



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 17, 2023 – 10:57 PM EDT

PDB ID : 4ZRU
Title : X-ray crystal structure of *Lymnaea stagnalis* acetylcholine binding protein (Ls-AChBP) in complex with 3-[2-[(2S)-pyrrolidin-2-yl]ethynyl]pyridine (TI-5180)
Authors : Bobango, J.; Sankaran, B.; Park, J.F.; Wu, J.; Talley, T.T.
Deposited on : 2015-05-12
Resolution : 1.90 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35.1
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35.1

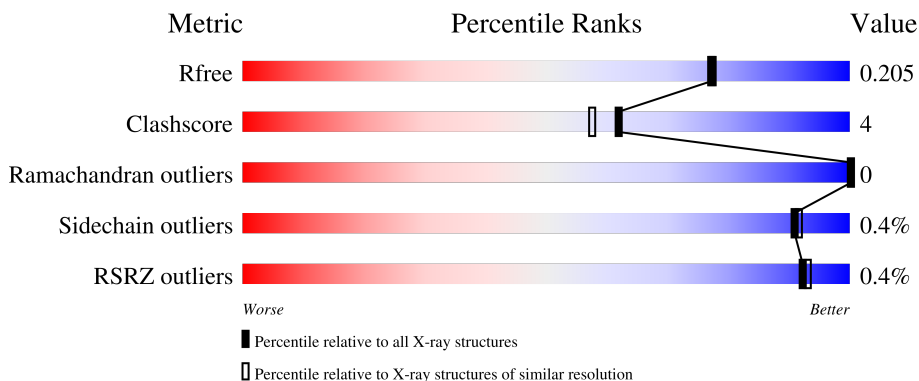
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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}	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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	218	87% 10% .
1	B	218	89% 6% .
1	C	218	87% 6% 7%
1	D	218	84% 11% 6%
1	E	218	% 87% 6% 6%

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Mol	Chain	Length	Quality of chain
1	F	218	 90% 7%
1	G	218	 81% 11% 8%
1	H	218	 86% 7% 7%
1	I	218	 85% 8% 7%
1	J	218	 87% 6% 7%

2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 17808 atoms, of which 120 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 Acetylcholine-binding protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	211	Total 1631	C 1023	N 274	O 329	S 5	0	0	0
1	B	209	Total 1648	C 1032	N 277	O 334	S 5	0	3	0
1	C	203	Total 1599	C 1005	N 267	O 322	S 5	0	4	0
1	D	206	Total 1617	C 1016	N 271	O 325	S 5	0	2	0
1	E	204	Total 1588	C 1002	N 264	O 317	S 5	0	3	0
1	F	211	Total 1618	C 1013	N 267	O 333	S 5	0	1	0
1	G	201	Total 1561	C 983	N 261	O 312	S 5	0	0	0
1	H	203	Total 1564	C 984	N 259	O 316	S 5	0	0	0
1	I	203	Total 1569	C 988	N 263	O 313	S 5	0	0	0
1	J	203	Total 1563	C 985	N 261	O 312	S 5	0	1	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	ASP	-	expression tag	UNP P58154
A	-6	TYR	-	expression tag	UNP P58154
A	-5	LYS	-	expression tag	UNP P58154
A	-4	ASP	-	expression tag	UNP P58154
A	-3	ASP	-	expression tag	UNP P58154
A	-2	ASP	-	expression tag	UNP P58154
A	-1	ASP	-	expression tag	UNP P58154
A	0	LYS	-	expression tag	UNP P58154
B	-7	ASP	-	expression tag	UNP P58154

