

Cite this as: Huayuan XIANG, Chenxuan BAO, Qiaoqiao CHEN, Qing GAO, Nan WANG, Qianqian GAO, Lingxiang MAO. Extracellular vesicles (EVs)' journey in recipient cells: from recognition to cargo release[J]. Journal of Zhejiang University Science B, 2024, 25(8): 633-655.

<http://doi.org/10.1631/jzus.B2300566>

Extracellular vesicles (EVs)' journey in recipient cells: from recognition to cargo release

Key words: extracellular vesicles (EVs); exosomes; endocytosis; uptake; release

Research Summary

This review summarizes the current understanding of the molecular mechanisms of EVs' biological journey in recipient cells, from recognition to uptake and cargo release.

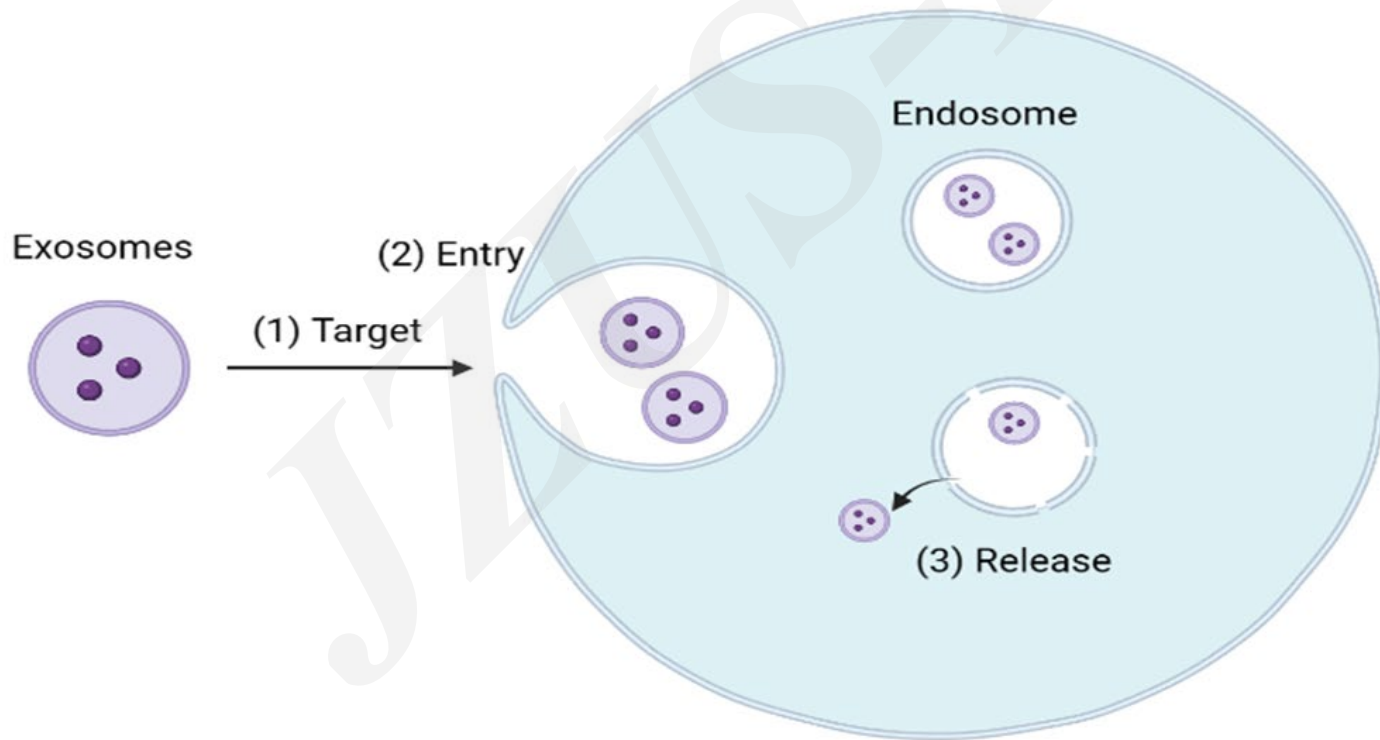


Figure 1

Innovation points

- **Introduction** of the entire process of EVs from recognition, uptake to cargo release.
- **Summary** of current research on the shortcomings of EV recognition and uptake mechanisms.
- **Emphasis** of the value of EVs as delivery vehicles and the focus of future research directions.

Innovation points

We created a table summarizing the components that have been shown to be involved in the recognition and uptake of EVs.

Table 1 | Components involved in the identification and uptake of EVs.

Table 1. Components involved in the identification and uptake of EVs.⁴²

EVs or exosomes surface recognition molecules ⁴²		Donor cells ⁴²	Recipient cells ⁴²	target molecules on Recipient cells surface ⁴²	Function ⁴²	Action mechanism ⁴²	Potential application ⁴²	Ref. ⁴²
Molecular type ⁴²	Specific molecule ⁴²							
Tetraspanins ⁴²	CD9 ⁴²	Melanoma cells (FEMX-I, A375 and C8161 cells) and mesenchymal stromal cells ⁴²	Melanoma cells (FEMX-I cells) ⁴²	unknown ⁴²	Participates in the uptake of EVs by recipient cells. ⁴²	unknown ⁴²	Divalent CD9 Ab could cross-link CD9 proteins associated with host cells and EVs to stimulate the endocytosis on EVs which may favor tissue/organ repair. ⁴²	(Santos et al., 2019) ⁴²
		Colorectal carcinoma cell (Colo-320 cells) ⁴²	Colorectal carcinoma cell (Colo-320 cells) ⁴²	unknown ⁴²	Resulting in reduced adhesion and uptake of exosomes by recipient cells. ⁴²	By inhibiting the interaction between the ligand ADAM17 on exosomes and the receptor integrin $\alpha 5\beta 1$ on cells ⁴²	CD9 may be a <u>promising therapeutic targets</u> to inhibit peritoneal carcinogenesis in colorectal cancer. ⁴²	(Cardenes et al., 2021) ⁴²
	CD81 ⁴²	Human cervical cancer cells (Hela cells) ⁴²	Liver carcinoma cells (Huh-7 cells) and gastric carcinoma cells (NCI-N87 cells) ⁴²	Laminin ⁴²	Promotes the binding and uptake of EVs by recipient cells. ⁴²	CD81 interacts with laminin. ⁴²	Taking advantage of the feature that Laminin binding CD81 enhances cellular uptake of EVs, recombinant expression of CD81 on the surface of EVs enables EV-mediated specific delivery to various cells and tissues. ⁴²	(Vogt et al., 2021) ⁴²
	TSPAN8 / CD151 ⁴²	Human breast cancer cells (T-47D cells) ⁴²	Human breast cancer cells (T-47D cells) and human fetal lung fibroblasts (MRC-5 cells) ⁴²	unknown ⁴²	Promotes sEV attachment to recipient cells and uptake in vivo. ⁴²	Increasing the attachment efficiency and reducing the evasion frequency ⁴²	TSPAN8-sEV promotes cancer cell motility and invasion and may serve as an important direct or indirect therapeutic target. ⁴²	(Wang et al., 2021a) ⁴²