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Fig. 1

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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 NaHCO<sub>3</sub> 7.5% solution or 3.70 g/L of NaHCO<sub>3</sub> 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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## 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<br>(mOsm) |
|---------------------------|----------------------|----------------------|
| Negative                  | 7.07-7.40            | 286-305              |
| Cell Growth<br>Generation | Endotoxin<br>(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<br>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 NaHCO<sub>3</sub>, 7.5% solution or 1.2 g/L NaHCO<sub>3</sub> 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 NaHCO<sub>3</sub>; NaHCO<sub>3</sub> 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 <sub>3</sub> , 7.5% solution or 1.2 g/L NaHCO <sub>3</sub> 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

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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% CO<sub>2</sub>/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  $2.5 \times 10^3$  cells/cm<sup>2</sup> and  $8 \times 10^4$  cells/cm<sup>2</sup>. **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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Revised: 30 May 2009

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Fig. 4 continued

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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

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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<br>List | Company Name | Catalogue<br>Number |
|----------------------------|--------------|---------------------|
|----------------------------|--------------|---------------------|

**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 |
|--------------------|---------------|---------|

**Antibiotic**

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

**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  |

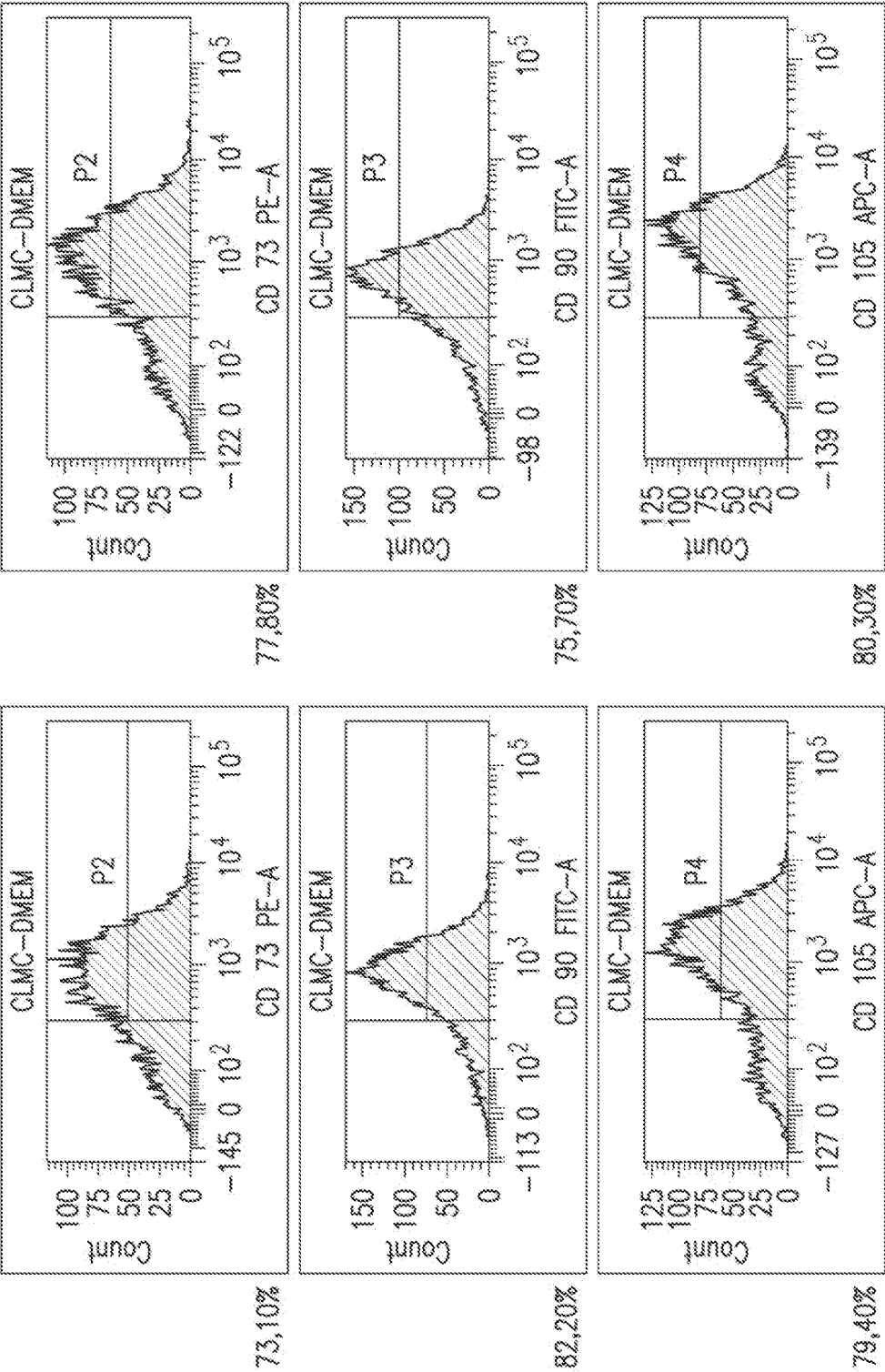


FIG.6A

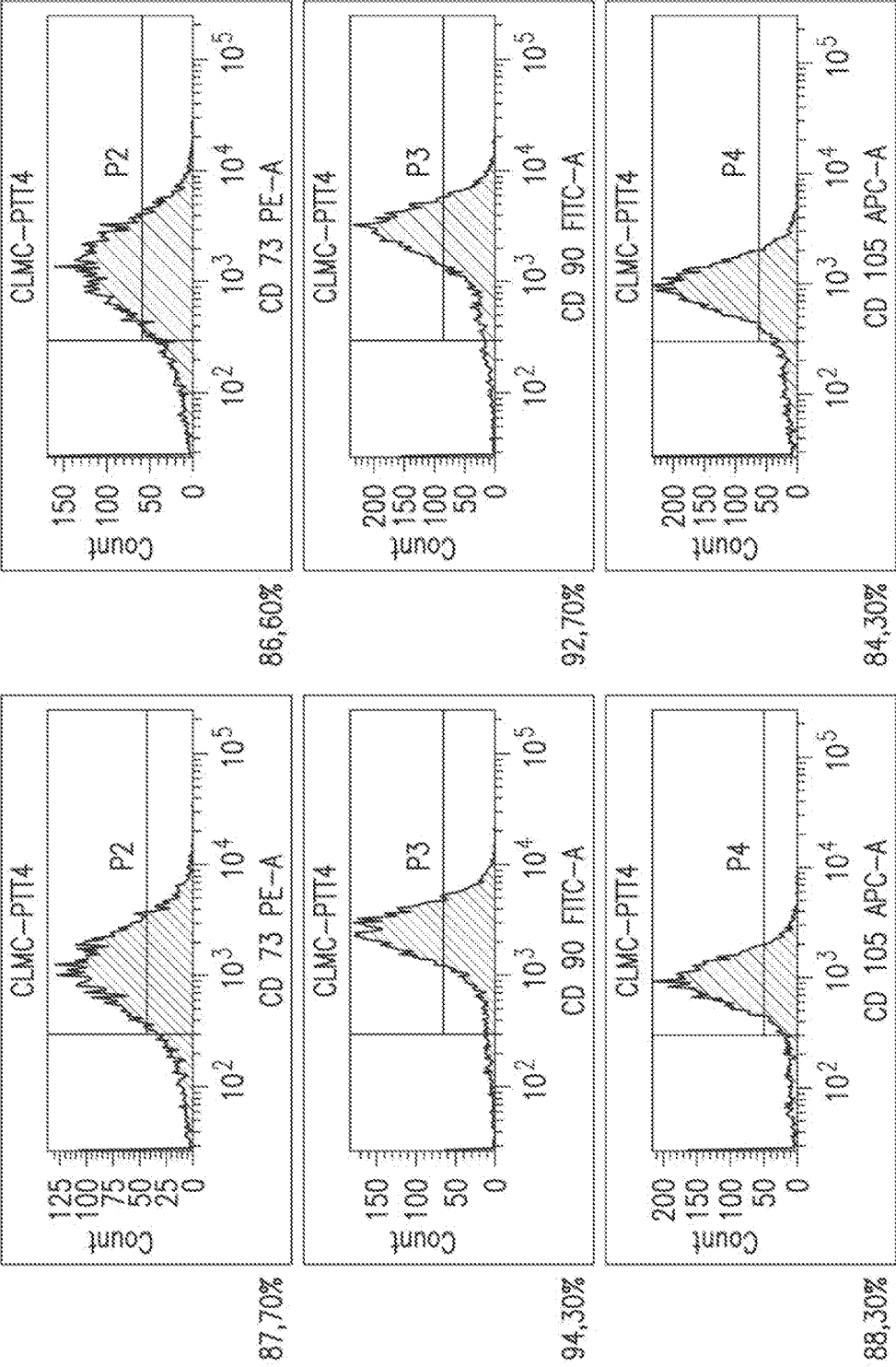


FIG.6B

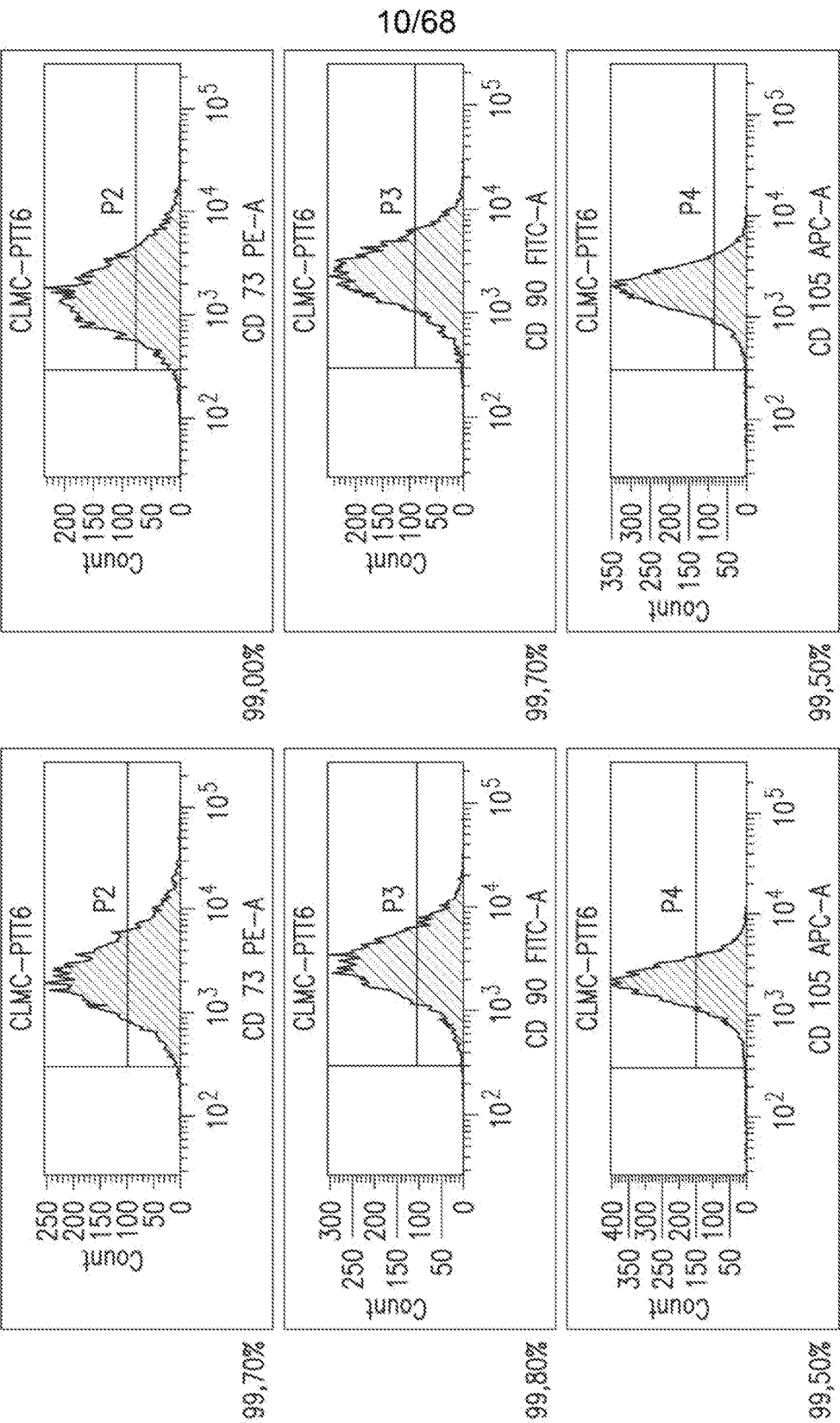
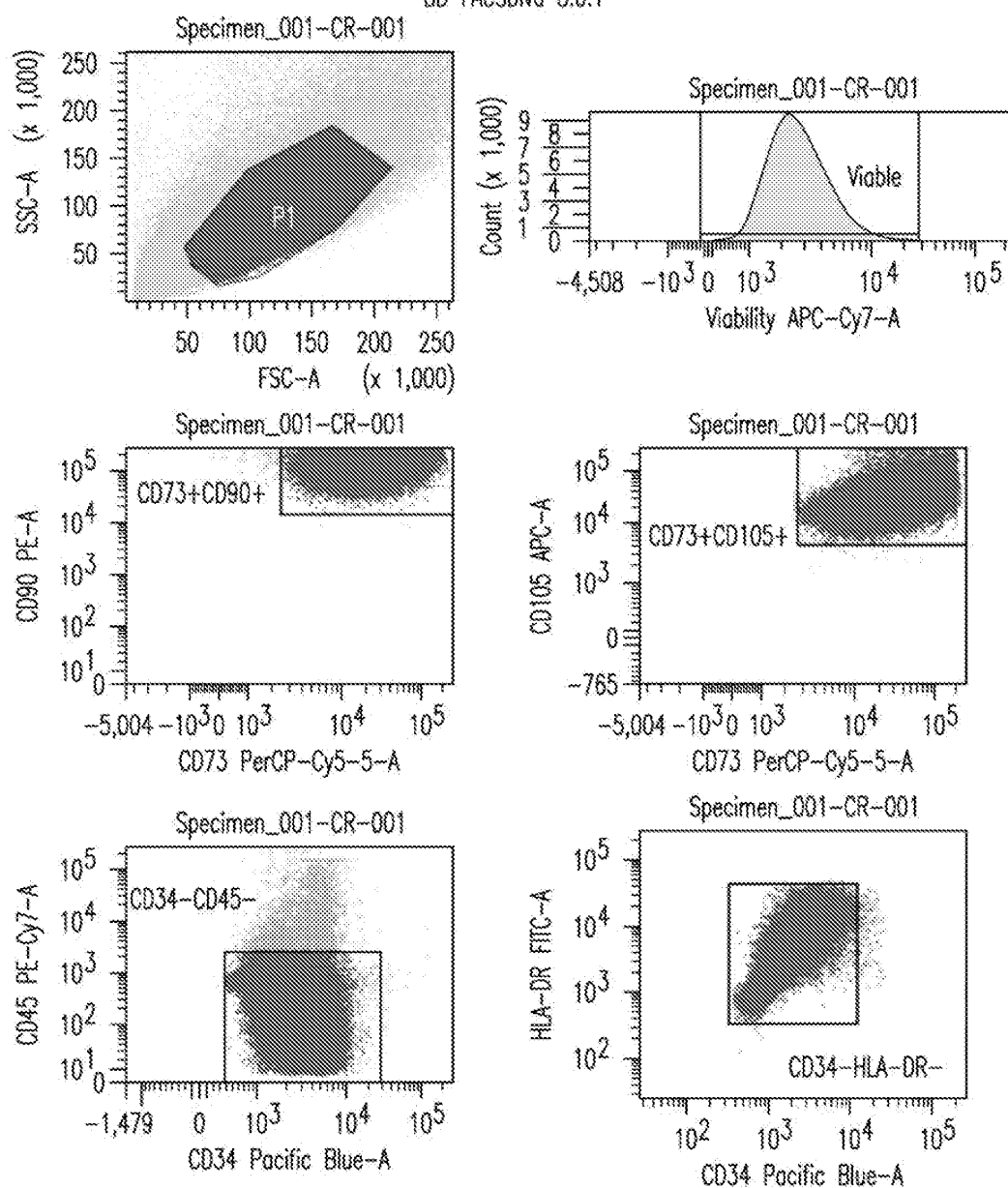


FIG.6C

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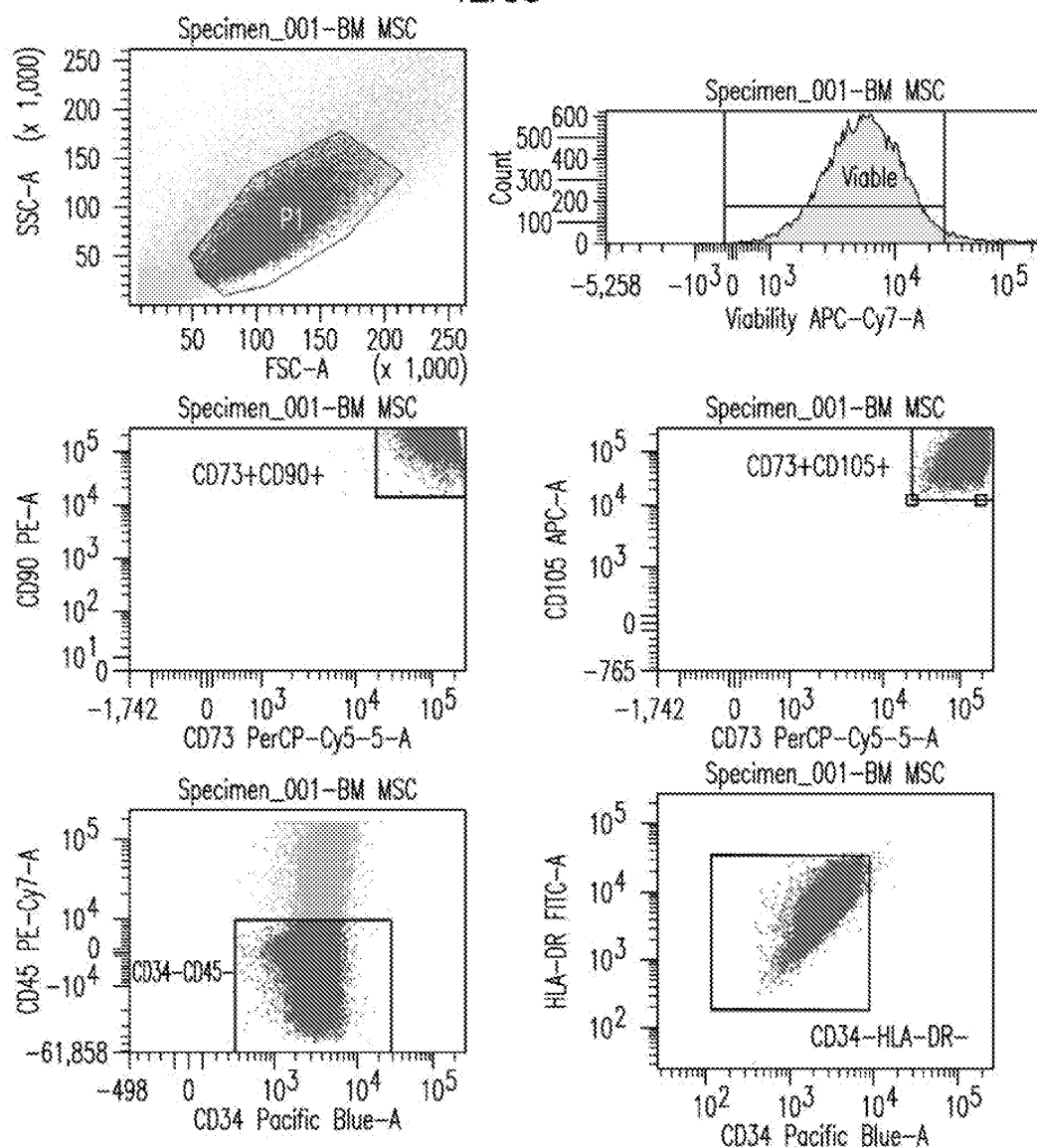
BD FACSDiva 8.0.1



| 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

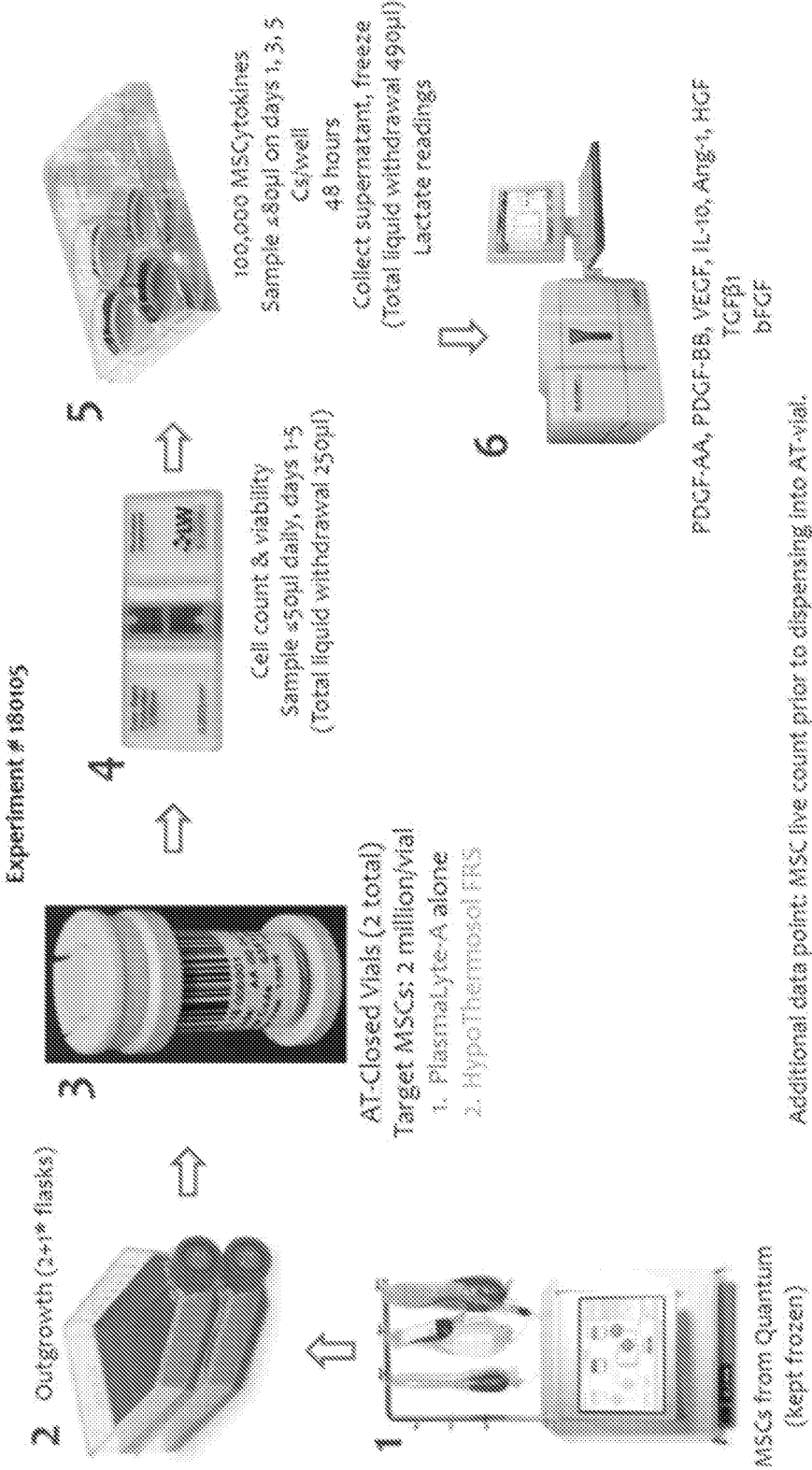
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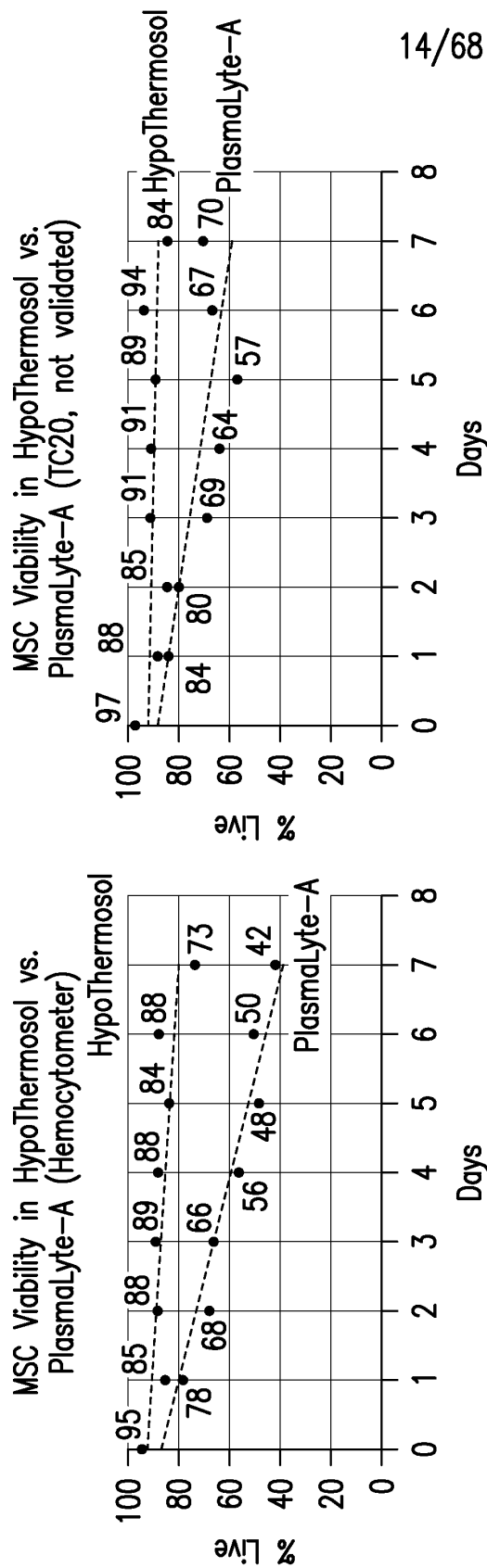


