

Methods for Facilitating Vascular Growth in Cardiovascular Muscle

Background

Coronary artery disease leading to myocardial infarction is the leading cause of mortality in the United States. Myocardial recovery following myocardial infarction is dependent on the revascularization of infarcted myocardium. Growth factors such as vascular endothelial growth factor (VEGF) and basic fibroblast growth factor (bFGF) promote revascularization of cardiac muscle following myocardial infarction and limit the infarct size. However, negative growth factors that inhibit angiogenesis may also have a role in the repair of myocardial tissue following myocardial infarction and represent new ways to treat cardiovascular diseases. These anti-angiogenic proteins are not as widely investigated as the positive factors that promote vascularization of cardiac tissues.

Description of the Technology

Endothelial monocyte activating polypeptide (EMAP) II is an anti-angiogenic protein that may have a function in the myocardial repair process following myocardial infarction. To investigate its function in the repair process, the distribution of EMAPII was examined in a rat model for myocardial infarction. These studies indicated a rapid change in the temporospatial distribution of EMAPII suggesting that EMAPII may be involved in repair process.

Next, the ability of EMAPII to promote revascularization and improve cardiac function was tested using a rat model for myocardial infarction. Intraperitoneal injection of a polyclonal EMAPII antibody following myocardial infarction lead to a statistically significant improvement in cardiac function. Specifically, it was determined that inhibition of EMAPII anti-angiogenic effect improves diastolic function and ventricular contractility.

Additionally, recombinant EMAPII with a shelf life of at least 6 months to 1 year under frozen conditions has been developed for research as well as therapeutic applications.

Applications

- Therapeutic Applications:
 - a) For the development of agents (antisense oligos, antibodies, or a receptor agonists) that inhibit EMAPII activity in order to promote vascular growth in a muscle, and in particular cardiac muscle. b) The recombinant EMAPII can be used to inhibit angiogenesis for the treatment of cancer including brain tumor as EMAPII passes blood brain barrier.
- Research Applications: Recombinant EMAPII could be used as a research tool to investigate angiogenesis and revascularization of cardiac muscle.

Deliverables

- Recombinant EMAPII
- Expression systems and vectors for EMAPII

- EMAPII polyclonal antibody

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Patent Status

- United States Patent Application filed Dec. 8, 2000
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Licensing Opportunity

- This technology will be licensed non-exclusively for research applications or exclusively for therapeutic applications.

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