



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 11:17 PM UTC

PDB ID : 4HFD / pdb_00004hfd
Title : The GLIC pentameric Ligand-Gated Ion Channel F14'A ethanol-sensitive mutant complexed to bromoform
Authors : Sauguet, L.; Howard, R.J.; Malherbe, L.; Lee, U.S.; Corringer, P.J.; Harris, R.A.; Delarue, M.
Deposited on : 2012-10-05
Resolution : 3.10 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	NOT EXECUTED
Xtriage (Phenix)	:	2.0
EDS	:	NOT EXECUTED
Buster-report	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

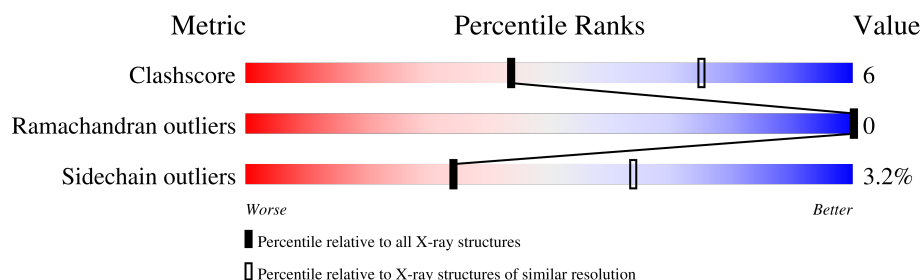
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	190562	1539 (3.10-3.10)
Ramachandran outliers	187476	1467 (3.10-3.10)
Sidechain outliers	187428	1467 (3.10-3.10)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	317	
1	B	317	
1	C	317	
1	D	317	
1	E	317	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	MBR	A	402	-	-	X	-
3	MBR	A	403[A]	-	-	X	-
3	MBR	A	403[B]	-	-	X	-
3	MBR	B	402	-	-	X	-
3	MBR	B	405	-	-	X	-
3	MBR	B	406[A]	-	-	X	-
3	MBR	B	406[B]	-	-	X	-
3	MBR	C	406	-	-	X	-
3	MBR	C	407	-	-	X	-
3	MBR	C	408[A]	-	-	X	-
3	MBR	C	408[B]	-	-	X	-
3	MBR	D	404	-	-	X	-
3	MBR	D	405[B]	-	-	X	-
3	MBR	D	406	-	-	X	-
3	MBR	E	404	-	-	X	-
3	MBR	E	405[A]	-	-	X	-
6	ACT	A	408	-	-	X	-

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 13044 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

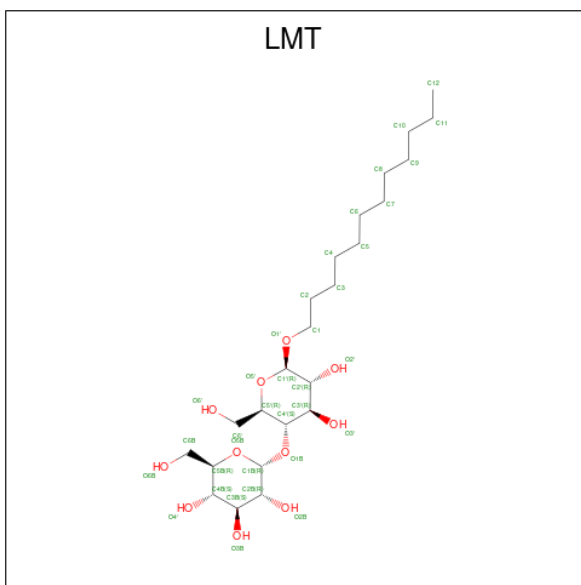
- Molecule 1 is a protein called Proton-gated ion channel.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	311	Total	C	N	O	S	0	0	0
			2519	1658	404	453	4			
1	B	311	Total	C	N	O	S	0	0	0
			2519	1658	404	453	4			
1	C	311	Total	C	N	O	S	0	0	0
			2519	1658	404	453	4			
1	D	311	Total	C	N	O	S	0	0	0
			2519	1658	404	453	4			
1	E	311	Total	C	N	O	S	0	0	0
			2519	1658	404	453	4			

There are 10 discrepancies between the modelled and reference sequences:

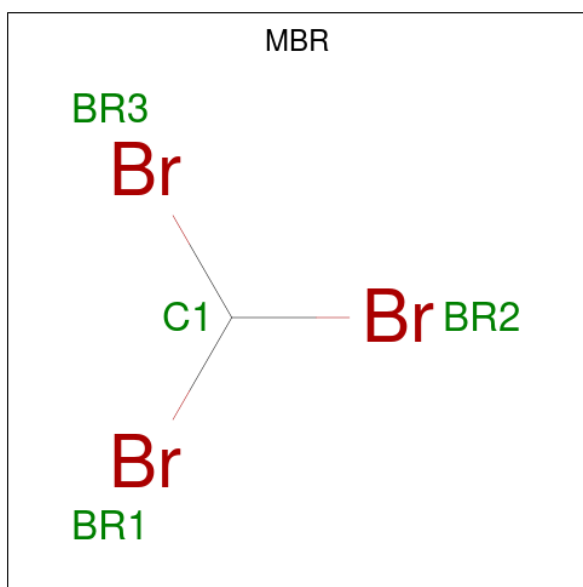
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	ALA	-	expression tag	UNP Q7NDN8
A	238	ALA	PHE	engineered mutation	UNP Q7NDN8
B	1	ALA	-	expression tag	UNP Q7NDN8
B	238	ALA	PHE	engineered mutation	UNP Q7NDN8
C	1	ALA	-	expression tag	UNP Q7NDN8
C	238	ALA	PHE	engineered mutation	UNP Q7NDN8
D	1	ALA	-	expression tag	UNP Q7NDN8
D	238	ALA	PHE	engineered mutation	UNP Q7NDN8
E	1	ALA	-	expression tag	UNP Q7NDN8
E	238	ALA	PHE	engineered mutation	UNP Q7NDN8

- Molecule 2 is DODECYL-BETA-D-MALTOSIDE (CCD ID: LMT) (formula: C₂₄H₄₆O₁₁).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C 12 12	0	0
2	B	1	Total C 12 12	0	0
2	C	1	Total C 12 12	0	0
2	C	1	Total C 12 12	0	0
2	D	1	Total C 12 12	0	0
2	E	1	Total C 12 12	0	0

- Molecule 3 is TRIBROMOMETHANE (CCD ID: MBR) (formula: CHBr_3).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	Br	C	0	0
			4	3	1		
3	A	1	Total	Br	C	0	1
			8	6	2		
3	B	1	Total	Br	C	0	0
			4	3	1		
3	B	1	Total	Br	C	0	0
			4	3	1		
3	B	1	Total	Br	C	0	1
			8	6	2		
3	C	1	Total	Br	C	0	0
			4	3	1		
3	C	1	Total	Br	C	0	0
			4	3	1		
3	C	1	Total	Br	C	0	1
			8	6	2		
3	C	1	Total	Br	C	0	0
			4	3	1		
3	D	1	Total	Br	C	0	0
			4	3	1		
3	D	1	Total	Br	C	0	1
			8	6	2		
3	D	1	Total	Br	C	0	0
			4	3	1		
3	E	1	Total	Br	C	0	0
			4	3	1		
3	E	1	Total	Br	C	0	1
			8	6	2		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	E	1	Total	Br	C	0	0
			4	3	1		

- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	3	Total	Cl	0	0
			3	3		
4	B	1	Total	Cl	0	0
			1	1		
4	C	1	Total	Cl	0	0
			1	1		
4	D	1	Total	Cl	0	0
			1	1		
4	E	1	Total	Cl	0	0
			1	1		

- Molecule 5 is SODIUM ION (CCD ID: NA) (formula: Na).

