



# Optimization of Intravascular Peptide Delivery for Restenosis Prevention at Sites of Peripheral Angioplasty

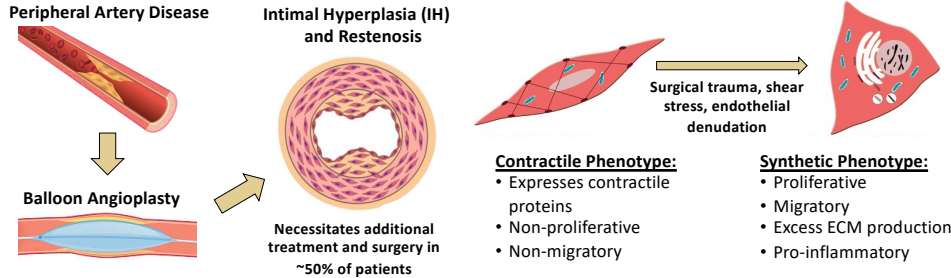
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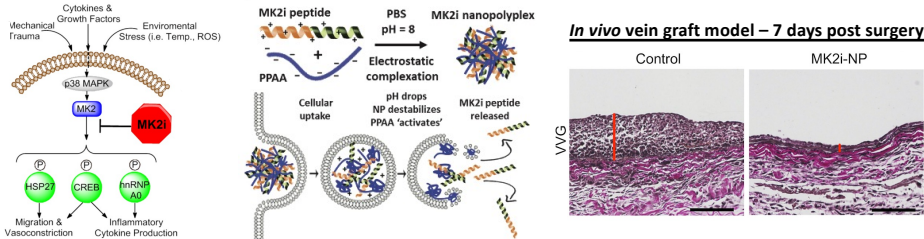
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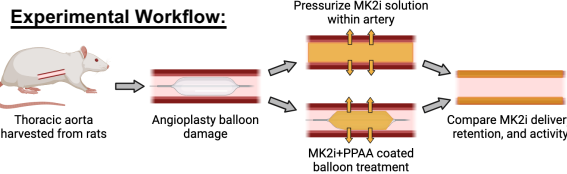
## Smooth muscle cell (SMC) phenotype switch leads to intimal hyperplasia after vascular interventions



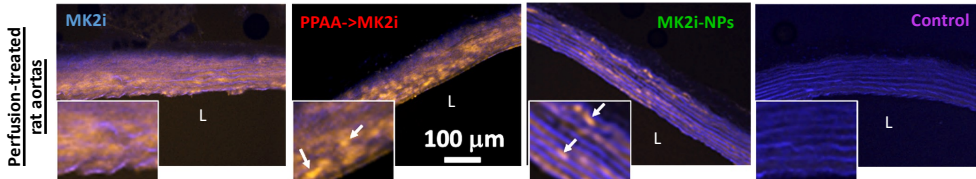
## MK2i-NPs prevent phenotype switching and IH by blocking the p38 stress-activated pathway



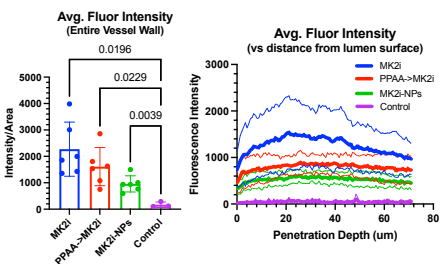
**Goal: Develop and optimize intravascular delivery of MK2i+PPAA to prevent restenosis at sites of peripheral angioplasty.**



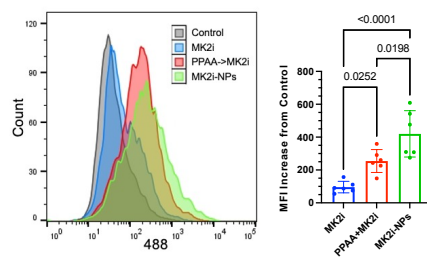
## Convective delivery of MK2i + PPAA formulations ex vivo



