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Fig. 1

Lonza

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 Document # TS-12-604-3 08/11
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Dulbecco's modified eagle medium (DMEM)**Product use**

Dulbecco's modified eagle medium was developed in 1969 and is a modification of basal medium eagle (BME) that differs from BME and MEM by the following characteristics:

- Vitamins 4X greater than MEM. Vitamins and amino acids greater than BME
- Types and quantities of amino acids greater than MEM and BME
- Iron (ferric nitrate)

Description

- 12-604 With 4.5 g/L glucose, with L-glutamine
 12-614 With 4.5 g/L glucose, without L-glutamine
 12-707 With 1.0 g/L glucose, without L-glutamine
 12-708 With 1.0 g/L glucose, and 25 mM HEPES buffer, without L-glutamine
 12-709 With 4.5 g/L glucose, and 25 mM HEPES buffer, without L-glutamine
 12-733 With 4.5 g/L glucose, without L-glutamine, without sodium pyruvate
 12-741 With 4.5 g/L glucose, with L-glutamine, without sodium pyruvate
 12-914 With 4.5 g/L glucose, without L-glutamine, screened to support hybridoma growth
 12-917 With 4.5 g/L glucose, without L-glutamine or phenol red
 15-604 With 4.5 g/L glucose, with L-glutamine, without sodium pyruvate, powder
 15-614 With 4.5 g/L glucose, without L-glutamine or sodium pyruvate, powder
 (Powder formulations require the addition of 49.3 mL of NaHCO₃ 7.5% solution or 3.70 g/L of NaHCO₃ powder)

Quick reference chart

	Glucose	L-glutamine	Phenol red	HEPES buffer	Sodium pyruvate
12-604	4.5 g/L	+	+	-	+
12-614	4.5 g/L	-	+	-	+
12-707	1.0 g/L	-	+	-	+
12-708	1.0 g/L	-	+	+	+
12-709	4.5 g/L	-	+	+	+
12-733	4.5 g/L	-	+	-	-
12-741	4.5 g/L	+	+	-	-
12-914	4.5 g/L	-	+	-	+
12-917	4.5 g/L	-	-	-	+

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Fig. 1 continued

Lonza**Specifications**

	Sterility	pH	Osmolality (mOsm)	Cell growth promotion (% of control)	Endotoxin (EU/ml)
12-604	Neg.	7.0-7.4	324-352	≥75%	FIO
12-614	Neg.	7.0-7.4	324-352	≥75%	FIO
12-707	Neg.	7.0-7.4	306-346	≥75%	FIO
12-708	Neg.	7.03-7.27	300-326	≥75%	FIO
12-709	Neg.	7.0-7.4	321-351	≥75%	FIO
12-733	Neg.	7.0-7.4	318-360	≥75%	FIO
12-741	Neg.	7.0-7.4	318-360	≥75%	FIO
12-914	Neg.	7.0-7.4	324-352	≥85% **	FIO
12-917	Neg.	7.0-7.4	329-343	≥75%	FIO
15-604 ***	-	5.5-7.0	235-265	≥75%	≤1.0
15-614 ***	-	5.5-7.0	235-265	≥75%	≤1.0

FIO -- for information only

** Result of functional test

*** Moisture content #1.0

Storage

2°C to 8°C

Product use statement

THESE PRODUCTS ARE FOR RESEARCH USE ONLY. Not approved for human or veterinary use, for application to humans or animals, or for use in clinical or *in vitro* procedures.

Ordering information

Catalog number	Description	Size
12-604F	DMEM with 4.5 g/L glucose, with L-glutamine	500 ml
12-604Q	DMEM with 4.5 g/L glucose, with L-glutamine	1 L
12-614F	DMEM with 4.5 g/L glucose, without L-glutamine	500 ml
12-614Q	DMEM with 4.5 g/L glucose, without L-glutamine	1 L
12-707F	DMEM with 1.0 g/L glucose, without L-glutamine	500 ml
12-708F	DMEM with 1.0 g/L glucose, and 25 mM HEPES buffer, without L-glutamine	500 ml
12-709F	DMEM with 4.5 g/L glucose, and 25 mM HEPES buffer, without L-glutamine	500 ml
12-733F	DMEM with 4.5 g/L glucose, without L-glutamine, without sodium pyruvate	500 ml
12-733Q	DMEM with 4.5 g/L glucose, without L-glutamine, without sodium pyruvate	1 L
12-741F	DMEM with 4.5 g/L glucose, with L-glutamine, without sodium pyruvate	500 ml
12-914F	DMEM with 4.5 g/L glucose, without L-glutamine, screened to support hybridoma growth.	500 ml
12-917F	DMEM with 4.5 g/L glucose, without L-glutamine or phenol red.	500 ml
15-604D	DMEM with 4.5 g/L glucose, with L-glutamine, without sodium pyruvate, powder	1 x 10L
15-604F	DMEM with 4.5 g/L glucose, without L-glutamine or sodium pyruvate, powder	1 X 50L
15-614D	DMEM with 4.5 g/L glucose, without L-glutamine or sodium pyruvate, powder	1 x 10L

Fig. 2

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Document # TS 12-615-2 11/08
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Ham's F12 Medium

Product Use

Ham's F12 Medium is a nutrient mixture designed to cultivate a wide variety of mammalian and hybridoma cells when used with serum in combination with hormones and transferrin.

Specifications

Sterility	pH	Osmolality (mOsm)
Negative	7.07-7.40	286-305
Cell Growth Generation	Endotoxin (EU/ml)	
≥75% of control	FIO	

Storage

2°C to 8°C

Product Use Statement

THESE PRODUCTS ARE FOR RESEARCH USE ONLY. Not approved for human or veterinary use, for application to humans or animals, or for use in clinical or *in vitro* procedures.

Ordering Information

Catalog Number	Description	Size
12-615F	Ham's F12 Medium with L-glutamine	500 ml

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Fig. 3

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DMEM: F12 (1:1) medium**Product use**

DMEM combined with Hams F12 has been extensively used to demonstrate the effect of various hormones and growth factors on target tissues.

Description

- 12-719 with L-glutamine, 15 mM HEPES, and 3.151 g/L glucose
 15-719 powder – with L-glutamine, 15 mM HEPES, and 3.151 g/L glucose. Powdered medium requires the addition of 16.0 ml/L of NaHCO₃, 7.5% solution or 1.2 g/L NaHCO₃ powder
 04-687 with 3.151 g/L glucose, with L-glutamine, without HEPES

Specifications

	Sterility	pH	Osmolality (mOsm)
12-719	Negative	7.0-7.4	286-356
15-719*	Negative	4.5-6.5	260-290
04-687	Negative	FIO	FIO
	Cell growth promotion	Endotoxin (EU/ml)	Moisture
12-719	≥ 75% of control	FIO	—
15-719*	≥ 75% of control	≤ 1 EU/ml	≤ 2%
04-687	—	FIO	—

* pH, osmolality, endotoxin, and moisture are done without NaHCO₃; NaHCO₃ is added for cell growth test.

Storage

2°C to 8°C

Product use statement

THESE PRODUCTS ARE FOR RESEARCH USE ONLY. Not approved for human or veterinary use, for application to humans or animals, or for use in clinical or *in vitro* procedures.

Ordering information

Catalog number	Description	Size
12-719F	DMEM: F12 with L-glutamine, 15 mM HEPES, and 3.151 g/L glucose	500 ml
12-719Q	DMEM: F12 with L-glutamine, 15 mM HEPES, and 3.151 g/L glucose	1 L
15-719D	DMEM: F12 powder – with L-glutamine, 15 mM HEPES, and 3.151 g/L glucose. Powdered medium requires the addition of 16.0 ml/L of NaHCO ₃ , 7.5% solution or 1.2 g/L NaHCO ₃ powder	1 x 10L
04-687Q	DMEM: F12 with 3.151 g/L glucose, with L-glutamine, without HEPES	1 L

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Fig. 4

Cascade Biologics™
invitrogen cell culture

GIBCO®
invitrogen cell culture

Medium 171, Medium 171PRF, and MEGS

Medium 171

M-171-500

500 ml

Medium 171PRF

(Phenol Red-Free)

M-171PRF-500

500 ml

Product Description

Medium 171 and Medium 171PRF are sterile, liquid tissue culture media intended for use as one component in a complete culture environment for the growth of normal human mammary epithelial cells. Medium 171 is a basal medium containing essential and non-essential amino acids, vitamins, other organic compounds, trace minerals, and inorganic salts. Medium 171PRF is a phenol red-free version of Medium 171. These media do not contain antibiotics, antimycotics, hormones, growth factors, or proteins. These media are HEPES and bicarbonate buffered and are designed for use in an incubator with an atmosphere of 5% CO₂/95% air. To support plating and long-term proliferation of normal human mammary epithelial cells, these media must be supplemented with Mammary Epithelial Growth Supplement (MEGS, cat. no S-015-5).

Intended Use

Medium 171 is intended for use in the routine culture of normal human mammary epithelial cells. Medium 171PRF is intended for use by investigators who wish to culture normal human mammary epithelial cells in the absence of phenol red. When supplemented with MEGS, these media will support the plating and proliferation of normal human mammary epithelial cells at densities between 2.5×10^3 cells/cm² and 8×10^4 cells/cm². **This product is for research use only. Not for use in animals, humans, or diagnostic procedures.**

Caution: If handled improperly, some components of this product may present a health hazard. Take appropriate precautions when handling this product, including the wearing of protective clothing and eyewear. Dispose of properly.

Storage and Stability

Medium 171 and Medium 171PRF are stored at 4° C in our facility and are shipped at ambient temperature. Upon receipt, these media should be stored at 4° C and should not be frozen. **Protect from light.** Several components of these tissue culture media are light-labile, and we recommend that the media not be exposed to light for lengthy periods of time. If the media are warmed prior to use, do not exceed 37° C. When stored in the dark at 4° C, the product is stable until the expiration date on the label.

Preparation of Supplemented Medium 171

1. Thaw one bottle of MEGS. Take one bottle of Medium from cold storage. Make sure that the caps of the vessels are tight.
2. Gently swirl the bottle of supplement. Avoid splashing the supplement into the cap of the bottle or causing the supplement to foam.
3. Wipe the outside of the containers with a disinfecting solution such as 70% ethanol or isopropanol.
4. Using sterile technique in a laminar flow culture hood, transfer the entire contents of the bottle of supplement to the bottle of Medium.
5. Tightly cap the bottle of supplemented medium and swirl the contents to ensure a homogeneous solution. Avoid causing the medium to foam.

Storage and Stability of Supplemented Medium 171

Once Medium 171 or Medium 171PRF has been supplemented with MEGS, the supplemented medium should be stored in the dark at 4° C and should not be frozen. When stored in the dark at 4° C, the supplemented medium is stable for 1 month.

Selected References

The Medium 171 formulation is based on medium MCDB 170, with modifications.

Hammond SL, Ham RG, Stampfer MR; PNAS 81:5435-5439, 1984

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MAN0001585

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Revised: 30 May 2009

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Fig. 4 continued

Cascade Biologics™
invitrogen cell culture

GIBCO®
invitrogen cell culture

MEGS Mammary Epithelial Growth Supplement

Cat. no. S-015-5
5 ml

Product Description

Mammary Epithelial Growth Supplement (MEGS) is a sterile, concentrated (100X) solution intended for use as one component in a complete culture environment for the growth of normal human mammary epithelial cells. Each 5 ml bottle of MEGS contains all of the growth factors, hormones, and tissue extracts necessary for the culture of normal human mammary epithelial cells and is the correct amount of supplement for a 500 ml bottle of Medium 171 or Medium 171PRF. MEGS is an ionically-balanced supplement containing bovine pituitary extract (BPE), bovine insulin, hydrocortisone and recombinant human epidermal growth factor. When a 500 ml bottle of Medium 171 or Medium 171PRF is supplemented with MEGS, the final concentrations of the components in the supplemented medium are: BPE, 0.4% v/v; bovine insulin, 5 µg/ml; hydrocortisone, 0.5 µg/ml; and recombinant human epidermal growth factor, 3 ng/ml.

Intended Use

MEGS is intended for use in conjunction with Medium 171 or Medium 171PRF for the routine serum-free culture of normal human mammary epithelial cells. **This product is for research use only. Not for use in animals, humans, or diagnostic procedures.**

Caution: If handled improperly, some components of this product may present a health hazard. Take appropriate precautions when handling this product, including the wearing of protective clothing and eyewear. Dispose of properly.

Limited Use Label License No. 5: Invitrogen Technology

The purchase of this product conveys to the buyer the non-transferable right to use the purchased amount of the product and components of the product in research conducted by the buyer (whether the buyer is an academic or for-profit entity). The buyer cannot sell or otherwise transfer (a) this product (b) its components or (c) materials made using this product or its components to a third party or otherwise use this product or its components or materials made using this product or its components for Commercial Purposes. The buyer may transfer information or materials made through the use of this product to a scientific collaborator, provided that such transfer is not for any Commercial Purpose, and that such collaborator agrees in writing (a) not to transfer such materials to any third party, and (b) to use such transferred materials and/or information solely for research and not for Commercial Purposes. Commercial Purposes means any activity by a party for consideration and may include, but is not limited to: (1) use of the product or its components in manufacturing; (2) use of the product or its components to provide a service, information, or data; (3) use of the product or its components for therapeutic, diagnostic or prophylactic purposes; or (4) resale of the product or its components, whether or not such product or its components are resold for use in research. For products that are subject to multiple limited use label licenses, the terms of the most restrictive limited use label license shall control. Life Technologies Corporation will not assert a claim against the buyer of infringement of patents owned or controlled by Life Technologies Corporation which cover this product based upon the manufacture, use or sale of a therapeutic, clinical diagnostic, vaccine or prophylactic product developed in research by the buyer in which this product or its components was employed, provided that neither this product nor any of its components was used in the manufacture of such product. If the purchaser is not willing to accept the limitations of this limited use statement, Life Technologies is willing to accept return of the product with a full refund. For information on purchasing a license to this product for purposes other than research, contact Licensing Department, Life Technologies Corporation, 5791 Van Allen Way, Carlsbad, California 92008. Phone (760) 603-7200. Fax (760) 602-6500. Email: outlicensing@invitrogen.com.

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Storage and Stability

MEGS is stored at -20° C at our facility and is shipped on dry ice. Upon receipt, the product should be stored at -20° C in a freezer that is not self-defrosting. When stored at -20° C, the product is stable until the expiration date shown on the label.

After long-term storage at -20° C, MEGS may contain a small amount of precipitate. This precipitate is formed from cold-insoluble material in the BPE component of the MEGS and will not affect the performance of the product.

Thawing

To thaw, place the product in a 37° C water bath or overnight at 4° C. If thawed in a water bath, do not leave the product at 37° C after the product has thawed. For instructions on adding MEGS to Medium 171, please refer to the instructions that accompany the basal medium.

Selected References

The MEGS formulation is based on published supplementation of medium MCDB 170, with modifications.

Hammond SL, Ham RG, Stampfer MR; PNAS 81:5435-5439, 1984.

