



## Xeno-Free Protocol for Generating Endothelial Cells from Human Pluripotent Stem Cells

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**WARF: P140372US02**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing the first fully defined method of its kind to derive human endothelial cells suitable for clinical applications.**

### Overview

Endothelial cells (ECs) are vital to blood vessel formation. Generating ECs from human pluripotent stem cells (hPSCs) has powerful potential for cardiovascular health and drug development. However, standard protocols use xenogenic (animal-derived) reagents such as bovine serum albumin that are often poorly defined, pose safety concerns for clinical applications and contribute to highly variable results and limited reproducibility.

### The Invention

UW–Madison researchers have developed a fully defined and xenogenic material-free method of producing and expanding clinically relevant human ECs for therapeutic and tissue modelling applications. Populations of up to 80 percent CD31<sup>+</sup> ECs are generated from both human embryonic and induced pluripotent stem cells.

Like existing protocols, the new method uses factors including Bone Morphogenetic Protein (BMP), Activin A and a TGF-Beta 1 inhibitor.

### Applications

- Generation of clinical grade endothelial cells
- Potential applications include engineering of new blood vessels, EC transplantation into the heart, myocardial regeneration, treatment of regional ischemia, drug and toxicity screening

### Key Benefits

- First xeno-free, albumin-free, fully chemically defined method of its kind
- Highly efficient and reproducible

### Stage of Development

The protocol has been shown to generate 50-80 percent CD31<sup>+</sup> ECs depending on the cell line. The results demonstrate robust and efficient generation of human ECs in fully defined conditions, which addresses a crucial production requirement for potential clinical utility.

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#### For More Information About the Inventors

- [James Thomson](#)

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#### Related Technologies

- [WARF reference number P140400US02 describes the researchers' development of vascularized neuronal tissue models derived from hPSCs.](#)
- [WARF reference number P140410US02 describes the researchers' method to make microglia.](#)

#### Tech Fields

- [Pluripotent Stem Cells : Differentiation](#)

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