Type I Collagen Hydrogels

Cellular Matrices for Physiologically Relevant Research

Purified Type I Collagen

- Chemically-defined
- Use in 2D and 3D formats
- Concentrations ranging from 3-35 mg/ml
- Purity >99%
- Over 30 type I collagen options

Collagen is the most abundant protein in the human body. Type I collagen is a major structural component of skin, bone, tendon, and other fibrous connective tissues. Researchers grow cells inside collagen hydrogels or on top of collagen coatings to provide an *in vivo*-like environment for cells.

Importance of Collagen Hydrogel Stiffness

Matrix stiffness can impact a wide variety of cellular pathways including propagation, differentiation, lineage specification, gene expression, morphology, self-renewal, pluripotency and migration.

Furthermore, the structural integrity of a hydrogel construct may be of importance, particularly in load bearing scenarios.

As culture systems become more tissue specific, the need to quantify the mechanical stiffness of biomaterials becomes more present.

Main Influencers of 3D Hydrogel Formation

➢ Concentration

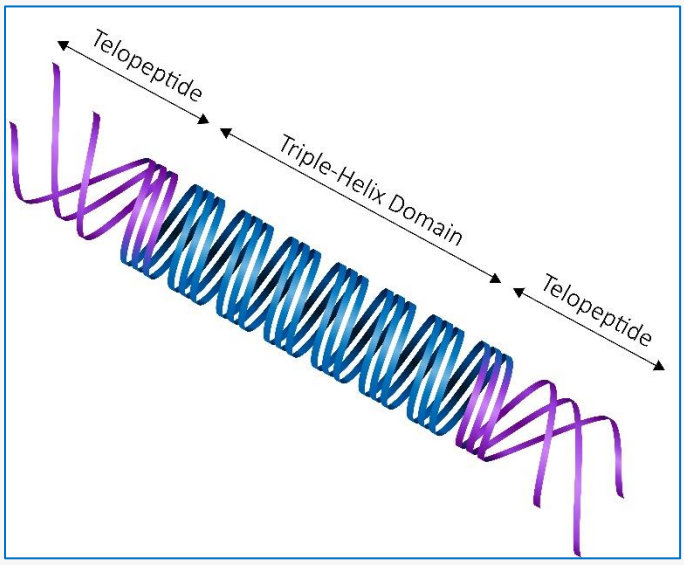
- Collagen with higher concentration polymerizes (gels) quicker and forms a stronger hydrogel

➢ Extraction Method

- Collagen extracted from the source using enzymes results in Atelocollagen (maintains triple-helix domain but Telopeptide region is cleaved)

- Collagen extracted using acid results in Telocollagen (telopeptide region is intact)

- Telocollagen polymerizes quicker and forms a stronger hydrogel than Atelocollagen of the same concentration.



