



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 07:27 AM UTC

PDB ID : 6HPP / pdb_00006hpp
Title : X-ray structure of GLIC in complex with propionate
Authors : Fourati, Z.; Delarue, M.
Deposited on : 2018-09-21
Resolution : 3.20 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 : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

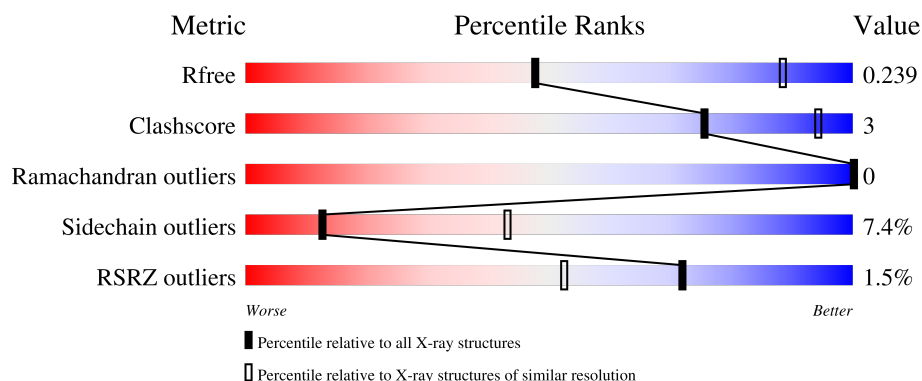
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 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))
R_{free}	180053	1466 (3.20-3.20)
Clashscore	190562	1573 (3.20-3.20)
Ramachandran outliers	187476	1548 (3.20-3.20)
Sidechain outliers	187428	1547 (3.20-3.20)
RSRZ outliers	180081	1466 (3.20-3.20)

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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	317	85% 13% ..
1	B	317	82% 15% .
1	C	317	2% 81% 16% ..
1	D	317	2% 83% 15% .
1	E	317	2% 82% 16% .

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	NA	A	405	-	-	-	X
5	PPI	A	408	-	X	-	-
5	PPI	B	404	-	-	-	X
5	PPI	B	405	-	X	-	-
5	PPI	C	404	-	X	-	-
5	PPI	D	404	-	X	-	-
5	PPI	D	405	-	X	-	X
5	PPI	D	406	-	X	-	-
5	PPI	E	404	-	X	-	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 12782 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
			2525	1664	404	453	4			
1	B	311	Total	C	N	O	S	0	0	0
			2525	1664	404	453	4			
1	C	311	Total	C	N	O	S	0	0	0
			2525	1664	404	453	4			
1	D	311	Total	C	N	O	S	0	0	0
			2525	1664	404	453	4			
1	E	311	Total	C	N	O	S	0	0	0
			2525	1664	404	453	4			

- Molecule 2 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

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

- Molecule 3 is SODIUM ION (CCD ID: NA) (formula: Na).

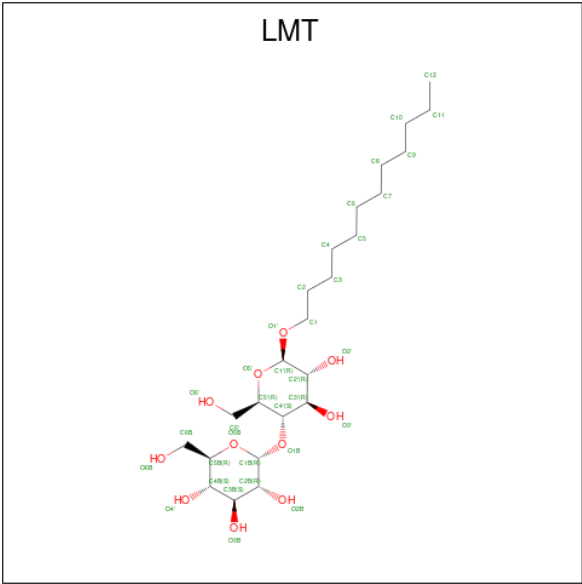
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Na	0	0
			2	2		
3	B	1	Total	Na	0	0
			1	1		

Continued on next page...

Continued from previous page...

