Products for Heparin Analysis

2014 - 2015

Adhoc International

Our Company

Located in Beijing, Adhoc International is an integrated vendor who produces reagents used in researches and quality control of heparins and chondroitin sulfates.

Adhoc International also uses its engineering prowess to develop novel devices for microbial mutation, such as multifunctional plasma mutagenesis systems.

Our Focuses

⇒ Heparinases and chondroitinases
⇒ Reagents for chromogenic assays
⇒ Determination of heparin sources
⇒ Multifunctional plasma mutagenesis systems
⇒ Chemicals used in personal health products

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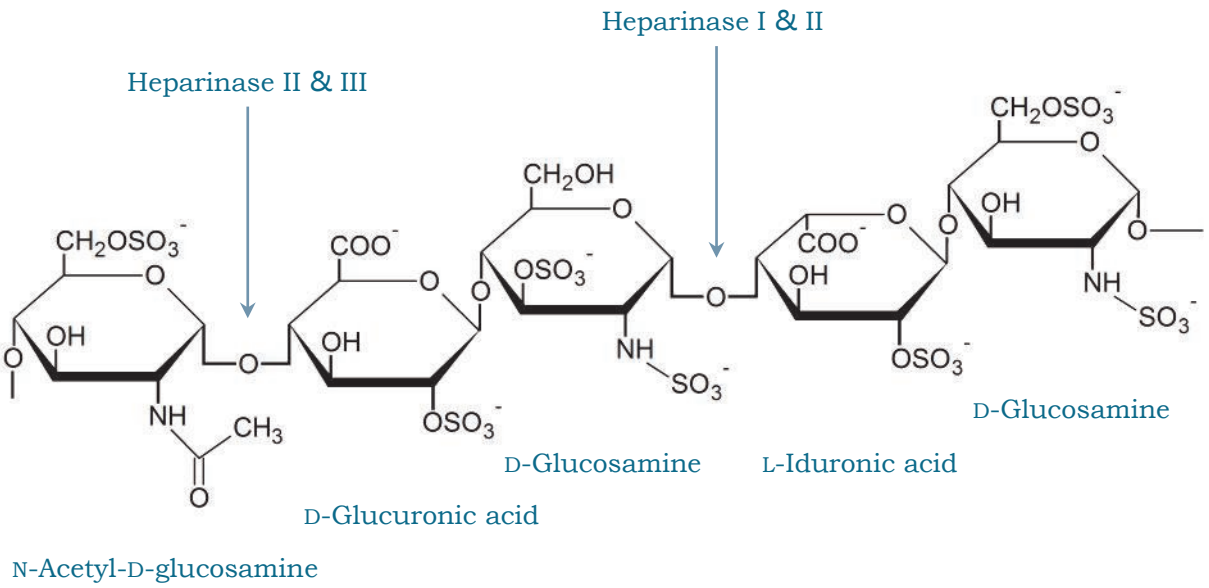
Heparinases

from Flavobacterium heparinum

Heparinases, or heparin lyases, are widely used in studies of heparin and heparan sulfate as well as in quality control of heparin products.

With improved fermentation capabilities and advanced purification techniques, we promise a large supply of natural heparinases.

Specificity



Heparinases can clave glycosidic bonds of heparin and/or heparan sulfate by a β-elimination mechanism, generating unsaturated products (mostly disaccharides) with a double bond between C4 and C5 of the uronate residue.

The resulting unsaturated products can be measured at 232 nm wavelength.

Enzyme	Substrate
Heparinase I	Heparin and heparan sulfate (ratio approx. 3:1)
Heparinase II	Heparin and heparan sulfate
Heparinase III	Heparan sulfate

Features

⇒ Natural enzymes, isolated from Flavobacterium heparinum
⇒ High purities, without BSA and other protein impurities
⇒ Superb stabilities, especially for heparinase II
⇒ Consistent degradation performance

Specifications

	Heparinase I	Heparinase II	Heparinase III
CAS Number	9025-39-2	149371-12-0	37290-86-1
EC Number	4.2.2.7	-	4.2.2.8
Molecular Weight	42.8 kDa	84.1 kDa	70.8 kDa
Purity (HPLC)	> 99%	> 99%	> 99%
Specific Activity	> 400 IU/mg (heparin)	> 15 IU/mg (heparin); > 18 IU/mg (HS)	> 200 IU/mg (HS)
Concentration	10 IU/mL	4 IU/mL	5 IU/mL
Storage Temperature	- 20 ℃	- 20 ℃	- 20 ℃

NOTE: 1 IU = 600 Sigma units where IU stands for international unit.

