



wwPDB X-ray Structure Validation Summary Report ⓘ

Apr 25, 2026 – 02:50 AM EDT

PDB ID : 1VH8 / pdb_00001vh8
Title : Crystal structure of a 2C-methyl-D-erythritol 2,4-cyclodiphosphate synthase
Authors : Structural GenomiX
Deposited on : 2003-12-01
Resolution : 2.35 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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
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

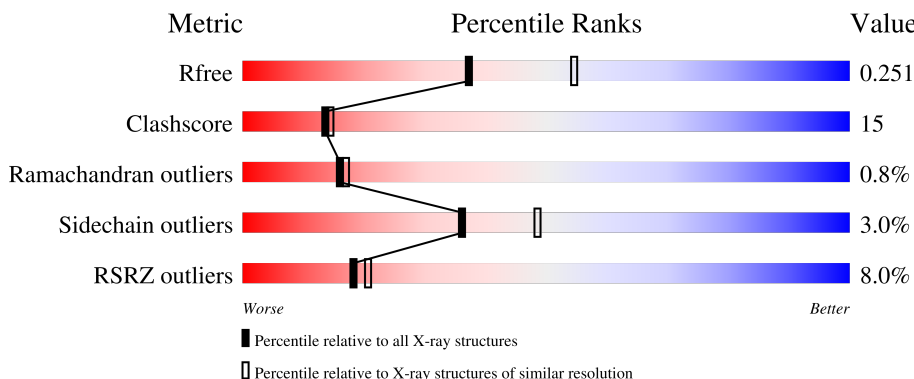
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 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	170	8% 68% 19% • 10%
1	B	170	8% 69% 19% • 11%
1	C	170	5% 69% 18% • 11%
1	D	170	6% 62% 24% • 11%
1	E	170	8% 67% 20% • 11%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	170	8% 59% 26% • 11%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 7183 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 2-C-methyl-D-erythritol 2,4-cyclodiphosphate synthase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	153	Total	C	N	O	S	Se	0	0	0
			1155	728	208	215	2	2			
1	B	152	Total	C	N	O	S	Se	0	0	0
			1146	722	206	214	2	2			
1	C	152	Total	C	N	O	S	Se	0	0	0
			1146	722	206	214	2	2			
1	D	152	Total	C	N	O	S	Se	0	0	0
			1145	721	206	214	2	2			
1	E	152	Total	C	N	O	S	Se	0	0	0
			1145	721	206	214	2	2			
1	F	152	Total	C	N	O	S	Se	0	0	0
			1145	721	206	214	2	2			

There are 96 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MSE	-	cloning artifact	UNP P44815
A	0	SER	-	cloning artifact	UNP P44815
A	1	LEU	-	cloning artifact	UNP P44815
A	67	MSE	MET	modified residue	UNP P44815
A	106	MSE	MET	modified residue	UNP P44815
A	113	MSE	MET	modified residue	UNP P44815
A	159	GLU	-	cloning artifact	UNP P44815
A	160	GLY	-	cloning artifact	UNP P44815
A	161	GLY	-	cloning artifact	UNP P44815
A	162	SER	-	cloning artifact	UNP P44815
A	163	HIS	-	cloning artifact	UNP P44815
A	164	HIS	-	cloning artifact	UNP P44815
A	165	HIS	-	cloning artifact	UNP P44815
A	166	HIS	-	cloning artifact	UNP P44815
A	167	HIS	-	cloning artifact	UNP P44815
A	168	HIS	-	cloning artifact	UNP P44815
B	-1	MSE	-	cloning artifact	UNP P44815

Continued on next page...

Continued from previous page...

