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Autophagy is a catabolic pathway that relies on a machinery of enzymes and cargo receptors to deliver protein aggregates, lipid droplets, damaged organelles, or pathogens into lysosomes for degradation. Our group is interested in understanding how autophagy can be modulated at the transcriptional and post-translational level to target diseases such as proteinopathies, metabolic dysregulation, or cancer. We have established robust cell-based assays relying on fluorescently-tagged autophagy markers such as LC3 or p62 and have completed genetic screens for pathway modulators that are currently being validated as starting points for drug discovery. Furthermore, we are deploying molecular profiling technologies to screen for novel autophagy substrates such as NCOA4 and are looking into building the next generation of assays using iPS technology and genome editing tools.

Selected Publications

Selective VPS34 inhibitor blocks autophagy and uncovers a role for NCOA4 in ferritin degradation and iron homeostasis in vivo ^[2].

Dowdle WE, Nyfeler B, Nagel J, Elling RA, Liu S, Triantafellow E, Menon S, Wang Z, Honda A, Pardee G, Cantwell J, Luu C, Cornella-Taracido I, Harrington E, Fekkes P, Lei H, Fang Q, Digan ME, Burdick D, Powers AF, Helliwell SB, D'Aquin S, Bastien J, Wang H, Wiederschain D, Kuerth J, Bergman P, Schwalb D, Thomas J, Ugwonalu S, Harbinski F, Tallarico J, Wilson CJ, Myer VE, Porter JA, Bussiere DE, Finan PM, Labow MA, Mao X, Hamann LG, Manning BD, Valdez RA, Nicholson T, Schirle M, Knapp MS, Keaney EP, Murphy LO.
Nat Cell Biol. 2014 Nov;16(11):1069-79.

Quantitative visualization of autophagy induction by mTOR inhibitors [3].

Nyfeler B, Bergman P, Wilson CJ, Murphy LO.

Methods Mol Biol. 2012;821:239-50.

Relieving autophagy and 4EBP1 from rapamycin resistance [4].

Nyfeler B, Bergman P, Triantafellow E, Wilson CJ, Zhu Y, Radetich B, Finan PM, Klionsky DJ, Murphy LO.

Mol Cell Biol. 2011 Jul;31(14):2867-76.

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[2] <http://www.ncbi.nlm.nih.gov/pubmed/25327288>

[3] <http://www.ncbi.nlm.nih.gov/pubmed/22125069>

[4] <http://www.ncbi.nlm.nih.gov/pubmed/21576371>

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