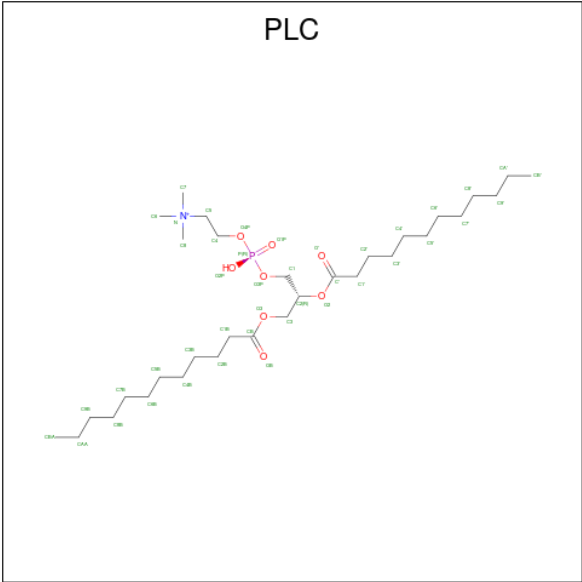
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Na	0	0
			1	1		
5	B	1	Total	Na	0	0
			1	1		
5	C	2	Total	Na	0	0
			2	2		
5	D	1	Total	Na	0	0
			1	1		
5	E	1	Total	Na	0	0
			1	1		

- Molecule 6 is ACETATE ION (CCD ID: ACT) (formula: C₂H₃O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			4	2	2		
6	C	1	Total	C	O	0	0
			4	2	2		
6	C	1	Total	C	O	0	0
			4	2	2		
6	D	1	Total	C	O	0	0
			4	2	2		
6	D	1	Total	C	O	0	0
			4	2	2		
6	E	1	Total	C	O	0	0
			4	2	2		
6	E	1	Total	C	O	0	0
			4	2	2		

- Molecule 7 is DIUNDECYL PHOSPHATIDYL CHOLINE (CCD ID: PLC) (formula: $C_{32}H_{65}NO_8P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
7	A	1	Total	C	N	O	P	0	0
			34	24	1	8	1		
7	B	1	Total	C	N	O	P	0	0
			34	24	1	8	1		
7	C	1	Total	C	N	O	P	0	0
			34	24	1	8	1		
7	D	1	Total	C	N	O	P	0	0
			34	24	1	8	1		
7	E	1	Total	C	N	O	P	0	0
			34	24	1	8	1		

- Molecule 8 is water.

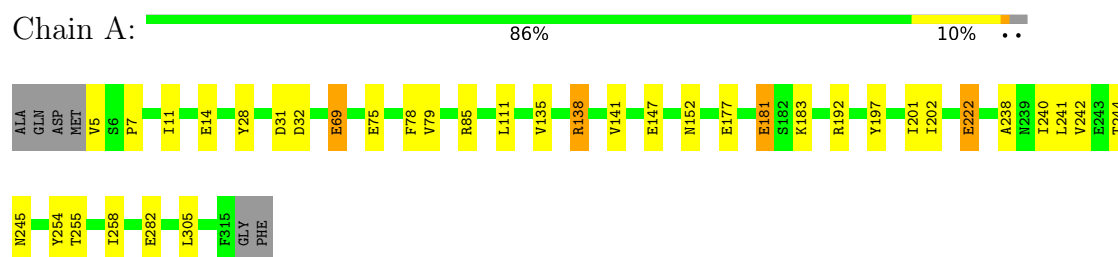
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	13	Total	O	0	0
			13	13		
8	B	15	Total	O	0	0
			15	15		
8	C	15	Total	O	0	0
			15	15		
8	D	18	Total	O	0	0
			18	18		
8	E	13	Total	O	0	0
			13	13		

3 Residue-property plots [i](#)

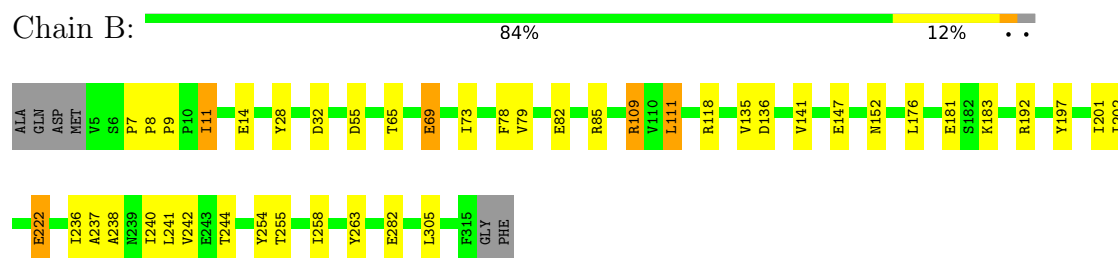
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

Note EDS was not executed.

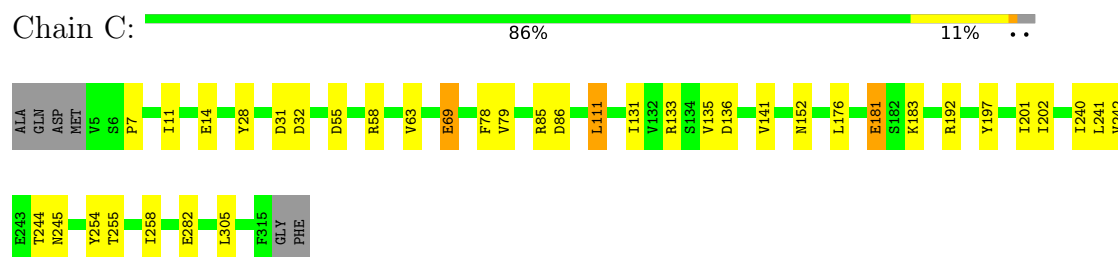
• Molecule 1: Proton-gated ion channel



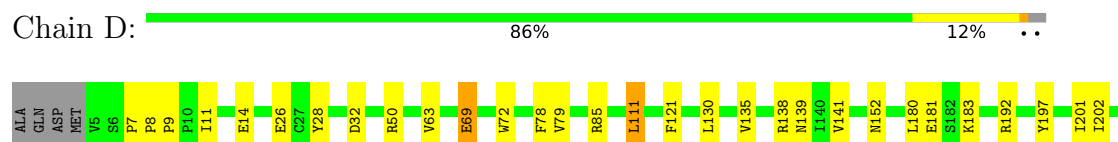
• Molecule 1: Proton-gated ion channel



• Molecule 1: Proton-gated ion channel

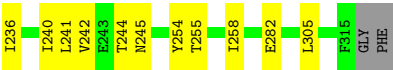
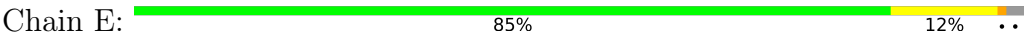


• Molecule 1: Proton-gated ion channel





- Molecule 1: Proton-gated ion channel



4 Data and refinement statistics

EDS was not executed - this section is therefore incomplete.

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	181.22Å 132.87Å 159.38Å 90.00° 102.29° 90.00°	Depositor
Resolution (Å)	27.73 – 3.10	Depositor
% Data completeness (in resolution range)	99.9 (27.73-3.10)	Depositor
R_{merge}	0.10	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.64 (at 3.12Å)	Xtriage
Refinement program	BUSTER 2.11.2	Depositor
R, R_{free}	0.195 , 0.208	Depositor
Wilson B-factor (Å ²)	71.6	Xtriage
Anisotropy	0.370	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	13044	wwPDB-VP
Average B, all atoms (Å ²)	83.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.57% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NA, MBR, CL, LMT, PLC, ACT

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.85	0/2586	1.22	7/3536 (0.2%)
1	B	0.85	0/2586	1.19	2/3536 (0.1%)
1	C	0.86	0/2586	1.21	3/3536 (0.1%)
1	D	0.85	0/2586	1.22	2/3536 (0.1%)
1	E	0.86	0/2586	1.22	3/3536 (0.1%)
All	All	0.85	0/12930	1.21	17/17680 (0.1%)

There are no bond length outliers.

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	222	GLU	CB-CG-CD	8.56	127.15	112.60
1	E	152	ASN	CA-CB-CG	6.87	119.47	112.60
1	B	152	ASN	CA-CB-CG	6.54	119.14	112.60
1	A	152	ASN	CA-CB-CG	6.29	118.89	112.60
1	C	152	ASN	CA-CB-CG	6.28	118.88	112.60
1	D	152	ASN	CA-CB-CG	6.28	118.88	112.60
1	D	139	ASN	CA-CB-CG	5.84	118.44	112.60
1	E	86	ASP	CA-CB-CG	5.71	118.31	112.60
1	A	177	GLU	CA-C-N	5.44	130.07	122.08
1	A	177	GLU	C-N-CA	5.44	130.07	122.08
1	A	31	ASP	CA-CB-CG	5.20	117.80	112.60
1	B	55	ASP	CA-CB-CG	5.13	117.73	112.60
1	E	222	GLU	CB-CG-CD	5.08	121.25	112.60
1	A	138	ARG	N-CA-C	5.08	116.79	109.07
1	C	86	ASP	CA-CB-CG	5.08	117.68	112.60
1	C	31	ASP	CA-CB-CG	5.04	117.64	112.60
1	A	222	GLU	CA-CB-CG	5.02	124.14	114.10

