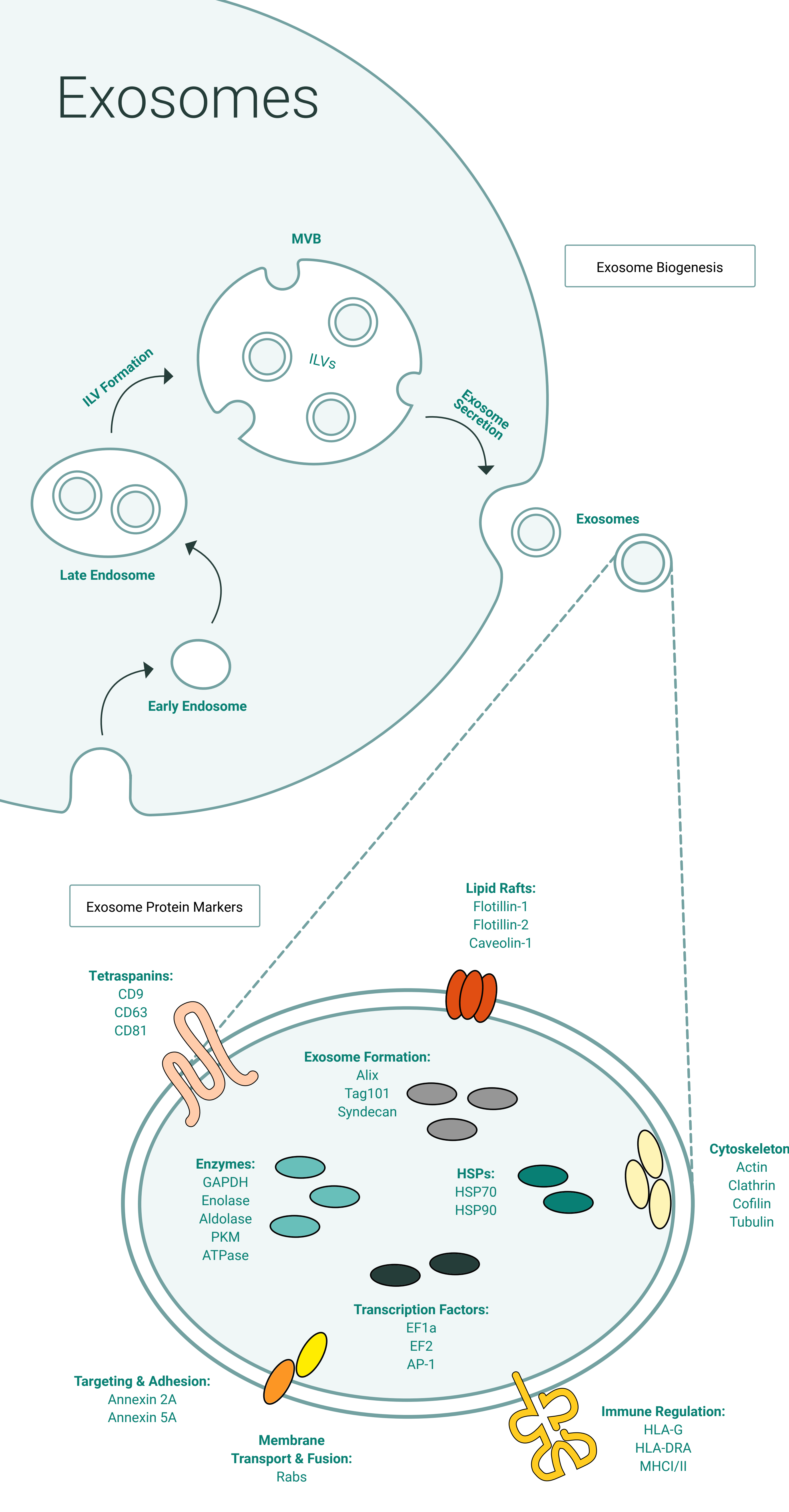


# Exosomes



Exosomes are small (50-120nm) endosome derived extracellular microvesicles (EMV) that play a crucial role in intercellular communication by transporting various biomolecules, such as proteins, lipids, and nucleic acids, between cells.

