

## MemGold\*

## MD1 - 39

The most advanced membrane protein crystallization screen to date. MemGold is based on crystallization conditions data mined from the Protein Data Bank and contains 96 conditions covering a range of pH, PEGs and salt additives.

A targeted sparse matrix kit of 96 × 10ml conditions.

### Features of MemGold:

- Data mined from 300 crystallization conditions.
- Covers conditions for approximately 130 different membrane protein structures in the PDB.
- Addresses the diversity of membrane proteins studied, with many more transporters and channels now in the database, and a good number of both  $\alpha$  - and  $\beta$  - types.

### Introduction

Recent years have seen a steady increase in the number of membrane protein structures solved and there are now approximately 130 different membrane protein structures in the PDB and over 300 crystallization conditions. The diversity of proteins has increased, with many more transporters and channels now in the database and a good number of both  $\alpha$  - and  $\beta$  - types.

Recent work by Dr. Simon Newstead in the group of Prof. So Iwata at Imperial College, London, has produced a new sparse matrix screen for membrane proteins, MemGold. MemGold is based on the conditions mined from the PDB and contains 96 conditions covering a range of pH, PEGs and salt additives.

### Formulation notes

MemGold screen reagents are formulated using ultrapure water (>18.0 M $\Omega$ ) and are sterile-filtered using 0.22  $\mu$ m filters. No preservatives are added.

Final pH may vary from that specified on the datasheet.

### Reference

Newstead, S., Ferrandon, S., Iwata, S. 2008, *Protein Science (In Press)*.

### Contact Us

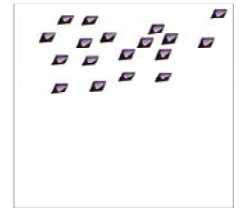
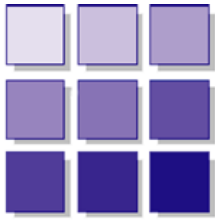
Molecular Dimensions Ltd. will be happy to discuss the precise formulation of individual reagents.

Individual reagents and stock solutions for optimization are available from Molecular Dimensions.

Molecular Dimensions Ltd. would be very grateful if investigators were prepared to provide feedback on their own experiences with the new screen. Crystallization reports or pictures can be e-mailed to [enquiries@moleculardimensions.com](mailto:enquiries@moleculardimensions.com)

Contact and product details can be found at [www.moleculardimensions.com](http://www.moleculardimensions.com)

\*Developed by Dr. S. Newstead, of the So Iwata lab, Imperial College, London and manufactured under licence by Molecular Dimensions Ltd.

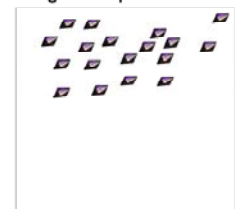
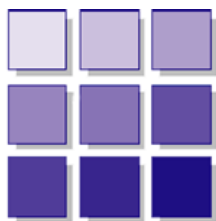


