

JCK Poster

JCK Poster 1 (II-JCKP1)

Basics/New Insights/Others

Chair: Tran Cong Bao Phung (Cardiology Department, Children Hospital 1, Ho Chi Minh City, VietNam)

Sat. Jul 8, 2017 6:15 PM - 7:15 PM Poster Presentation Area (Exhibition and Event Hall)

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[II-JCKP1-03] Vegfa signaling regulates diverse artery/vein formation in vertebrate vasculatures

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Objective— Vascular endothelial growth factor A (Vegfa) signaling regulates vascular development during embryogenesis and organ formation. However, the signaling mechanisms that govern formation of arteries and veins in various tissues are incompletely understood. We aimed to understand differential functions and mechanisms of Vegfa signaling during formation of diverse arteries/veins in zebrafish trunk and head vasculatures.

Approach and Results— We utilized TALEN to generate zebrafish *vegfaa* mutants. *vegfaa*^{-/-} embryos are embryonic lethal, and display a complete loss of the dorsal aorta and expansion of the cardinal vein. We find that activation of Vegfa signaling expands the arterial cell population at expense of venous cells during vasculogenesis of axial vessels in the trunk. Vegfa signaling regulates endothelial cell proliferation after arterial-venous specification. Formation and extension of tip cell filopodia of intersegmental vessels are significantly inhibited in both Vegfa-deficient and Vegfa-overexpressing embryos.

Conclusions— Our results indicate that Vegfa signaling induces formation of the dorsal aorta at expense of the cardinal vein during vasculogenesis, and is required for angiogenic formation of mesencephalic veins and central arteries in the brain. These findings suggest that Vegfa signaling governs formation of diverse arteries/veins by distinct cellular mechanisms in vertebrate vasculatures.