Exosome Biogenesis begins with the invagination of early endosomes. These mature into late endosomes and then further into multivesicular bodies (MVBs). MVB formation involves the inward budding of the endosomal membrane, leading to the sequestration of cytoplasmic components into intraluminal vesicles (ILVs). ILVs are released through exocytosis into the extracellular space, which earned exosomes their name.

Exosomes can contain a wide variety of exosome protein markers depending on their host cell and the cell's state (e.g. stress, activation, or inhibition of specific signaling pathways). Tetraspanins like CD9, CD63 and CD81 are the most common canonical exosome marker proteins. Surface localization of tetraspanins makes them particularly well suited for immunolabeling and purification of exosomes from biological samples. Components of the endosomal sorting complex required for transport (ESCRT) like TSG101 and Alix, cytoskeletal proteins, integrins and annexins are also enriched on exosomes. These molecules play a pivotal role in exosome targeting and cell adhesion.

Because exosomes are secreted from nearly every cell type, their composition mirrors their host diversity, and depends heavily upon the type of cell from which they originate. Their molecular composition also reflects physiological or pathophysiological changes in their cell or tissue of origin. This makes exosomes excellent biomarkers for liquid biopsies to diagnose and track disease progression. For cancer diagnostics, exosomes have significant advantages over circulating tumor cells (CTCs) or circulating tumor DNA (ctDNA) because of their abundance, stability, and the wide variety of contained marker molecules.

