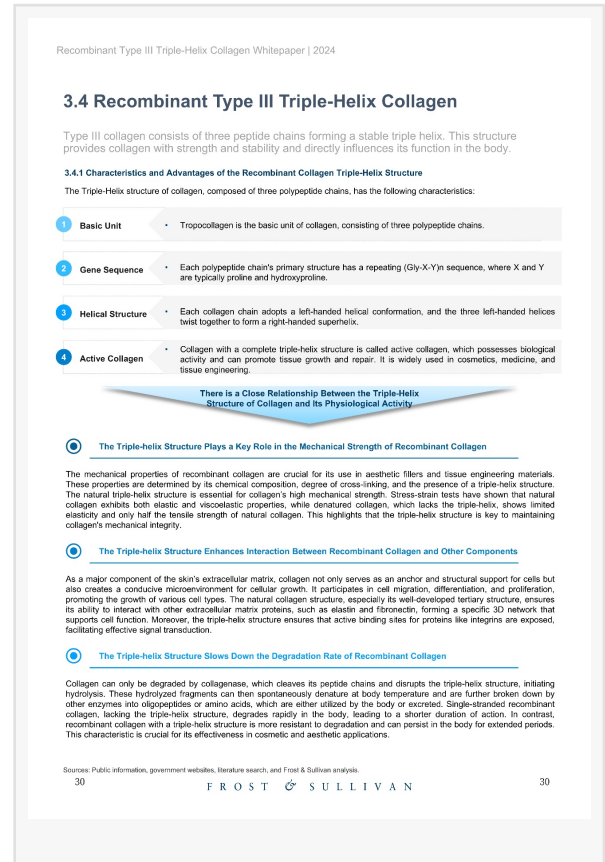


# Frost & Sullivan co-published Recombinant Type III Triple-Helix Collagen Whitepaper with Everon Healthcare

SHANGHAI, CHINA, October 1, 2024 / EINPresswire.com/ -- Frost & Sullivan and Everon Healthcare have conducted extensive investigation across the recombinant collagen Industry and co-published the "Recombinant Type III Triple-Helix Collagen Whitepaper" on Sep. 29th, 2024, which aims to analyze the latest research advancements, production technologies, application fields, and market prospects for recombinant type III triple helix collagen. It delves into the preparation process, key technologies, and quality control standards of recombinant type III collagen, highlighting its broad applications in serious medical treatments, aesthetic medicine, and efficacy-driven skincare, among other consumer fields. The whitepaper aims to share valuable insights and analyses with industry stakeholders and investors, fostering discussions on the future trajectory of recombinant type III triple-helix collagen. (To read the Recombinant Type III Triple-Helix Collagen Whitepaper, go here <https://hub.frost.com/recombinant-type-iii-triple-helix-collagen/> )



Recombinant Type III Triple-Helix Collagen Whitepaper | 2024

### 3.4 Recombinant Type III Triple-Helix Collagen

Type III collagen consists of three peptide chains forming a stable triple helix. This structure provides collagen with strength and stability and directly influences its function in the body.

#### 3.4.1 Characteristics and Advantages of the Recombinant Collagen Triple-Helix Structure

The Triple-Helix structure of collagen, composed of three polypeptide chains, has the following characteristics:

- Basic Unit** • Tropocollagen is the basic unit of collagen, consisting of three polypeptide chains.
- Gene Sequence** • Each polypeptide chain's primary structure has a repeating (Gly-X-Y)n sequence, where X and Y are typically proline and hydroxyproline.
- Helical Structure** • Each collagen chain adopts a left-handed helical conformation, and the three left-handed helices twist together to form a right-handed superhelix.
- Active Collagen** • Collagen with a complete triple-helix structure is called active collagen, which possesses biological activity and can promote tissue growth and repair. It is widely used in cosmetics, medicine, and tissue engineering.

**There is a Close Relationship Between the Triple-Helix Structure of Collagen and its Physiological Activity**

- The Triple-helix Structure Plays a Key Role in the Mechanical Strength of Recombinant Collagen**

The mechanical properties of recombinant collagen are crucial for its use in aesthetic fillers and tissue engineering materials. These properties are determined by its chemical composition, degree of cross-linking, and the presence of a triple-helix structure. The natural triple-helix structure is essential for collagen's high mechanical strength. Stress-strain tests have shown that natural collagen exhibits both elastic and viscoelastic properties, while denatured collagen, which lacks the triple-helix, shows limited elasticity and only half the tensile strength of natural collagen. This highlights that the triple-helix structure is key to maintaining collagen's mechanical integrity.
- The Triple-helix Structure Enhances Interaction Between Recombinant Collagen and Other Components**

As a major component of the skin's extracellular matrix, collagen not only serves as an anchor and structural support for cells but also creates a conducive microenvironment for cellular growth. It participates in cell migration, differentiation, and proliferation, promoting the growth of various cell types. The natural collagen structure, especially its well-developed tertiary structure, ensures its ability to interact with other extracellular matrix proteins, such as elastin and fibronectin, forming a specific 3D network that supports cell function. Moreover, the triple-helix structure ensures that active binding sites for proteins like integrins are exposed, facilitating effective signal transduction.
- The Triple-helix Structure Slows Down the Degradation Rate of Recombinant Collagen**

Collagen can only be degraded by collagenase, which cleaves its peptide chains and disrupts the triple-helix structure, initiating hydrolysis. These hydrolyzed fragments can then spontaneously denature at body temperature and are further broken down by other enzymes into oligopeptides or amino acids, which are either utilized by the body or excreted. Single-stranded recombinant collagen, lacking the triple-helix structure, degrades rapidly in the body, leading to a shorter duration of action. In contrast, recombinant collagen with a triple-helix structure is more resistant to degradation and can persist in the body for extended periods. This characteristic is crucial for its effectiveness in cosmetic and aesthetic applications.

