Exosomes derived from ischemic cerebral endothelial cells and neural stem cells enhance the coupling of neurogenesis and angiogenesis by transfer of microRNAs

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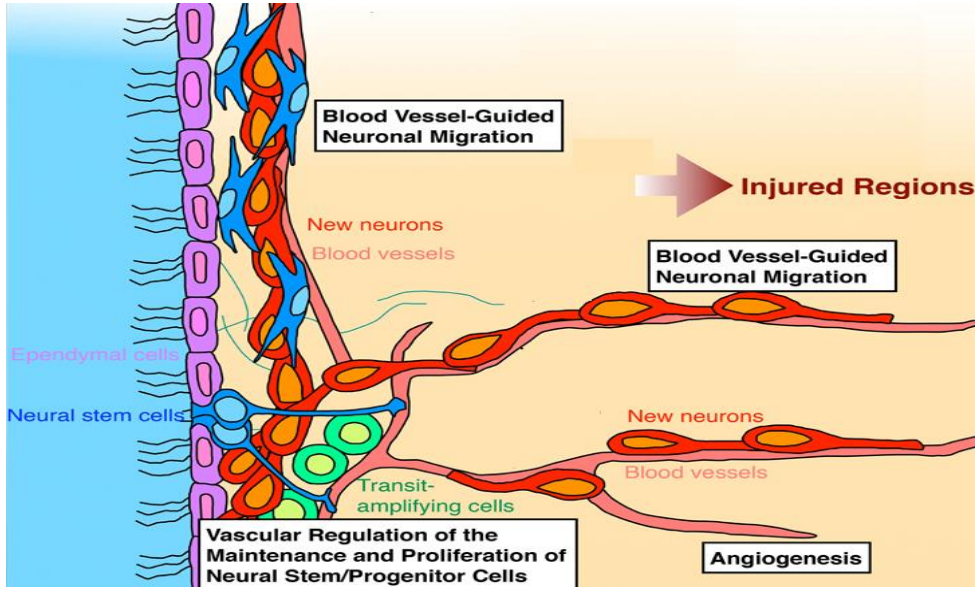
Disclosure

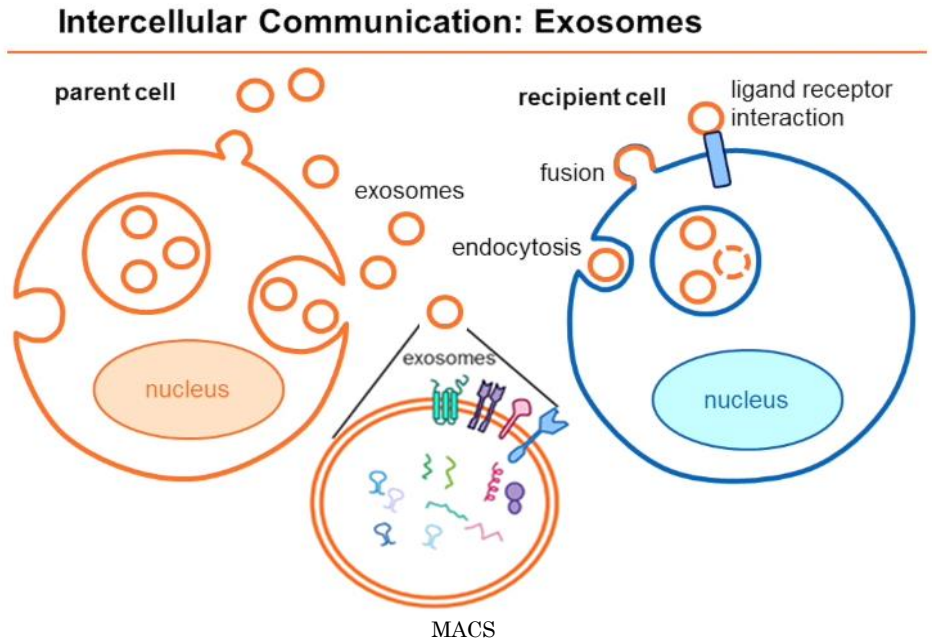
- None

Introduction

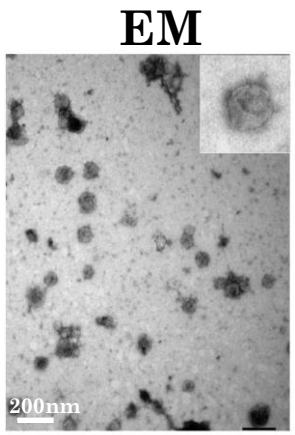
- Stroke induces angiogenesis and neurogenesis.
- Exosomes mediate the coupling of angiogenesis and neurogenesis after stroke.

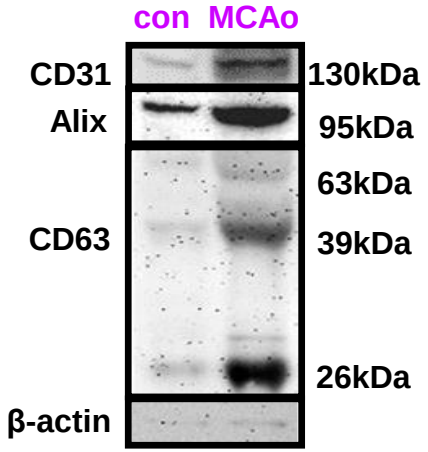


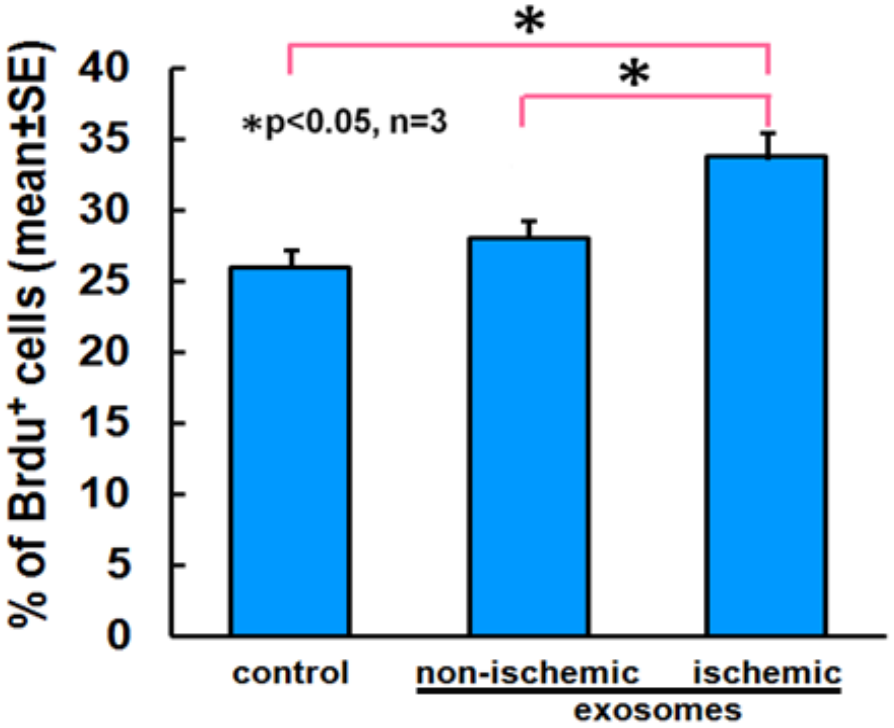
Sawada M, et al. Front Neurosci. 2014 ; 17;8:53.