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-6	TYR	-	expression tag	UNP P58154
B	-5	LYS	-	expression tag	UNP P58154
B	-4	ASP	-	expression tag	UNP P58154
B	-3	ASP	-	expression tag	UNP P58154
B	-2	ASP	-	expression tag	UNP P58154
B	-1	ASP	-	expression tag	UNP P58154
B	0	LYS	-	expression tag	UNP P58154
C	-7	ASP	-	expression tag	UNP P58154
C	-6	TYR	-	expression tag	UNP P58154
C	-5	LYS	-	expression tag	UNP P58154
C	-4	ASP	-	expression tag	UNP P58154
C	-3	ASP	-	expression tag	UNP P58154
C	-2	ASP	-	expression tag	UNP P58154
C	-1	ASP	-	expression tag	UNP P58154
C	0	LYS	-	expression tag	UNP P58154
D	-7	ASP	-	expression tag	UNP P58154
D	-6	TYR	-	expression tag	UNP P58154
D	-5	LYS	-	expression tag	UNP P58154
D	-4	ASP	-	expression tag	UNP P58154
D	-3	ASP	-	expression tag	UNP P58154
D	-2	ASP	-	expression tag	UNP P58154
D	-1	ASP	-	expression tag	UNP P58154
D	0	LYS	-	expression tag	UNP P58154
E	-7	ASP	-	expression tag	UNP P58154
E	-6	TYR	-	expression tag	UNP P58154
E	-5	LYS	-	expression tag	UNP P58154
E	-4	ASP	-	expression tag	UNP P58154
E	-3	ASP	-	expression tag	UNP P58154
E	-2	ASP	-	expression tag	UNP P58154
E	-1	ASP	-	expression tag	UNP P58154
E	0	LYS	-	expression tag	UNP P58154
F	-7	ASP	-	expression tag	UNP P58154
F	-6	TYR	-	expression tag	UNP P58154
F	-5	LYS	-	expression tag	UNP P58154
F	-4	ASP	-	expression tag	UNP P58154
F	-3	ASP	-	expression tag	UNP P58154
F	-2	ASP	-	expression tag	UNP P58154
F	-1	ASP	-	expression tag	UNP P58154
F	0	LYS	-	expression tag	UNP P58154
G	-7	ASP	-	expression tag	UNP P58154
G	-6	TYR	-	expression tag	UNP P58154
G	-5	LYS	-	expression tag	UNP P58154

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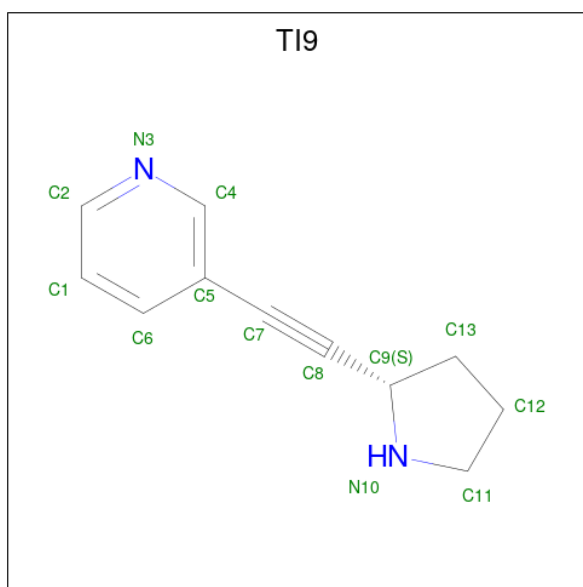
Chain	Residue	Modelled	Actual	Comment	Reference
G	-4	ASP	-	expression tag	UNP P58154
G	-3	ASP	-	expression tag	UNP P58154
G	-2	ASP	-	expression tag	UNP P58154
G	-1	ASP	-	expression tag	UNP P58154
G	0	LYS	-	expression tag	UNP P58154
H	-7	ASP	-	expression tag	UNP P58154
H	-6	TYR	-	expression tag	UNP P58154
H	-5	LYS	-	expression tag	UNP P58154
H	-4	ASP	-	expression tag	UNP P58154
H	-3	ASP	-	expression tag	UNP P58154
H	-2	ASP	-	expression tag	UNP P58154
H	-1	ASP	-	expression tag	UNP P58154
H	0	LYS	-	expression tag	UNP P58154
I	-7	ASP	-	expression tag	UNP P58154
I	-6	TYR	-	expression tag	UNP P58154
I	-5	LYS	-	expression tag	UNP P58154
I	-4	ASP	-	expression tag	UNP P58154
I	-3	ASP	-	expression tag	UNP P58154
I	-2	ASP	-	expression tag	UNP P58154
I	-1	ASP	-	expression tag	UNP P58154
I	0	LYS	-	expression tag	UNP P58154
J	-7	ASP	-	expression tag	UNP P58154
J	-6	TYR	-	expression tag	UNP P58154
J	-5	LYS	-	expression tag	UNP P58154
J	-4	ASP	-	expression tag	UNP P58154
J	-3	ASP	-	expression tag	UNP P58154
J	-2	ASP	-	expression tag	UNP P58154
J	-1	ASP	-	expression tag	UNP P58154
J	0	LYS	-	expression tag	UNP P58154

- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O₄P).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total O P 5 4 1	0	0
2	A	1	Total O P 5 4 1	0	0
2	B	1	Total O P 5 4 1	0	0
2	C	1	Total O P 5 4 1	0	0
2	D	1	Total O P 5 4 1	0	0
2	F	1	Total O P 5 4 1	0	0
2	F	1	Total O P 5 4 1	0	0
2	G	1	Total O P 5 4 1	0	0
2	I	1	Total O P 5 4 1	0	0
2	I	1	Total O P 5 4 1	0	0

- Molecule 3 is 3-[(2S)-pyrrolidin-2-ylethynyl]pyridine (three-letter code: TI9) (formula: C₁₁H₁₂N₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	H	N	0	0
			25	11	12	2		
3	B	1	Total	C	H	N	0	0
			25	11	12	2		
3	C	1	Total	C	H	N	0	0
			25	11	12	2		
3	D	1	Total	C	H	N	0	0
			25	11	12	2		
3	E	1	Total	C	H	N	0	0
			25	11	12	2		
3	F	1	Total	C	H	N	0	0
			25	11	12	2		
3	G	1	Total	C	H	N	0	0
			25	11	12	2		
3	H	1	Total	C	H	N	0	0
			25	11	12	2		
3	I	1	Total	C	H	N	0	0
			25	11	12	2		
3	J	1	Total	C	H	N	0	0
			25	11	12	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	144	Total	O	0	0
			144	144		
4	B	185	Total	O	0	0
			185	185		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	168	Total 168	O 168	0	0
4	D	161	Total 161	O 161	0	0
4	E	181	Total 181	O 181	0	0
4	F	158	Total 158	O 158	0	0
4	G	120	Total 120	O 120	0	0
4	H	133	Total 133	O 133	0	0
4	I	159	Total 159	O 159	0	0
4	J	141	Total 141	O 141	0	0

3 Residue-property plots [i](#)


These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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.

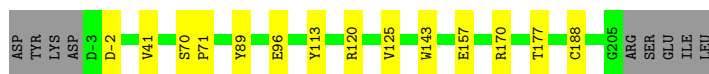
- Molecule 1: Acetylcholine-binding protein

Chain A: 




- Molecule 1: Acetylcholine-binding protein

Chain B: 




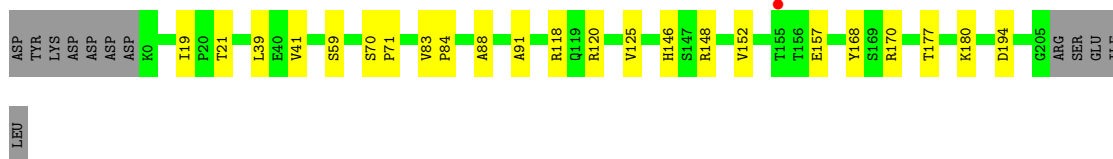
- Molecule 1: Acetylcholine-binding protein

Chain C: 




- Molecule 1: Acetylcholine-binding protein

Chain D: 

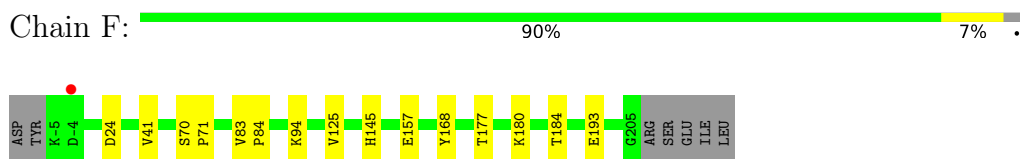


- Molecule 1: Acetylcholine-binding protein

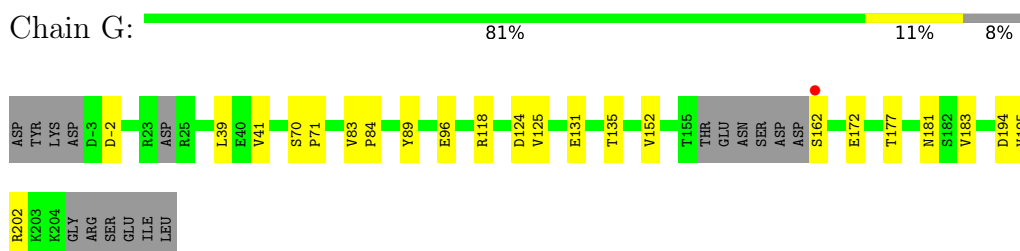
Chain E: 



