

# Cellular Infection Glossary

## Types of Endosomes

Name	Abbreviation	Function
Early endosome (sorting endosome)	EE	Primary destination for many endocytic cargoes. The cargoes are either recycled back to the plasma membrane or are destined for endosomal maturation leading to degradation.
Intralumenal vesicle	ILV	Internal vesicles derived from invagination of the EE membrane. Incorporates membrane proteins entering the degradative pathway.
Late endosome	LE	Feeds cellular cargo to the lysosome for degradation. Fusion with other late endosomes or lysosomes.
Maturing endosome	ME	Contain Rab-5 and Rab-7 and serve as precursors for LE
Recycling endosome	RE	Slow recycling back to the plasma membrane.

## Cellular Factors

Name	Abbreviation	Function
Adaptor protein 2	AP2	Principal clathrin adaptor type associated with clathrin-mediated endocytosis; Heterotetramer.
Auxilin	Aux	Recruited to an endocytic-coated vesicle immediately after it has pinched off from the plasma membrane. J-domain recruits and activates the uncoating ATPase Hsc70.
c-Casitas B-lineage Lymphoma	c-Cbl	E3 ligase which plays a role in RTK ubiquitination. Recruited to the activated EGFR either directly by a phosphorylated residue or indirectly by a Grb2 adaptor protein.
Clathrin		Forms a lattice-like coat on membranes. Trimer of three heavy chains, each with an associated light chain.
Clathrin-coated pit	CCP	Morphologically distinct region of the plasma membrane thickened on the inner leaflet with clathrin assembly factors. Dynamics of CCP assembly and uncoating are well defined.
Clathrin-coated vesicle	CCV	Primary endocytic vesicle derived from a clathrin coated pit.
Clathrin-mediated endocytosis	CME	Best understood endocytic pathway, which can be divided into six activities: formation of a structural coat, adaptor and accessory protein recruitment, scission, regulation, cytoskeletal activation, and intracellular trafficking.
Dynamin	Dyn	Large multidomain GTPases. Drives the pinching off of CCV at the plasma membrane through a cycle of oligomerization and GTP hydrolysis.
Early Endosome Antigen 1	EEA1	Rab effector, early endosome membrane tethering and fusion <i>in vitro</i> , interacts <i>in vivo</i> with the early endosomal SNAREs.
Endosomal Sorting Complex Required for Transport	ESCRT	Series of multi subunit complexes that function sequentially to recognize monoubiquitin tagged proteins destined for degradation and form and incorporate them into ILVs.
Epidermal growth factor	EGF	Growth factor. Binds to EGFR and initiates kinase activity of the receptor.
Epidermal growth factor receptor	EGFR	Receptor tyrosine kinase. Plays critical roles in physiological and pathological processes in epithelial cells.
Epidermal growth factor receptor ubiquitinated	EGFR-Ub	Ubiquitinated EGFR is recognized in early endosomes by the ESCRT complex components Hrs (and STAM), which drives Ub-EGFR inclusion in ILV and trafficking to the lysosome for degradation.
Epsin, Eps15		BAR domain-containing proteins. Contain an F-BAR domain that preferentially binds to curved membranes. Eps15 is a candidate for coated -vesicle stabilization. Early recruitment of Eps15 and epsin to a clathrin triskelion is essential for stability and further growth.
Heat shock cognate 70 kDa Protein	Hsc70	Clathrin uncoating. Actin-like ATPase domain that can capture hydrophobic peptides to facilitate dissociation of CCVs.

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Heat shock protein family 70	Hsp70	Cytosolic heat-shock cognate protein that mediates clathrin uncoating and release of a free vesicle after recruitment by auxilin.
Hepatocyte growth factor regulated tyrosine-kinase substrate	Hrs	Component of ESCRT-0. Recognizes EGFR-Ub via its UBDs and retain the receptor in the limiting membrane of MVBs, thus preventing its recycling.
Homotypic fusion and protein-sorting/class C vacuole protein-sorting	HOPS/VPS complex	Multi subunit conserved complex. Displays GEF activity toward the yeast Rab7 ortholog, Ypt7p.
Phosphatidylinositol 4,5-bis-phosphate	PtdIns(4,5)P <sub>2</sub>	Polyphosphatidyl inositol polyphosphates. PtdIns(4,5)P <sub>2</sub> is the principal species of PIPs in the plasma membrane. Recognized by the AP2 $\alpha$ -chain.
Phosphatidylinositol-3-kinase Vps34/Vps15 complex	PI3K Vps34/Vps15 complex	Vps34 catalyzes the phosphorylation of phosphatidylinositol to yield PIP3.
Phosphatidylinositol-3-phosphate	PI3P	Polyphosphatidyl inositol polyphosphates. Highly enriched on early endosomes, late endosomes, and in the internal vesicles of MVBs and serves as a recognition motif for binding of FYVE-domain proteins.
Ras-related protein in brain 11	Rab11	Functions on the early endocytic pathway, mediates endosomal recycling.
Ras-related protein in brain 4	Rab4	Functions on the early endocytic pathway, targeting to the plasma membrane.
Ras-related protein in brain 5	Rab5	Functions on the early endocytic pathway and in the homotypic fusion between early endosomes. Spatially and temporally stimulate PI3K Vps34/Vps15 complex enzymatic activity following GTPase activation, thus leading to the localized synthesis of PI3P.
Ras-related protein in brain 7	Rab7	Functions on the late endocytic pathway. Targeting to LEs.
Ras-related protein in brain 9	Rab9	Functions on the late endocytic pathway.
Transferrin	Tf	Metal-binding glycoproteins that mediates binding and transportation of non-heme iron.
Transferrin receptor	TfnR	Receptor for Tf. Internalized by clathrin-mediated endocytosis.
Vacuolar adenosine triphosphatase	v-ATPase	Due to v-ATPase activity, the intraluminal pH drops across the endosomal system.

### Viral Factors

Name	Abbreviation	Function
IAV Hemagglutinin	HA	Viral receptor protein. Mediates viral entry by binding to sialic acid residues in cell surface glycoconjugates. Mediates the fusion of the viral envelope with the endosome membrane upon exposure to low pH.
IAV Matrix protein 2	M2	Component of IAV membrane. Acid-activated channel for protons that is a minor membrane component.
IAV Viral ribonucleoproteins	vRNP	Contain nucleoprotein and a RNA polymerase complex of the IAV.
Influenza A virus	IAV	Enveloped negative-stranded RNA virus of the myxovirus family that uses cellular endocytic entry pathway to gain access to the nucleus for replication.
Semliki forest virus	SFV	Simple enveloped positive-stranded RNA toga(alpha)virus, with a diameter of about 70nm. Binds to the surface of cells via an unknown receptor/s and
SFV Envelope 1	E1 protein	Viral envelope glycoprotein, hydrophobic fusion loop. Responsible for membrane fusion.
SFV Envelope 2	E2 protein	Viral envelope glycoprotein. Responsible for receptor binding and protects the fusion loop at neutral pH.