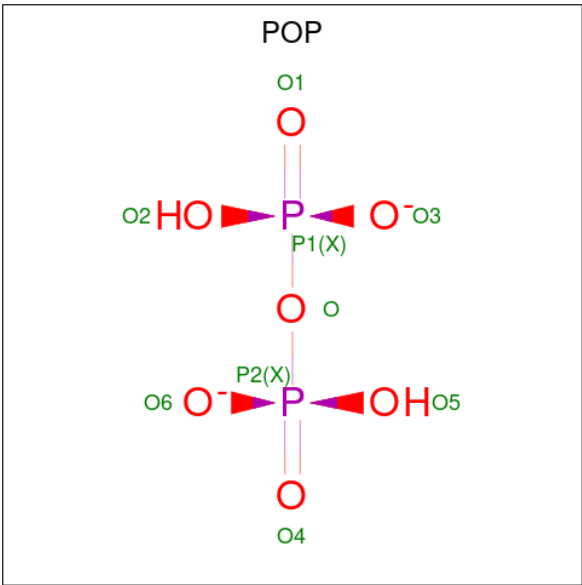
Chain	Residue	Modelled	Actual	Comment	Reference
B	0	SER	-	cloning artifact	UNP P44815
B	1	LEU	-	cloning artifact	UNP P44815
B	67	MSE	MET	modified residue	UNP P44815
B	106	MSE	MET	modified residue	UNP P44815
B	113	MSE	MET	modified residue	UNP P44815
B	159	GLU	-	cloning artifact	UNP P44815
B	160	GLY	-	cloning artifact	UNP P44815
B	161	GLY	-	cloning artifact	UNP P44815
B	162	SER	-	cloning artifact	UNP P44815
B	163	HIS	-	cloning artifact	UNP P44815
B	164	HIS	-	cloning artifact	UNP P44815
B	165	HIS	-	cloning artifact	UNP P44815
B	166	HIS	-	cloning artifact	UNP P44815
B	167	HIS	-	cloning artifact	UNP P44815
B	168	HIS	-	cloning artifact	UNP P44815
C	-1	MSE	-	cloning artifact	UNP P44815
C	0	SER	-	cloning artifact	UNP P44815
C	1	LEU	-	cloning artifact	UNP P44815
C	67	MSE	MET	modified residue	UNP P44815
C	106	MSE	MET	modified residue	UNP P44815
C	113	MSE	MET	modified residue	UNP P44815
C	159	GLU	-	cloning artifact	UNP P44815
C	160	GLY	-	cloning artifact	UNP P44815
C	161	GLY	-	cloning artifact	UNP P44815
C	162	SER	-	cloning artifact	UNP P44815
C	163	HIS	-	cloning artifact	UNP P44815
C	164	HIS	-	cloning artifact	UNP P44815
C	165	HIS	-	cloning artifact	UNP P44815
C	166	HIS	-	cloning artifact	UNP P44815
C	167	HIS	-	cloning artifact	UNP P44815
C	168	HIS	-	cloning artifact	UNP P44815
D	-1	MSE	-	cloning artifact	UNP P44815
D	0	SER	-	cloning artifact	UNP P44815
D	1	LEU	-	cloning artifact	UNP P44815
D	67	MSE	MET	modified residue	UNP P44815
D	106	MSE	MET	modified residue	UNP P44815
D	113	MSE	MET	modified residue	UNP P44815
D	159	GLU	-	cloning artifact	UNP P44815
D	160	GLY	-	cloning artifact	UNP P44815
D	161	GLY	-	cloning artifact	UNP P44815
D	162	SER	-	cloning artifact	UNP P44815
D	163	HIS	-	cloning artifact	UNP P44815

Continued on next page...

Continued from previous page...