**MemGold**

**Box 1 - Tubes 1-24**

**MD1-39**

Tube #	Salt	Buffer	pH	Precipitant
1.1	None	0.08 M sodium citrate	5.2	2.2 M ammonium sulfate
1.2	None	0.01 M Tris	8.0	1.2 M tri-sodium citrate
1.3	None	0.015 M tricine	8.5	24 % w/v PEG 4000
1.4	0.36 M sodium chloride/0.1% w/v sodium azide	0.015 M sodium phosphate	7.0	9.9 % w/v PEG 4000
1.5	0.3 M sodium chloride	0.01 M Tris	8.0	27.5 % w/v PEG 4000
1.6	None	0.225 M MES/bis-tris	6.6	6.6 % w/v PEG 6000
1.7	0.1 M ammonium sulfate	0.1 M HEPES	7.5	12.0 % w/v PEG 4000/ 22 % v/v glycerol
1.8	0.02 M calcium chloride/0.01 M magnesium sulfate/0.02 M sodium chloride	0.02 M MES	6.5	7.7 % w/v PEG 1500
1.9	None	0.05 M HEPES	7.5	2.5 M ammonium sulfate
1.10	None	0.0665 M HEPES	7.5	1.1 M tri-sodium citrate
1.11	None	0.15 M potassium phosphate	6.5	3.3 M ammonium sulfate
1.12	0.1 M magnesium acetate	0.1 M sodium citrate	5.8	14 % w/v PEG 5000 MME
1.13	0.1 M sodium chloride	0.02 M sodium citrate	5.6	11 % w/v PEG 3350
1.14	0.1 M sodium chloride	0.02 M sodium citrate	5.6	5.5 % w/v PEG 3350
1.15	0.05 M calcium chloride/0.05 M barium chloride	0.1 M Tris	8.2	32 % v/v PEG 400
1.16	0.05 M sodium chloride	0.1 M sodium phosphate	6.2	16 % w/v PEG 4000
1.17*	0.1 M magnesium chloride	0.03 M Tris-hydrochloride	8.2	19 % w/v PEG 4000
1.18	0.2 M sodium chloride	0.025 M HEPES	7.5	13 % w/v PEG 4000
1.19	None	0.1 M HEPES	7.5	11 % w/v PEG 3350
1.20	0.1 M sodium chloride	0.02 M KMES	6.7	6.6 % w/v PEG 4000
1.21	0.1 M potassium chloride	0.02 M Tris	7.0	20 % w/v PEG 4000
1.22	0.05 M magnesium chloride/0.1% w/v sodium azide	0.1 M sodium cacodylate	6.7	6.6 % w/v PEG 3350
1.23*	0.2 M potassium chloride	0.1 M sodium citrate	5.5	37 % v/v pentaerythritol propoxylate (5/4 PO/OH)
1.24	None	0.1 M Tris	8.0	5.5 % w/v PEG 4000

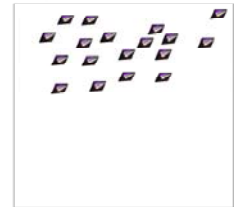
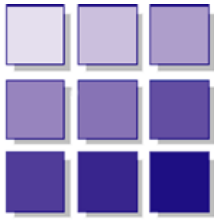


**MemGold**

**Box 1 - Tubes 25-48**

**MD1-39**

Tube #	Salt	Buffer	pH	Precipitant
1.25	0.1 M sodium chloride	0.02 M Tris	7.0	7.7 % w/v PEG 4000
1.26	0.1 M magnesium chloride	0.1 M Tris	7.5	22 % v/v PEG 400
1.27	0.04 M sodium chloride	0.04 M Tris	8.0	27 % v/v PEG 350 MME
1.28	0.05 M sodium chloride/0.02 M magnesium chloride	0.1 M sodium citrate	6.0	22 % v/v PEG 400
1.29	None	0.1 M sodium acetate	5.5	8.8 % w/v PEG 2000 MME
1.30	None	0.4 M ammonium acetate	8.0	13 % w/v PEG 2000 MME
1.31	None	0.02 M bis Tris	7.0	15 % w/v PEG 2000
1.32	0.1 M sodium chloride/0.1 M magnesium chloride	0.02 M Tris	7.5	11 % w/v PEG 1500
1.33	0.1 M sodium chloride/0.1 M magnesium chloride	0.1 M HEPES	8.0	11 % w/v PEG 1500
1.34	0.2 M sodium acetate/0.2 M Potassium Chloride	0.1 M HEPES	7.0	22 % w/v PEG 3000
1.35	0.02 M nickel sulfate	0.01 M HEPES	7.0	33 % v/v Jeffamine-M600
1.36	0.15 M sodium chloride	0.1 M Tris	8.0	13 % w/v PEG 6000
1.37	0.2 M calcium chloride	0.1 M HEPES	7.5	53 % v/v PEG 400
1.38	0.05 M magnesium acetate	0.05 M sodium acetate	5.0	28 % v/v PEG 400
1.39	None	0.05 M HEPES	7.5	22 % v/v PEG 4000
1.40	0.2 M calcium chloride	0.1 M Tris hydrochloride	8.0	44 % v/v PEG 400
1.41	0.05 M magnesium acetate	0.05 M sodium acetate	5.4	24 % v/v PEG 400
1.42	0.2 M calcium chloride	0.1 M MES	6.5	26 % v/v PEG 350 MME
1.43	0.1 M potassium chloride	0.1 M Tris	8.5	39 % v/v PEG 400
1.44	0.05 M magnesium chloride	0.1 M glycine	9.0	22 % v/v PEG 400
1.45	0.1 M ammonium sulfate	0.1 M glycine	3.8	28 % w/v tri-ethylene glycol
1.46	0.15 M sodium formate	0.1 M HEPES	7.2	18 % w/v PEG 3350
1.47	None	0.2 M sodium acetate	6.8	8.8 % w/v PEG 6000
1.48	0.2 M potassium chloride	0.1 M MES	6.5	18 % w/v PEG 6000



