Exogenous Hyaluronidases and Degradation of Hyaluronic Acid in the Rabbit Eye

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The infusion of two enzymes that degrade hyaluronic acid—testicular hyaluronidase and Streptomyces hyaluronidase—was evaluated by quantitative aqueous perfusion of rabbit eyes and by analyses of glycosaminoglycans (GAGs) isolated from the enzyme-treated eyes. The infusion of 1 and 10 units of Streptomyces hyaluronidase (SH) was considerably more effective than the infusion of 10 and 100 units of testicular hyaluronidase (TH) in reducing aqueous outflow resistance. As a result of the infusion of heat-inactivated enzymes, only a moderate decrease of hyaluronic acid in the aqueous outflow pathway was observed. There was no significant “wash-out” of other GAG material, ie, keratan sulfate, heparan sulfate, and hybrid dermatan sulfate-chondroitin sulfate. The SH enzyme, tested by infusion and isolation of GAGs or by in vitro analyses of the rate and extent of degradation of GAGs, completely removed all hyaluronic acid and did not alter the other GAGs. In contrast, the TH enzyme was only partially effective in degrading susceptible GAGs. The results of these studies indicate that SH is more effective than TH in decreasing aqueous outflow resistance and that hyaluronic acid is an important GAG contributor to aqueous outflow resistance in the normal rabbit eye. Invest Ophthalmol Vis Sci 25:286–293, 1984

The aqueous outflow pathway glycosaminoglycan profile (ie, hyaluronic acid, keratan sulfate, heparan sulfate, and hybrid dermatan sulfate-chondroitin sulfate) has been identified in rabbit1 and in human eyes.2 A considerable amount of circumstantial evidence indicates that GAGs have a role in regulating water flow through connective tissue3 and in modulating aqueous outflow resistance. Direct support for the notion that GAGs play a physiologic role in the aqueous outflow pathway came from the testicular hyaluronidase (TH) studies on enucleated cattle and rabbit eyes. The perfusion of TH resulted in a 50% decrease in resistance to aqueous flow in the aqueous outflow pathway.4,5 Initially, Bárány concluded that there were at least two barriers to aqueous outflow, one sensitive and the other insensitive to TH.

Further investigations on the relative importance of GAGs as determined by TH infusions, however, have suggested a mechanism of considerable complexity.6 In the human eye, the results of TH infusions on aqueous outflow resistance are variable and inconclusive.7,8 A moderate, but variable, reduction in aqueous outflow resistance in monkey eyes was observed during TH perfusion studies.9 In contrast, a biphasic response to TH infusion was observed in dogs: a rapid effect and a gradual, time-dependent effect on aqueous outflow resistance.10 Thus, the evidence to-date suggests that in nonprimate species there is a GAG barrier to aqueous outflow that is sensitive to TH infusion. In primate species, the physiologic evidence for the presence of a GAG barrier to aqueous outflow is inconclusive.

The aim of this study was to evaluate the relationships of GAGs and aqueous outflow resistance by testing the effectiveness of two exogenous hyaluronidases, Streptomyces hyaluronidase (SH) and TH. Three experimental approaches were used: (1) in vitro analyses were performed on the effectiveness of the enzymes in degrading reference GAGs in near physiological and optimum enzyme conditions; (2) a constant infusion of the enzyme into rabbit eyes was used to determine the time sequence effects of the enzyme on pressure-facility relationships; (3) biochemical analyses of isolated GAGs from the enzyme-infused eyes were performed to test whether infusion of the control, SH or TH solutions had changed the GAG profiles.

Materials and Methods

Cannulation of Rabbit Eye

New Zealand red rabbits, approximately 8-weeks-old and 1.5 kg, were killed by an overdose of intravenous phenobarbital. The eyes were enucleated, and the globes were placed in moist, gauze-lined cavities...
within a paraffin block. The paraffin block was maintained at 37°C by a heating module (Scientific Products, Chicago, IL). The eyes were covered by gauze to the limbal area of the globe. The surface of the globe was moistened at regular intervals with warm (37°C), 25 mM Hepes-buffered Ringer's lactate solution.

Aqueous flow was determined by the protocol of Bárány.11 Four needles were inserted into the anterior chamber to measure or manipulate aqueous fluid flow. The needles were glued to the cornea by the application of one drop cyanoacrylate adhesive (Quick Fix®) to prevent aqueous leakage.

