

Table S1) Buffers used for microcalorimetric studies. Composition of the dialysis buffers used for each of the proteins analysed. Dialyzed proteins were transferred into the microcalorimeter and ligand solutions were made up in dialysis buffer.

pH	Buffer composition
Periplasmic LBDs, α/β folds	
CtpM-LBD	
4.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
4.5	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
5.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
5.5	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
6.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
7.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
8.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
9.5	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
McpV-LBD	
4.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
4.5	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
5.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
11.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
11.5	10 mM Na ₂ PO ₄ /NaOH, 150 mM NaCl, 10 % (v/v) glycerol
12.0	10 mM KCl/NaOH, 150 mM NaCl, 10 % (v/v) glycerol
McpH-LBD	
3.0	10 mM citric acid/sodium citrate
3.5	10 mM citric acid/sodium citrate
4.0	10 mM citric acid/sodium citrate
5.0	10 mM citric acid/sodium citrate
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃
10.5	10 mM Na ₂ CO ₃ /NaHCO ₃
PctA-LBD	
2.5	20 mM acetic acid/HCl
3.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
3.5	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
4.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
4.5	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
5.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
5.5	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
6.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol

7.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
8.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
9.5	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
10.5	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
11.0	10 mM Na ₂ PO ₄ /NaOH, 150 mM NaCl, 10 % (v/v) glycerol
11.5	10 mM Na ₂ PO ₄ /NaOH, 150 mM NaCl, 10 % (v/v) glycerol
12.0	10 mM Na ₂ PO ₄ /NaOH, 150 mM NaCl, 10 % (v/v) glycerol
McpU-LBD	
4.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
4.5	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
5.0	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
5.5	10 mM citric acid/sodium citrate, 150 mM NaCl, 10 % (v/v) glycerol
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
6.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
7.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
8.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
9.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 150 mM NaCl, 10 % (v/v) glycerol
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
10.5	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
11.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 150 mM NaCl, 10 % (v/v) glycerol
11.5	10 mM Na ₂ PO ₄ /NaOH, 150 mM NaCl, 10 % (v/v) glycerol
12.0	10 mM Na ₂ PO ₄ /NaOH, 150 mM NaCl, 10 % (v/v) glycerol
Periplasmic LBDs, four-helix bundle folds	
Tar-LBD	
2.5	20 mM acetic acid/HCl
3.0	10 mM citric acid/sodium citrate
3.5	10 mM citric acid/sodium citrate
4.0	10 mM citric acid/sodium citrate
4.5	10 mM citric acid/sodium citrate
5.0	10 mM citric acid/sodium citrate
5.5	10 mM citric acid/sodium citrate
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES
6.5	3 mM Tris, 3 mM PIPES, 3 mM MES
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES
7.5	3 mM Tris, 3 mM PIPES, 3 mM MES
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES
8.5	3 mM Tris, 3 mM PIPES, 3 mM MES
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES
9.5	10 mM Na ₂ CO ₃ /NaHCO ₃
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃
10.5	10 mM Na ₂ CO ₃ /NaHCO ₃
11.0	10 mM Na ₂ CO ₃ /NaHCO ₃
PcaY_PP-LBD	
3.0	10 mM citric acid/sodium citrate
3.5	10 mM citric acid/sodium citrate
4.0	10 mM citric acid/sodium citrate
5.0	10 mM citric acid/sodium citrate
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES

7.0	3 mM Tris, 3 mM PIPES, 3 mM MES
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃
11.0	10 mM Na ₂ CO ₃ /NaHCO ₃
11.5	10 mM KCl/NaOH
12.0	10 mM KCl/NaOH
McpS-LBD	
2.5	20 mM acetic acid/HCl
3.0	10 mM citric acid/sodium citrate
3.5	10 mM citric acid/sodium citrate
4.0	10 mM citric acid/sodium citrate
4.5	10 mM citric acid/sodium citrate
5.0	10 mM citric acid/sodium citrate
5.5	10 mM citric acid/sodium citrate
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES
6.5	3 mM Tris, 3 mM PIPES, 3 mM MES
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES
7.5	3 mM Tris, 3 mM PIPES, 3 mM MES
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES
8.5	3 mM Tris, 3 mM PIPES, 3 mM MES
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES
9.5	10 mM Na ₂ CO ₃ /NaHCO ₃
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃
10.5	10 mM Na ₂ CO ₃ /NaHCO ₃
McpQ-LBD	
3.5	10 mM acetic acid/ sodium acetate, 10 mM MgCl ₂
4.0	10 mM acetic acid/ sodium acetate, 10 mM MgCl ₂
5.0	10 mM acetic acid/ sodium acetate, 10 mM MgCl ₂
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 10 mM MgCl ₂
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 10 mM MgCl ₂
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 10 mM MgCl ₂
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 10 mM MgCl ₂
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 10 mM MgCl ₂
11.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 10 mM MgCl ₂
11.5	10 mM KCl/NaOH, 10 mM MgCl ₂
Periplasmic solute binding proteins	
E6B08 RS28125	
2.5	20 mM acetic acid/HCl
3.0	10 mM citric acid/sodium citrate
4.0	10 mM citric acid/sodium citrate
5.0	10 mM citric acid/sodium citrate
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃
11.0	10 mM Na ₂ CO ₃ /NaHCO ₃
11.5	10 mM Na ₂ HPO ₄ /NaOH
MBP	
2.0	20 mM acetic acid/HCl
2.5	20 mM acetic acid/HCl
3.0	10 mM citric acid/sodium citrate

4.0	10 mM citric acid/sodium citrate
5.0	10 mM citric acid/sodium citrate
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃
11.0	10 mM Na ₂ CO ₃ /NaHCO ₃
11.5	10 mM Na ₂ HPO ₄ /NaOH
Cytosolic LBDs	
TodS-Nter	
5.0	10 mM citric acid/sodium citrate, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
5.5	10 mM citric acid/sodium citrate, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
6.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
7.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
8.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
9.5	10 mM Na ₂ CO ₃ /NaHCO ₃ , 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 2 mM DDT, 2 mM MgCl ₂ , 0.1 mM EDTA
AdmX-LBD	
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 1 mM 2-mercaptoethanol
7.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 1 mM 2-mercaptoethanol
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 1 mM 2-mercaptoethanol
8.5	3 mM Tris, 3 mM PIPES, 3 mM MES, 1 mM 2-mercaptoethanol
TtgV	
4.5	10 mM citric acid/sodium citrate, 100 mM NaCl, 10 % (v/v) glycerol, 1 mM 2-mercaptoethanol, 8 mM magnesium acetate
5.0	10 mM citric acid/sodium citrate, 100 mM NaCl, 10 % (v/v) glycerol, 1 mM 2-mercaptoethanol, 8 mM magnesium acetate
6.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 100 mM NaCl, 10 % (v/v) glycerol, 1 mM 2-mercaptoethanol, 8 mM magnesium acetate
7.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 100 mM NaCl, 10 % (v/v) glycerol, 1 mM 2-mercaptoethanol, 8 mM magnesium acetate
8.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 100 mM NaCl, 10 % (v/v) glycerol, 1 mM 2-mercaptoethanol, 8 mM magnesium acetate
9.0	3 mM Tris, 3 mM PIPES, 3 mM MES, 100 mM NaCl, 10 % (v/v) glycerol, 1 mM 2-mercaptoethanol, 8 mM magnesium acetate
10.0	10 mM Na ₂ CO ₃ /NaHCO ₃ , 100 mM NaCl, 10 % (v/v) glycerol, 1 mM 2-mercaptoethanol, 8 mM magnesium acetate