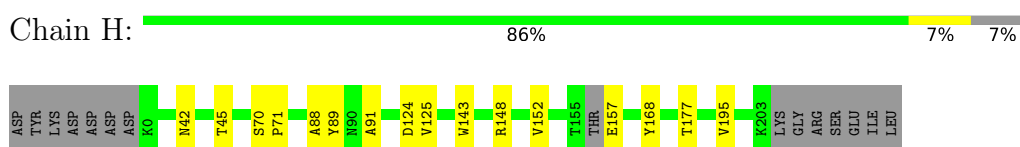
- Molecule 1: Acetylcholine-binding protein



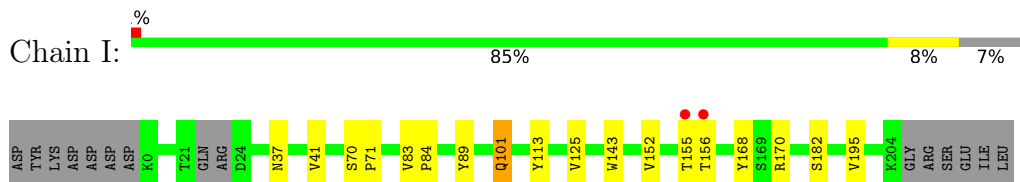
- Molecule 1: Acetylcholine-binding protein



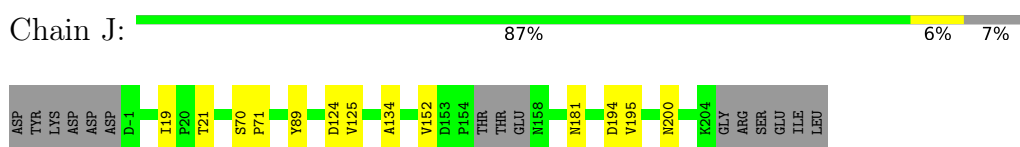
- Molecule 1: Acetylcholine-binding protein



- Molecule 1: Acetylcholine-binding protein



- Molecule 1: Acetylcholine-binding protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	92.91Å 108.87Å 122.70Å 90.00° 95.31° 90.00°	Depositor
Resolution (Å)	90.00 – 1.90 92.51 – 1.85	Depositor EDS
% Data completeness (in resolution range)	99.1 (90.00-1.90) 94.6 (92.51-1.85)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.68 (at 1.86Å)	Xtrriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.171 , 0.204 0.174 , 0.205	Depositor DCC
R_{free} test set	10168 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	22.3	Xtrriage
Anisotropy	0.090	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 48.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	17808	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.18% 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: PO4, TI9

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	0.39	0/1667	0.52	0/2284
1	B	0.38	0/1693	0.54	0/2315
1	C	0.38	0/1647	0.54	0/2256
1	D	0.40	0/1659	0.55	0/2271
1	E	0.39	0/1633	0.52	0/2240
1	F	0.36	0/1657	0.52	0/2273
1	G	0.35	0/1595	0.51	0/2182
1	H	0.34	0/1599	0.50	0/2193
1	I	0.36	0/1604	0.60	3/2198 (0.1%)
1	J	0.36	0/1601	0.53	0/2197
All	All	0.37	0/16355	0.53	3/22409 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	155	THR	N-CA-C	9.42	136.45	111.00
1	I	156	THR	N-CA-C	-8.24	88.76	111.00
1	I	156	THR	N-CA-CB	-5.12	100.58	110.30