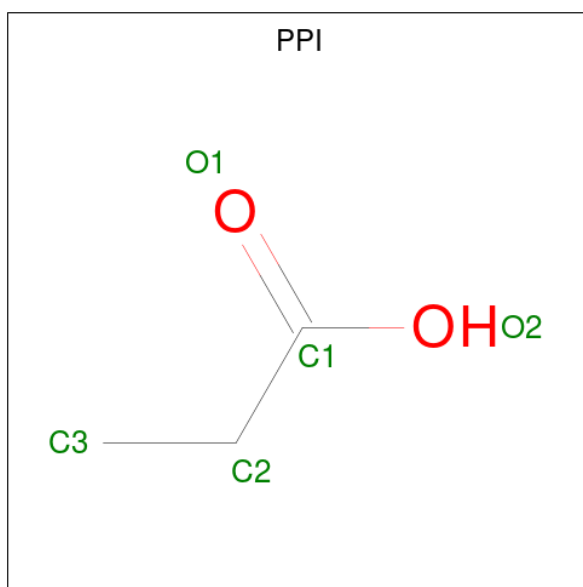
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	1	Total	Na	0	0
			1	1		
3	D	1	Total	Na	0	0
			1	1		
3	E	1	Total	Na	0	0
			1	1		

- Molecule 4 is DODECYL-BETA-D-MALTOSE (CCD ID: LMT) (formula: C₂₄H₄₆O₁₁).



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

- Molecule 5 is PROPANOIC ACID (CCD ID: PPI) (formula: C₃H₆O₂).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 5 3 2	0	0
5	A	1	Total C O 5 3 2	0	0
5	A	1	Total C O 5 3 2	0	0
5	B	1	Total C O 5 3 2	0	0
5	B	1	Total C O 5 3 2	0	0
5	C	1	Total C O 5 3 2	0	0
5	D	1	Total C O 5 3 2	0	0
5	D	1	Total C O 5 3 2	0	0
5	D	1	Total C O 5 3 2	0	0
5	E	1	Total C O 5 3 2	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	4	Total O 4 4	0	0
6	B	4	Total O 4 4	0	0

Continued on next page...

Continued from previous page...

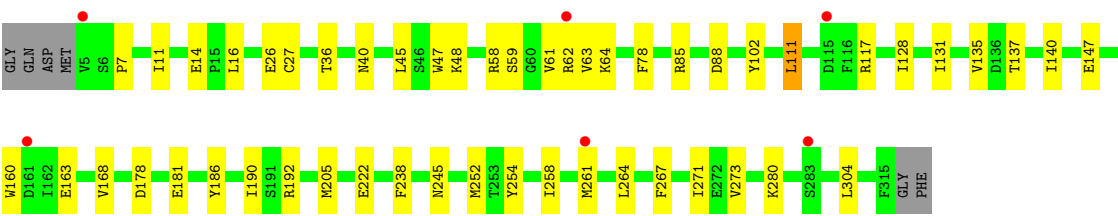
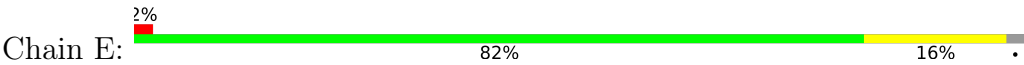
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	C	8	Total 8	O 8	0	0
6	D	2	Total 2	O 2	0	0
6	E	4	Total 4	O 4	0	0

- Molecule 1: Proton-gated ion channel





● Molecule 1: Proton-gated ion channel



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	180.69Å 133.73Å 158.89Å 90.00° 101.38° 90.00°	Depositor
Resolution (Å)	20.00 – 3.20 20.00 – 3.20	Depositor EDS
% Data completeness (in resolution range)	99.8 (20.00-3.20) 99.3 (20.00-3.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.40 (at 3.19Å)	Xtriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.194 , 0.201 0.224 , 0.239	Depositor DCC
R_{free} test set	3080 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	88.8	Xtriage
Anisotropy	0.372	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 63.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	12782	wwPDB-VP
Average B, all atoms (Å ²)	113.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.26% 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

5.1 Standard geometry

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

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	0.80	0/2593	1.20	3/3545 (0.1%)
1	B	0.80	0/2593	1.19	3/3545 (0.1%)
1	C	0.81	0/2593	1.19	3/3545 (0.1%)
1	D	0.80	0/2593	1.19	2/3545 (0.1%)
1	E	0.80	0/2593	1.19	3/3545 (0.1%)
All	All	0.80	0/12965	1.19	14/17725 (0.1%)

