



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 04:53 AM UTC

PDB ID : 6VAT / pdb_00006vat
Title : Structure of the periplasmic domain of YejM from Salmonella typhimurium
Authors : Gabale, U.; Ressler, S.
Deposited on : 2019-12-17
Resolution : 2.35 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:

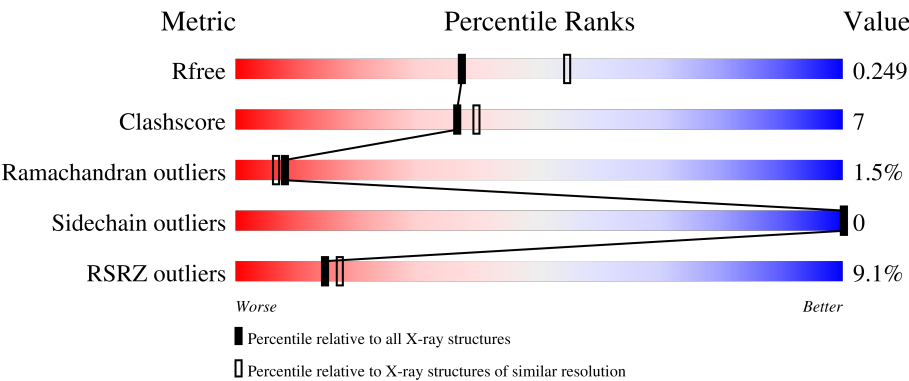
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal 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 i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.35 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	1596 (2.36-2.36)
Clashscore	190562	1663 (2.36-2.36)
Ramachandran outliers	187476	1646 (2.36-2.36)
Sidechain outliers	187428	1646 (2.36-2.36)
RSRZ outliers	180081	1598 (2.36-2.36)

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	368	7% 83% 11% 7%
1	B	368	2% 83% 10% 7%
1	C	368	4% 82% 11% 6%
1	D	368	3% 81% 12% 7%
1	E	368	14% 72% 21% 6%

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Mol	Chain	Length	Quality of chain
1	F	368	21% 70% 21% • 6%

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 17290 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 Periplasmic domain of the cardiolipin transporter protein YejM/PbgA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	344	Total	C	N	O	S	0	0	0
			2723	1716	476	523	8			
1	B	343	Total	C	N	O	S	0	0	0
			2716	1711	475	522	8			
1	C	345	Total	C	N	O	S	0	1	0
			2734	1723	478	525	8			
1	D	343	Total	C	N	O	S	0	0	0
			2718	1712	476	522	8			
1	E	346	Total	C	N	O	S	0	0	0
			2736	1723	479	526	8			
1	F	345	Total	C	N	O	S	0	0	0
			2731	1720	478	525	8			

There are 132 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	219	MET	-	expression tag	UNP A0A4V1IDU5
A	220	SER	-	expression tag	UNP A0A4V1IDU5
A	221	GLY	-	expression tag	UNP A0A4V1IDU5
A	222	HIS	-	expression tag	UNP A0A4V1IDU5
A	223	HIS	-	expression tag	UNP A0A4V1IDU5
A	224	HIS	-	expression tag	UNP A0A4V1IDU5
A	225	HIS	-	expression tag	UNP A0A4V1IDU5
A	226	HIS	-	expression tag	UNP A0A4V1IDU5
A	227	HIS	-	expression tag	UNP A0A4V1IDU5
A	228	SER	-	expression tag	UNP A0A4V1IDU5
A	229	SER	-	expression tag	UNP A0A4V1IDU5
A	230	GLY	-	expression tag	UNP A0A4V1IDU5
A	231	LEU	-	expression tag	UNP A0A4V1IDU5
A	232	VAL	-	expression tag	UNP A0A4V1IDU5
A	233	PRO	-	expression tag	UNP A0A4V1IDU5
A	234	ARG	-	expression tag	UNP A0A4V1IDU5

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Chain	Residue	Modelled	Actual	Comment	Reference
A	235	GLY	-	expression tag	UNP A0A4V1IDU5
A	236	SER	-	expression tag	UNP A0A4V1IDU5
A	237	HIS	-	expression tag	UNP A0A4V1IDU5
A	238	MET	-	expression tag	UNP A0A4V1IDU5
A	239	ALA	-	expression tag	UNP A0A4V1IDU5
A	240	SER	-	expression tag	UNP A0A4V1IDU5
B	219	MET	-	expression tag	UNP A0A4V1IDU5
B	220	SER	-	expression tag	UNP A0A4V1IDU5
B	221	GLY	-	expression tag	UNP A0A4V1IDU5
B	222	HIS	-	expression tag	UNP A0A4V1IDU5
B	223	HIS	-	expression tag	UNP A0A4V1IDU5
B	224	HIS	-	expression tag	UNP A0A4V1IDU5
B	225	HIS	-	expression tag	UNP A0A4V1IDU5
B	226	HIS	-	expression tag	UNP A0A4V1IDU5
B	227	HIS	-	expression tag	UNP A0A4V1IDU5
B	228	SER	-	expression tag	UNP A0A4V1IDU5
B	229	SER	-	expression tag	UNP A0A4V1IDU5
B	230	GLY	-	expression tag	UNP A0A4V1IDU5
B	231	LEU	-	expression tag	UNP A0A4V1IDU5
B	232	VAL	-	expression tag	UNP A0A4V1IDU5
B	233	PRO	-	expression tag	UNP A0A4V1IDU5
B	234	ARG	-	expression tag	UNP A0A4V1IDU5
B	235	GLY	-	expression tag	UNP A0A4V1IDU5
B	236	SER	-	expression tag	UNP A0A4V1IDU5
B	237	HIS	-	expression tag	UNP A0A4V1IDU5
B	238	MET	-	expression tag	UNP A0A4V1IDU5
B	239	ALA	-	expression tag	UNP A0A4V1IDU5
B	240	SER	-	expression tag	UNP A0A4V1IDU5
C	219	MET	-	expression tag	UNP A0A4V1IDU5
C	220	SER	-	expression tag	UNP A0A4V1IDU5
C	221	GLY	-	expression tag	UNP A0A4V1IDU5
C	222	HIS	-	expression tag	UNP A0A4V1IDU5
C	223	HIS	-	expression tag	UNP A0A4V1IDU5
C	224	HIS	-	expression tag	UNP A0A4V1IDU5
C	225	HIS	-	expression tag	UNP A0A4V1IDU5
C	226	HIS	-	expression tag	UNP A0A4V1IDU5
C	227	HIS	-	expression tag	UNP A0A4V1IDU5
C	228	SER	-	expression tag	UNP A0A4V1IDU5
C	229	SER	-	expression tag	UNP A0A4V1IDU5
C	230	GLY	-	expression tag	UNP A0A4V1IDU5
C	231	LEU	-	expression tag	UNP A0A4V1IDU5
C	232	VAL	-	expression tag	UNP A0A4V1IDU5

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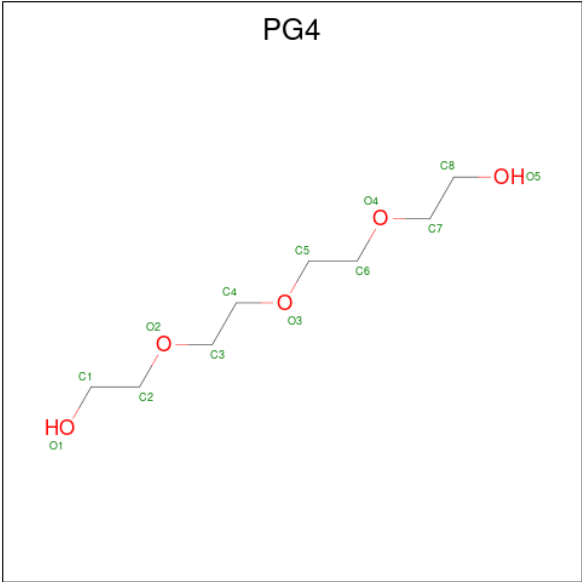
Chain	Residue	Modelled	Actual	Comment	Reference
C	233	PRO	-	expression tag	UNP A0A4V1IDU5
C	234	ARG	-	expression tag	UNP A0A4V1IDU5
C	235	GLY	-	expression tag	UNP A0A4V1IDU5
C	236	SER	-	expression tag	UNP A0A4V1IDU5
C	237	HIS	-	expression tag	UNP A0A4V1IDU5
C	238	MET	-	expression tag	UNP A0A4V1IDU5
C	239	ALA	-	expression tag	UNP A0A4V1IDU5
C	240	SER	-	expression tag	UNP A0A4V1IDU5
D	219	MET	-	expression tag	UNP A0A4V1IDU5
D	220	SER	-	expression tag	UNP A0A4V1IDU5
D	221	GLY	-	expression tag	UNP A0A4V1IDU5
D	222	HIS	-	expression tag	UNP A0A4V1IDU5
D	223	HIS	-	expression tag	UNP A0A4V1IDU5
D	224	HIS	-	expression tag	UNP A0A4V1IDU5
D	225	HIS	-	expression tag	UNP A0A4V1IDU5
D	226	HIS	-	expression tag	UNP A0A4V1IDU5
D	227	HIS	-	expression tag	UNP A0A4V1IDU5
D	228	SER	-	expression tag	UNP A0A4V1IDU5
D	229	SER	-	expression tag	UNP A0A4V1IDU5
D	230	GLY	-	expression tag	UNP A0A4V1IDU5
D	231	LEU	-	expression tag	UNP A0A4V1IDU5
D	232	VAL	-	expression tag	UNP A0A4V1IDU5
D	233	PRO	-	expression tag	UNP A0A4V1IDU5
D	234	ARG	-	expression tag	UNP A0A4V1IDU5
D	235	GLY	-	expression tag	UNP A0A4V1IDU5
D	236	SER	-	expression tag	UNP A0A4V1IDU5
D	237	HIS	-	expression tag	UNP A0A4V1IDU5
D	238	MET	-	expression tag	UNP A0A4V1IDU5
D	239	ALA	-	expression tag	UNP A0A4V1IDU5
D	240	SER	-	expression tag	UNP A0A4V1IDU5
E	219	MET	-	expression tag	UNP A0A4V1IDU5
E	220	SER	-	expression tag	UNP A0A4V1IDU5
E	221	GLY	-	expression tag	UNP A0A4V1IDU5
E	222	HIS	-	expression tag	UNP A0A4V1IDU5
E	223	HIS	-	expression tag	UNP A0A4V1IDU5
E	224	HIS	-	expression tag	UNP A0A4V1IDU5
E	225	HIS	-	expression tag	UNP A0A4V1IDU5
E	226	HIS	-	expression tag	UNP A0A4V1IDU5
E	227	HIS	-	expression tag	UNP A0A4V1IDU5
E	228	SER	-	expression tag	UNP A0A4V1IDU5
E	229	SER	-	expression tag	UNP A0A4V1IDU5
E	230	GLY	-	expression tag	UNP A0A4V1IDU5