At the onset of the perfusion studies, a specially designed flow needle12 was inserted into the anterior chamber. This allowed for free communication between the posterior chamber, the anterior chamber, and a perfusion reservoir. During the initial cannulation, intraocular pressure (IOP) was maintained at 10 mmHg. A second 23-gauge needle, which was connected to a pressure transducer via a PE 90 tubing, was inserted at the limbal cornea into the anterior chamber. After completion of part 1 of the experimental protocol (see below), a mixing needle13 was inserted into the anterior chamber. Finally, a 25-gauge needle, which was connected to a 50 μl preloaded Hamilton syringe on a Sage syringe pump, was inserted at the limbus into the anterior chamber.

**Experimental Design**

The perfusion studies were performed in three parts. Each eye was tested with a perfusate of (1) 25 mM Hepes-buffered Ringer's lactate (preinfusion data); (2) the enzyme or heat-inactivated enzyme control solution (time-sequence study); and (3) 25 mM Hepes-buffered Ringer's lactate (postinfusion data).

Testicular hyaluronidase (E.C. 3.2.1.35) and Streptomyces hyaluronidase (E.C. 4.2.2.1) were obtained from Miles Laboratories (Elkhart, IN). The TH was prepared from bovine testes and was reported to have an activity of 2,000 TRU per mg. SH was infused in a volume of 50 μl containing 1 or 100 units of enzyme. The SH was prepared from Streptomyces hyalurolyticus and was reported to have an activity of 2,000 TRU per mg. SH was infused in a volume of 50 μl containing 1 or 10 units of enzyme. The control solutions were 25 mM Hepes-buffered Ringer's lactate containing inactive TH or SH enzymes denatured by immersion for 5 min in a 100° water bath.

**Preinfusion Data**

Flow rates of buffer were determined at stepwise increases of IOP levels, ie, at 5, 7.5, 10, 15, 20, 25, and 30 mmHg. The time allowed to establish steady-state conditions was 15 min at 5 and 7.5 mmHg and 4–5 min at each of the other IOP levels. Steady-state flow rates of buffers were then determined at stepwise decreases of IOP levels, ie, 25, 20, 15, 10, 7.5, and 5 mmHg.

**Time-sequence Studies**

Time-sequence studies of control solutions, TH solutions and SH solutions were performed by the injection of the solutions into the anterior chamber at the rate of 2 μl per min for 25 min. The anterior chamber contents were “mixed” by the anterior chamber mixing needle for 5 seconds every min. The IOP was recorded by a pressure transducer throughout the infusion time period. The infusion flow rate was the sum of the measured buffer solution plus the infusion solution (2 μl/min). After the infusion was completed, flow rates of the buffer solutions were measured for an additional 35 min at an IOP of 10 mmHg.

**Postinfusion Data**

Postinfusion data were obtained from the control and enzyme-treated eyes. Aqueous flow rates were measured, and the facility was calculated at a series of steady states as the IOP level was elevated to 30 mmHg and again as the IOP level was reduced to 5 mmHg.

The total duration of parts 1, 2, and 3 was from 6–9 hr, depending upon the rapidity with which steady-state conditions were obtained. If any disturbance in the needles and/or leakage from the needles occurred, the eye was discarded, and the results were not used for the physiology determinations or the biochemical data.

**Isolation and Identification of GAG-enriched Fraction**

After the aqueous perfusion was completed, the anterior sclera, the iris-ciliary body and the aqueous outflow pathway (ie, the trabecular meshwork) were dissected and handled as previously outlined.1 For comparative purposes, the anterior chamber structures of 12 normal, unperfused eyes were dissected.

The GAGs were isolated by methods previously described.14 The GAG material was dissolved in a volume of 0.075 M sodium chloride equivalent to 10 μl per 1 mg of dried, defatted tissue weight.