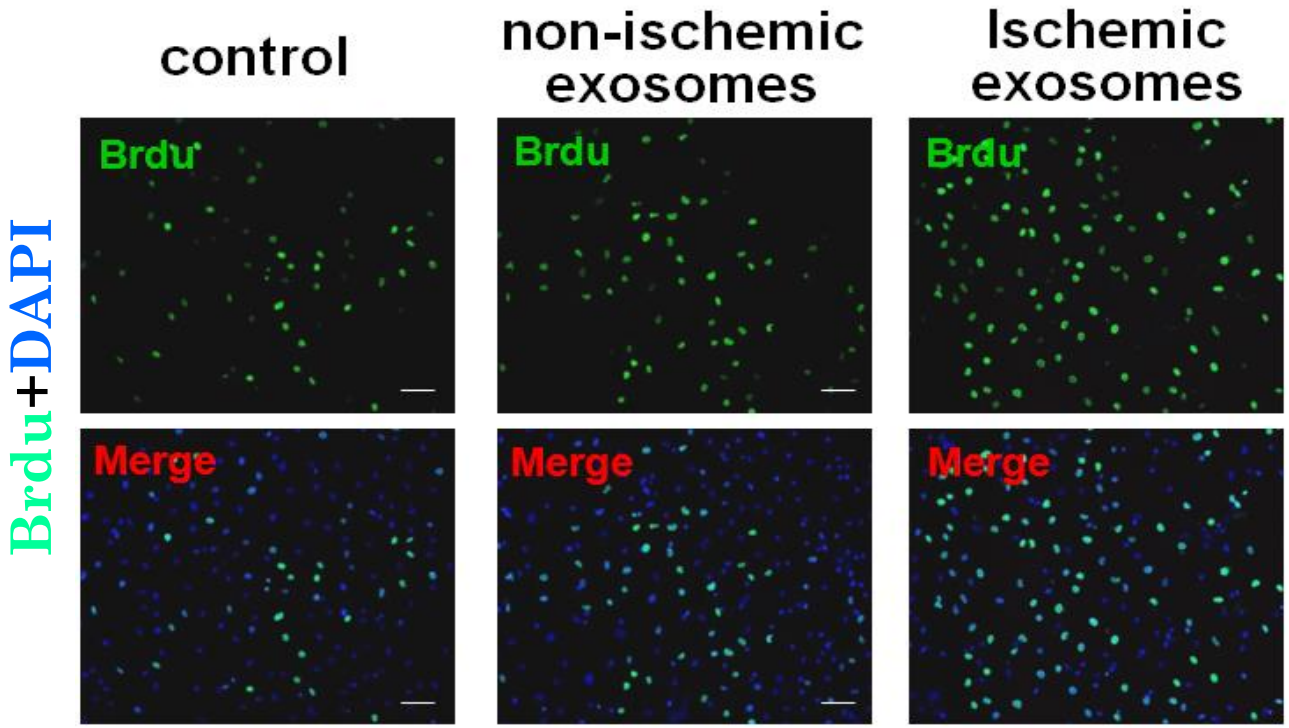


Ischemic cerebral endothelial cell (CEC)-exosomes enhance neural progenitor cell (NPC) proliferation

