



## Product Information

### Minimum Essential Medium Eagle (MEM)

Minimum Essential Medium (MEM), developed by Harry Eagle, is one of the most widely used of all synthetic cell culture media. Early attempts to cultivate normal mammalian fibroblasts and certain subtypes of HeLa cells revealed that they had specific nutritional requirements that could not be met by Eagle's Basal Medium (BME). Subsequent studies using these and other cells in culture indicated that additions to BME could be made to aid growth of a wider variety of fastidious cells. MEM, which incorporates these modifications, includes higher concentrations of amino acids so that the medium more closely approximates the protein composition of cultured mammalian cells. MEM has been used for cultivation of a wide variety of cells grown in monolayers. Optional supplementation of non-essential amino acids to the formulations that incorporate either Hanks' or Earle's salts has broadened the usefulness of this medium. The formulation has been further modified by optional elimination of calcium to permit growth of cells in suspension culture.

COMPONENT	M 0268 g/L	M 4655 [1X] g/L	M 4642 g/L	M 4780 [1X] g/L	M 0643 g/L	M 1018 g/L
<b>INORGANIC SALTS</b>						
CaCl <sub>2</sub> •2H <sub>2</sub> O	0.265	0.265	0.185	0.185	0.265	0.185
MgSO <sub>4</sub> (anhyd)	0.09767	0.09767	0.09767	0.09767	0.09767	0.09767
KCl	0.4	0.4	0.4	0.4	0.4	0.4
KH <sub>2</sub> PO <sub>4</sub> (anhyd)	—	—	0.06	0.06	—	0.06
NaHCO <sub>3</sub>	—	2.2	—	0.35	—	—
NaCl	6.8	6.8	8.0	8.0	6.8	8.0
Na <sub>2</sub> HPO <sub>4</sub> (anhyd)	—	—	0.04788	0.04788	—	0.04788
NaH <sub>2</sub> PO <sub>4</sub> (anhyd)	0.122	0.122	—	—	0.122	—
<b>AMINO ACIDS</b>						
L-Alanine	—	—	—	—	0.0089	0.0089
L-Arginine•HCl	0.126	0.126	0.126	0.126	0.126	0.126
L-Asparagine•H <sub>2</sub> O	—	—	—	—	0.015	0.015
L-Aspartic Acid	—	—	—	—	0.0133	0.0133
L-Cystine•2•HCl	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313
L-Glutamic Acid	—	—	—	—	0.0147	0.0147
L-Glutamine	0.292	0.292	0.292	0.292	0.292	0.292
Glycine	—	—	—	—	0.0075	0.0075
L-Histidine•HCl•H <sub>2</sub> O	0.042	0.042	0.042	0.042	0.042	0.042
L-Isoleucine	0.052	0.052	0.052	0.052	0.052	0.052
L-Leucine	0.052	0.052	0.052	0.052	0.052	0.052
L-Lysine•HCl	0.0725	0.0725	0.0725	0.0725	0.0725	0.0725
L-Methionine	0.015	0.015	0.015	0.015	0.015	0.015
L-Phenylalanine	0.032	0.032	0.032	0.032	0.032	0.032
L-Proline	—	—	—	—	0.0115	0.0115
L-Serine	—	—	—	—	0.0105	0.0105
L-Threonine	0.048	0.048	0.048	0.048	0.048	0.048
L-Tryptophan	0.01	0.01	0.01	0.01	0.01	0.01
L-Tyrosine•2Na•2H <sub>2</sub> O	0.0519	0.0519	0.0519	0.0519	0.0519	0.0519
L-Valine	0.046	0.046	0.046	0.046	0.046	0.046
<b>VITAMINS</b>						
Choline Chloride	0.001	0.001	0.001	0.001	0.001	0.001
Folic Acid	0.001	0.001	0.001	0.001	0.001	0.001
Myo-Inositol	0.002	0.002	0.002	0.002	0.002	0.002
Niacinamide	0.001	0.001	0.001	0.001	0.001	0.001
D-Pantothenic Acid •½Ca	0.001	0.001	0.001	0.001	0.001	0.001
Pyridoxal•HCl	0.001	0.001	0.001	0.001	0.001	0.001
Riboflavin	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Thiamine•HCl	0.001	0.001	0.001	0.001	0.001	0.001
Vitamin B-12	—	—	—	—	—	—
<b>OTHER</b>						
Glucose	1.0	1.0	1.0	1.0	1.0	1.0
Phenol Red•Na	0.011	0.011	0.011	0.011	0.011	0.011
<b>ADD</b>						
NaHCO <sub>3</sub>	2.2	—	0.35	—	2.2	0.35
Grams of powder required to prepare 1 L	9.6	N/A	10.7	N/A	9.7	10.8