Applications

⇒ Test for 1,6-anhydro derivative for enoxaparin sodium
⇒ Finding featured fragments in heparin chains
⇒ Degrading of heparin before qPCR experiments for determining the origin of heparin
⇒ Processing blood samples or other tissues in order to neutralize heparin/heparan sulfate
⇒ Preparation of heparin derived unsaturated disaccharides and heparin oligosaccharides
⇒ Production of low molecular weight heparins from unfractionated heparin

Order Information

Catalog #	Description	Size
AG00-2519	Heparinase I, from Flavobacterium Heparinum	1 IU
AG00-6512	Heparinase II, from Flavobacterium Heparinum	1 IU
AG00-8891	Heparinase III, from Flavobacterium Heparinum	1 IU

NOTE: Heparinases must be stored at -20 ℃ or below. Use dry ice as coolant during transportation.

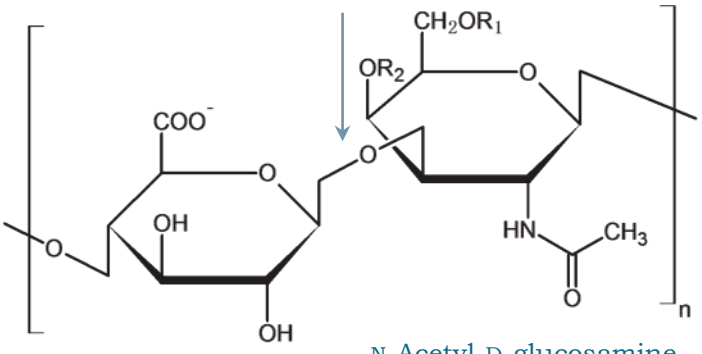
Chondroitinases

chondroitinase AC and chondroitinase B

Chondroitinases, or chondroitin lyases, act on chondroitin sulfates and could be used for the assay of chondroitin sulfates.

Specificity

Chondroitinase AC



D-Glucuronic acid

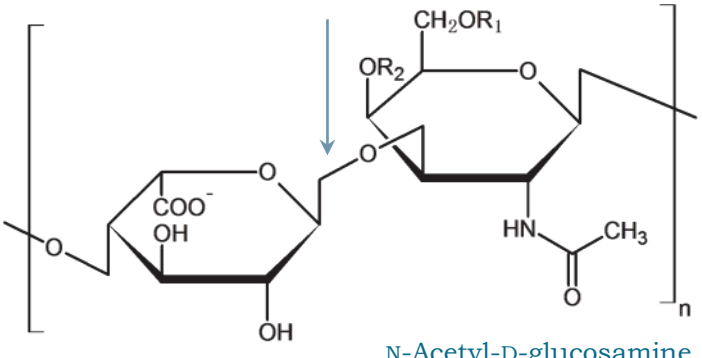
N-Acetyl-D-glucosamine

Chondroitin sulfate A & C

R_1 = H or SO_3^-

R_2 = H or SO_3^-

Chondroitinase B



L-Iduronic acid

N-Acetyl-D-glucosamine

Dermatan sulfate

(Chondroitin sulfate B)

R_1 = H

R_2 = SO_3^-

Chondroitinases can cleave glycosidic bonds of chondroitin sulfates and dermatan sulfate by a β-elimination mechanism, generating unsaturated products (mostly disaccharides) which can be measured at 232 nm wavelength.

