

Researchers find master gene behind blood vessel development

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In a first of its kind discovery, University of Minnesota researchers have identified the "master gene" behind blood vessel development. Better understanding of how this gene operates in the early stages of development may help researchers find better treatments for heart disease and cancer.

Using genetically engineered mice, researchers with the University of Minnesota Medical School's Lillehei Heart Institute were able to identify a protein, Nkx2-5, which activates a certain gene, and in turn, determines the fate of a group of cells in a developing embryo.

"If we can understand the mechanism, or how certain stem cells choose a particular path, we can alter it to prevent or treat disease," said Daniel Garry, M.D., Ph.D., lead researcher, executive director of the institute, and chief of the cardiovascular division in the Department of Medicine. "This gene discovery provides the key to unlocking the secret of how blood vessels grow."

Researchers knew that certain precursor cells, or progenitor cells, become the three types of cells that make up the cardiovascular system: smooth muscle, endothelial (blood vessel), and cardiac muscle. What they didn't know, until now, is how those progenitor cells end up as one type or another. Garry likened the team's discovery to finding the recipe of how certain cells become blood vessels.

By understanding how the cells develop, Garry said they will be able to

study how they might modify the gene to create a desired response.

"Next we are looking at how we could over-express the gene or knock it down," he said.

For example, in the case of heart disease or heart failure, they may be able to "turn on" the gene to make it create new, healthy blood vessels. Or, in the case of cancer, they could turn off the gene to limit blood supply to a tumor, causing it to shrink.

The research appeared in a recent issue of the *Proceedings of the National Academy of Sciences*.

Source: University of Minnesota

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