, 2017, 16(1): 91. (IF=7.776)
3. Jacobson M E, Bishop-Wang L, Becker K W, et al. Delivery of 5'-triphosphate RNA with endosomolytic nanoparticles potently activates RIG-I to improve cancer immunotherapy[J]. Biomaterials science, 2018. (IF=5.831)
4. Li J, Chen B, Zhong L, et al. AMP-activated protein kinase agonist N-(6-(3-hydroxyphenyl) adenosine protects against fulminant hepatitis by suppressing inflammation and apoptosis[J]. Cell death & disease, 2018, 9(2): 37. (IF=5.638)
5. Dong Y F, Guo R B, Ji J, et al. S1 PR 3 is essential for phosphorylated fingolimod to protect astrocytes against oxygen - glucose deprivation - induced neuroinflammation via inhibiting TLR 2/4 - NF κ B signalling[J]. Journal of cellular and molecular medicine, 2018, 22(6): 3159-3166. (IF=5.593)

Insulin (INS)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Rabbit, Porcine, Dog, Bovine, Chicken	98

Excerpt:

1. Ji Y X, Huang Z, Yang X, et al. The deubiquitinating enzyme cylindromatosis mitigates nonalcoholic steatohepatitis[J]. *Nature medicine*, 2018, 24(2): 213. (IF=32.621)
2. Zhang Y, Hu M, Meng F, et al. Metformin ameliorates uterine defects in a rat model of polycystic ovary syndrome[J]. *EBioMedicine*, 2017, 18: 157-170. (IF=10.293)
3. Xiao N, Lou M D, Lu Y T, et al. Ginsenoside Rg5 attenuates hepatic glucagon response via suppression of succinate-associated HIF-1 α induction in HFD-fed mice[J]. *Diabetologia*, 2017, 60(6): 1084-1093. (IF=6.023)
4. Min W, Wu M, Fang P, et al. Effect of Baicalein on GLUT4 Translocation in Adipocytes of Diet-Induced Obese Mice[J]. *Cellular Physiology and Biochemistry*, 2018, 50(2): 426-436. (IF=5.5)
5. Hou N, Liu Y, Han F, et al. Irisin improves perivascular adipose tissue dysfunction via regulation of the heme oxygenase-1/adiponectin axis in diet-induced obese mice[J]. *Journal of molecular and cellular cardiology*, 2016, 99: 188-196. (IF=5.296)

Hypoxia Inducible Factor 1 Alpha (HIF1a)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Rabbit, Porcine, Dog, Bovine, Chicken	30

Excerpt:

1. Chen H, Sun Y, Li Y, et al. Determination of hypoxia-inducible factor-1 by using a ratiometric colorimetric test based on click-mediated growth of gold nanoparticles[J]. *Microchimica Acta*, 2018, 185(10): 451. (IF=5.705)
2. Lin X, Chen Q, Liu W, et al. Oxygen-induced cell migration and on-line monitoring biomarkers modulation of cervical cancers on a microfluidic system[J]. *Scientific reports*, 2015, 5: 9643.
3. Salva E, Turan S Ö, Eren F, et al. The enhancement of gene silencing efficiency with chitosan-coated liposome formulations of siRNAs targeting HIF-1 α and VEGF[J]. *International journal of pharmaceutics*, 2015, 478(1): 147-154.

B-Cell Leukemia/Lymphoma 2 (Bcl2)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Porcine, Bovine	28

Excerpt:

1. Elwahab A H A, Ramadan B K, Schaal M F, et al. A Novel Role of SIRT1/FGF-21 in Taurine Protection Against Cafeteria Diet-Induced Steatohepatitis in Rats[J]. *Cellular Physiology and Biochemistry*, 2017, 43(2): 644-659. (IF=5.5)
2. Alawdi S H, El-Denshary E S, Safar M M, et al. Neuroprotective effect of nanodiamond in Alzheimer's disease rat model: a pivotal role for modulating NF- κ B and STAT3 signaling[J]. *Molecular neurobiology*, 2017, 54(3): 1906-1918. (IF=5.076)
3. Wu J, Fan C, Ma L, et al. Distinctive expression signatures of serum microRNAs in ischaemic stroke and transient ischaemic attack patients[J]. *Thrombosis and haemostasis*, 2017, 117(05): 992-1001. (IF=4.952)

Beclin 1 (BECN1)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse	7

Excerpt:

1. Schlemmer F, Boyer L, Soumagne T, et al. Beclin1 circulating levels and accelerated ageing markers in COPD[J]. 2017. (IF=12.242)
2. Schlemmer F, Boyer L, Soumagne T, et al. Beclin1 circulating levels and accelerated aging markers in COPD[J]. Cell death & disease, 2018, 9(2): 156. (IF=5.638)
3. Bar-Shai A, Shenhar-Tsarfaty S, Ahimor A, et al. A novel combined score of biomarkers in sputum may be an indicator for lung cancer: A pilot study[J]. Clinica Chimica Acta, 2018, 487: 139-144.