**Minimum Essential Medium Eagle (MEM) continued**

COMPONENT	M 3024 g/L	M 3149 g/L	M 3911 [1X] g/L	M 3786 [1X] g/L	M 2289 [1X] g/L	M 2414 [1X] g/L
<b>INORGANIC SALTS</b>						
CaCl <sub>2</sub> •2H <sub>2</sub> O	0.265	0.185	0.265	0.265	0.265	0.265
MgSO <sub>4</sub> (anhyd)	0.09767	0.09767	0.09767	0.09767	0.09767	0.09767
KCl	0.4	0.4	0.4	0.4	0.4	0.4
KH <sub>2</sub> PO <sub>4</sub> (anhyd)	—	0.060	—	—	—	—
NaHCO <sub>3</sub>	—	—	2.2	2.2	2.2	0.85
NaCl	6.8	8.0	6.8	6.8	6.8	6.8
Na <sub>2</sub> HPO <sub>4</sub> (anhyd)	—	0.04788	—	—	—	—
NaH <sub>2</sub> PO <sub>4</sub> (anhyd)	0.122	—	0.122	—	0.122	0.122
<b>AMINO ACIDS</b>						
L-Alanine	0.0089	0.0089	—	—	—	—
L-Arginine•HCl	0.126	0.126	0.126	0.126	0.126	0.126
L-Asparagine•H <sub>2</sub> O	0.015	0.015	—	—	—	—
L-Aspartic Acid	0.0133	0.0133	—	—	—	—
L-Cystine•2HCl	0.0313	0.0313	0.0313	—	—	0.0313
L-Glutamic Acid	0.0147	0.0147	—	—	—	—
L-Glutamine	—	—	0.292	—	—	—
Glycine	0.0075	0.0075	—	—	—	—
L-Histidine•HCl•H <sub>2</sub> O	0.042	0.042	0.042	0.042	0.042	0.042
L-Isoleucine	0.052	0.052	0.052	0.052	0.052	0.052
L-Leucine	0.052	0.052	0.052	0.052	0.052	0.052
L-Lysine•HCl	0.0725	0.0725	0.0725	0.0725	0.0725	0.0725
L-Methionine	0.015	0.015	—	0.015	—	0.015
L-Phenylalanine	0.032	0.032	0.032	0.032	0.032	0.032
L-Proline	0.0115	0.0115	—	—	—	—
L-Serine	0.0105	0.0105	—	—	—	—
L-Threonine	0.048	0.048	0.048	0.048	0.048	0.048
L-Tryptophan	0.01	0.01	0.01	0.01	0.01	0.01
L-Tyrosine•2Na•2H <sub>2</sub> O	0.0519	0.0519	0.0519	0.0519	0.0519	0.0519
L-Valine	0.046	0.046	0.046	0.046	0.046	0.046
<b>VITAMINS</b>						
Choline Chloride	0.001	0.001	0.001	0.001	0.001	0.001
Folic Acid	0.001	0.001	0.001	0.001	0.001	0.001
myo-Inositol	0.002	0.002	0.002	0.002	0.002	0.002
Niacinamide	0.001	0.001	0.001	0.001	0.001	0.001
D-Pantothenic Acid •½Ca	0.001	0.001	0.001	0.001	0.001	0.001
Pyridoxal•HCl	0.001	0.001	0.001	0.001	0.001	0.001
Riboflavin	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Thiamine•HCl	0.001	0.001	0.001	0.001	0.001	0.001
<b>OTHER</b>						
Glucose	1.0	1.0	1.0	1.0	1.0	1.0
Phenol Red•Na	—	—	0.011	0.011	0.011	0.11
<b>ADD</b>						
NaHCO <sub>3</sub>	2.2	0.35	—	—	—	—
L-Cystine•2HCl	—	—	—	—	0.313	—
L-Glutamine	0.292	0.292	—	—	0.292	0.292
L-Leucine	—	—	—	—	—	—
L-Lysine	—	—	—	—	—	—
L-Methionine	—	—	0.015	—	0.015	—
NaH <sub>2</sub> PO <sub>4</sub> (anhyd)	—	—	—	0.122	—	—
Grams of powder required to prepare 1 L	9.4	10.5	N/A	N/A	N/A	N/A

