**Docket #:** S14-051

# Pericytes are intermediate progenitors for epicardial-derived coronary artery smooth muscle

Coronary artery disease is the leading cause of death worldwide, yet coronary artery development and regeneration remain poorly understood. Although it is known that epicardial cells on the surface of the heart give rise to coronary artery smooth muscle deep in the myocardium, the differentiation steps between the epicardium and mature smooth muscle were previously unknown. Inventors at Stanford discovered that pericytes, mural cells closely associated with small blood vessels, are epicardial-derived progenitors for coronary artery smooth muscle. Pericytes is a new potential cell type for cell therapy that could be used for vascular regeneration, revascularization after an infarct, or vascular malformation.

The Red-Horse Lab have developed a method of providing smooth muscle cells to a tissue where they are needed. The invention involves creating an isolated population of epicardial-derived pericytes and providing the pericytes to the tissue of interest. The epicardial-derived pericytes then differentiate into smooth muscle cells that express smooth muscle myosin heavy chain. The pericytes are lineage committed but not as matured as smooth muscle cells, making them the ideal cell type to inject and induce angiogenesis within new tissues. This invented method also paves the way for pericytes to act as a drug target for vascular abnormalities in particular diseases which involve deregulated smooth muscle or deregulated pericytes.

## Applications

- -Drug target for vascular diseases involving abnormal pericyte/smooth muscle deregulation.
- -Cell therapy applications where injected pericytes could induce angiogenesis in devascularized regions of all tissues in the body or replace lost smooth muscle

on diseased vessels.
- -Smooth muscle angiogenesis

## Advantages

- -lineage traced the intermediate step of pericytes differentiating into smooth muscle cells and obtained evidence for this differentiation pathway using 2 transgenic mouse models
- -Pericytes are lineage committed but not as matured as smooth muscle cells, making them the ideal cell type to inject and induce angiogenesis within new tissues

## Publications


- Das, S., Goldstone, A. B., Wang, H., Farry, J., D'Amato, G., Paulsen, M. J., ... & Red-Horse, K. (2019). " A unique collateral artery development program promotes neonatal heart regeneration." Cell, 176(5), 1128-1142.


## Patents

- Published Application: 20170312319
- Issued: 10,543,235 (USA)

## Innovators

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