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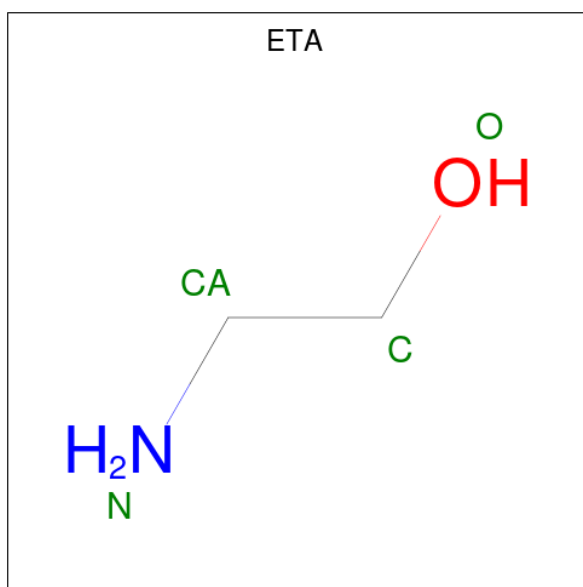
Chain	Residue	Modelled	Actual	Comment	Reference
E	231	LEU	-	expression tag	UNP A0A4V1IDU5
E	232	VAL	-	expression tag	UNP A0A4V1IDU5
E	233	PRO	-	expression tag	UNP A0A4V1IDU5
E	234	ARG	-	expression tag	UNP A0A4V1IDU5
E	235	GLY	-	expression tag	UNP A0A4V1IDU5
E	236	SER	-	expression tag	UNP A0A4V1IDU5
E	237	HIS	-	expression tag	UNP A0A4V1IDU5
E	238	MET	-	expression tag	UNP A0A4V1IDU5
E	239	ALA	-	expression tag	UNP A0A4V1IDU5
E	240	SER	-	expression tag	UNP A0A4V1IDU5
F	219	MET	-	expression tag	UNP A0A4V1IDU5
F	220	SER	-	expression tag	UNP A0A4V1IDU5
F	221	GLY	-	expression tag	UNP A0A4V1IDU5
F	222	HIS	-	expression tag	UNP A0A4V1IDU5
F	223	HIS	-	expression tag	UNP A0A4V1IDU5
F	224	HIS	-	expression tag	UNP A0A4V1IDU5
F	225	HIS	-	expression tag	UNP A0A4V1IDU5
F	226	HIS	-	expression tag	UNP A0A4V1IDU5
F	227	HIS	-	expression tag	UNP A0A4V1IDU5
F	228	SER	-	expression tag	UNP A0A4V1IDU5
F	229	SER	-	expression tag	UNP A0A4V1IDU5
F	230	GLY	-	expression tag	UNP A0A4V1IDU5
F	231	LEU	-	expression tag	UNP A0A4V1IDU5
F	232	VAL	-	expression tag	UNP A0A4V1IDU5
F	233	PRO	-	expression tag	UNP A0A4V1IDU5
F	234	ARG	-	expression tag	UNP A0A4V1IDU5
F	235	GLY	-	expression tag	UNP A0A4V1IDU5
F	236	SER	-	expression tag	UNP A0A4V1IDU5
F	237	HIS	-	expression tag	UNP A0A4V1IDU5
F	238	MET	-	expression tag	UNP A0A4V1IDU5
F	239	ALA	-	expression tag	UNP A0A4V1IDU5
F	240	SER	-	expression tag	UNP A0A4V1IDU5

- Molecule 2 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: C₈H₁₈O₅).



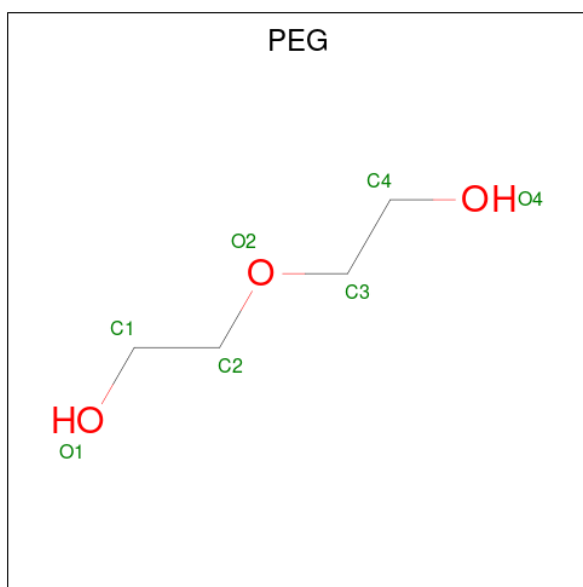
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			13	8	5		
2	A	1	Total	C	O	0	0
			13	8	5		
2	B	1	Total	C	O	0	0
			13	8	5		
2	C	1	Total	C	O	0	0
			13	8	5		
2	C	1	Total	C	O	0	0
			13	8	5		
2	D	1	Total	C	O	0	0
			13	8	5		
2	E	1	Total	C	O	0	0
			13	8	5		

- Molecule 3 is ETHANOLAMINE (CCD ID: ETA) (formula: C₂H₇NO).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			4	2	1	1		
3	C	1	Total	C	N	O	0	0
			4	2	1	1		
3	D	1	Total	C	N	O	0	0
			4	2	1	1		

- Molecule 4 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



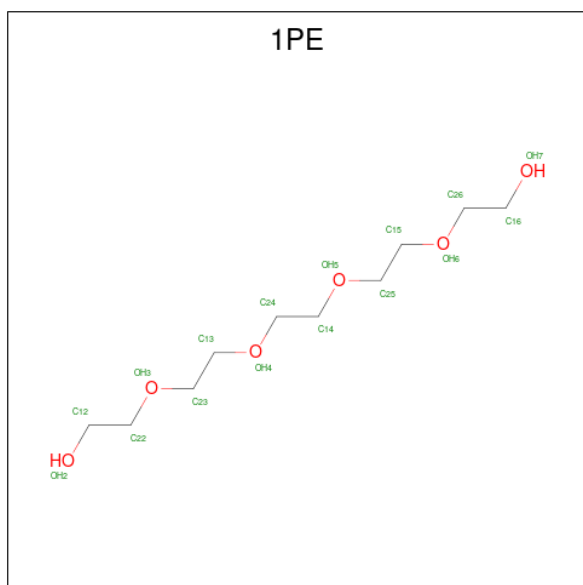
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			7	4	3		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	C	1	Total	C	O	0	0
			7	4	3		
4	D	1	Total	C	O	0	0
			7	4	3		

- Molecule 5 is PENTAETHYLENE GLYCOL (CCD ID: 1PE) (formula: $C_{10}H_{22}O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			16	10	6		
5	C	1	Total	C	O	0	0
			16	10	6		
5	E	1	Total	C	O	0	0
			16	10	6		
5	F	1	Total	C	O	0	0
			16	10	6		

- Molecule 6 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

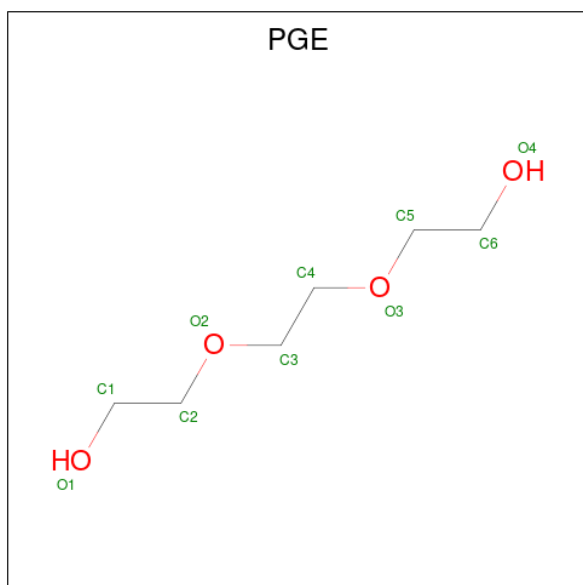
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total	Mg	0	0
			1	1		
6	B	1	Total	Mg	0	0
			1	1		
6	C	1	Total	Mg	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	D	1	Total	Mg	0	0
			1	1		
6	F	1	Total	Mg	0	0
			1	1		

- Molecule 7 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).