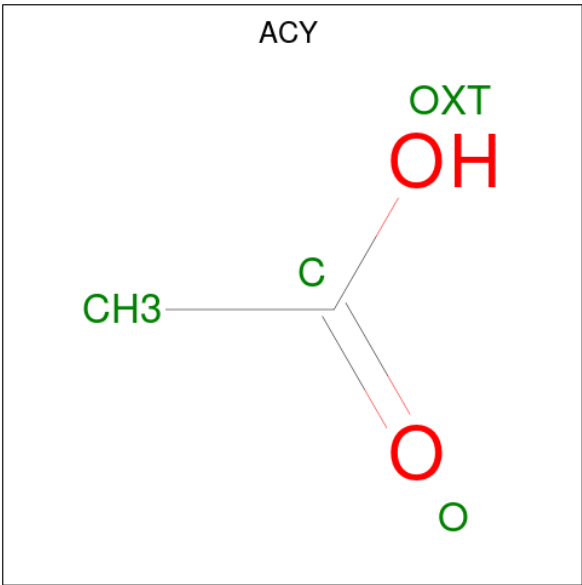
Chain	Residue	Modelled	Actual	Comment	Reference
D	164	HIS	-	cloning artifact	UNP P44815
D	165	HIS	-	cloning artifact	UNP P44815
D	166	HIS	-	cloning artifact	UNP P44815
D	167	HIS	-	cloning artifact	UNP P44815
D	168	HIS	-	cloning artifact	UNP P44815
E	-1	MSE	-	cloning artifact	UNP P44815
E	0	SER	-	cloning artifact	UNP P44815
E	1	LEU	-	cloning artifact	UNP P44815
E	67	MSE	MET	modified residue	UNP P44815
E	106	MSE	MET	modified residue	UNP P44815
E	113	MSE	MET	modified residue	UNP P44815
E	159	GLU	-	cloning artifact	UNP P44815
E	160	GLY	-	cloning artifact	UNP P44815
E	161	GLY	-	cloning artifact	UNP P44815
E	162	SER	-	cloning artifact	UNP P44815
E	163	HIS	-	cloning artifact	UNP P44815
E	164	HIS	-	cloning artifact	UNP P44815
E	165	HIS	-	cloning artifact	UNP P44815
E	166	HIS	-	cloning artifact	UNP P44815
E	167	HIS	-	cloning artifact	UNP P44815
E	168	HIS	-	cloning artifact	UNP P44815
F	-1	MSE	-	cloning artifact	UNP P44815
F	0	SER	-	cloning artifact	UNP P44815
F	1	LEU	-	cloning artifact	UNP P44815
F	67	MSE	MET	modified residue	UNP P44815
F	106	MSE	MET	modified residue	UNP P44815
F	113	MSE	MET	modified residue	UNP P44815
F	159	GLU	-	cloning artifact	UNP P44815
F	160	GLY	-	cloning artifact	UNP P44815
F	161	GLY	-	cloning artifact	UNP P44815
F	162	SER	-	cloning artifact	UNP P44815
F	163	HIS	-	cloning artifact	UNP P44815
F	164	HIS	-	cloning artifact	UNP P44815
F	165	HIS	-	cloning artifact	UNP P44815
F	166	HIS	-	cloning artifact	UNP P44815
F	167	HIS	-	cloning artifact	UNP P44815
F	168	HIS	-	cloning artifact	UNP P44815

- Molecule 2 is PYROPHOSPHATE 2- (CCD ID: POP) (formula: $\text{H}_2\text{O}_7\text{P}_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	P	0	1
			27	21	6		
2	D	1	Total	O	P	0	1
			27	21	6		

- Molecule 3 is ACETIC ACID (CCD ID: ACY) (formula: C₂H₄O₂).



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

Continued on next page...

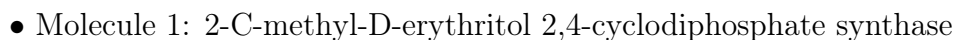
Continued from previous page...

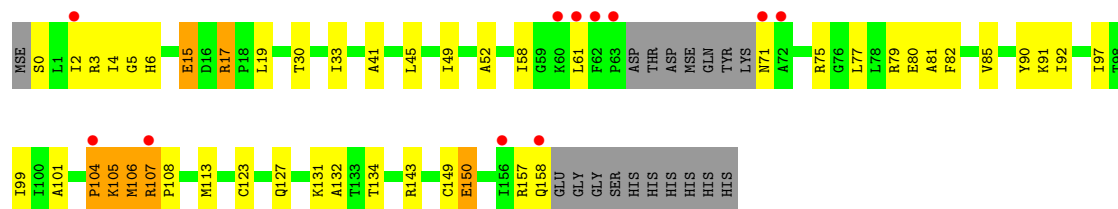
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	C	1	Total 4	C 2	O 2	0	0
3	D	1	Total 4	C 2	O 2	0	0
3	E	1	Total 4	C 2	O 2	0	0
3	F	1	Total 4	C 2	O 2	0	0

- Molecule 4 is water.