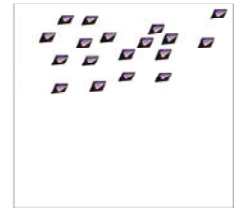
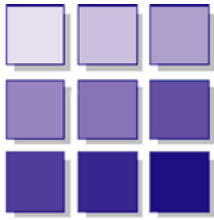
**MemGold**

**Box 2 - Tubes 1-24**

**MD1-39**

Tube #	Salt	Buffer	pH	Precipitant
2.1	0.22 M sodium citrate	0.1 M Tris	8.0	35 % v/v PEG 400
2.2	None	0.1 M sodium acetate	4.5	17 % v/v PEG 400
2.3	None	0.02 M Tris	8.5	1.0 M lithium sulfate/1.8 % w/v PEG 8000
2.4	None	0.02 M Tris	7.5	22 % v/v PEG 550 MME
2.5	0.05 M sodium chloride	0.02 M glycine	10.0	33 % w/v PEG 1000
2.6	0.2 M magnesium chloride	0.1 M Tris	8.5	25 % w/v PEG 4000
2.7	0.2 M magnesium chloride	0.1 M sodium cacodylate	6.5	31 % w/v PEG 2000
2.8	None	0.64 M sodium acetate	4.6	18 % w/v PEG 3350
2.9	0.1 M sodium chloride/0.1 M cadmium chloride	0.1 M Tris hydrochloride	8.0	33 % v/v PEG 400
2.10	None	0.1 M Bicine	8.9	31 % w/v PEG 2000
2.11	0.05 M sodium sulfate/0.05 M lithium sulfate	0.05 M Tris	8.5	35 % v/v PEG 400
2.12	0.1 M sodium chloride	0.05 M glycine	9.5	33 % v/v PEG 300
2.13	0.3 M magnesium nitrate	0.1 M Tris	8.0	23 % w/v PEG 2000
2.14	0.12 M lithium sulfate	0.02 M Tris/0.1 M sodium citrate	7.5/ 5.0	20 % v/v PEG 300
2.15	0.1 M sodium chloride	0.12 M Tris	9.4	20 % v/v PEG 400
2.16	0.2 M sodium chloride	0.1 M HEPES	7.0	22 % v/v PEG 550 MME
2.17	0.1 M sodium chloride/0.325 M sodium acetate	0.1 M Tris	8.0	21 % v/v PEG 400
2.18	0.02 M sodium citrate	0.08 M sodium phosphate	6.2	18 % w/v PEG 2000
2.19	0.02 M potassium nitrate	0.03 M potassium citrate	6.5	7.7 % w/v PEG 4000
2.20	0.1 M sodium chloride/0.005 M magnesium chloride	0.1 M Tris	8.5	30 % w/v PEG 2000 MME
2.21	0.2 M calcium chloride	0.1 M HEPES	7.0	33 % v/v PEG 400
2.22	0.1 M calcium chloride	0.1 M Tris	6.5	13 % w/v PEG 2000 MME
2.23	0.2 M ammonium sulfate/0.02 M sodium chloride	0.02 M sodium acetate	4.0	33 % v/v PEG 200
2.24	0.07 M sodium chloride	0.05 M sodium citrate	4.5	22 % v/v PEG 400