Enzyme	Substrate
AG00-2780	Chondroitin sulfate A, chondroitin sulfate C, chondroitin and hyaluronic acid
AG00-8058	Dermatan sulfate (chondroitin sulfate B)

Features

⇒ Natural enzymes, isolated from Flavobacterium heparinum
⇒ High purities and high stabilities

Specifications

	Chondroitinase AC	Chondroitinase B
CAS Number	9047-57-8	52227-83-5
EC Number	4.2.2.5	4.2.2.19
Molecular Weight	77 kDa	55 kDa
Purity (HPLC)	> 99%	> 99%
Specific Activity	> 100 IU/mg	> 100 IU/mg
Concentration	5 IU/mL	5 IU/mL
Storage Temperature	- 20 ℃	- 20 ℃

Applications

⇒ Determination of contents of chondroitin sulfates by HPLC
⇒ Processing animal tissues before further investigations
⇒ Preparation of chondroitin and hyaluronic acid derived unsaturated disaccharides
⇒ Preparation of hyaluronic acid derived unsaturated disaccharide

Order Information

Catalog #	Description	Size
AG00-2780	Chondroitinase AC, from Flavobacterium Heparinum	5 IU
AG00-8058	Chondroitinase B, from Flavobacterium Heparinum	5 IU

NOTE: Chondroitinases must be stored at -20 ℃ or below. Use dry ice as coolant during transportation.