**Minimum Essential Medium Eagle (MEM) continued**

<b>COMPONENT</b>	<b>M 0894</b> g/L	<b>M 0644</b> g/L	<b>M 2645</b> g/L	<b>M 0769</b> g/L
<b>INORGANIC SALTS</b>				
CaCl <sub>2</sub> •2H <sub>2</sub> O	0.265	0.265	0.265	0.265
MgSO <sub>4</sub> (anhyd)	0.09767	0.09767	0.09767	0.09767
KCl	0.4	0.4	0.4	0.4
NaCl	6.8	6.8	5.5	6.8
NaH <sub>2</sub> PO <sub>4</sub> (anhyd)	0.122	0.122	0.122	0.122
Na Succinate•6H <sub>2</sub> O	—	—	—	0.1
Succinic Acid (free acid)	—	—	—	0.075
<b>AMINO ACIDS</b>				
L-Alanine	0.025	0.025	—	—
L-Arginine•HCl	0.126	0.126	0.126	0.126
L-Asparagine•H <sub>2</sub> O	0.05	0.05	—	—
L-Aspartic Acid	0.03	0.03	—	—
L-Cysteine•HCl•H <sub>2</sub> O	0.1	0.1	—	—
L-Cystine•2HCl	0.0313	0.0313	0.0313	0.0313
L-Glutamic Acid	0.075	0.075	—	—
L-Glutamine	0.292	0.292	0.292	—
Glycine	0.05	0.05	—	—
L-Histidine•HCl•H <sub>2</sub> O	0.042	0.042	0.042	0.042
L-Isoleucine	0.052	0.052	0.052	0.052
L-Leucine	0.052	0.052	0.052	0.052
L-Lysine•HCl	0.0725	0.0725	0.0725	0.0725
L-Methionine	0.015	0.015	0.015	0.015
L-Phenylalanine	0.032	0.032	0.032	0.032
L-Proline	0.04	0.04	—	—
L-Serine	0.025	0.025	—	—
L-Threonine	0.048	0.048	0.048	0.048
L-Tryptophan	0.01	0.01	0.01	0.01
L-Tyrosine 2Na•2H <sub>2</sub> O	0.0519	0.0519	0.0519	—
L-Tyrosine (free base)	—	—	—	0.036
L-Valine	0.046	0.046	0.046	0.046
<b>VITAMINS</b>				
L-Ascorbic Acid•Na	0.05	0.05	—	—
Biotin	0.0001	0.0001	—	—
Choline Bitartrate	—	—	—	0.0018
Choline Chloride	0.001	0.001	0.001	—
Folic Acid	0.001	0.001	0.001	0.001
myo-Inositol	0.002	0.002	0.002	0.002
Niacinamide	0.001	0.001	0.001	0.001
D-Pantothenic Acid •½Ca	0.001	0.001	0.001	0.001
Pyridoxal•HCl	0.001	0.001	0.001	0.001
Riboflavin	0.0001	0.0001	0.0001	0.0001
Thiamine•HCl	0.001	0.001	0.001	0.001
Vitamin B-12	0.00136	0.00136	—	—
<b>OTHER</b>				
Adenosine	—	0.01	—	—
Cytidine	—	0.01	—	—
2'-Deoxyadenosine	—	0.01	—	—
2'-Deoxycytidine•HCl	—	0.011	—	—
2'-Deoxyguanosine	—	0.01	—	—
Glucose	1.0	1.0	1.0	1.00
Guanosine	—	0.01	—	—
HEPES	—	—	5.958	—
Phenol Red•Na	0.011	0.011	0.011	0.0064
Pyruvic Acid•Na	0.11	0.11	—	—
Thioctic Acid	0.0002	0.0002	—	—
Thymidine	—	0.01	—	—
Uridine	—	0.01	—	—
<b>ADD</b>				
NaHCO <sub>3</sub>	2.2	2.2	2.2	2.2
L-Glutamine	—	—	—	0.292
Grams of powder required to prepare 1 L	10.1	10.2	14.2	9.4