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2519	0	2541	31	0
1	B	2519	0	2541	34	0
1	C	2519	0	2541	31	0
1	D	2519	0	2541	32	0
1	E	2519	0	2541	32	0
2	A	12	0	23	0	0
2	B	12	0	23	1	0
2	C	24	0	46	2	0
2	D	12	0	23	1	0
2	E	12	0	23	1	0
3	A	12	0	0	16	0
3	B	16	0	0	16	0
3	C	20	0	0	19	0
3	D	16	0	0	15	0
3	E	16	0	0	14	0
4	A	3	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	2	0	0	0	0
5	D	1	0	0	0	0
5	E	1	0	0	0	0
6	A	8	0	6	3	0
6	B	8	0	6	0	0
6	C	8	0	6	0	0
6	D	8	0	6	0	0
6	E	8	0	6	0	0
7	A	34	0	42	1	0
7	B	34	0	42	1	0
7	C	34	0	42	0	0
7	D	34	0	42	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	E	34	0	42	0	0
8	A	13	0	0	0	0
8	B	15	0	0	0	0
8	C	15	0	0	0	0
8	D	18	0	0	0	0
8	E	13	0	0	2	0
All	All	13044	0	13083	159	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (159) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:241:LEU:HG	3:C:407:MBR:BR1	2.15	1.01
1:B:197:TYR:HB3	3:B:406[A]:MBR:BR2	2.18	0.98
1:A:197:TYR:HB3	3:A:403[A]:MBR:BR2	2.22	0.95
1:E:197:TYR:HB3	3:E:405[A]:MBR:BR1	2.22	0.94
1:C:201:ILE:HD11	3:C:407:MBR:BR2	2.27	0.90
1:C:197:TYR:HB3	3:C:408[A]:MBR:BR2	2.28	0.89
1:C:201:ILE:CD1	3:C:407:MBR:BR2	2.76	0.88
1:B:241:LEU:HG	3:B:405:MBR:BR2	2.36	0.80
1:E:245:ASN:HB2	3:E:404:MBR:BR1	2.37	0.80
1:B:201:ILE:HG12	3:B:405:MBR:BR2	2.36	0.80
1:A:202:ILE:HG13	3:A:403[A]:MBR:BR2	2.41	0.75
1:C:255:THR:HG23	3:C:408[A]:MBR:BR3	2.42	0.74
1:C:201:ILE:HD13	3:C:407:MBR:BR2	2.41	0.74
1:A:255:THR:HG21	3:A:403[A]:MBR:BR1	2.43	0.74
1:E:81:VAL:O	8:E:506:HOH:O	2.07	0.73
1:D:245:ASN:HB2	3:D:404:MBR:BR2	2.44	0.73
1:D:242:VAL:HA	3:D:404:MBR:BR2	2.44	0.72
1:E:202:ILE:HG13	3:E:405[A]:MBR:BR1	2.44	0.72
1:C:133:ARG:NH1	1:C:176:LEU:O	2.22	0.72
1:A:245:ASN:HB2	3:A:402:MBR:BR3	2.44	0.72
1:E:242:VAL:HG22	3:E:404:MBR:BR3	2.46	0.70
1:B:202:ILE:HG13	3:B:406[A]:MBR:BR2	2.48	0.68
3:E:404:MBR:BR3	3:E:405[A]:MBR:BR3	3.21	0.68
1:B:236:ILE:HG23	3:B:402:MBR:BR1	2.49	0.67
1:B:242:VAL:HG22	3:B:405:MBR:BR2	2.51	0.66
1:E:242:VAL:HA	3:E:404:MBR:BR1	2.51	0.66
1:B:201:ILE:HD11	3:B:405:MBR:BR3	2.52	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:406:MBR:BR1	1:E:236:ILE:HG23	2.52	0.65
1:B:255:THR:HG23	3:B:406[A]:MBR:BR3	2.51	0.65
1:E:201:ILE:HB	3:E:405[A]:MBR:BR1	2.51	0.64
1:C:202:ILE:HG13	3:C:408[A]:MBR:BR2	2.52	0.64
1:D:242:VAL:HG22	3:D:404:MBR:BR1	2.54	0.62
1:C:11:ILE:HG13	1:C:14:GLU:OE2	1.99	0.62
1:A:242:VAL:HA	3:A:402:MBR:BR3	2.55	0.62
1:B:242:VAL:CG2	3:B:405:MBR:BR2	3.02	0.61
1:C:241:LEU:HD23	3:C:409:MBR:BR1	2.56	0.61
1:C:202:ILE:HG12	3:C:408[B]:MBR:BR1	2.56	0.60
1:A:255:THR:CG2	3:A:403[A]:MBR:BR1	3.05	0.60
1:D:245:ASN:ND2	3:D:404:MBR:BR3	2.90	0.60
1:E:255:THR:HG23	3:E:405[A]:MBR:BR2	2.56	0.60
1:E:11:ILE:HG13	1:E:14:GLU:OE2	2.02	0.59
1:D:201:ILE:HA	3:D:406:MBR:BR2	2.58	0.59
1:D:11:ILE:HG13	1:D:14:GLU:OE2	2.02	0.59
1:C:245:ASN:ND2	3:C:407:MBR:C1	2.66	0.58
1:E:241:LEU:HD23	3:E:406:MBR:BR1	2.59	0.58
1:B:202:ILE:HG12	3:B:406[B]:MBR:BR2	2.59	0.58
1:A:135:VAL:HG23	1:A:138:ARG:H	1.69	0.57
1:D:26:GLU:HG3	8:E:506:HOH:O	2.05	0.57
2:C:402:LMT:H61	2:E:401:LMT:H72	1.86	0.57
1:B:28:TYR:HB3	1:C:111:LEU:HD21	1.85	0.56
1:C:131:ILE:HD11	1:C:181:GLU:HG2	1.88	0.55
1:D:78:PHE:CE2	1:D:85:ARG:HD3	2.42	0.55
1:B:118:ARG:HH12	7:B:409:PLC:H72	1.71	0.55
1:A:202:ILE:HG12	3:A:403[B]:MBR:BR1	2.63	0.54
1:A:201:ILE:HD11	3:A:402:MBR:BR1	2.63	0.54
1:B:78:PHE:CE2	1:B:85:ARG:HD3	2.42	0.54
1:E:78:PHE:CE2	1:E:85:ARG:HD3	2.43	0.54
1:A:78:PHE:CE2	1:A:85:ARG:HD3	2.43	0.53
1:A:242:VAL:HG22	3:A:402:MBR:BR2	2.64	0.53
1:C:255:THR:HG23	3:C:408[B]:MBR:BR3	2.64	0.53
1:D:255:THR:HA	3:D:405[B]:MBR:BR1	2.64	0.53
1:A:11:ILE:HG13	1:A:14:GLU:OE2	2.08	0.53
1:B:263:TYR:OH	3:B:402:MBR:BR1	2.81	0.53
1:C:255:THR:HG21	3:C:408[A]:MBR:BR1	2.64	0.53
1:A:255:THR:HG23	3:A:403[B]:MBR:BR2	2.64	0.52
1:A:28:TYR:HB3	1:B:111:LEU:HD21	1.92	0.52
1:C:242:VAL:HA	3:C:407:MBR:BR1	2.65	0.51
1:C:78:PHE:CE2	1:C:85:ARG:HD3	2.45	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:82:GLU:HG3	1:B:109:ARG:HG2	1.93	0.51
1:B:258:ILE:HD13	3:B:406[B]:MBR:BR2	2.65	0.51
1:B:201:ILE:HB	3:B:406[A]:MBR:BR2	2.66	0.51
1:E:245:ASN:ND2	3:E:404:MBR:BR2	2.99	0.50
1:D:237:ALA:HA	2:D:401:LMT:H82	1.92	0.50
1:C:201:ILE:HB	3:C:408[A]:MBR:BR2	2.67	0.50
1:C:255:THR:HA	3:C:408[B]:MBR:BR3	2.67	0.50
1:E:255:THR:HG21	3:E:405[A]:MBR:BR3	2.67	0.49
1:D:255:THR:HG23	3:D:405[A]:MBR:BR3	2.67	0.49
1:A:32:ASP:CG	1:A:192:ARG:HH22	2.20	0.49
1:A:240:ILE:O	1:A:244:THR:HG23	2.12	0.49
1:C:7:PRO:HG3	1:C:135:VAL:HG21	1.93	0.49
1:D:7:PRO:HG3	1:D:135:VAL:HG21	1.94	0.49
1:D:28:TYR:HB3	1:E:111:LEU:HD21	1.95	0.49
1:A:7:PRO:HG3	1:A:135:VAL:HG21	1.94	0.49
1:B:32:ASP:CG	1:B:192:ARG:HH22	2.21	0.48
1:D:240:ILE:O	1:D:244:THR:HG23	2.13	0.48
1:E:78:PHE:HE2	1:E:85:ARG:HD3	1.78	0.48
1:C:32:ASP:CG	1:C:192:ARG:HH22	2.22	0.48
1:B:7:PRO:HG3	1:B:135:VAL:HG21	1.95	0.48
1:D:32:ASP:CG	1:D:192:ARG:HH22	2.20	0.48
1:D:202:ILE:HG12	3:D:405[B]:MBR:C1	2.44	0.48
6:A:408:ACT:OXT	1:E:105:ARG:HD2	2.14	0.47
1:D:78:PHE:HE2	1:D:85:ARG:HD3	1.79	0.47
1:C:240:ILE:O	1:C:244:THR:HG23	2.14	0.47
1:E:32:ASP:CG	1:E:192:ARG:HH22	2.22	0.47
1:C:69:GLU:H	1:C:69:GLU:CD	2.22	0.47
1:B:240:ILE:O	1:B:244:THR:HG23	2.15	0.47
1:C:55:ASP:HB3	1:C:58:ARG:HB2	1.96	0.47
1:D:69:GLU:H	1:D:69:GLU:CD	2.22	0.47
1:D:202:ILE:HG12	3:D:405[B]:MBR:BR2	2.70	0.47
1:B:78:PHE:HE2	1:B:85:ARG:HD3	1.79	0.47
1:B:69:GLU:CD	1:B:69:GLU:H	2.23	0.47
1:E:240:ILE:O	1:E:244:THR:HG23	2.15	0.47
1:A:201:ILE:HD13	3:A:402:MBR:BR2	2.70	0.46
1:A:181:GLU:OE2	6:A:408:ACT:O	2.33	0.46
1:B:176:LEU:HB3	1:B:181:GLU:HG3	1.97	0.46
1:A:69:GLU:H	1:A:69:GLU:CD	2.23	0.46
1:B:11:ILE:HG13	1:B:14:GLU:OE2	2.16	0.46
1:C:258:ILE:HD13	3:C:408[B]:MBR:BR1	2.72	0.45
1:B:242:VAL:HG23	3:B:405:MBR:BR2	2.70	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:79:VAL:HG21	1:E:183:LYS:HD2	1.98	0.45
1:B:237:ALA:HA	2:B:401:LMT:H92	1.99	0.45
1:E:69:GLU:H	1:E:69:GLU:CD	2.24	0.45
1:D:255:THR:HG23	3:D:405[B]:MBR:BR1	2.72	0.44
1:B:222:GLU:CD	1:B:222:GLU:H	2.24	0.44
1:B:254:TYR:CZ	1:B:258:ILE:HD11	2.53	0.44
1:C:28:TYR:HB3	1:D:111:LEU:HD21	1.98	0.44
3:D:406:MBR:BR1	1:E:236:ILE:CG2	3.19	0.44
1:D:135:VAL:HG23	1:D:138:ARG:H	1.83	0.44
1:D:254:TYR:CZ	1:D:258:ILE:HD11	2.53	0.44
1:A:78:PHE:HE2	1:A:85:ARG:HD3	1.82	0.44
1:E:131:ILE:HD11	1:E:181:GLU:HG2	2.00	0.43
1:E:201:ILE:HD11	3:E:404:MBR:BR2	2.73	0.43
1:A:79:VAL:HG21	1:A:183:LYS:HD2	1.99	0.43
1:A:254:TYR:CZ	1:A:258:ILE:HD11	2.54	0.43
1:E:254:TYR:CZ	1:E:258:ILE:HD11	2.52	0.43
1:C:254:TYR:CZ	1:C:258:ILE:HD11	2.53	0.43
7:A:410:PLC:H2A1	7:A:410:PLC:H5'1	2.01	0.43
1:D:79:VAL:HG21	1:D:183:LYS:HD2	2.01	0.43
1:C:78:PHE:HE2	1:C:85:ARG:HD3	1.83	0.42
1:D:202:ILE:HG23	3:D:405[B]:MBR:BR2	2.74	0.42
1:E:62:ARG:HD2	1:E:63:VAL:HG23	2.00	0.42
1:A:201:ILE:HB	3:A:403[A]:MBR:BR2	2.74	0.42
1:A:197:TYR:CD1	3:A:402:MBR:BR2	3.27	0.42
1:C:79:VAL:HG21	1:C:183:LYS:HD2	2.00	0.42
1:B:79:VAL:HG21	1:B:183:LYS:HD2	2.01	0.42
1:A:238:ALA:HB2	3:B:402:MBR:BR2	2.75	0.42
1:A:241:LEU:HD23	3:B:402:MBR:BR3	2.75	0.42
1:B:8:PRO:HA	1:B:9:PRO:HD3	1.92	0.42
2:C:401:LMT:H82	2:C:402:LMT:H51	2.02	0.42
1:A:75:GLU:HA	6:A:409:ACT:H1	2.01	0.42
1:A:255:THR:HG23	3:A:403[A]:MBR:BR3	2.74	0.42
1:D:63:VAL:HG11	1:E:136:ASP:CG	2.45	0.42
1:A:245:ASN:ND2	3:A:402:MBR:BR1	3.08	0.41
1:E:7:PRO:HG3	1:E:135:VAL:HG21	2.02	0.41
1:E:130:LEU:HD23	1:E:130:LEU:HA	1.92	0.41
1:E:201:ILE:HD13	3:E:404:MBR:BR3	2.76	0.41
1:B:238:ALA:HB2	3:C:406:MBR:BR1	2.76	0.41
1:D:8:PRO:HD3	1:D:72:TRP:CE3	2.56	0.41
1:E:155:VAL:HG12	1:E:162:ILE:HD13	2.02	0.41
1:B:78:PHE:HE2	1:B:85:ARG:CD	2.34	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:8:PRO:HA	1:D:9:PRO:HD3	1.97	0.41
1:E:245:ASN:CB	3:E:404:MBR:BR1	3.16	0.41
1:B:201:ILE:HA	3:C:406:MBR:BR2	2.76	0.41
1:D:258:ILE:HG21	3:D:405[B]:MBR:BR2	2.76	0.41
1:C:245:ASN:HD22	3:C:407:MBR:C1	2.34	0.40
1:D:197:TYR:CD1	3:D:404:MBR:BR1	3.29	0.40
1:A:197:TYR:HE1	3:A:402:MBR:C1	2.34	0.40
1:D:130:LEU:HD23	1:D:130:LEU:HA	1.93	0.40
1:D:121:PHE:CE2	7:D:409:PLC:H1A2	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	309/317 (98%)	304 (98%)	5 (2%)	0	100	100
1	B	309/317 (98%)	303 (98%)	6 (2%)	0	100	100
1	C	309/317 (98%)	302 (98%)	7 (2%)	0	100	100
1	D	309/317 (98%)	304 (98%)	5 (2%)	0	100	100
1	E	309/317 (98%)	305 (99%)	4 (1%)	0	100	100
All	All	1545/1585 (98%)	1518 (98%)	27 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	279/283 (99%)	270 (97%)	9 (3%)	34	64
1	B	245/283 (87%)	233 (95%)	12 (5%)	22	53
1	C	279/283 (99%)	271 (97%)	8 (3%)	37	66
1	D	279/283 (99%)	272 (98%)	7 (2%)	42	69
1	E	279/283 (99%)	271 (97%)	8 (3%)	37	66
All	All	1361/1415 (96%)	1317 (97%)	44 (3%)	34	64