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	B	168	VAL	CA-C-N	5.53	128.33	120.53
1	B	168	VAL	C-N-CA	5.53	128.33	120.53
1	B	245	ASN	CA-CB-CG	5.33	117.93	112.60
1	A	245	ASN	CA-CB-CG	5.27	117.87	112.60
1	C	245	ASN	CA-CB-CG	5.26	117.86	112.60
1	A	168	VAL	CA-C-N	5.26	127.95	120.53
1	A	168	VAL	C-N-CA	5.26	127.95	120.53
1	E	168	VAL	CA-C-N	5.24	127.92	120.53
1	E	168	VAL	C-N-CA	5.24	127.92	120.53
1	E	245	ASN	CA-CB-CG	5.24	117.84	112.60
1	C	168	VAL	CA-C-N	5.18	127.84	120.53
1	C	168	VAL	C-N-CA	5.18	127.84	120.53
1	D	168	VAL	CA-C-N	5.17	127.82	120.53
1	D	168	VAL	C-N-CA	5.17	127.82	120.53

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	2525	0	2545	13	0
1	B	2525	0	2545	18	0
1	C	2525	0	2545	19	0
1	D	2525	0	2545	17	0
1	E	2525	0	2545	16	0
2	A	3	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
3	A	2	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
4	A	24	0	46	2	0
4	B	12	0	23	1	0
4	C	12	0	23	1	0
4	D	12	0	23	0	0
4	E	12	0	23	0	0
5	A	15	0	15	0	0
5	B	10	0	10	0	0
5	C	5	0	5	0	0
5	D	15	0	15	0	0
5	E	5	0	5	0	0
6	A	4	0	0	0	0
6	B	4	0	0	0	0
6	C	8	0	0	1	0
6	D	2	0	0	0	0
6	E	4	0	0	0	0
All	All	12782	0	12913	78	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 3.