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Fig. 5**PTT6 Medium ingredients list**

Medium composition List	Company Name	Catalogue Number
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Basic media

DMEM (also referred to herein as PTT6-basal medium)	Lonza	12-604F
DMEM/F12	Lonza	12-719F
M171	Life technologies	M171500

Serum

Fetal Bovine Serum	GE Healthcare	A15-151
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Antibiotic

Penicillin- Streptomycin- Amphotericin B	Lonza	17-745E
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Supplements

Adenine (optional)	Sigma	A8626-25G
Hydrocortisone (optional)	Sigma	H-0888
Epidermal Growth Factor	Millipore	GF-144
T3 (3,3',5-Triiodo-L- thyronine sodium salt) (optional)	Sigma	200-223-5
Recombinant Human Insulin AOF	Life Technologies	A11382IJ

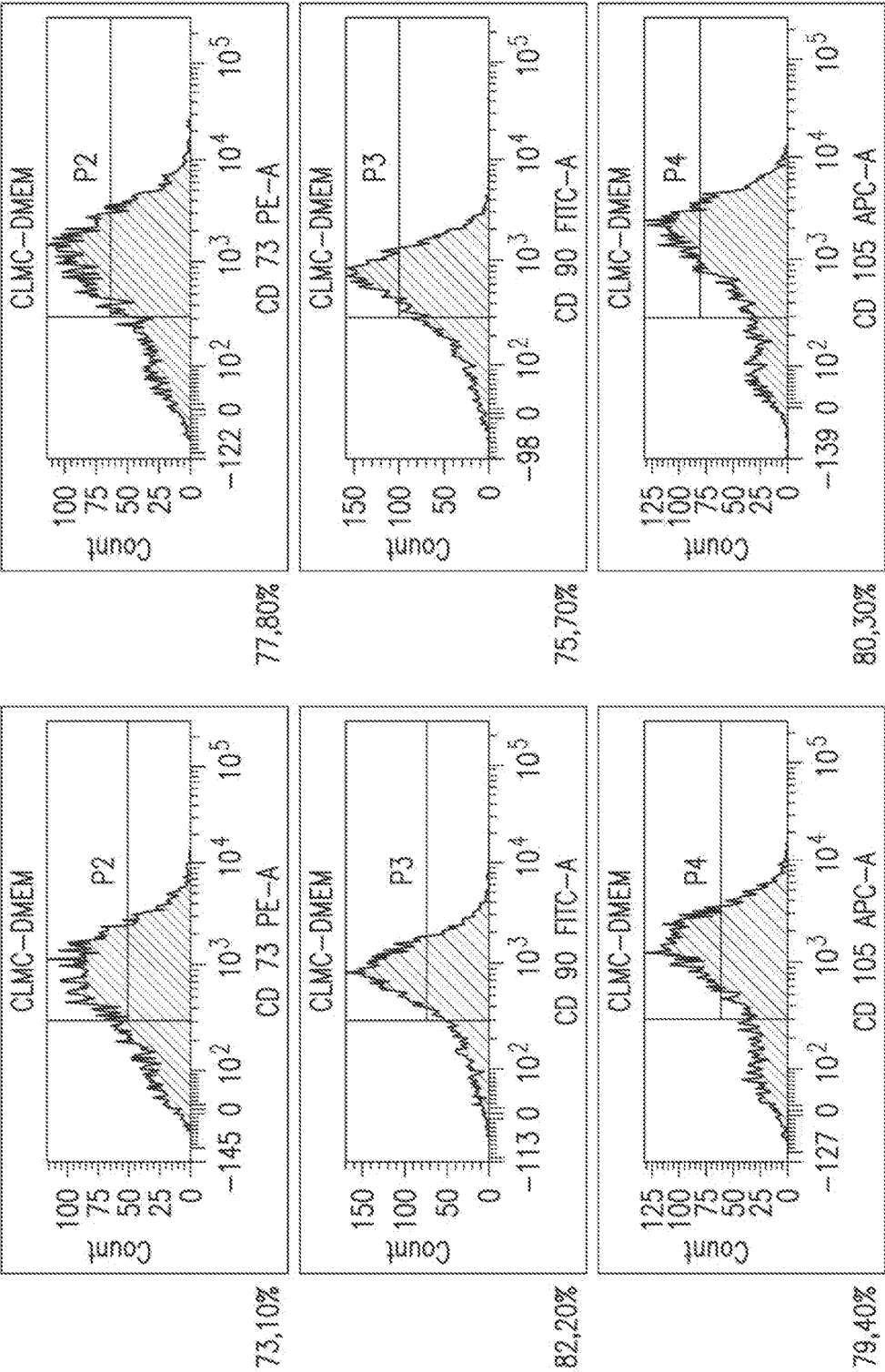


FIG.6A

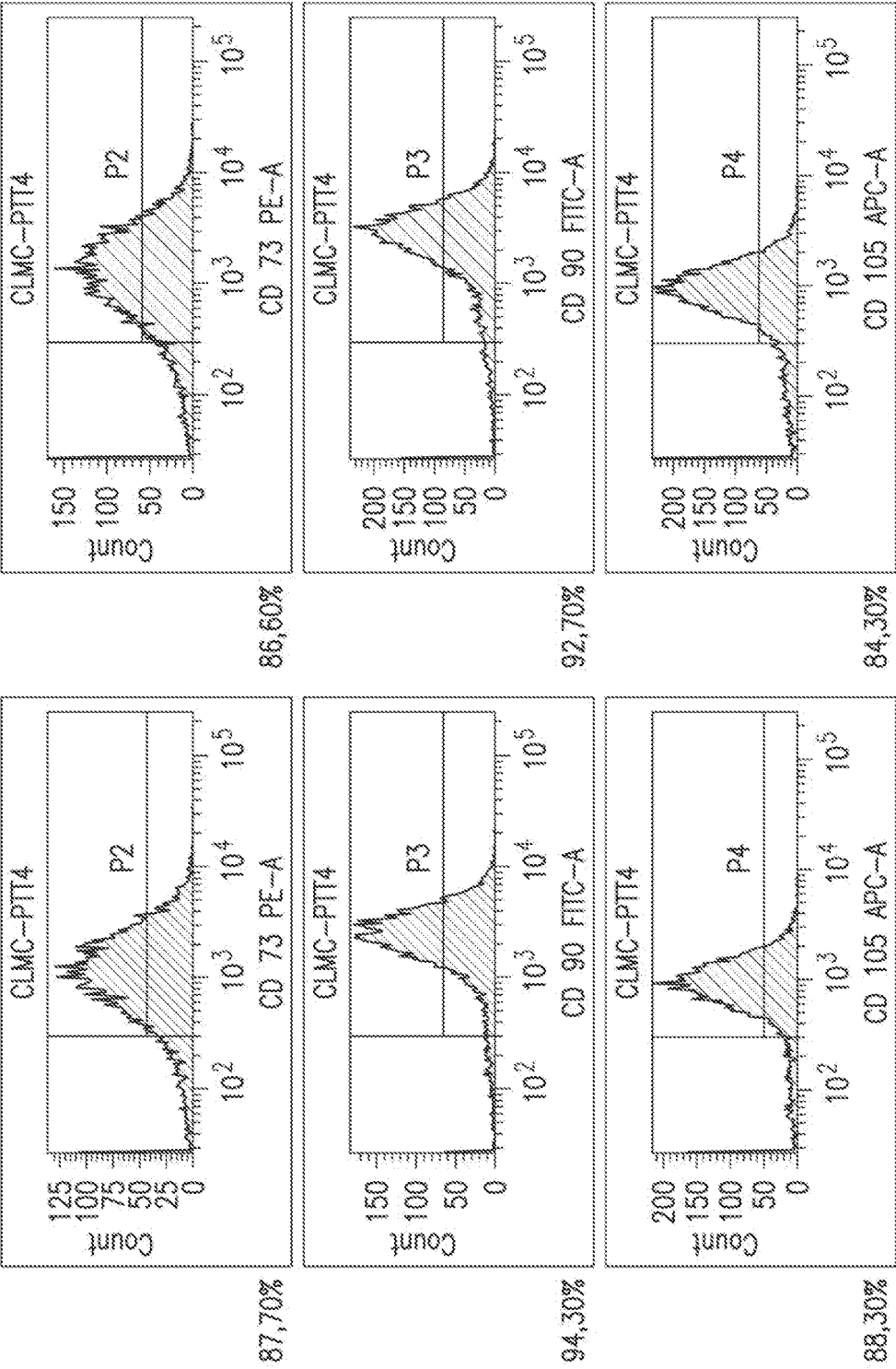


FIG.6B

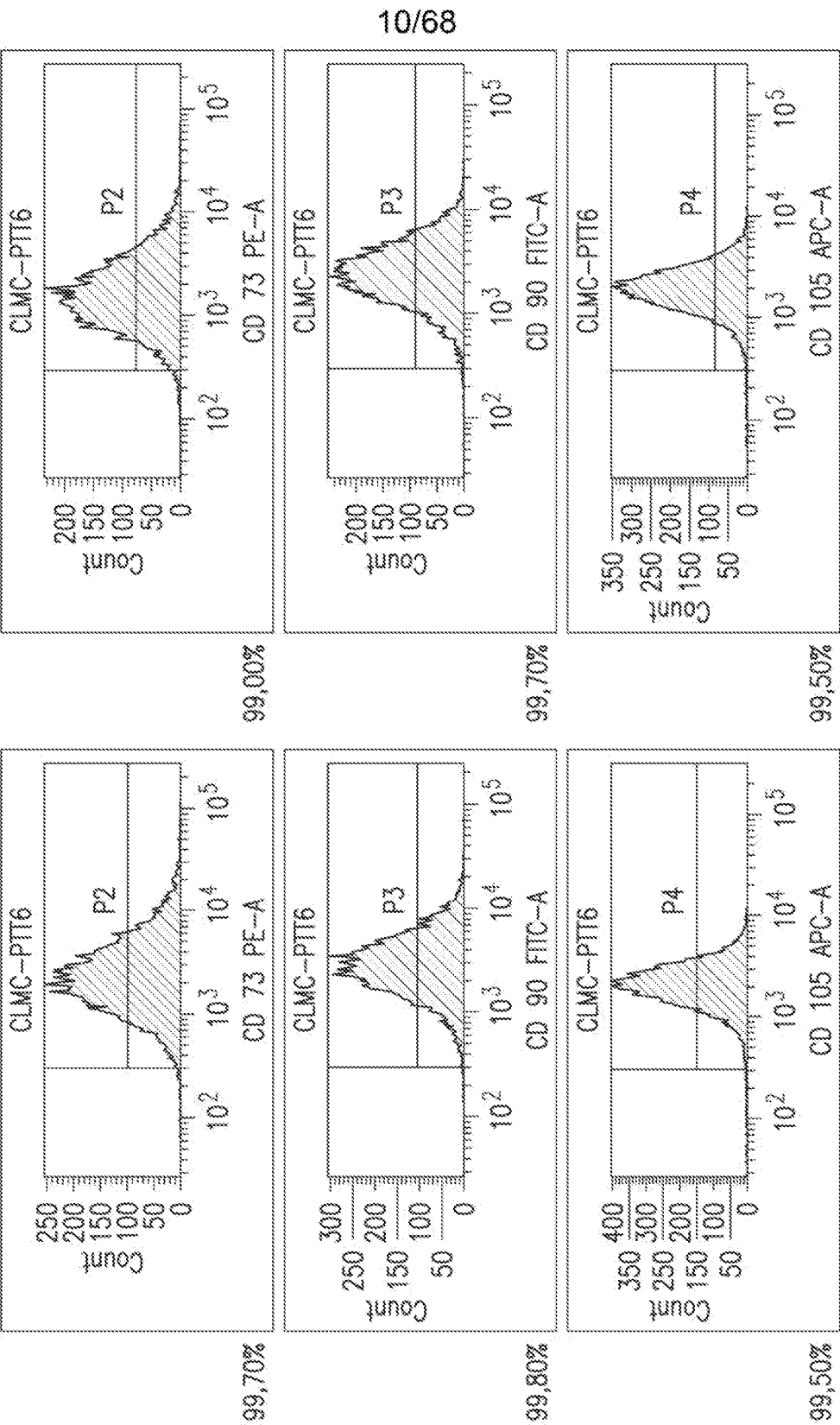
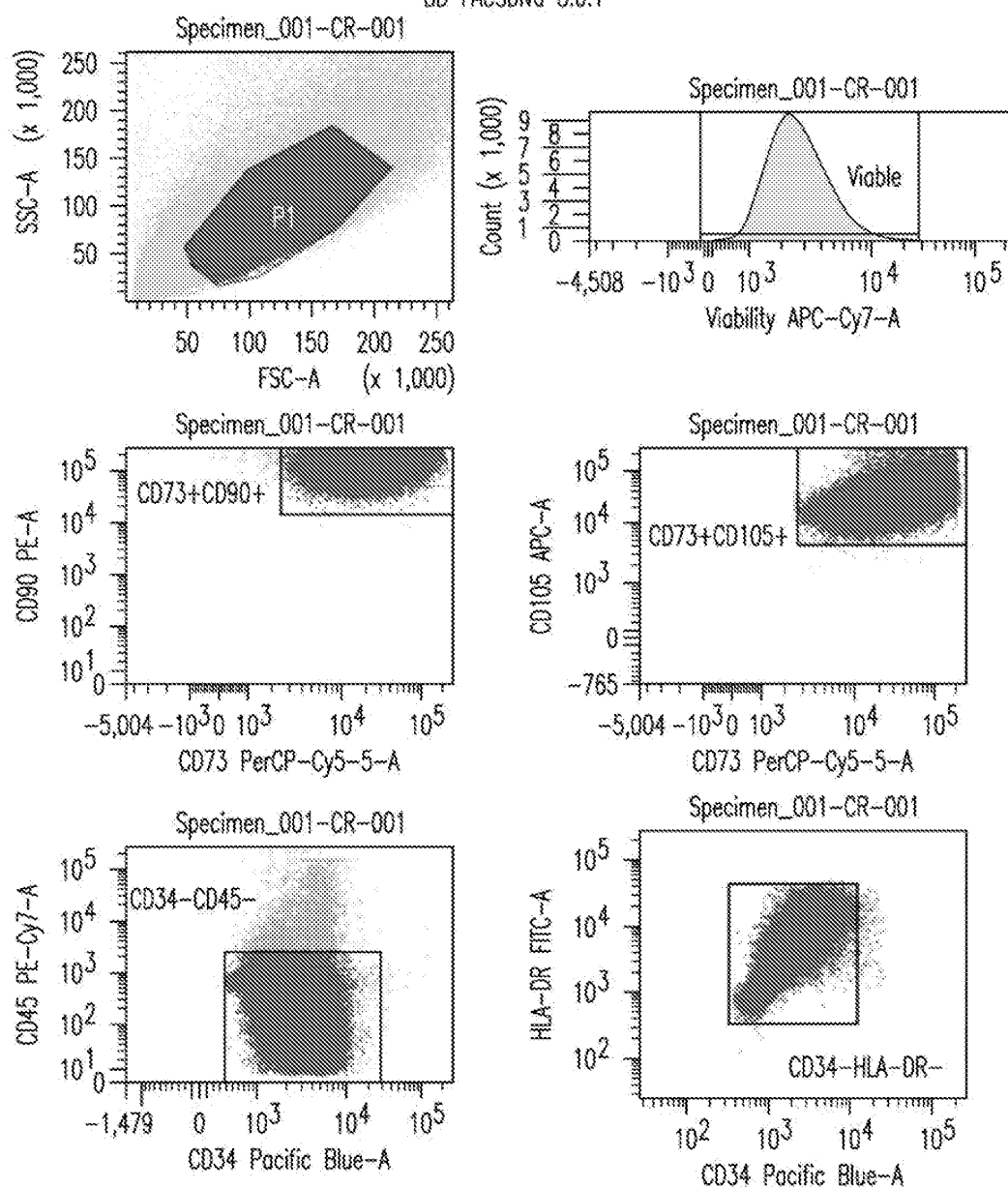


FIG.6C

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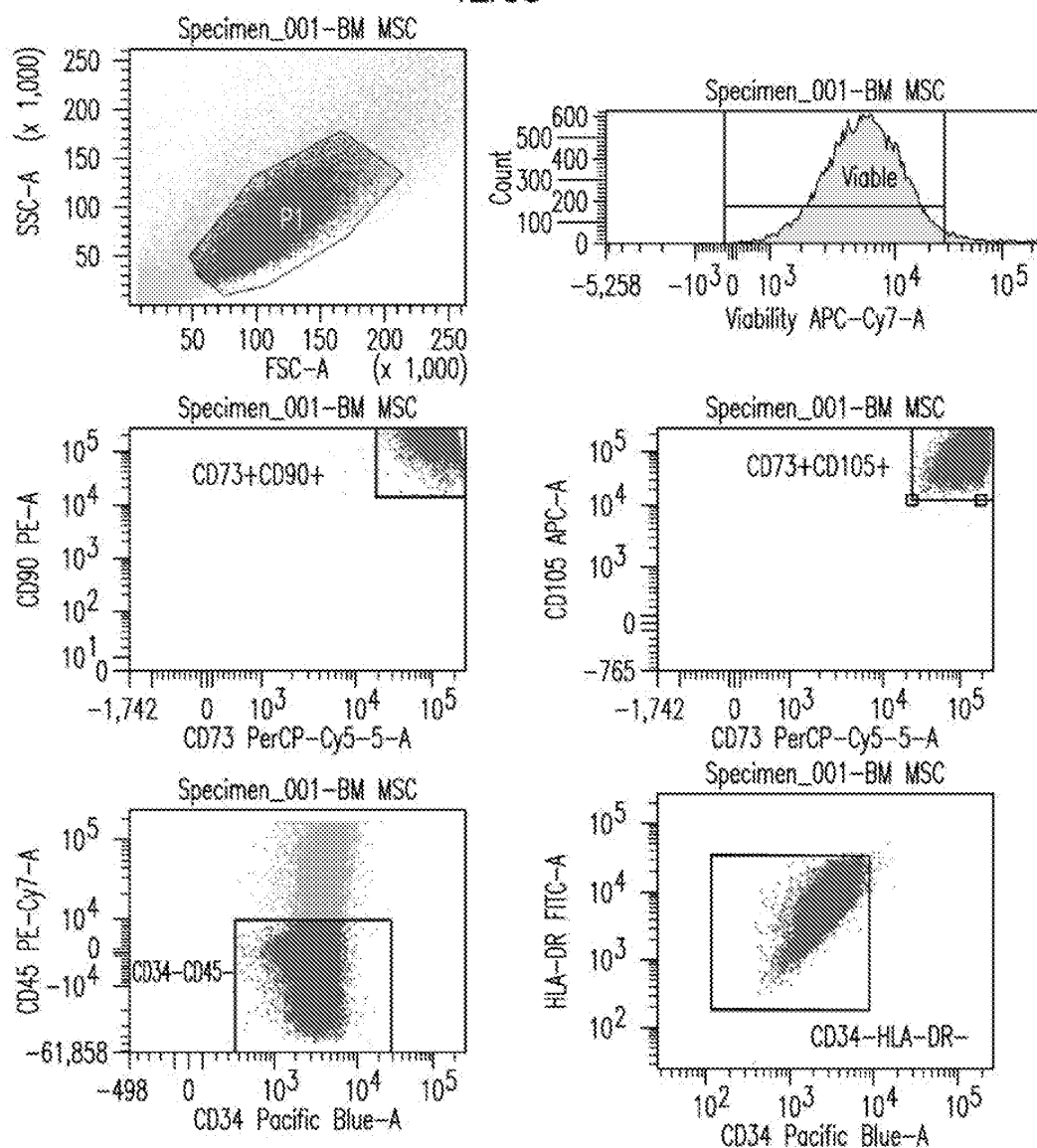
BD FACSDiva 8.0.1