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	VAL
1	A	69	GLU
1	A	111	LEU
1	A	141	VAL
1	A	147	GLU
1	A	181	GLU
1	A	222	GLU
1	A	282	GLU
1	A	305	LEU
1	B	11	ILE
1	B	65	THR
1	B	69	GLU
1	B	73	ILE
1	B	109	ARG
1	B	111	LEU
1	B	136	ASP
1	B	141	VAL
1	B	147	GLU
1	B	222	GLU
1	B	282	GLU
1	B	305	LEU
1	C	63	VAL
1	C	69	GLU
1	C	111	LEU
1	C	136	ASP
1	C	141	VAL
1	C	181	GLU
1	C	282	GLU

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Mol	Chain	Res	Type
1	C	305	LEU
1	D	50	ARG
1	D	69	GLU
1	D	111	LEU
1	D	141	VAL
1	D	180	LEU
1	D	181	GLU
1	D	282	GLU
1	E	48	LYS
1	E	69	GLU
1	E	111	LEU
1	E	136	ASP
1	E	141	VAL
1	E	181	GLU
1	E	282	GLU
1	E	305	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	139	ASN
1	A	245	ASN
1	A	277	HIS
1	B	193	GLN
1	B	239	ASN
1	B	245	ASN
1	C	83	ASN
1	C	193	GLN
1	C	239	ASN
1	C	245	ASN
1	D	139	ASN
1	D	193	GLN
1	D	239	ASN
1	D	245	ASN
1	E	245	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

Mogul was not executed - this section is therefore empty.

