

A Preliminary Report on the Dielectric Dispersion of Hyaluronic Acid

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Hyaluronic acid has been studied by Jorpes and co-workers in this laboratory. They have obtained preparations of very high purity from umbilical cord after digestion with pancreatic enzymes (unpublished results). In connection with their investigations some dielectric measurements have been made. Fürth's ellipsoid method, adapted to determinations of dielectric constants at different frequencies within the radio frequency range, is used in the manner described for investigations of polynucleotides^{1,2}. The preparations used have been kindly supplied by Prof. E. Jorpes.

The neutral sodium salt of hyaluronic acid is found to belong to those substances which have a (positive) dielectric increment. The increment is very high, about 6 DC units in 0.07 per cent aqueous solution, and shows a pronounced dependence on the concentration.

The dielectric dispersion is fairly well defined with a rather theoretical course,

indicating a certain degree of monodispersity. With decreasing concentrations the anomalous dispersion curve moves considerably to longer wave-lengths. This corresponds to a higher aggregate weight in dilute solutions.

With the assumptions of high aggregate asymmetry, and the resulting dipole moment transverse to the longer axis (which are plausible assumptions), a mean molecular weight of about 80 000 is calculated. The theoretical treatment of results of such substances are by no means easy, however, and the value mentioned must be taken with reserve until more exact knowledge has been obtained.

However, the order of magnitude is interesting because the supposed monomer (glucuronido-N-acetyl-glucosamin) might have been expected to orient rather freely around the glucosidic linkages. The existence of large aggregates, orientating as a whole, with high polarity, offers a chance for further dielectric investigations and especially for studies of the enzymatic decomposition.

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2. Jungner, I. *Acta Physiol. Scandinav.* **20** (1950) Suppl. 69.

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