|                  |              |         |        |
|------------------|--------------|---------|--------|
| Experiment Name: | MSC 062216   |         |        |
| Specimen Name:   | Specimen_001 |         |        |
| Tube Name:       | BM MSC       |         |        |
| Population       | #Events      | %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





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| 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

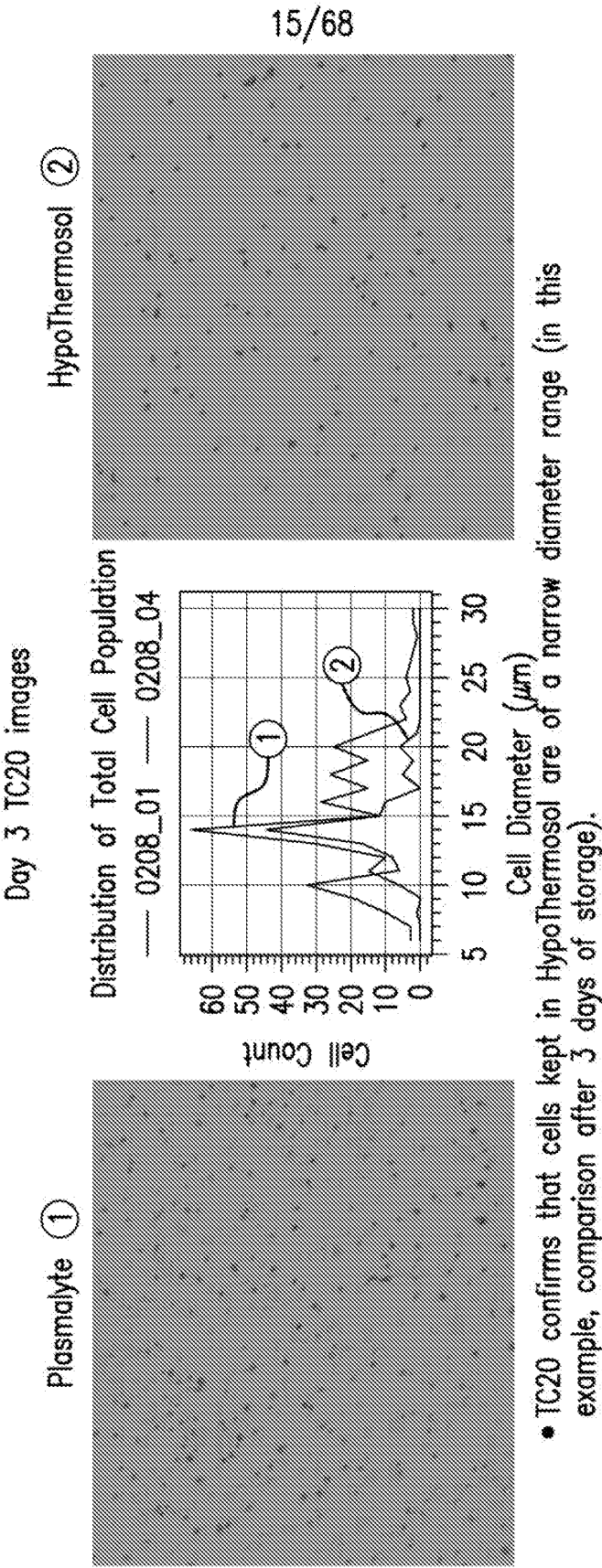


Figure 10

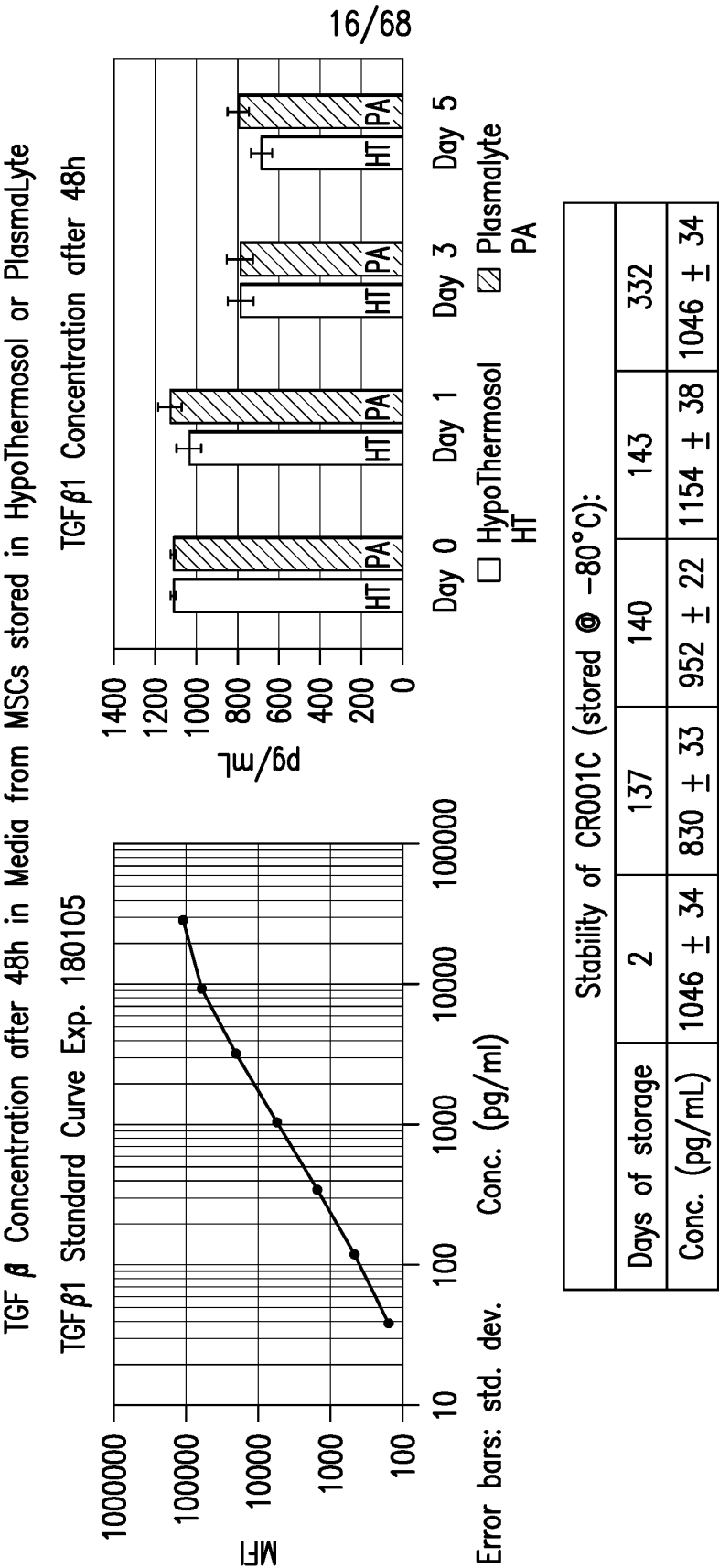


Figure 11

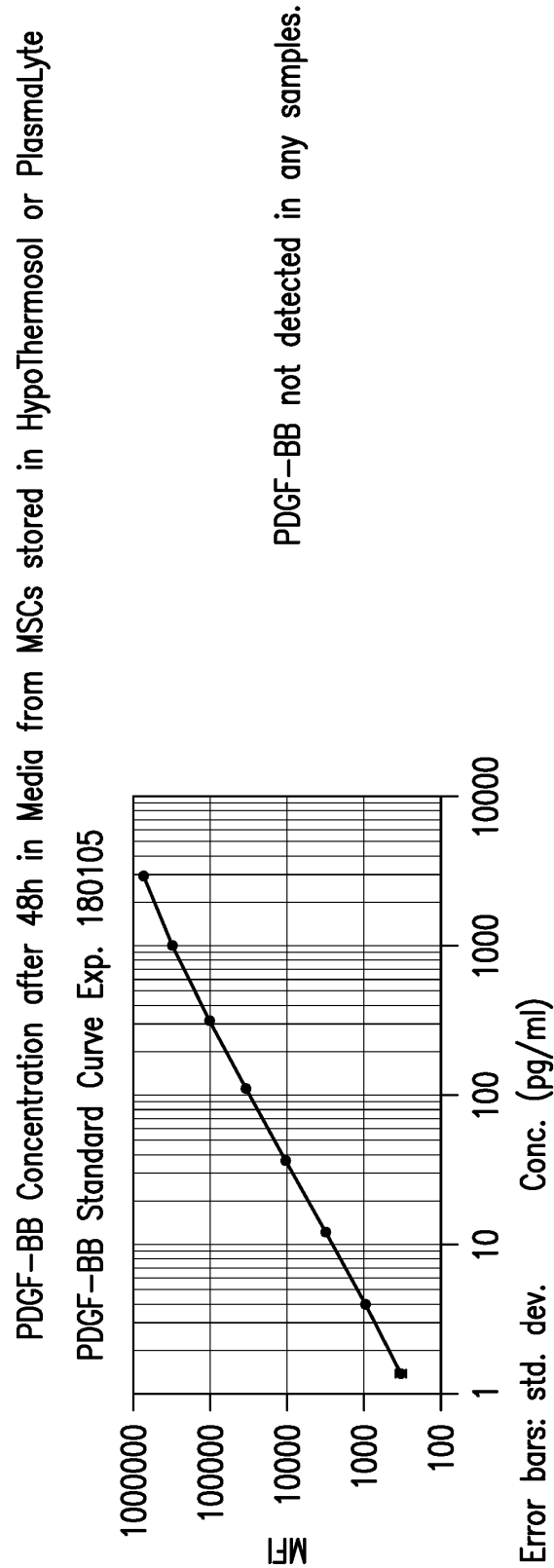


Figure 12

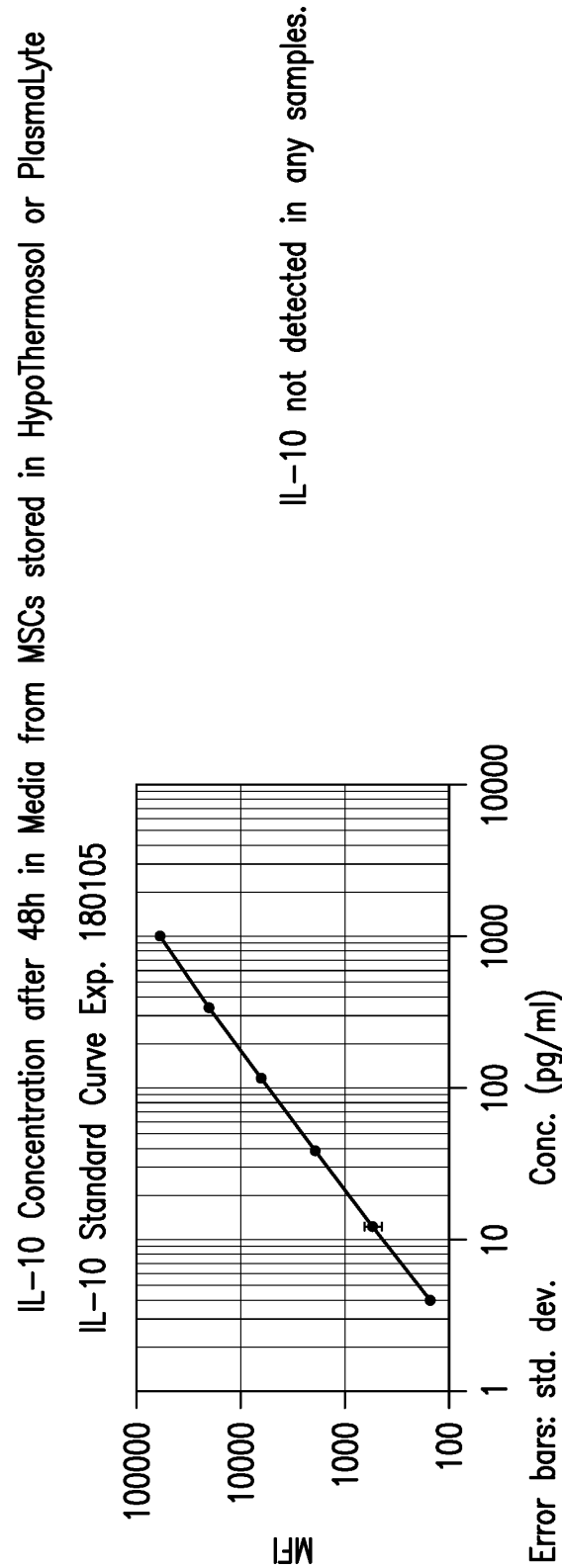
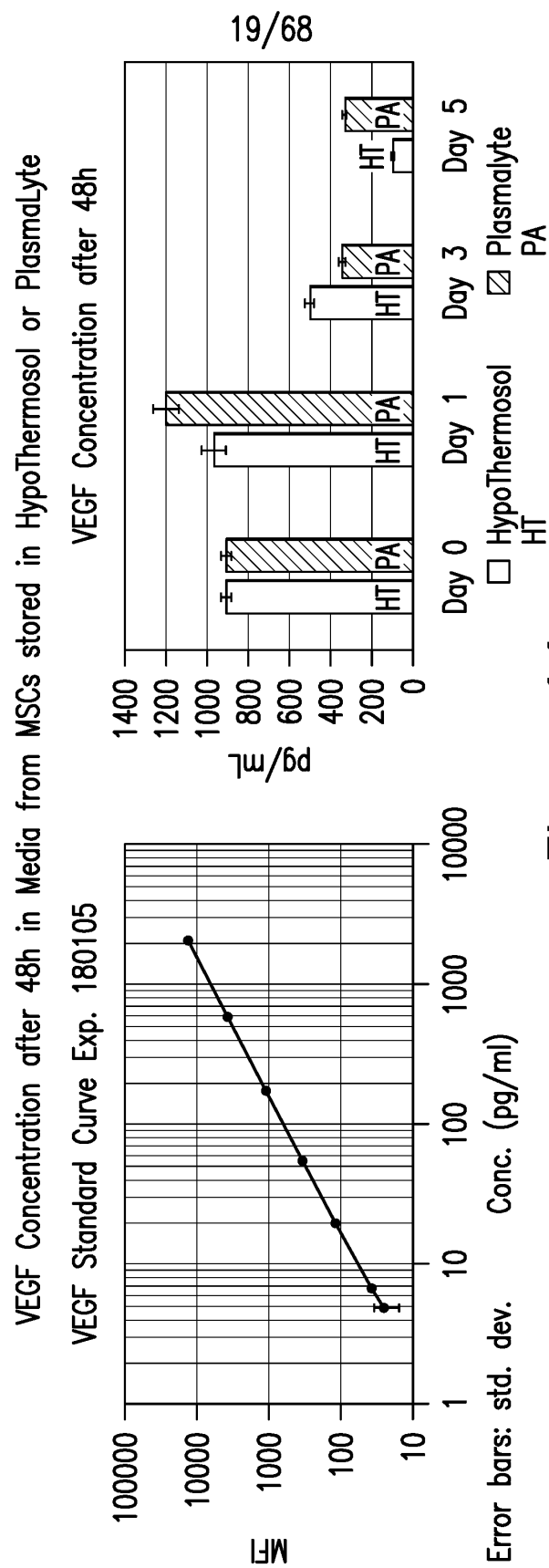
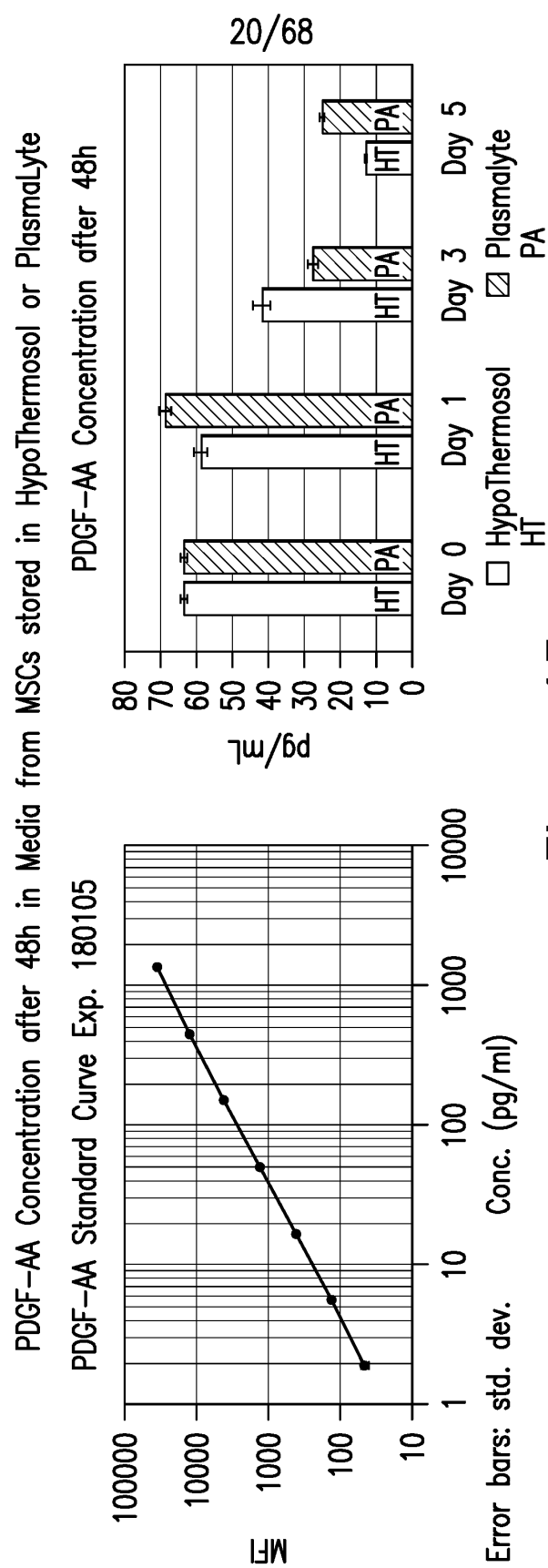