5.5 Carbohydrates [i](#)

Mogul was not executed - this section is therefore empty.

5.6 Ligand geometry [i](#)

Mogul was not executed - this section is therefore empty.

5.7 Other polymers [i](#)

Mogul was not executed - this section is therefore empty.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

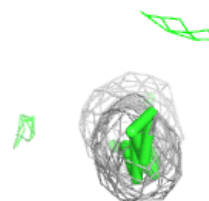
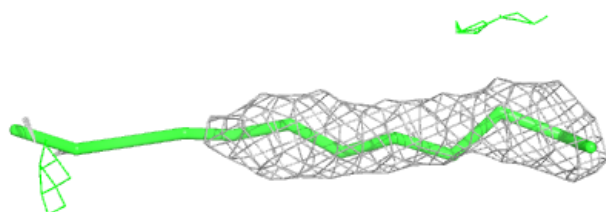
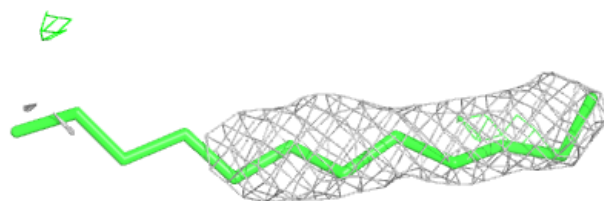
6.4 Ligands

EDS was not executed - this section is therefore empty.

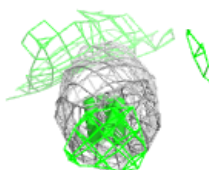
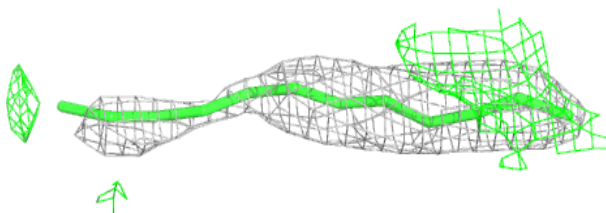
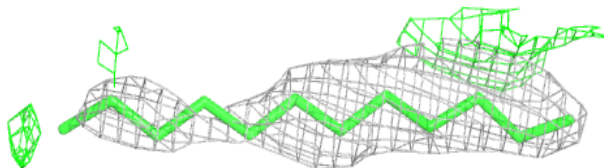
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around LMT B 401:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

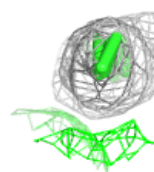
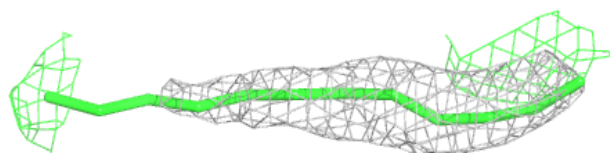
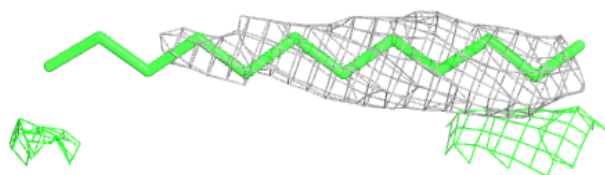
**Electron density around LMT C 401:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

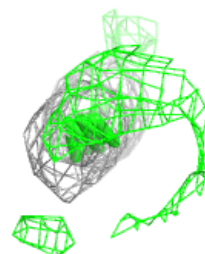
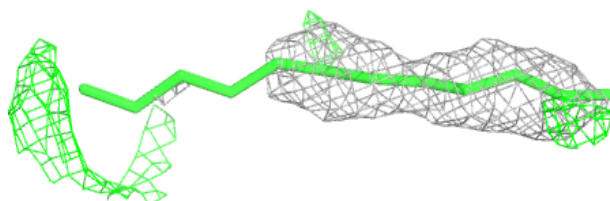
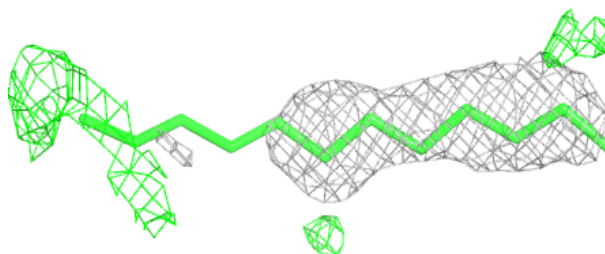


Electron density around LMT D 401:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

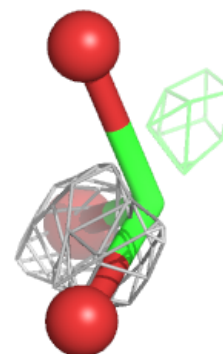
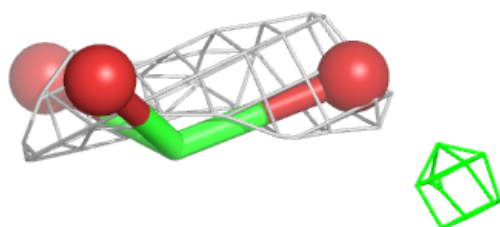
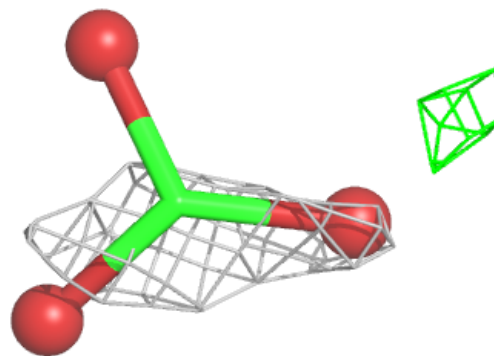
**Electron density around LMT E 401:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



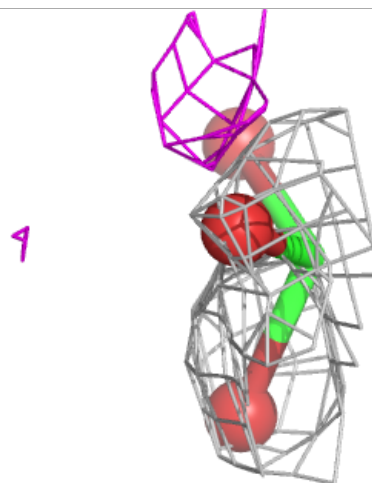
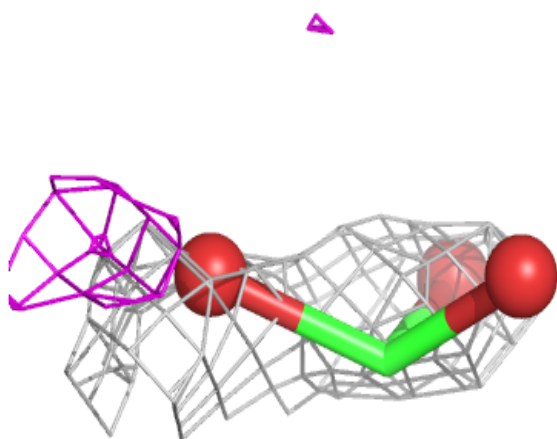
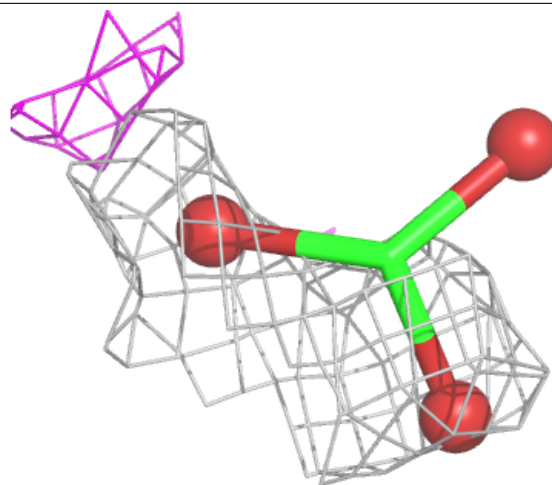
Electron density around MBR A 402:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