Cathepsin D (CTSD)

Product	Species	Citations
Protein / Antibody / ELISA kit	Human, Rat, Mouse, Bovine	4

Excerpt:

1. Walenbergh S M A, Houben T, Hendrikx T, et al. Plasma cathepsin D levels: a novel tool to predict pediatric hepatic inflammation[J]. The American journal of gastroenterology, 2015, 110(3): 462. (IF=10.231)
2. Walenbergh S M A, Houben T, Rensen S S, et al. Plasma cathepsin D correlates with histological classifications of fatty liver disease in adults and responds to intervention[J]. Scientific reports, 2016, 6: 38278.
3. Huber-Lang M, Denk S, Fulda S, et al. Cathepsin D is released after severe tissue trauma in vivo and is capable of generating C5a in vitro[J]. Molecular immunology, 2012, 50(1-2): 60-65.

3. Cloud-Clone Autophagy Signaling Pathway Related Targets

Cloud-Clone Autophagy Signaling Pathways Related Targets							
Targets	Core No.	Targets	Core No.	Targets	Core No.	Targets	Core No.
AKT1	C231	CTSD	B280	MAPK1	A930	PRKCD	A433
AKT1S1	J651	CTSL	A306	MAPK10	B869	PRKCQ	A494
AKT2	B719	DAPK1	C429	MAPK3	B357	PTEN	F822
AKT3	A382	DAPK2	F164	MAPK8	B156	RAB33B	P141
AMBRA1	M487	DAPK3	F163	MAPK9	D576	RAB7A	K300
ATG10	L223	DDIT4	J281	MLST8	N253	RAB7B	S167
ATG101	L229	DEPTOR	N494	MRAS	K298	RAF1	C232
ATG12	L224	EIF2AK3	E975	MTMR14	F614	RB1CC1	M108
ATG13	R933	EIF2AK4	E974	MTMR3	F613	RHEB	M142
ATG14	N596	EIF2S1	E994	MTMR4	F615	RPS6KB1	L979
ATG16L1	N942	ERN1	C460	MTOR	B806	RPS6KB2	M086
ATG16L2	T670	GABARAP	J078	NRAS	J747	RPTOR	M681
ATG2A	R924	GABARAPL1	G401	NRBF2	H521	RRAGA	M162

ATG2B	S872	GABARPL2	J288	PDPK1	C246	RRAGB	M163
ATG3	N502	HIF1A	A798	PIK3C3	J828	RRAGC	M164
ATG4A	P097	HMGB1	A399	PIK3CA	J830	RRAGD	M165
ATG4B	N522	HRAS	B294	PIK3CB	J829	RRAS	K297
ATG4C	P144	IGBP1	C541	PIK3CD	J832	RRAS2	M166
ATG4D	N523	IGF1R	B659	PIK3R1	J833	RUBCN	M905
ATG5	L221	INS	A448	PIK3R2	J834	SH3GLB1	P689
ATG7	L222	IRS1	C546	PIK3R3	J835	SNAP29	F884
ATG9A	L225	IRS2	D880	PIK3R4	P798	STK11	H115
ATG9B	N916	IRS4	D881	PPP2CA	E029	STX17	F934
BAD	C337	ITPR1	E845	PPP2CB	E030	SUPT20H	N533
BCL2	A778	KRAS	H751	PRAP1	D816	TP53INP2	Q503
BCL2L1	Q166	LAMP1	B441	PRKAA1	A679	TRAF6	G751
BECN1	J557	LAMP2	B464	PRKAA2	D357	TSC1	C813
BNIP3	J545	MAP2K1	D559	PRKACA	M062	TSC2	F852
CAMKK2	L286	MAP2K2	D562	PRKACB	J750	ULK1	K079
CFLAR	L332	MAP3K7	D567	PRKACG	M061	ULK2	L881

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