Figure 13



## Figure 14

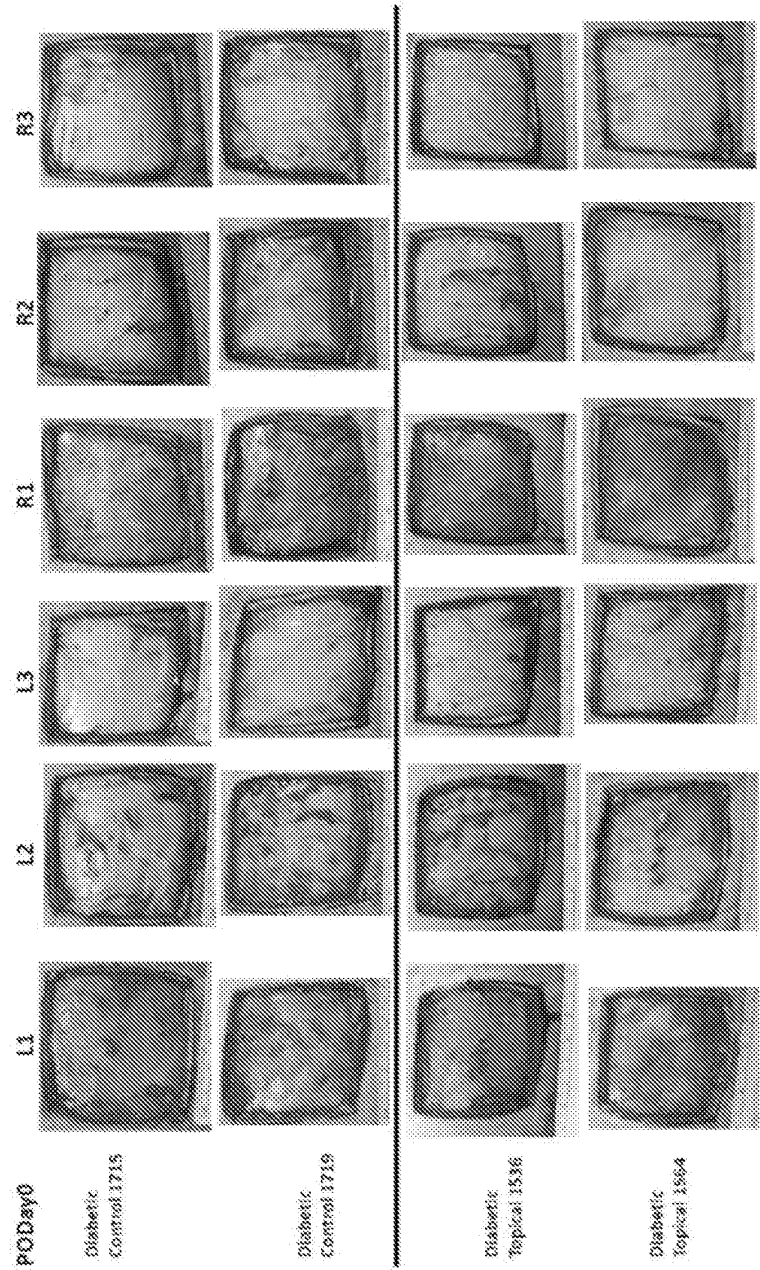


## Figure 15



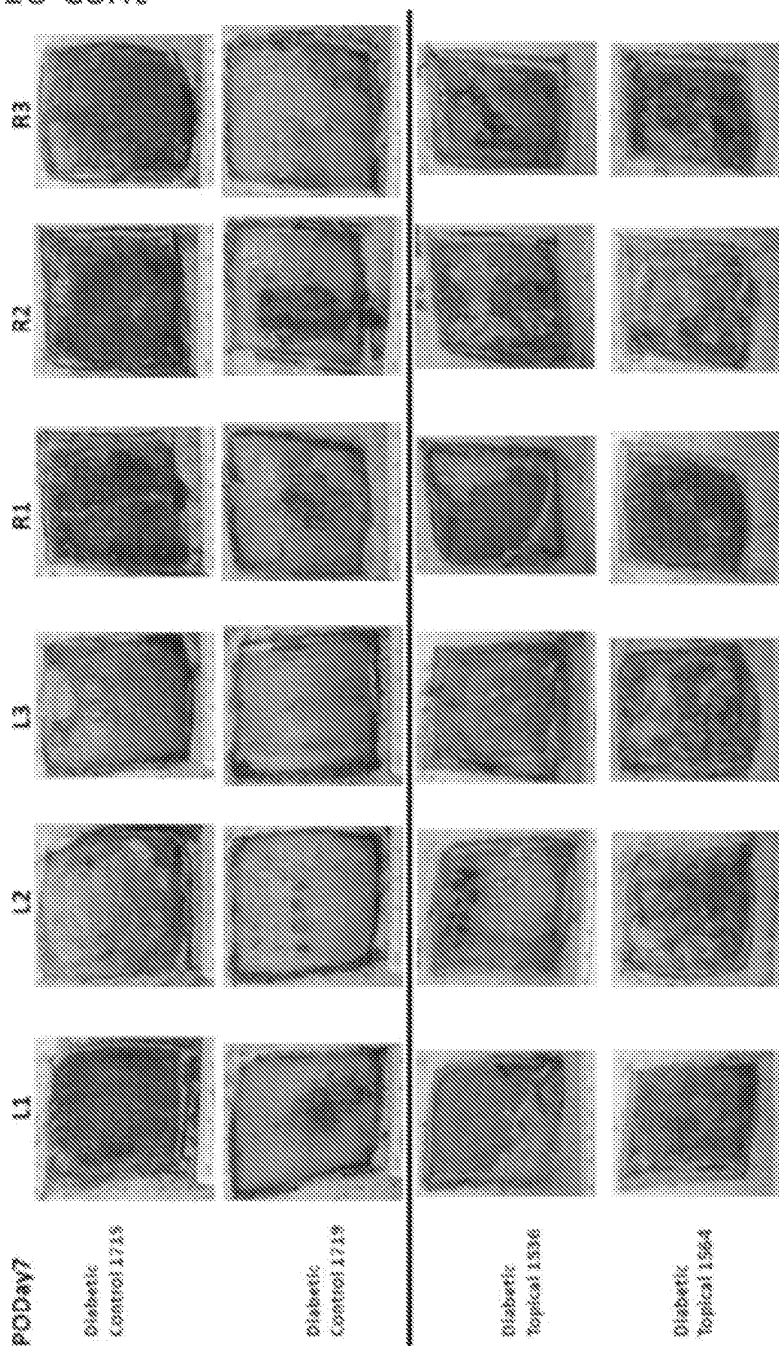


Figure 18



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Figure 18 cont'



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Figure 18 cont'

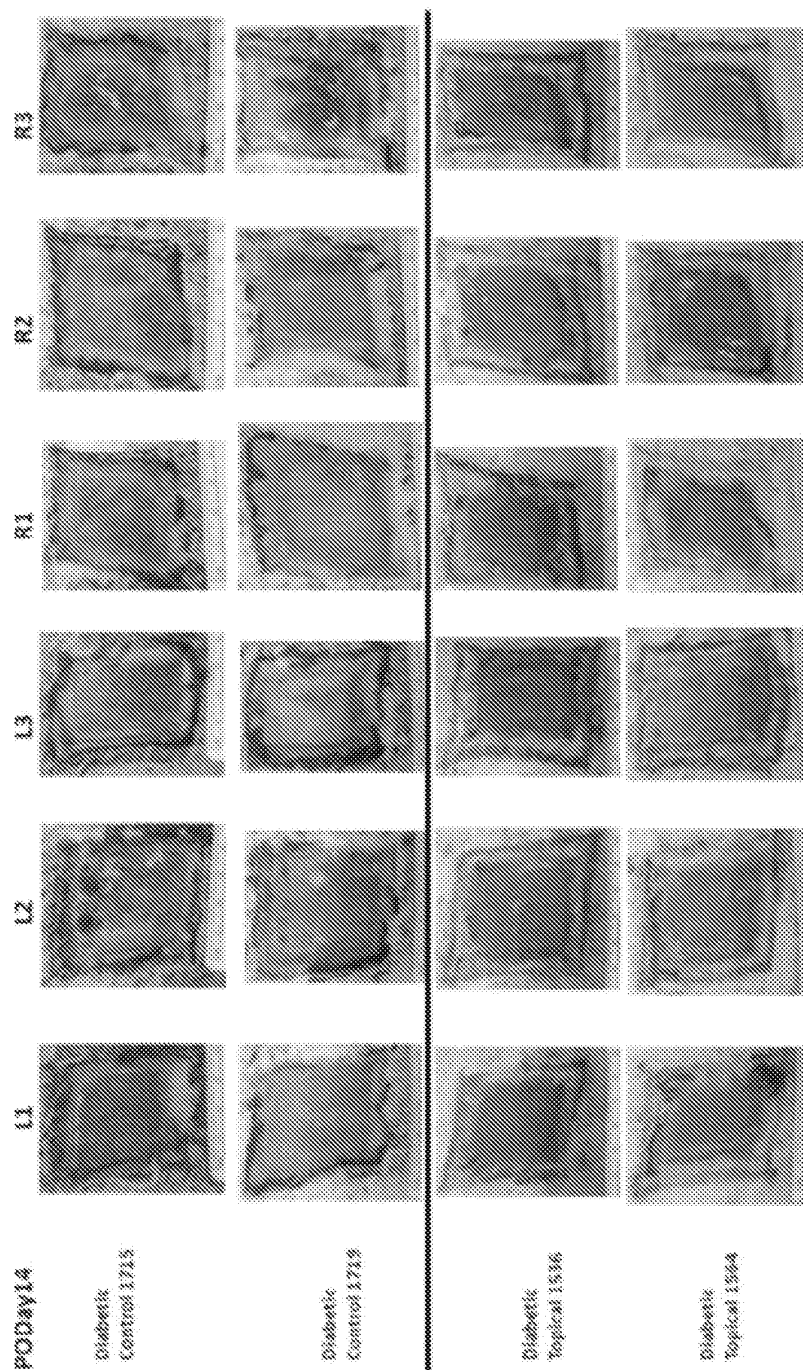


Figure 18 cont'

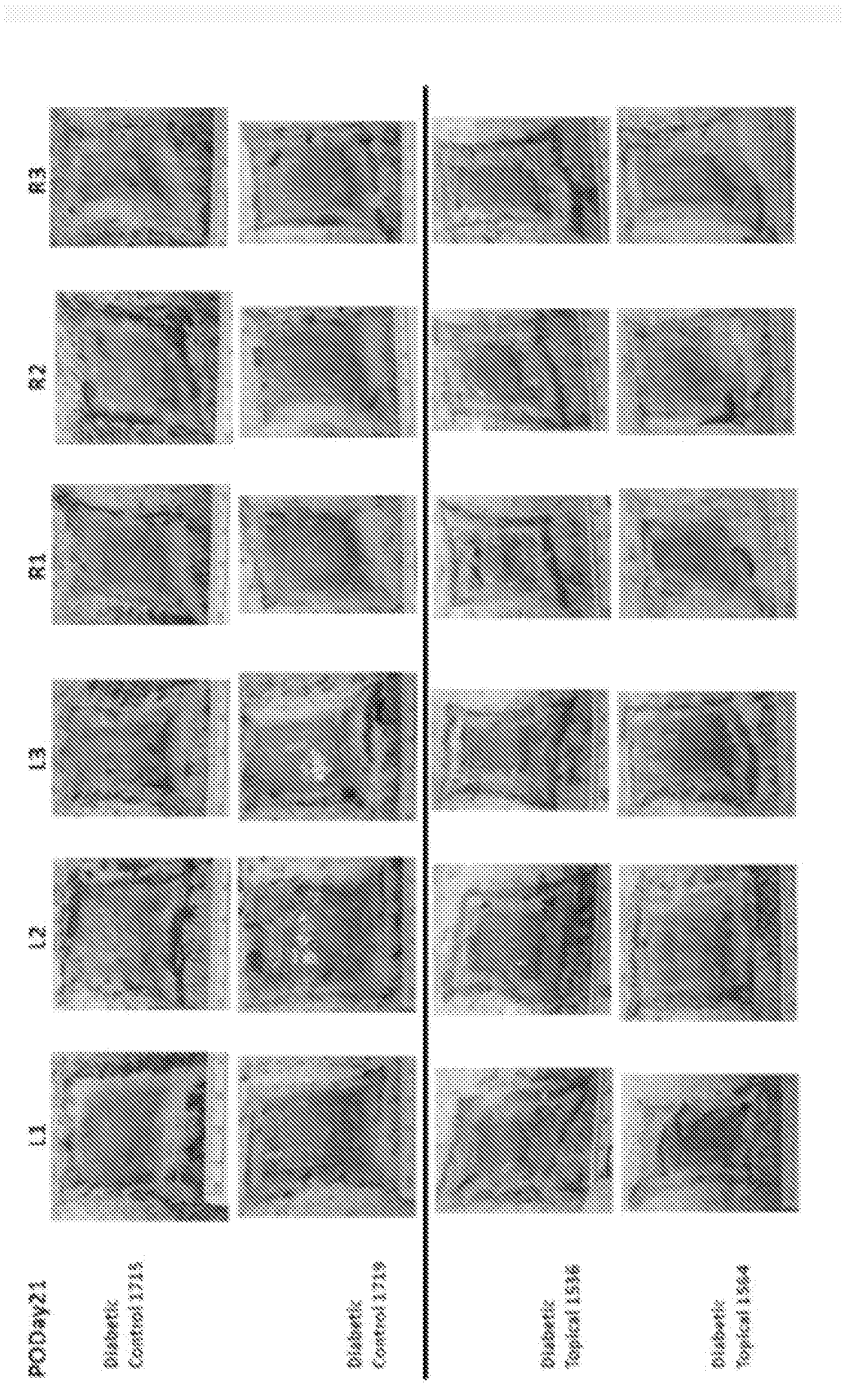
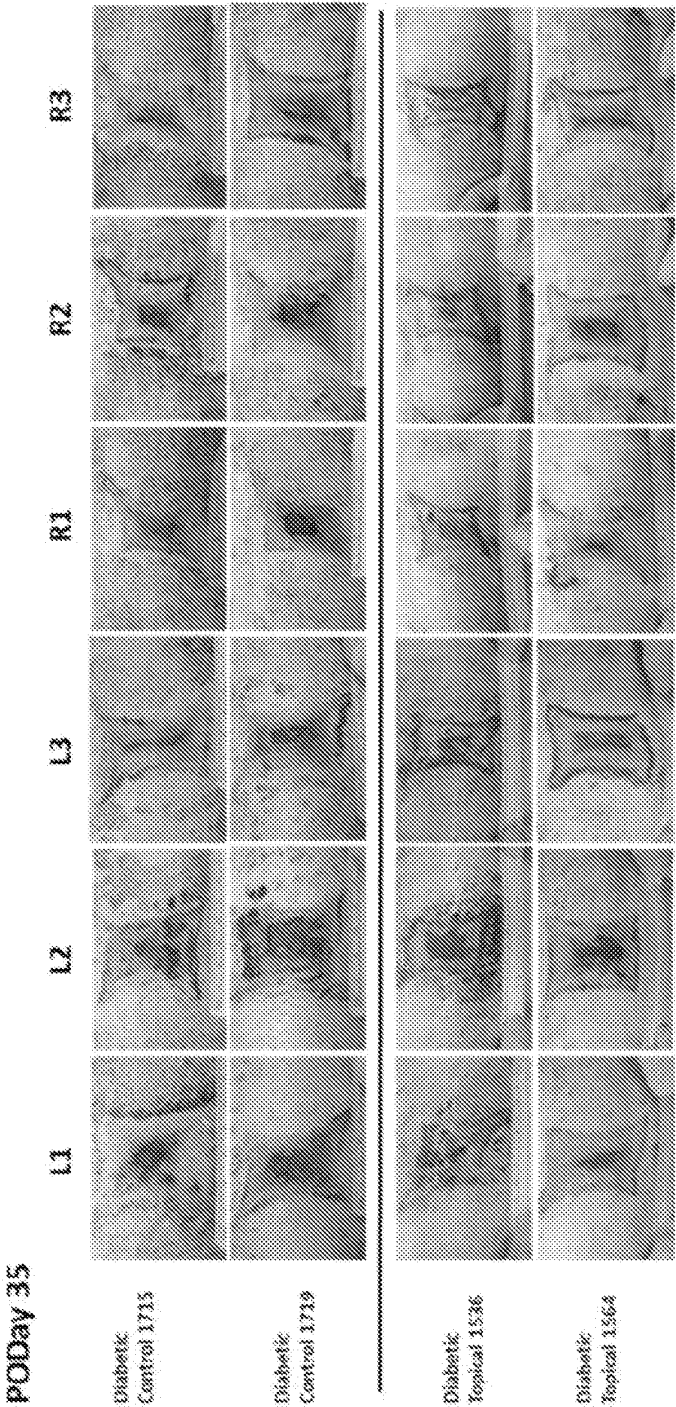