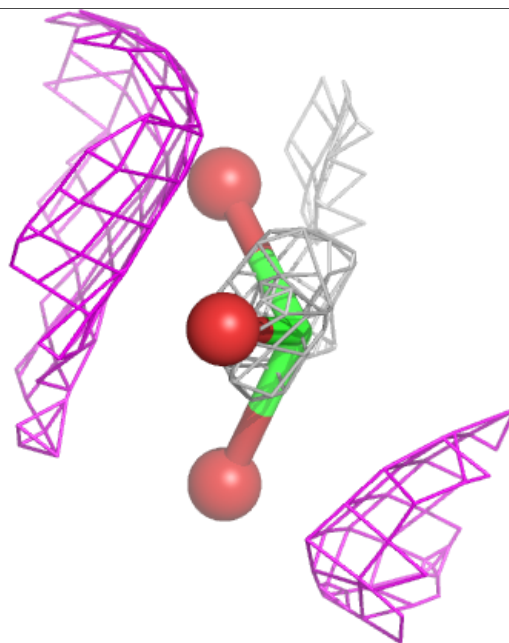
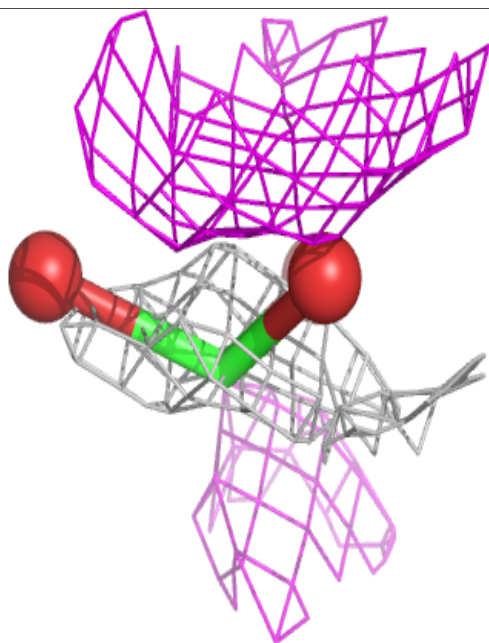
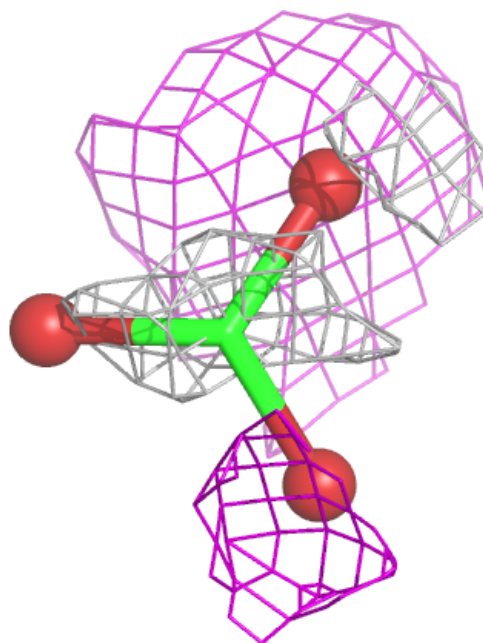
Electron density around MBR A 403 (A):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



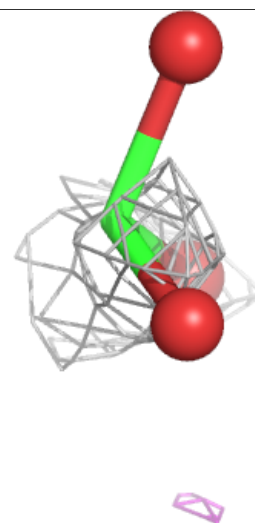
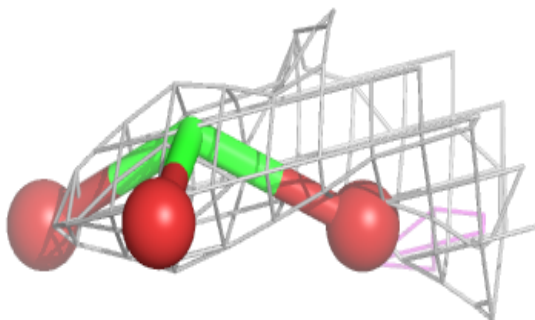
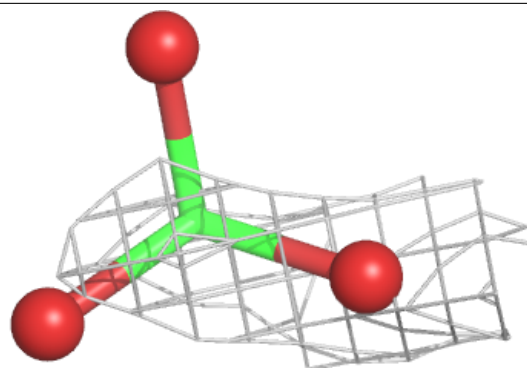
Electron density around MBR B 402:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



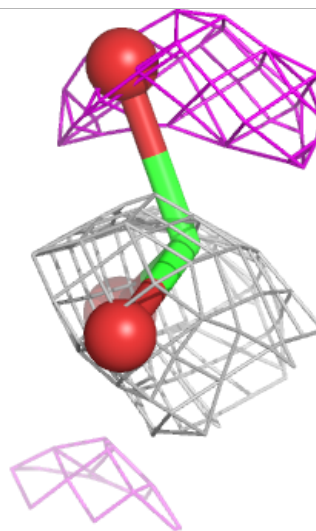
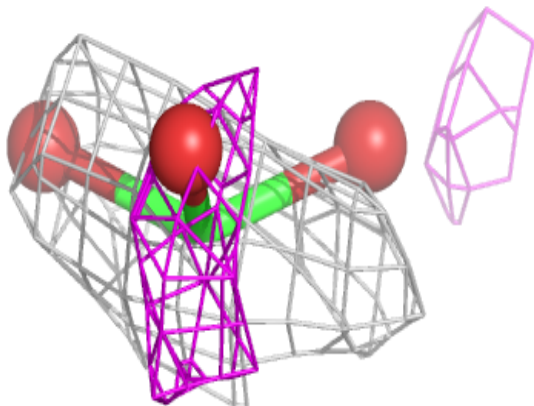
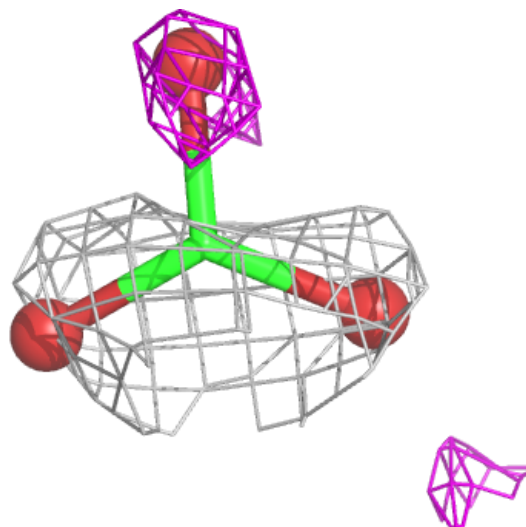
Electron density around MBR B 406 (A):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



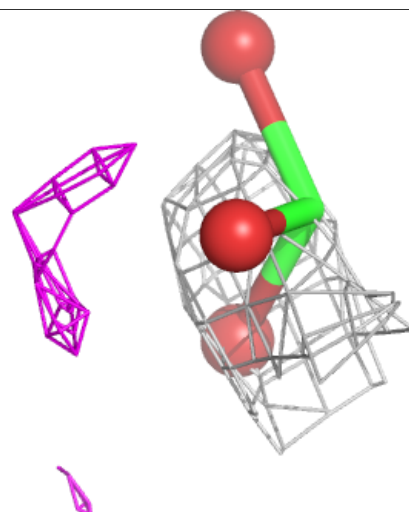
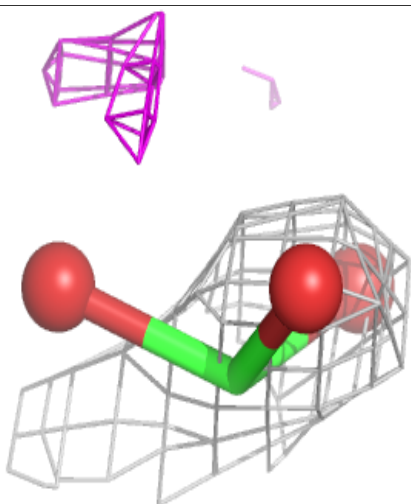
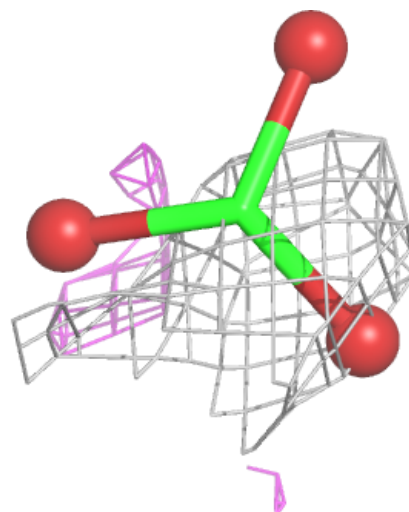
Electron density around MBR B 406 (B):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



