Product Information

Minimum Essential Medium Eagle (MEM)

Alpha Modifications

M0644, M0894, M4526, M0200,
M6199, M8042, M0450, M6074

Product Information

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 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 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 the medium more closely approximates the protein composition of cultured mammalian cells. 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 Alpha modification of MEM with Earle's Balanced Salts, commonly referred to as αMEM, contains non-essential amino acids, sodium pyruvate, and additional vitamins. These modifications were first described by Stanners for use in growing hybrid mouse and hamster cells.[1] The formulation is without the deoxyribonucleosides and ribonucleosides originally used in Stanners' studies.

References

MEM Alpha

1. Stanners, C.P., et al., Two Types of Ribosome in Mouse-Hampster Hybrid Cells. Nature New Biology, 230, 52-54 (1971).
2. Stanners, C.P., and Goldberg, V.J., On the Mechanism of Neutropism of Vesicular Stomatitis Virus in Newborn Hampsters. Studies With Temperature-Sensitive Mutants. J. Gen. Virol. 29, 281-296 (1975).

MEM

1. Eagle, H., et al., myo-Inositol as an Essential Growth Factor for Normal and Malignant Human Cells in Tissue Culture. J.Biol. Chem., 214, 845-847 (1956).
3. Eagle, H., Media for Animal Cell Culture. Tissue Culture Association Manual, 3, 517-520 (1976).
4. Eagle, H., Amino Acid Metabolism in Mammalian Cell Cultures. Science, 130, 432-437 (1959).
5. Eagle, H., Nutrition Needs of Mammalian Cells in Culture. Science, 122, 501 (1955).

Component	M0644 (powder) g/L	M0894 (powder) g/L	M4526 (1x) g/L	M0200 (1x) g/L	M6199 (1x) g/L
Inorganic Salts					
$CaCl_2 \bullet 2H_2O$	0.2	0.2	0.2	0.2	0.2
$MgSO_4$ (anhydrous)	0.09767	0.09767	0.09767	0.09767	0.09767
KCl	0.4	0.4	0.4	0.4	0.4
$NaHCO_3$	—	—	2.2	2.2	2.2
NaCl	6.8	6.8	6.8	6.8	6.8
NaH_2PO_4 (anhydrous)	0.122	0.122	0.122	0.122	0.122
Amino acids					
L-Alanine	0.025	0.025	0.025	0.025	0.025
L-Alanyl-L-Glutamine	—	—	—	—	0.434
L-Arginine • HCl	0.126	0.126	0.126	0.126	0.126
L-Asparagine • H_2O	0.05	0.05	0.05	0.05	0.05
L-Aspartic acid	0.03	0.03	0.03	0.03	0.03
L-Cysteine • HCl• H_2O	0.1	0.1	0.1	0.1	0.1
L-Cystine • 2HCl	0.0313	0.0313	0.0313	0.0313	0.0313
L-Glutamic acid	0.075	0.075	0.075	0.075	0.075
L-Glutamine	0.292	0.292	—	0.292	—
Glycine	0.05	0.05	0.05	0.05	0.05
L-Histidine • HCl • H_2O	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	0.04	0.04	0.04	0.04	0.04
L-Serine	0.025	0.025	0.025	0.025	0.025
L-Threonine	0.015	0.015	0.015	0.015	0.015
L-Tryptophan	0.032	0.032	0.032	0.032	0.032
L-Tyrosine • 2Na • $2H_2O$	0.04	0.04	0.04	0.04	0.04
L-Valine	0.025	0.025	0.025	0.025	0.025
Vitamins					
L-Ascorbic Acid • Na	0.05	0.05	0.05	0.05	0.05
D-Biotin	0.0001	0.0001	0.0001	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	0.001
myo-Inositol	0.002	0.002	0.002	0.002	0.002
Lipoic Acid	—	—	0.0002	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
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	0.00136	0.00136	0.00136

