# P53-PDGF Signaling Regulates Vasculatures To Control The Heterogeneity Of MSCs

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## BACKGROUND

Microenvironmental cues provided by stem cell niches are important for regulating the fate of mesenchymal stem cells (MSCs), and the detailed mechanisms of the crosstalk between them are of significant interest. Blood and lymphatic vasculature have well-known roles in transporting oxygen and nutrients, as well as removing waste and $CO_2$. However, the vasculature's role as a niche component in regulating MSCs remains largely unclear.

## PURPOSE

To investigate the role of vasculature in regulating stem cell homeostasis in adult tissue.

## MATERIAL AND METHOD

The transgenic mouse model used in this study is *Gli1-CreER$^{T2}$;Trp53$^{fl/fl}$*. Cellular and molecular experiments used in this study included immunohistochemistry, in situ hybridization, CoIP, RNA-seq, scRNA-seq and ChIP-qPCR.

## RESULTS

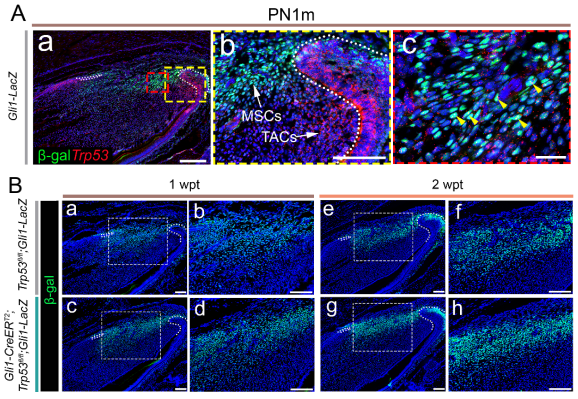



**Fig 1. Loss of *Trp53* in GLI1+ lineage cells results in impaired tissue homeostasis of adult mouse incisor.**

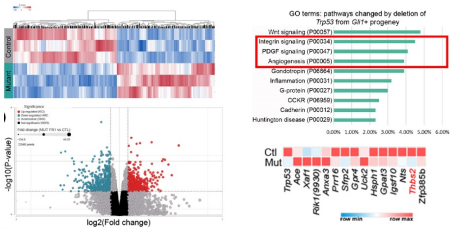



**Fig 2. Deletion of Trp53 in the GLI1+ cells alters gene expression profile and pathways related to vasculatures are mostly affected.**