**Minimum Essential Medium Eagle (MEM) continued**

<b>COMPONENT</b>	<b>M 0518</b> g/L	<b>M 4144</b> g/L	<b>M 4767</b> g/L	<b>M 8167</b> [1X] g/L	<b>M 7270</b> g/L	<b>M 7395</b> g/L
<b>INORGANIC SALTS</b>						
CaCl <sub>2</sub> •H <sub>2</sub> O	—	0.265	—	—	0.265	0.265
MgCl <sub>2</sub> •6H <sub>2</sub> O	0.2	—	—	—	—	—
MgSO <sub>4</sub> (anhyd)	—	0.09767	0.09767	0.09767	0.09767	0.09767
KCl	0.4	0.4	0.4	0.4	0.4	0.4
NaCl	6.5	6.8	6.8	6.8	6.8	6.8
NaH <sub>2</sub> PO <sub>4</sub> (anhyd)	1.154	0.122	1.22	1.22	0.122	0.122
<b>AMINO ACIDS</b>						
L-Arginine•HCl	0.126	0.126	0.126	0.126	0.126	0.126
L-Cystine•2HCl	0.0324	0.0313	0.0313	0.0313	0.0313	0.0313
L-Glutamine	0.292	—	0.292	—	0.292	0.292
L-Histidine•HCl•H <sub>2</sub> O	0.042	0.042	0.042	0.042	0.042	0.042
L-Isoleucine	0.052	0.052	0.052	0.052	0.052	0.052
L-Leucine	0.052	0.052	0.052	0.052	—	0.052
L-Lysine•HCl	0.0725	0.0725	0.0725	0.0725	—	0.0725
L-Methionine	0.015	0.015	0.015	0.015	—	0.015
L-Phenylalanine	0.032	0.032	0.032	0.032	0.032	0.032
L-Threonine	0.048	0.048	0.048	0.048	0.048	0.048
L-Tryptophan	0.01	0.01	0.01	0.01	0.01	0.01
L-Tyrosine•2Na•2H <sub>2</sub> O	0.05452	0.0519	0.0519	0.0519	0.0519	0.0519
L-Valine	0.046	0.046	0.046	0.046	0.046	—
D-Valine	—	—	—	—	—	0.092
<b>VITAMINS</b>						
Choline Chloride	0.001	0.001	0.001	0.001	0.001	0.001
Folic Acid	0.001	0.001	0.001	0.001	0.001	0.001
myo-Inositol	0.002	0.002	0.002	0.002	0.002	0.002
Niacinamide	0.001	0.001	0.001	0.001	0.001	0.001
D-Pantothenic Acid •½Ca	0.001	0.001	0.001	0.001	0.001	0.001
Pyridoxal•HCl	0.001	0.001	0.001	0.001	0.001	0.001
Riboflavin	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Thiamine•HCl	0.001	0.001	0.001	0.001	0.001	0.001
<b>OTHER</b>						
Glucose	2.0	1.0	1.0	1.0	1.0	1.0
Phenol Red•Na	0.011	—	0.011	0.011	0.011	0.011
NaHCO <sub>3</sub>	—	—	—	2.2	—	—
<b>ADD</b>						
L-Glutamine	—	0.292	—	0.292	—	—
L-Leucine	—	—	—	—	0.052	—
L-Lysine	—	—	—	—	0.0725	—
L-Methionine	—	—	—	—	0.015	—
NaHCO <sub>3</sub>	2.0	2.2	2.2	—	2.2	2.2
Grams of powder required to prepare 1 L	11.2	9.3	10.4	—	9.4	9.6