Tube: CR-001			
Population	#Events	%Parent	%Total
■ All Events	540.988	####	100.0
■ P1	425.093	78.6	78.6
■ Viable	414.643	97.5	76.6
■ CD73+CD90+	414.554	100.0	76.6
■ CD73+CD105+	414.490	100.0	76.6
■ CD34-CD45-	411.206	99.2	76.0
■ CD34-HLA-DR-	411.061	100.0	76.0

FIG.7A

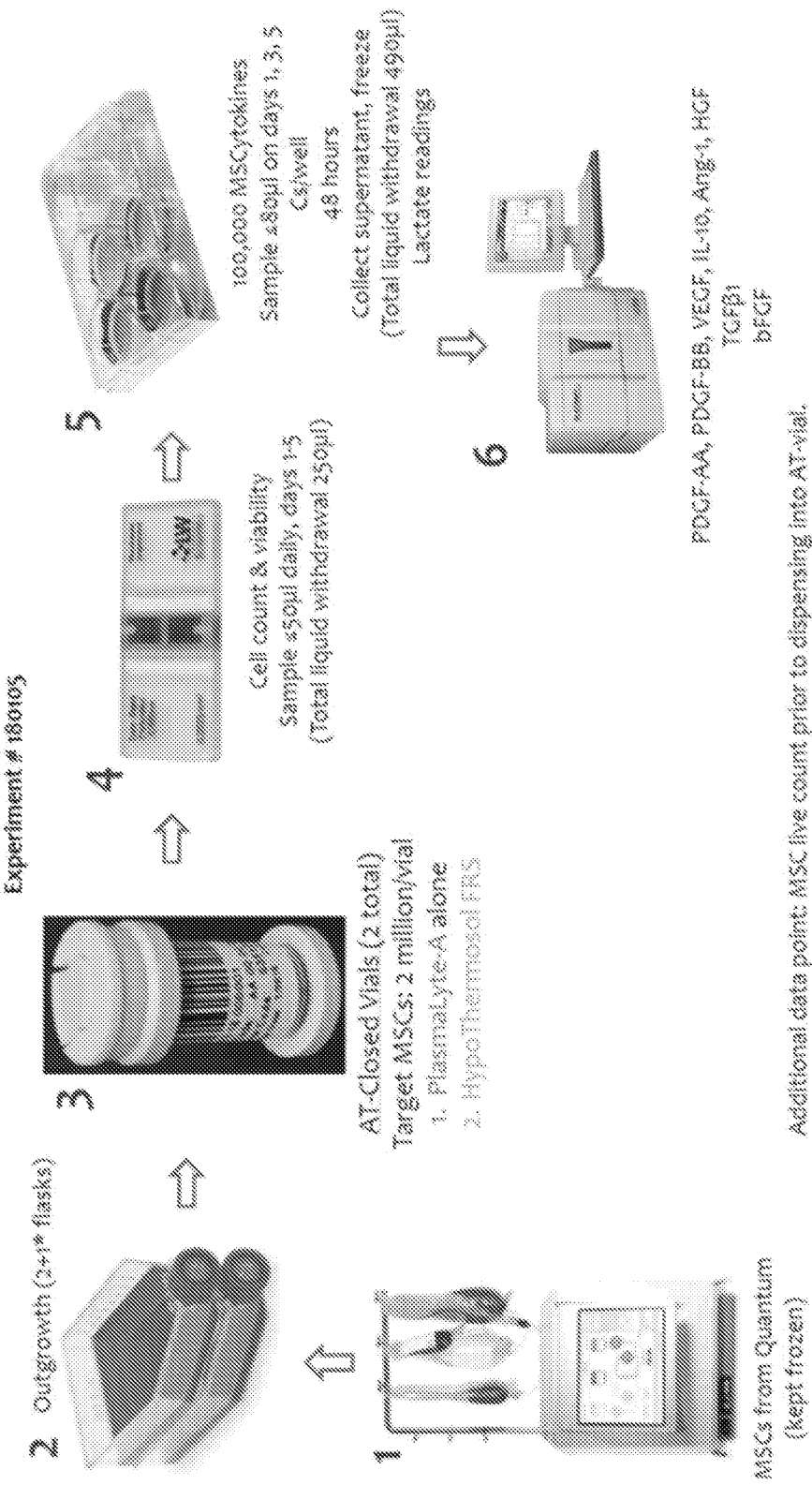
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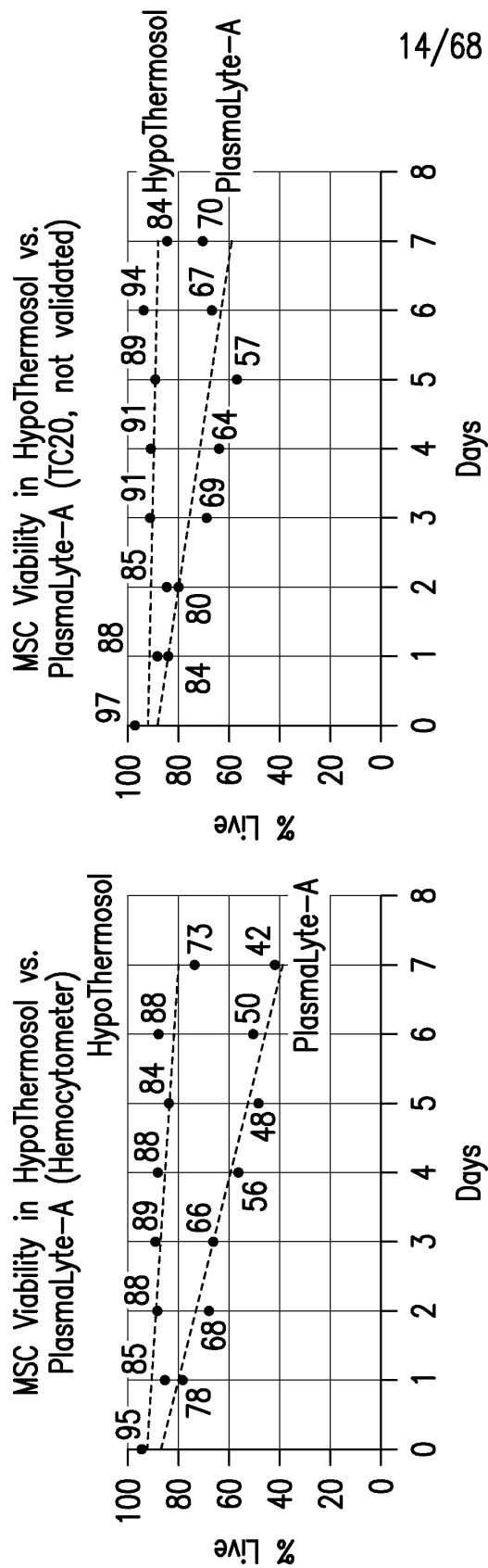


Experiment Name:	MSC 062216		
Specimen Name:	Specimen_001		
Tube Name:	BM MSC		
Population	#Events	%Parent	
CD34-HLA-DR-	21.128	99.9	
Population	#Events	%Parent	%Total
All Events	77.022	###	100.0
P1	35.780	46.5	46.5
Viable	33.741	94.3	43.8
CD73+CD90+	33.729	100.0	43.8
CD73+CD105+	33.710	99.9	43.8
CD34-CD45-	21.155	62.8	27.5
CD34-HLA-DR	21.128	99.9	27.4

FIG. 7B

Figure 8





Total cell counts	Hemocytometer	Std. dev.	% std. dev.	TC20	Std. dev.	% std. dev.
HypoThermosol:	802,500	119,155	14.8	758,357	104,994	13.8
Plasmalyte:	1,608,571	213,902	13.3	1,301,571	208,991	16.1

- HypoThermosol noticeably supports membrane integrity and presumably survival over a week timespan (6 days).
- All counts based on duplicate readings that are within 10% of one another. Following SOP CR D2.600.1.
- During counting, cells stored in HypoThermosol were noticeably smaller with smooth and defined edges. By contrast, cells in Plasmalyte appeared of a range of sizes.