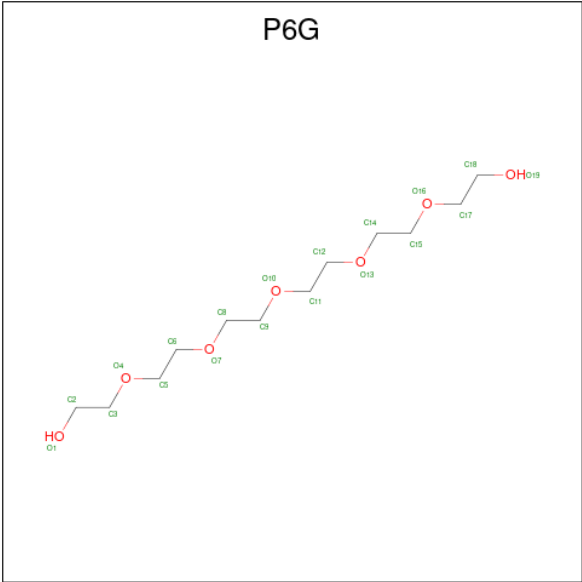


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	B	1	Total	C	O	0	0
			10	6	4		
7	C	1	Total	C	O	0	0
			10	6	4		
7	F	1	Total	C	O	0	0
			10	6	4		

- Molecule 8 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	B	1	Total	Ca	0	0
			1	1		
8	C	1	Total	Ca	0	0
			1	1		
8	E	1	Total	Ca	0	0
			1	1		

- Molecule 9 is HEXAETHYLENE GLYCOL (CCD ID: P6G) (formula: $C_{12}H_{26}O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	D	1	Total	C	O	0	0
			19	12	7		

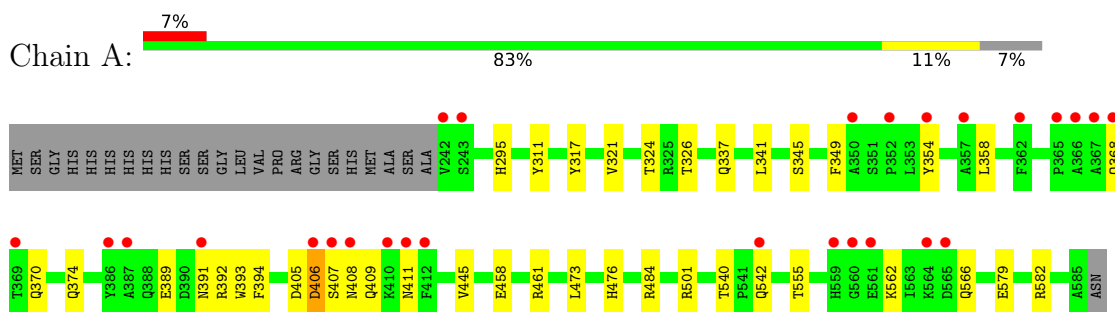
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	142	Total	O	0	0
			142	142		
10	B	151	Total	O	0	0
			151	151		
10	C	133	Total	O	0	0
			133	133		
10	D	141	Total	O	0	0
			141	141		
10	E	77	Total	O	0	0
			77	77		
10	F	43	Total	O	0	0
			43	43		

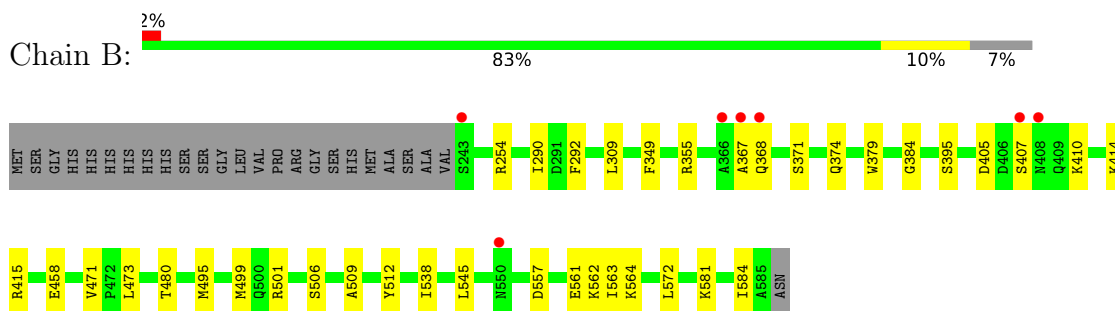
3 Residue-property plots

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). 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.

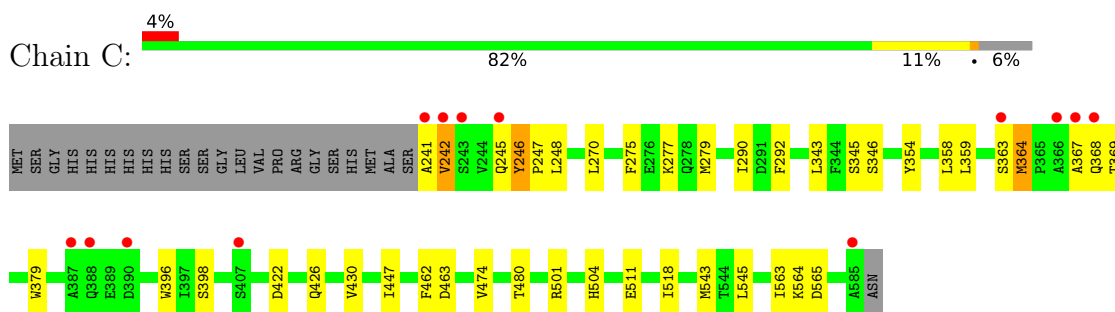
- Molecule 1: Periplasmic domain of the cardiolipin transporter protein YejM/PbgA



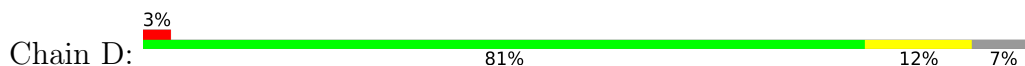
- Molecule 1: Periplasmic domain of the cardiolipin transporter protein YejM/PbgA

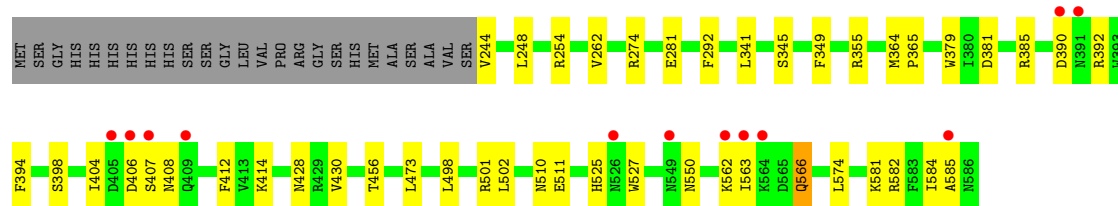


- Molecule 1: Periplasmic domain of the cardiolipin transporter protein YejM/PbgA

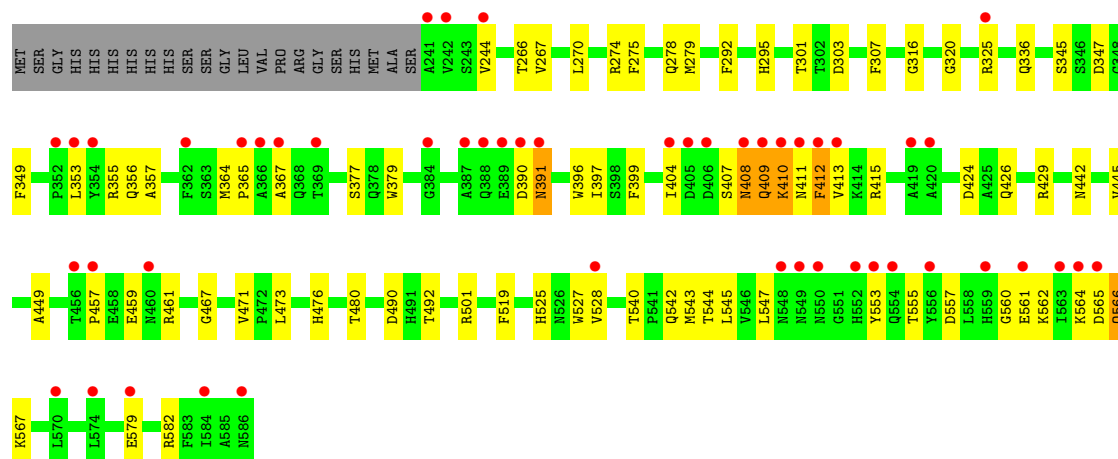


- Molecule 1: Periplasmic domain of the cardiolipin transporter protein YejM/PbgA

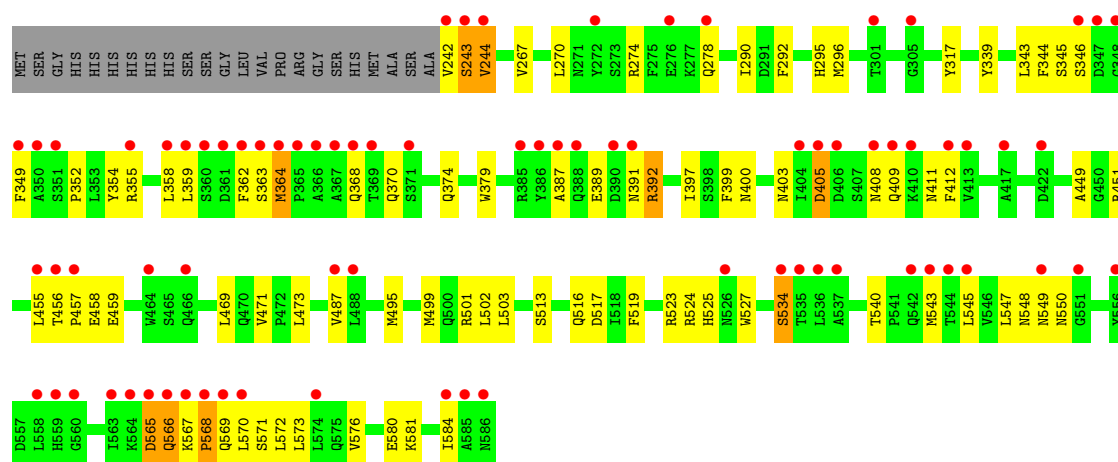




- Molecule 1: Periplasmic domain of the cardiolipin transporter protein YejM/PbgA



