**Product Overview**

This standardized collagen polymer was acid extracted from porcine dermis and contains high oligomer content. Unlike conventional collagen formulations (atelocollagen and telocollagen), oligomers represent aggregates of monomers that retain their telopeptide regions and natural intermolecular crosslinks (Figure 1)[1, 2]. These collagen polymer building blocks have the uncommon ability to undergo fibrillar and suprafibrillar assembly, thereby giving rise to highly interconnected collagen-fibril matrices. The intermolecular crosslinks together with the higher-order fibril interactions contribute to matrices with improved handling, mechanical integrity, and resistance to proteolytic degradation[1-3]. In addition, matrices prepared from oligomers have been shown to induce cellular responses and programmed tissue morphogenesis beyond that which has been achieved by conventional monomer matrices[1, 2, 4].

**Product Description**

Oligomer-PD represents a 5 mg/ml solution in 0.01 M hydrochloric acid. Extraction and purification were performed using a quality-controlled manufacturing process with starting material obtained from closed herd animals. This product is rendered aseptic by exposure to chloroform and confirmed negative for bacterial and fungal contamination. Oligomer-PD is standardized in terms of purity, molecular composition, and polymerization capacity according to ASTM standard guidelines (F3089-14)[5].

**Storage/Stability**

Product should be stored and maintained at 2-10°C. Do not freeze.

**Molecular Composition**

Oligomer™ is a purified type I collagen polymer solution (≥99.9% SDS-PAGE) that retains its natural intermolecular crosslinks. This uncommon collagen formulation yields a prominent protein band corresponding to molecular weight of 260kDa in addition to alpha, beta, and gamma bands (Figure 2). The absence of contaminating collagen types and noncollagenous proteins has been verified by SDS-PAGE and Western blotting[1, 2].

**Polymerization Capacity**

Rapid polymerization (<10 minutes) is observed upon neutralization of acid-soluble Oligomer using GeniPhys’ polymerization kit and warming to 37°C[1, 2]. Short polymerization times facilitate uniform entrapment of cells throughout the collagen-fibril matrix when forming in-vitro 3D tissue constructs. Oligomer polymerization capacity has been standardized by relating the viscoelastic properties (shear storage modulus or stiffness) of self-assembled collagen matrices as a function of the CollYmer concentration of the polymerization reaction (Figure 3). The resultant best-fit polynomial curve serves as a Customizable Polymerization Formulary for highly reproducible and rapid user customization of 3D fibril matrices and 3D cellularized tissue constructs.
This formulary allows user customization of matrices based on Collymer concentration or matrix stiffness. Shear storage modulus or matrix stiffness has been chosen as the functional matrix property since it plays a critical role in matrix-based mechanobiology signaling of cells[6].

Precautions and Disclaimer
This product is for research and development use only and not intended for human or other uses. Please consult the Material Safety Data Sheet for information regarding safety hazards and safe handling practices.

References