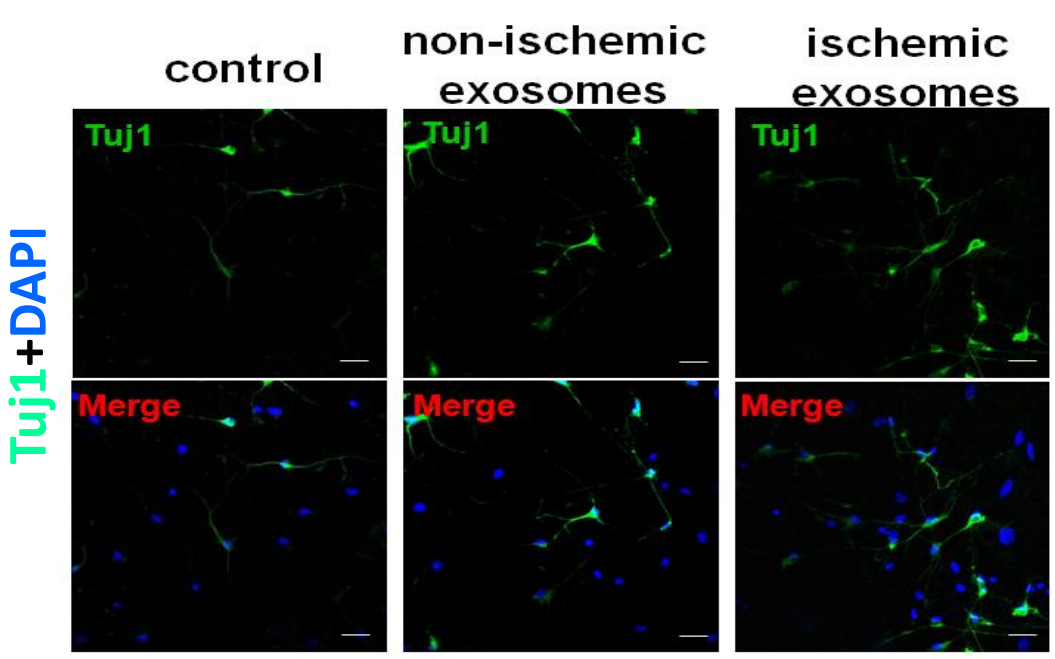


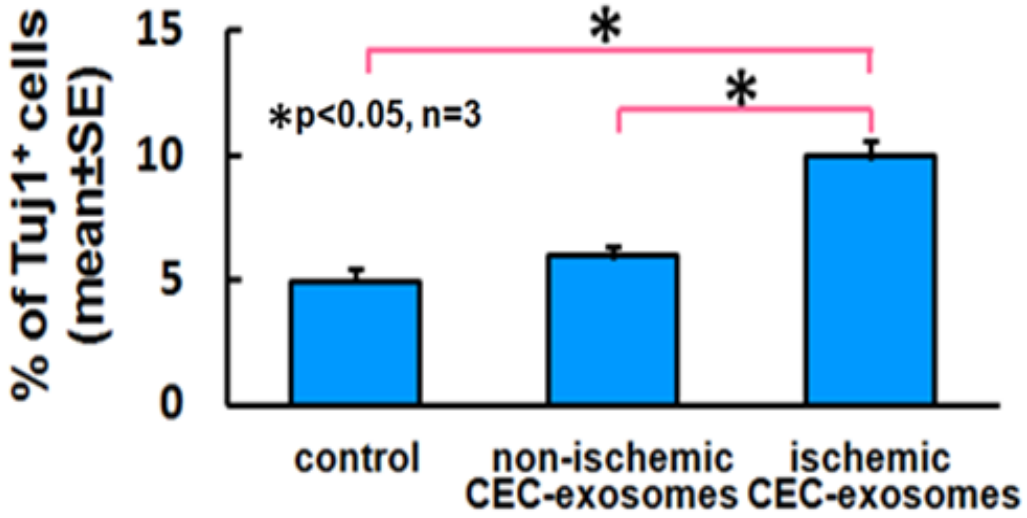


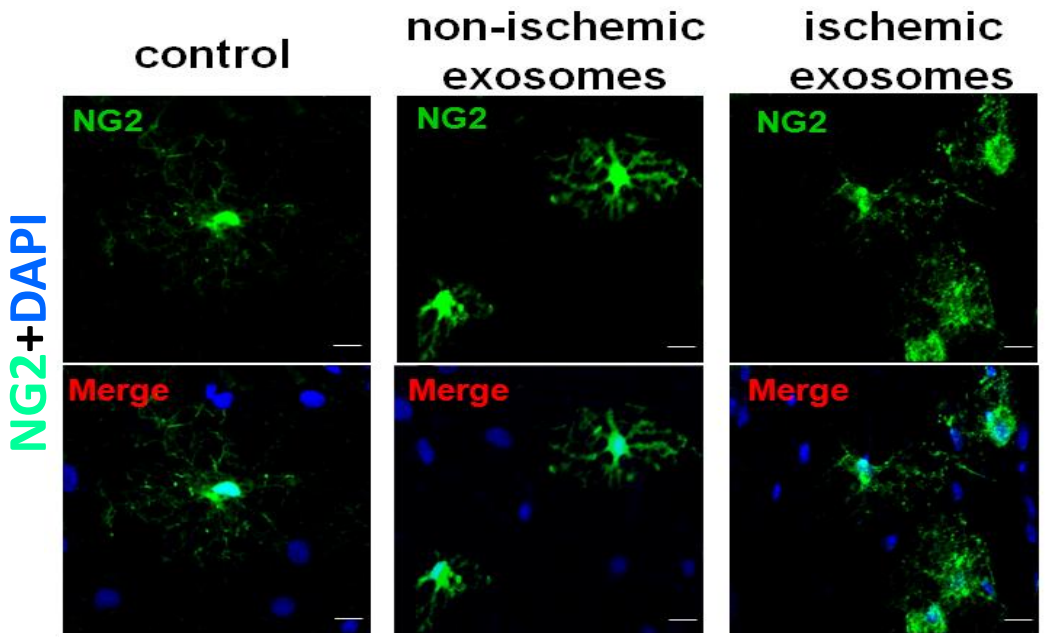


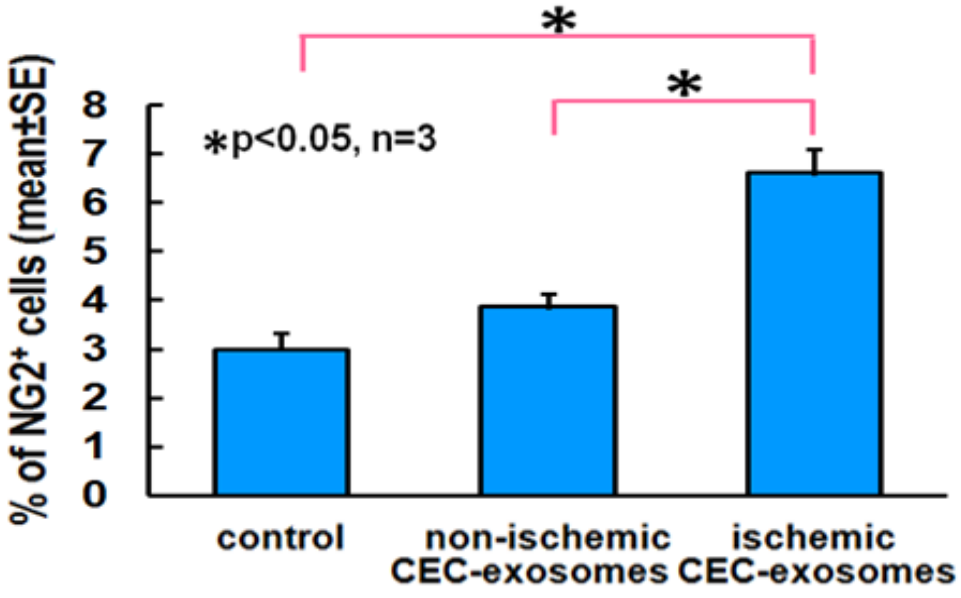


Ischemic CEC-exosomes enhance neuronal and oligodendrocyte differentiation of NPCs



