

LICENSING OPPORTUNITY

Molecular Variant Fibrinogen Fusion Proteins

Keywords

Fibrinogen, fibrin polymers, fibrin gel, drug delivery, bio-degradable polymers, protein delivery, peptide delivery, re-formulation, pharmaceuticals, bio-pharmaceuticals, pharmacokinetics, pharmacodynamics.

Patents status

US Patent Application US60/704,075/2005
"Molecular Variant Fibrinogen Fusion Proteins"

Supporting patents:

- 1) US Patent Application US60/686,188/2005
"Triblock copolymers for cytoplasmic delivery of gene-based drugs"
- 2) EP, US, JP, CA, AU
"Block copolymers for multifunctional self-assembled systems"
- 3) EP, US, JP, CA, AU
"Compositions and methods for use of bioactive agents derived from sulfated and sulfonated amino acids"
- 4) US Patent Application US60/775,132/2006
"Nanoparticles for Delivery of Drugs"

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The present invention is related to new variants of fibrinogen and their use for incorporating proteins or peptides into a fibrin polymer, which can be used for drug delivery or in tissue engineering.

Controlled drug release involves the combination of a carrier protein or polymer with the active agent to be delivered in such a way that the agent can be delivered in a designed manner.

A wide range of materials has been investigated for use within the human body in order to reduce the number of necessary administrations, provide more localized and better use of the active agents, and increase patient compliance.

The aim of the present, new variant of fibrinogen based, delivery technology, is to deliver bio-pharmaceuticals in a controlled manner to patients with engineered fibrin gels.

Fibrin gel is a natural gel with several biomedical applications. Fibrin gel has been used as a sealant because of its ability to bind to many tissues and its natural role in wound healing.

Current methods for incorporation of a drug to be delivered in fibrin include cross-linking of the drug to the fibrinogen and physical incorporation into a fibrin matrix. The latter is difficult to control with variable incorporation as well as release, and the former may interfere with fibrin cross-linking to form a gel.

The present invention provides methods of making fibrinogen fusion proteins to enhance the incorporation of a therapeutic protein or peptide species into a fibrin polymer.

The simplicity of the present technology is the customization of production of fibrinogen fusion proteins to be delivered which can then be used alone or mixed with native fibrinogen to form a fibrin polymer.

Main advantages

- Customized highly efficient incorporation of therapeutic proteins or peptides of choice into fibrinogen.
- Easy production of the fusion proteins at scale able amounts.
- Easy production of fibrin polymers with the use of the engineered fibrinogen.
- There is no need for use of low efficiency non-controllable methodologies such as cross-linking or physical incorporation of therapeutic proteins or peptides into fibrinogen.
- Controllable bio-availability and bio-distribution of delivered proteins
- The technology is supported by numerous patents.

Potential Commercial Applications

- Production of fibrin polymers for
 - a) delivery of biologic drugs
 - b) tissue engineering
- Controllable pharmacokinetics and pharmacodynamics of biologic drugs.
- Diminishing toxicity of highly toxic active drugs.
- Re-formulation of generics and extension of pharmaceuticals life cycle.