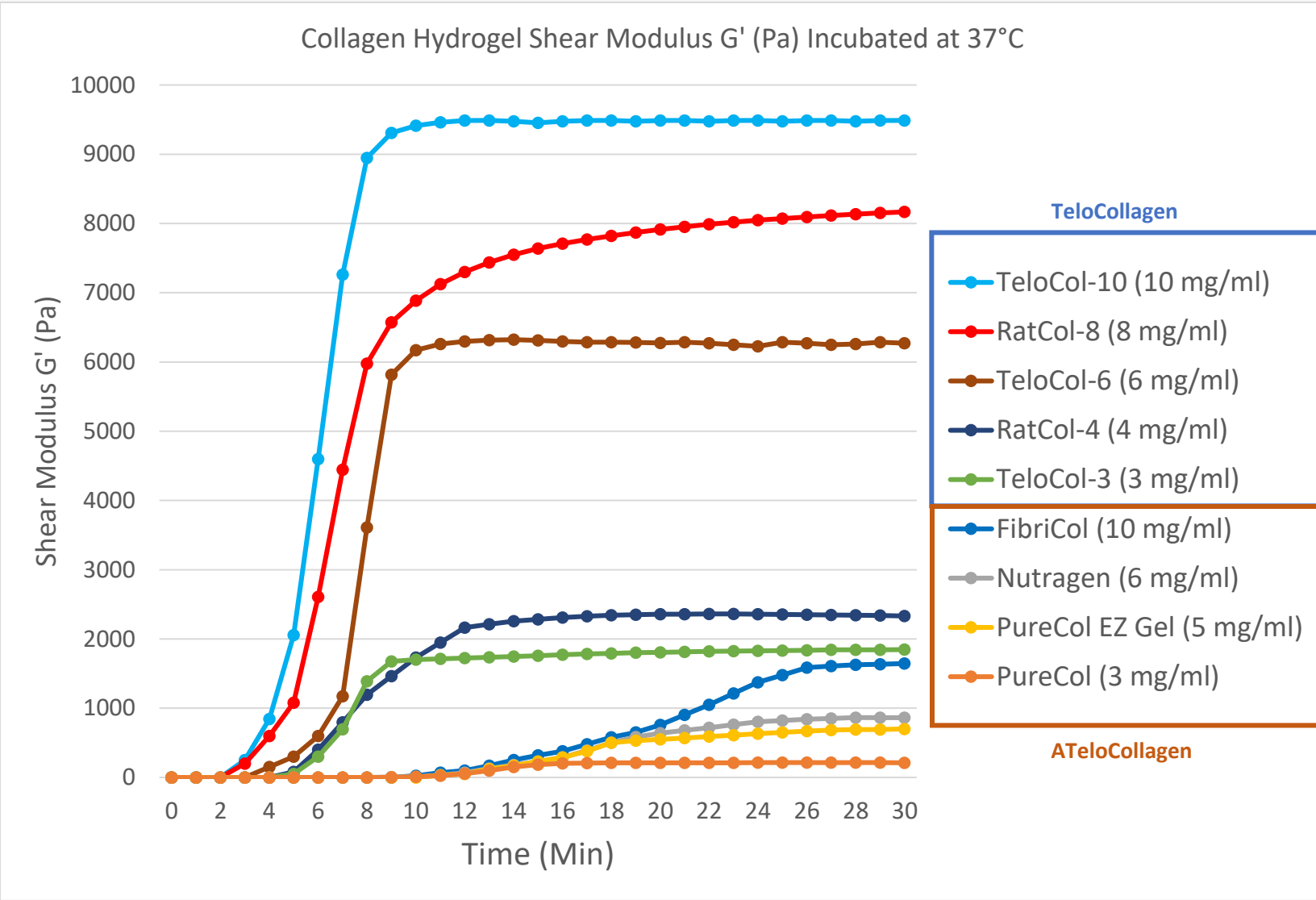
Other Factors for 3D Hydrogel Formation

Other parameters that can affect hydrogel gelation speed and strength include:

- pH
- Temperature
- Osmolarity
- Heat transfer
- Time
- Collagen purity
- Age of product

3D Hydrogel Shear Modulus G’ (Pa)

The following gelation data (G’ Shear Modulus) was collected using the ElastoSens Bio2 contactless rheometer. Samples were gelled within the ElastoSens unit at 37°C for 30 minutes, resulting in the following gelation curves:



To evaluate the effect of concentration on gelation properties, compare TeloCol®-6 to TeloCol®-10.

To evaluate the effect of protein extraction on gelation properties, compare FibriCol® (10 mg/ml Atelocollagen) to TeloCol®-10 (10 mg/ml Telocollagen).

Summary of Collagen for 3D Hydrogels

Product Name	Catalog #	Concentration (mg/ml)	pH	Source	Extraction	Telo vs Atelo	Hydrogel Shear Modulus G'
PureCol®	5005	3	2.0	Bovine Skin	Enzyme	Atelo	200 Pa
PureCol® EZ Gel	5074	5	7.4	Bovine Skin	Enzyme	Atelo	700 Pa
Nutragen®	5010	6	2.0	Bovine Skin	Enzyme	Atelo	850 Pa
FibriCol®	5133	10	2.0	Bovine Skin	Enzyme	Atelo	1650 Pa
TeloCol®-3	5026	3	3.0	Bovine Skin	Acid	Telo	1850 Pa
TeloCol®-6	5225	6	3.0	Bovine Skin	Acid	Telo	6300 Pa
TeloCol®-10	5226	10	3.0	Bovine Skin	Acid	Telo	9400 Pa
RatCol®-4	5153	4	3.0	Rat Tail Tendon	Acid	Telo	2300 Pa
RatCol®-8	5279	8	3.0	Rat Tail Tendon	Acid	Telo	8100 Pa

To order product or learn more,

visit our website at

www.AdvancedBioMatrix.com

Additional Collagen from Advanced BioMatrix

Product Name	Catalog #	Concentration (mg/ml)	pH	Source	Extraction	Telo vs Atelo	Other
VitroCol®	5007	3	2	Human Fibroblast Culture	Enzyme	Atelo	Highly Purified Human Collagen
FlexiCol®	5169	3	2	Porcine Skin	Enzyme	Atelo	N/A
PureCol®-S	5015	3	2	Bovine Skin	Enzyme	Atelo	>99.9% Pure Collagen Standard
PureCol® Lyophilized	5006	15 mg Powder	N/A	Bovine Skin	Enzyme	Atelo	Use for assays or plasticware coating
VitroCol® Lyophilized	5008	15 mg Powder	N/A	Human Fibroblast Culture	Enzyme	Atelo	Use for assays or plasticware coating
PhotoCol®	5198	100 mg Powder	N/A	Bovine Skin	Acid	Telo	Photocrosslinkable and Tunable hydrogels
Lifeink® 200 Bioink	5278	35	7	Bovine Skin	Enzyme	Atelo	Pure Collagen Bioink for FRESH Bioprinting
Lifeink® 240 Bioink	5267	35	4	Bovine Skin	Enzyme	Atelo	Pure Collagen Bioink for FRESH Bioprinting
Insoluble Fibrous Powder	5162	1 gram Powder	N/A	Bovine Tendon	Acid	Telo	Use for sponges, films and suspensions

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Collagen Data Disclaimer

The gelation data (G' shear modulus) was collected using the ElastoSens Bio2 contactless rheometer. Samples were gelled within the ElastoSens unit at 37°C for 30 minutes. Other testing methodologies use different measurements, sample volumes, pH, temperatures, gelation parameters, moduli, etc.. and may give different results than the values seen in the graphs above. Furthermore, gelation kinetics of collagen may slowly change over time. These values were obtained from fresh batches of each respective product.

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