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	1631	0	1518	18	0
1	B	1648	0	1574	13	0
1	C	1599	0	1526	13	0
1	D	1617	0	1542	18	0
1	E	1588	0	1514	11	0
1	F	1618	0	1496	15	0
1	G	1561	0	1474	21	1
1	H	1564	0	1462	15	1
1	I	1569	0	1483	16	0
1	J	1563	0	1465	11	0
2	A	10	0	0	1	0
2	B	5	0	0	0	0
2	C	5	0	0	0	0
2	D	5	0	0	0	0
2	F	10	0	0	1	0
2	G	5	0	0	0	0
2	I	10	0	0	0	0
3	A	13	12	12	1	0
3	B	13	12	12	2	0
3	C	13	12	12	1	0
3	D	13	12	12	0	0
3	E	13	12	12	1	0
3	F	13	12	12	0	0
3	G	13	12	12	2	0
3	H	13	12	12	3	0
3	I	13	12	12	3	0
3	J	13	12	12	1	0
4	A	144	0	0	3	1
4	B	185	0	0	2	1
4	C	168	0	0	4	0
4	D	161	0	0	3	0
4	E	181	0	0	0	0
4	F	158	0	0	0	0
4	G	120	0	0	2	0
4	H	133	0	0	0	0
4	I	159	0	0	0	0
4	J	141	0	0	0	0
All	All	17688	120	15174	138	2

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 4.