The isolated GAG-enriched fraction was assayed for hexuronic acid.15 The GAG profile of each tissue was identified by a combination of zone electrophoresis and susceptibility to digestion with GAG degrading enzymes.
enzymes.\textsuperscript{1,16} GAG samples equivalent to 5 μg hexuronic acid were treated with 1.0 unit Streptomyces hyaluronidase, 0.1 unit chondroitinase AC and 0.1 unit chondroitinase ABC, as described previously.\textsuperscript{1} The GAG material resistant to chondroitinase ABC treatment was incubated with 20 μg crude heparinase\textsuperscript{17} (the gift of Dr. Alfred Linker, VA Hospital, Salt Lake City, UT). The GAG material resistant to heparinase treatment was treated with 0.1 unit endo-β-D-galactosidase\textsuperscript{18} (the gift of Dr. Suzuki, Nagoya University, Japan). To determine the result of each GAG-degrading enzyme incubation, an aliquot of the remaining undegraded GAG was subjected to zone electrophoresis on cellulose acetate membranes. A quantitative determination of the intensity of the alcian blue staining was obtained by densitometric scanning of the membranes. The precision of reproducibility of the alcian blue staining was determined by planimetry. When replicate samples of isolated GAGs from a tissue were analyzed, the areas were within ±8% of one another.

Degradation of Reference GAG by Testicular Hyaluronidase and by Streptomyces Hyaluronidase

The rate and extent of degradation of reference GAGs (the gift of Drs. M. B. Mathews and J. A. Cifonelli, University of Chicago, Chicago, IL) by TH and SH was studied in optimum enzyme-substrate conditions and in near physiologic buffer conditions. For TH, the optimum incubation mixture\textsuperscript{19} (100 μl) was 10 units TH enzyme; 10 μmoles sodium acetate-15 μmoles sodium chloride, pH 5.2; and 40 μg reference

Fig. 1. Rate and extent of \textit{in vitro} degradation of reference GAGs with Streptomyces hyaluronidase. A, The conditions of the experiment were optimum, ie, 2 μmoles sodium acetate-15 μmoles sodium chloride, pH 5.0. B, The conditions of the experiment were 25 mM Hepes-buffered Ringer's lactate, pH 7.6. In a volume of 100 μl, the enzyme concentration was 1 unit, and 40 μg amounts of the following substrates were used: ▲, hyaluronic acid; □, enzyme-resistant GAGs, ie, chondroitin 4-sulfate, chondroitin 6-sulfate, dermatan sulfate, keratan sulfate type I, heparan sulfate or heparin.

Fig. 2. Rate and extent of \textit{in vitro} degradation of reference GAGs with testicular hyaluronidase. A, The conditions of the experiment were optimum, ie, 10 μmoles sodium acetate-15 μmoles sodium chloride, pH 5.2. B, The conditions of the experiment were 25 mM Hepes-buffered Ringer's lactate, pH 7.6. In a volume of 100 μl, the enzyme concentration was 10 units, and 40 μg amounts of the following substrates were used: ▲, hyaluronic acid; ○, chondroitin 4-sulfate; ●, chondroitin 6-sulfate; △, dermatan sulfate; □, enzyme resistant GAGs, ie, keratan sulfate type I, heparan sulfate or heparin.
GAG. For SH, the optimum incubation mixture\(^2\) (100 \(\mu\)l) was 1.0 unit SH enzyme; 2 \(\mu\)moles sodium acetate-15 \(\mu\)moles sodium chloride, pH 5.0; and 40 \(\mu\)g reference GAG. For each enzyme, the near physiologic incubation mixture (100 \(\mu\)l) was 10 units TH or 1.0 unit SH; 25 mM Hepes-buffered Ringer’s lactate, pH 7.6; 40 \(\mu\)g reference GAG. Controls contained heat-inactivated enzyme. The reaction mixtures were incubated at 37\(^\circ\)C for 2 hr.

The degradation of each GAG substrate was assayed by densitometric scanning of the material stained by alcian blue that remained after enzyme treatment. The percent dye-binding was expressed as a ratio of the alcian blue, enzyme-treated GAG material to the alcian blue, heat-inactivated enzyme GAG material. The rate of hyaluronic acid degradation \textit{in vitro} by SH was faster in the optimum buffer than in the Hepes-buffered Ringer’s lactate (Fig. 1). After 40 min of incubation in either buffer, hyaluronic acid was 100% degraded. Similarly, the initial rate for TH degradation of hyaluronic acid in optimum buffer was faster than the rate in 25 mM Hepes-buffered Ringer’s lactate (Fig. 2). After 40 min of incubation in optimum buffer, hyaluronic acid was completely degraded by TH. After 2 hr of incubation in Hepes-buffered Ringer’s lactate, the hyaluronic acid was degraded only 50% by TH. The extent of degradation of chondroitin 4-sulfate and of chondroitin 6-sulfate was 30% and 40%, respectively, after prolonged incubation in Hepes-buffered Ringer’s lactate. In optimum buffer conditions, these chondroitin sulfates were degraded completely after 2 hr of incubation. Dermatan sulfate was degraded 25% in optimum buffer conditions and 10% in Hepes-buffered Ringer’s lactate solution. These biochemical results indicate that SH was considerably more effective than TH in degrading susceptible GAGs in vitro.

