Table S1. Examples of protein complexes attaching molecular motors to endosomes, relates to Fig. 1

Cargo	Motor	Mechanism	References
EE	Dynein-dynactin (DLIC-1)	Rab4	(Bielli et al., 2001)
EE	Kinesin-2 (KIF3A/B)	Rab4-unkown	(Dey et al., 2017)
EE	Kinesin-3 (KIF16B)	Rab5-VPS34-PI(3)P	(Christoforidis et al., 1999, Hoepfner et al., 2005)
EE	Dynein-dynactin (DLIC1) and kinesin-3 (KIF1C)	Rab5-FHF complex (FHIP1B/Hook1-3/FTS)	(Bielska et al., 2014, Christensen et al., 2021, Guo et al., 2016, Kendrick et al., 2019, Schroeder and Vale, 2016, Yao et al., 2014, Zhang et al., 2014)
SE	kinesin-2 (KIF3B)	Rab11-Rip11/FIP5	(Schonteich et al., 2008)
SE	Kinesin-3 (KIF13A)	Rab10/Rab11/Rab22A-BLOC1/2	(Patel et al., 2021, Shakya et al., 2018, Delevoye et al., 2014, Etoh and Fukuda, 2019)
SE	Dynein-Dynactin (DLC1)	PI(3)P-SNX4-KIBRA	(Skanland et al., 2009, Traer et al., 2007)
SE	Dynein-Dynactin (DLIC1)	Rab11-FIP3	(Horgan et al., 2010)
LE/Lys	Dynein-dynactin ($p150^{glued}$/DLIC1)	Rab7-RILP-ORP1L-Cholesterol	(Johansson et al., 2007, Jordens et al., 2001)
LE/Lys	Kinesin-1 (KIF5B)	Rab7-FYCO1-PI(3)P	(Pankiv et al., 2010, Raiborg et al., 2015)
LE/Lys	Kinesin-1 (KIF5B-KLC)	BORC-Arl8b-SKIP	(Guardia et al., 2016, Pu et al., 2015, Rosa-Ferreira and Munro, 2011)
LE/Lys	Kinesin-3 (KIF1A/B-CC3)	BORC-Arl8b	(Guardia et al., 2016, Pu et al., 2015)
LE/Lys	Dynein-dynactin	Arl8b-RUFY3/4-JIP4	(Keren-Kaplan et al., 2022, Kumar et al., 2022)
Lys	Kinesin-1 Dynein-dynactin	LRRK2-Rab35-Rab10-JIP4	(Bonet-Ponce et al., 2020)
Lys	Dynein-Dynactin	$PI(3,5)P_2$-TRPML1-ALG2	(Li et al., 2016)

Table S2. The influence of MAPs on motor proteins, relates to Fig. 3

	Stimulated	Not affected	Inhibited
MAP2		Kinesin-3 (KIF1) (Gumy et al., 2017)	Kinesin-1 (KIF5B) (Monroy et al., 2020, Gumy et al., 2017, Hagiwara et al., 1994) Kinesin-3 (KIF1A) (Monroy et al., 2020) Dynein-dynactin (Paschal et al., 1989)
Tau		Dynein-dynactin-BICD (Chaudhary et al., 2018, Monroy et al., 2018) Kinesin-2 (KIF3A) (Hoeprich et al., 2014, Chaudhary et al., 2018)	Kinesin-1 (KIF5B) (Monroy et al., 2020, Chaudhary et al., 2018) Kinesin-3 (KIF1A) (Monroy et al., 2018, Monroy et al., 2020)
MAP4	Kinesin-2 (KIF3A) (Semenova et al., 2014)		Kinesin-1 (Tokuraku et al., 2007) Dynein-dynactin (Semenova et al., 2014)
MAP7	Kinesin-1 (KIF5B) (Hooikaas et al., 2019, Monroy et al., 2018, Chaudhary et al., 2019)	Dynein-dynactin-BICD (Monroy et al., 2018) Kinesin-2 (Chaudhary et al., 2019)	Kinesin-3 (KIF1A) (Monroy et al., 2020, Monroy et al., 2018) Dynein-dynactin-BICD (Ferro et al., 2022)
MAP7D1	Kinesin-1 (KIF5B) (Hooikaas et al., 2019, Song et al., 2013)		
MAP7D2	Kinesin-1 (KIF5A/B/C) (Pan et al., 2019)		
MAP7D3	Kinesin-1 (KIF5B) (Hooikaas et al., 2019)		
MAP9	Kinesin-3 (KIF1A) (Monroy et al., 2020)		Kinesin-1 (KIF5B) (Monroy et al., 2020) Dynein-dynactin-BICD (Monroy et al., 2020)

Table S3. The effects of tubulin PTM on motor proteins, relates to Fig. 3

Modification		Affected	Not affected
Acetylation (α-tubulin)	Addition of an acetyl group to K40	Kinesin-1 (KIF5B) (Guardia et al., 2016, Reed et al., 2006, Cai et al., 2009)	Kinesin-2 (KIF17) (Cai et al., 2009) Kinesin-3 (KIF1A) (Cai et al., 2009)
Tyrosination (α-tubulin)	Presence of tyrosine at the C-terminal tail	Kinesin-3 (KIF1A/B) (Guardia et al., 2016) Dynein-dynactin ($p150^{glued}$) (Honnappa et al., 2006, McKenney et al., 2016, Mishima et al., 2007) Kinesin-13 (Sirajuddin et al., 2014)	Kinesin-2 (Sirajuddin et al., 2014)
De-tyrosination (α-tubulin)	Removal of C-terminal tyrosine	Kinesin-1 (KIF5) (Cai et al., 2009, Kaul et al., 2014, Liao and Gundersen, 1998, Mohan et al., 2019, Reed et al., 2006) Kinesin-2 (Sirajuddin et al., 2014) Kinesin-7 (CENP-E) (Barisic et al., 2015)	Kinesin-2 (KIF17) (Cai et al., 2009) Kinesin-3 (KIF1A) (Cai et al., 2009)
Polyglutamylation (α- and β-tubulin)	Addition of multiple glutamate residues at the C-terminal tail	Kinesin-1 (KIF5) (Sirajuddin et al., 2014) Kinesin-2 (KIF3A) (Sirajuddin et al., 2014) Kinesin-3 (KIF1A) (Ikegami et al., 2007, Lessard et al., 2019)	Kinesin-2 (KIF3A) (Ikegami et al., 2007) Kinesin-1 (KIF5) (Ikegami et al., 2007) Kinesin-13 (Sirajuddin et al., 2014) Dynein-dynactin (Sirajuddin et al., 2014)
Polyglycylation (α- and β-tubulin)	Addition of glycine residues at the C-terminal tail	Microtubule stabilization (Bosch Grau et al., 2013, Rogowski et al., 2009)	
Polyamination (β-tubulin)	Addition of an amine group to Q15 of β-tubulin	Microtubule stabilization (Song et al., 2013)	
O-GlcNAcylation (α- and β-tubulin)	Addition of a sugar-chain to α- and β-tubulin	Microtubule dynamics (inhibits microtubule polymerization) (Ji et al., 2011, Walgren et al., 2003)	
Ubiquitination (α-tubulin)	Addition of a ubiquitin moiety	Microtubule stabilization (Mukherjee et al., 2017)	

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