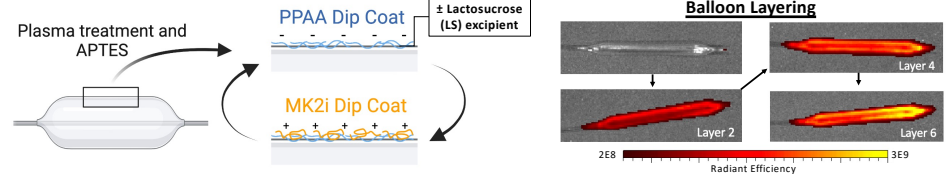
### Tissue Penetration



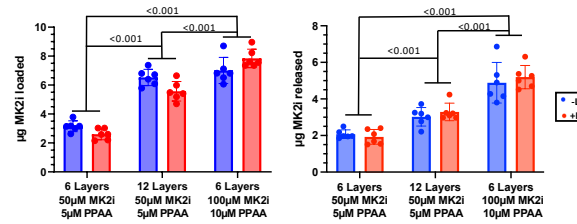
### Cell Uptake



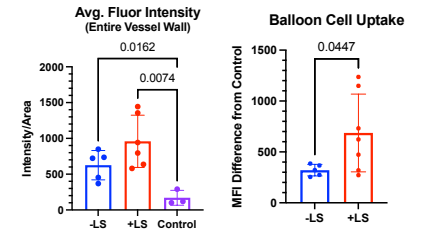
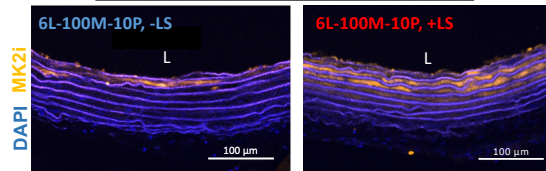
## Layer-by-layer balloon coating to maximize loading, release, and cellular uptake of MK2i+PPAA



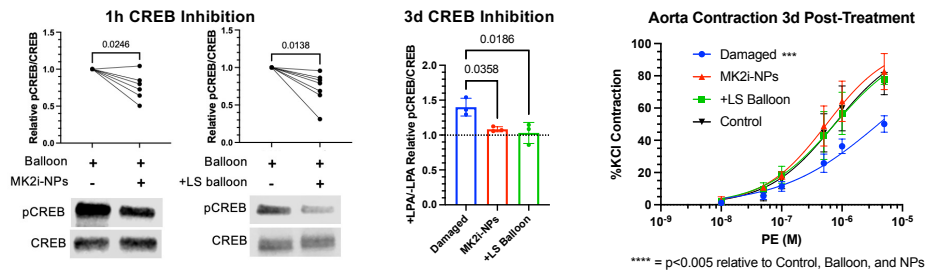
## Increasing Balloon Loading – Layers vs. Concentration



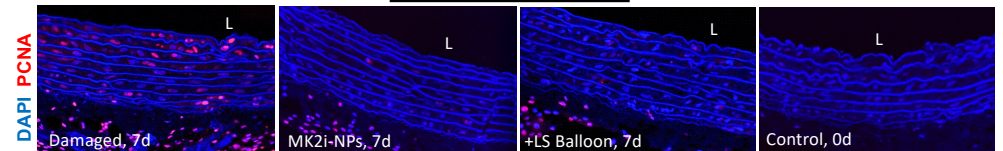
## Coated Balloon Delivery to Explanted Rat Aortas



## MK2i blocks pCREB long term, inhibits SMC proliferation, and preserves vessel contractility



## Inhibition of SMC Proliferation



## References

- Tierney JW, et al. Therapeutic MK2 inhibition blocks pathological vascular smooth muscle cell phenotype switch. *JCI Insight*. 2021.
- Evans BC, et al. MK2 inhibitory peptide delivered in nanopolyplexes prevents vascular graft intimal hyperplasia. *Science Translational Medicine*. 2015.
- Al-Shehri TS, et al. Anti-atherosclerotic plants which modulate the phenotype of vascular smooth muscle cells. *Phytotherapy*. 2016.

## Acknowledgements

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\*Provisional patent filed on angioplasty balloon coating. Application No. 63/516,746