\section*{Results}

\subsection*{Physiology}

\textit{Control solutions}: Time-sequence studies for the control solutions are shown for pressure-facility relationships in Figure 3A and 4A. The results indicate that the facility increased slightly during the time-sequence study for both controls, ie, the mean facility...
Fig. 5. Zone electrophoresis of (a) isolated sclera, (b) iris-ciliary body, and (c) aqueous outflow pathway GAGs obtained from the six experimental groups: Lane 1, normal unperfused eyes. Lane 2, control eyes perfused heat-inactivated enzyme. Lane 3, eyes infused with 10 units SH. Lane 4, eyes infused with 100 units SH. Lane 5, eyes infused with 1 unit SH. Lane 6, eyes infused with 10 units SH. Electrolyte, 0.05 M lithium chloride. The densitometric tracings are from cellulose acetate membranes stained with alcian blue. The bands of sclera are labeled with Arabic numerals; the bands of iris-ciliary body and aqueous outflow pathways are labeled with Roman numerals. Alcian blue positive material identified as hyaluronic acid by in vitro susceptibility to degradation by hyaluronate lyase.

Values changed from 0.400 to 0.437 μl per min per mmHg for the heat-inactivated SH and from 0.388 to 0.436 μl per min per mmHg for the heat-inactivated TH. The increase in facility was 9% for heat-inactivated SH and 11% for heat-inactivated TH, which was statistically insignificant. (See Figs. 3A, 4A.) The slight increase in facility suggested that the experimental protocol not only was technically feasible, but also maintained pressure-flow and pressure-facility relationships very similar to the preinfusion relationships.

The postinfusion control data on pressure-facility relationships (Figs. 3B, 4B) are similar to the preinfusion data. Although there were some differences, the facility was increased by about 20% at the lower IOP perfusion levels (5 to 15 mmHg) and by about 12% at the higher IOP perfusion levels (20–30 mmHg).

Streptomyces hyaluronidase: Time-sequence studies of SH infusion are shown for pressure-facility relationships in Figure 3A. The infusion of 1 or 10 units of SH was effective in decreasing aqueous outflow resistance. Infusion of SH resulted in a significant increase in facility at 15 min, (ie, the latency period, which was defined by a paired t test, P < 0.05). The total decrease in outflow resistance was 46% for 1 unit and 50% for 10 units of SH.

In order to gain further information on the nature of SH modulation of aqueous outflow resistance, the enzyme-treated eyes were tested at a series of IOP levels. The results of these studies indicated that SH was remarkably effective in decreasing outflow resistance. The infusion of SH resulted in a decrease in outflow resistance of approximately 40% for 1 unit (P < 0.0005) and 50% for 10 units (P < 0.0005) at all IOP perfusion levels (Fig. 3B).

Testicular hyaluronidase: The infusion of 100 units of TH resulted in a moderate overall effect. A significant increase was observed at 30 min, (ie, latency period). The maximum effect was a 29% net decrease in outflow resistance (Fig. 4A). In contrast, the infusion of 10 units of TH resulted in a minimal overall effect: latency period of 40 min. and a maximum effect of a 13% net decrease in outflow resistance.

The results of the postinfusion studies indicated that the infusion of 100 units of TH was effective in increasing flow and facility at all IOP levels (Fig. 4B). Although there were some differences, the outflow resistance was decreased by about 34% at the lower perfusion levels (5 to 15 mmHg) and by about 25% at the higher perfusion levels (20 to 30 mmHg). These changes were statistically significant (P < 0.025). In contrast, the infusion of 10 units of TH did not result in a statistically significant change in any of the pressure-facility relationships.