All (78) 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:D:205:MET:HE2	1:D:238:PHE:HB3	1.56	0.87
1:D:36:THR:HG22	1:D:111:LEU:HD22	1.68	0.76
1:C:36:THR:HG22	1:C:111:LEU:HD22	1.69	0.73
1:B:36:THR:HG22	1:B:111:LEU:HD22	1.68	0.73
1:A:205:MET:HE2	1:A:238:PHE:HB3	1.71	0.73
1:E:36:THR:HG22	1:E:111:LEU:HD22	1.70	0.72
1:A:36:THR:HG22	1:A:111:LEU:HD22	1.71	0.71
1:B:205:MET:HE2	1:B:238:PHE:HB3	1.74	0.70
1:E:205:MET:HE2	1:E:238:PHE:HB3	1.75	0.68
1:D:78:PHE:HE2	1:D:85:ARG:HD3	1.64	0.63
1:A:78:PHE:HE2	1:A:85:ARG:HD3	1.65	0.62
1:B:78:PHE:HE2	1:B:85:ARG:HD3	1.65	0.61
1:E:78:PHE:HE2	1:E:85:ARG:HD3	1.65	0.61
1:C:205:MET:HE2	1:C:238:PHE:HB3	1.82	0.61
1:C:78:PHE:HE2	1:C:85:ARG:HD3	1.66	0.60
1:C:16:LEU:HD11	1:C:47:TRP:HB2	1.85	0.58
1:B:195:PHE:HZ	1:C:252:MET:HG2	1.69	0.57
1:E:16:LEU:HD11	1:E:47:TRP:HB2	1.86	0.57
1:D:16:LEU:HD11	1:D:47:TRP:HB2	1.90	0.54
4:A:406:LMT:H62	4:A:407:LMT:H92	1.90	0.54
1:C:237:ALA:HA	4:C:403:LMT:H92	1.89	0.53
1:A:63:VAL:HG21	1:B:136:ASP:OD1	2.09	0.53
1:D:195:PHE:HZ	1:E:252:MET:HG2	1.74	0.53
1:A:16:LEU:HD11	1:A:47:TRP:HB2	1.92	0.52
1:B:128:ILE:HB	1:B:186:TYR:HB2	1.93	0.50
1:E:62:ARG:HD2	1:E:63:VAL:HG23	1.92	0.50
1:B:195:PHE:CZ	1:C:252:MET:HG2	2.47	0.49
1:B:94:VAL:HG22	1:B:100:VAL:HG22	1.96	0.47
1:C:176:LEU:HB3	1:C:181:GLU:OE1	2.15	0.47
1:B:16:LEU:HD11	1:B:47:TRP:HB2	1.97	0.47
1:A:267:PHE:O	1:A:271:ILE:HG12	2.15	0.47
1:C:241:LEU:HD22	1:D:240:ILE:HG12	1.97	0.46
1:C:267:PHE:O	1:C:271:ILE:HG12	2.15	0.46
1:D:267:PHE:O	1:D:271:ILE:HG12	2.15	0.46
1:B:7:PRO:HG3	1:B:135:VAL:HG21	1.96	0.46
1:B:267:PHE:O	1:B:271:ILE:HG12	2.15	0.46
1:A:261:MET:HA	1:A:264:LEU:HD12	1.97	0.46
1:E:267:PHE:O	1:E:271:ILE:HG12	2.16	0.46
1:D:7:PRO:HG3	1:D:135:VAL:HG21	1.98	0.46
1:B:45:LEU:HB2	1:B:102:TYR:HB3	1.99	0.45
1:B:261:MET:HA	1:B:264:LEU:HD12	1.98	0.45
1:D:261:MET:HA	1:D:264:LEU:HD12	1.99	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:209:LEU:HD13	1:C:262:ILE:HG23	1.99	0.45
1:C:261:MET:HA	1:C:264:LEU:HD12	1.99	0.45
1:B:78:PHE:CE2	1:B:85:ARG:HD3	2.50	0.44
1:D:78:PHE:CE2	1:D:85:ARG:HD3	2.49	0.44
1:D:195:PHE:CZ	1:E:252:MET:HG2	2.52	0.44
1:A:7:PRO:HG3	1:A:135:VAL:HG21	1.99	0.44
1:A:45:LEU:HB2	1:A:102:TYR:HB3	2.00	0.43
1:E:45:LEU:HB2	1:E:102:TYR:HB3	2.00	0.43
1:D:26:GLU:HB2	1:D:40:ASN:HB3	2.01	0.43
1:C:7:PRO:HG3	1:C:135:VAL:HG21	1.99	0.43
1:E:261:MET:HA	1:E:264:LEU:HD12	1.99	0.43
1:C:254:TYR:CZ	1:C:258:ILE:HD11	2.54	0.43
1:B:26:GLU:HB2	1:B:40:ASN:HB3	2.01	0.43
1:E:7:PRO:HG3	1:E:135:VAL:HG21	2.01	0.43
1:E:160:TRP:CE3	1:E:190:ILE:HD12	2.54	0.43
4:A:407:LMT:H71	4:B:403:LMT:H82	1.99	0.42
1:D:201:ILE:O	1:D:205:MET:HB2	2.19	0.42
1:E:254:TYR:CZ	1:E:258:ILE:HD11	2.54	0.42
1:A:254:TYR:CZ	1:A:258:ILE:HD11	2.54	0.42
1:C:45:LEU:HB2	1:C:102:TYR:HB3	2.00	0.42
1:C:209:LEU:CD1	6:C:503:HOH:O	2.66	0.42
1:A:160:TRP:CE3	1:A:190:ILE:HD12	2.54	0.42
1:E:26:GLU:HB2	1:E:40:ASN:HB3	2.01	0.42
1:D:160:TRP:CE3	1:D:190:ILE:HD12	2.54	0.42
1:D:254:TYR:CZ	1:D:258:ILE:HD11	2.54	0.42
1:A:78:PHE:CE2	1:A:85:ARG:HD3	2.49	0.41
1:A:128:ILE:HB	1:A:186:TYR:HB2	2.03	0.41
1:B:254:TYR:CZ	1:B:258:ILE:HD11	2.54	0.41
1:C:160:TRP:CE3	1:C:190:ILE:HD12	2.55	0.41
1:B:160:TRP:CE3	1:B:190:ILE:HD12	2.55	0.41
1:C:26:GLU:HB2	1:C:40:ASN:HB3	2.02	0.41
1:E:128:ILE:HB	1:E:186:TYR:HB2	2.01	0.41
1:D:128:ILE:HB	1:D:186:TYR:HB2	2.03	0.41
1:D:45:LEU:HB2	1:D:102:TYR:HB3	2.01	0.41
1:E:59:SER:C	1:E:61:VAL:H	2.29	0.41
1:B:90:VAL:HG13	1:C:77:ARG:NH1	2.35	0.41

