Elastic storage modulus hyaluronic acid

Does hyaluronic acid have a viscoelastic gel?
(a) A tube inversion assay shows that hyaluronic acid solutions prepared at pH 1.6 exhibit viscous flow (s),whereas solutions prepared at pH 2.5 form a viscoelastic gel(p) that flows only on time scales beyond 2 min. (b) The pH dependence of the viscous and elastic modulus of hyaluronic acid in heavy water solutions.

What are hyaluronic acid properties?
A review. Hyaluronic Acid (HA) or hyaluronan displays remarkable properties of elasticity and water retentionat a specific and narrow pH range of 2.4-2.6. The behavior and mech. properties have been characterized using a variety of methodologies including ultracentrifuge sedimentation,rheometry,rate and extent of diffusion,and NMR.

Is hyaluronic acid a responsive Natural hydrogel?
(11-15)Hyaluronic acid is a paradigmatic example of a responsive natural hydrogel: it displays a sharp transition in mechanical behavior at pH 2.5,switching from a viscous state to an elastic gel,denoted as the "putty state".

Are hydrogels elastic for 3D culture?
However,hydrogels used as synthetic ECMs for three-dimensional (3D) culture are typically elastic. Here,we report a materials approach to tune the rate of stress relaxation of hydrogels for 3D culture,independently of the hydrogel's initial elastic modulus,degrdn.,and cell-adhesion-ligand d.

Does pH affect hyaluronic acid gelation?
Here,we use two-dimensional infrared spectroscopy to study the pH-induced gelation of hyaluronic acid,a ubiquitous biopolymer,which undergoes a transition from a viscous to an elastic state in a narrow pH range around 2.5.

What is hyaluronic acid composed of?
Hyaluronic acid has a relatively simple linear structure and homogeneous composition with repeating disaccharides composed of N-acetyl-glucosamine and glucuronic acid(illustrated in the inset of Figure 1b). The pH-dependent viscoelastic behavior of hyaluronic acid solutions stands out clearly in tube inversion assays,as shown in Figure 1a.

Abstract Storage and loss moduli of hyaluronic acid solutions with different molecular weights were observed as a function of frequency in the presence of sugars and salts. The hyaluronic acid ...

These hydrogels were swollen in water and the elastic modulus was obtained with a contact mechanics approach in ambient conditions using a low-load mechanical tester under ...

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In this work the elastic modulus of hyaluronic acid gels swollen to equilibrium in water and crosslinked using a zero length crosslinker is presented. The modulus is obtained using ...

In this study, we introduce a novel quantitative method of cohesion analysis termed the Modulus of Cohesion (MOC). The MOC is derived from rheometric strain sweep testing by calculating ...

In this context, a proposed gel, comprised of 4% carboxymethylcellulose (CMC4), 20 mg/ml of hyaluronic acid (HA), and 5 mg/ml of keratin (K), denoted as (CMC4+HA+K5), demonstrates ...

Hyaluronic acid was crosslinked using 1-ethyl-3- (3-dimethylaminopropyl)carbodiimide and N-hydroxysuccinimide to form hydrogels with low elastic modulus. These hydrogels were swollen ...

The storage (G ?) and loss (G ?) moduli increase with frequency. The storage modulus usually represents the elastic character and the loss modulus describes the viscous behavior. This ...

Abstract and Figures Hyaluronic acid was crosslinked using 1-ethyl-3- (3-dimethylaminopropyl)carbodiimide and N -hydroxysuccinimide to form hydrogels with low elastic ...

Abstract Hyaluronic acid was crosslinked using 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide and N-hydroxysuccinimide to form hydrogels with low elastic modulus. These hydrogels were swollen in ...

Natural hydrogels are widely investigated for biomedical applications because of their structures similar to extracellular matrix of native tissues, possessing excellent biocompatibility and ...

Application of these tailor-made methacrylated hyaluronic acid (MeHA) gels for bone tissue engineering and 3D bioprinting was the subject of investigation. Visco-elastic properties of MeHA gels, measured ...

Background: The cross- linked hyaluronic acid (HA) fillers are the viscoelastic hydrogel with a dominant elasticity rather than a viscosity as a useful medical device in the soft tissue augmentation. These HA ...

The results are useful to better fine-tune the storage and loss moduli of hyaluronic acid-gelatin hydrogels by varying the concentrations of the constituents for use in patient-specific treatments. Keywords: ...

You know, when we talk about energy storage materials, most people immediately think of lithium-ion batteries or pumped hydro. But what if I told you that hyaluronic acid--yes, the same stuff in your ...

Elastic hydrogels with high gel content (>=95%) and high storage moduli (up to 22.4 kPa) were obtained. An in vitro study in the presence of hyaluronidase (100 U/mL) revealed that with ...

Visco-elastic properties of MeHA gels, measured by rheology and dynamic mechanical analysis, showed that irradiation of the hydrogels with UV light led to increased storage moduli and elastic moduli, ...

Elastic storage modulus hyaluronic acid

Here, we use two-dimensional infrared spectroscopy to study the pH-induced gelation of hyaluronic acid, a ubiquitous biopolymer, which undergoes a transition from a viscous to an elastic ...

Viscoelastic materials exhibit a response between these two extremes, with the in-phase component of the response described as the storage, or elastic, modulus and the out-of-phase ...

In this work the elastic modulus of hyaluronic acid gels swollen to equilibrium in water and crosslinked using a zero length crosslinker is presented. The modulus is obtained using compression testing in a ...

Understanding rheologic and physicochemical properties will guide clinicians in aligning HA characteristics to the facial area being treated for optimal clinical performance. Keywords: aesthetics, ...

Hyaluronic acid (HA) solutions represent an important class of biomedical products, mostly used as viscosupplements in orthopaedics and as fillers in the cosmetic industry. The focus of ...