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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 degenerative and inflammatory diseases. We have established robust cell-based assays and have completed genetic screens for pathway modulators that are currently being validated as starting points for drug discovery. Furthermore, we are deploying chemical biology approaches to engage autophagy for targeted protein degradation.

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.

TMEM41B is a novel regulator of autophagy and lipid mobilization [3].

Moretti F, Bergman P, Dodgson S, Marcellin D, Claerr I, Goodwin JM, DeJesus R, Kang Z, Antczak C, Begue D, Bonenfant D, Graff A, Genoud C, Reece-Hoyes JS, Russ C, Yang Z, Hoffman GR, Mueller M, Murphy LO, Xavier RJ, Nyfeler B.
EMBO Rep. 2018 Sep;19(9):e45889.

Functional CRISPR screening identifies the ufmylation pathway as a regulator of SQSTM1/p62

[4].

DeJesus R, Moretti F, McAllister G, Wang Z, Bergman P, Liu S, Frias E, Alford J, Reece-Hoyes JS, Lindeman A, Kelliher J, Russ C, Knehr J, Carbone W, Beibel M, Roma G, Ng A, Tallarico JA, Porter JA, Xavier RJ, Mickanin C, Murphy LO, Hoffman GR, Nyfeler B.
Elife. 2016 Jun 28;5:e17290.

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[3] <https://pubmed.ncbi.nlm.nih.gov/30126924/>

[4] <https://pubmed.ncbi.nlm.nih.gov/27351204/>

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