Figure 9

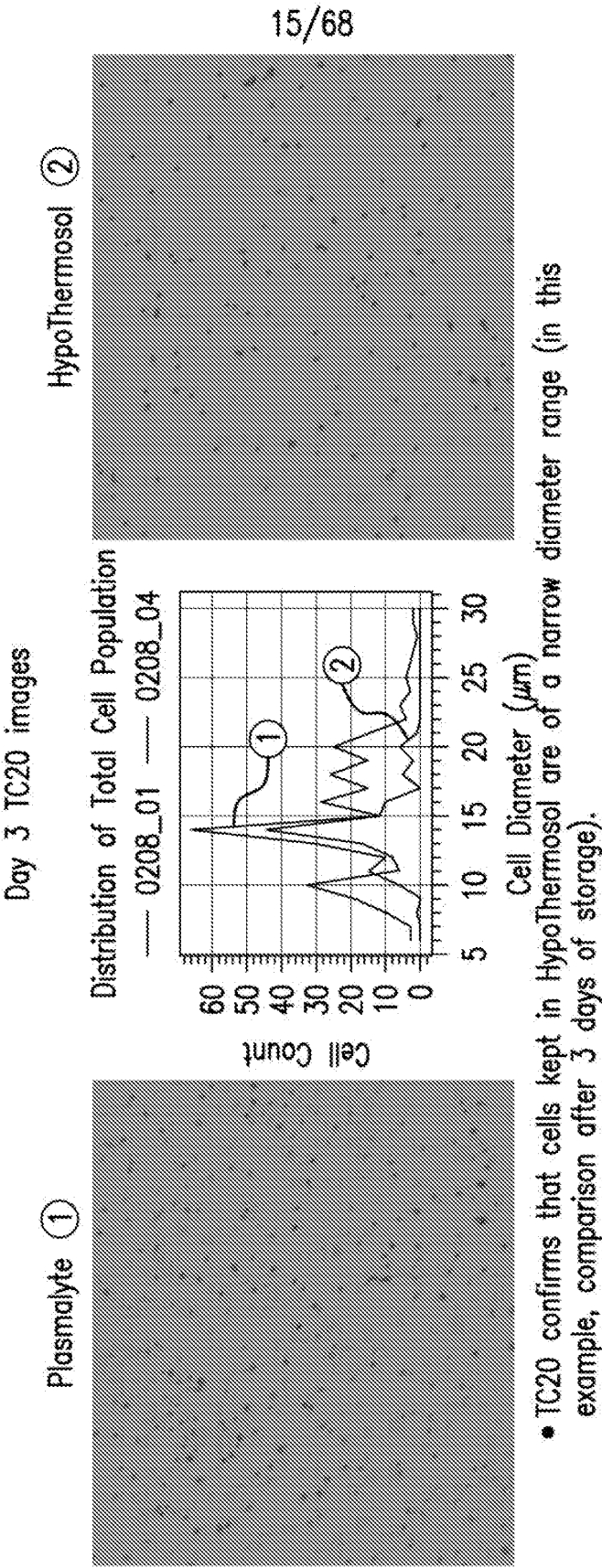


Figure 10

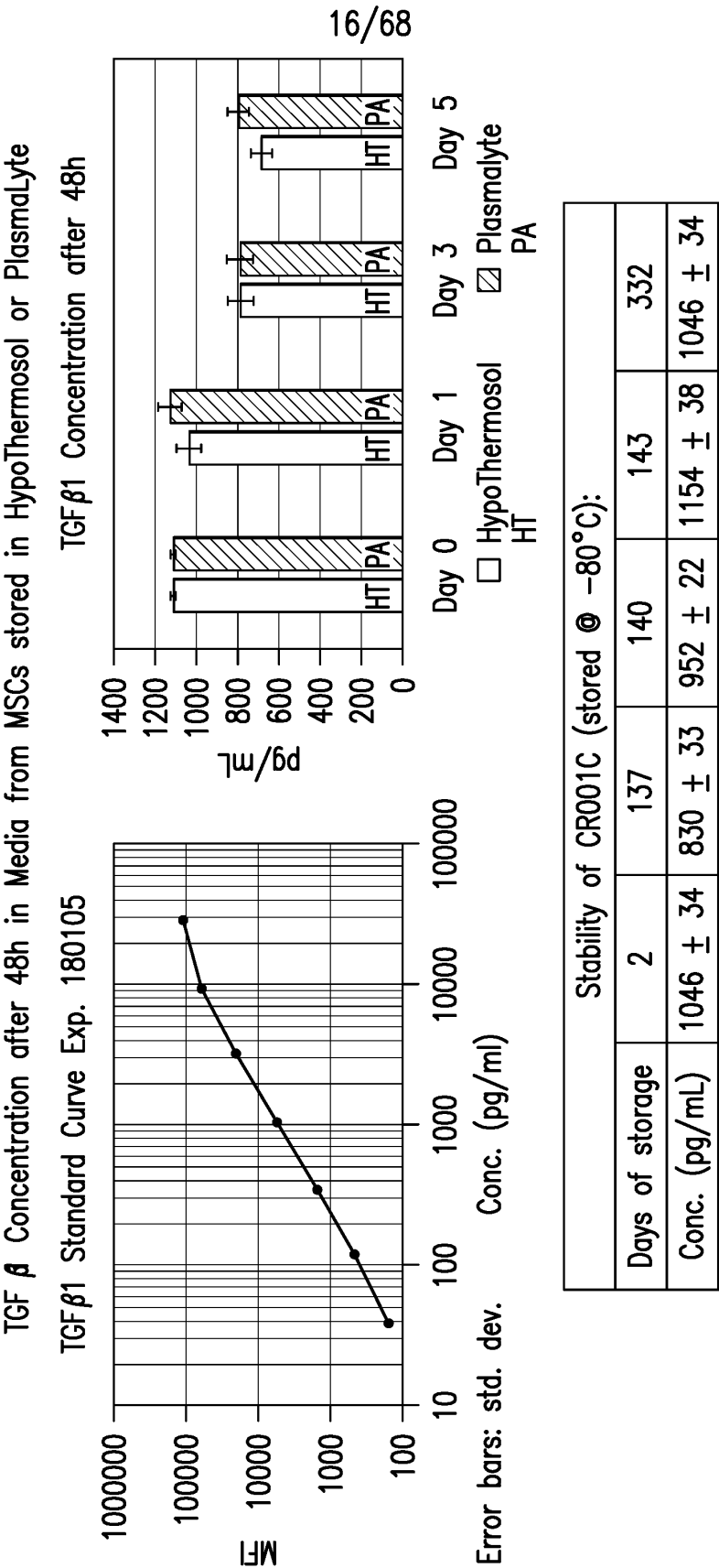


Figure 11

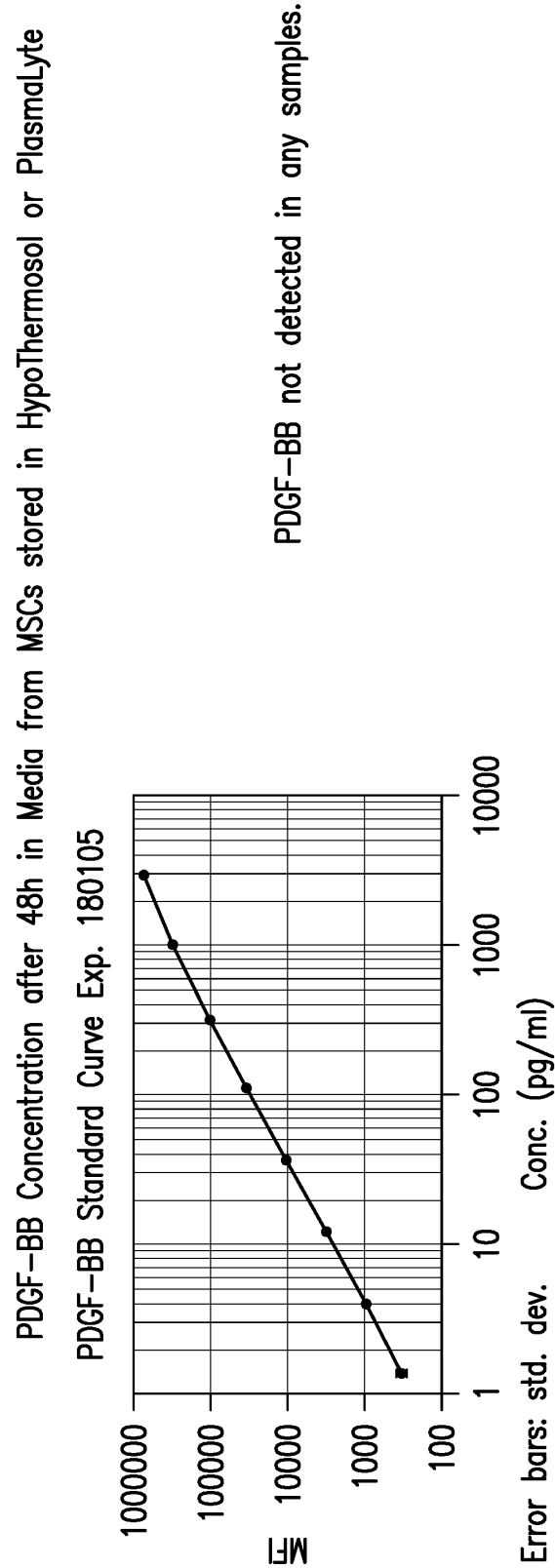


Figure 12

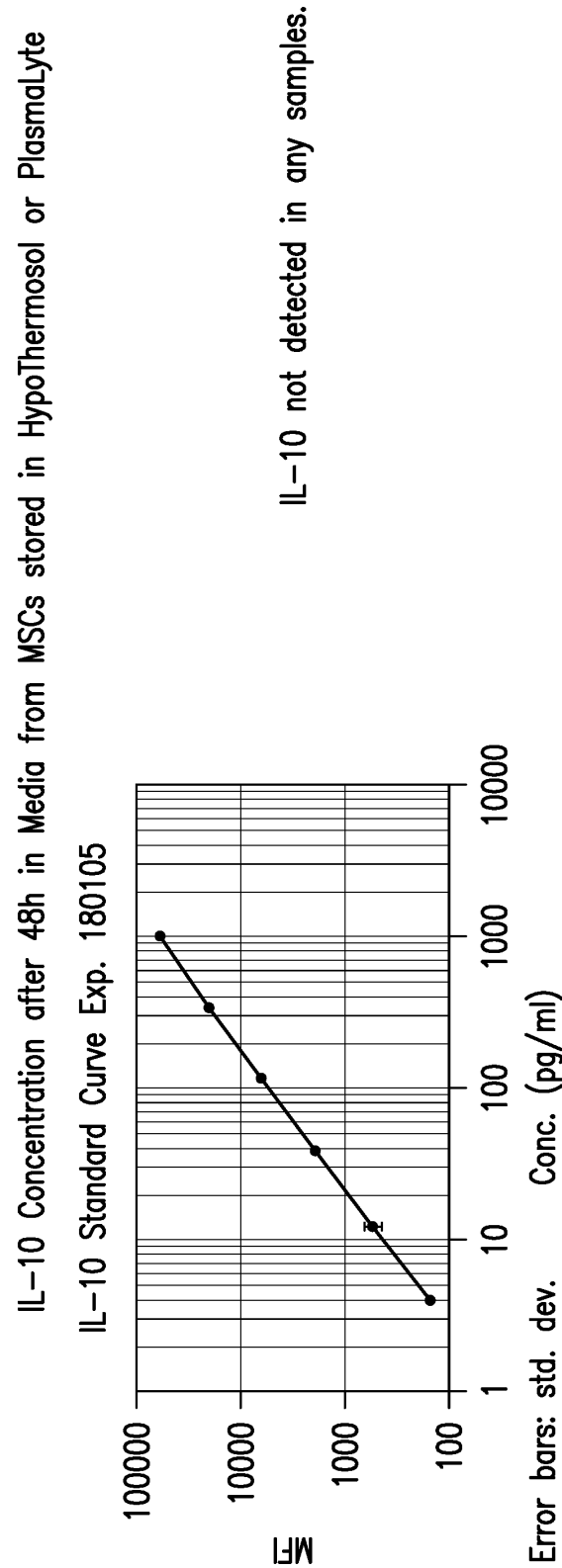


Figure 13

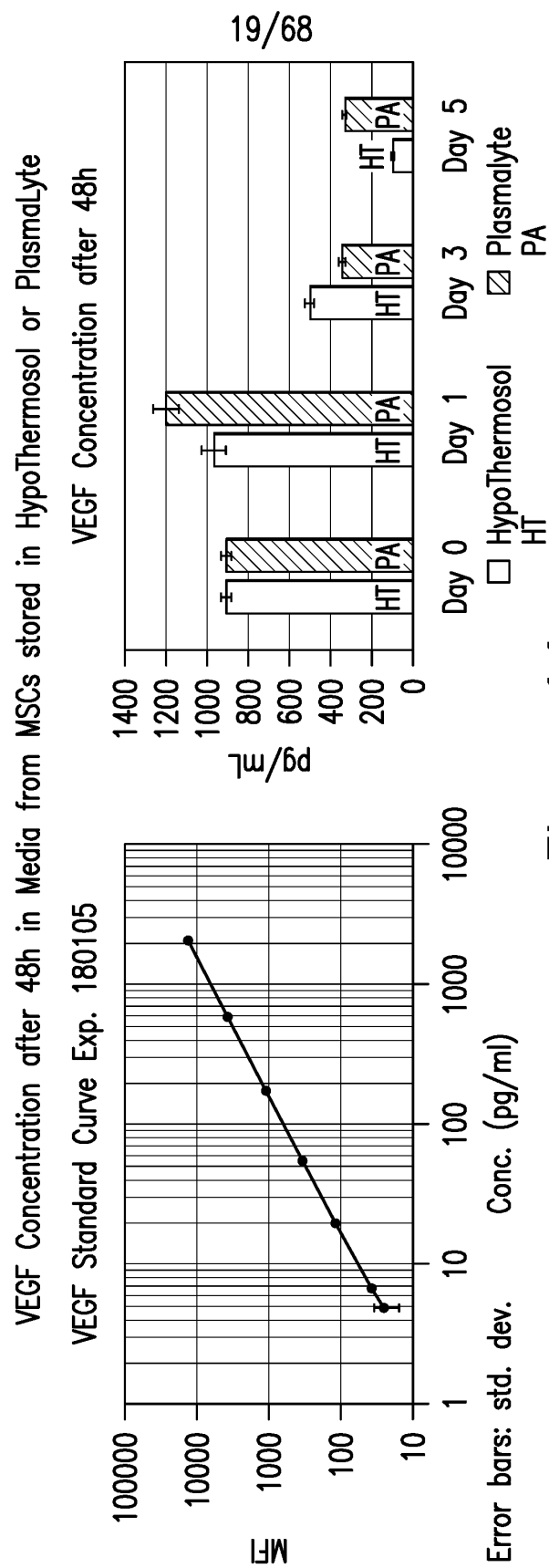


Figure 14

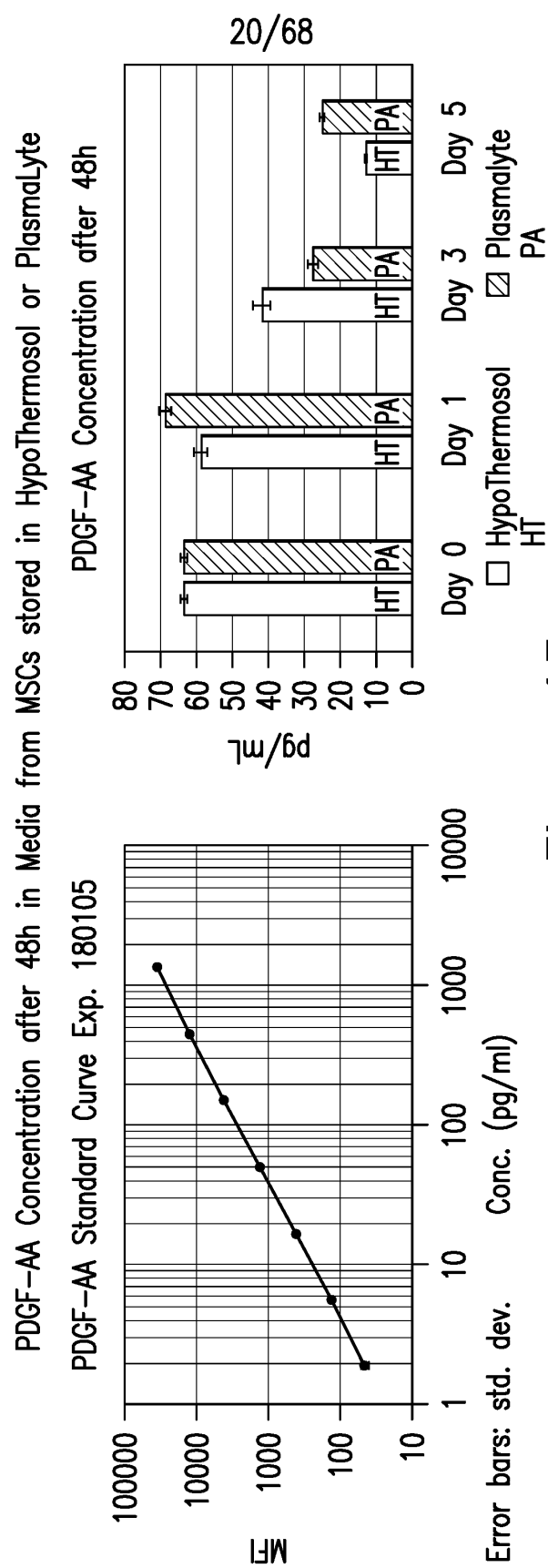


Figure 15

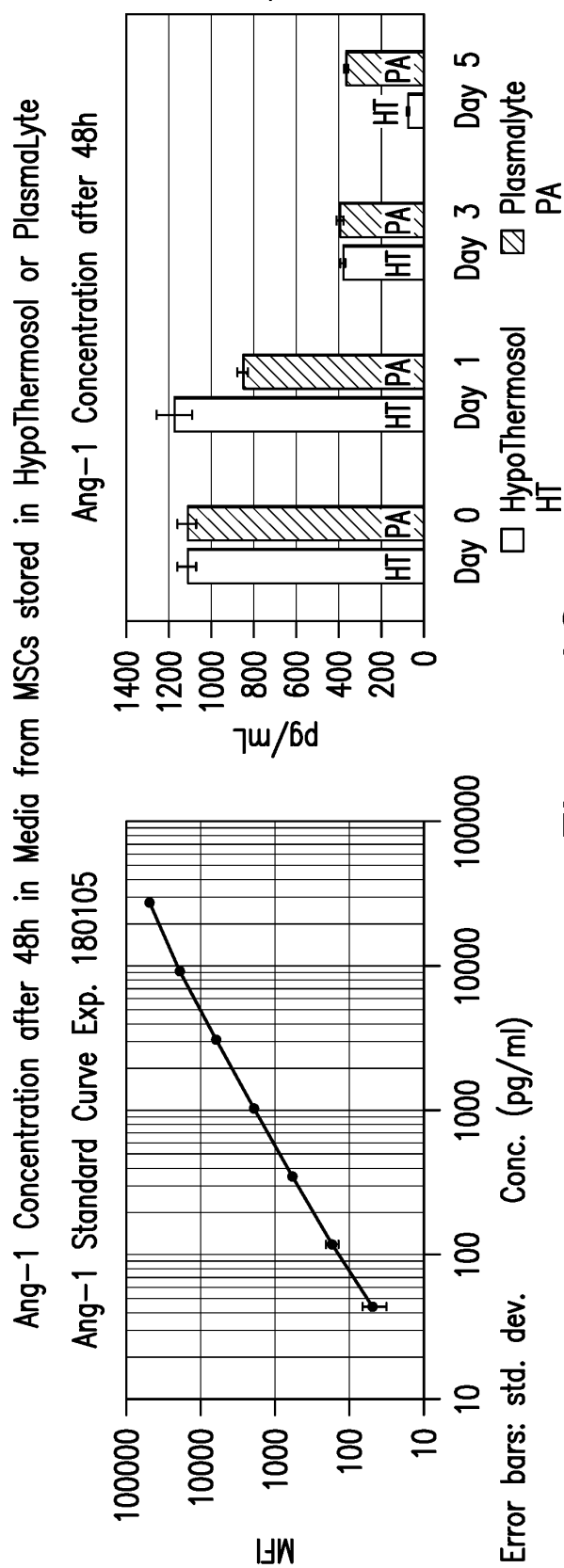
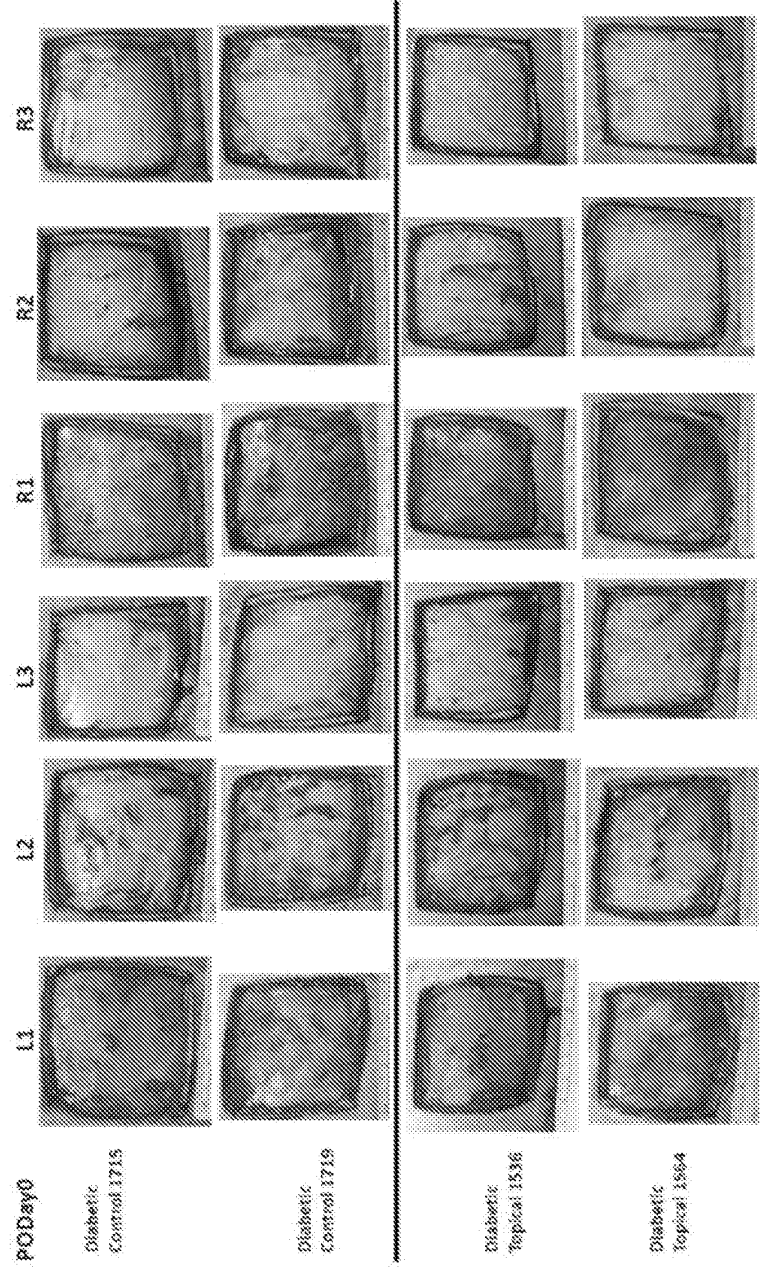


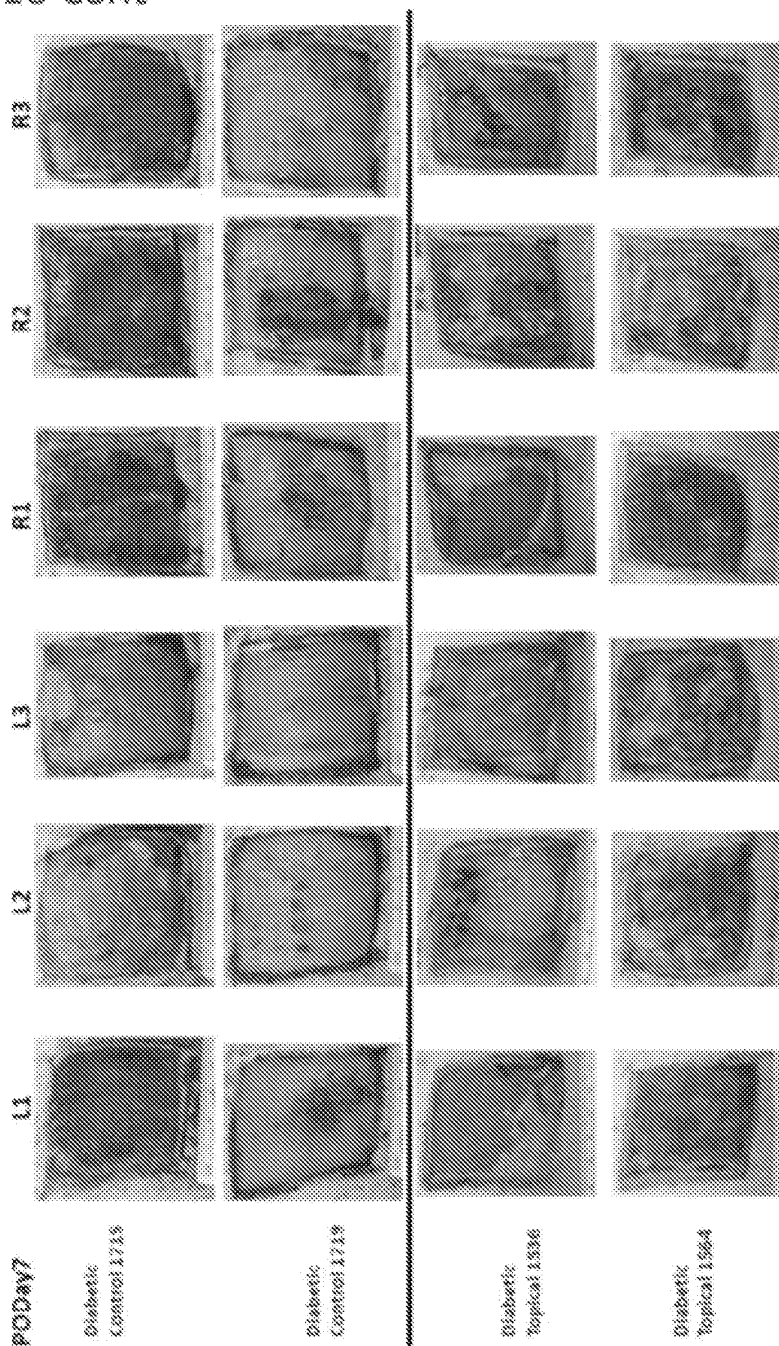
Figure 16

Figure 18



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Figure 18 cont'