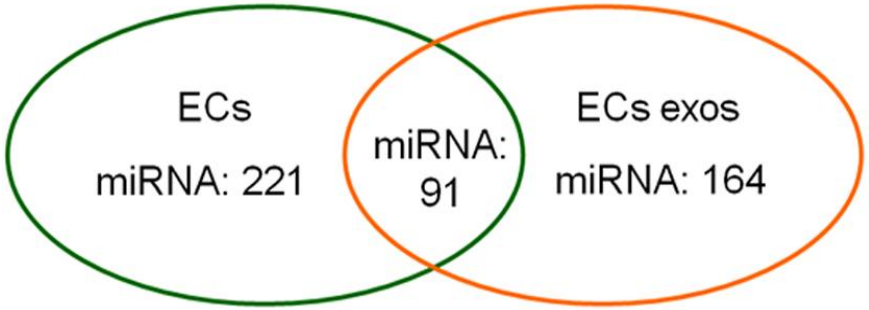


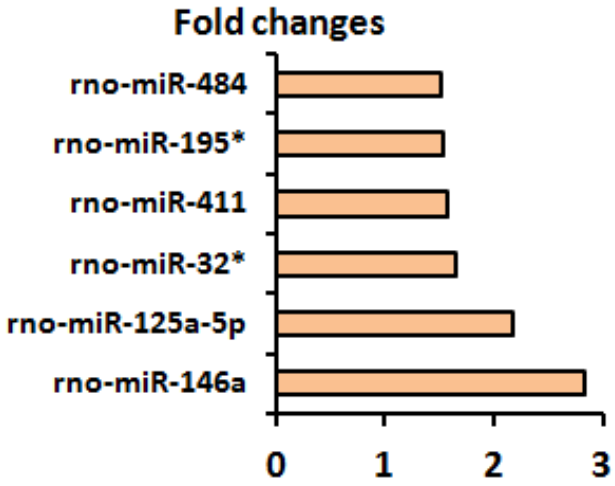


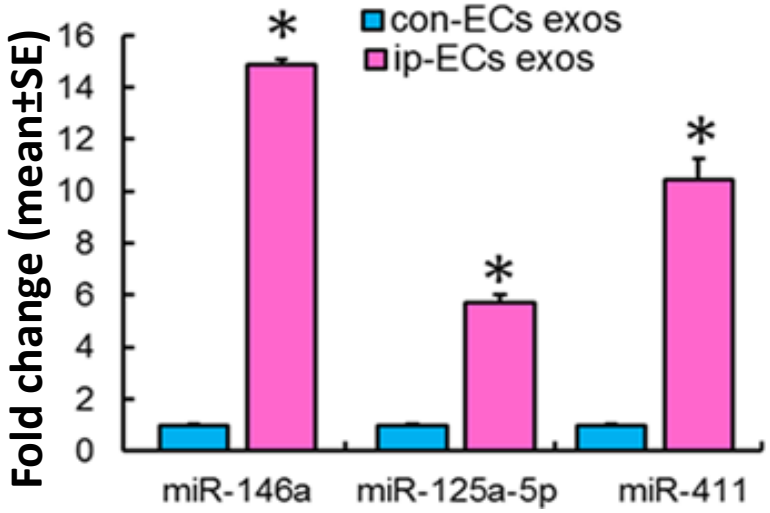


miRNAs within CEC-exosomes are transported to NPCs

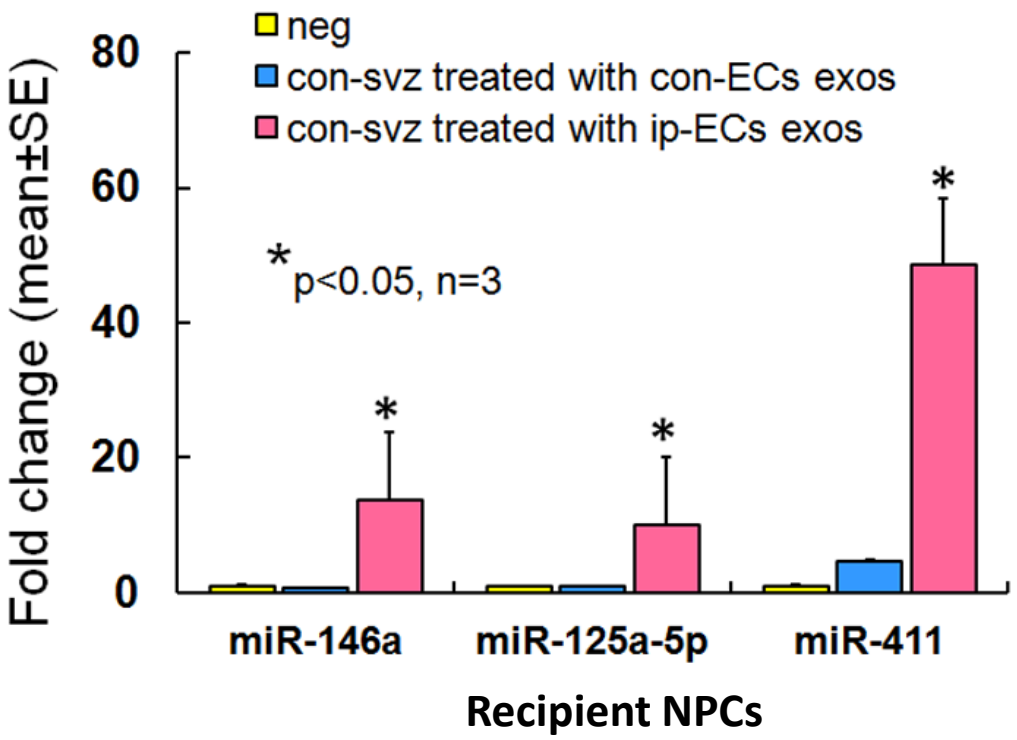
miRs in CEC-exosomes



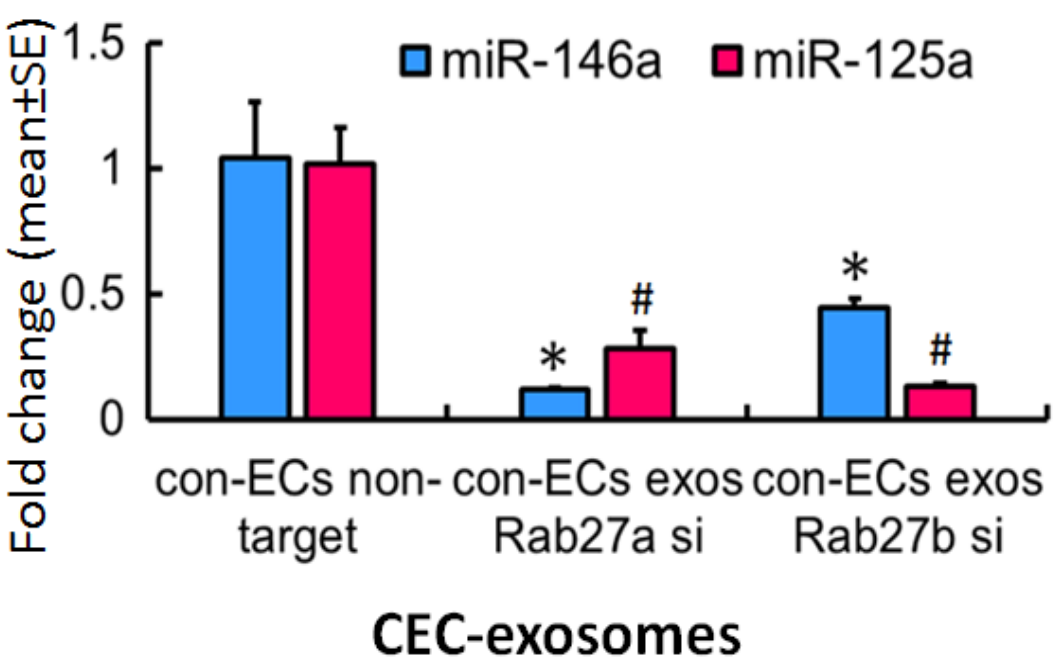




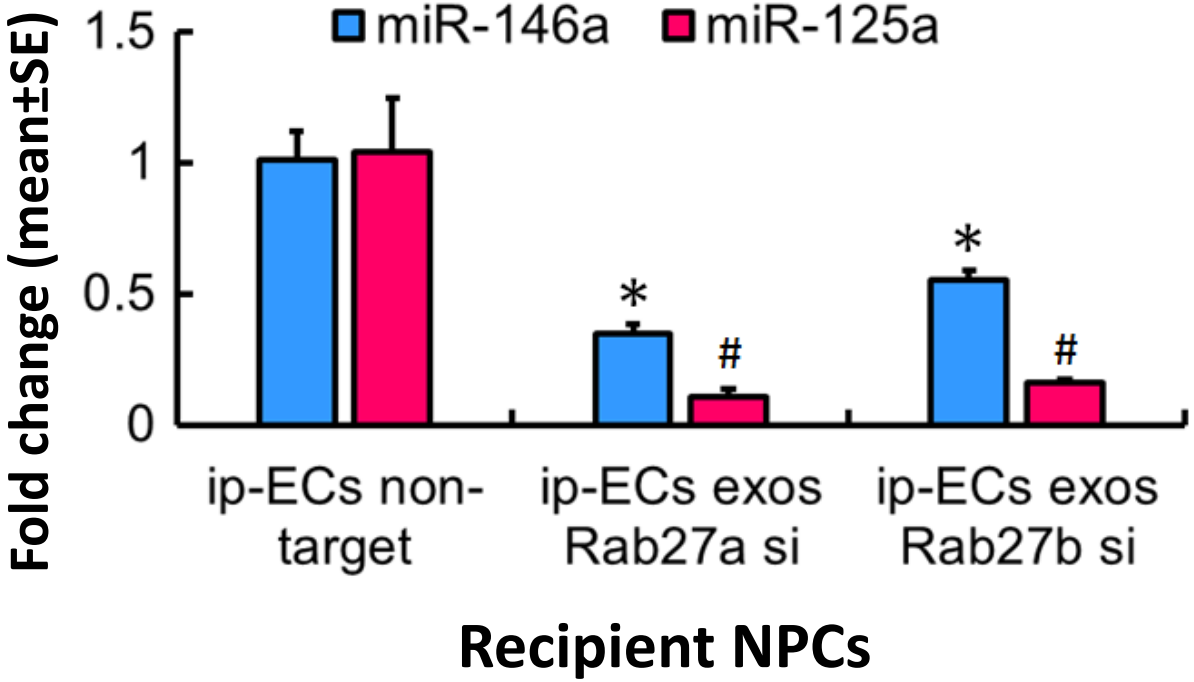
miR transfer from CECs to NPCs