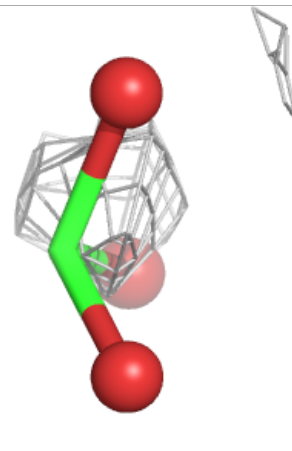
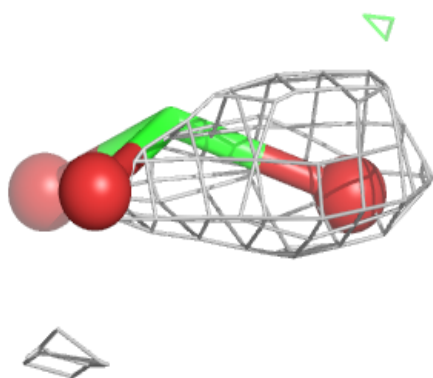
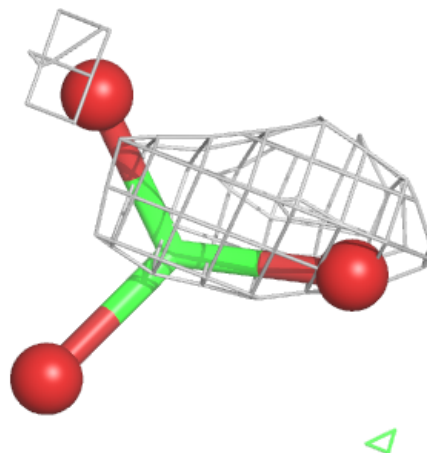
Electron density around MBR C 408 (A):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



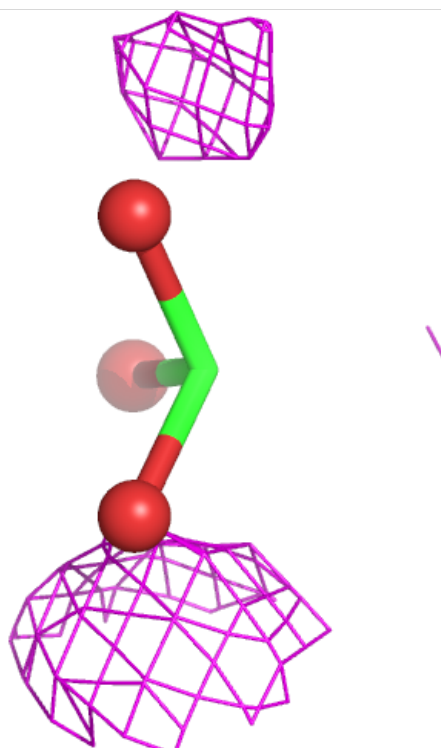
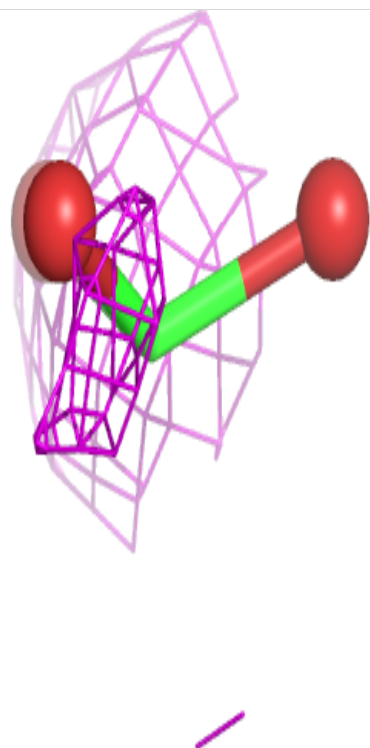
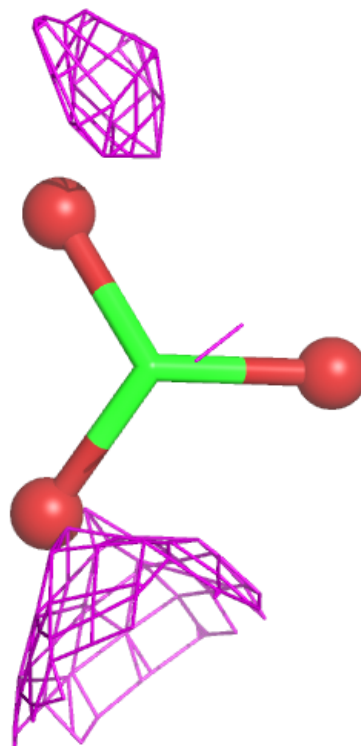
Electron density around MBR D 404:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



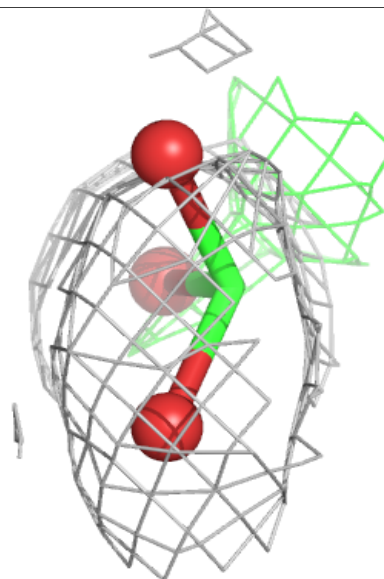
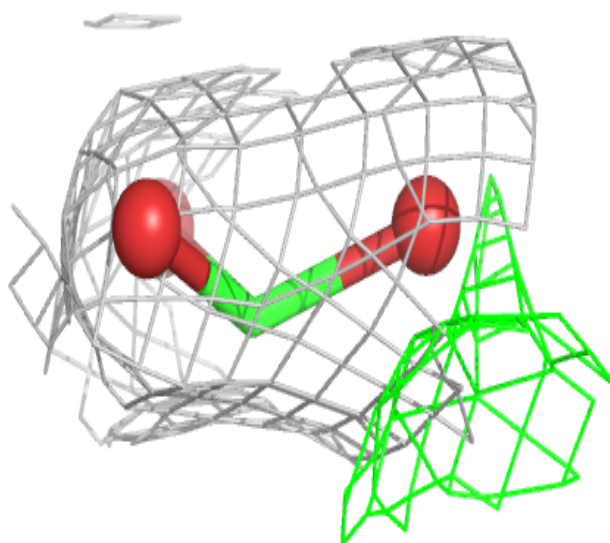
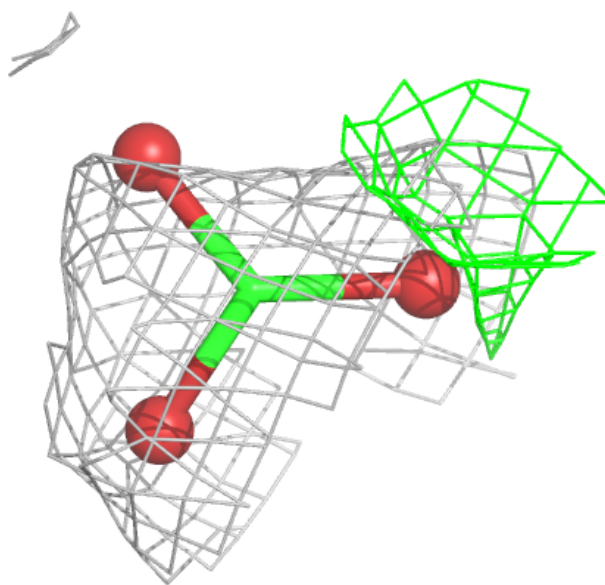
Electron density around MBR D 406:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