**Minimum Essential Medium Eagle (MEM) continued**

COMPONENTS	M 7399 g/L	M 2279 M 7647 [1X] g/L	M 4526 [1X] g/L	M 5775 [1X] g/L	M 8292 [1X] g/L
<b>INORGANIC SALTS</b>					
CaCl <sub>2</sub> •2H <sub>2</sub> O	0.265	0.265	0.265	0.185	0.265
MgSO <sub>4</sub> (anhyd)	0.09767	0.09767	0.09767	0.09767	0.09767
KCl	0.4	0.4	0.4	0.4	0.4
KH <sub>2</sub> PO <sub>4</sub> (anhyd)	—	—	—	0.06	—
NaHCO <sub>3</sub>	—	2.2	2.2	0.35	2.2
NaCl	6.8	6.8	6.8	8.0	6.8
Na <sub>2</sub> HPO <sub>4</sub> (anhyd)	—	—	—	0.04788	—
NaH <sub>2</sub> PO <sub>4</sub> (anhyd)	0.122	0.122	0.122	—	0.122
<b>AMINO ACIDS</b>					
L-Alanine	0.0089	—	0.025	—	0.025
L-Arginine•HCl	0.126	0.126	0.126	0.126	0.126
L-Asparagine•H <sub>2</sub> O	0.015	—	0.05	—	0.05
L-Aspartic Acid	0.0133	—	0.03	—	0.03
L-Cysteine•HCl•H <sub>2</sub> O	—	—	0.1	—	0.1
L-Cystine•HCl	0.0313	0.0313	0.0313	0.0313	0.0313
L-Glutamic Acid	0.0147	—	0.075	—	0.075
L-Glutamine	0.292	—	—	—	—
Glycine	0.0075	—	0.05	—	0.05
L-Histidine•HCl•H <sub>2</sub> O	0.042	0.042	0.042	0.042	0.042
L-Isoleucine	0.052	0.052	0.052	0.052	0.052
L-Leucine	0.052	0.052	0.052	0.052	0.052
L-Lysine•HCl	0.0725	0.0725	0.0725	0.0725	0.0725
L-Methionine	0.015	0.015	0.015	0.015	0.015
L-Phenylalanine	0.032	0.032	0.032	0.032	0.032
L-Proline	0.0115	—	0.04	—	0.04
L-Serine	0.0105	—	0.025	—	0.025
L-Threonine	0.048	0.048	0.048	0.048	0.048
L-Tryptophan	0.01	0.01	0.01	0.01	0.01
L-Tyrosine•2Na•2H <sub>2</sub> O	0.0519	0.0519	0.0519	0.0519	0.0519
L-Valine	0.046	0.046	0.046	0.046	0.046
<b>VITAMINS</b>					
L-Ascorbic Acid•Na	—	—	0.05	—	0.05
Biotin	—	—	0.0001	—	0.0001
Choline Chloride	0.001	0.001	0.001	0.001	0.001
Folic Acid	0.001	0.001	0.001	0.001	—
myo-Inositol	0.002	0.002	0.002	0.002	0.002
Lipoic Acid	—	—	0.0002	—	0.0002
Niacinamide	0.001	0.001	0.001	0.001	0.001
D-Pantothenic Acid •½Ca	0.001	0.001	0.001	0.001	0.001
Pyridoxal•HCl	0.001	0.001	0.001	0.001	0.001
Pyruvic Acid	—	—	0.11	—	0.11
Riboflavin	0.0001	0.0001	0.0001	0.0001	0.0001
Thiamine•HCl	0.001	0.001	0.001	0.001	0.001
Vitamin B-12	—	—	0.00136	—	0.00136
<b>OTHER</b>					
Glucose	1.0	1.0	1.0	1.0	1.0
Lactalbumin Hydrolysate	0.5	—	—	—	—
Phenol Red•Na	0.011	0.011	0.011	0.011	0.011
<b>ADD</b>					
L-Glutamine	—	0.292	0.292	0.292	0.292
NaHCO <sub>3</sub>	2.2	—	—	—	—
Grams of powder required to prepare 1 L	10.2	N/A	N/A	N/A	N/A