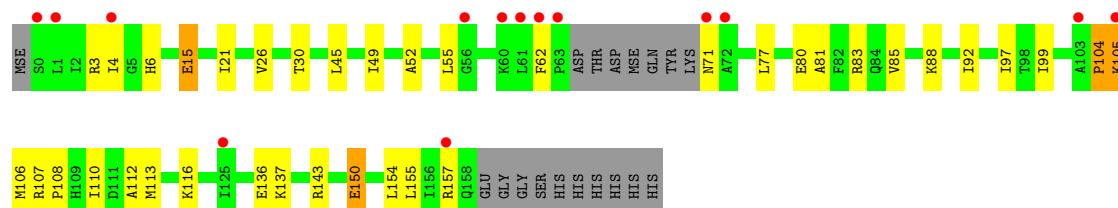
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	40	Total 40	O 40	0	0
4	B	40	Total 40	O 40	0	0
4	C	50	Total 50	O 50	0	0
4	D	32	Total 32	O 32	0	0
4	E	27	Total 27	O 27	0	0
4	F	34	Total 34	O 34	0	0

- Molecule 1: 2-C-methyl-D-erythritol 2,4-cyclodiphosphate synthase

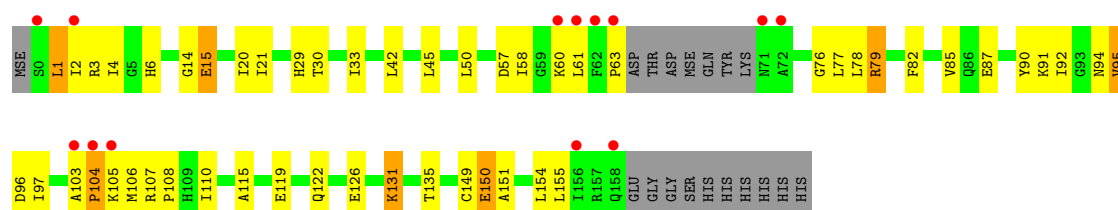




● Molecule 1: 2-C-methyl-D-erythritol 2,4-cyclodiphosphate synthase



● Molecule 1: 2-C-methyl-D-erythritol 2,4-cyclodiphosphate synthase



4 Data and refinement statistics

Property	Value	Source
Space group	I 41	Depositor
Cell constants a, b, c, α , β , γ	104.85Å 104.85Å 195.75Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.94 – 2.35 48.94 – 2.35	Depositor EDS
% Data completeness (in resolution range)	(Not available) (48.94-2.35) 99.3 (48.94-2.35)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.38 (at 2.34Å)	Xtriage
Refinement program	REFMAC 4.0	Depositor
R, R_{free}	0.240 , 0.280 0.207 , 0.251	Depositor DCC
R_{free} test set	2208 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	36.8	Xtriage
Anisotropy	0.074	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 46.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.025 for h,-k,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7183	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.30% 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: POP, ACY

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	0.42	0/1170	0.89	3/1576 (0.2%)
1	B	0.42	0/1161	0.87	4/1565 (0.3%)
1	C	0.46	1/1161 (0.1%)	0.87	4/1565 (0.3%)
1	D	0.39	0/1160	0.84	1/1564 (0.1%)
1	E	0.37	0/1160	0.87	3/1564 (0.2%)
1	F	0.45	1/1160 (0.1%)	0.89	3/1564 (0.2%)
All	All	0.42	2/6972 (0.0%)	0.87	18/9398 (0.2%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	71	ASN	CG-OD1	5.20	1.33	1.23
1	F	122	GLN	CD-OE1	5.10	1.33	1.23

