Stable Collagen for Wound Healing, Artificial Skin, Sutures and Treating Collagen Disorders

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WARF: P97135US
View U.S. Patent No. 5,973,112 in PDF format.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing stable collagen mimics.

OVERVIEW

Collagen is the most abundant protein in vertebrates. It serves as the fundamental structural protein for vertebrate tissues and is critically important in wound healing. Many diseases, including arthritis, atherosclerosis, rheumatism, osteoporosis and osteogenesis imperfecta, are linked to weak or abnormal collagen.

In addition to treating diseases associated with collagen abnormalities, collagen could be used for other medical purposes, such as healing wounds. It also can serve as a substrate for several types of artificial skin and as “solder” in tissue welding, a technique in which the collagen in the skin at the edge of a wound is thermally denatured by a laser and then allowed to reanneal.

In connective tissue, individual collagen molecules are wound together in tight triple helices, which are further organized into strong fibrils. The collagen polypeptide chains are composed of approximately 300 repeats of the sequence X-Y-Gly, where X is often proline (Pro), Y is often Pro or hydroxyproline (Hyp), and the third residue is always glycine (Gly). Having Hyp, rather than Pro, in the Y position leads to greater stability.

THE INVENTION

A UW-Madison researcher has created a novel collagen mimic that is even more stable than native collagen with Hyp in the Y position. This mimic contains 4(R)-fluoroproline (Flp) in the Y position.

The inventor found that the electronegativity of the side chain atom provides a critical parameter in triple helix stability. The fluorine of Flp is more electronegative than the side-chain oxygen of Hyp or the side-chain hydrogen of Pro, leading to increased stability.
APPLICATIONS

• Treatment of disorders associated with abnormal collagen
• Tissue welding
• Production of artificial skin and sutures

KEY BENEFITS

• Provides collagen mimics with increased stability
• Includes several methods of synthesizing the Flp collagen mimic

ADDITIONAL INFORMATION

Related Technologies
See WARF reference number P06406US for several new collagen mimics that use steric, rather than stereoelectronic, effects to achieve increased stability. These mimics are more versatile and can display useful functional groups.
See WARF reference number P08274US for a semisynthetic collagen mimic in which the natural Hyp residues in the Y position are replaced by synthetic (2S,4R)-4-methoxyproline (Mop) residues for increased strength and durability.

Publications
Click here for a news release describing this technology.

Tech Fields
Pharmaceuticals & Vitamin D - Skin & connective tissue
Drug Discovery - Drug production & design

CONTACT INFORMATION

For current licensing status, please contact Joshua Carson at icarson@warf.org or (608) 890-1622.