Figure 18 cont'



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**TOCRIS**  
a biotechne brand

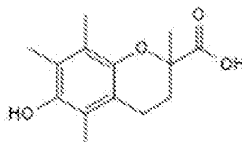
Figure 19

Print Date: Sep 16<sup>th</sup> 2016**Certificate of Analysis**[www.tocris.com](http://www.tocris.com)

|                                                                                                |                          |                     |
|------------------------------------------------------------------------------------------------|--------------------------|---------------------|
| <b>Product Name:</b> Trolox                                                                    | <b>Catalog No.:</b> 6002 | <b>Batch No.:</b> 1 |
| <b>CAS Number:</b> 53188-07-1                                                                  |                          |                     |
| <b>IUPAC Name:</b> 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<sub>14</sub>H<sub>18</sub>O<sub>4</sub>·nH<sub>2</sub>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  
**<sup>1</sup>H 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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[techsupport@bio-technne.com](mailto:techsupport@bio-technne.com)

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 Tel: +86 (21) 52380373

**Europe Middle East Africa**  
 Tel: +44 (0)1235 529449

**Rest of World**  
[www.tocris.com/distributors](http://www.tocris.com/distributors)  
 Tel: +1 612 379 2956

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**TOCRIS**  
a biotechne brand

Figure 19 cont'

Print Date: Sep 16<sup>th</sup> 2016**Product Information**[www.tocris.com](http://www.tocris.com)

|                                                                                                |                          |                     |
|------------------------------------------------------------------------------------------------|--------------------------|---------------------|
| <b>Product Name:</b> Trolox                                                                    | <b>Catalog No.:</b> 6002 | <b>Batch No.:</b> 1 |
| <b>CAS Number:</b> 53188-07-1                                                                  |                          |                     |
| <b>IUPAC Name:</b> 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.

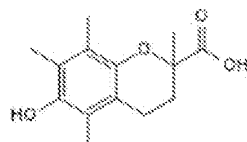
**Physical and Chemical Properties:**

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.

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**Rest of World**

[www.tocris.com/distributors](http://www.tocris.com/distributors)

Tel: +1 612 379 2966

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**SIGMA-ALDRICH** Figure 20[sigmaaldrich.com](http://sigmaaldrich.com)

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: [www.sigmaaldrich.com](http://www.sigmaaldrich.com)Email USA: [techserv@sial.com](mailto:techserv@sial.com)Outside USA: [eurotechserv@sial.com](mailto: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 <sub>4</sub> )      | ≤ 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](http://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'[sigmaaldrich.com](http://sigmaaldrich.com)

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: [www.sigmaaldrich.com](http://www.sigmaaldrich.com)Email USA: [techserv@sial.com](mailto:techserv@sial.com)Outside USA: [eurtechserv@sial.com](mailto: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 21[sigmaaldrich.com](http://sigmaaldrich.com)

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: [www.sigmaaldrich.com](http://www.sigmaaldrich.com)Email USA: [techserv@sial.com](mailto:techserv@sial.com)Outside USA: [surtechserv@sial.com](mailto: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:

H<sub>2</sub>KO<sub>4</sub>P

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](http://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 22

sigma-aldrich.com

3850 Spruce Street, Saint Louis, MO 63103, USA

Website: [www.sigmaaldrich.com](http://www.sigmaaldrich.com)Email USA: [techserv@sial.com](mailto:techserv@sial.com)Outside USA: [surtechserv@sial.com](mailto: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:**C<sub>8</sub>H<sub>18</sub>N<sub>2</sub>O<sub>4</sub>S**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](http://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](http://sigmaaldrich.com)

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: [www.sigmaaldrich.com](http://www.sigmaaldrich.com)Email USA: [techserv@sigmaaldrich.com](mailto:techserv@sigmaaldrich.com)Outside USA: [eurotechserv@sigmaaldrich.com](mailto: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:**C<sub>8</sub>H<sub>18</sub>N<sub>2</sub>O<sub>4</sub>S**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<br>1.0M aqueous | ≤ 0.05 Abs UN |
| UV Absorbance 280nm<br>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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12/26/2017

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

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## 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 <sub>12</sub> H <sub>21</sub> O <sub>12</sub> 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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12/26/2017

COMBI-BLOCKS

QW-1395 p.3

**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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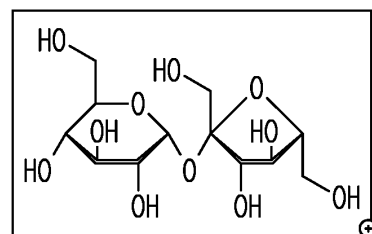
USA Home ARK2195B – Sucrose, Low Endotoxin

SIGMA-ALDRICH

ARK2195B SIGMA-ALDRICH

**Sucrose, Low Endotoxin**

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

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

SDS

CAS Number 57-50-1 ; Empirical Formula (Hill Notation) C<sub>12</sub>H<sub>22</sub>O<sub>11</sub> ; 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](https://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    | <input type="text" value="0"/> |
| ARK2195B-1KG  | Only 2 left in stock (more on the way) – From | 376.70      | <input type="text" value="0"/> |
| ARK2195B-10KG | Estimated to ship on 04/12/18                 | 2,893.70    | <input type="text" value="0"/> |
| ARK2195B-100G | Only 3 left in stock (more on the way) – From | 202.00      | <input type="text" value="0"/> |

ADD TO CART

**Figure 24 continued**

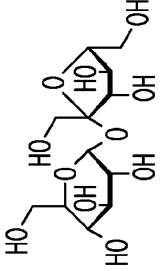
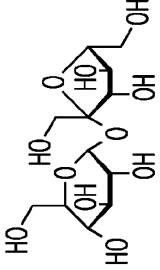
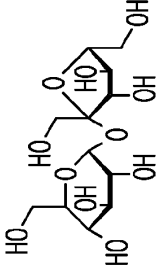
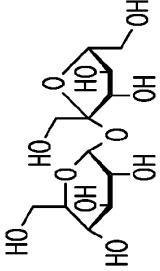
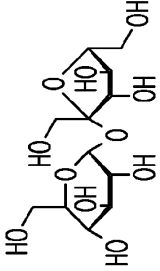
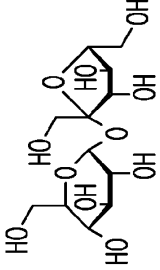
|                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                                                           |                                                                                   |
|--------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Personalized Product Recommendations |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                                                           |                                                                                   |
| Customers Also Viewed                |    |    |                                                                                     |                                                                                                                                                                                                                           |                                                                                   |
|                                      | S3929<br>Sucrose<br>meets USP testing specifications                                | 16104<br>Sucrose<br>puriss., meets analytical specification of Ph. Eur., BP, NF     |                                                                                     |                                                                                                                                                                                                                           |                                                                                   |
| Customers Also Viewed                |  |  |  |                                                                                                                                          |  |
|                                      | S3929<br>Sucrose<br>meets USP testing specifications                                | 16104<br>Sucrose<br>puriss., meets analytical specification of Ph. Eur., BP, NF     | 84097<br>Sucrose<br>BioUltra, for molecular biology, ≥99.5% (HPLC)                  | 1.00892<br>Sucrose<br>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<br>Sucrose<br>BioXtra, ≥99.5% (GC)                                          |
|                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                                                           |                                                                                   |
|                                      |                                                                                     |                                                                                     |                                                                                     |                                                                                                                                                                                                                           |                                                                                   |

Figure 24 continued

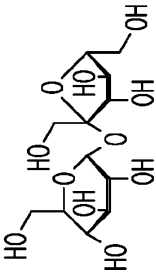
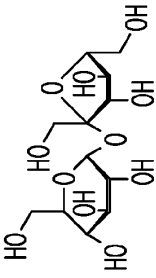
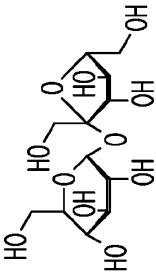
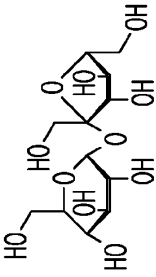
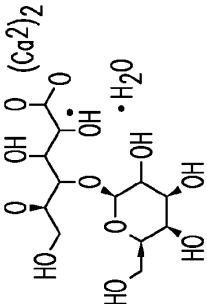
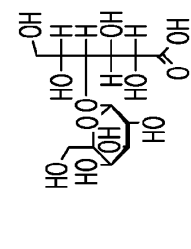
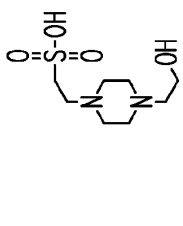
|                                                                                                                                                         |                                                                                                                              |                  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

Figure 24 continued

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

| Safety Information |                                 |  | Documents                |                                                 |  |
|--------------------|---------------------------------|--|--------------------------|-------------------------------------------------|--|
| RIDADR             | NONH for all modes of transport |  | Certificate of Analysis  |                                                 |  |
| WGK Germany        | 2                               |  | Enter Lot No.            | Anfi                                            |  |
| RTECS              | WN6500000                       |  | Bulk Quote–Order Product | SDS                                             |  |
|                    |                                 |  | Structure Search         | Sucrose, Low Endotoxin EQP Documentation (1 MB) |  |

Related Content

<https://www.sigmaaldrich.com/catalog/product/sial/ark2195b?lang=en&region=US> 30.03.2018

Figure 24 continued

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Formula Weight: 182.17

Suitable for Use in Biotechnology

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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)     |
|--------------------------|----------------|----------------|--------------|------------------------------------|----------------|---------------------|--------------------|----------------------|
| <input type="checkbox"/> | 7781-88        | 1              | 12KG         | 6.5GL polyethylene pail: screw top | \$1467.49      | --                  | 1                  | <input type="text"/> |

You must be [logged in](#) to add the products to the cart.