Protein	Gene	Gene ID	Uniprot	ExoCarta Top 100	Tetraspanin	Exosome Formation	Lipid Raft	Targeting/Adhesion	Cytoskeleton	Membrane Transport/Fusion	Enzyme	Immune Regulation/Inflammation	Antigen Presentation	Apoptosis	Regulator	Cancer	Viral Infection	Neurological Disease
14-3-3 protein epsilon	YWHAE	7531	P62258	#22														
14-3-3 protein eta	YWHAH	7533	Q04917	#94														
14-3-3 protein theta	YWHAQ	10971	P27348	#56														
14-3-3 protein gamma	YWHAG	7532	P61981	#54														
14-3-3 protein beta/alpha	YWHAB	7529	P31946	#50														
14-3-3 protein zeta/delta	YWHAZ	7534	P63104	#15														
78 kDa glucose-regulated protein	HSPA5	3309	P11021	#35														
Actin, cytoplasmic 1	ACTB	60	P60709	#5														
ADAM10	ADAM10	102	O14672	-														
Alix	PDCDC6P	10015	Q8WUM4	#3														
Alpha-Enolase	ENO1	2023	P06733	#9														
Alpha-Synuclein	SNCA	6622	P37840	-														
Aminopeptidase N	ANPEP	290	P15144	-														
Beta-amyloid 42	APP	351	P05067	-														
Annexin A1	ANXA1	301	P04083	#53														
Annexin A2	ANXA2	302	P07355	#6														
Annexin A4	ANXA4	307	P09525	#72														
Annexin A5	ANXA5	308	P08758	#20														
Annexin A6	ANXA6	309	P08133	#67														
Annexin A11	ANXA11	311	P50995	#68														
AP-1	JUN	3725	P05412	-														
ATP citrate lyase	ACLY	47	P53396	#73														
ATPase	ATP1A1	476	P05023	#39														
Basigin	BSG	682	P35613	-														
Caveolin-1	CAV1	857	Q03135	-														
CD9	CD9	928	P21926	#1														
CD11a	ITGAL	3683	P20701	-														
CD11b	ITGAX	3687	P11215	-														
CD11c	ITGAM	3684	P20702	-														
CD29	ITGB1	3688	P05556	#34														
CD37	CD37	951	P11049	-														
CD44	CD44	960	P16070	-														
CD49f	ITGA6	3655	P23229	#89														
CD53	CD53	963	P19397	-														
CD63	CD63	967	P08962	#7														
CD81	CD81	975	P60033	#24														
CD82	CD82	3732	P27701	-														
CD142	TF	2152	P13726	-														
CD146	MCAM	4162	P43121	-														
CD163	CD163	9332	Q86V87	-														
Clathrin heavy chain 1	CLTC	1213	Q00610	#23														
Claudin-1	CLDN1	9076	O95832	-														
Cofilin-1	CFL1	1072	P23528	#25														
EBV LMP1	-	-	-	-														
EBV LMP2A	-	-	-	-														
EF-1-alpha-1	EEF1A1	1915	P68104	#14														
EF2	EEF2	1938	P13639	#17														
EGFR	EGFR	1956	P00533	-														
Ep-CAM	EPCAM	4072	P16422	-														
Fatty acid synthase	FASN	2194	P49327	#21														
Fibronectin	FN1	2335	P02751	#93														
Flotillin-1	FLOT1	10211	O75955	#41														
Flotillin-2	FLOT2	2319	Q14254	-														
Fructose-bisphosphate aldolase A	ALDOA	226	P04075	#18														
Gelsolin	GSN	2934	P06396	#92														
Glyceraldehyde-3-phosphate dehydrogenase	GAPDH	2597	P04406	#4														
HCV core protein	-	-	-	-														
Heat shock 70 kDa protein 1A	HSPA1A	3303	P0DMV8	#51														
Heat shock protein HSP 90-alpha	HSP90AA1	3320	P07900	#10														
Heat shock protein HSP 90-beta	HSP90AB1	3326	P08238	#19														
Heparanase	HPSE	10855	Q9Y251	-														
HIV Gag	-	-	-	-														
HIV Nef	-	-	-	-														
HLA-DRA	HLA-DRA	3122	P01903	-														
HLA-G	HLA-G	3135	P17693	-														
Hsc70	HSPA8	3312	P11142	#2														
HSV gB	-	-	-	-														
HTLV-1 Tax	Tax	-	-	-														
Huntingtin	HTT	3064	P42858	-														
ICAM-1	ICAM1	3383	P05362	-														
leucine-rich receptor kinase 2	LRRK2	120892	Q55007	-														
L-lactate dehydrogenase A chain	LDHA	3939	P00338	#13														
Lysosome-associated membrane glycoprotein 1	LAMP1	3916	P11279	-														
Lysosome-associated membrane glycoprotein 2	LAMP2	3920	P13473	#89														
MHCI	-	-	-	-														
MHCI	-	-	-	-														
MUC1	MUC1	4582	P15941	-														
N-cadherin	CDH2	1000	P19022	-														
Phosphoglycerate kinase 1	PGK1	5230	P00558	#16														
Alkaline Phosphatase, placental	ALPP	250	P05187	-														
prion proteins	-	-	-	-														
prostate-specific antigen	KLK3	354	P07288	-														
Pyruvate kinase PKM	PKM	5315	P14618	#12														
Rab-14	RAB14	51552	P61106	#75														
Rab-5a	RAB5A	5868	P20339	#80														
Rab-5b	RAB5B	5869	P61020	#86														
Rab-5c	RAB5C	5878	P51148	#64														
Rab-7	RAB7A	7879	P51149	#61														
Rap 1B	RAP1B	5908	P61224	#33														
Superoxide dismutase	SOD1	6647	P00441	-														
TARDBP	TDP-43	23435	Q13148	-														
Triosephosphate isomerase	TPI1	7167	P60174	#27														
Tubulin alpha-1C chain	TUBA1C	84790	Q9BQE3	-														
Tubulin alpha-4A chain	TUBA4A	7277	P68366	-														
Tubulin beta-2B chain	TUBB2B	347733	Q9BVA1	-														
Tubulin beta-4B chain	TUBB4B	10383	P68371	-														
Syndecan-1	SDC1	6382	P18827	-														
Syndecan-4	SDC4	6385	P31431	-														
Syntenin-1	SDCBP	6386	O00560	#8														
Tumor-Associated Glycoprotein	TAG-72	-	-	-														
Tetraspanin-8	Tspan8	7103	P19075	-														
Tsg101	TSG101	7251	Q99816	#11														
vacuolar-sorting protein 35	VPS35	55737	Q96QK1	-														
Transitional endoplasmic reticulum ATPase	VCP	7415	P55072	#26														

**antibodies-online Inc.**  
 PO Box 5201  
 Limerick, PA 19468  
 USA

**Website** www.antibodies-online.com  
**Email** support@antibodies-online.com  
**Phone** +1 877 302 8632  
**Fax** +1 888 205 9894 (Toll-free)

**antibodies-online GmbH**  
 Schloss-Rahe-Str. 15  
 52072 Aachen  
 Deutschland

**Website** www.antikoerper-online.de  
**Email** info@antikoerper-online.de  
**Phone** +49 (0)241 95 163 153  
**Fax** +49 (0)241 95 163 155