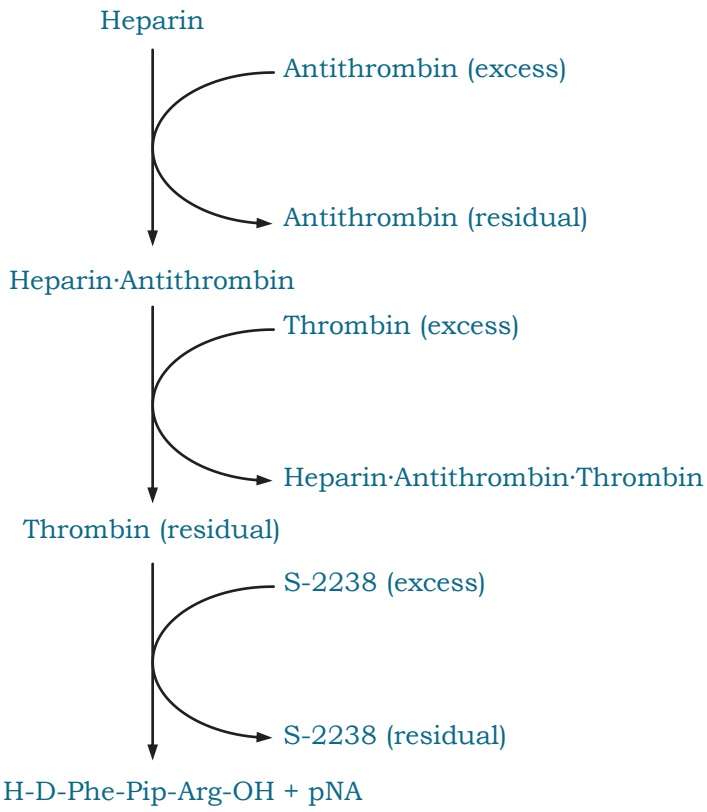
Chromogenic Assays

for anti-FIIa and anti-FXa activities of heparin

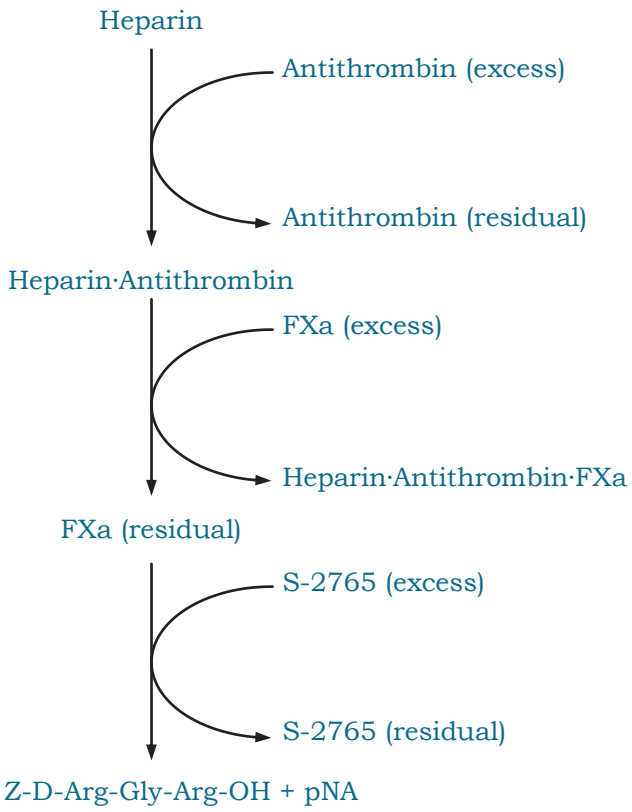
Anti-FIIa and anti-FXa activities are biochemical potencies of heparin and can be determined by chromogenic assays.

Chromogenic substrates also can be used in clinic diagnosis. Highly purified antithrombin and thrombin are powerful tools in separation and purification of some species.

Measurement Principle



Anti-FIIa Assay



Anti-FXa Assay

The resulting chromophore, p-nitroaniline (pNA) , can be measured at 405 nm wavelength. The potency of heparin therefore can be calculated by parallel-line assay method.

Specifications

	S-2238	S-2765	S-2222
CAS Number	113711-77-6	115388-96-0	-
EC Number	4.2.2.7		4.2.2.8
Molecular Weight	625.6 Da	714.6 Da	741.3 Da
Purity (HPLC)	> 99.5%	> 99.5%	> 99.5%
Impurities (OD_{405})	≤ 0.120 [L/(g·cm)]	≤ 0.120 [L/(g·cm)]	≤ 0.120 [L/(g·cm)]
Solubility in Water	> 10 mg/mL	> 10 mg/mL	> 10 mg/mL

	Activated Factor X	Alpha-Thrombin	Antithrombin
Abbreviation	FXa	FIIa	AT
Origin	Bovine Plasma	Bovine Plasma	Bovine Plasma
Molecular Weight	~ 44 kDa	~ 36 kDa	~ 56 kDa
Purity (SDS-PAGE)	> 95%	> 95%	> 95%
Specific Activity	> 90 IU/mg	> 700 IU/mg	> 6 IU/mg

Applications

⇒ Anti-factor Xa activity to anti-factor IIa activity ratios of heparin and LMWHs
⇒ Anti-factor IIa activities Anti-factor IIa activitis of heparin and LMWHs
⇒ Production of kits for determination of antithrombin activity in plasma
⇒ Evaluation of potential anticoagulants from synthesis, fermentation and animal tissues

Order Information

Catalog #	Description	Size
AG00-0101	S-2238, Chromogenic Substrate for Thrombin	10x10 mg
AG00-0102	S-2765, Chromogenic Substrate for Factor Xa	10x10 mg
AG00-0103	S-2222, Chromogenic Substrate for Factor Xa	10x25 mg
AG00-0121	Activated Factor X (FXa), from Bovine Plasma	10x2.5 IU
AG00-0122	Alpha-Thrombin (FIIa), from Bovine Plasma	10x50 IU
AG00-0131	Antithrombin (AT), from Bovine Plasma	10x10 IU

GAG Disaccharides

derived from glycosaminoglycans

Prepared from glycosaminoglycans (GAGs) by enzymatic degradation, these highly purified disaccharides are usually used as reference standards in HPLC analysis.

Heparin Unsaturated Disaccharides

Using our heparinases and purification techniques, we prepare heparin derived unsaturated disaccharides and make them useful tools for structural studies and quality control of heparin and LMWHs.