MemGold

Box 2 - Tubes 25-48

MD1-39

Tube #	Salt	Buffer	pH	Precipitant
2.25	0.2 M ammonium sulfate	0.1 M sodium acetate	4.6	28 % v/v PEG 550 MME
2.26	None	0.05 M glycine	9.0	55 % v/v PEG 400
2.27	0.1 M magnesium chloride/0.1M sodium chloride	0.1 M Tris	8.5	33 % v/v PEG 400
2.28	0.1 M lithium sulfate/0.05 M di-sodium hydrogen phosphate	0.05 M citric acid	None	19 % w/v PEG 1000
2.29	0.2 M magnesium chloride/ 0.1 M potassium chloride	0.025 M sodium citrate	4.0	33 % v/v PEG 400
2.30	0.05 M zinc acetate	0.05 M MES	6.1	11 % w/v PEG 8000
2.31	0.3 M magnesium nitrate	0.1 M Tris	8.0	22 % w/v PEG 8000
2.32	0.1 M sodium chloride/4% v/v ethylene glycol	0.1 M MES	6.5	33 % v/v PEG 400
2.33	0.05 M sodium chloride	0.1 M sodium citrate	5.5	26 % v/v PEG 400
2.34	0.1 M lithium sulfate	0.1 M glycine	9.3	30 % v/v PEG 400
2.35*	0.15 M potassium citrate/ 0.05 M lithium citrate	0.1 M sodium phosphate	-	22 % w/v PEG 6000
2.36	0.001 M zinc sulfate	0.05 M HEPES	7.8	28 % v/v PEG 600
2.37	0.1 M sodium chloride	0.1 M sodium phosphate	7.0	33 % v/v PEG 300
2.38	0.1 M sodium chloride	0.05 M Bicine	9.0	33 % v/v PEG 300
2.39	0.05 M zinc acetate/6% v/v ethylene glycol	0.1 M sodium cacodylate	6.0	6.6 % w/v PEG 8000
2.40	0.2 M lithium sulfate	0.1 M sodium citrate	3.5	28 % v/v PEG 400
2.41	0.1 M sodium chloride	0.1 M Tris	7.5	11 % w/v PEG 4000
2.42*	0.05 M lithium sulfate	0.1 M tricine	7.4	7 % w/v PEG 3000
2.43*	0.2 M calcium chloride	0.1 M MES	6.5	33% v/v PEG 400
2.44*	1 M sodium chloride	0.1 M sodium citrate	6.0	28% w/v PEG 4000
2.45*	None	0.1 M HEPES	7.5	11% w/v PEG 4000
2.46*	0.002 M zinc sulfate	0.08 M HEPES	7.0	25 % v/v Jeffamine ED2001
2.47*	0.001 M cadmium chloride/0.03 M magnesium chloride	0.1 M MES	6.5	30 % v/v PEG 400
2.48*	None	0.1 M bis-tris-propane	7.0	3.0 M sodium chloride

- **\*These conditions have been changed from the pre-release (prior to June 2007) beta version of MemGold. The pre-release conditions have been moved to the sister screen MemPlus (MD1-44), a new screen for Outer Membrane protein crystallisation.\***

**Abbreviations:**

**ADA;** N-(2-Acetamido)iminodiacetic Acid, **Bicine;** N,N-Bis(2-hydroxyethyl)glycine, **CHES;** 2-(N-Cyclohexylamino)ethane sulfonic Acid, **HEPES;** N-(2-hydroxyethyl)-piperazine-N'-2-ethanesulfonic acid, **KMES;** 2-(N-morpholino)ethanesulfonic acid potassium salt, **MES;** 2-(N-morpholino)ethanesulfonic acid, **MME;** Monomethylether, **PEG;** Polyethylene glycol, **Tricine;** N-[Tris(hydroxymethyl)methyl]glycine, **Tris;** 2-Amino-2-(hydroxymethyl)propane-1,3-diol, **Tris HCl;** 2-Amino-2-(hydroxymethyl)propane-1,3-diol, hydrochloride.]

