

## Hyaluronic Acid (Polysaccharides)

**H**yaluronic Acid (HA) is a ubiquitous, very high molecular weight polysaccharide that has been of particular importance in ophthalmic surgery. HA acts as a molecular “shock-absorber” and stabilizer for cells and its visco-elastic properties are valuable for separating tissue and maintaining shape. It is a critical component in tissue lubrication, and is believed to play a leading role in wound repair. Finally, HA’s property of non-pyrogenicity makes it an ideal sheath for implants, whose presence might cause the body to suffer an immune response.

Among the many benefits high molecular weight HA hold are:

- ❑ The maintenance of tissue space for surgery.
- ❑ The protection of cells and tissue.
- ❑ Therapeutic effectiveness.

HA’s therapeutic effectiveness depends critically on molecular weight: the higher the molecular weight, the longer its benefit. However, due to its visco-elastic properties, standards-based GPC analysis is inappropriate for characterizing HA. There exist *no* standards identical to HA, and the desirability of altering experimental conditions renders conventional GPC/SEC impractical.

Combining a DAWN DSP with a chromatograph, however, provides an ideal platform for absolute characterization, since the light scattering measurements do not depend on pump speed, polymer standards or molecular conformation.

A DAWN DSP was connected to a GPC/SEC line (0.15 M PBS buffer pH 7.5, TSK-Gel G6000PW column from Toso-Haas, Optilab Interferometric Refractometer, Waters 510 pump) and generated the data required to determine not only absolute molecular weights, but also molecular size, for a variety of competing HA products.

Figure 1 shows the Molecular Weight vs. Elution Volume (with the 90° light scattering chromatograms in the background) for the three samples, ranging from approximately 2 million to 200K Daltons. Figure 2 illustrates how profoundly different the samples are by revealing their differential molecular weight distributions. These indicate that the samples will behave in different ways when used medically, depending on the content of their high molecular weight HA.

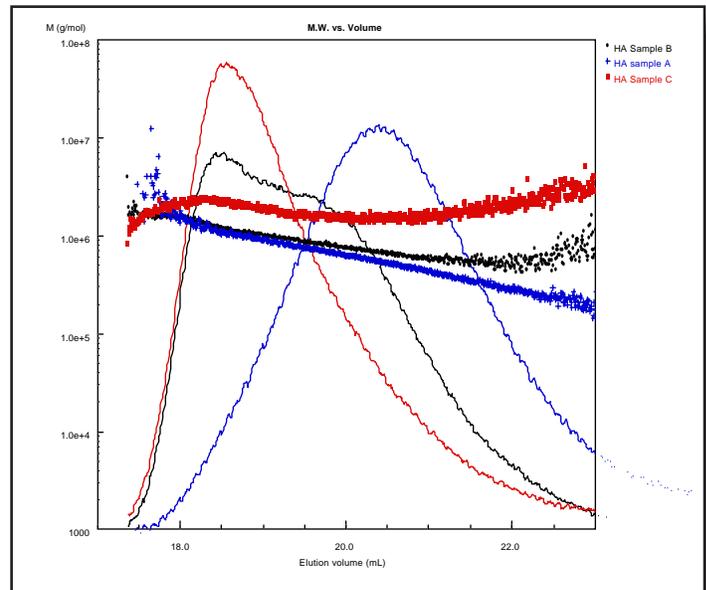


Figure 1. From the molecular weight vs. elution volume plot, important differences can be seen among the samples.

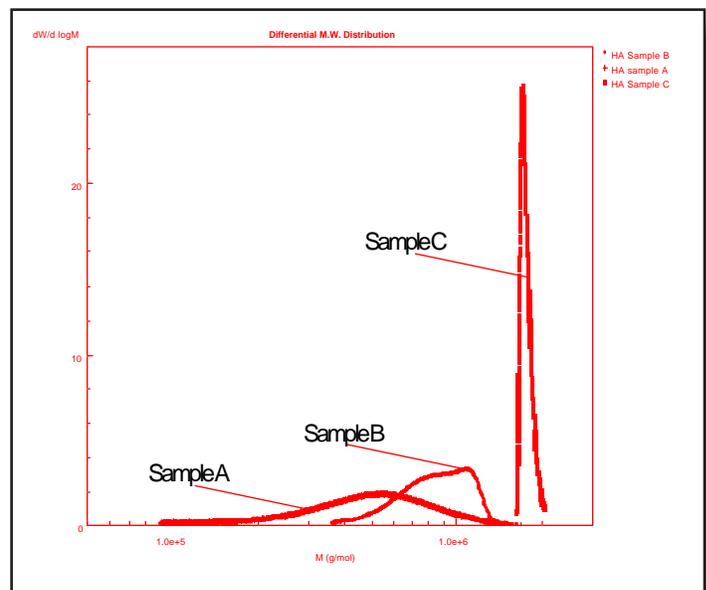
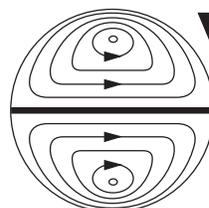


Figure 2. The differential molecular weight distributions calculated by ASTRA immediately confirm the large differences among the three HA samples.



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