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## TECHNICAL INFORMATION

Catalog Number: 1050120, 1050122, 1050124

### Williams Medium E, powder, with L-glutamine, without sodium bicarbonate

**Description:** Isolated epithelial cells, as described in his sequential plating method by Williams, et al., in 1971, were originally cultivated in a rich medium known as Williams' Medium D. From these early newborn animal studies, Williams and Gunn developed a subsequent medium, Williams' Medium E, for the long-term cultivation of adult rat liver epithelial cells.

**Instructions for Use:** Mix powder with water at about 90% of volume indicated on the label (1l or 10L). Add sodium bicarbonate as either powder or liquid in the amounts indicated below. the pH prior to the addition of sodium bicarbonate is approximately 3.8 and after the addition will be in the range of 6.8 - 7.3. Sterile filter, as desired.

#### Formulation:

Component	mg/lit	Mol. Wt.	Mol. (mM)
<b>Amino Acids</b>			
L-Alanine	90.00000	89.1	1.01
L-Arginine HCl	60.50000	174.2	0.35
L-Asparagine H <sub>2</sub> O	20.00000	150.1	0.13
L-Aspartic Acid	30.00000	133.1	0.23
L-Cysteine HCl H <sub>2</sub> O	58.00000	175.6	0.33
L-Cystine 2HCl	26.09000	313.2	0.08
L-Glutamic Acid	50.00000	147.1	0.34
L-Glutamine	292.00000	146.1	2.00
Glycine	50.00000	75.07	0.67
L-Histidine HCl H <sub>2</sub> O	20.30000	209.6	0.10
L-Isoleucine	50.00000	131.2	0.38
L-Leucine	75.00000	131.2	0.57
L-Lysine HCl	87.50000	182.6	0.48
L-Methionine	15.00000	149.2	0.10
L-Phenylalanine	25.00000	165.2	0.15
L-Proline	30.00000	115.1	0.26
L-Serine	10.00000	105.1	0.10
L-Threonine	40.00000	119.1	0.34

L-Tryptophan	10.00000	204.2	0.05
L-Tyrosine	35.00000	181.2	0.19
L-Valine	50.00000	117.1	0.43
<b>Vitamins</b>			
Biotin	0.50000	244.3	0.0020
Calciferol	1.00000	396.7	0.0025
Choline Chloride	1.50000	139.6	0.0107
D-Calcium Pantothenate	1.00000	238.3	0.0042
DL-a-Tocopherol PO4 Na2	0.01000	554.7	0.00002
Folic Acid	1.00000	441.4	0.0023
L-Ascorbic Acid	2.00000	176.1	0.0114
Menadione Sodium Bisulfite 3H2O	0.01000	330.2	0.00003
myo-Inositol	2.00000	180.2	0.0111
Nicotinamide	1.00000	122.13	0.0082
Pyridoxal HCl	1.00000	203.6	0.0049
Riboflavin	0.10000	376.4	0.0003
Thiamine HCl	1.00000	337.3	0.0030
Vitamin A Acetate	0.10000	328.5	0.0003
Vitamin B12	0.20000	1355.4	0.0001
<b>Inorganic Salts</b>			
Calcium Chloride [CaCl2 2H2O] Dihydrate	264.90000	147	1.80
Cupric Sulfate [CuSO4]	0.00006	159.68	0.0000004
Ferric Nitrate [Fe(NO3)3 9H2O] Nonahydrate	0.0001	404	0.00000025
Magnesium Sulfate [MgSO4]	97.70000	120.4	0.81
Manganese Chloride [MnCl2 4H2O] Tetrahydrate	0.00010	197.9	0.0000005
Potassium Chloride [KCl]	400.00000	74.55	5.37
Sodium Chloride [NaCl]	6800.00000	58.44	116.36
Sodium Phosphate Monobasic [NaH2PO4 H2O] Monohydrate	140.00000	159.96	0.88
Zinc Sulfate [ZnSO4 7H2O] Heptahydrate	0.00020	287.5	0.0000007
<b>Other</b>			
Dextrose	2000.00000	180.2	11.10
Glutathione (reduced)	0.05000	307.33	0.0002

Methyl Linoleate	0.03000	294.5	0.0001
Phenol Red Sodium Salt	10.00000	376.4	0.03
Sodium Pyruvate	25.00000	110	0.23
<b>Add either one to adjust pH to 7.4</b>			
NaHCO <sub>3</sub> Powder (g/L)	2.2000		
NaHCO <sub>3</sub> 7.5% Solution (mL/L)	29.4000		

**Availability:**

**1X Liquid:**

Catalog Number	Description	Size
1250254	1X Williams' Medium E without L-glutamine	500 ml

**Powder:**

Catalog Number	Description	Size
1050122	Williams' Medium E with L-glutamine without sodium bicarbonate	1 x 10 liter

**Reference:**

– Williams, G.M., Weisburger, E.K. and Weisburger, J.H., *J. Exptl. Cell Res.*, v. **69**, 106 (1971).