Inhibition of exosome release impairs miRNA transfer from CEC to NPCs

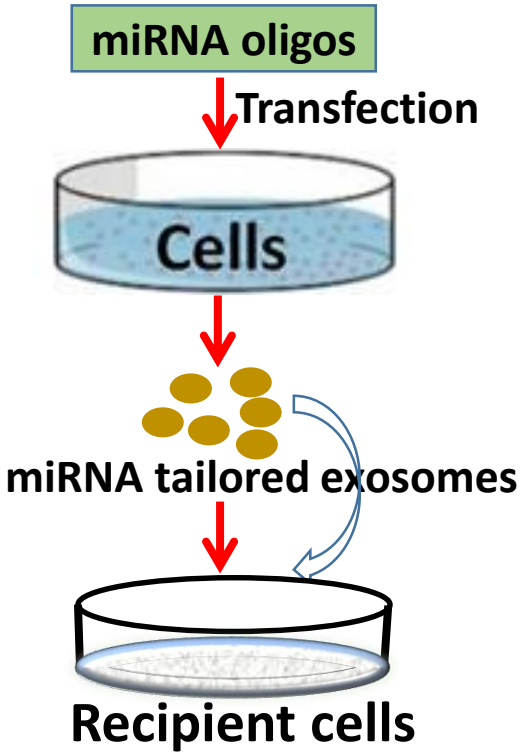


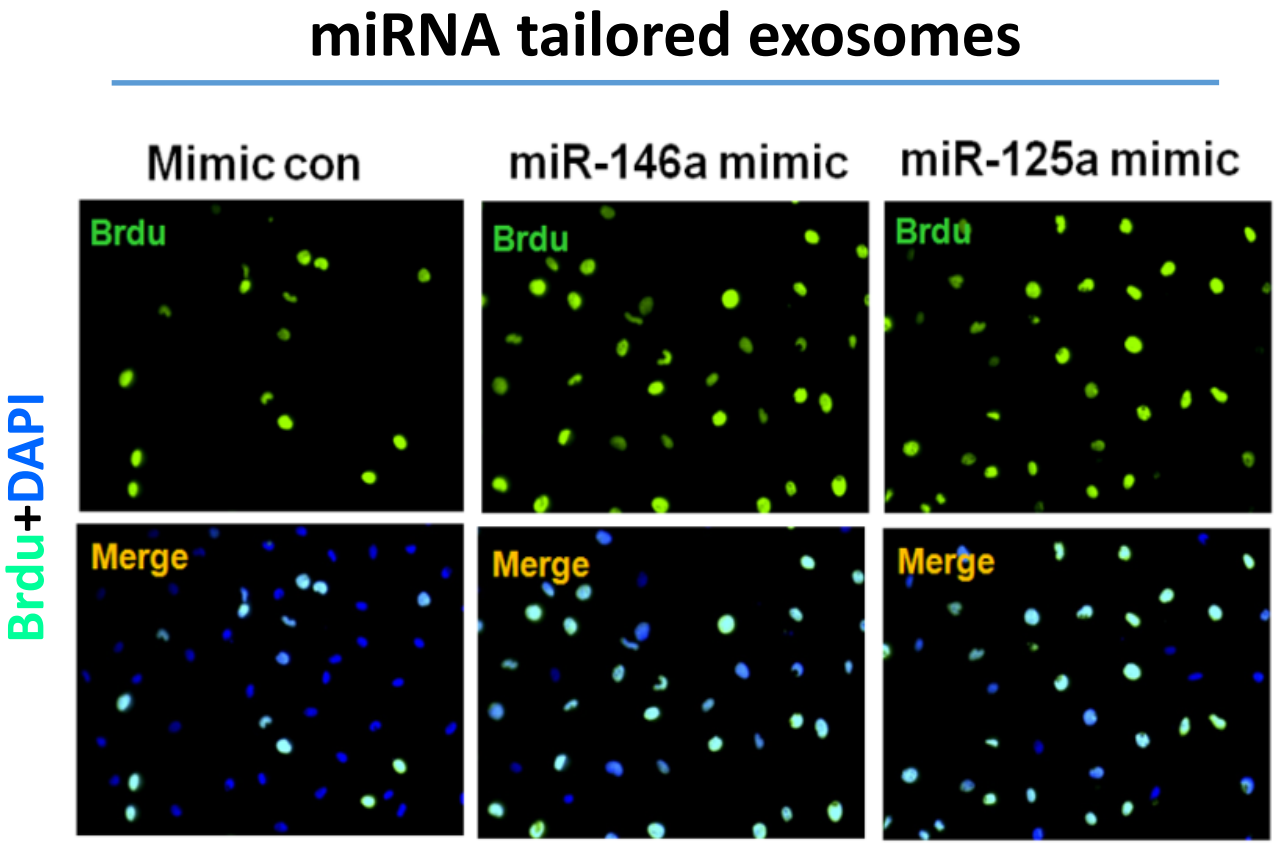
CEC-exosomes

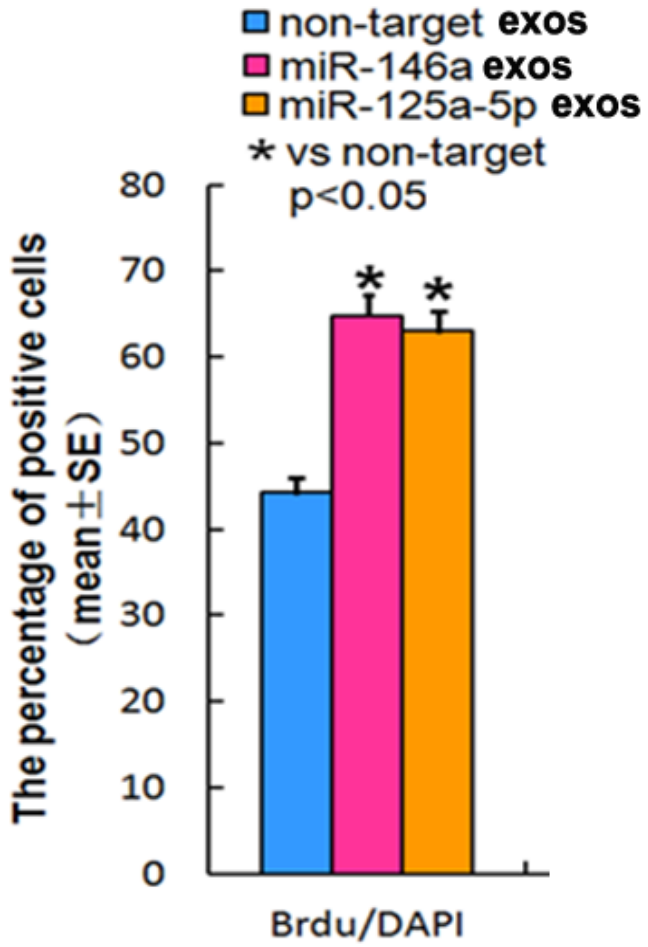


Recipient NPCs

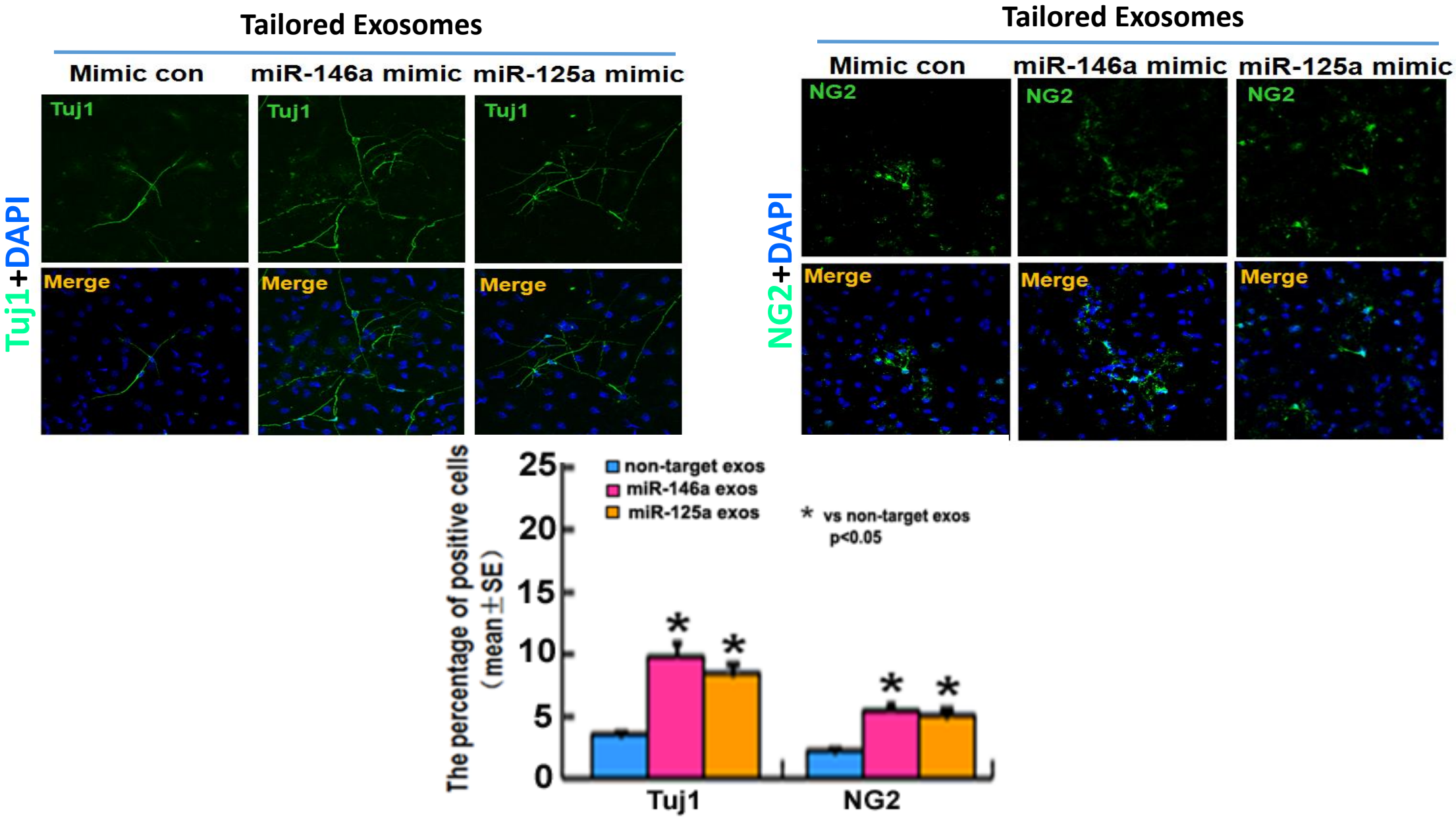
CEC-derived exosomes transfer miRNAs to NPCs and promote their proliferation