The worst 5 of 18 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	106	MSE	N-CA-C	-8.97	102.74	114.31
1	E	106	MSE	N-CA-C	-8.93	103.22	114.56
1	B	106	MSE	N-CA-C	-7.45	103.32	114.64
1	E	105	LYS	N-CA-C	6.79	119.81	108.20
1	C	106	MSE	N-CA-C	-6.15	106.75	114.56

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	1155	0	1160	42	0
1	B	1146	0	1147	35	0
1	C	1146	0	1147	31	0
1	D	1145	0	1145	37	0
1	E	1145	0	1145	31	0
1	F	1145	0	1145	48	0
2	A	27	0	0	4	0
2	D	27	0	0	2	0
3	A	4	0	3	1	0
3	B	4	0	3	1	0
3	C	4	0	3	0	0
3	D	4	0	3	0	0
3	E	4	0	3	0	0
3	F	4	0	3	0	0
4	A	40	0	0	1	0
4	B	40	0	0	0	0
4	C	50	0	0	0	0
4	D	32	0	0	1	0
4	E	27	0	0	0	0
4	F	34	0	0	1	0
All	All	7183	0	6907	201	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 15.

The worst 5 of 201 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:107:ARG:HH12	1:A:132:ALA:H	1.08	1.01
1:B:107:ARG:HH21	1:B:107:ARG:HB2	1.27	0.95
1:A:107:ARG:HH22	1:A:132:ALA:HB3	1.32	0.94
1:A:70:LYS:HG2	1:A:71:ASN:H	1.30	0.93
1:A:15:GLU:HG2	1:A:30:THR:HB	1.49	0.92

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	149/170 (88%)	142 (95%)	6 (4%)	1 (1%)	18	20
1	B	148/170 (87%)	142 (96%)	5 (3%)	1 (1%)	18	20
1	C	148/170 (87%)	144 (97%)	3 (2%)	1 (1%)	18	20
1	D	148/170 (87%)	141 (95%)	5 (3%)	2 (1%)	9	7
1	E	148/170 (87%)	141 (95%)	6 (4%)	1 (1%)	18	20
1	F	148/170 (87%)	142 (96%)	5 (3%)	1 (1%)	18	20
All	All	889/1020 (87%)	852 (96%)	30 (3%)	7 (1%)	16	17

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	104	PRO
1	C	104	PRO
1	D	104	PRO
1	E	104	PRO
1	F	104	PRO

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	116/129 (90%)	113 (97%)	3 (3%)	40	54
1	B	115/129 (89%)	111 (96%)	4 (4%)	32	42
1	C	115/129 (89%)	113 (98%)	2 (2%)	53	68

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	115/129 (89%)	110 (96%)	5 (4%)	26	34
1	E	115/129 (89%)	113 (98%)	2 (2%)	53	68
1	F	115/129 (89%)	110 (96%)	5 (4%)	26	34
All	All	691/774 (89%)	670 (97%)	21 (3%)	36	48

5 of 21 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	15	GLU
1	F	79	ARG
1	F	150	GLU
1	F	95	VAL
1	F	15	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	122	GLN
1	F	35	HIS
1	F	43	HIS
1	E	122	GLN
1	C	122	GLN

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

12 ligands are modelled in this entry.