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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%)	300 (97%)	9 (3%)	0	100	100
1	B	309/317 (98%)	299 (97%)	10 (3%)	0	100	100
1	C	309/317 (98%)	298 (96%)	11 (4%)	0	100	100
1	D	309/317 (98%)	298 (96%)	11 (4%)	0	100	100
1	E	309/317 (98%)	298 (96%)	11 (4%)	0	100	100
All	All	1545/1585 (98%)	1493 (97%)	52 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	280/284 (99%)	260 (93%)	20 (7%)	13	44
1	B	280/284 (99%)	260 (93%)	20 (7%)	13	44
1	C	280/284 (99%)	257 (92%)	23 (8%)	10	39
1	D	280/284 (99%)	260 (93%)	20 (7%)	13	44
1	E	280/284 (99%)	259 (92%)	21 (8%)	12	42
All	All	1400/1420 (99%)	1296 (93%)	104 (7%)	13	43

All (104) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	ILE
1	A	14	GLU
1	A	27	CYS
1	A	48	LYS
1	A	63	VAL
1	A	69	GLU
1	A	88	ASP
1	A	111	LEU
1	A	117	ARG
1	A	131	ILE
1	A	137	THR
1	A	140	ILE
1	A	147	GLU
1	A	163	GLU
1	A	178	ASP
1	A	181	GLU
1	A	192	ARG
1	A	222	GLU
1	A	280	LYS
1	A	304	LEU
1	B	11	ILE
1	B	14	GLU
1	B	27	CYS
1	B	62	ARG
1	B	69	GLU
1	B	88	ASP
1	B	111	LEU
1	B	117	ARG
1	B	131	ILE
1	B	137	THR
1	B	140	ILE
1	B	147	GLU
1	B	163	GLU
1	B	178	ASP
1	B	181	GLU
1	B	192	ARG
1	B	222	GLU
1	B	273	VAL
1	B	280	LYS
1	B	304	LEU
1	C	11	ILE
1	C	14	GLU
1	C	27	CYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	48	LYS
1	C	58	ARG
1	C	62	ARG
1	C	64	LYS
1	C	69	GLU
1	C	88	ASP
1	C	111	LEU
1	C	117	ARG
1	C	131	ILE
1	C	137	THR
1	C	140	ILE
1	C	147	GLU
1	C	163	GLU
1	C	178	ASP
1	C	179	ARG
1	C	181	GLU
1	C	192	ARG
1	C	222	GLU
1	C	280	LYS
1	C	304	LEU
1	D	11	ILE
1	D	14	GLU
1	D	27	CYS
1	D	58	ARG
1	D	62	ARG
1	D	63	VAL
1	D	88	ASP
1	D	111	LEU
1	D	117	ARG
1	D	131	ILE
1	D	137	THR
1	D	140	ILE
1	D	147	GLU
1	D	163	GLU
1	D	178	ASP
1	D	181	GLU
1	D	192	ARG
1	D	273	VAL
1	D	280	LYS
1	D	304	LEU
1	E	11	ILE
1	E	14	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	E	27	CYS
1	E	48	LYS
1	E	58	ARG
1	E	64	LYS
1	E	88	ASP
1	E	111	LEU
1	E	117	ARG
1	E	131	ILE
1	E	137	THR
1	E	140	ILE
1	E	147	GLU
1	E	163	GLU
1	E	178	ASP
1	E	181	GLU
1	E	192	ARG
1	E	222	GLU
1	E	273	VAL
1	E	280	LYS
1	E	304	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	83	ASN
1	A	239	ASN
1	A	277	HIS
1	B	200	ASN
1	B	239	ASN
1	B	277	HIS
1	C	239	ASN
1	D	239	ASN
1	D	277	HIS
1	E	200	ASN
1	E	239	ASN
1	E	277	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 29 ligands modelled in this entry, 13 are monoatomic - leaving 16 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
4	LMT	C	403	-	11,11,36	0.75	0	10,10,47	0.57	0
5	PPI	B	405	-	4,4,4	1.96	2 (50%)	4,4,4	1.92	2 (50%)
5	PPI	D	404	-	4,4,4	1.99	2 (50%)	4,4,4	1.80	2 (50%)
4	LMT	B	403	-	11,11,36	0.71	0	10,10,47	0.58	0
5	PPI	D	405	-	4,4,4	2.01	2 (50%)	4,4,4	1.95	2 (50%)
5	PPI	C	404	-	4,4,4	1.95	2 (50%)	4,4,4	1.85	2 (50%)
4	LMT	A	406	-	11,11,36	0.74	0	10,10,47	0.54	0
5	PPI	D	406	-	4,4,4	2.00	2 (50%)	4,4,4	1.79	2 (50%)
5	PPI	A	409	-	4,4,4	0.55	0	4,4,4	0.52	0
5	PPI	A	408	-	4,4,4	1.99	2 (50%)	4,4,4	2.03	2 (50%)
4	LMT	D	403	-	11,11,36	0.65	0	10,10,47	0.56	0
4	LMT	E	403	-	11,11,36	0.60	0	10,10,47	0.56	0
5	PPI	B	404	-	4,4,4	0.50	0	4,4,4	0.49	0
5	PPI	E	404	-	4,4,4	1.94	2 (50%)	4,4,4	1.89	2 (50%)
5	PPI	A	410	-	4,4,4	0.30	0	4,4,4	0.39	0
4	LMT	A	407	-	11,11,36	0.67	0	10,10,47	0.59	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	LMT	C	403	-	-	0/9/9/61	-
5	PPI	B	405	-	-	2/2/2/2	-
5	PPI	D	404	-	-	2/2/2/2	-
4	LMT	B	403	-	-	0/9/9/61	-
5	PPI	D	405	-	-	0/2/2/2	-
5	PPI	C	404	-	-	2/2/2/2	-
4	LMT	A	406	-	-	0/9/9/61	-
5	PPI	D	406	-	-	1/2/2/2	-
5	PPI	A	409	-	-	0/2/2/2	-
5	PPI	A	408	-	-	1/2/2/2	-
4	LMT	D	403	-	-	1/9/9/61	-
4	LMT	E	403	-	-	0/9/9/61	-
5	PPI	B	404	-	-	0/2/2/2	-
5	PPI	E	404	-	-	2/2/2/2	-
5	PPI	A	410	-	-	2/2/2/2	-
4	LMT	A	407	-	-	0/9/9/61	-