Biochemistry

Heat-inactivated enzyme: The results of the analyses of the isolated GAG material from the control solutions indicated that there were minimal changes in the GAG distribution profile. Densitometry tracings of the sclera alcian blue profiles were identical with those of the normal, unperfused alcian blue profiles; the alcian blue profiles of the iris-ciliary body were slightly decreased in bands I and IV, whereas the alcian blue profiles of the aqueous outflow pathway were slightly decreased in band I (Fig. 5). The hexuronic acid values were
similar for the unperfused and the control perfused sclera and aqueous outflow pathway tissue, but lower for the iris-ciliary body tissue (Table 1). It would appear, therefore, that infusion of the control solutions did not markedly alter the GAG distribution patterns.

*Streptomyces hyaluronidase:* The isolated GAG material from the SH infusion experiments indicated that hyaluronic acid was removed (Fig. 5). The sclera alcian blue profile demonstrated a progressive decrease in band I as the dosage of SH was increased. The alcian blue profiles of the iris-ciliary body and aqueous outflow pathway also demonstrated a progressive decrease in band I and a slight decrease in band IV. There did not appear to be any effect on bands II or III. The hexuronic acid values were consistent with the electrophoretic results (Table 1). It would appear, therefore, that infusion of the SH resulted principally in the degradation of hyaluronic acid and did not markedly alter the other GAG distribution patterns.

*Testicular hyaluronidase:* The isolated GAG material from the TH infusion experiments indicated that there were minimal changes in the GAG distribution patterns. The sclera alcian blue profiles and the hexuronic acid values appeared similar, although there was a slight decrease in sclera band I. The profiles of the iris-ciliary body indicated that there was a decrease in band I and that band IV was slightly decreased (Fig. 5). The alcian blue profiles of the aqueous outflow pathway also indicated that band I was decreased in the 10 and 100 unit TH experiments; however, the hexuronic acid values were similar to those in the normal, unperfused eyes.

**Enzymatic determination of GAGs isolated from infused rabbit eyes:** Enzyme procedures were performed on the isolated GAGs, which were obtained from the infusion experiments, in order to confirm the identification of the GAGs. Band I (iris-ciliary body/aqueous outflow pathway) and a portion of band 1 (sclera) were susceptible to degradation by SH and were identified as hyaluronic acid. The remainder of band 1 (sclera) and most of band 2 (sclera) were susceptible to degradation by chondroitinase AC and were identified as chondroitin 4 (6)-sulfate. Band 3 (sclera) and band IV (iris-ciliary body/aqueous outflow pathway) were partially susceptible to degradation by chondroitinase AC and completely susceptible to degradation by chondroitinase ABC. Thus, the two bands were identified as hybrid dermatan sulfate-chondroitin sulfate. Band III (iris-ciliary body/aqueous outflow pathway) was susceptible to degradation by crude heparinase and was identified as heparan sulfate. Band II (iris-ciliary body/aqueous outflow pathway) was susceptible to degradation by endo-β-D-galactosidase and was identified as keratan sulfate. The results of these experiments are the same as those previously described for the identification of the control, unperfused, isolated GAGs.1

**Table 1. Hexuronic acid* determination of isolated GAGs**

<table>
<thead>
<tr>
<th>Experimental condition</th>
<th>Sclera</th>
<th>Iris-ciliary body</th>
<th>Aqueous outflow pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal unperfused</td>
<td>94</td>
<td>65</td>
<td>75</td>
</tr>
<tr>
<td>Control†</td>
<td>86</td>
<td>50</td>
<td>73</td>
</tr>
<tr>
<td>10 units TH</td>
<td>83</td>
<td>49</td>
<td>73</td>
</tr>
<tr>
<td>100 units TH</td>
<td>85</td>
<td>52</td>
<td>74</td>
</tr>
<tr>
<td>1 unit SH</td>
<td>76</td>
<td>52</td>
<td>65</td>
</tr>
<tr>
<td>10 units SH</td>
<td>68</td>
<td>54</td>
<td>59</td>
</tr>
</tbody>
</table>

* Table entries are for nanomoles of hexuronic acid per 10 mg weight of dry defatted tissue; the data represent the average of duplicate analyses of a tissue pool.
† Control eyes were perfused with 0.025 M Hepes-buffered Ringer’s lactate and with 100 units heat-inactivated TH.

**Discussion**

The results of this study indicate that SH is more effective than TH in degrading hyaluronic acid in vitro or when infused into the rabbit eye. SH is a highly specific hyaluronic-acid-degrading enzyme that is active over a wide pH range (4.0–10.0), is temperature stable, and is not inhibited by sulfated GAG polymers.19 In contrast, TH is a less specific GAG degrading enzyme that potentially degrades hyaluronic acid and chondroitin sulfate.