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Figure 18 cont'

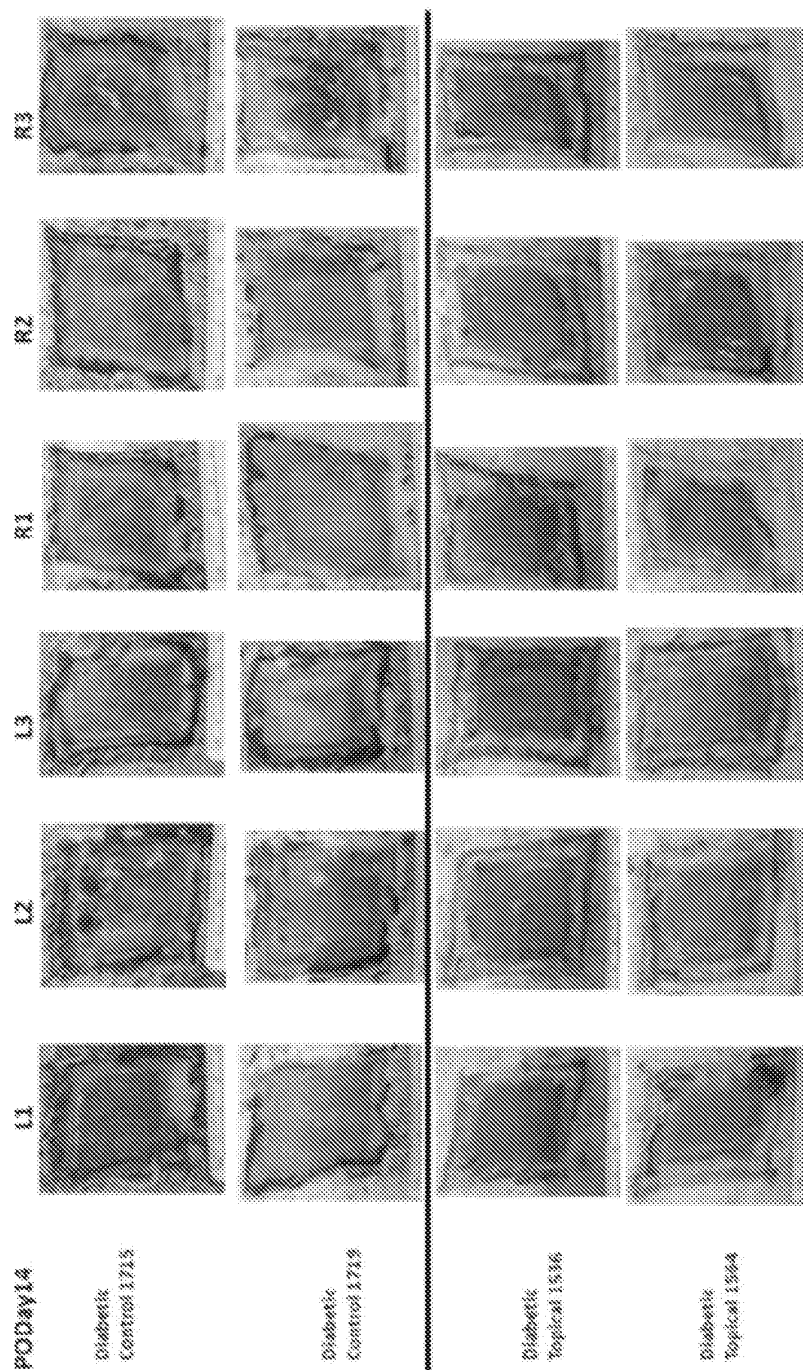


Figure 18 cont'

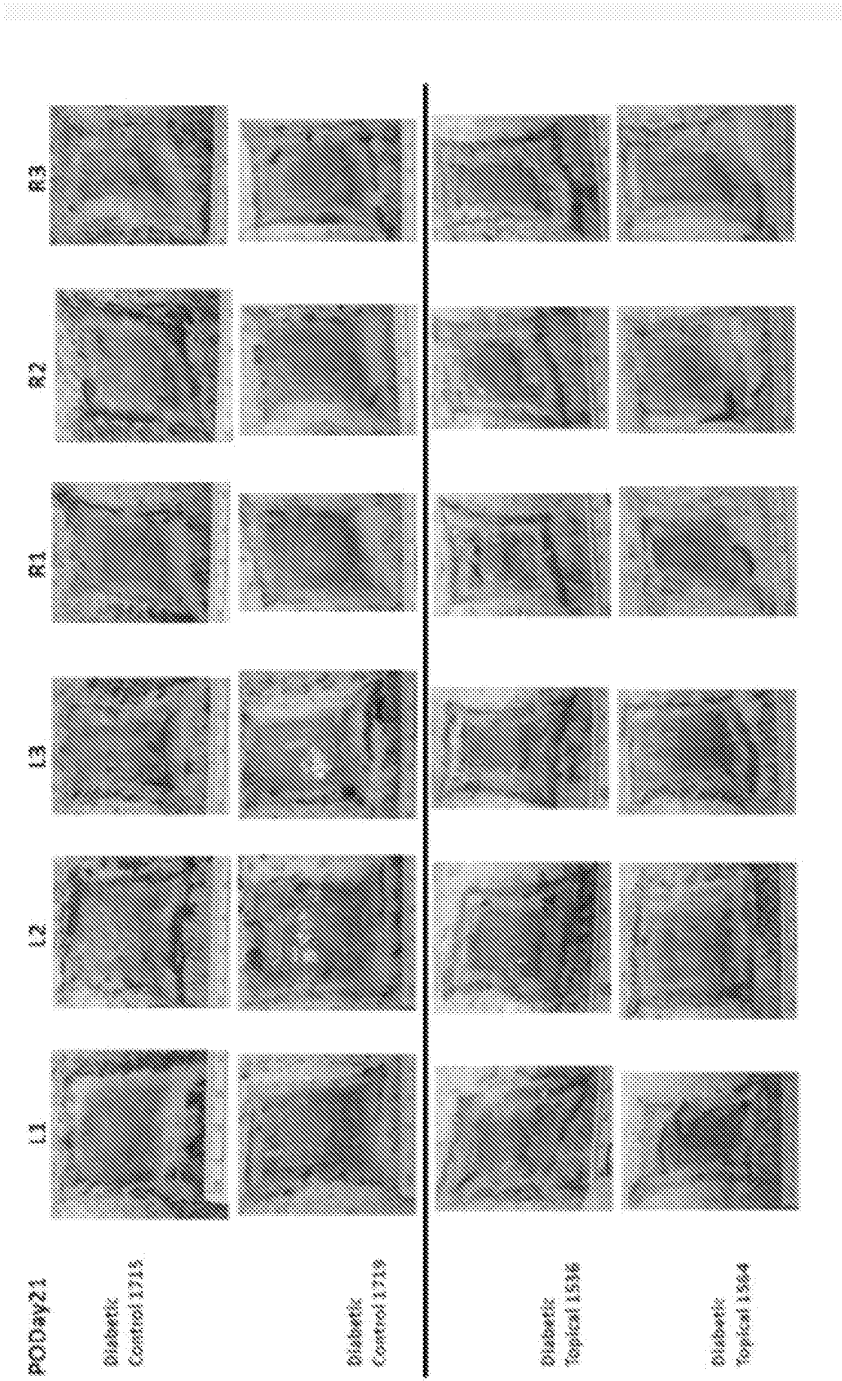
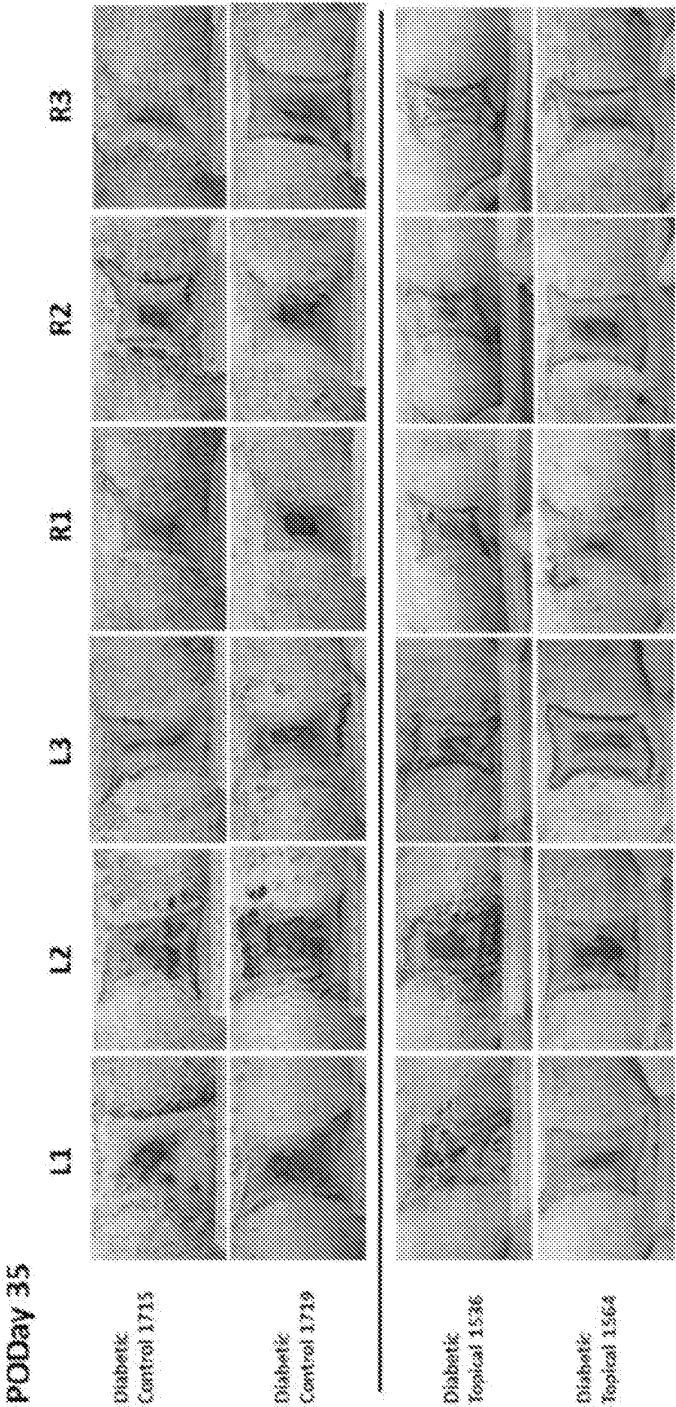


Figure 18 cont'



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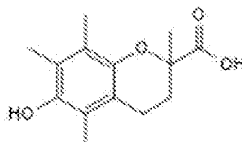
Figure 19

Print Date: Sep 16th 2016**Certificate of Analysis**www.tocris.com

Product Name:	Trolox	Catalog No.:	6002	Batch No.:	1
CAS Number:	53188-07-1				
IUPAC Name:	3,4-Dihydro-6-hydroxy-2,5,7,8-tetramethyl-2H-1-benzopyran-2-carboxylic acid				

1. PHYSICAL AND CHEMICAL PROPERTIES

Batch Molecular Formula:	C ₁₄ H ₁₈ O ₄ ·nH ₂ O
Batch Molecular Weight:	259.3
Physical Appearance:	Beige solid
Solubility:	DMSO to 100 mM ethanol to 100 mM
Storage:	Store at +4°C
Batch Molecular Structure:	

**2. ANALYTICAL DATA**

HPLC:	Shows 99.7% purity
¹H NMR:	Consistent with structure
Mass Spectrum:	Consistent with structure
Microanalysis:	Carbon Hydrogen Nitrogen
	Theoretical 64.85 7.39
	Found 64.72 7.58

Caution - Not Fully Tested • Research Use Only • Not For Human or Veterinary Use

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Tel: +1 612 379 2956

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TOCRIS
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Figure 19 cont'

Print Date: Sep 16th 2016**Product Information**www.tocris.com

Product Name: Trolox	Catalog No.: 6002	Batch No.: 1
CAS Number: 53188-07-1		
IUPAC Name: 3,4-Dihydro-6-hydroxy-2,5,7,8-tetramethyl-2H-1-benzopyran-2-carboxylic acid		

Description:

Antioxidant vitamin E derivative; suppresses osteoclast formation and inhibits IL-1-induced osteoclast bone loss. Cell-permeable and water soluble.

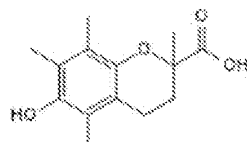
Physical and Chemical Properties:

Batch Molecular Formula: $C_{28}H_{48}O_4 \cdot \frac{1}{2}H_2O$

Batch Molecular Weight: 259.3

Physical Appearance: Beige solid

Minimum Purity: >98%

Batch Molecular Structure:

Storage: Store at +4°C

Solubility & Usage Info:

DMSO to 100 mM
ethanol to 100 mM

Stability and Solubility Advice:

Some solutions can be difficult to obtain and can be encouraged by rapid stirring, sonication or gentle warming (in a 45-60°C water bath).

Information concerning product stability, particularly in solution, has rarely been reported and in most cases we can only offer a general guide. Our standard recommendations are:

SOLIDS: Provided storage is as stated on the product label and the vial is kept tightly sealed, the product can be stored for up to 6 months from date of receipt.

SOLUTIONS: We recommend that stock solutions, once prepared, are stored aliquoted in tightly sealed vials at -20°C or below and used within 1 month. Wherever possible solutions should be made up and used on the same day.

References:

Lee *et al* (2009) Trolox prevents osteoclastogenesis by suppressing RANKL expression and signaling. *J Biol Chem*. **284** 13725. PMID: 19299513.

Giulivi *et al* (1993) Inhibition of protein radical reactions of ferrimyoglobin by the water-soluble analog of vitamin E, Trolox C. *Arch Biochem Biophys*. **303** 152. PMID: 8489259.

Caution - Not Fully Tested • Research Use Only • Not For Human or Veterinary Use

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SIGMA-ALDRICH Figure 20

sigmaaldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.comEmail USA: techserv@sial.comOutside USA: eurotechserv@sial.com

Product Specification

Product Name:

Sodium chloride - PharmaGrade, USP, Manufactured under appropriate GMP controls for pharma or biopharmaceutical production.

Product Number:

RES0926S-A7

CAS Number:

7647-14-5

Formula:

NaCl

Formula Weight:

58.44 g/mol

TEST	Specification
Appearance (Color)	White
Appearance (Form)	Powder
Appearance of Solution (Turbid)	Clear
20% aqueous	
Appearance of Solution (Color)	Colorless
20% aqueous	
Heavy Metals (per USP)	≤ 5 ppm
Identification	Pass
Iodides	Pass
Iron (Fe)	≤ 2.0 µg/g
Limit of Bromides	≤ 0.010 %
Limit of Phosphate	≤ 0.0025 %
Limit of Potassium	≤ 0.05 %
Loss on Drying (USP)	≤ 0.5 %
Acidity or Alkalinity	Pass
Aluminum (Al)	≤ 0.2 µg/g
Arsenic (As)	≤ 1.0 µg/g
Assay	99.0 - 100.5 %
Dried basis	
Barium (USP)	Pass
Chloride	Pass
Ferrocyanides	Pass
Magnesium/Alkaline Earth Metal	Pass
Nitrites	Pass
Sulfate (SO ₄)	≤ 0.020 %

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

1 of 2

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SIGMA-ALDRICH Figure 20 cont'sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.comEmail USA: techserv@sial.comOutside USA: eurtechserv@sial.com

Product Specification

Product Name:

Sodium chloride – PharmaGrade, USP, Manufactured under appropriate GMP controls for pharma or biopharmaceutical production.