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	405	PPI	O1-C1	2.96	1.31	1.22
5	D	406	PPI	O1-C1	2.93	1.31	1.22
5	D	404	PPI	O1-C1	2.90	1.31	1.22
5	D	405	PPI	O1-C1	2.87	1.31	1.22
5	C	404	PPI	O1-C1	2.84	1.31	1.22
5	A	408	PPI	O1-C1	2.84	1.31	1.22
5	E	404	PPI	O1-C1	2.77	1.31	1.22
5	D	406	PPI	O2-C1	-2.66	1.22	1.30
5	E	404	PPI	O2-C1	-2.66	1.22	1.30
5	D	405	PPI	O2-C1	-2.65	1.22	1.30
5	D	404	PPI	O2-C1	-2.61	1.22	1.30
5	C	404	PPI	O2-C1	-2.59	1.22	1.30
5	A	408	PPI	O2-C1	-2.54	1.22	1.30
5	B	405	PPI	O2-C1	-2.48	1.22	1.30

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	408	PPI	O2-C1-C2	3.34	127.50	113.49
5	D	405	PPI	O2-C1-C2	3.19	126.90	113.49
5	B	405	PPI	O2-C1-C2	3.09	126.46	113.49
5	E	404	PPI	O2-C1-C2	3.07	126.37	113.49

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	404	PPI	O2-C1-C2	3.00	126.08	113.49
5	D	404	PPI	O2-C1-C2	2.95	125.88	113.49
5	D	406	PPI	O2-C1-C2	2.89	125.63	113.49
5	A	408	PPI	O1-C1-C2	-2.29	109.91	123.23
5	B	405	PPI	O1-C1-C2	-2.27	110.04	123.23
5	D	405	PPI	O1-C1-C2	-2.22	110.35	123.23
5	E	404	PPI	O1-C1-C2	-2.18	110.58	123.23
5	C	404	PPI	O1-C1-C2	-2.17	110.62	123.23
5	D	406	PPI	O1-C1-C2	-2.11	110.98	123.23
5	D	404	PPI	O1-C1-C2	-2.05	111.31	123.23

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	410	PPI	O1-C1-C2-C3
5	A	410	PPI	O2-C1-C2-C3
5	B	405	PPI	O1-C1-C2-C3
5	C	404	PPI	O1-C1-C2-C3
5	C	404	PPI	O2-C1-C2-C3
4	D	403	LMT	C3-C4-C5-C6
5	D	404	PPI	O1-C1-C2-C3
5	A	408	PPI	O1-C1-C2-C3
5	B	405	PPI	O2-C1-C2-C3
5	D	404	PPI	O2-C1-C2-C3
5	D	406	PPI	O2-C1-C2-C3
5	E	404	PPI	O1-C1-C2-C3
5	E	404	PPI	O2-C1-C2-C3