Applications

⇒ Test for 1,6-anhydro derivative for enoxaparin sodium
⇒ Finding featured fragments in heparin chains
⇒ Preparation of novel disaccharides by chemical modification

Order information

Catalog #	Description	Size
AG00-0401	Heparin Unsaturated Disaccharide ΔI-S, Sodium Salt, 98%	1 mg, 5 mg, 25 mg
AG00-0402	Heparin Unsaturated Disaccharide ΔII-S, Sodium Salt, 98%	0.5 mg, 1 mg, 5 mg
AG00-0403	Heparin Unsaturated Disaccharide ΔIII-S, Sodium Salt, 98%	1 mg, 2 mg, 5 mg
AG00-0404	Heparin Unsaturated Disaccharide ΔIV-S, Sodium Salt, 98%	1 mg, 2 mg
AG00-0405	Heparin Unsaturated Disaccharide ΔI-A, Sodium Salt, 98%	1 mg, 2 mg, 5 mg
AG00-0406	Heparin Unsaturated Disaccharide ΔII-A, Sodium Salt, 98%	1 mg, 5 mg
AG00-0407	Heparin Unsaturated Disaccharide ΔIII-A, Sodium Salt, 98%	1 mg, 5 mg
AG00-0408	Heparin Unsaturated Disaccharide ΔIV-A, Sodium Salt, 98%	0.5 mg, 1 mg
AG00-0409	Heparin Unsaturated Disaccharide ΔI-H, Sodium Salt, 98%	1 mg, 2 mg
AG00-0410	Heparin Unsaturated Disaccharide ΔII-H, Sodium Salt, 98%	1 mg, 2 mg
AG00-0411	Heparin Unsaturated Disaccharide ΔIII-H, Sodium Salt, 98%	1 mg, 2 mg
AG00-0412	Heparin Unsaturated Disaccharide ΔIV-H, Sodium Salt, 98%	1 mg, 2 mg
AG00-0413	Heparin Unsaturated Disaccharide ΔI-P, Sodium Salt, 98%	1 mg, 2 mg

Chondroitin Unsaturated Disaccharides

Using our chondroitinases and purification techniques, we prepare chondroitin and derived unsaturated disaccharides with high purities.

Applications

⇒ Determination of contents of chondroitin sulfates by HPLC

Order information

Catalog #	Description	Size
AG00-0421	Chondroitin Unsaturated Disaccharide ΔDi-0S, Sodium Salt, 98%	5 mg, 10 mg
AG00-0422	Chondroitin Unsaturated Disaccharide ΔDi-4S, Sodium Salt, 98%	5 mg, 10 mg
AG00-0423	Chondroitin Unsaturated Disaccharide ΔDi-6S, Sodium Salt, 98%	5 mg, 10 mg
AG00-0424	Chondroitin Unsaturated Disaccharide ΔDi-diSE, Sodium Salt, 98%	1 mg, 5 mg
AG00-0425	Chondroitin Unsaturated Disaccharide ΔDi-diSD, Sodium Salt, 98%	1 mg, 5 mg
AG00-0426	Chondroitin Unsaturated Disaccharide ΔDi-diSB, Sodium Salt, 98%	1 mg, 5 mg
AG00-0427	Chondroitin Unsaturated Disaccharide ΔDi-triS, Sodium Salt, 98%	1 mg, 5 mg
AG00-0428	Chondroitin Unsaturated Disaccharide ΔDi-UA2S, Sodium Salt, 98%	1 mg, 5 mg
AG00-0431	Chondroitin Disaccharide Di-4S, Sodium Salt, 98%	1 mg, 2 mg
AG00-0432	Chondroitin Disaccharide Di-4S, Sodium Salt, 98%	1 mg, 2 mg

Hyaluronic Acid Unsaturated Disaccharides

Hyaluronic acid is prepared from hyaluronic acid by chondroitinases degradation and can be used in some biological researches.

Order information

Catalog #	Description	Size
AG00-0429	Hyaluronic Acid Unsaturated Disaccharide ΔDiHA, Sodium Salt, 98%	2 mg, 5 mg

Heparin Analogs

including HS, DS and OSCS

These heparin-like glycansaminoglycans (GAGs), include heparan sulfate (HS), dermatan sulfate (DS) and oversulfated chondroitin sulfate (OSCS).