- Molecule 1: Periplasmic domain of the cardiolipin transporter protein YejM/PbgA



4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	113.80Å 113.80Å 299.78Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	59.65 – 2.35 59.65 – 2.35	Depositor EDS
% Data completeness (in resolution range)	99.9 (59.65-2.35) 90.5 (59.65-2.35)	Depositor EDS
R_{merge}	0.21	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.30 (at 2.20Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.196 , 0.249 0.197 , 0.249	Depositor DCC
R_{free} test set	4744 reflections (4.13%)	wwPDB-VP
Wilson B-factor (Å ²)	23.6	Xtriage
Anisotropy	0.099	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 52.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.035 for -h,-k,l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	17290	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.99% 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: ETA, MG, PG4, PEG, CA, PGE, P6G, 1PE

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	0.17	0/2787	0.38	0/3797
1	B	0.19	1/2780 (0.0%)	0.36	0/3787
1	C	0.16	0/2801	0.36	0/3816
1	D	0.16	0/2782	0.35	0/3790
1	E	0.17	0/2800	0.40	0/3815
1	F	0.19	0/2795	0.43	1/3808 (0.0%)
All	All	0.17	1/16745 (0.0%)	0.38	1/22813 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	E	0	1
1	F	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	471	VAL	CA-C	-5.34	1.48	1.52

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	566	GLN	N-CA-C	-5.53	108.32	114.62

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	409	GLN	Peptide
1	F	565	ASP	Peptide

5.2 Too-close contacts [i](#)

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	2723	0	2631	30	0
1	B	2716	0	2622	25	0
1	C	2734	0	2641	27	0
1	D	2718	0	2623	32	0
1	E	2736	0	2642	56	0
1	F	2731	0	2637	66	0
2	A	26	0	36	2	0
2	B	13	0	18	2	0
2	C	26	0	36	3	0
2	D	13	0	18	1	0
2	E	13	0	18	1	0
3	A	4	0	0	0	0
3	C	4	0	0	0	0
3	D	4	0	0	0	0
4	A	7	0	10	0	0
4	C	7	0	10	2	0
4	D	7	0	10	0	0
5	A	16	0	22	1	0
5	C	16	0	20	0	0
5	E	16	0	22	6	0
5	F	16	0	22	5	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
6	C	1	0	0	0	0
6	D	1	0	0	0	0
6	F	1	0	0	0	0
7	B	10	0	14	2	0
7	C	10	0	14	0	0
7	F	10	0	14	1	0
8	B	1	0	0	0	0
8	C	1	0	0	0	0
8	E	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	D	19	0	26	2	0
10	A	142	0	0	1	0
10	B	151	0	0	1	0
10	C	133	0	0	0	0
10	D	141	0	0	5	0
10	E	77	0	0	2	0
10	F	43	0	0	0	0
All	All	17290	0	16106	236	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 7.