Product Number:

RES0926S-A7

CAS Number:

7647-14-5

Formula:

NaCl

Formula Weight:

58.44 g/mol

TEST**Specification**

Specification: PRD.0.ZQ5.10000051146

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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SIGMA-ALDRICH Figure 21sigmaaldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.comEmail USA: techserv@sial.comOutside USA: surtechserv@sial.com**Product Specification**

Product Name:

Potassium phosphate monobasic - 99.99% trace metals basis

Product Number:

229806

CAS Number:

7778-77-0

MDL:

MFCD00011401

Formula:

H₂KO₄P

Formula Weight:

136.09 g/mol

**TEST****Specification**

Appearance (Color)

Conforms to Requirements

White or Colorless

Appearance (Form)

Powder or Crystals

Purity (Titration by NaOH)

22.3 - 23.2 %

% P

ICP Major Analysis

Confirmed

Confirms Potassium and Phosphorus Components

Trace Metal Analysis

≤ 150.0 ppm

Purity

Meets Requirements

99.99% Based On Trace Metals Analysis

Specification: PRD.2.ZQ5.10000038396

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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Figure 22

sigma-aldrich.com

3850 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.comEmail USA: techserv@sial.comOutside USA: surtechserv@sial.com

Product Specification

Product Name:

HEPES - PharmaGrade. Manufactured under appropriate controls for use as a raw material in pharma or biopharmaceutical production, suitable for cell culture

Product Number:

RES6003H-B7

CAS Number:

7365-45-9

Formula:

C₈H₁₈N₂O₄S

Formula Weight:

238,3 g/mol

TEST	Specification
Appearance (Color)	White
Appearance (Form)	Fine Flowing Powder
Infrared Spectrum	Conforms to Reference
Solubility (Turbidity)	Clear
1.0M aqueous	
Solubility (Color)	Colorless
1.0M aqueous	
Solubility (Form)	Solution
1.0M aqueous	
Water (by Karl Fischer)	≤ 0.5 %
Titration by NaOH	≥ 99.5 %
Cytotoxicity	Pass
DNase - Nickase	Pass
DNase-Endo/Exonuclease	Pass
RNAse Detection	Pass
pH	4.7 - 5.3
1.0% aqueous	
Endotoxin	≤ 50 EU/g
Yeast and Mold	≤ 100 CFU/g
Bioburden	≤ 100 CFU/g
Protease Detection	Pass
Residue on Ignition	≤ 0.1 %
Arsenic (As)	≤ 3.0 ppm
Iron (Fe)	≤ 5.0 ppm
Zinc (Zn)	≤ 5.0 ppm

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at SigmaAldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

1 of 2

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SIGMA-ALDRICH Figure 22 cont'

sigmaaldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.comEmail USA: techserv@sigmaaldrich.comOutside USA: eurotechserv@sigmaaldrich.com**Product Specification****Product Name:**

HEPES - PharmaGrade, Manufactured under appropriate controls for use as a raw material in pharma or biopharmaceutical production, suitable for cell culture

Product Number:

RES6003H-B7

CAS Number:

7365-45-8

Formula:C₈H₁₈N₂O₄S**Formula Weight:**

238.3 g/mol

TEST	Specification
Nickel (Ni)	≤ 5.0 ppm
Magnesium (Mg)	≤ 5.0 ppm
Calcium (Ca)	≤ 30.0 ppm
Lead (Pb)	≤ 5.0 ppm
Bismuth (Bi)	≤ 5.0 ppm
Lithium (Li)	≤ 5.0 ppm
Molybdenum (Mo)	≤ 5.0 ppm
Aluminum (Al)	≤ 5.0 ppm
Antimony (Sb)	≤ 5.0 ppm
Barium (Ba)	≤ 5.0 ppm
Cobalt (Co)	≤ 5.0 ppm
Chromium (Cr)	≤ 5.0 ppm
Cadmium (Cd)	≤ 5.0 ppm
Copper (Cu)	≤ 5.0 ppm
Manganese (Mn)	≤ 5.0 ppm
UV Absorbance 260nm 1.0M aqueous	≤ 0.05 Abs UN
UV Absorbance 280nm 1.0M aqueous	≤ 0.04 Abs UN

Specification: PRO.0.ZQ5-10000550458

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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COMBI-BLOCKS

QW-1395 p.1

Figure 23

Safety Data Sheet

1. Identification of the substance

Product Name: Sodium lactobionate
Synonyms:
Catalog number: QW-1395
Supplier: Combi-Blocks, Inc., 7949 Silverton Ave # 915, San Diego, CA 92126, USA. Tel: 858-635-8950

2. Hazards identification

No known hazard.

3. Composition/information on ingredients.

Ingredient name: Sodium lactobionate
CAS number: 27297-39-8

4. First aid measures

Skin contact: Immediately wash skin with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes. If irritation persists, seek medical attention.
Eye contact: Immediately wash skin with copious amounts of water for at least 15 minutes. Assure adequate flushing of the eyes by separating the eyelids with fingers. If irritation persists, seek medical attention.
Inhalation: Remove to fresh air. In severe cases or if symptoms persist, seek medical attention.
Ingestion: Wash out mouth with copious amounts of water for at least 15 minutes. Seek medical attention.

5. Fire fighting measures

In the event of a fire involving this material, alone or in combination with other materials, use dry powder or carbon dioxide extinguishers. Protective clothing and self-contained breathing apparatus should be worn.

6. Accidental release measures

Personal precautions: Wear suitable personal protective equipment which performs satisfactorily and meets local/state/national standards.
Respiratory precaution: Wear approved mask/respirator
Hand precaution: Wear suitable gloves/gauntlets
Skin protection: Wear suitable protective clothing
Eye protection: Wear suitable eye protection

Methods for cleaning up: Mix with sand or similar inert absorbent material, sweep up and keep in a tightly closed container for disposal. See section 12.

Environmental precautions: Do not allow material to enter drains or water courses.

7. Handling and storage

Handling: This product should be handled only by, or under the close supervision of, those properly qualified in the handling and use of potentially hazardous chemicals, who should take into account the fire, health and chemical hazard data given on this sheet.
Storage: Store in closed vessels.

8. Exposure Controls / Personal protection

Engineering Controls: Use only in a chemical fume hood.
Personal protective equipment: Wear laboratory clothing, chemical-resistant gloves and safety goggles.
General hygiene measures: Wash thoroughly after handling. Wash contaminated clothing before reuse.

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12/26/2017

COMBI-BLOCKS

QW-1395 p.2

Figure 23 cont'

9. Physical and chemical properties

<i>Appearance:</i>	Not specified
<i>Boiling point:</i>	No data
<i>Melting point:</i>	No data
<i>Flash point:</i>	No data
<i>Density:</i>	No data
<i>Molecular formula:</i>	C ₁₂ H ₂₁ O ₁₂ Na
<i>Molecular weight:</i>	380.3

10. Stability and reactivity

<i>Conditions to avoid:</i>	Heat, flames and sparks.
<i>Materials to avoid:</i>	Oxidizing agents.
<i>Possible hazardous combustion products:</i>	Carbon monoxide, nitrogen oxides.

11. Toxicological information

<i>Acute toxicity:</i>	No data available.
<i>Skin irritation/corrosion:</i>	No data available.
<i>Eye damage/irritation:</i>	No data available.
<i>Respiratory or skin sensitization:</i>	No data available.
<i>Germ cell mutagenicity:</i>	No data available.
<i>Carcinogenicity:</i>	No classification data on carcinogenic properties of this material is available from EPA, IARC, NTP, OSHA or ACGIH.
<i>Reproductive toxicity:</i>	No effects known.
<i>Specific target organ system toxicity - repeated exposure:</i>	No effects known.
<i>Specific target organ system toxicity - single exposure:</i>	No data available.
<i>Aspiration hazard:</i>	No data available.
<i>Additional information:</i>	To the best of our knowledge, the chemical, physical and toxicological properties of this substance have not been thoroughly investigated.

12. Ecological information

<i>Toxicity:</i>	No data available.
<i>Persistence and degradability:</i>	No data available.
<i>Bioaccumulative potential:</i>	No data available.
<i>Mobility in soil:</i>	No data available.
<i>Result of PBT and vPvB assessment:</i>	PBT: Not applicable. vPvB: Not applicable.
<i>Other adverse effects:</i>	No further relevant information available.

13. Disposal consideration

Arrange disposal as special waste, by licensed disposal company, in consultation with local waste disposal authority, in accordance with national and regional regulations.

14. Transportation information

No known hazard for air and ground transportation.

15. Regulatory information

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302, or have known CAS numbers that exceed the threshold reporting levels established by SARA Title III, Section 313.

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COMBI-BLOCKS

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16. Other information

This MSDS is correct to the best of our knowledge at the date of publication but does not purport to be all inclusive and shall be used only as a guide. Combi-Blocks shall not be held liable for any injury or damage resulting from handling or from contact with the above product.

Figure 23 cont'

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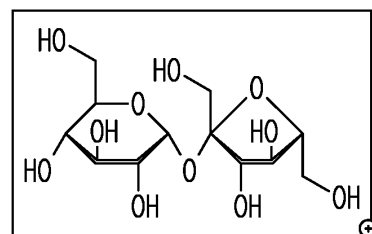
USA Home ARK2195B – Sucrose, Low Endotoxin

SIGMA-ALDRICH

ARK2195B SIGMA-ALDRICH

Sucrose, Low Endotoxin

PharmaGrade, USP/NF, Ph Eur, Manufactured under appropriate GMP controls for pharma or Biopharmaceutical production.

Synonym: α -D-Glc-(1 $\rightarrow$ 2)- β -D-Fru, α -D-Glucopyranosyl β -D-fructofuranoside, β -D-Fructofuranosyl- α -D-glucopyranoside, D(+)-Saccharose, Sucrose, Sugar

SDS

CAS Number 57-50-1 ; Empirical Formula (Hill Notation) C₁₂H₂₂O₁₁ ; Molecular Weight 342.30 ;
 Bellstein Registry Number 90825 ; EC Number 200-334-9 ; MDL number MFCD00006626 ;
 PubChem Substance ID 329773061

Properties

Related Categories	Biochemicals and Reagents, Carbohydrates for Protein Stabilization, Proteins and Derivatives, Reagents for Protein Stabilization
Biological source	plant
grade	Ph Eur
	USP/NF
InChi Key	CZMRCDWAGMRECN-UGDNZRGBSA-N
product line	PharmaGrade
form	powder
impurities	Endotoxin; tested, Sulfites; tested
mp	185–187°C(lit.)
suitability	suitable for manufacturing use
	Show Fewer Properties

Figure 24

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Description**General description**

PharmaGrade products are manufactured under appropriate controls for use as a raw material in pharma or biopharmaceutical production. For more information on the PharmaGrade Program, visit sigma-aldrich.com/safc-pharmagrade.

Linkage

Quality Documentation on PharmaGrade Sucrose, Low Endotoxin

Price and Availability

SKU-Pack Size	Availability	Price (USD)	Quantity
ARK2195B-25KG	Estimated to ship on 05/08/18	5,590.70	0
ARK2195B-1KG	Only 2 left in stock (more on the way) – From	376.70	0
ARK2195B-10KG	Estimated to ship on 04/12/18	2,893.70	0
ARK2195B-100G	Only 3 left in stock (more on the way) – From	202.00	0

Figure 24 continued

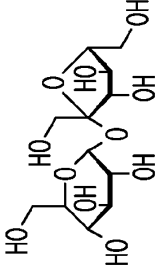
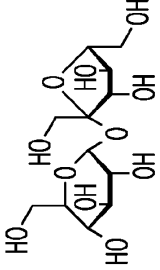
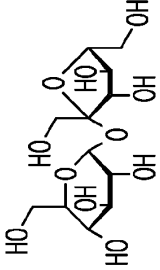
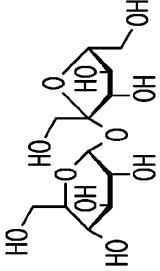
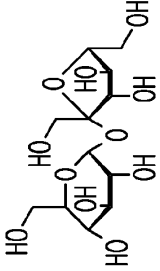
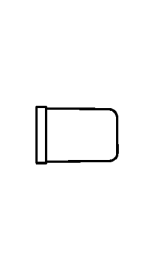
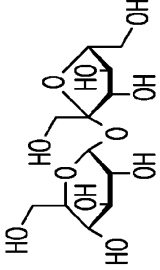
Personalized Product Recommendations					
Customers Also Viewed					
	S3929 Sucrose meets USP testing specifications	16104 Sucrose puriss., meets analytical specification of Ph. Eur., BP, NF			
Customers Also Viewed					
	S3929 Sucrose meets USP testing specifications	16104 Sucrose puriss., meets analytical specification of Ph. Eur., BP, NF	84097 Sucrose BioUltra, for molecular biology, ≥99.5% (HPLC)	1.00892 Sucrose Sucrose low in endotoxins suitable for use as excipient EMPROVE® exp Ph JP,NF. CAS 57-50-1, pH 7 (100 g/l, H2O, 20°C), low in endotoxins suitable for use as excipient EMPROVE® exp Ph EUR,BP,JP,NF	S7903 Sucrose BioXtra, ≥99.5% (GC)

Figure 24 continued

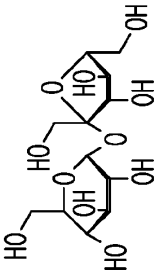
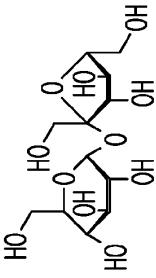
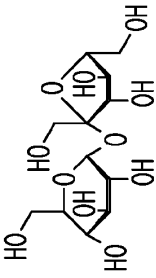
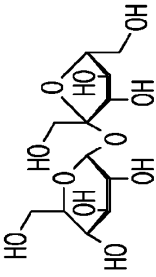
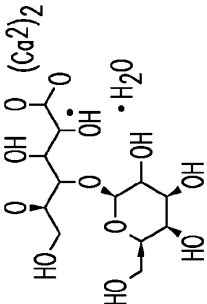
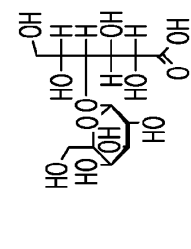
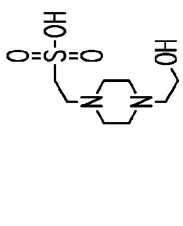
 S0389 Sucrose for molecular biology, ≥99.5% (GC)	 S9378 Sucrose ≥99.5% (GC)	 S1600000 Sucrose European Pharmacopoeia (EP) Reference Standard	 S1888 Sucrose BioReagent, suitable for cell culture, suitable for insect cell culture, ≥99.5% (GC)	 1.37048 D(+)-Glucose D(+)-Glucose anhydrous suitable for the biopharmaceutical production EMPROVE® bio Ph Eur,BP,USP. CAS 50- 99-7, molar mass 180.16 g/mol., anhydrous suitable for the biopharmaceutical production EMPROVE® bio Ph Eur,BP,USP,ACS
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Figure 24 continued

Recently Viewed	 L3375 Calcium lactobionate monohydrate 98.0–102.0% (EDTA titration)	 153516 Lactobionic acid 97%	 RES6003H–B7 HEPES PharmaGrade Manufactured under appropriate controls for use as a raw material in pharmaceutical production, suitable for cell culture	 229806 Potassium phosphate monobasic 99.99% trace metals basis	 KH ₂ PO ₄	 Res20760–A7 Potassium phosphate monobasic PharmaGrade, NF Manufactured under appropriate GMP controls for pharma or biopharmaceutical production	 KH ₂ PO ₄
-----------------	--	--	---	--	-------------------------------------	---	-------------------------------------

Safety Information			Documents		
RIDADR	NONH for all modes of transport	Certificate of Analysis	Enter Lot No.	Anfi	
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RTECS	WN6500000				

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Figure 24 continued

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Formula Weight: 182.17

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Select Size	Product Number	Units per Case	Package Size	Container Type	Price per Unit	Case Price per Unit	Min Order in Units	Quantity (Units)
☐	7781-88	1	12KG	6.5GL polyethylene pail: screw top	\$1467.49	--	1	

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* Products noted with an astericks (*) in the "Units Per Case" column are available for sale in case units of measure only.

The Following product(s) have been removed from catalog:

Removed Products	Package Size	Equivalent Products	Equivalent Pkg Size	Comments/Notes Products
7781-04	500G	Not Available	--	Please contact Customer Services.

[SAFETY DATA SHEET](#)[SEARCH FOR PRODUCT REGULATORY DATASHEETS](#)

Figure 25

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Product Specifications

TEST	SPECIFICATION
GMP Manufactured Product	
Meets B.P. Chemical Specifications	
Meets E.P. Chemical Specifications	
Meets U.S.P Requirements	
CAUTION: For Manufacturing, processing or repackaging	
Bulk Pharmaceutical Chemical	
USP-Assay (dried basis)	97.0–102.0 %
USP-Identification	Passes Test
USP-Related Substances: Sorbitol	<= 2.0 %
USP-Related Substances: Sum of isomalt& maltitol	<= 2.0 %
USP-Related Substances: Unspecified Impurities	<= 0.10 %
USP-Related Substances: Total Impurities	<= 2.0 %
USP-Loss on Drying at 105°C	<= 0.5 %
USP-Melting Point	165–170°C
USP-Reducing Sugars	<= 0.1%
USP-Nickel (Ni)	<= 1 ppm
USP-Appearance of Solution	Passes Test
USP-Conductivity ($\mu\text{S cm}^{-1}$)	<= 20 $\mu\text{S/cm}$
USP-Total Aerobic Microbial Count	<= 100 cfu/g

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<https://www.avantorinc.com/commerce/product.aspx?id=21474846759>

Figure 25 continued

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USP–Total Yeast and Mold Count	<= 100cfu/g
USP–Escherichia coli	Passes Test
EP/BP–Assay (as C ₆ H ₁₄ O ₆)(calculated on anhydrous basis)	97.0–102.0 %
EP/BP–Conductivity, uS cm ⁻¹	<= 20
EP/BP–Identification C	Passes Test
EP/BP–Melting Point	165–170°C
EP/BP–Heavy Metals (as Pb)	<= 5 ppm
EP/BP–Nickel (Ni)	<= 1 ppm
EP/BP–Loss on Drying	<= 0.5 %
EP/BP–Reducing Sugars	<= 0.1 %
EP/BP–Related Substances: Impurity A	<= 2.0 %
EP/BP–Related Substances: Sum of Impurity B & C	<= 2.0 %
EP/BP–Related Substances: Unspecified Impurity, each	<= 0.10 %
EP/BP–Related Substances: Total Impurities	<= 2.0 %
EP/BP–Appearance of Solution	Passes Test
Total Aerobic Microbial Count (cfu/g)	<= 1000
Total Mold and Yeast Count (cfu/g)	<= 100
EP/BP–Escherichia coli (absent)	Passes Test
Salmonella (absent)	Passes Test
Endotoxin Concentration (EU/g)	<= 10
Appearance (fine, white crystalline powder)	
Not Intended for Parenteral Use	
Only Class 2 solvents (Ethylene Glycol) are likely to be present. All are below Option 1 limits.	
Metallic Residues: No metal catalysts or metal reagents, as defined by EMA Guideline EMEA/CHMP/SWP/4446/2000, are used in the production of this material.	