\* 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 (uS cm <sup>-1</sup> )               | <= 20 μS/cm   |
| USP-Total Aerobic Microbial Count                     | <= 100 cfu/g  |

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**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 <sub>6</sub> H <sub>14</sub> O <sub>6</sub> )(calculated on anhydrous basis)                                                             | 97.0–102.0 % |
| EP/BP–Conductivity, uS cm <sup>-1</sup>                                                                                                                    | <= 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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OK

30.03.2018

Figure 25 continued

SUBSTITUTE SHEET RULE 26

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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  $\alpha$ -D-glucose and 150 °C for  $\beta$ -D-glucose<sup>1</sup>  
 pH: 5.9 (0.5 M aqueous)<sup>2</sup>

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

| 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  $\alpha$ - and  $\beta$ -anomers, primarily the  $\alpha$ -anomer. The optical rotation of the  $\alpha$ -anomer is +112.2° (c = 10% in water, 20 °C) and the  $\beta$ -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  $\alpha$ - and two-thirds  $\beta$ -D-glucose.<sup>2</sup>

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

#### 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.<sup>2</sup>

#### Storage/Stability

Solutions are sterilized by autoclaving.<sup>4</sup>

#### 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<br>500 g in poly bottle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>Application</p> <p>Dextran is a branched glucan composed of linear <math>\alpha(1 \rightarrow 6)</math> linked glucose units and <math>\alpha(1 \rightarrow 3)</math> 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.</p> <p>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.</p> |

**Price and Availability**

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

**BULK ORDERS?**

ADD TO CART

**Figure 27**

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

Figure 27 continued

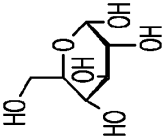
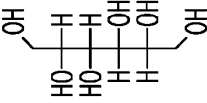
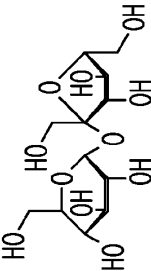
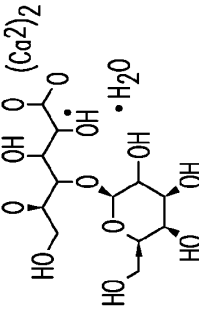
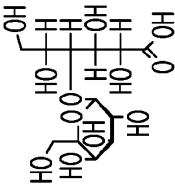
|                 |                                                                                                                                                                                                |                                                                                                                                                                                  |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Recently Viewed | <br><chem>C([C@H]([C@@H]([C@H]([C@@H](CO)O)O)O)O)O</chem>                                                   | <b>G8270</b><br>D-(+)-Glucose<br>≥99.5% (GC)                                                                                                                                     |
|                 | <br><chem>C([C@H]([C@@H]([C@H]([C@@H](CO)O)O)O)O</chem>                                                     | <b>M4125</b><br>D-Mannitol<br>≥98%                                                                                                                                               |
|                 | <br><chem>C([C@H]([C@@H]([C@H]([C@@H](CO)O)O)O)O[C@H]1[C@@H]([C@@H]([C@H]([C@@H](CO)O)O)O[C@H]1O</chem>     | <b>ARK2195B</b><br>Sucrose, Low Endotoxin<br>PharmaGrade, USP/NF, Ph<br>Eur, Manufactured under<br>appropriate GMP controls<br>for pharma or<br>biopharmaceutical<br>production. |
|                 | <br><chem>C([C@H]([C@@H]([C@H]([C@@H](CO)O)O)O)O[C@H]1[C@@H]([C@@H]([C@H]([C@@H](CO)O)O)O[C@H]1O.Ca2+</chem> | <b>L3375</b><br>Calcium lactobionate<br>monohydrate<br>98.0–102.0% (EDTA titration)                                                                                              |
|                 | <br><chem>C([C@H]([C@@H]([C@H]([C@@H](CO)O)O)O)O</chem>                                                       | <b>153516</b><br>Lactobionic acid<br>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  | Anf<br><br>SDS |
| Enter Lot No.            |                |
| Bulk Quote–Order Product |                |
| 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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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:  $-61.7^\circ$  (7 mg/100 ml water)<sup>1</sup>pK<sub>a</sub>: 3.5 and 12.5.<sup>2</sup>Extinction Coefficient:  $E^{1\%}_{1cm} = 15.4$  (259 nm in 0.01 M PO<sub>4</sub>, pH 7)<sup>3</sup>

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.<sup>2</sup>

## 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.

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## Preparation Instructions

Soluble in water (7 mg/ml).<sup>3</sup>

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**SIGMA-ALDRICH** Figure 29[sigma-aldrich.com](http://sigma-aldrich.com)

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: [www.sigmaaldrich.com](http://www.sigmaaldrich.com)Email USA: [techserv@sigmaaldrich.com](mailto:techserv@sigmaaldrich.com)Outside USA: [eurtechserv@sigmaaldrich.com](mailto: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, H<sub>2</sub>O

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](http://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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## 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](http://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

P280

P305 + P351 + P338

P337 + P313

Wash skin thoroughly after handling.

Wear protective gloves/ eye protection/ face protection.

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

If eye irritation persists: Get medical advice/ attention.

**Figure 31**

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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          | : $\text{CaCl}_2$ |
| 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<br>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 <sup>3</sup>            |
| 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**

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## Product Specification

Product Name:

Magnesium chloride - anhydrous, ≥98%

Product Number:

M8266

CAS Number:

7786-30-3

MDL:

MFCD00011106

Formula:

Cl<sub>2</sub>Mg

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 |               |

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# Figure 32

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Figure 33:

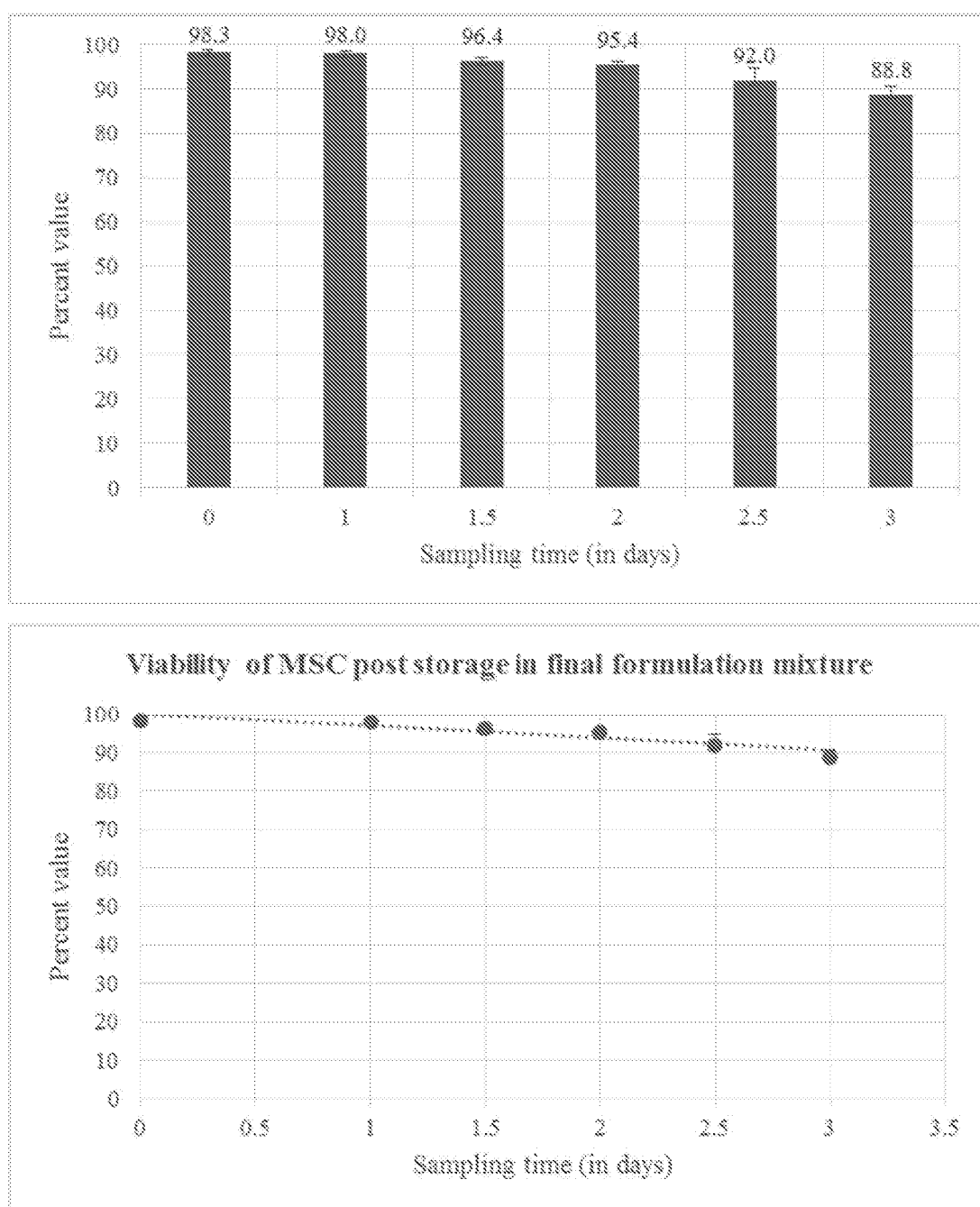
**a**

Figure 33 (cont.1):