All (236) 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:A:458:GLU:HG3	1:A:461:ARG:NH2	1.74	1.01
1:A:458:GLU:CG	1:A:461:ARG:NH2	2.24	1.01
1:A:540:THR:HG22	1:A:542:GLN:H	1.34	0.91
1:A:458:GLU:HG3	1:A:461:ARG:CZ	2.06	0.85
1:E:501:ARG:HH12	5:E:602:1PE:H161	1.40	0.85
1:F:267:VAL:HG12	1:F:399:PHE:HB2	1.58	0.82
1:A:458:GLU:HG2	1:A:461:ARG:NH2	1.95	0.80
1:F:517:ASP:O	1:F:523:ARG:NH2	2.21	0.74
1:A:501:ARG:HH11	2:A:601:PG4:H22	1.52	0.74
1:E:279:MET:HG2	1:E:424:ASP:HB2	1.68	0.74
1:E:547:LEU:HD12	1:E:553:TYR:HB3	1.70	0.72
1:E:545:LEU:HG	1:E:555:THR:HG22	1.73	0.71
1:A:354:TYR:HA	1:A:358:LEU:HB2	1.70	0.71
1:D:562:LYS:HE3	1:D:566:GLN:HE21	1.56	0.70
1:F:501:ARG:HH22	5:F:702:1PE:H252	1.57	0.70
1:F:581:LYS:HG2	1:F:584:ILE:HG13	1.74	0.69
1:C:463:ASP:H	4:C:605:PEG:H22	1.57	0.68
1:A:370:GLN:HB2	1:A:374:GLN:HE21	1.57	0.68
1:D:244:VAL:N	10:D:704:HOH:O	2.28	0.67
1:F:569:GLN:O	1:F:571:SER:N	2.27	0.67
1:E:267:VAL:HG21	1:E:270:LEU:HG	1.76	0.67
1:F:501:ARG:HD3	5:F:702:1PE:H121	1.76	0.66
1:A:370:GLN:HB2	1:A:374:GLN:NE2	2.11	0.66
1:E:540:THR:HG22	1:E:542:GLN:H	1.61	0.66
1:A:501:ARG:HD3	2:A:601:PG4:H32	1.77	0.65
1:C:292:PHE:CE1	1:C:518:ILE:HG12	2.31	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:501:ARG:HG2	5:E:602:1PE:H232	1.79	0.65
1:E:267:VAL:HG12	1:E:399:PHE:HB2	1.79	0.64
1:F:242:VAL:O	1:F:244:VAL:N	2.30	0.64
1:B:538:ILE:HG21	1:B:572:LEU:HD21	1.80	0.63
1:F:408:ASN:HB3	1:F:411:ASN:HB3	1.81	0.63
1:B:254:ARG:HG3	1:B:506:SER:HB3	1.80	0.62
1:E:349:PHE:HB2	1:E:364:MET:HE1	1.80	0.62
1:D:345:SER:HB2	1:D:398:SER:HB3	1.80	0.62
1:C:248:LEU:HB2	1:C:511:GLU:HG2	1.80	0.62
1:D:510:ASN:O	1:D:582:ARG:NH1	2.32	0.62
1:E:426:GLN:OE1	1:E:429:ARG:NH1	2.31	0.62
1:A:337:GLN:O	1:A:392:ARG:NH1	2.33	0.61
1:C:543:MET:HE3	1:C:545:LEU:HB2	1.82	0.61
1:E:579:GLU:HA	1:E:582:ARG:HG3	1.80	0.61
1:F:495:MET:HE3	1:F:499:MET:HG3	1.81	0.61
1:C:345:SER:HB2	1:C:398:SER:HB3	1.83	0.61
1:F:349:PHE:HE2	1:F:359:LEU:HD21	1.65	0.60
1:E:442:ASN:ND2	10:E:702:HOH:O	2.35	0.60
1:F:455:LEU:N	1:F:459:GLU:OE1	2.34	0.60
1:E:244:VAL:HG13	1:E:320:GLY:HA3	1.84	0.60
1:C:354:TYR:HA	1:C:358:LEU:HB2	1.84	0.59
1:F:524:ARG:HE	1:F:525:HIS:CE1	2.20	0.59
1:F:534:SER:HB3	1:F:549:ASN:HD22	1.68	0.59
1:A:321:VAL:HA	1:A:324:THR:HG22	1.85	0.59
1:C:501:ARG:HH22	2:C:601:PG4:H72	1.68	0.58
1:A:406:ASP:N	1:A:406:ASP:OD1	2.36	0.58
1:E:407:SER:HB2	1:E:410:LYS:HG2	1.86	0.58
1:F:267:VAL:HG21	1:F:270:LEU:HG	1.86	0.57
1:F:495:MET:HE1	1:F:513:SER:HB3	1.86	0.57
1:D:581:LYS:HZ3	2:D:601:PG4:H52	1.70	0.57
1:E:377:SER:HG	1:E:429:ARG:HH22	1.51	0.56
1:F:243:SER:O	1:F:244:VAL:HG12	2.05	0.56
1:C:270:LEU:HD13	1:C:279:MET:HE1	1.88	0.56
1:D:581:LYS:HD2	1:D:584:ILE:HD11	1.88	0.56
1:E:325:ARG:CZ	1:E:356:GLN:HB2	2.36	0.56
1:F:354:TYR:HA	1:F:358:LEU:HB2	1.87	0.56
1:B:538:ILE:HD12	1:B:545:LEU:HD22	1.89	0.55
1:F:487:VAL:HG21	1:F:523:ARG:HG3	1.88	0.55
1:B:410:LYS:HD2	1:B:415:ARG:NH2	2.22	0.55
1:C:462:PHE:HB2	4:C:605:PEG:H21	1.89	0.55
1:E:557:ASP:OD2	1:E:561:GLU:N	2.31	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:317:TYR:O	1:A:321:VAL:HG23	2.07	0.55
1:C:290:ILE:HD11	1:C:480:THR:HG21	1.88	0.55
1:A:409:GLN:HG3	1:A:411:ASN:H	1.71	0.54
1:B:499:MET:HG3	1:B:512:TYR:CE1	2.42	0.54
1:F:296:MET:HB3	1:F:469:LEU:HB3	1.89	0.53
1:E:404:ILE:HG23	1:E:412:PHE:HD1	1.73	0.53
1:C:292:PHE:HE1	1:C:518:ILE:HG12	1.73	0.53
1:F:370:GLN:HB3	1:F:374:GLN:NE2	2.24	0.53
1:D:254:ARG:NH1	10:D:711:HOH:O	2.42	0.53
1:F:345:SER:HB3	1:F:368:GLN:HE21	1.73	0.53
1:F:346:SER:HB2	1:F:400:ASN:ND2	2.23	0.53
1:C:354:TYR:HB3	1:C:359:LEU:HG	1.91	0.52
1:C:564:LYS:HG2	1:C:565:ASP:H	1.74	0.52
1:E:266:THR:CG2	1:E:396:TRP:HE1	2.23	0.52
1:E:355:ARG:HH21	1:E:367:ALA:HB2	1.74	0.51
1:E:490:ASP:HB3	1:E:528:VAL:CG2	2.41	0.51
1:A:484:ARG:NH1	10:A:710:HOH:O	2.43	0.51
1:E:525:HIS:NE2	1:E:579:GLU:OE1	2.44	0.51
1:D:341:LEU:HD23	1:D:394:PHE:HB3	1.93	0.51
1:E:412:PHE:HB2	1:E:415:ARG:HB2	1.92	0.51
1:D:292:PHE:HB2	1:D:473:LEU:HB3	1.92	0.51
1:F:267:VAL:HG23	1:F:449:ALA:HB2	1.92	0.50
1:F:409:GLN:HA	1:F:412:PHE:HB3	1.94	0.50
1:F:584:ILE:HD11	7:F:701:PGE:H4	1.94	0.50
1:B:349:PHE:O	1:B:355:ARG:NH1	2.44	0.50
1:E:543:MET:HG2	1:E:544:THR:N	2.27	0.49
1:F:502:LEU:HD23	1:F:503:LEU:HG	1.95	0.49
1:E:275:PHE:HB2	1:E:279:MET:HE3	1.94	0.49
1:E:292:PHE:HB2	1:E:473:LEU:HB3	1.93	0.49
1:D:408:ASN:O	1:D:412:PHE:N	2.40	0.49
1:B:501:ARG:HH11	2:B:601:PG4:H81	1.77	0.49
1:C:501:ARG:HA	2:C:602:PG4:H62	1.95	0.49
1:D:566:GLN:OE1	10:D:701:HOH:O	2.20	0.49
1:C:564:LYS:CG	1:C:565:ASP:H	2.26	0.49
1:A:324:THR:HG23	1:A:326:THR:H	1.78	0.48
1:E:565:ASP:OD1	1:E:567:LYS:NZ	2.46	0.48
1:D:262:VAL:HG22	1:D:502:LEU:HD13	1.95	0.48
1:D:345:SER:HB3	1:D:349:PHE:CZ	2.47	0.48
1:F:408:ASN:O	1:F:412:PHE:HB2	2.13	0.48
1:A:341:LEU:HD22	1:A:394:PHE:HB3	1.96	0.48
1:B:292:PHE:HB2	1:B:473:LEU:HB3	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:449:ALA:HB3	1:E:471:VAL:HG23	1.95	0.48
1:F:540:THR:OG1	1:F:543:MET:HG2	2.14	0.48
1:F:545:LEU:HD11	1:F:568:PRO:HG3	1.96	0.48
1:B:384:GLY:O	1:C:367:ALA:HA	2.14	0.48
1:E:459:GLU:HB3	1:E:467:GLY:HA3	1.96	0.48
1:F:409:GLN:HA	1:F:412:PHE:CB	2.44	0.47
1:F:501:ARG:NE	1:F:517:ASP:OD2	2.45	0.47
1:A:295:HIS:CE1	1:A:473:LEU:HD22	2.49	0.47
1:A:391:ASN:HB2	1:A:393:TRP:HD1	1.79	0.47
1:E:390:ASP:CG	1:E:391:ASN:H	2.22	0.47
1:E:411:ASN:O	1:E:413:VAL:N	2.47	0.47
1:F:346:SER:HB2	1:F:400:ASN:HD21	1.78	0.47
1:F:516:GLN:HB2	1:F:524:ARG:HH12	1.79	0.47
1:B:371:SER:H	1:B:374:GLN:NE2	2.13	0.46
1:D:498:LEU:HD22	1:D:502:LEU:HD12	1.97	0.46
1:E:301:THR:HG22	1:E:303:ASP:H	1.81	0.46
1:E:490:ASP:OD1	1:E:492:THR:OG1	2.22	0.46
1:F:501:ARG:HH12	5:F:702:1PE:H261	1.80	0.46
1:E:519:PHE:HB3	5:E:602:1PE:H252	1.97	0.46
1:F:501:ARG:HH12	5:F:702:1PE:H151	1.80	0.46
1:F:547:LEU:HD12	1:F:573:LEU:HD22	1.96	0.46
1:E:562:LYS:HZ2	1:E:566:GLN:HE21	1.62	0.46
1:B:405:ASP:OD1	1:B:407:SER:HB3	2.15	0.46
1:D:364:MET:HE2	1:D:364:MET:HB3	1.89	0.46
1:D:281:GLU:HG2	1:D:428:ASN:CG	2.41	0.45
1:F:379:TRP:CD2	1:F:397:ILE:HD11	2.51	0.45
1:A:406:ASP:CG	1:A:407:SER:H	2.24	0.45
1:D:345:SER:HB3	1:D:349:PHE:CE2	2.51	0.45
1:D:355:ARG:NH2	1:D:365:PRO:O	2.41	0.45
1:D:501:ARG:HH12	9:D:604:P6G:H52	1.82	0.45
1:D:501:ARG:NH1	9:D:604:P6G:H52	2.30	0.45
1:E:408:ASN:HB2	1:E:409:GLN:H	1.65	0.45
1:E:336:GLN:HG3	10:E:749:HOH:O	2.16	0.45
1:D:406:ASP:OD2	1:D:407:SER:N	2.45	0.45
1:F:292:PHE:HB2	1:F:473:LEU:HB3	1.97	0.45
1:F:389:GLU:O	1:F:391:ASN:N	2.46	0.45
1:E:379:TRP:CG	1:E:397:ILE:HD11	2.52	0.45
1:F:449:ALA:H	1:F:471:VAL:HG11	1.82	0.45
1:F:565:ASP:CG	1:F:566:GLN:H	2.23	0.45
1:E:355:ARG:NH2	1:E:365:PRO:O	2.50	0.44
1:B:458:GLU:OE1	1:B:458:GLU:N	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:274:ARG:HH21	1:D:456:THR:HG22	1.82	0.44
1:B:581:LYS:HB3	1:B:584:ILE:HD12	1.99	0.44
1:D:574:LEU:HD23	1:D:574:LEU:HA	1.81	0.44
1:B:355:ARG:NH2	1:B:367:ALA:H	2.15	0.44
1:C:363:SER:OG	1:C:364:MET:N	2.51	0.44
1:D:381:ASP:OD1	1:D:385:ARG:NE	2.51	0.44
1:F:278:GLN:OE1	1:F:455:LEU:HD11	2.18	0.44
1:F:527:TRP:CZ3	1:F:576:VAL:HG23	2.53	0.44
1:F:290:ILE:HD13	1:F:519:PHE:HE1	1.82	0.44
1:F:317:TYR:OH	1:F:580:GLU:O	2.24	0.44
1:F:339:TYR:CE2	1:F:392:ARG:HD3	2.53	0.44
1:B:509:ALA:HA	1:B:512:TYR:CZ	2.52	0.44
1:D:392:ARG:NH1	10:D:717:HOH:O	2.51	0.44
1:E:525:HIS:HB3	1:E:527:TRP:CE2	2.53	0.44
1:F:387:ALA:HA	1:F:391:ASN:HD21	1.82	0.44
1:F:573:LEU:HA	1:F:576:VAL:HG12	1.99	0.44
1:B:562:LYS:HB3	1:B:564:LYS:NZ	2.34	0.43
1:E:307:PHE:HB2	1:E:353:LEU:HD11	1.99	0.43
1:F:274:ARG:HG3	1:F:455:LEU:HD12	1.99	0.43
1:E:274:ARG:O	1:E:278:GLN:HG2	2.17	0.43
1:F:344:PHE:HA	1:F:364:MET:SD	2.58	0.43
1:A:445:VAL:HB	1:A:476:HIS:HB3	1.99	0.43
1:E:457:PRO:O	1:E:461:ARG:HD3	2.19	0.43
1:E:295:HIS:CE1	1:E:473:LEU:HD22	2.54	0.43
1:F:548:ASN:C	1:F:550:ASN:H	2.26	0.43
1:A:542:GLN:NE2	1:D:550:ASN:HD21	2.16	0.42
1:A:579:GLU:HG3	1:A:582:ARG:HE	1.84	0.42
1:B:581:LYS:HD3	7:B:602:PGE:H1	2.00	0.42
1:B:557:ASP:OD1	1:B:561:GLU:HB2	2.19	0.42
1:C:422:ASP:O	1:C:426:GLN:HG2	2.19	0.42
1:D:525:HIS:HB3	1:D:527:TRP:CE2	2.55	0.42
1:E:480:THR:HG22	5:E:602:1PE:H242	2.01	0.42
1:F:405:ASP:HA	1:F:412:PHE:CE2	2.54	0.42
1:C:275:PHE:HB2	1:C:279:MET:HE2	2.01	0.42
1:C:346:SER:HA	1:C:368:GLN:O	2.19	0.42
1:F:274:ARG:O	1:F:278:GLN:N	2.38	0.42
1:A:389:GLU:CD	1:A:389:GLU:H	2.28	0.42
1:B:501:ARG:HD3	2:B:601:PG4:H51	2.00	0.42
1:E:345:SER:OG	1:E:347:ASP:OD1	2.35	0.42
1:F:352:PRO:HA	1:F:355:ARG:HB3	2.02	0.42
5:A:605:1PE:H251	5:A:605:1PE:H242	1.85	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:309:LEU:O	1:B:495:MET:HB2	2.19	0.42
1:F:345:SER:HB3	1:F:368:GLN:NE2	2.34	0.42
1:F:355:ARG:HA	1:F:359:LEU:HD12	2.02	0.42
1:E:270:LEU:HD23	1:E:270:LEU:HA	1.85	0.42
1:B:581:LYS:HZ3	7:B:602:PGE:H1	1.85	0.42
1:F:270:LEU:HD23	1:F:270:LEU:HA	1.80	0.42
1:F:501:ARG:NH2	5:F:702:1PE:H252	2.30	0.42
1:A:311:TYR:CE2	1:A:321:VAL:HG11	2.55	0.42
1:C:277:LYS:HB3	1:C:277:LYS:HE2	1.94	0.42
1:D:248:LEU:HD12	1:D:511:GLU:HA	2.02	0.42
1:E:316:GLY:HA3	2:E:601:PG4:H22	2.01	0.42
1:A:458:GLU:CG	1:A:461:ARG:HH21	2.21	0.41
1:B:414:LYS:HD3	1:B:414:LYS:N	2.35	0.41
1:C:241:ALA:O	1:C:242:VAL:HG22	2.20	0.41
1:C:504:HIS:NE2	2:C:602:PG4:H82	2.35	0.41
1:F:295:HIS:CE1	1:F:473:LEU:HD22	2.55	0.41
1:E:555:THR:O	1:E:562:LYS:HD3	2.20	0.41
1:A:555:THR:OG1	1:A:566:GLN:HG3	2.20	0.41
1:E:445:VAL:HB	1:E:476:HIS:HB3	2.02	0.41
1:E:449:ALA:H	1:E:471:VAL:HG21	1.84	0.41
1:B:290:ILE:HD11	1:B:480:THR:HG21	2.02	0.41
1:D:390:ASP:O	10:D:702:HOH:O	2.22	0.41
1:F:572:LEU:O	1:F:576:VAL:HG12	2.21	0.41
1:F:457:PRO:HG2	1:F:458:GLU:OE2	2.21	0.41
1:C:246:TYR:HA	1:C:247:PRO:HA	1.91	0.41
1:C:343:LEU:HD13	1:C:396:TRP:CE3	2.56	0.41
1:C:379:TRP:CZ3	1:C:430:VAL:HG13	2.55	0.41
1:E:412:PHE:HA	1:E:415:ARG:HD3	2.02	0.41
1:E:501:ARG:NH1	5:E:602:1PE:H161	2.22	0.41
1:E:562:LYS:NZ	1:E:566:GLN:HE21	2.19	0.41
5:E:602:1PE:H131	5:E:602:1PE:H221	1.88	0.41
1:F:349:PHE:CE2	1:F:359:LEU:HD21	2.51	0.41
1:F:566:GLN:HB2	1:F:567:LYS:HG2	2.02	0.41
1:A:345:SER:HB3	1:A:349:PHE:CE1	2.56	0.41
1:B:564:LYS:HA	10:B:722:HOH:O	2.21	0.41
1:C:447:ILE:HB	1:C:474:VAL:HG22	2.02	0.41
1:F:343:LEU:HD21	1:F:368:GLN:NE2	2.36	0.41
1:F:456:THR:HG23	1:F:459:GLU:HG3	2.03	0.41
1:B:379:TRP:NE1	1:B:395:SER:OG	2.50	0.40
1:D:404:ILE:HD11	1:D:412:PHE:CD1	2.56	0.40
1:D:379:TRP:CZ3	1:D:430:VAL:HG13	2.56	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:545:LEU:HD21	1:E:553:TYR:CG	2.57	0.40
1:F:403:ASN:HB3	1:F:451:ARG:HH22	1.85	0.40
1:A:405:ASP:HB3	1:A:408:ASN:HB2	2.03	0.40
1:D:414:LYS:O	1:D:414:LYS:NZ	2.50	0.40
1:E:557:ASP:OD2	1:E:560:GLY:N	2.43	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	342/368 (93%)	318 (93%)	21 (6%)	3 (1%)	14	14
1	B	341/368 (93%)	323 (95%)	16 (5%)	2 (1%)	21	24
1	C	344/368 (94%)	313 (91%)	25 (7%)	6 (2%)	7	6
1	D	341/368 (93%)	325 (95%)	13 (4%)	3 (1%)	14	14
1	E	344/368 (94%)	318 (92%)	19 (6%)	7 (2%)	6	4
1	F	343/368 (93%)	296 (86%)	37 (11%)	10 (3%)	3	2
All	All	2055/2208 (93%)	1893 (92%)	131 (6%)	31 (2%)	8	7