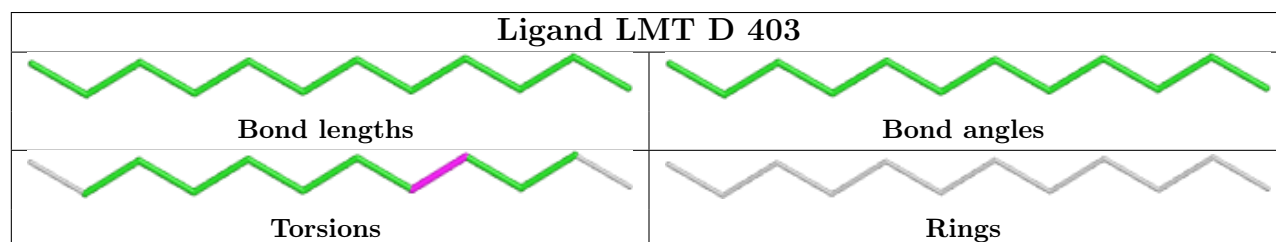
There are no ring outliers.

4 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	403	LMT	1	0
4	B	403	LMT	1	0
4	A	406	LMT	1	0
4	A	407	LMT	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

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

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	311/317 (98%)	-0.06	3 (0%) 79 63	82, 108, 162, 217	0
1	B	311/317 (98%)	-0.07	2 (0%) 85 73	80, 106, 150, 175	0
1	C	311/317 (98%)	0.00	6 (1%) 66 46	81, 107, 161, 220	0
1	D	311/317 (98%)	0.04	7 (2%) 61 41	83, 106, 164, 216	0
1	E	311/317 (98%)	0.02	6 (1%) 66 46	81, 107, 159, 184	0
All	All	1555/1585 (98%)	-0.02	24 (1%) 72 52	80, 107, 161, 220	0

All (24) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	139	ASN	3.6
1	D	5	VAL	3.1
1	C	58	ARG	2.9
1	D	148	LYS	2.9
1	D	136	ASP	2.8
1	B	136	ASP	2.8
1	E	5	VAL	2.6
1	B	5	VAL	2.6
1	A	136	ASP	2.6
1	C	5	VAL	2.6
1	E	161	ASP	2.5
1	A	5	VAL	2.5
1	A	172	ALA	2.5
1	C	57	VAL	2.4
1	C	61	VAL	2.4
1	D	149	VAL	2.4
1	E	115	ASP	2.4
1	D	115	ASP	2.3
1	E	62	ARG	2.3
1	E	283	SER	2.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	261	MET	2.2
1	C	261	MET	2.1
1	D	104	GLU	2.1
1	C	88	ASP	2.1

