



Therapeutic Application of Pregnancy-Associated Plasma Protein A (VA Reference No. 06-062)

Novel metabolic disease therapy with the potential to induce bone growth, muscle regeneration, angiogenesis, and peripheral nerve regeneration

Technology

Administration of PAPP-A as a novel therapy to induce bone growth, muscle regeneration, angiogenesis, and peripheral nerve regeneration

Inventor

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Key Features

- Better performance than IGF-I or other known growth factors
- Administration either locally or systemically
- Could enhance IGF-I therapy when co-administered

Stage of Development

Reduced to practice with successful demonstration in vitro and in animal models

Field

Therapeutic

- Osteoporosis
- Sarcopenia
- Bone regeneration

Patent Status

Patent application has been filed

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Technology

The Department of Veterans Affairs has developed a treatment methodology of using Pregnancy-Associated Plasma Protein A (PAPP-A) to induce bone growth, muscle regeneration, angiogenesis, and peripheral nerve regeneration by increasing the population of active insulin-like growth factors (IGFs).

Description

Insulin-like growth factors, IGF-I and IGF-II, play a pivotal role in the regulation of growth and development. Past studies demonstrate that local or systemic treatment with the IGF-I peptide can promote bone formation, muscle regeneration, angiogenesis, and peripheral nerve regeneration. However, one major barrier with IGF-I peptide is the inhibition of IGFs by several IGF-binding proteins (IGFBPs) *in vivo*. Therefore, increased degradation of these inhibitory IGFBPs represents a potentially better alternative treatment for metabolic diseases, where IGF deficiency is involved in the pathogenesis.

PAPP-A has been identified as a protease that significantly degrades IGFBP-4 and IGFBP-5. As a potent anabolic factor in promoting bone formation and angiogenesis, PAPP-A could potentially be used as a novel therapeutic drug for the treatment of metabolic diseases such as osteoporosis and sarcopenia. In addition, PAPP-A may be used to treat traumatic injuries such as bone fractures and loss of skeletal muscle.

Competitive Advantage

PAPP-A has been demonstrated to promote myoblast and osteoblast proliferation and/or differentiation in vitro, and bone formation and bone vascularity in animal models. The use of PAPP-A in these studies demonstrated better performance than IGF-I or any other known growth factor in promoting bone formation and vascularization.

In addition to increased efficacy when compared to treatment with IGF-I, this invention:

- Can be delivered locally or systemically, depending on the pathological conditions.
- Is expected to enable bone cells and muscle cells to grow faster and differentiate into unique cell types.
- Could enhance IGF-I therapeutic efficacy when co-administered.

Status

The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).