All (31) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	406	ASP
1	C	242	VAL
1	E	412	PHE
1	C	369	THR
1	D	585	ALA
1	F	243	SER
1	F	244	VAL

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Mol	Chain	Res	Type
1	F	570	LEU
1	A	368	GLN
1	C	245	GLN
1	C	246	TYR
1	D	566	GLN
1	E	391	ASN
1	E	408	ASN
1	E	410	LYS
1	F	534	SER
1	B	563	ILE
1	C	364	MET
1	F	362	PHE
1	F	363	SER
1	F	392	ARG
1	A	562	LYS
1	B	368	GLN
1	C	563	ILE
1	E	357	ALA
1	E	564	LYS
1	E	566	GLN
1	F	405	ASP
1	F	568	PRO
1	F	364	MET
1	D	563	ILE

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	296/315 (94%)	296 (100%)	0	100	100
1	B	295/315 (94%)	295 (100%)	0	100	100
1	C	297/315 (94%)	297 (100%)	0	100	100
1	D	295/315 (94%)	295 (100%)	0	100	100
1	E	297/315 (94%)	297 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	F	297/315 (94%)	297 (100%)	0	100	100
All	All	1777/1890 (94%)	1777 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (35) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	288	GLN
1	A	374	GLN
1	A	411	ASN
1	A	466	GLN
1	A	486	ASN
1	A	526	ASN
1	A	542	GLN
1	A	552	HIS
1	A	554	GLN
1	B	374	GLN
1	B	500	GLN
1	B	510	ASN
1	C	428	ASN
1	C	525	HIS
1	C	554	GLN
1	D	252	HIS
1	D	260	GLN
1	D	432	ASN
1	D	486	ASN
1	D	548	ASN
1	E	356	GLN
1	E	408	ASN
1	E	411	ASN
1	E	500	GLN
1	E	566	GLN
1	F	304	ASN
1	F	368	GLN
1	F	374	GLN
1	F	460	ASN
1	F	468	HIS
1	F	525	HIS
1	F	548	ASN
1	F	549	ASN

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Mol	Chain	Res	Type
1	F	569	GLN
1	F	586	ASN

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, 8 are monoatomic - leaving 21 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	$\# Z > 2$
5	1PE	E	602	-	15,15,15	0.54	0	14,14,14	0.54	0
2	PG4	C	601	-	12,12,12	0.54	0	11,11,11	0.25	0
3	ETA	D	602	-	3,3,3	0.54	0	2,2,2	0.45	0
2	PG4	A	601	-	12,12,12	0.53	0	11,11,11	0.20	0
7	PGE	C	603	-	9,9,9	0.52	0	8,8,8	0.23	0
5	1PE	A	605	-	15,15,15	0.54	0	14,14,14	0.45	0
3	ETA	A	603	-	3,3,3	0.52	0	2,2,2	0.33	0
7	PGE	F	701	-	9,9,9	0.53	0	8,8,8	0.23	0
3	ETA	C	604	-	3,3,3	0.51	0	2,2,2	0.52	0
7	PGE	B	602	-	9,9,9	0.53	0	8,8,8	0.20	0
4	PEG	C	605	-	6,6,6	0.51	0	5,5,5	0.30	0
4	PEG	D	603	-	6,6,6	0.51	0	5,5,5	0.30	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	PG4	C	602	-	12,12,12	0.54	0	11,11,11	0.25	0
2	PG4	D	601	-	12,12,12	0.53	0	11,11,11	0.23	0
4	PEG	A	604	-	6,6,6	0.50	0	5,5,5	0.28	0
2	PG4	A	602	-	12,12,12	0.54	0	11,11,11	0.21	0
2	PG4	E	601	-	12,12,12	0.54	0	11,11,11	0.21	0
5	1PE	C	606	-	15,15,15	0.55	0	14,14,14	0.42	0
2	PG4	B	601	-	12,12,12	0.53	0	11,11,11	0.21	0
9	P6G	D	604	-	18,18,18	0.54	0	17,17,17	0.38	0
5	1PE	F	702	-	15,15,15	0.55	0	14,14,14	0.43	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
5	1PE	E	602	-	-	7/13/13/13	-
2	PG4	C	601	-	-	4/10/10/10	-
3	ETA	D	602	-	-	1/1/1/1	-
2	PG4	A	601	-	-	3/10/10/10	-
7	PGE	C	603	-	-	4/7/7/7	-
5	1PE	A	605	-	-	9/13/13/13	-
3	ETA	A	603	-	-	0/1/1/1	-
7	PGE	F	701	-	-	3/7/7/7	-
3	ETA	C	604	-	-	0/1/1/1	-
7	PGE	B	602	-	-	4/7/7/7	-
4	PEG	C	605	-	-	2/4/4/4	-
4	PEG	D	603	-	-	2/4/4/4	-
2	PG4	C	602	-	-	7/10/10/10	-
2	PG4	D	601	-	-	4/10/10/10	-
4	PEG	A	604	-	-	2/4/4/4	-
2	PG4	A	602	-	-	3/10/10/10	-
2	PG4	E	601	-	-	4/10/10/10	-
5	1PE	C	606	-	-	8/13/13/13	-
2	PG4	B	601	-	-	8/10/10/10	-
9	P6G	D	604	-	-	11/16/16/16	-
5	1PE	F	702	-	-	9/13/13/13	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (95) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	602	ETA	O-C-CA-N
5	A	605	1PE	OH4-C13-C23-OH3
5	A	605	1PE	C24-C14-OH5-C25
5	F	702	1PE	OH4-C13-C23-OH3
5	A	605	1PE	OH5-C14-C24-OH4
9	D	604	P6G	O1-C2-C3-O4
2	D	601	PG4	O3-C5-C6-O4
9	D	604	P6G	O7-C8-C9-O10
5	A	605	1PE	OH6-C15-C25-OH5
9	D	604	P6G	O10-C11-C12-O13
9	D	604	P6G	O13-C14-C15-O16
2	B	601	PG4	O3-C5-C6-O4
2	B	601	PG4	O4-C7-C8-O5
2	C	602	PG4	O1-C1-C2-O2
4	A	604	PEG	O2-C3-C4-O4
5	C	606	1PE	OH4-C13-C23-OH3
5	E	602	1PE	OH5-C14-C24-OH4
5	F	702	1PE	C12-C22-OH3-C23
4	A	604	PEG	O1-C1-C2-O2
5	A	605	1PE	C12-C22-OH3-C23
7	B	602	PGE	C4-C3-O2-C2
2	C	601	PG4	O4-C7-C8-O5
2	D	601	PG4	O4-C7-C8-O5
4	C	605	PEG	O1-C1-C2-O2
4	D	603	PEG	O2-C3-C4-O4
5	A	605	1PE	OH2-C12-C22-OH3
5	A	605	1PE	OH7-C16-C26-OH6
5	E	602	1PE	OH7-C16-C26-OH6
5	F	702	1PE	OH2-C12-C22-OH3
7	B	602	PGE	O1-C1-C2-O2
2	B	601	PG4	O1-C1-C2-O2
5	E	602	1PE	C16-C26-OH6-C15
9	D	604	P6G	O16-C17-C18-O19
9	D	604	P6G	O4-C5-C6-O7
2	C	602	PG4	O2-C3-C4-O3
2	C	602	PG4	O3-C5-C6-O4
7	F	701	PGE	C3-C4-O3-C5

