

## Product Information

# Dulbecco's Modified Eagle's Medium (DMEM)

### Product description

Harry Eagle (1905–1992), an American pathologist, was one of the first to define the nutritional needs of human and mammalian cells in culture more precisely, leading to the media still in use today – such as Eagle's Minimal Essential Medium (MEM), one of the most widely used of all synthetic cell culture media. Dulbecco's Modified Eagle's Medium (DMEM), a variation of this medium, includes additional glycine, serine and ferric nitrate as well as a fourfold-higher concentration of amino acids and vitamins, plus an increased concentration of glucose compared to the original formula. Merck Millipore's DMEM has been formulated with a set of raw materials rigorously selected to ensure a high level of quality, consistency and traceability. The medium is manufactured according to GMP (IPEC-PQG GMP for Pharmaceutical Excipients 2006).

### Application

DMEM has been widely used for the cultivation of adherent cells such as primary fibroblasts, bone marrow cells, neurons, glial cells and smooth muscle cells, grown in monolayers or attached onto a carrier. Its performance has been extensively tested in the expansion of human mesenchymal stem cells (MSCs) derived from bone marrow, in combination with either fetal bovine serum (FBS) or human platelet lysate (PL), in planar culture or in microcarrier-based bioreactor applications at small and large scales.

As DMEM does not contain glutamine, proteins, lipids, or growth factors, it requires supplementation for stem cell culture, for example with serum-derived materials such as 10 % FBS or plasma-derived materials such as 5–10 % PL.

This product is intended for research or further manufacturing but not for human or therapeutic use.

### Formulation

No.	Component	CAS no.	g/L
1	L-Arginine hydrochloride	1119-34-2	0.0840
2	L-Cystine	56-89-3	0.0480
3	Glycine	56-40-6	0.0300
4	L-Histidine hydrochloride monohydrate	5934-29-2	0.0420
5	L-Isoleucine	73-32-5	0.1050
6	L-Leucine	61-90-5	0.1050
7	L-Lysine hydrochloride	657-27-2	0.1460
8	L-Methionine	63-68-3	0.0300
9	L-Phenylalanine	63-91-2	0.0660
10	L-Serine	56-45-1	0.0420
11	L-Threonine	72-19-5	0.0950
12	L-Tryptophan	73-22-3	0.0160
13	L-Tyrosine	60-18-4	0.0720
14	L-Valine	72-18-4	0.0940
15	Calcium-D(+) pantothenate	137-08-6	0.0040
16	Choline chloride	67-48-1	0.0040
17	Folic acid	59-30-3	0.0040
18	Myo-Inositol	87-89-8	0.0072
19	Nicotinamide	98-92-0	0.0040
20	Pyridoxine hydrochloride	58-56-0	0.0040
21	Riboflavin	83-88-5	0.0004
22	Thiamine hydrochloride	67-03-8	0.0040
23	Calcium chloride dihydrate	10035-04-8	0.2640
24	Iron(III) nitrate nonahydrate	7782-61-8	0.0001
25	Magnesium sulfate heptahydrate	10034-99-8	0.2000
26	Potassium chloride	7447-40-7	0.4000
27	Sodium chloride	7647-14-5	6.4000
28	Sodium dihydrogen phosphate dihydrate	13472-35-0	0.1410
29	D(+)-Glucose monohydrate	14431-43-7	1.1000
30	Pyruvic acid sodium salt	113-24-6	0.1100
<b>Grams of powder per liter</b>			<b>9.6217</b>

## Media preparation – applicable for powder medium only

1. Pour 90 % of the final volume of Milli-Q® or similar cell culture grade water, at an ambient temperature of 15–30 °C into an appropriately sized mixing vessel. Add the dry powder medium slowly to the water and rinse out the original package with a small amount of cell culture grade water to remove all traces of powder. Add the rinse to the solution and mix until completely dissolved. Supplement with 0.584 g/L (4 mM) L-glutamine, or as necessary.
2. As buffering substance, add 3.7 g of sodium bicarbonate per liter of the final volume of the medium. The medium now requires a 5–10 % CO<sub>2</sub> environment to maintain its physiological pH. The control of pH can be achieved with an incubator for traditional static cultures or by addition of air with 5 % CO<sub>2</sub> as an overlay in bioreactors.
3. While stirring the solution, use 1N NaOH or 1N HCl to adjust the pH to 0.2–0.3 units below the desired pH, as the pH may rise upon exposure to ambient air during filtration. The recommended working pH is 7.0–7.6.
4. Add Milli-Q® or similar cell culture grade water to achieve the final volume. Keep the vessel closed until final filtration.
5. Sterilize the medium by filtration using an appropriately sized Stericup® filter.
6. Aliquot the sterile solution under aseptic conditions to avoid contamination, and store the medium at 2–8 °C, protected from light.
7. Serum or further supplements can be added to the medium using aseptic techniques.

## Storage

Dry powder medium should be stored at 2–8 °C, protected from light. Liquid medium should be stored at 2–8 °C, protected from light. Do not use after expiration date.

## Shelf life

12 months

As dry powder media are hygroscopic, they must be protected from humidity and air moisture. We advise using the entire contents of each package immediately after opening.

## Ordering information for DMEM – Dry powder & Liquid

Catalog number	Product name	Pkg. size	Equivalent
1.02568.0010	DMEM Cell Culture Medium Powder	95.267 g	10 liters
1.02568.0100	DMEM Cell Culture Medium Powder	952.67 g	100 liters
1.02730.0500	DMEM Cell Culture Medium Liquid	500 mL	
1.02730.1000	DMEM Cell Culture Medium Liquid	1,000 mL	

## Ordering information for cell culture additives

Catalog number	Product name	Pkg. size	Mega units
1.37013.2500	Sodium hydrogen carbonate suitable for biopharmaceutical production EMPROVE® bio Ph Eur, BP, USP, JP	2.5 kg	
1.00286.1000	L-Glutamine suitable for use as excipient EMPROVE® exp DAB, USP	1 kg	
1.06301.0010	CellPrime® rTrypsin recombinant Trypsin (powder)	10 g	25 MU
1.06302.0010	CellPrime® rTrypsin recombinant Trypsin (liquid)	10 mL	2.7 MU
1.37065.1000	Poloxamer 188 Ph Eur	1 kg	

Other packaging sizes are available.

## Ordering information for aseptic filters

Catalog number	Product name	Qty/Pk
SCGPU11RE	Stericup®-GP Filter, 0.22 µm	12
SCGVU11RE	Stericup®-GV Filter, 0.22 µm	12

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The typical technical data above serve to generally characterize the cell culture media in industry-relevant expression systems. The product information is available separately from the website [www.merckmillipore.com](http://www.merckmillipore.com)

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