Sources: Public information, government websites, literature search, and Frost & Sullivan analysis.

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Collagen, a vital structural component of the extracellular matrix, is omnipresent in tissues and organs, including skin, bone, tendon, ligament, and cartilage. Comprising 70% of the skin's composition, collagen is instrumental in limb movement. Type III collagen, the second most abundant type in the body, is a key structural element in fibrous collagen tissues, conferring strength, durability, and elasticity to tissues and playing a role in numerous biological interactions.

Type III collagen is predominantly found in blood vessels, internal organs, and muscles, where it is crucial for the integration and repair of the extracellular matrix. It forms a robust fiber network in blood vessels, supporting and strengthening the vessel walls while maintaining their elasticity and stability against blood pressure. In internal organs such as the liver, lungs, and kidneys, type III collagen supports and protects their proper functioning.

Research indicates that type III collagen regulates collagen fiber diameter and crosslinking by interacting with other collagen types. It also contains cell surface receptor recognition sites that promote cell adhesion, migration, proliferation, and wound healing through integrin interactions. Recent studies suggest that type III collagen can inhibit tumor proliferation by maintaining tumor cell dormancy within the tumor microenvironment, exhibiting anti-tumor effects.

The metabolism of type III collagen is a complex network of interrelated pathways that mediate collagen metabolism, beginning with gene transcription regulated by various signaling pathways.

Recombinant type III collagen's unique properties—biocompatibility, biodegradability, cell proliferation promotion, and hemostasis—make it invaluable in serious medical applications. Its widespread use in medical cosmetology promotes skin regeneration and repair, addressing skin injuries and diseases like burns, wounds, and scars. Clinical trials have confirmed its application value in this field.

Collagen's presence in cosmetic formulations as a natural moisturizer and repair ingredient is well-established. Recombinant collagen technology enhances collagen's purity, integrin site exposure, transdermal absorption rate, and safety. Recombinant collagen products also extend to health food, pet products, and other fields, indicating broad application prospects.

Source: Frost & Sullivan

Everon Healthcare is one of the leading enterprises in China that can optimize protein transformation from sequence-structure-function aspects. Everon Healthcare has an AI-assisted protein design platform, a high-throughput structural biology platform, a host strain modification platform, and a protein raw material pairing, screening, and validation Platform. Everon Healthcare's 'ultimate' triple helix recombinant Type III collagen features 90°(194°) thermal reversibility, '360°' water molecule binding strength, self-assembled quaternary structure, and outstanding repair and anti-aging efficacy, which is expected to further open up the application field of recombinant Type III collagen.

Recombinant Type XVII Collagen Whitepaper highlights the following:

- Collagen Overview (definition, function, structure, types, etc.)
- Type III Collagen Insights (discovery, naming, structure, distribution, etc.)
- Recombinant Type III Collagen (advantages, industry standards, design, production, etc.)
- Recombinant Type III Collagen's Biological Functionality (safety, skin recovery, wound repairing, anti-wrinkle effect, etc.)
- Recombinant Type III Collagen Applications (aesthetic medicine, skincare products, surgical sutures, surgical dressing, etc.)

## Key Topics Covered:

1. An Overview of Collagen
  - a. Definition and Function of Collagen
  - b. Classification of Collagen
  - c. Introduction to Type III Collagen
  
2. Properties and Functions of Type III Collagen
  - a. Physicochemical Properties of Collagen
  - b. Functions of Type III Collagen
  - c. Type III Collagen and Signal Transduction
  
3. Recombinant Type III Triple-Helix Collagen
  - a. Introduction to Recombinant Type III Collagen
  - b. Industry Standards for Recombinant Collagen
  - c. Preparation Process and Key Technologies for Recombinant Type III Collagen
  - d. Recombinant Type III Triple-Helix Collagen
  
4. Applications of Recombinant Type III Triple-Helix Collagen
  - a. Market Analysis of Recombinant Collagen Products
  - b. Applications of Recombinant Type III Collagen — Serious Medical Applications
  - c. Applications of Recombinant Type III Collagen — Aesthetic Medicine
  - d. Applications of Recombinant Type III Collagen — Efficacy-Driven Skincare
  - e. Applications of Recombinant Type III Collagen — Other Consumer Fields

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## About Everon Healthcare

Everon Healthcare, a biopharmaceutical company focused on synthetic biology, regenerative medicine materials, and aesthetic medicine products, is a supplier to the Francis Crick Institute in the UK and part of its global supply chain system. As a subsidiary of Jinmeiji Group, Everon Healthcare is a high-tech enterprise in Guangdong, China, with 29 years of development and research achievements in various fields. Everon Healthcare has forged strategic, long-term partnerships with prestigious scientific research institutes and CROs, collaboratively advancing cutting-edge biomedical research and innovation.

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