The constant infusion of the SH or TH enzymes over 25 min resulted in a decrease in total aqueous outflow resistance. During the infusion period, an attempt was made to achieve steady state flow conditions by gradually increasing and then decreasing IOP; however, it is possible that the visco-elastic properties of the cornea and sclera may have influenced the flow measurements at the various IOP levels. The data presented for the facility-pressure relationship for TH and SH are for the stepwise increase in IOP. Similar data were recorded for the stepwise decrease in IOP, which suggests that a near steady state was obtained for the infusion period.

It has generally been accepted that prolonged infusion of buffer results in the “wash-out” of GAGs.7,10,21 However, proteoglycans and their covalently attached GAG chains are dissociated only under extreme non-physiologic conditions, eg, with 4 M guanidine hydrochloride, 3 M magnesium chloride or 6 M lithium chloride. Low salt concentrations, eg, 0.15 M potassium chloride, allow aggregate formation and are referred to as associative conditions.22 The results of these stud-
ies do not show removal of GAGs from the aqueous outflow pathway, iris ciliary body, or sclera during prolonged infusion. Although the densitometric tracings of the alcian blue profiles of isolated GAGs from unperfused, control eyes and of perfused, control eyes are similar, a moderate decrease in hyaluronic acid was demonstrated in the perfused, control aqueous outflow pathway. Consequently, it is most probable that the so called “wash-out” effect of prolonged infusion is the result of other cellular or extracellular changes in the aqueous outflow pathway rather than of the removal of GAGs per se.

In order to test the effectiveness of the hyaluronidases, in vitro studies were carried out to examine the rate and extent of degradation of GAGs by SH and TH. Hyaluronic acid was degraded completely by SH. Normally, hyaluronic acid, chondroitin 4 (6)-sulfate and, to some extent, dermatan sulfate are susceptible to digestion by TH. In vitro incubation of hyaluronic acid with TH in the Ringer’s buffer resulted in a 50% degradation, which indicates that the enzyme is only partially effective at physiologic pH. The pH optimum for TH is between 5 and 6. The activity of TH at pH 7 was approximately 25% of its activity at the optimum pH.

An important consideration in the evaluation of enzyme infusion studies is the purity of the enzyme preparation. Hyaluronidase enzyme preparations have detectable protease activity; SH, 44 units/100 TRU; TH, 30 units/100 TRU. The SH enzyme used in this study was homogeneous by molecular exclusion and DEAE cellulose chromatography. The TH enzyme was purified partially by ammonium sulfate fractionation and ion-exchange chromatography. Despite the low SH concentration and relatively low TH enzyme concentration used in this study, protease contamination and other impurities in the preparations also may have acted to decrease aqueous outflow resistance.

The biochemical studies, as determined by hexuronic acid and densitometric tracings of the alcian blue profiles of isolated GAGs from the enzyme-infused eyes, indicate that the SH is considerably more effective in degrading susceptible GAGs than is TH. In addition, the extent of removal of hyaluronic acid in the aqueous outflow pathway was correlated with the degree of decrease in aqueous outflow resistance. The conflicting results, as reported in the literature, of the infusion of TH in primate eyes on aqueous outflow resistance, may relate to a variable and incomplete degradation of hyaluronic acid by TH in physiologic pH conditions.

The infusion of two other GAG degrading enzymes—chondroitin AC lyase (which potentially degrades hyaluronic acid and chondroitin 4 [6]-sulfate) and chondroitin ABC lyase (which potentially degrades hyaluronic acid, chondroitin 4 [6]-sulfate and dermatan sulfate)—was observed to decrease outflow resistance by 30% in the rabbit eye. In the chondroitin AC lyase and in the chondroitin ABC lyase infusions, the GAG profile indicated incomplete degradation of hyaluronic acid and complete degradation of the other susceptible GAG material. On the basis of the results of the present study and the chondroitin AC and chondroitin ABC lyase experiments, it appears that hyaluronic acid is the important GAG contributor to aqueous outflow resistance in the normal rabbit eye.

Key words: aqueous outflow pathway, aqueous dynamics, Streptomyces hyaluronidase, testicular hyaluronidase, glycosaminoglycans

References

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