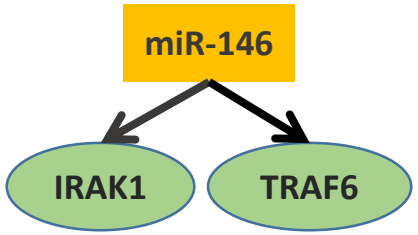


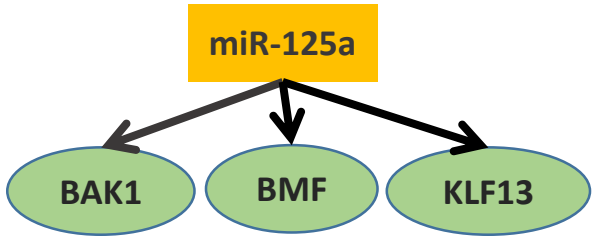


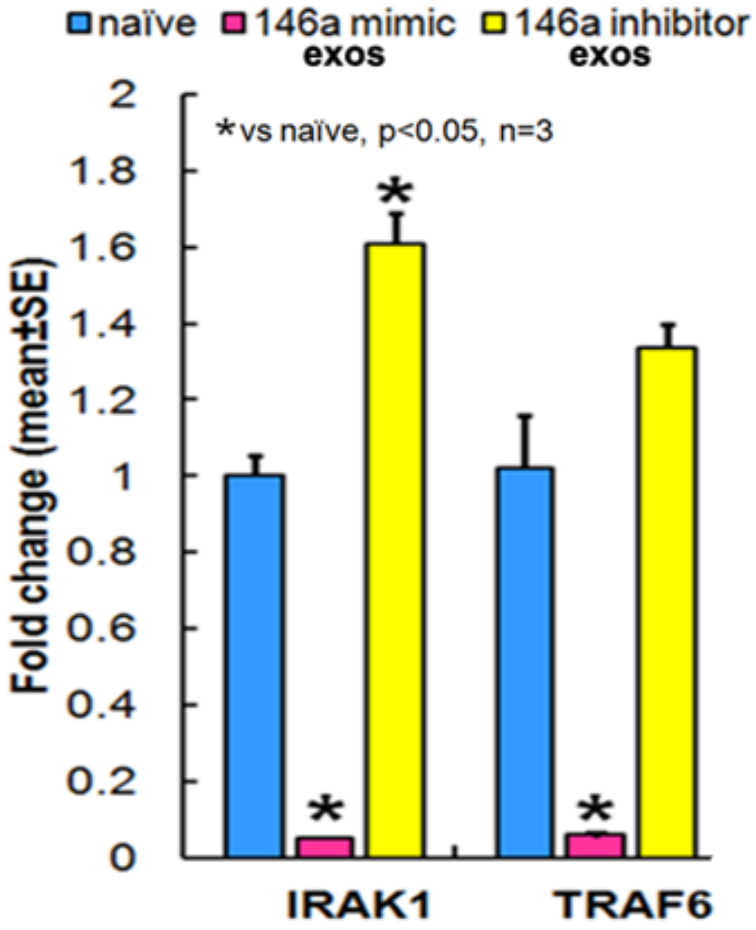
CEC-derived exosomes transfer miRNAs to NPCs and promote neuronal differentiation