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

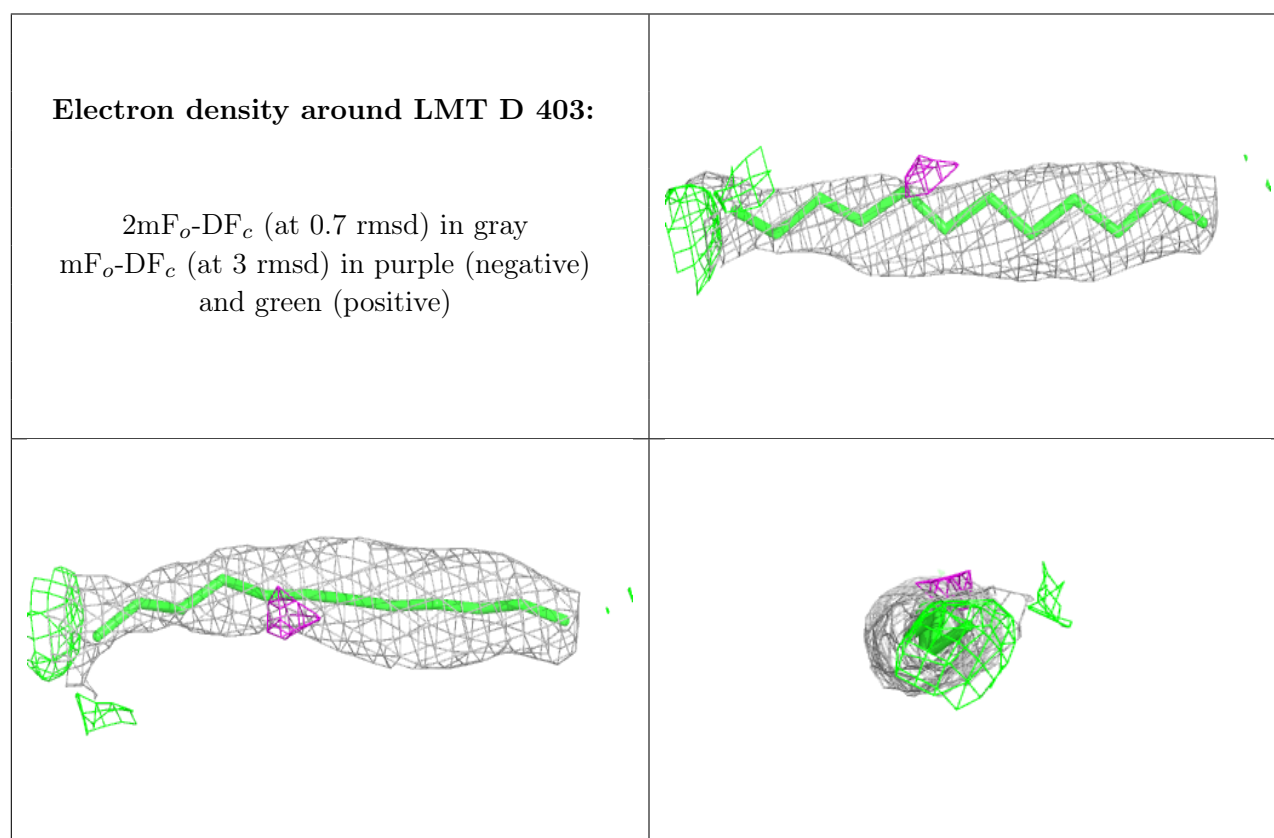
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	NA	A	405	1/1	0.00	0.65	137,137,137,137	0
3	NA	D	402	1/1	0.47	0.37	136,136,136,136	0
3	NA	B	402	1/1	0.51	0.39	145,145,145,145	0
5	PPI	C	404	5/5	0.58	0.36	151,152,152,152	0
3	NA	C	402	1/1	0.72	0.20	117,117,117,117	0
5	PPI	E	404	5/5	0.72	0.36	158,159,159,159	0
5	PPI	B	404	5/5	0.75	0.48	197,198,198,198	0
4	LMT	D	403	12/35	0.78	0.22	89,92,96,98	0
4	LMT	C	403	12/35	0.80	0.18	64,71,101,101	0
3	NA	A	404	1/1	0.80	0.21	120,120,120,120	0
5	PPI	D	405	5/5	0.80	0.43	165,167,169,171	0
5	PPI	A	410	5/5	0.80	0.32	154,156,158,160	0
3	NA	E	402	1/1	0.81	0.31	144,144,144,144	0
2	CL	C	401	1/1	0.82	0.20	112,112,112,112	0
5	PPI	D	406	5/5	0.83	0.32	153,153,154,155	0
4	LMT	A	407	12/35	0.83	0.17	82,87,92,94	0
4	LMT	E	403	12/35	0.84	0.18	82,91,104,105	0
5	PPI	A	408	5/5	0.84	0.34	155,157,159,160	0
4	LMT	A	406	12/35	0.86	0.15	85,93,100,101	0

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	PPI	B	405	5/5	0.86	0.24	145,146,147,147	0
5	PPI	A	409	5/5	0.89	0.27	156,158,158,159	0
2	CL	E	401	1/1	0.89	0.14	114,114,114,114	0
4	LMT	B	403	12/35	0.90	0.12	57,65,88,91	0
2	CL	A	401	1/1	0.91	0.13	111,111,111,111	0
2	CL	A	403	1/1	0.93	0.36	159,159,159,159	0
2	CL	B	401	1/1	0.94	0.09	108,108,108,108	0
2	CL	A	402	1/1	0.94	0.16	150,150,150,150	0
2	CL	D	401	1/1	0.95	0.12	116,116,116,116	0
5	PPI	D	404	5/5	0.96	0.17	143,144,144,144	0

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.



6.5 Other polymers ⓘ

There are no such residues in this entry.