**b**

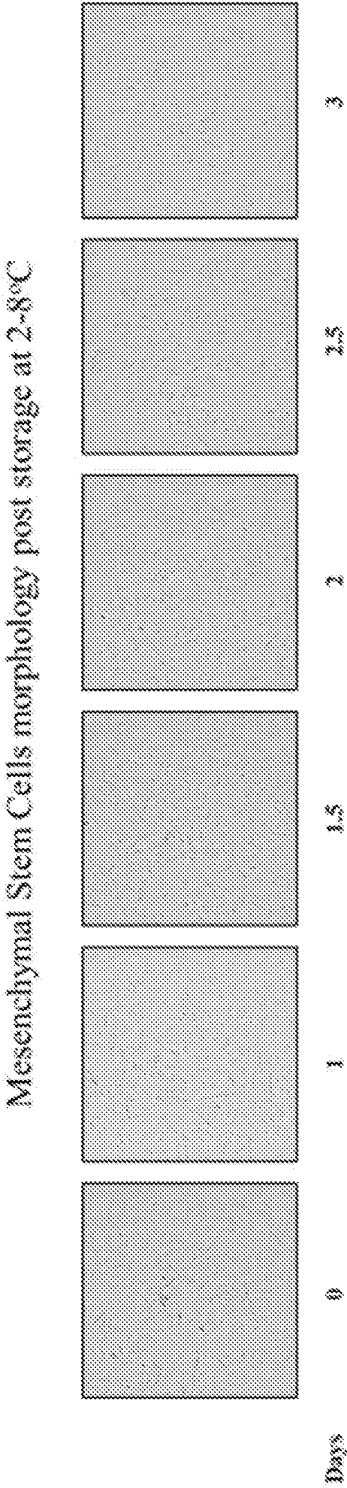
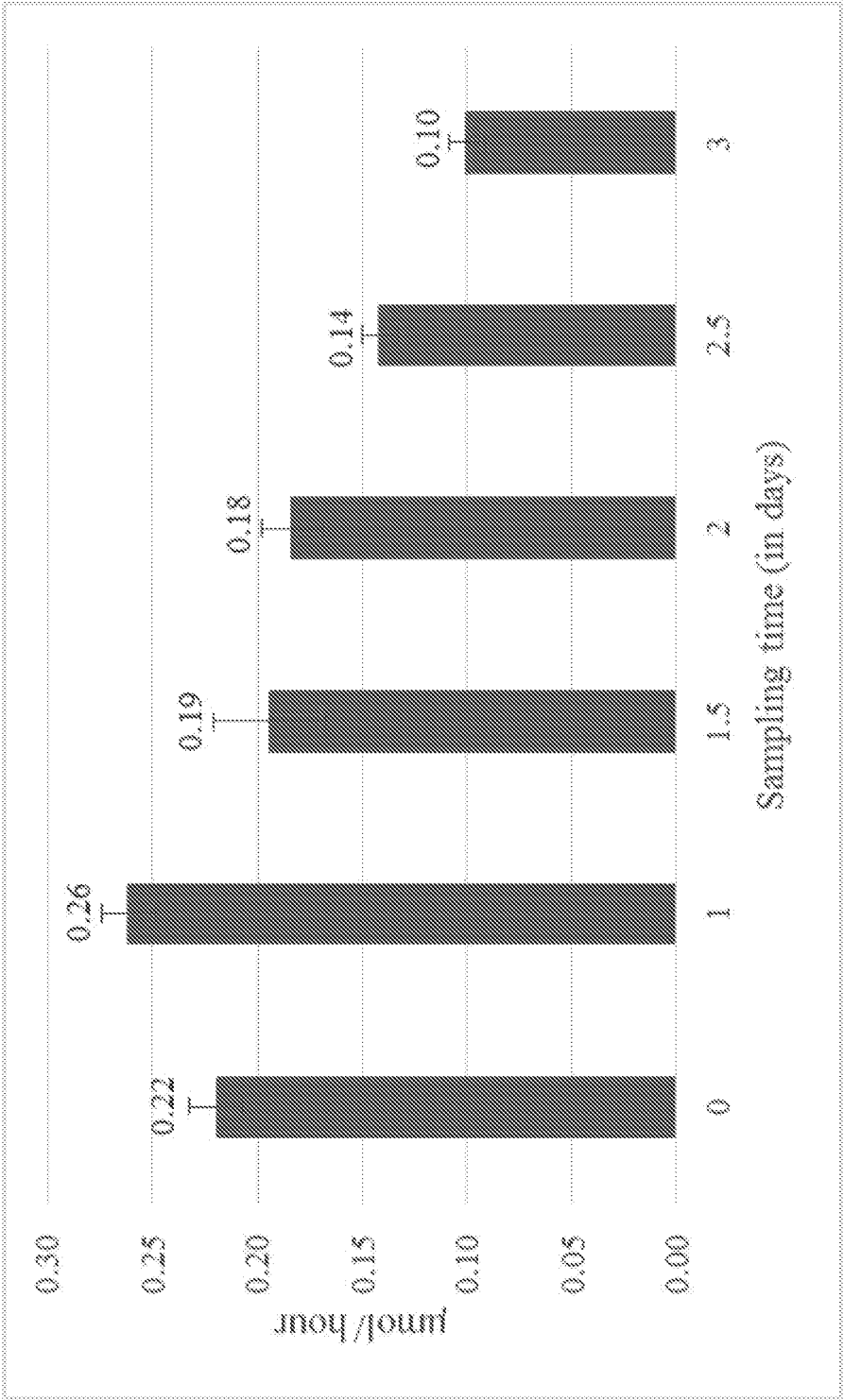


Figure 33 (cont.2):



C

Figure 33 (cont.3):

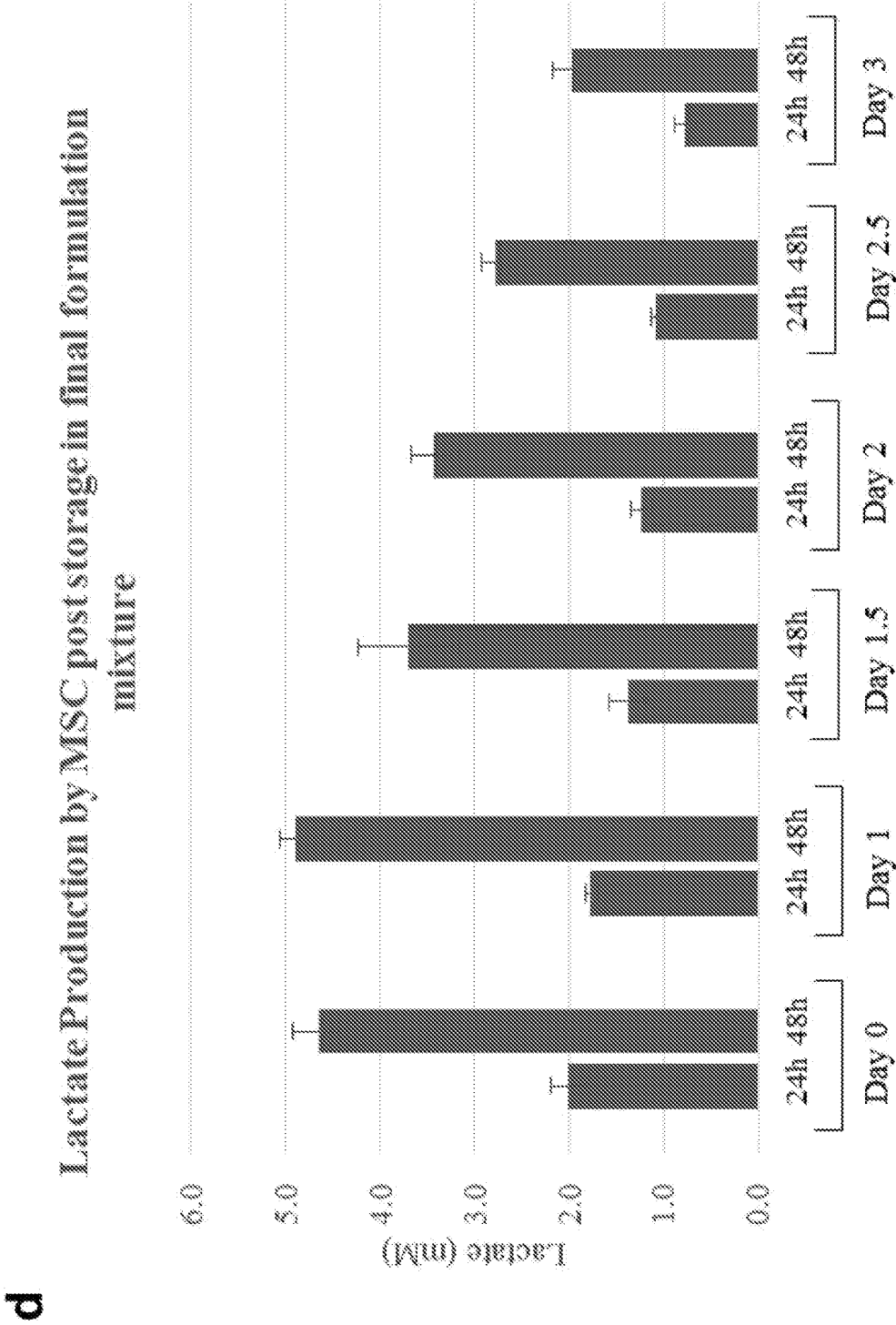
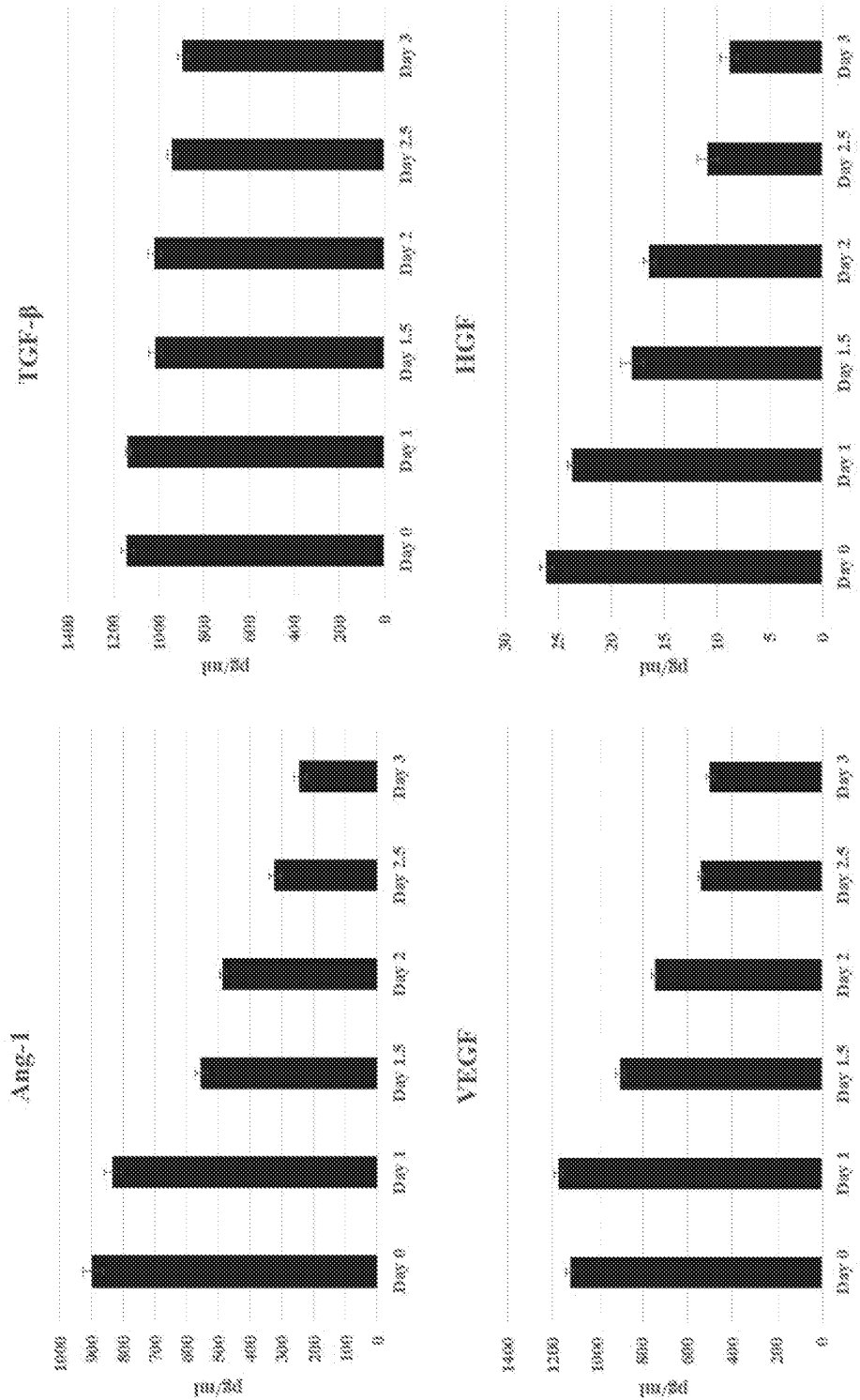


Figure 33 (cont.4):

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e

Figure 33 (cont.5):