Minimum Essential Medium Eagle (MEM) continued

COMPONENT	M 5650 [1X] g/L	M 8028 [1X] g/L	M 7278 [1X] g/L	M 0275 [10X] g/L	M 9288 [10X] g/L
<b>INORGANIC SALTS</b>					
CaCl <sub>2</sub> •2H <sub>2</sub> O	0.265	—	0.265	2.65	1.85
MgCl•6H <sub>2</sub> O	—	0.2	—	—	—
MgSO <sub>4</sub> (anhyd)	0.09767	—	0.09767	0.9767	0.9767
KCl	0.4	0.4	0.4	4.0	4.0
KH <sub>2</sub> PO <sub>4</sub>	—	—	—	—	0.6
NaHCO <sub>3</sub>	2.2	2.0	2.2	—	—
NaCl	6.8	6.5	5.5	68.0	80.0
NaH <sub>2</sub> PO <sub>4</sub> (anhyd)	0.122	1.154	0.122	1.22	—
Na <sub>2</sub> HPO <sub>4</sub>	—	—	—	—	0.4788
<b>AMINO ACIDS</b>					
L-Alanine	0.0089	—	—	—	—
L-Arginine•HCl	0.126	0.126	0.126	1.26	1.26
L-Asparagine•H <sub>2</sub> O	0.015	—	—	—	—
L-Aspartic Acid	0.0133	—	—	—	—
L-Cystine•2HCl	0.0313	0.0324	0.0313	0.313	0.313
L-Glutamic Acid	0.0147	—	—	—	—
Glycine	0.0075	—	—	—	—
L-Histidine•HCl•H <sub>2</sub> O	0.042	0.042	0.042	0.42	0.42
L-Isoleucine	0.052	0.052	0.052	0.52	0.52
L-Leucine	0.052	0.052	0.052	0.52	0.52
L-Lysine•HCl	0.0725	0.0725	0.0725	0.725	0.725
L-Methionine	0.015	0.015	0.015	0.15	0.15
L-Phenylalanine	0.032	0.032	0.032	0.32	0.32
L-Proline	0.0115	—	—	—	—
L-Serine	0.0105	—	—	—	—
L-Threonine	0.048	0.048	0.048	0.48	0.48
L-Tryptophan	0.01	0.01	0.01	0.1	0.1
L-Tyrosine•2Na•2H <sub>2</sub> O	0.0519	0.05452	0.0519	0.519	0.519
L-Valine	0.046	0.046	0.046	0.46	0.46
<b>VITAMINS</b>					
Choline Chloride	0.001	0.001	0.001	0.01	0.01
Folic Acid	0.001	0.001	0.001	0.01	0.01
myo-Inositol	0.002	0.002	0.002	0.02	0.02
Niacinamide	0.001	0.001	0.001	0.01	0.01
D-Pantothenic Acid •½Ca	0.001	0.001	0.001	0.01	0.01
Pyridoxal•HCl	0.001	0.001	0.001	0.01	0.01
Riboflavin	0.0001	0.0001	0.0001	0.001	0.001
Thiamine•HCl	0.001	0.001	0.001	0.01	0.01
<b>OTHER</b>					
Glucose	1.0	2.0	1.0	10.0	10.0
Phenol Red•Na	0.011	0.011	0.011	0.11	0.11
HEPES	—	—	5.958	—	—
<b>ADD</b>					
L-Glutamine	0.292	0.292	0.292	0.292 at 1X	0.292 at 1X
NaHCO <sub>3</sub>	—	—	—	2.2 at 1X	0.35 at 1X

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