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Mol	Chain	Res	Type	Atoms
5	C	606	1PE	OH5-C14-C24-OH4
2	C	602	PG4	C5-C6-O4-C7
2	B	601	PG4	C8-C7-O4-C6
5	F	702	1PE	C24-C14-OH5-C25
9	D	604	P6G	C18-C17-O16-C15
2	A	601	PG4	C1-C2-O2-C3
9	D	604	P6G	C12-C11-O10-C9
2	B	601	PG4	C4-C3-O2-C2
5	F	702	1PE	C16-C26-OH6-C15
9	D	604	P6G	C14-C15-O16-C17
5	A	605	1PE	C13-C23-OH3-C22
5	C	606	1PE	C23-C13-OH4-C24
2	E	601	PG4	C1-C2-O2-C3
5	F	702	1PE	C15-C25-OH5-C14
7	B	602	PGE	C1-C2-O2-C3
5	E	602	1PE	C24-C14-OH5-C25
2	C	601	PG4	O1-C1-C2-O2
7	C	603	PGE	C1-C2-O2-C3
4	C	605	PEG	C4-C3-O2-C2
5	E	602	1PE	C15-C25-OH5-C14
5	C	606	1PE	C16-C26-OH6-C15
2	A	601	PG4	C6-C5-O3-C4
9	D	604	P6G	C15-C14-O13-C12
9	D	604	P6G	C9-C8-O7-C6
5	C	606	1PE	C24-C14-OH5-C25
2	A	601	PG4	O1-C1-C2-O2
2	A	602	PG4	C5-C6-O4-C7
5	C	606	1PE	C25-C15-OH6-C26
2	C	602	PG4	C6-C5-O3-C4
5	C	606	1PE	OH6-C15-C25-OH5
4	D	603	PEG	C1-C2-O2-C3
2	C	602	PG4	C3-C4-O3-C5
5	F	702	1PE	C25-C15-OH6-C26
7	F	701	PGE	C1-C2-O2-C3
7	C	603	PGE	O1-C1-C2-O2
2	C	601	PG4	C4-C3-O2-C2
7	C	603	PGE	C3-C4-O3-C5
2	E	601	PG4	C8-C7-O4-C6
5	E	602	1PE	OH6-C15-C25-OH5
2	B	601	PG4	C1-C2-O2-C3
5	F	702	1PE	OH5-C14-C24-OH4
2	B	601	PG4	C6-C5-O3-C4

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Mol	Chain	Res	Type	Atoms
2	C	601	PG4	C3-C4-O3-C5
2	D	601	PG4	C6-C5-O3-C4
2	E	601	PG4	O4-C7-C8-O5
7	B	602	PGE	O2-C3-C4-O3
2	E	601	PG4	O3-C5-C6-O4
5	E	602	1PE	C23-C13-OH4-C24
7	F	701	PGE	O2-C3-C4-O3
2	A	602	PG4	C8-C7-O4-C6
2	A	602	PG4	O3-C5-C6-O4
5	F	702	1PE	OH6-C15-C25-OH5
2	B	601	PG4	C5-C6-O4-C7
5	C	606	1PE	C12-C22-OH3-C23
2	C	602	PG4	C1-C2-O2-C3
2	D	601	PG4	C1-C2-O2-C3
5	A	605	1PE	C14-C24-OH4-C13
7	C	603	PGE	O2-C3-C4-O3

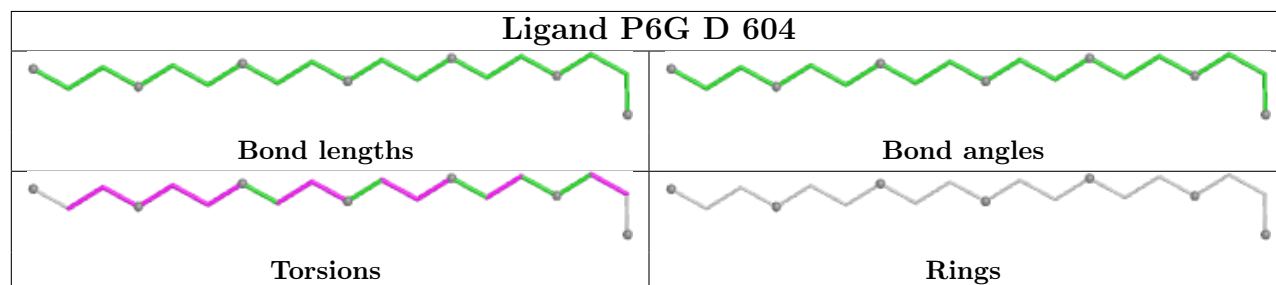
There are no ring outliers.

13 monomers are involved in 28 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	E	602	1PE	6	0
2	C	601	PG4	1	0
2	A	601	PG4	2	0
5	A	605	1PE	1	0
7	F	701	PGE	1	0
7	B	602	PGE	2	0
4	C	605	PEG	2	0
2	C	602	PG4	2	0
2	D	601	PG4	1	0
2	E	601	PG4	1	0
2	B	601	PG4	2	0
9	D	604	P6G	2	0
5	F	702	1PE	5	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	344/368 (93%)	0.11	27 (7%) 19 21	17, 36, 104, 160	0
1	B	343/368 (93%)	-0.07	7 (2%) 65 70	21, 36, 73, 109	0
1	C	345/368 (93%)	0.08	13 (3%) 44 50	17, 38, 79, 128	1 (0%)
1	D	343/368 (93%)	0.00	12 (3%) 47 53	22, 39, 79, 117	0
1	E	346/368 (94%)	0.87	50 (14%) 6 7	30, 62, 122, 182	0
1	F	345/368 (93%)	1.19	78 (22%) 2 1	32, 68, 141, 178	0
All	All	2066/2208 (93%)	0.37	187 (9%) 15 17	17, 44, 110, 182	1 (0%)

All (187) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	367	ALA	6.4
1	C	366	ALA	6.2
1	F	362	PHE	6.2
1	F	350	ALA	5.7
1	C	241	ALA	5.4
1	A	366	ALA	5.1
1	F	386	TYR	5.0
1	C	368	GLN	5.0
1	A	242	VAL	4.8
1	C	242	VAL	4.8
1	F	387	ALA	4.6
1	B	367	ALA	4.6
1	E	563	ILE	4.5
1	A	367	ALA	4.5
1	E	241	ALA	4.4
1	A	411	ASN	4.4
1	F	367	ALA	4.3
1	E	387	ALA	4.3
1	A	365	PRO	4.3

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Mol	Chain	Res	Type	RSRZ
1	F	242	VAL	4.2
1	E	553	TYR	4.1
1	F	359	LEU	4.1
1	F	585	ALA	4.0
1	E	354	TYR	4.0
1	D	585	ALA	4.0
1	F	404	ILE	4.0
1	F	563	ILE	3.9
1	E	412	PHE	3.8
1	A	410	LYS	3.8
1	C	387	ALA	3.8
1	E	404	ILE	3.8
1	F	413	VAL	3.8
1	F	366	ALA	3.6
1	F	568	PRO	3.6
1	F	349	PHE	3.6
1	C	363	SER	3.6
1	F	408	ASN	3.6
1	D	391	ASN	3.5
1	F	417	ALA	3.5
1	A	391	ASN	3.5
1	F	457	PRO	3.4
1	A	357	ALA	3.4
1	A	387	ALA	3.4
1	B	366	ALA	3.4
1	F	558	LEU	3.4
1	F	409	GLN	3.4
1	F	363	SER	3.4
1	A	386	TYR	3.4
1	F	365	PRO	3.4
1	A	412	PHE	3.3
1	E	353	LEU	3.3
1	A	362	PHE	3.3
1	B	407	SER	3.3
1	F	488	LEU	3.2
1	F	360	SER	3.2
1	F	391	ASN	3.2
1	E	554	GLN	3.2
1	F	566	GLN	3.2
1	F	405	ASP	3.1
1	F	543	MET	3.1
1	E	242	VAL	3.1