Heparan Sulfate

Heparan sulfate exists as a proteoglycan component of many cell-surface receptors and a part of the extracellular matrix. It is structurally similar to heparin, but has a lower sulfation degree and more glucuronic acids.

Heparan sulfate regulates a variety of biological processes, such as development, angiogenesis, blood coagulation and tumor metastasis.

Dermatan Sulfate

Dermatan sulfate, or chondroitin sulfate B (CS-B), exists in skin, blood vessels, heart valves, tendons and lungs.

Oversulfated Chondroitin Sulfate

Oversulfated chondroitin sulfate is a non-natural material whose repeating disaccharide units are sulfated in all four hydroxyls.

Order Information

Catalog #	Description	Size
AG00-9905	Heparan Sulfate (HS), Sodium Salt, 95%	25 mg
AG00-9320	Dermatan Sulfate (DS), Sodium Salt, 95%	50 mg
AG00-9620	Oversulfated Chondroitin Sulfate (OSCS), Sodium Salt, 95%	100 mg

Heparin Polysaccharides

as molecular weight reference standards

Highly purified heparin polysaccharides with MW ranging from 2600 Da to 30,000 Da, can be used as molecular weight reference standards.

Applications

⇒ Determination of molecular weight distribution of heparin and LMWHs

Order Information

Catalog #	Description	Size
AG00-1201	Heparin Polysaccharide I, MW 2600 Da, 98%	2 mg
AG00-1202	Heparin Polysaccharide II, MW 3550 Da, 98%	2 mg
AG00-1203	Heparin Polysaccharide III, MW 5000 Da, 98%	1 mg
AG00-1204	Heparin Polysaccharide IV, MW 7000 Da, 98%	1 mg
AG00-1205	Heparin Polysaccharide V, MW 9000 Da, 98%	1 mg
AG00-1206	Heparin Polysaccharide VI MW 12000 Da, 98%	2 mg
AG00-1207	Heparin Polysaccharide VII, MW 15000 Da, 98%	2 mg
AG00-1208	Heparin Polysaccharide VIII, MW 20000 Da, 98%	2 mg
AG00-1209	Heparin Polysaccharide IX, MW 30000 Da, 98%	2 mg

Benzethonium Chloride

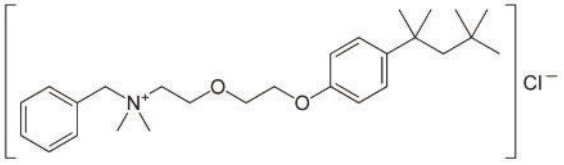
meeting with USP specifications

Benzethonium chloride can be used in production of enoxaparin sodium.

With our state-of-the-art manufacturing facilities, we are able to offer thousands of tons of high quality benzethonium chloride each year.

Specifications

Appearance:	White powder
Odour :	Odourless
Assay:	> 99.5%
Loss on Drying:	< 0.5%
Residue on Ignition:	< 0.05%
Melting Point:	161 to 162 ℃
Solubility:	Soluble in water



CAS Number:	121-54-0
EC Number:	204-479-9
Molecular Formula:	$C_{27}H_{42}ClNO_2$
Molecular Weight:	448.08

Applications

⇒ As surfactant, antiseptic and anti-infective ingredients in personal care products

⇒ Production of LMWHs, such as enoxaparin sodium

Order Information

Catalog #	Description	Size
AG06-0100	Benzethonium Chloride, 99.5%	1 kg, 5 kg, 25 kg, 50 kg

New!

MPMS

a powerful tool for improving your strains

Our newly released product, multifunctional plasma mutagenesis system (MPMS), provides a novel mutagenesis approach for strain improvement.

Features

⇒ Room temperature plasma, ultraviolent and chemical agents in one device
⇒ Advanced plasma generating technique results in stable survival curves
⇒ Use nitrogen as working gas, reducing your operating cost
⇒ A large LCD touch screen enables convenient automatic operation

Please contact us for more information.

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