Components	M0644 (powder) g/L	M0894 (powder) g/L	M4526 (1x) g/L	M0200 (1x) g/L	M6199 (1x) g/L
Other					
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	1.0	1.0
Guanosine	0.01	—	—	—	—
Phenol Red • Na	0.011	0.011	0.011	0.011	0.011
Pyruvic Acid	0.11	0.11	0.11	0.11	0.11
Thioctic Acid	0.0002	0.0002	—	—	—
Thymidine	0.01	—	—	—	—
Uridine	0.01	—	—	—	—
Add					
L-Glutamine	—	—	0.292	—	0.292
$NaHCO_3$	2.2	2.2	—	—	—

Component	M8042 (1x) g/L	M0450 (1x) g/L	M6074 (1x) g/L
Inorganic Salts			
$CaCl_2 \cdot 2H_2O$	0.2	0.2	0.2
$MgSO_4$ (anhydrous)	0.09767	0.09767	0.09767
KCl	0.4	0.4	0.4
$NaHCO_3$	2.2	2.2	2.2
NaCl	6.8	6.8	6.8
NaH_2PO_4 (anhydrous)	0.122	0.122	0.122
Amino acids			
L-Alanine	0.025	0.025	0.025
L-Alanyl-L-Glutamine	—	—	0.434
L-Arginine • HCl	0.126	0.126	0.126
L-Asparagine • H_2O	0.05	0.05	0.05
L-Aspartic acid	0.03	0.03	0.03
L-Cysteine • HCl• H_2O	0.1	0.1	0.1
L-Cystine • 2HCl	0.0313	0.0313	0.0313
L-Glutamic acid	0.075	0.075	0.075
L-Glutamine	—	0.292	—
Glycine	0.05	0.05	0.05
L-Histidine • HCl • H_2O	0.042	0.042	0.042
L-Isoleucine	0.052	0.052	0.052
L-Leucine	0.052	0.052	0.052
L-Lysine • HCl	0.0725	0.0725	0.0725
L-Methionine	0.015	0.015	0.015
L-Phenylalanine	0.032	0.032	0.032
L-Proline	0.04	0.04	0.04
L-Serine	0.025	0.025	0.025
L-Threonine	0.048	0.048	0.048
L-Tryptophan	0.01	0.01	0.01
L-Tyrosine • 2Na • $2H_2O$	0.0519	0.0519	0.0519
L-Valine	0.046	0.046	0.046
Vitamins			
L-Ascorbic Acid • Na	0.05	0.05	0.05
D-Biotin	0.0001	0.0001	0.0001
Choline chloride	0.001	0.001	0.001
Folic acid	0.001	0.001	0.001
myo-Inositol	0.002	0.002	0.002
Lipoic Acid	—	—	—
Niacinamide	0.001	0.001	0.001
D-Pantothenic acid • ½Ca	0.001	0.001	0.001
Pyridoxal • HCl	0.001	0.001	0.001
Riboflavin	0.0001	0.0001	0.0001
Thiamine • HCl	0.001	0.001	0.001
Vitamin B_{12}	0.00136	0.00136	0.00136

Components	M8042 (1x) g/L	M0450 (1x) g/L	M6074 (1x) g/L
Other			
Adenosine	0.01	0.01	0.01
Cytidine	0.01	0.01	0.01
2′-Deoxyadenosine	0.01	0.01	0.01
2′-Deoxycytidine • HCl	0.011	0.011	0.011
2′-Deoxyguanosine	0.01	0.01	0.01
Glucose	1.0	1.0	1.0
Guanosine	0.01	0.01	0.01
Phenol Red • Na	0.011	0.011	0.011
Pyruvic Acid	0.11	0.11	0.11
Thioctic Acid	0.0002	0.0002	0.0002
Thymidine	0.01	0.01	0.01
Uridine	0.01	0.01	0.01
Add	1.0		
L-Glutamine	0.292	0.292	—
$NaHCO_3$	—	—	0.35

Notice

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