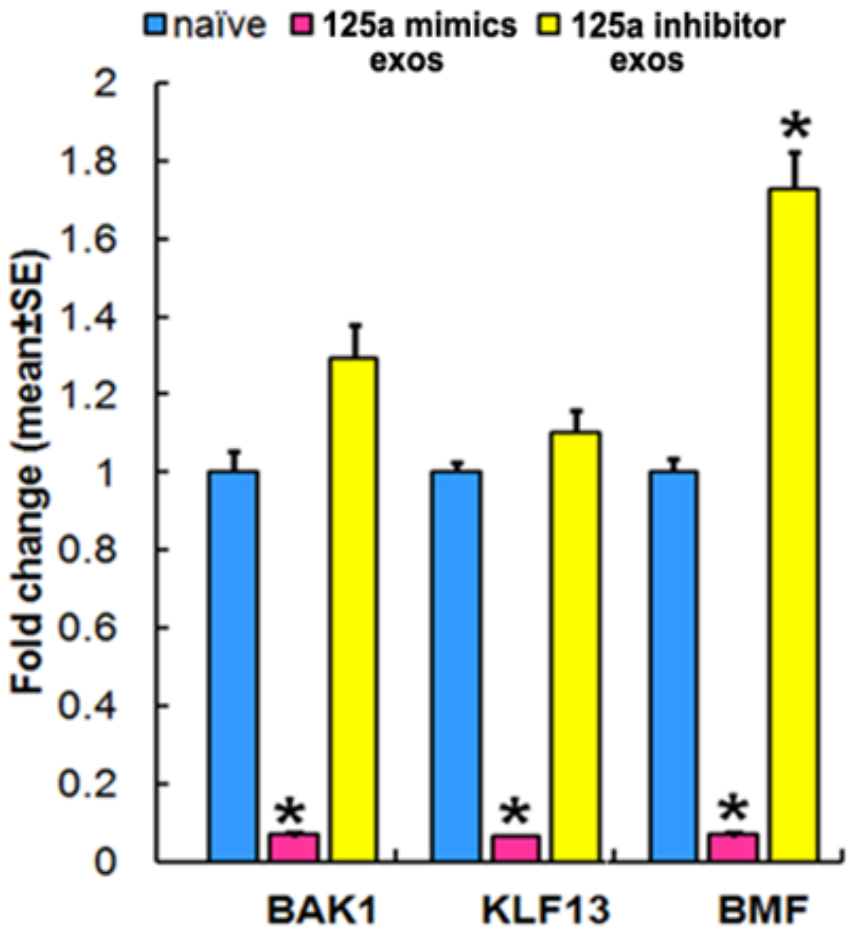


miRNA transmission reduces target genes in recipient NPCs

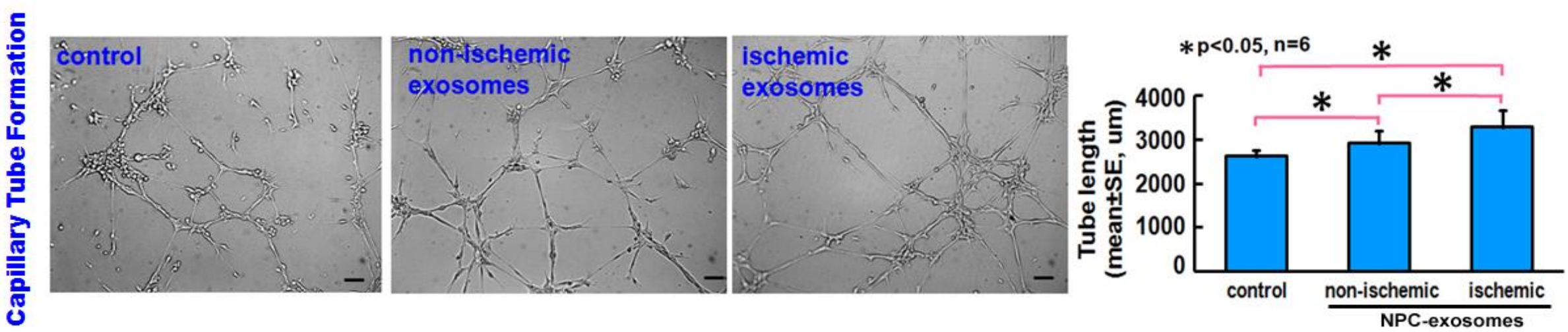


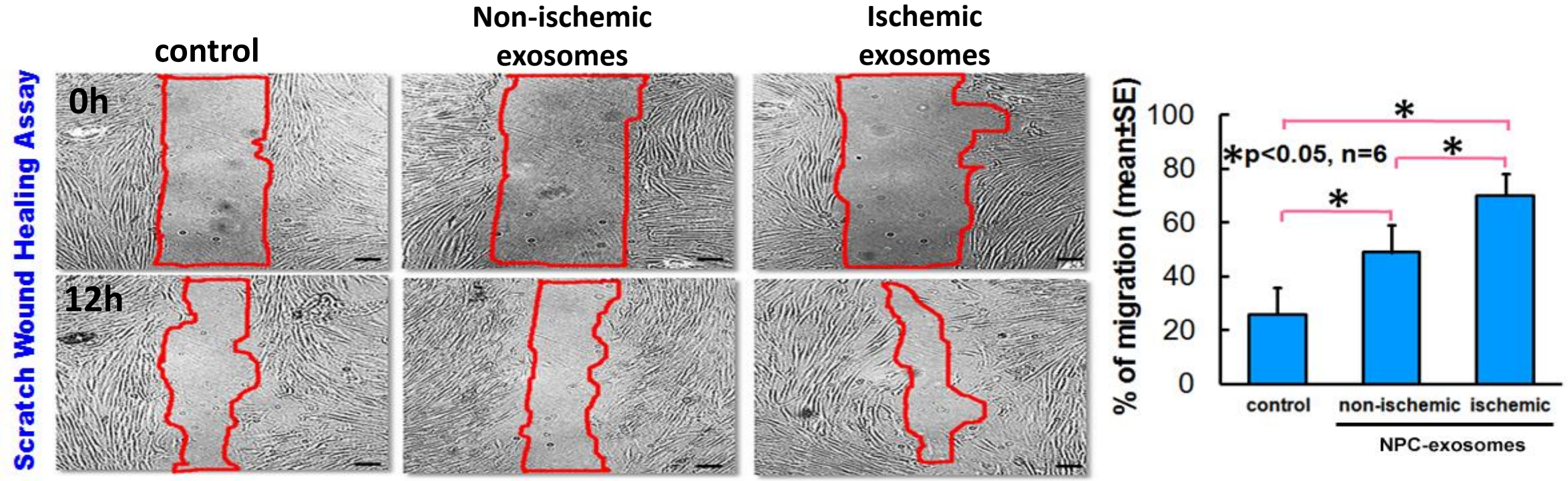






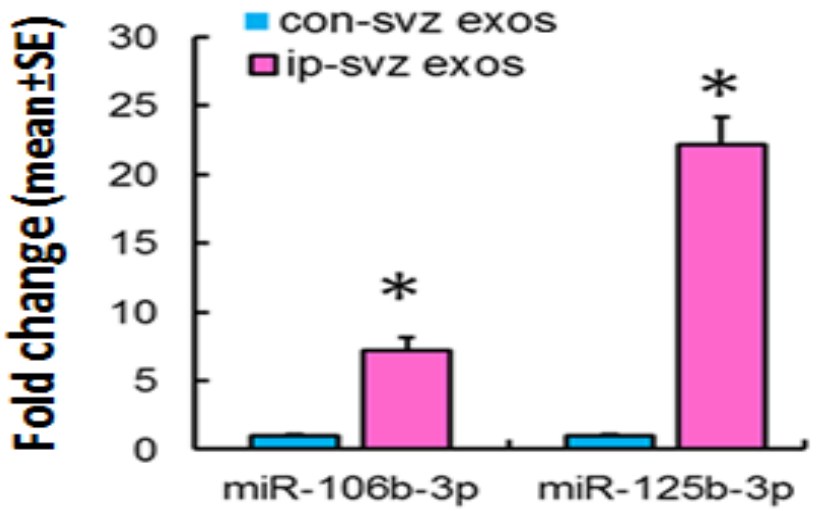
NPC-exosomes increase capillary tube formation and migration of CECs