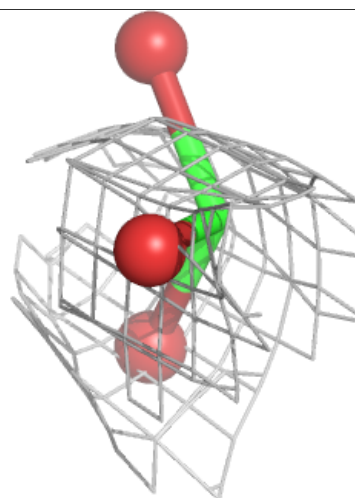
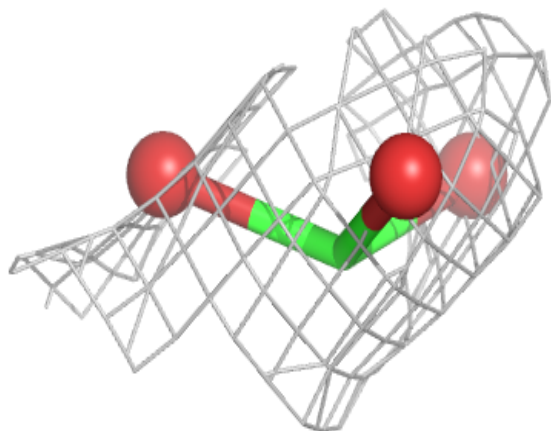
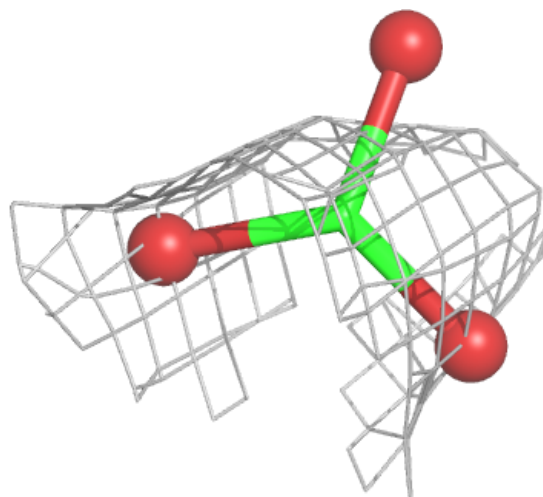
Electron density around MBR E 404:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



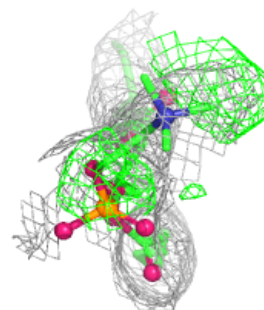
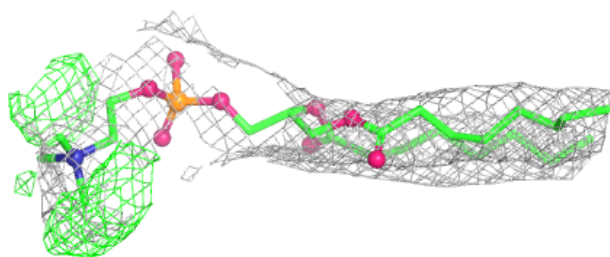
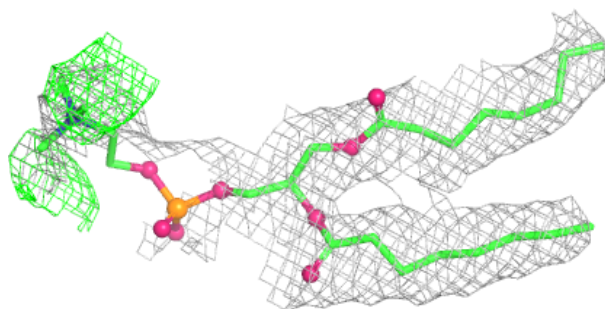
Electron density around MBR E 405 (A):

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

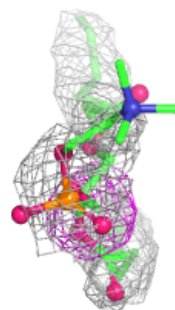
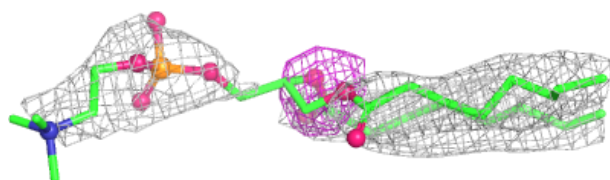
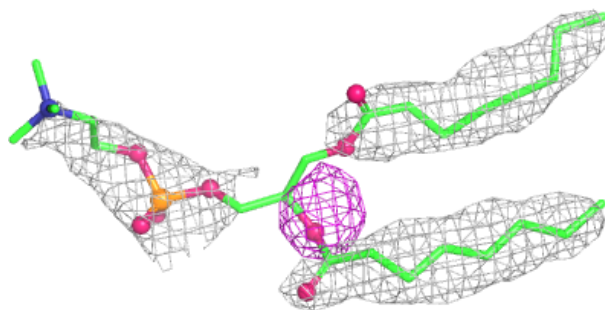


Electron density around PLC A 410:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

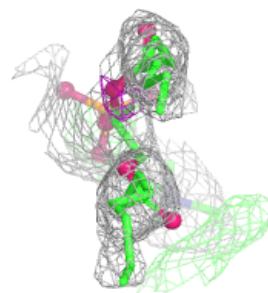
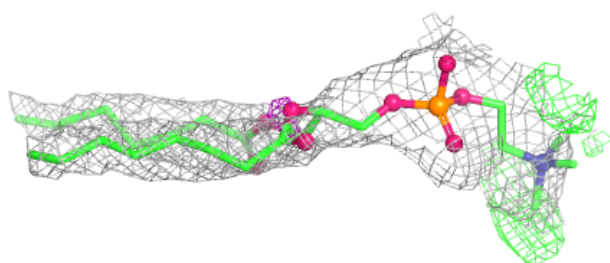
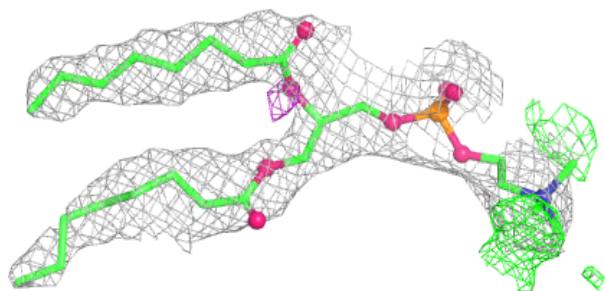
**Electron density around PLC B 409:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

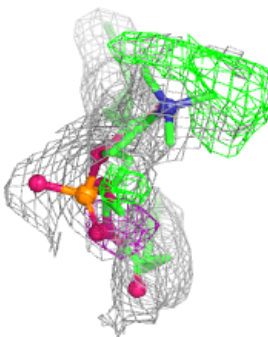
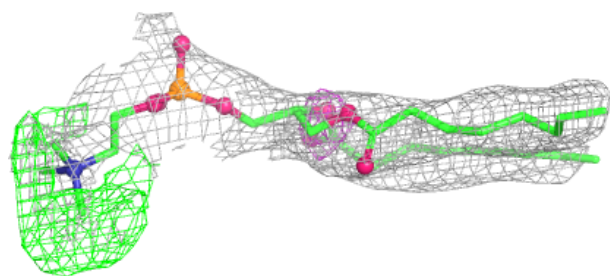
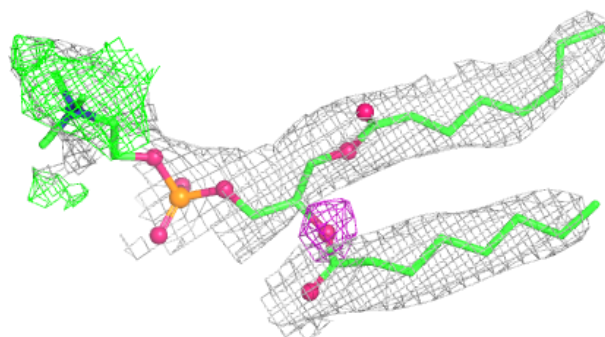


Electron density around PLC C 412:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

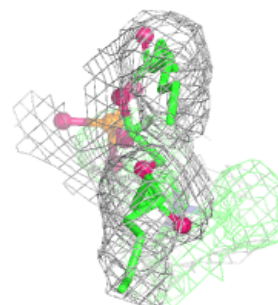
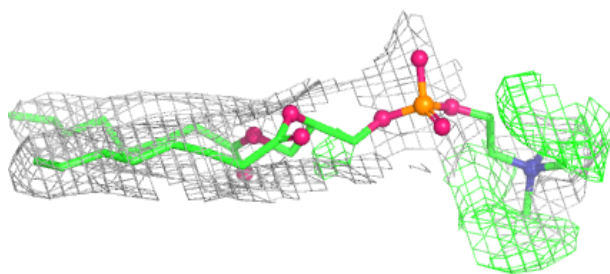
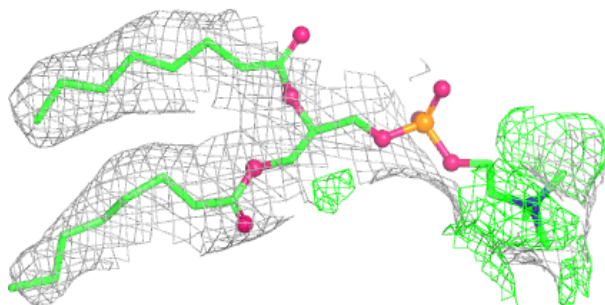
**Electron density around PLC D 409:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around PLC E 409:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.