Figure 25 continued

PRINT FRIENDLY PRODUCT SPECIFICATIONS

Product Information

CAS Number	69-65-8
HTS Number	2905430000
Density	1L=1.52 Kg
Management of Change	R

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https://www.avantorinc.com/commerce/product.aspx?id=21474846759

OK

30.03.2018

Figure 25 continued

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SIGMA® Figure 26

3050 Spruce Street
 Saint Louis, Missouri 63103 USA
 Telephone 800-325-5832 • (314) 771-5765
 Fax (314) 286-7828
 email: techserv@sigma.com
 sigma-aldrich.com

Product Information

D-(+)-Glucose

Product Number **G 8270**
 Store at Room Temperature

Product Description

Molecular Formula: $C_6H_{12}O_6$
 CAS Number: 50-99-7
 Molecular Weight: 180.2
 Melting Point: 146 °C for α -D-glucose and 150 °C for β -D-glucose¹
 pH: 5.9 (0.5 M aqueous)²

Densities of aqueous solutions (w/v) at 17.5 °C with respect to water:²

Concentration (%)	5	10	20	30	40
Density (g/ml)	1.019	1.038	1.076	1.113	1.149

Glucose is a main source of energy for living organisms. Glucose occurs naturally in the free state in fruits and other parts of plants. Glucose is combined into glucosides, disaccharides, oligosaccharides, the polysaccharides (cellulose and starch), and glycogen.

Glucose is a mixture of α - and β -anomers, primarily the α -anomer. The optical rotation of the α -anomer is +112.2° (c = 10% in water, 20 °C) and the β -anomer is +18.7° (c = 10% in water, 20 °C). When D-glucose is dissolved in water, the optical rotation gradually changes (mutarotates) with time and approaches a final equilibrium value of +52.7° (c = 10%, 20 °C) due to the formation of an equilibrium mixture consisting of approximately one-third α - and two-thirds β -D-glucose.²

Normal human blood contains 0.08-0.1% glucose.²
 Small amounts of glucose (also hydrogen peroxide or glucose oxidase) can be measured using luminol as a substrate with horseradish peroxidase.³

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

One gram of glucose dissolves in 1.1 ml of water at 25 °C and in 0.18 ml of water at 90 °C.²

Storage/Stability

Solutions are sterilized by autoclaving.⁴

References

1. Biochemistry, 2nd ed., Lehninger, A. L., ed., Worth Publishers, Inc. (New York, NY: 1975), p. 253.
2. The Merck Index, 13th Ed., Entry# 4472.
3. Puget, K., and Michelson, A.M., Microestimation of glucose and glucose oxidase. *Biochimie*, **58**, 757-758 (1976).
4. Martindale The Extra Pharmacopoeia, 29th ed., Reynolds, J. E. F., ed., The Pharmaceutical Press (London, England: 1989), p. 1265.

MES/AJH 11/02

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USA Home 31389 – Dextran from *Leuconostoc* spp.SIGMA-ALDRICH

31389 SIGMA

Dextran from *Leuconostoc* spp. $M_r \sim 40,000$

Synonym: DEXTRAN 40

SDS SIMILAR PRODUCTS

CAS Number 9004-54-0 | Linear Formula $(C_6H_{10}O_5)_n$ | EC Number 232-677-5 |
 MDL number MFCD00130935

Properties

Related Categories	Biochemicals and Reagents, Biostabilization Agents, Carbohydrates, Dextran, Dextran for General Research Applications, More...
mol wt	$M_r \sim 40,000$
loss	$\leq 7\%$ loss on drying
absorption	A10%/375 nm, $H_2O \leq 0.05$
storage temp.	room temp

Description

Packaging 500 g in poly bottle
Application Dextran is a branched glucan composed of linear $\alpha(1 \rightarrow 6)$ linked glucose units and $\alpha(1 \rightarrow 3)$ link initiated branches. Dextran ranges in size from 10,000 to 150,000 Kd. Dextran is used in many applications as volume extenders, stabilizers, matrix components, binding platforms, lubricants and physical structure components. Dextran 40 is used in the development of new improved preservation solutions for organ transplantation. Dextran 40 may be used to determine cell tightness and flux parameters across cell layers. Dextran 40 is used as a colloidal plasma volume extender.

Price and Availability

SKU-Pack Size	Availability	Price (USD)	Quantity
31389-100G	Only 6 left in stock (more on the way) – FROM	296.00	0
31389-25G	Available to ship on 03/30/18 – FROM	88.50	0
31389-500G	Available to ship on 03/30/18 – FROM	1,022.00	0

BULK ORDERS?

ADD TO CART

Figure 27

Customers Also Viewed					
68084 Dextran from <i>Leuconostoc</i> spp. M _r ~40000	1179708 Dextran 40 United States Pharmacopeia (USP) Reference Standard	31388 Dextran from <i>Leuconostoc</i> spp. M _r ~6,000	31390 Dextran from <i>Leuconostoc</i> spp. M _r ~70,000	09184 Dextran from <i>Leuconostoc</i> spp. M _r ~100,000	
D1662 Dextran from <i>Leuconostoc</i> <i>mesenteroides</i> average mol wt 35,000– 45,000	31392 Dextran from <i>Leuconostoc</i> spp. M _r 450,000–650,000	1179876 Dextran 40 Calibration United States Pharmacopeia (USP) Reference Standard	 31387 Dextran from <i>Leuconostoc</i> spp. M _r 15,000–25,000	D2447 Dimethyl Sulfoxide DMSO/Dextran T 40 55% w/v DMSO USP, Ph.Eur. 5% w/v Dextran T40 USP in NaCl	

Figure 27 continued

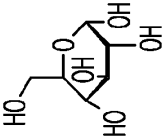
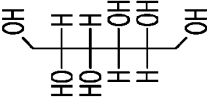
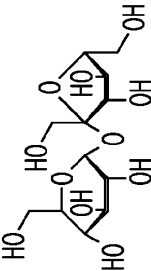
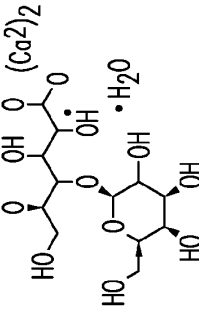
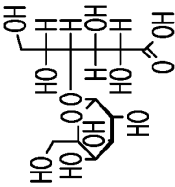
Recently Viewed	 <chem>O=C[C@@H](O)[C@H](O)[C@@H](O)CO</chem>	G8270 D-(+)-Glucose ≥99.5% (GC)
	 <chem>O=C[C@@H](O)[C@H](O)[C@@H](O)CO</chem>	M4125 D-Mannitol ≥98%
	 <chem>O=C[C@@H](O)[C@H](O)[C@@H](O)[C@H](O)[C@@H](O)O</chem>	ARK2195B Sucrose, Low Endotoxin PharmaGrade, USP/NF, Ph Eur, Manufactured under appropriate GMP controls for pharma or biopharmaceutical production.
	 <chem>O=C[C@@H](O)[C@H](O)[C@@H](O)[C@H](O)[C@@H](O)O</chem>	L3375 Calcium lactobionate monohydrate 98.0–102.0% (EDTA titration)
	 <chem>O=C[C@@H](O)[C@H](O)[C@@H](O)[C@H](O)CO</chem>	153516 Lactobionic acid 97%

Figure 27 continued

Safety Information

Personal Protective Equipment	Eyeshields, Gloves, type N95 (US), type P1 (EN143) respirator filter
RIDADR	NONH for all modes of transport
WGK Germany	2

Documents

Certificate of Analysis
Enter Lot No. Anf
Bulk Quote–Order Product SDS
Specification Sheet

Articles

Dextran and Related Polysaccharides

Historically, dextrans had been long recognized as contaminants in sugar processing and other food production. The formation of dextran in wine was shown by Pasteur to be due to the activity of micro...

Vicki Caligur

BioFiles 2008, 3.10, 17.

Keywords. Adhesion, Applications, Chromatography, Clinical, Cosmetics, Derivatizations, Diffusion, Diltration, Immobilization, Industries, Ion Exchange, Ligands, Microscopy, Molecular biology, Monocular biology techniques, Nuclear magnetic resonance spectroscopy, nucleic acid hybridization, Pharmaceutical, Precipitation, Purification, Separation, Size exclusion chromatography, Spectroscopy, Sulfations, Type

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Peer–Reviewed Papers
Did you use this product in your Paper? If so click here.
https://www.sigmaaldrich.com/catalog/product/sigma/31389?lang=en&region=US&g...
30.03.2018

Figure 27 continued

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Product Information

sigma-aldrich.com

Figure 28

Adenosine

Product Number **A9251**

Storage Temperature 2-8 °C

Product Description

Molecular Formula: $C_{10}H_{13}N_5O_4$

Molecular Weight: 267.2

CAS Number: 58-61-7

Specific Rotation: -61.7° (7 mg/100 ml water)¹pK_a: 3.5 and 12.5.²Extinction Coefficient: $E^{1\%}_{1cm} = 15.4$ (259 nm in 0.01 M PO₄, pH 7)³

Adenosine is a nucleoside, a purine riboside widely distributed in nature. Adenosine is the product of the degradation of AMP.

Storage/Stability

Adenosine readily hydrolyzes in dilute mineral acids to adenine and D-ribose. Nitrous acid causes deamination.²

References

1. The Merck Index, 11th ed., Entry# 143
2. Dawson, R.M. C., et al., Data for Biochemical Research, 3rd ed., p. 77., Oxford University Press, New York, (1986).
3. Specifications and Criteria for Biochemical Compounds, 3rd ed., p. 157.

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

MES/ 8/08

Preparation Instructions

Soluble in water (7 mg/ml).³

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3050 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.comEmail USA: techserv@sigmaaldrich.comOutside USA: eurtechserv@sigmaaldrich.com**Product Specification****Product Name:**

L-Glutathione oxidized - PharmaGrade, Manufactured under appropriate controls for use as a raw material in pharma or biopharmaceutical production.

Product Number:**G2299****CAS Number:**

27025-41-8

Formula:

C20H32N6O12S2

Formula Weight:

612.63 g/mol

Storage Temperature:

2 - 8 °C

**TEST****Specification**

Appearance (Color)

White

Appearance (Form)

Powder

Solubility (Color)

Colorless

Solubility (Turbidity)

Clear

10 mg/ml, H₂O

Infrared spectrum

Conforms to Structure

Water (by Karl Fischer)

≤ 5 %

Nitrogen (anhydrous)

13.4 - 14.0 %

Purity (HPLC)

≥ 98 %

Impurity

≤ 2 %

Glutathione reduced by HPLC

Recommended Retest Period

3 Years

Specification: PRD.0.ZG5.10050041806

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

1 of 1

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HypoThermosol® FRS

Animal Component-Free, Defined Hypothermic (2 - 8°C) Preservation Medium

Catalog #	07935	100 mL
	07934	15 x 10 mL
	07936	500 mL Bottle
	07945	500 mL Bag

Figure 30



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Product Description

HypoThermosol® FRS is an optimized hypothermic (2 - 8°C) preservation media that enables improved and extended preservation of cells, tissues and organs. HypoThermosol® FRS is uniquely formulated to address the molecular-biological response of cells during the hypothermic preservation process. HypoThermosol® FRS includes key ions at concentrations that balance the intracellular state at hypothermic temperatures. Additional components include pH buffers, energy substrates, free radical scavengers, and osmotic/oncotic stabilizers.

- Ready-to-use
- Serum-free, protein-free
- Animal component-free
- cGMP manufactured with USP grade / highest quality components
- FDA master file
- Sterility, endotoxin, and cell-based release testing

Properties

Storage: Store at 2 - 8°C.

Shelf Life: Stable until expiry date (EXP) on label. Product should be protected from prolonged exposure to light.

Please refer to the Safety Data Sheet (SDS) for hazard information.

Product may be shipped at room temperature (15 - 25°C) and should be refrigerated upon receipt.

Handling / Directions For Use

HypoThermosol® FRS is ready to use and contains protective agents.

1. Wipe down outside of HypoThermosol® FRS container with 70% ethanol or isopropanol before opening.
2. Completely replace culture medium with cold (2 - 8°C) HypoThermosol® FRS. Do not warm HypoThermosol® FRS to 37°C.
3. Maintain sample at 2 - 8°C for duration of cold storage. HypoThermosol® FRS is not a culture medium, do not use above 15°C.

At the end of cold storage, simply centrifuge the cells to pellet them and remove HypoThermosol® FRS medium. Replace HypoThermosol® FRS with warmed culture medium of choice and flick the tube gently to resuspend the cells.

THIS PRODUCT IS MANUFACTURED UNDER A cGMP QUALITY MANAGEMENT SYSTEM COMPLIANT TO 21 CFR 820.

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SIGMA-ALDRICH

sigma-aldrich.com

SAFETY DATA SHEET

Version 6.1
 Revision Date 05/28/2017
 Print Date 08/08/2019

1. PRODUCT AND COMPANY IDENTIFICATION**1.1 Product identifiers**

Product name : Calcium chloride

Product Number : 449709

Brand : Aldrich

Index-No. : 017-013-00-2

CAS-No. : 10043-52-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
 3050 Spruce Street
 ST. LOUIS MO 63103
 UNITED STATES

Telephone : +1 314 771-5765

Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION**2.1 Classification of the substance or mixture**

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Eye irritation (Category 2A), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word : Warning

Hazard statement(s)

H319 : Causes serious eye irritation.

Precautionary statement(s)

P264 : Wash skin thoroughly after handling.

P280 : Wear protective gloves/ eye protection/ face protection.

P305 + P351 + P338 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337 + P313 : If eye irritation persists: Get medical advice/ attention.

Figure 31

SUBSTITUTE SHEET RULE 26

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2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: CaCl_2
Molecular weight	: 110.98 g/mol
CAS-No.	: 10043-52-4
EC-No.	: 233-140-8
Index-No.	: 017-013-00-2

Hazardous components

Component	Classification	Concentration
Calcium chloride	Eye Irrit. 2A, H319	$\leq 100\%$

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Hydrogen chloride gas, Calcium oxide

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

For personal protection see section 8.

Figure 31 Continued

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6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters****Components with workplace control parameters**

Contains no substances with occupational exposure limit values.