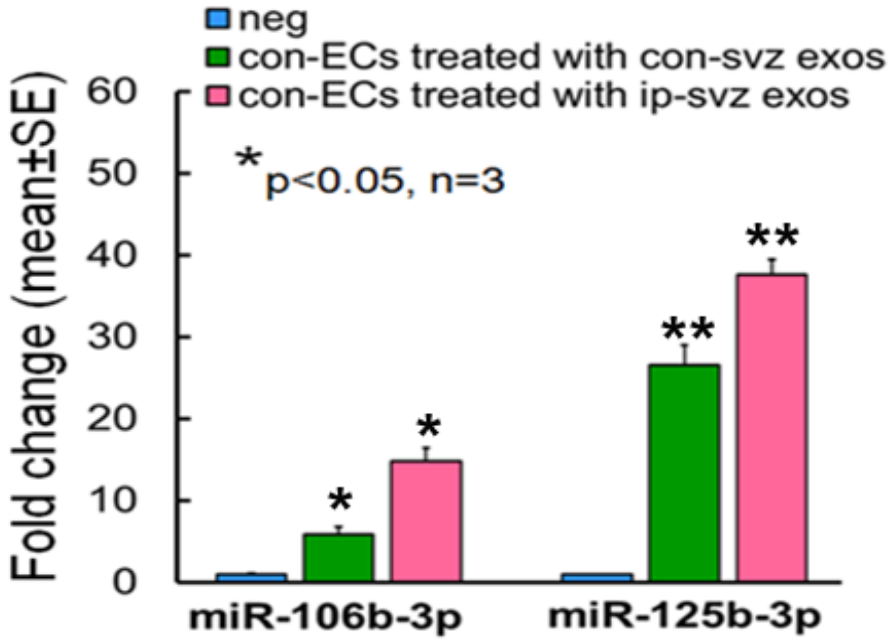


Altered miRNAs in ischemic NPC-exosomes are transported to CECs

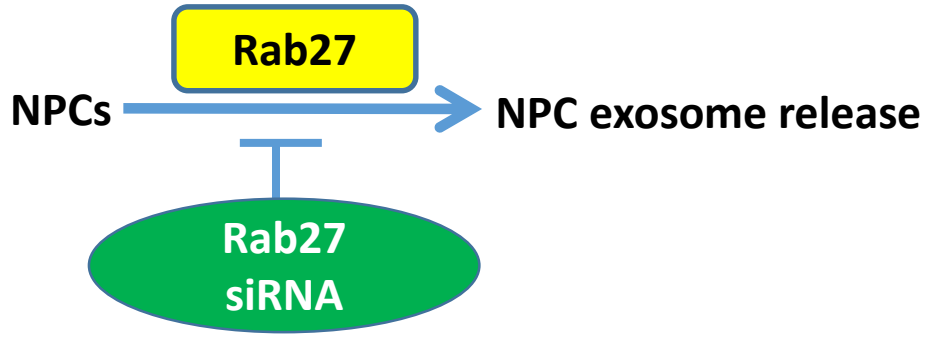
miRs in NPC-exosomes

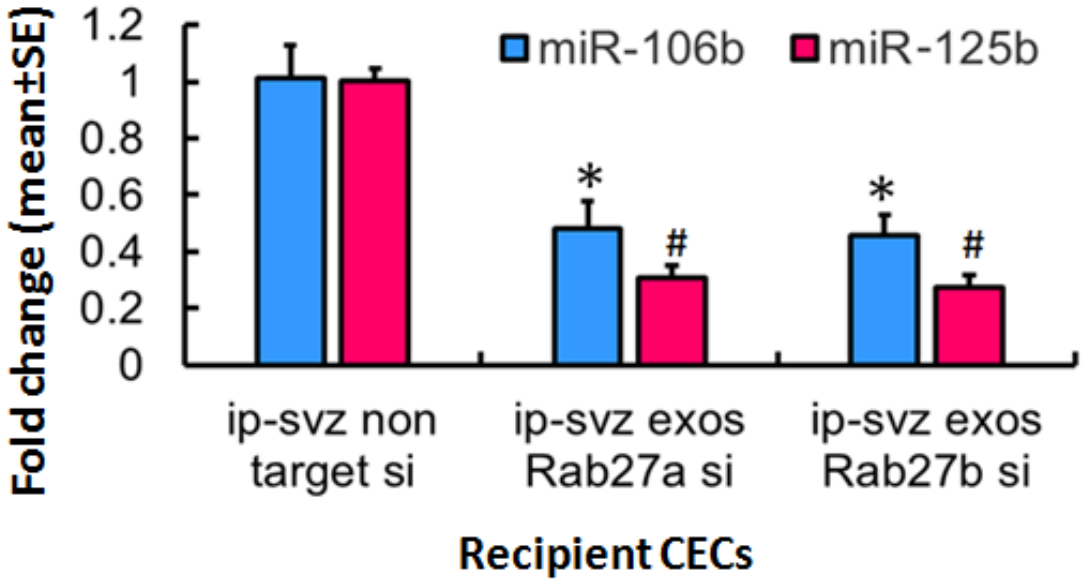


miR transfer

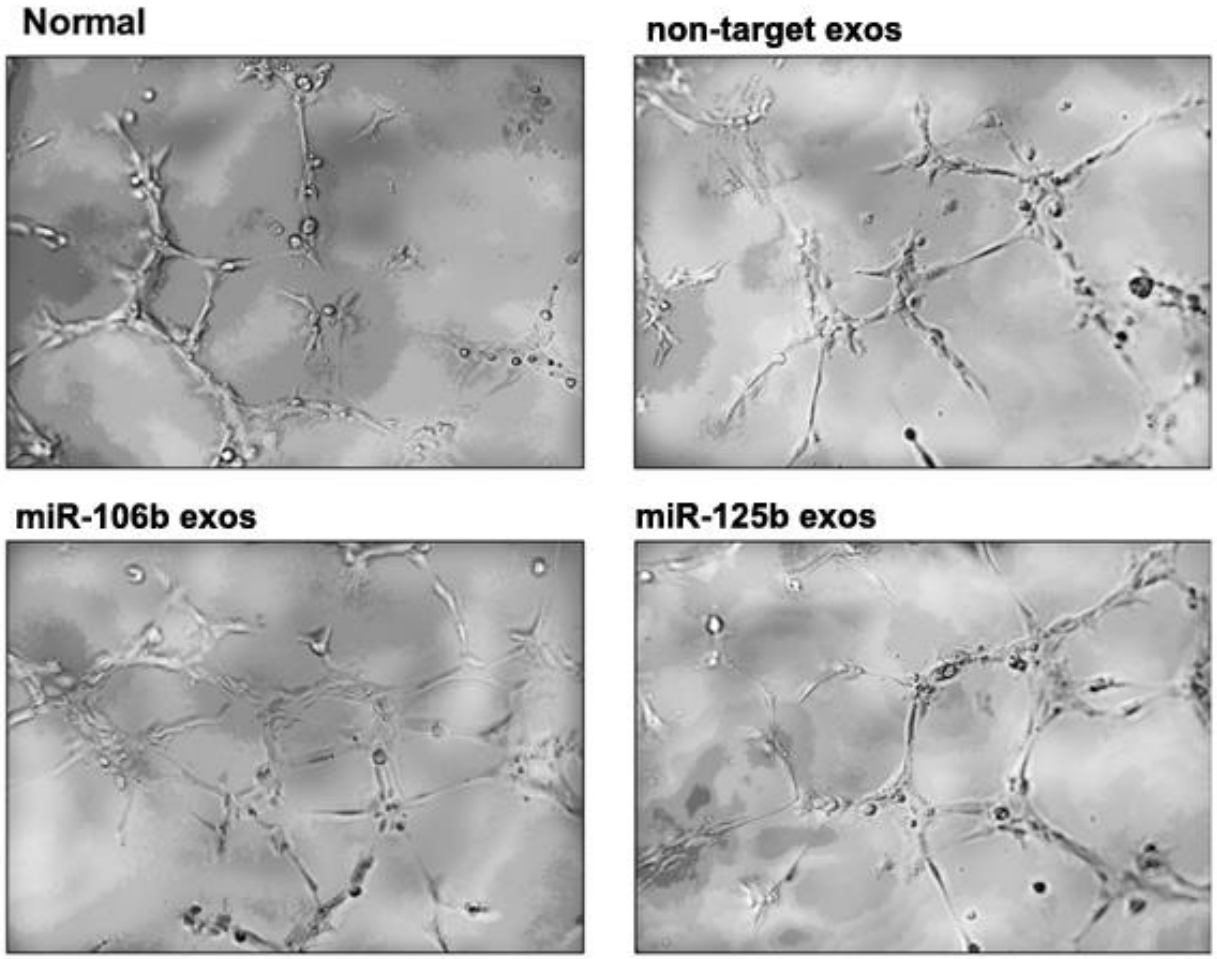


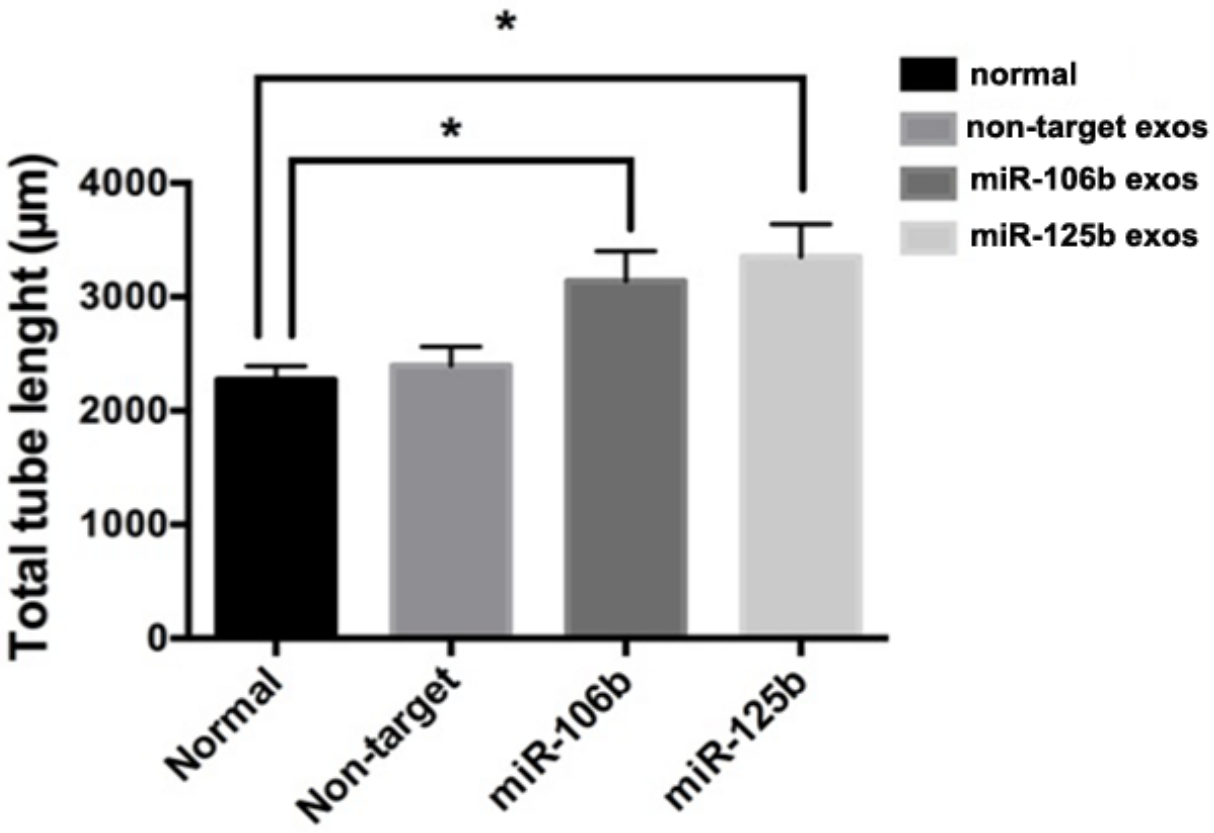
Exosome release





NPC-exosomes transfer miRNAs to CECs and induces tube formation





Summary

- Exosomes mediate the coupling of angiogenesis and neurogenesis.
- Ischemic CEC-exosomes enhance neurogenesis and oligodendrogenesis.
- Exosomes derived from either non-ischemic or ischemic NPCs promote in vitro angiogenesis.
- Exosome-transmitted miRNAs regulate stroke-induced neurogenesis and angiogenesis.

Acknowledgement

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