Hyaluronan Oligosaccharide assortment
(HA4, HA6, HA8, HA10, HA12)

Code#: CSR-93001
Product Name: Hyaluronan Oligosaccharide assortment
Size: 3mg/vial (HA4, HA6, HA8, HA10), 1mg/vial (HA12)
Molecular Weight: 820.61 (HA4), 1221.91 (HA6), 1623.21 (HA8), 2024.51 (HA10),
                  2425.81 (HA12)
Storage: below 4 ºC (Freezable)
Storage conditions: To avoid high temperature and high level of humidity and
                  exposure to UV light. Preferably store in the dark.
Note: This product is not sterilized, please use filter (ex. 0.22µm) as you need.
      Please pay enough attention to static electricity at the weighing.

Hyaluronan oligosaccharides are known for their various activities depending
on the size as reported by Stern R. et al[1]. Hyaluronan oligosaccharides are made by an
enzyme, hyaluronidase, from hyaluronan polymer extracted from rooster comb or
isolated from fermentation products of bacteria. There is a difference between the
structure of hyaluronan oligosaccharides made by mammalian enzyme and by
bacterial enzyme.

Oligosaccharides made by hyaluronidase derived from bacteria are called
“unsaturated” oligosaccharides because of the double bond between C-4 and C-5 position
of uronic acid at their non-reducing end. On the other hands, oligosaccharides made by
hyaluronidase derived from mammalian testis are called “saturated” oligosaccharide
because they have no unsaturated bound.

This product is made from hyaluronan polymer purified from fermentation
products of streptococcus sp, by digestion with mammalian hyaluronidase derived from
ovine testis, and purified by the column chromatography[2]. The structure of this product
is shown in the chart below.

HA Oligosaccharide: GlcAβ1→3(GlcNAcβ1→4 GlcA)nβ1→3GlcNAc

References :

NOTICE: For R&D use only. Do not use for drug, household, cosmetically and others.
# Certification of Analysis

**Code#:** CSR-11001  
**Product Name:** Hyaluronan Oligosaccharide 4mer sodium salt  
**Lot No.:** 9K63  
**Size:** 3 mg/vial  
**Date:** 09/11/16

<table>
<thead>
<tr>
<th>Item</th>
<th>Result</th>
<th>Specification</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White lyophilizate</td>
<td>White lyophilizate</td>
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<tr>
<td>Purity determined by HPLC</td>
<td>97.5%</td>
<td>&gt;90.0 %</td>
<td>1)</td>
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<tr>
<td>See the chromatogram below</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


![Elution profile of Hyaluronan Oligosaccharide 4mer sodium salt](image)

Manufactured by [PG Research](http://www.pg-r.com)  
Signature: 
Satoshi Miyauchi  
PG Research, 4-13-11, Hanakoganei,  
Kodaira, Tokyo 187-0002, Japan  
URL: [http://www.pg-r.com](http://www.pg-r.com)

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Certification of Analysis

Code#: CSR-11002  
Product Name: Hyaluronan Oligosaccharide 6mer sodium salt  
Lot No.: 9L80  
Size: 3 mg/vial  
Date: 10/03/10

<table>
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<td>Appearance</td>
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<tr>
<td>Purity determined by HPLC</td>
<td>98.2 %</td>
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<td>See the chromatogram below</td>
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Elution profile of Hyaluronan Oligosaccharide 6mer sodium salt

Manufactured by

PG Research

Signature:

Satoshi Miyauchi

PG Research, 4-13-11, Hanakoganei, Kodaira, Tokyo 187-0002, Japan
URL: http://www.pg-r.com

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Certification of Analysis

Code#: CSR-11003
Product Name: Hyaluronan Oligosaccharide 8mer sodium salt
Lot No.: 9K64
Size: 3 mg/vial
Date: 09/11/16

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![Chromatogram](image)

Manufactured by PG Research

Signature:

Satoshi Miyauchi
PG Research, 4-13-11, Hanakoganei, Kodaira, Tokyo 187-0002, Japan
URL: http://www.pg-r.com

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Certification of Analysis

Code#: CSR-11004  
Product Name: Hyaluronan Oligosaccharide 10mer sodium salt  
Lot No.: 9K65  
Size: 3 mg/vial  
Date: 09/11/16

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![Elution profile of Hyaluronan Oligosaccharide 10mer sodium salt](image)

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Signature: 

Satoshi Miyauchi

PG Research, 4-13-11, Hanakoganei, Kodaira, Tokyo 187-0002, Japan

URL: http://www.pg-r.com

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# Certification of Analysis

Code#: CSR-11005  
Product Name: Hyaluronan Oligosaccharide 12mer sodium salt  
Lot No.: 9K66  
Size: 1 mg/vial  
Date: 09/11/16

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See the chromatogram below


![chromatogram](attachment:image.png)

**Elution profile of Hyaluronan Oligosaccharide 12mer sodium salt**

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**Manufactured by**  
PG Research

**Signature:**  
Satoshi Miyauchi  
PG Research, 4-13-11, Hanakoganei, Kodaira, Tokyo 187-0002, Japan  
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