



**Tip:**

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# DMEM Dulbecco's Modified Eagle Media

**PRODUCT DESCRIPTION**

A basal medium consisting of vitamins, amino acids, salts, glucose and a pH indicator. It contains no proteins or growth promoting agents.

**CATALOG NUMBERS**

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**CATALOG NUMBERS**

Invitrogen offers several versions of DMEM including powder or liquid, with or without L-glutamine, High or Low Glucose, etc. The comparison table is a quick reference to help identify the catalog number that best suites your requirements:

Base Catalog Number	Glucose level	Liquid or Powder	With 4mM Glutamine	With GlutaMAX	With 1mM Sodium Pyruvate	With 25mM HEPES	Without Phenol Red	Without Glucose	Without Phosphate	Without Methionine and Cystine	Without Calcium
<a href="#">11965</a>	4.5 g/L	Liquid	•								
<a href="#">11995</a>	4.5 g/L	Liquid	•		•						
<a href="#">12430</a>	4.5 g/L	Liquid	•			•					
<a href="#">21063</a>	4.5 g/L	Liquid	•			•	•				
<a href="#">11971</a>	4.5 g/L	Liquid	•					•			
<a href="#">12100</a>	4.5 g/L	Powder	•								
<a href="#">12800</a>	4.5 g/L	Powder	•		•						
<a href="#">11960</a>	4.5 g/L	Liquid									
<a href="#">10313</a>	4.5 g/L	Liquid			•						
<a href="#">31053</a>	4.5 g/L	Liquid					•				
<a href="#">21013</a>	4.5 g/L	Liquid								•	
<a href="#">21068</a>	4.5 g/L	Liquid									•
<a href="#">10569</a>	4.5 g/L	Liquid		•	•						
<a href="#">10564</a>	4.5 g/L	Liquid		•		•	•				
<a href="#">10566</a>	4.5 g/L	Liquid		•							
<a href="#">11885</a>	1.0 g/L	Liquid	•		•						
<a href="#">11966</a>	0.0 g/L	Liquid	•					•			
<a href="#">12320</a>	1.0	Liquid	•		•	•					
<a href="#">31600</a>	1.0	Powder	•		•						
<a href="#">11054</a>	1.0	Liquid			•						
<a href="#">10567</a>	1.0	Liquid			•						

**BRAND**  
GIBCO®

**LABELING INTENDED USE**

Refer to specific product in our on-line catalog. Most versions have an intended use of *in vitro* diagnostic but some are intended for research only.

**STABILITY**

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Liquid: 12 months from date of production.

Powder: 36 months from date of production.

**STORAGE CONDITIONS**

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This product should be stored at 2-8°C, in the dark.

**SHIPPING CONDITIONS**

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This product is shipped at room temperature.

**QC SPECIFICATIONS**

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Test	Specification
Sterility (Only for liquid)	Negative
pH (only for liquid)	7.0-7.4 for most versions. May vary depending on specific product.
pH before additions (only for powder)	5.9-6.3 for most versions. May vary depending on specific product.
Osmolality	Will vary depending on specific product
Endotoxin	Warning limit when >0.5 EU/ml
Sp2 Toxicity Assay	80-200% of control

**PROTOCOL AND APPLICATION NOTES**

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**General Information:**

DMEM is a basal medium consisting of vitamins, amino acids, salts, glucose and a pH indicator. It contains no proteins or growth promoting agents. Therefore, it requires supplementation to be a “complete” medium. It is most commonly supplemented with 5-10% Fetal Bovine Serum (FBS). DMEM utilizes a sodium bicarbonate buffer system (3.7 g/L) and therefore requires artificial levels of CO to maintain the required pH. 7-10% CO<sub>2</sub> is optimal but many researchers successfully use it in 5% CO<sub>2</sub>. The potential problem with too low CO<sub>2</sub> level is that the pH may become too high. When exposed to ambient levels of CO<sub>2</sub>, the sodium bicarbonate in the medium will cause DMEM to become basic very rapidly. This why one will often observe a half used bottle of media appears purple, indicating a rise in pH. Powder media is formulated without sodium bicarbonate because it tends to gas off in the powdered state. Powder media requires the addition of 3.7 g/L of sodium bicarbonate upon dissolving it in water.

**Historical information:**

In 1955 Harry Eagle discovered that in addition to the ten essential amino acids (arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine), mammalian cells also required cystine and tyrosine and glutamine. His original formulation, known as Basal Media Eagle’s (BME), also contained eight B vitamins. The BME as originally developed was for HeLa cells and mouse fibroblasts although it was later extended to human diploid lines e.g. WI-38 and MRC-5.

There are a number of modifications of BME such as: Minimal Essential Medium (MEM) which has higher concentrations of amino acids; Glasgow MEM has the addition of 10% tryptose phosphate and double the concentration of amino acids and vitamins and DMEM which has a four-fold higher concentration of amino acids and vitamins.

DMEM was used initially for the culture of mouse embryonic stem cells. It has been found to be widely applicable in primary mouse and chicken cells, viral plaque formation and contact inhibition studies. The original DMEM formulation contained 1000 mg/L glucose although 4500 mg/L has been determined to be more optimal for certain cell types.

DMEM formulated from a standard published formulation often forms precipitates. The major component of the precipitate is elemental sulfur. It is insoluble in acid base and ethanol, but soluble in hexane and chloroform. The precipitate is a result of a chemical reaction which occurs over time. The reaction is dependent upon time, temperature and exposure to light. The mechanism of the reaction has not yet been determined. However, it requires the presence of iron, L-cystine and the aldehyde form of vitamin B6 (Pyridoxal). It has been determined that substituting Pyridoxine for Pyridoxal prevents the formation of this precipitate in stored media. Therefore in 1994, all Gibco DMEM formulations were converted from Pyridoxal HCl to Pyridoxine HCl.

**Directions for use:**

Media requires supplementation with animal serum or a cocktail of growth promoting agents. Many researches also supplement with antibiotics to help prevent contamination. Once supplemented, media should be used within 3-4 weeks.

Preparation of powdered media:

- Dissolve powder into roughly 95% of total volume to be made.
- Add the required amount of sodium bicarbonate.
- Adjust pH to 0.2 to 0.3 units below the desired working pH (7.0-7.4) by adding 1N NaOH or 1N HCl with stirring.
- QS to final volume. Keep container closed until ready to filter.
- Filter through a 0.2 micron filter.

**FORMULATION**

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Enter the first five digits of the catalog number you are interested in into the [media formulations database](#).

**PRODUCT DOCUMENTATION**

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**REFERENCES**

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1. Dulbecco, R. and Freeman, G. (1959) Virology 8:396.

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