

Table S1: Target domains identified from selected phages

Partner Domain		Function [Location]	CorM	SLiM ^a	Phage
A	Atg8^b	LC3-interacting region (LIR) mediates binding to Atg8 ubiquitylated proteins [membrane]	STL , AEY VND ESW , SWD DYD EYG , GES , VNA , SVN	EYSTL EYNMV DFSTP DYDMI GESVNA	ADHAEYSTL DFEYNMVND DFSTPESWD VDYDMIGDQ AEYGESVNA
B	PDZ	Autophagy-related [membrane-associated complexes]	EYG , GES , VNA , SVN SVD	VNA QSSVDA	AEYGESVNA GDYQSSVDA
C	WD40 domain of WDR5	Mediate assembly of histone modification complexes [nucleus]	VDV SVD PPT , APE	DYVDV QSSVDA PTAP	DYVDVSIND GDYQSSVDA DFPPTAPED
D	SUMO membrane protein	Sorting and internalization signal	LLN , LNE LLN , LNE	DTIALL ELEHLLN	DDTIALLNE EELEHLLNE
E	nuclear receptors	Expression of specific genes, development, homeostasis, and metabolism	LLN , LNE	ELEHLLN	EELEHLLNE
F	UEV	Nucleus, ESCRT-I complex ^c [cytosol]	DFP , FPP , PPT , APE	PPTAPE	DFPPTAPED
G	SH3	Signal transduction, traffic, cytoskeleton and organelle organization [cytosol]	DFP , FPP , PPT , APE DSF , FVN , VNA	DFPPTAP DSFVNAP	DFPPTAPED DSFVNAPED
H	mu subunit Adaptor Protein AP	Proteins directing traffic within the endosomal and the secretory pathways	DYD VND	DYDMI YNMV	VDYDMIGDQ DFEYNMVND
I	MYND zinc	gene regulation, cancers	LEP , EPG , GQD	PPEP	GPPLEPGQ
J	MATH^d	deubiquitinating protease USP7^e ; substrate recognition, nuclear localization	DSY DDS , DSY	PLDSY PDDSY	GTGPLDSYD VHPDDSYSD
K	BIR^f motif in IAP^e Proteins	involved in regulation of apoptosis	DAD , DPS	DADPS	VPSYDADPS

^a Short Linear Motifs (SLiMs) discovered using the Eukaryotic Linear Motif (ELM) resource (Gouw, et al., 2018)

^b Atg8 - Autophagy-related protein

^c USP7 - ubiquitin specific protease 7

^d MATH - Meprin And TRAF-Homology (MATH) domain

^e IAP - Inhibitor of Apoptosis Proteins

^f BIR - Baculovirus Inhibitor of apoptosis protein Repeat