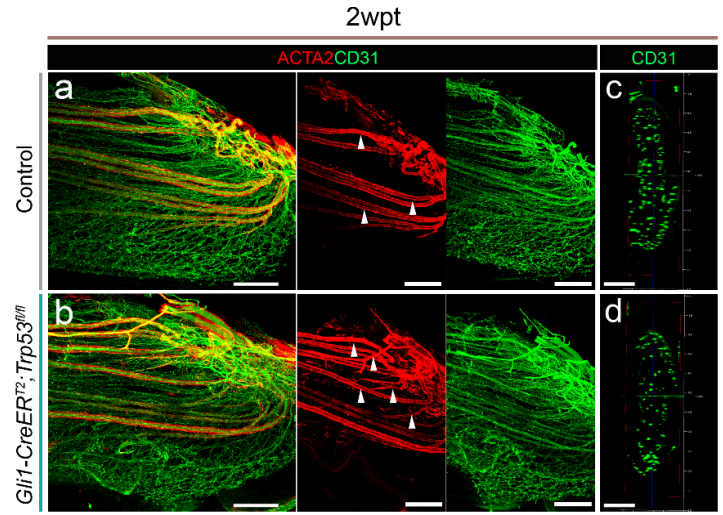



**Fig 3. *Trp53* alters vasculature in adult mouse incisor.**

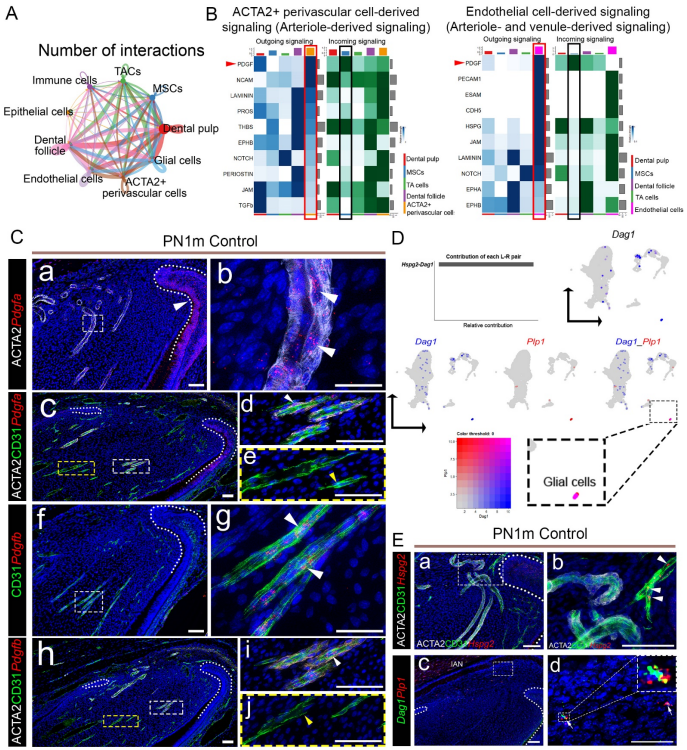
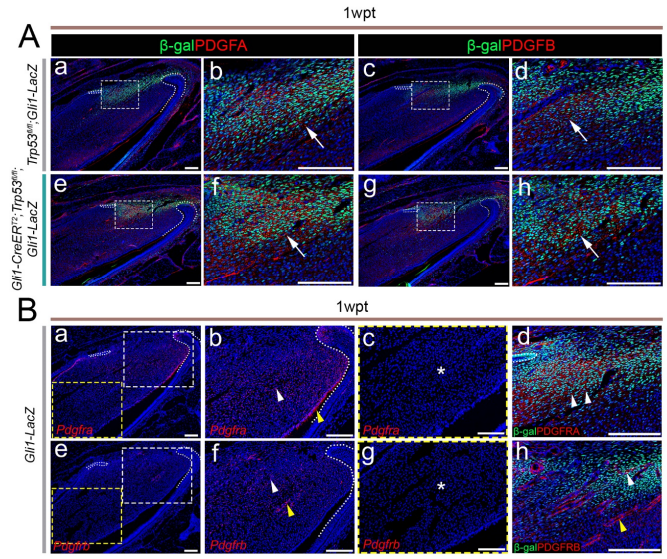



**Fig 4. Different vessels may regulate different subpopulations of MSCs and PDGF signaling derived from arteries regulate MSCs in adult mouse incisor.**



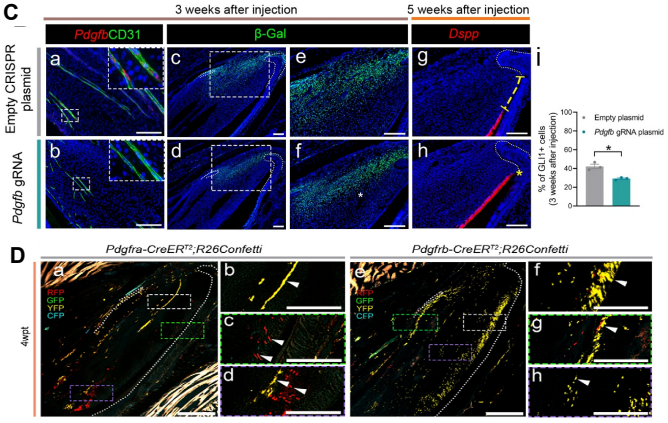




**Fig 5. PDGFRA+ and PDGFRB+ cells differentially contribute to defined cell lineages in the adult mouse incisor.**

## CONCLUSION

This study shows how different vessels can provide unique microenvironmental cues to regulate subpopulations of MSCs and maintain their heterogeneity, and establishes mechanistic insight into the crosstalk between vasculature and mesenchymal stem cells.

## ACKNOWLEDGEMENTS

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