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Mol	Chain	Res	Type	RSRZ
1	E	409	GLN	3.1
1	F	406	ASP	3.1
1	F	361	ASP	3.0
1	F	564	LYS	3.0
1	F	243	SER	3.0
1	D	407	SER	3.0
1	A	406	ASP	3.0
1	E	362	PHE	2.9
1	F	358	LEU	2.9
1	F	536	LEU	2.9
1	D	405	ASP	2.9
1	E	564	LYS	2.9
1	E	408	ASN	2.9
1	F	276	GLU	2.9
1	C	243	SER	2.8
1	F	369	THR	2.8
1	E	390	ASP	2.8
1	B	368	GLN	2.8
1	E	457	PRO	2.8
1	F	466	GLN	2.8
1	C	585	ALA	2.8
1	F	410	LYS	2.8
1	F	584	ILE	2.8
1	E	410	LYS	2.8
1	E	552	HIS	2.7
1	E	549	ASN	2.7
1	E	584	ILE	2.7
1	F	544	THR	2.7
1	F	545	LEU	2.7
1	F	559	HIS	2.7
1	A	369	THR	2.7
1	B	408	ASN	2.7
1	F	348	GLY	2.7
1	F	364	MET	2.7
1	F	305	GLY	2.7
1	E	366	ALA	2.7
1	A	561	GLU	2.7
1	D	406	ASP	2.6
1	D	549	ASN	2.6
1	E	352	PRO	2.6
1	F	534	SER	2.6
1	A	559	HIS	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	368	GLN	2.6
1	E	460	ASN	2.6
1	F	422	ASP	2.6
1	E	391	ASN	2.5
1	F	390	ASP	2.5
1	F	456	THR	2.5
1	C	407	SER	2.5
1	F	574	LEU	2.5
1	E	367	ALA	2.5
1	A	243	SER	2.5
1	F	556	TYR	2.5
1	E	574	LEU	2.5
1	E	405	ASP	2.5
1	D	409	GLN	2.5
1	F	535	THR	2.5
1	E	384	GLY	2.5
1	A	407	SER	2.4
1	F	272	TYR	2.4
1	C	390	ASP	2.4
1	F	570	LEU	2.4
1	F	526	ASN	2.4
1	F	487	VAL	2.4
1	F	278	GLN	2.4
1	A	565	ASP	2.3
1	F	388	GLN	2.3
1	D	390	ASP	2.3
1	D	526	ASN	2.3
1	E	561	GLU	2.3
1	F	569	GLN	2.3
1	A	408	ASN	2.3
1	D	564	LYS	2.3
1	E	411	ASN	2.3
1	E	565	ASP	2.3
1	E	586	ASN	2.3
1	F	565	ASP	2.3
1	E	365	PRO	2.3
1	B	243	SER	2.3
1	E	388	GLN	2.3
1	B	550	ASN	2.2
1	E	406	ASP	2.2
1	F	351	SER	2.2
1	F	244	VAL	2.2

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Mol	Chain	Res	Type	RSRZ
1	F	455	LEU	2.2
1	E	559	HIS	2.2
1	E	413	VAL	2.2
1	E	325	ARG	2.2
1	E	550	ASN	2.2
1	F	385	ARG	2.2
1	F	586	ASN	2.2
1	F	560	GLY	2.2
1	E	579	GLU	2.2
1	E	244	VAL	2.2
1	F	412	PHE	2.2
1	C	245	GLN	2.2
1	F	368	GLN	2.2
1	E	456	THR	2.2
1	A	354	TYR	2.1
1	A	560	GLY	2.1
1	A	564	LYS	2.1
1	F	567	LYS	2.1
1	F	542	GLN	2.1
1	F	551	GLY	2.1
1	F	346	SER	2.1
1	F	371	SER	2.1
1	E	369	THR	2.1
1	E	419	ALA	2.1
1	C	388	GLN	2.1
1	E	548	ASN	2.1
1	F	549	ASN	2.1
1	A	352	PRO	2.1
1	E	528	VAL	2.1
1	F	355	ARG	2.1
1	F	464	TRP	2.1
1	D	562	LYS	2.0
1	A	350	ALA	2.0
1	E	389	GLU	2.0
1	E	420	ALA	2.0
1	E	556	TYR	2.0
1	F	301	THR	2.0
1	F	537	ALA	2.0
1	A	542	GLN	2.0
1	E	570	LEU	2.0
1	F	347	ASP	2.0
1	D	563	ILE	2.0

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.

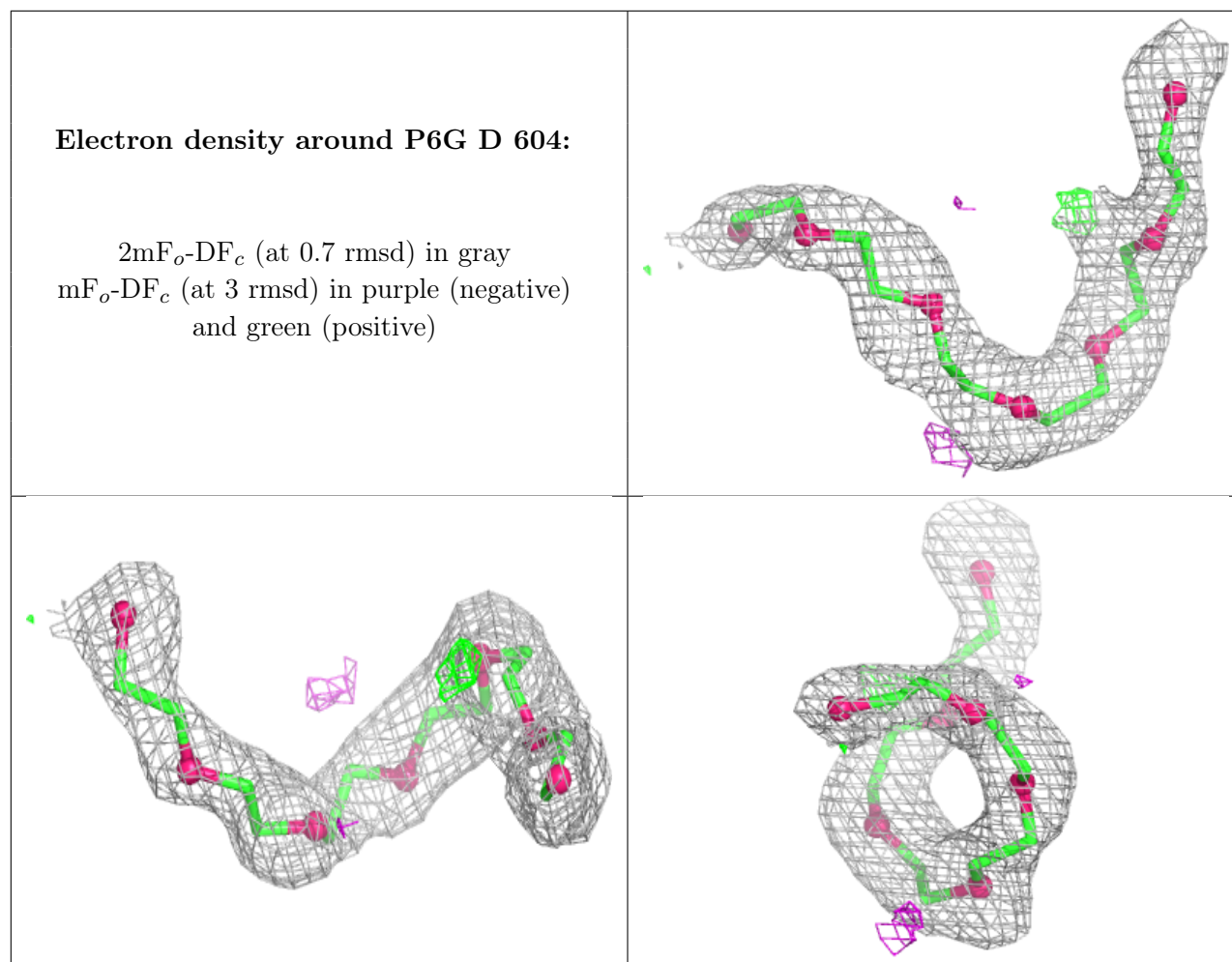
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
7	PGE	F	701	10/10	0.73	0.19	76,79,80,80	0
8	CA	E	603	1/1	0.74	0.22	174,174,174,174	0
4	PEG	D	603	7/7	0.78	0.16	63,67,70,70	0
2	PG4	A	602	13/13	0.80	0.15	56,64,72,73	0
7	PGE	C	603	10/10	0.80	0.17	67,68,68,69	0
4	PEG	A	604	7/7	0.81	0.17	69,74,76,77	0
3	ETA	A	603	4/4	0.82	0.23	53,58,64,66	0
2	PG4	C	602	13/13	0.82	0.19	58,69,81,82	0
2	PG4	E	601	13/13	0.82	0.17	69,71,74,74	0
5	1PE	F	702	16/16	0.83	0.15	55,63,70,71	0
3	ETA	D	602	4/4	0.83	0.17	47,51,52,54	0
4	PEG	C	605	7/7	0.85	0.15	48,60,70,72	0
5	1PE	E	602	16/16	0.85	0.15	50,57,60,62	0
7	PGE	B	602	10/10	0.87	0.17	41,68,73,73	0
2	PG4	A	601	13/13	0.88	0.13	43,52,58,61	0
2	PG4	D	601	13/13	0.88	0.15	57,68,73,74	0
5	1PE	C	606	16/16	0.88	0.11	45,54,59,62	0
9	P6G	D	604	19/19	0.88	0.15	49,63,70,71	0
5	1PE	A	605	16/16	0.90	0.13	49,60,66,66	0
2	PG4	B	601	13/13	0.90	0.12	40,47,54,60	0
3	ETA	C	604	4/4	0.90	0.13	25,33,38,39	0
6	MG	F	703	1/1	0.91	0.08	49,49,49,49	0
2	PG4	C	601	13/13	0.91	0.11	43,49,59,62	0
6	MG	B	603	1/1	0.96	0.07	30,30,30,30	0
6	MG	C	607	1/1	0.96	0.14	35,35,35,35	0
8	CA	B	604	1/1	0.98	0.09	60,60,60,60	0
8	CA	C	608	1/1	0.98	0.10	53,53,53,53	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
6	MG	A	606	1/1	0.98	0.03	26,26,26,26	0
6	MG	D	605	1/1	0.98	0.04	37,37,37,37	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 [i](#)

There are no such residues in this entry.