8.2 Exposure controls**Appropriate engineering controls**

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment**Eye/face protection**

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatri® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatri® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Figure 31 Continued

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Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle r (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

a) Appearance	Form: crystalline Colour: white
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	No data available
e) Melting point/freezing point	772 °C (1422 °F)
f) Initial boiling point and boiling range	1,670 °C (3,038 °F)
g) Flash point	()No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	0.01 hPa at 20 °C (68 °F)
l) Vapour density	No data available
m) Relative density	2.150 g/cm ³
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

Figure 31 Continued

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10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong acids, Borane/boron oxides, Zinc, Calcium oxide, Methyl vinyl ether, Calcium chloride is attacked by bromine trifluoride

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions: - Hydrogen chloride gas, Calcium oxide

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects****Acute toxicity**

LD50 Oral - Rat - 2,301 mg/kg(Calcium chloride)

(OECD Test Guideline 401)

Inhalation: No data available(Calcium chloride)

Dermal: No data available(Calcium chloride)

No data available(Calcium chloride)

Skin corrosion/irritation

Skin - Rabbit(Calcium chloride)

Result: No skin irritation

Serious eye damage/eye irritation

Eyes - Rabbit(Calcium chloride)

Result: Moderate eye irritation

(OECD Test Guideline 405)

Respiratory or skin sensitisation

No data available(Calcium chloride)

Germ cell mutagenicity

(Calcium chloride)

Rat

Unscheduled DNA synthesis

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available(Calcium chloride)

No data available(Calcium chloride)

Specific target organ toxicity - single exposure

No data available(Calcium chloride)

Specific target organ toxicity - repeated exposure

No data available

Figure 31 Continued

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Aspiration hazard

No data available(Calcium chloride)

Additional Information

RTECS: EV9800000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Calcium chloride)

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

Toxicity to fish LC50 - Lepomis macrochirus - 10,650 mg/l - 96 h(Calcium chloride)

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 2,400 mg/l - 48 h(Calcium chloride) (OECD Test Guideline 202)

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available(Calcium chloride)

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Figure 31 Continued

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SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Calcium chloride	10043-52-4	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Calcium chloride	10043-52-4	

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

H319 Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.1

Revision Date: 05/28/2017

Print Date: 08/08/2019

Figure 31 Continued

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SIGMA-ALDRICH

sigmaaldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.comEmail USA: techserv@sial.comOutside USA: surtechserv@sial.com

Product Specification

Product Name:

Magnesium chloride - anhydrous, ≥98%

Product Number:

M8266

CAS Number:

7786-30-3

MDL:

MFCD00011106

Formula:

Cl₂Mg

Formula Weight:

95.21 g/mol



TEST	Specification
Appearance (Color)	White
May contain gray or black specks	
Appearance (Form)	Powder
Water Insolubles	≤ 0.5 %
Water (by Karl Fischer)	≤ 3.0 %
Titration with EDTA	≥ 98 %
Anhydrous	
Recommended Retest Period	
4 Years	
Specification: PRD.0 Z05.10000030665	

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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Figure 32

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Figure 33:

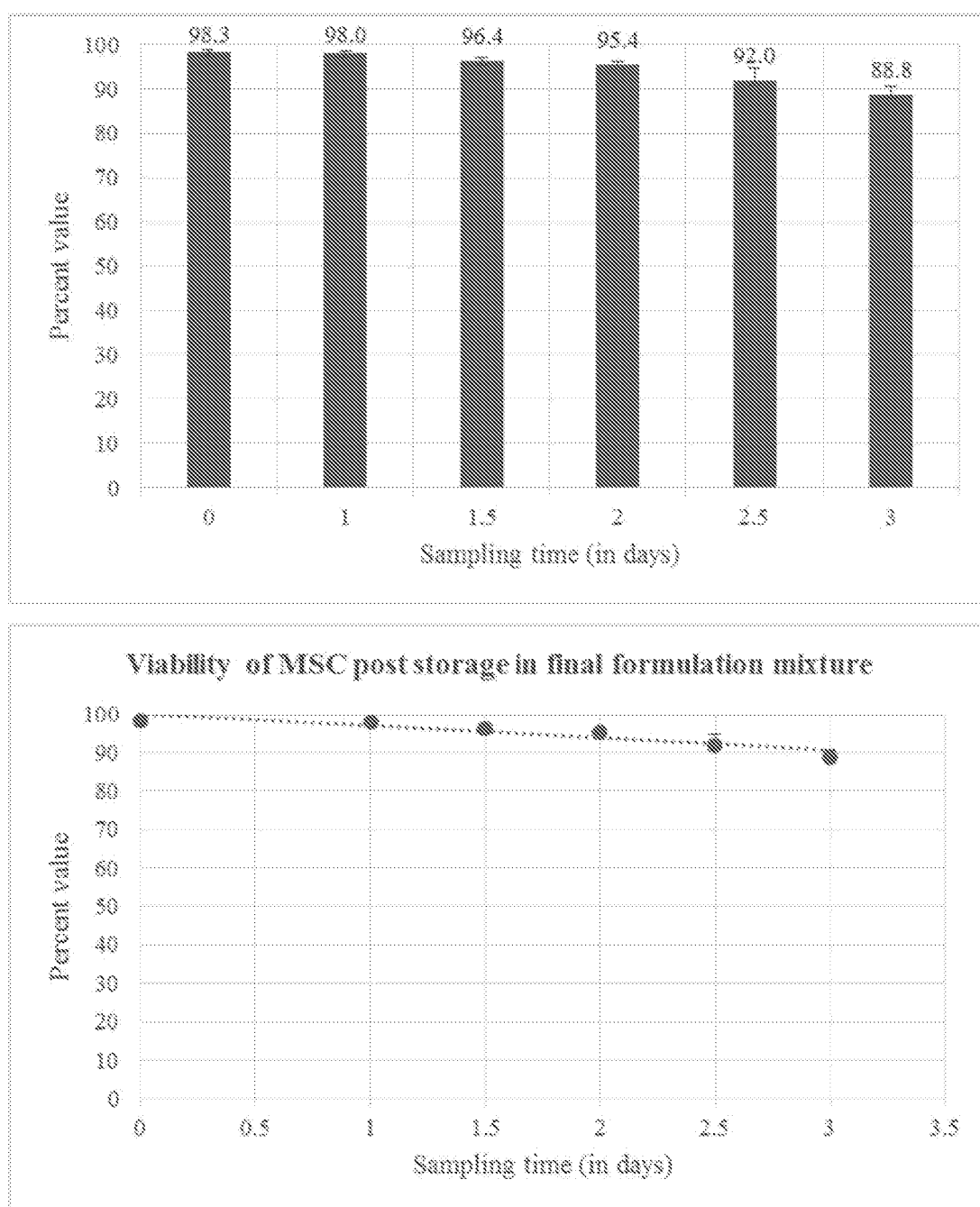
a

Figure 33 (cont.1):

b

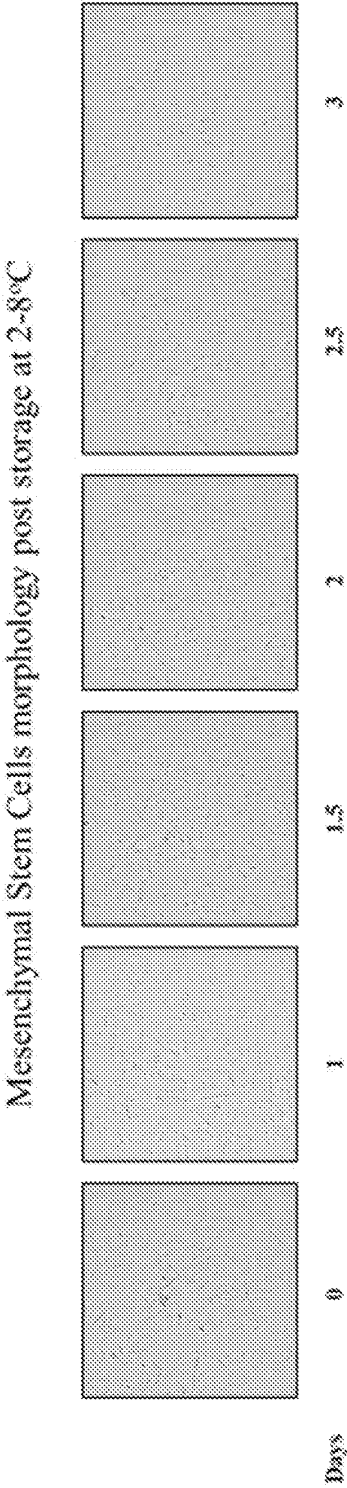
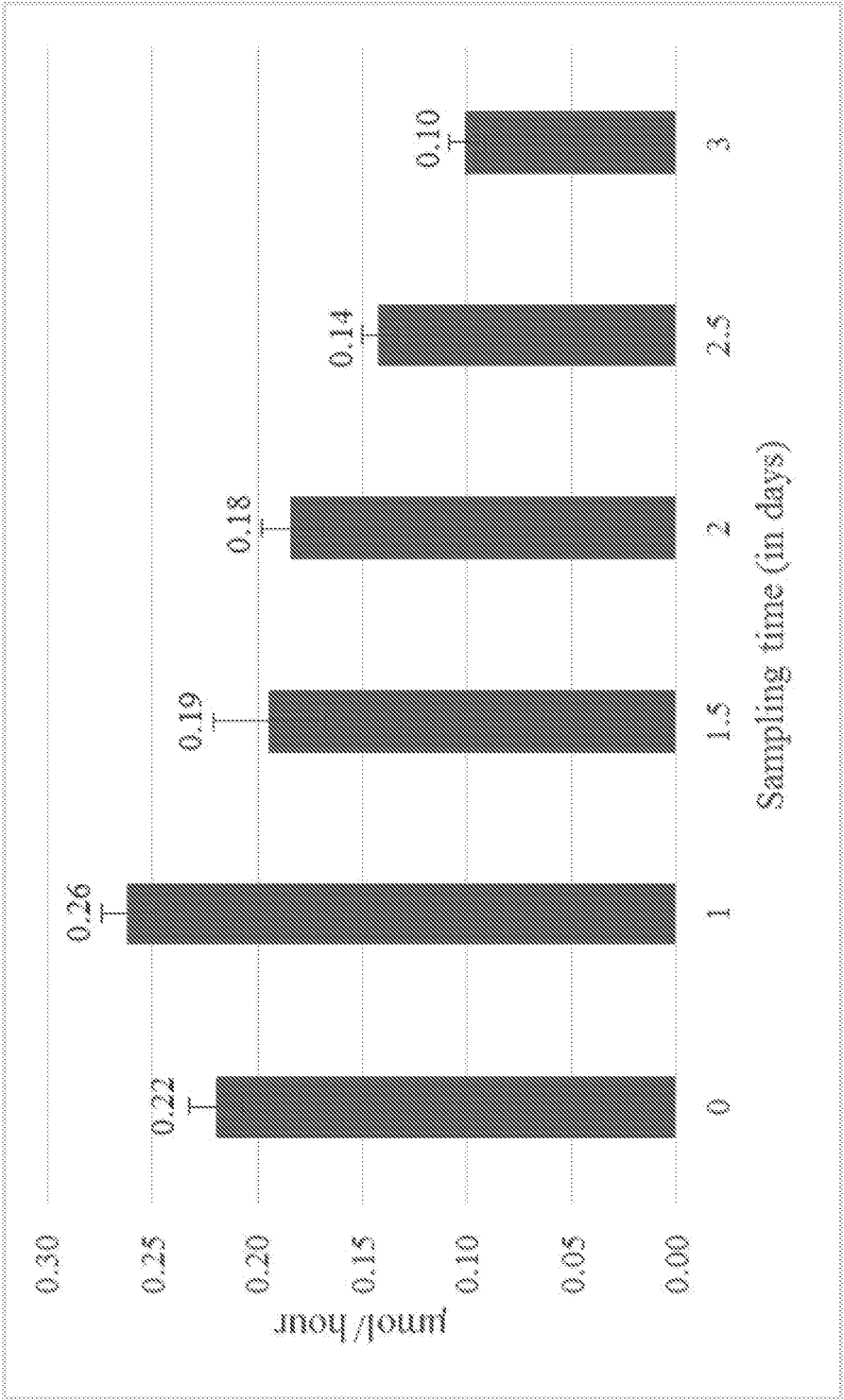


Figure 33 (cont.2):



C

Figure 33 (cont.3):

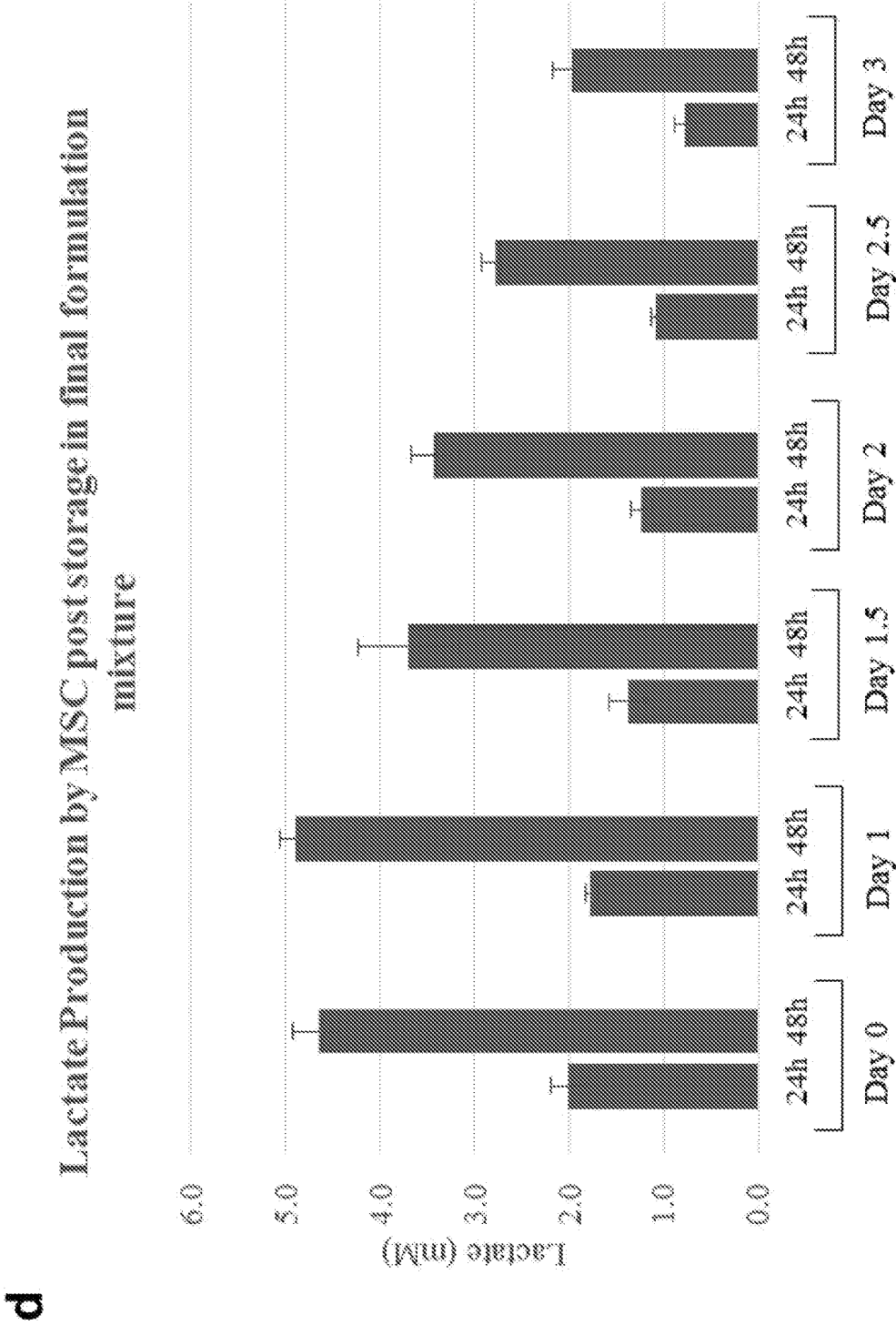
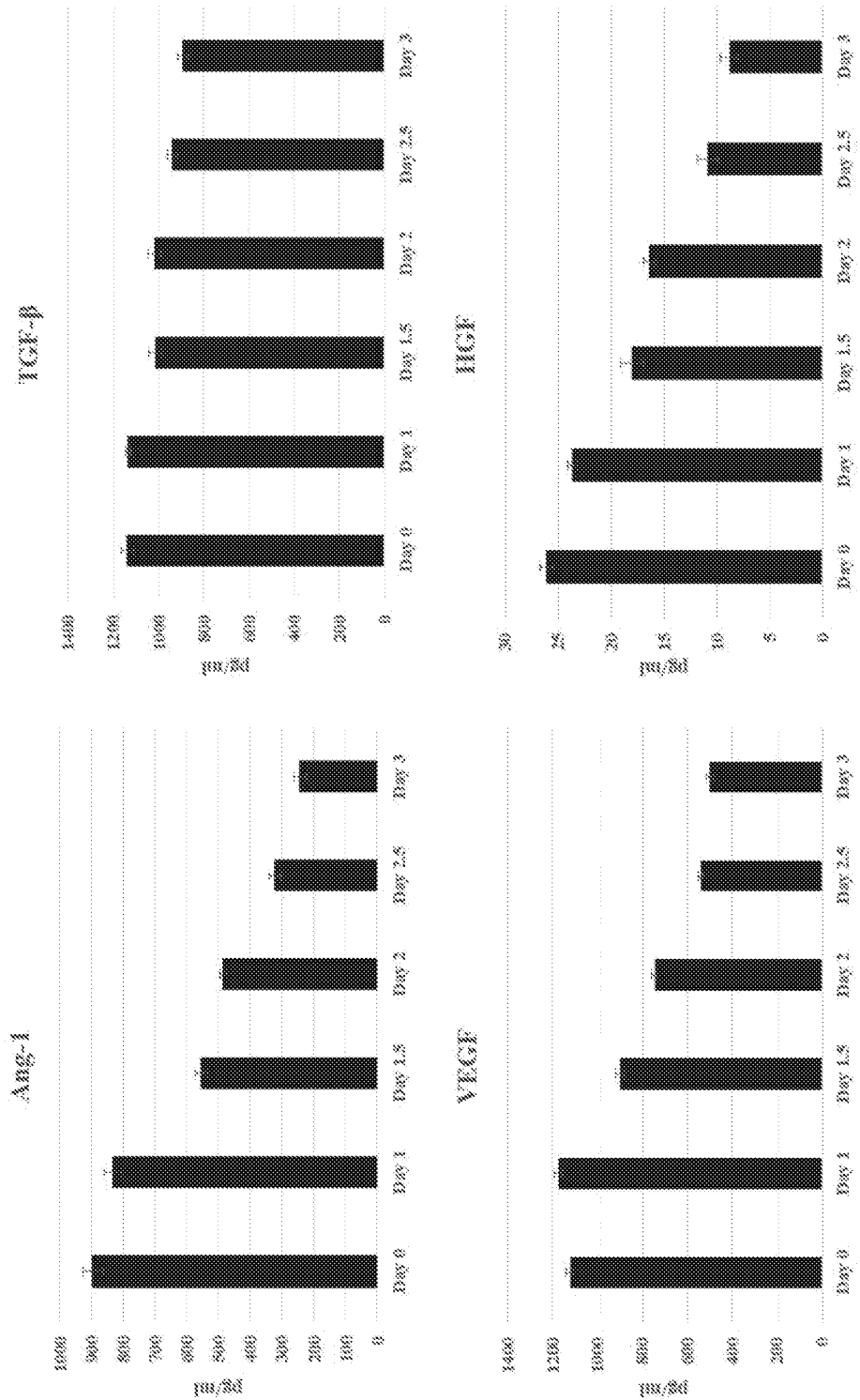


Figure 33 (cont.4):

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e

Figure 33 (cont.5):

f