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
2	POP	D	169[A]	3	6,8,8	1.16	0	12,13,13	0.84	0
3	ACY	D	170	2	3,3,3	0.91	0	3,3,3	1.69	1 (33%)
3	ACY	B	169	2	3,3,3	0.94	0	3,3,3	1.73	1 (33%)
3	ACY	F	169	2	3,3,3	1.02	0	3,3,3	1.69	1 (33%)
3	ACY	C	169	2	3,3,3	0.93	0	3,3,3	1.71	1 (33%)
2	POP	A	169[B]	3	6,8,8	1.18	0	12,13,13	0.85	0
2	POP	D	169[C]	3	6,8,8	1.20	0	12,13,13	0.84	0
2	POP	A	169[A]	3	6,8,8	1.17	0	12,13,13	0.84	0
3	ACY	A	170	2	3,3,3	0.98	0	3,3,3	1.73	1 (33%)
3	ACY	E	169	2	3,3,3	0.96	0	3,3,3	1.75	1 (33%)
2	POP	D	169[B]	3	6,8,8	1.18	0	12,13,13	0.85	0
2	POP	A	169[C]	3	6,8,8	1.15	0	12,13,13	0.82	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
2	POP	D	169[A]	3	-	1/6/6/6	-
2	POP	A	169[B]	3	-	3/6/6/6	-
2	POP	D	169[C]	3	-	3/6/6/6	-
2	POP	A	169[A]	3	-	1/6/6/6	-
2	POP	D	169[B]	3	-	3/6/6/6	-
2	POP	A	169[C]	3	-	3/6/6/6	-

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	169	ACY	O-C-CH3	-2.41	112.66	122.53
3	B	169	ACY	O-C-CH3	-2.39	112.74	122.53
3	A	170	ACY	O-C-CH3	-2.38	112.78	122.53
3	C	169	ACY	O-C-CH3	-2.36	112.85	122.53
3	F	169	ACY	O-C-CH3	-2.33	112.96	122.53

There are no chirality outliers.

5 of 14 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	169[B]	POP	P1-O-P2-O4
2	A	169[C]	POP	P1-O-P2-O4
2	D	169[C]	POP	P1-O-P2-O4
2	A	169[A]	POP	P1-O-P2-O5
2	D	169[B]	POP	P1-O-P2-O4

There are no ring outliers.

6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	169[A]	POP	1	0
3	B	169	ACY	1	0
2	A	169[A]	POP	1	0
3	A	170	ACY	1	0
2	D	169[B]	POP	1	0
2	A	169[C]	POP	3	0

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	151/170 (88%)	0.28	13 (8%) 16 18	17, 33, 58, 68	0
1	B	150/170 (88%)	0.24	13 (8%) 16 18	18, 29, 63, 93	0
1	C	150/170 (88%)	0.16	8 (5%) 32 37	16, 31, 55, 64	0
1	D	150/170 (88%)	0.43	11 (7%) 21 24	20, 38, 65, 87	0
1	E	150/170 (88%)	0.55	14 (9%) 14 17	21, 40, 68, 87	0
1	F	150/170 (88%)	0.40	13 (8%) 16 18	20, 32, 64, 94	0
All	All	901/1020 (88%)	0.34	72 (7%) 18 21	16, 34, 62, 94	0

The worst 5 of 72 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	62	PHE	5.1
1	F	63	PRO	4.9
1	B	63	PRO	4.8
1	F	0	SER	4.7
1	B	61	LEU	4.7

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

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(Å ²)	Q<0.9
3	ACY	E	169	4/4	0.59	0.24	31,32,34,35	4
3	ACY	D	170	4/4	0.69	0.19	24,25,26,26	4
3	ACY	A	170	4/4	0.71	0.22	28,31,32,33	4
3	ACY	F	169	4/4	0.71	0.22	23,25,25,26	4
3	ACY	B	169	4/4	0.73	0.21	25,27,28,28	4
3	ACY	C	169	4/4	0.77	0.18	22,23,23,24	4
2	POP	A	169[A]	9/9	0.98	0.06	16,19,21,21	9
2	POP	A	169[B]	9/9	0.98	0.06	11,13,15,15	9
2	POP	A	169[C]	9/9	0.98	0.06	21,22,23,24	9
2	POP	D	169[A]	9/9	0.98	0.06	19,20,22,23	9
2	POP	D	169[B]	9/9	0.98	0.06	21,22,24,25	9
2	POP	D	169[C]	9/9	0.98	0.06	26,27,29,30	9

6.5 Other polymers

There are no such residues in this entry.