U.S. FOOD & DRUG ADMINISTRATION

The Use of CpG Oligodeoxynucleotides to Promote Angiogenesis

Angiogenesis, the process of developing a hemovascular network, underlies solid tumor growth, wound healing, and growth processes. Angiogenesis has also been implicated in the pathophysiology of atherogenesis, arthritis, corneal neovascularization, and diabetic retinopathy. Angiogenesis factors play an important role in wound healing and are believed to have a central role in the development of malignancies.

Available to license, FDA inventors developed methods for stimulating angiogenesis using CpG oligonucleotides (ODNs) and a model system for screening potential anti-angiogenic agents. Although CpG ODN have many potential uses, their potential to induce angiogenesis has not been previously recognized. CpG ODN was shown to induce the production of VEGF (Vascular Endothelial Growth Factor). FDA researchers studied the use of CpG ODNs to promote angiogenesis because they express a wide range of biological activities. They are potent vaccine adjuvants, anti-allergens, and trigger a protective innate immune response. Several supporting studies suggest that CpG ODNs also stimulate cells of the central nervous system. The FDA inventors also discovered that bioactive CpG motifs induce dose-dependent neovascularization in the corneas of mice.

Potential Commercial Applications

- Wound healing
- Treatment for small-vessel atherosclerotic diseases
- Tissue repair, e.g. gastric or corneal ulcers

Competitive Advantages

- Accelerate angiogenesis to facilitate skin and other organ engraftment
- Accelerate wound healing

Development Stage:

Inventors: Dennis Klinman, Mei Zheng, Barry T. Rouse

Publications: Zheng, M., et. al. DNA containing CpG motifs induces angiogenesis. *Proc Natl Acad Sci U S A*. 2002;99(13):8944-8949. PMID: 12060721

Intellectual Property:

United States Patent No. 7,935,351 issued 05.03.2011
United States Patent No. 7,615,227 issued 11.10.2009
United States Patent No. 8,466,116 issued 04.16.2009
International Patents No. PCT/US2002/40955

Product Area: Wound healing, skin and other organ engraftment, small-vessel atherosclerotic treatment, tissue repair, treatment for baldness and psoriasis

FDA Reference No: E-2001-030

Licensing Contact:
Ken Millburne, J.D.
FDA Technology Transfer Program
Email: FDAInventionlicensing@fda.hhs.gov
Phone:301-346-3964