All (138) 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:J:152:VAL:HG12	1:J:195:VAL:HG23	1.43	1.00
1:A:94:LYS:HE3	1:B:96:GLU:HG3	1.62	0.81
1:I:152:VAL:CG1	1:I:195:VAL:HG23	2.11	0.80
1:I:101:GLN:NE2	1:I:113:TYR:OH	2.17	0.78
1:J:152:VAL:CG1	1:J:195:VAL:HG23	2.15	0.76
1:A:47:GLU:OE1	1:A:120:ARG:NH2	2.18	0.76
1:H:152:VAL:CG1	1:H:195:VAL:HG23	2.20	0.71
1:F:94:LYS:HE3	1:G:96:GLU:HG3	1.71	0.70
1:G:131:GLU:OE1	1:G:202:ARG:NH1	2.27	0.67
1:I:152:VAL:HG11	1:I:195:VAL:HG23	1.75	0.67
1:I:152:VAL:HG12	1:I:195:VAL:HG23	1.76	0.67
1:F:70:SER:HB2	1:F:71:PRO:HD2	1.79	0.64
1:H:70:SER:HB2	1:H:71:PRO:HD2	1.81	0.63
1:E:47:GLU:OE1	1:E:120:ARG:NH2	2.32	0.62
1:I:101:GLN:HE21	1:I:101:GLN:HA	1.63	0.62
1:D:170:ARG:NH2	4:D:403:HOH:O	2.30	0.62
1:F:83:VAL:HG13	1:F:84:PRO:HD2	1.82	0.61
1:D:70:SER:HB2	1:D:71:PRO:HD2	1.85	0.59
1:G:83:VAL:HG13	1:G:84:PRO:HD2	1.84	0.59
1:H:89:TYR:CE2	3:H:301:TI9:H112	2.38	0.59
1:G:89:TYR:CE2	3:G:302:TI9:H112	2.38	0.59
1:C:124:ASP:HB2	1:D:168:TYR:CE1	2.38	0.58
1:F:180:LYS:NZ	1:F:193:GLU:OE1	2.36	0.58
1:H:89:TYR:CZ	3:H:301:TI9:H112	2.39	0.58
1:G:172:GLU:OE2	1:G:202:ARG:NE	2.31	0.57
1:H:124:ASP:HB2	1:I:168:TYR:CE1	2.41	0.56
1:C:70:SER:HB2	1:C:71:PRO:HD2	1.88	0.55
1:C:155:THR:HG21	4:C:538:HOH:O	2.07	0.55
1:D:41:VAL:HG13	1:D:125:VAL:HG11	1.89	0.55
1:A:158:ASN:OD1	1:A:177:THR:HG22	2.08	0.54
1:C:60:ASP:OD2	4:C:401:HOH:O	2.19	0.53
1:G:70:SER:HB2	1:G:71:PRO:HD2	1.90	0.53
1:D:83:VAL:HG13	1:D:84:PRO:HD2	1.89	0.53
1:H:152:VAL:HG12	1:H:195:VAL:HG23	1.91	0.53
1:F:41:VAL:CG1	1:F:125:VAL:HG11	2.39	0.53
1:A:45:THR:HG22	1:B:170:ARG:NH1	2.24	0.52
1:E:158:ASN:OD1	1:E:177[A]:THR:HG22	2.09	0.52
1:F:70:SER:HB2	1:F:71:PRO:CD	2.39	0.52
1:B:125:VAL:HG12	1:B:125:VAL:O	2.09	0.52
1:B:143:TRP:O	3:B:302:TI9:H111	2.10	0.51
1:C:41:VAL:CG1	1:C:125:VAL:HG11	2.40	0.51
1:C:170:ARG:NH2	4:C:407:HOH:O	2.42	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:24:ASP:HA	1:G:-2:ASP:HB2	1.92	0.51
1:I:70:SER:HB2	1:I:71:PRO:HD2	1.92	0.51
1:J:70:SER:HB2	1:J:71:PRO:CD	2.40	0.51
1:J:125:VAL:HG12	1:J:125:VAL:O	2.11	0.51
1:A:32:SER:HB2	1:A:155:THR:HB	1.93	0.51
1:I:125:VAL:HG12	1:I:125:VAL:O	2.11	0.51
1:H:70:SER:HB2	1:H:71:PRO:CD	2.40	0.51
1:C:125:VAL:O	1:C:125:VAL:HG12	2.09	0.51
1:H:125:VAL:O	1:H:125:VAL:HG12	2.12	0.50
1:B:120:ARG:NH1	4:B:408:HOH:O	2.43	0.50
1:I:152:VAL:HG12	1:I:195:VAL:CG2	2.41	0.50
1:A:70:SER:HB2	1:A:71:PRO:CD	2.41	0.50
1:G:200:ASN:ND2	4:G:403:HOH:O	2.39	0.50
1:G:125:VAL:O	1:G:125:VAL:HG12	2.12	0.50
1:B:70:SER:HB2	1:B:71:PRO:HD2	1.93	0.49
1:E:157:GLU:O	1:E:177[A]:THR:HA	2.12	0.49
1:E:157:GLU:O	1:E:177[B]:THR:HA	2.13	0.49
1:D:120:ARG:HD2	4:D:435:HOH:O	2.13	0.49
1:F:157:GLU:O	1:F:177:THR:HA	2.13	0.49
1:D:157:GLU:O	1:D:177:THR:HA	2.14	0.48
1:J:70:SER:HB2	1:J:71:PRO:HD2	1.96	0.48
1:F:125:VAL:HG12	1:F:125:VAL:O	2.12	0.48
1:I:89:TYR:CE2	3:I:303:TI9:H112	2.48	0.48
1:I:41:VAL:HG12	1:I:125:VAL:HG11	1.96	0.48
1:J:152:VAL:HG12	1:J:195:VAL:CG2	2.29	0.48
2:A:302:PO4:O4	1:E:145:HIS:HE1	1.96	0.47
1:C:70:SER:HB2	1:C:71:PRO:CD	2.44	0.47
1:D:70:SER:HB2	1:D:71:PRO:CD	2.45	0.47
1:G:152:VAL:HG12	1:G:195:VAL:HG23	1.96	0.47
1:G:162:SER:HA	4:G:502:HOH:O	2.16	0.46
1:G:89:TYR:CZ	3:G:302:TI9:H112	2.50	0.46
1:I:143:TRP:CE3	3:I:303:TI9:H111	2.51	0.46
1:C:89:TYR:CE2	3:C:302:TI9:H112	2.50	0.46
1:J:89:TYR:CE2	3:J:301:TI9:H112	2.51	0.46
1:B:113:TYR:OH	4:B:401:HOH:O	2.20	0.45
1:E:134:ALA:O	1:E:200:ASN:HA	2.16	0.45
1:A:70:SER:HB2	1:A:71:PRO:HD2	1.97	0.45
1:H:45:THR:HG22	1:I:170:ARG:NH1	2.31	0.45
1:I:83:VAL:HG13	1:I:84:PRO:HD2	1.98	0.45
1:D:146:HIS:CE1	1:D:148:ARG:HB2	2.51	0.45
1:G:124:ASP:HB2	1:H:168:TYR:CE1	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:170:ARG:NH1	1:E:45:THR:HG22	2.32	0.45
1:C:41:VAL:CG1	1:C:125:VAL:CG1	2.95	0.44
1:D:152:VAL:HG21	1:D:194:ASP:HA	1.99	0.44
1:D:39:LEU:CD1	1:D:118:ARG:CZ	2.96	0.44
1:D:41:VAL:CG1	1:D:125:VAL:HG11	2.47	0.44
1:I:70:SER:HB2	1:I:71:PRO:CD	2.47	0.44
1:H:143:TRP:CE3	3:H:301:TI9:H111	2.53	0.44
1:J:181:ASN:ND2	1:J:194:ASP:OD2	2.49	0.44
1:D:180:LYS:HB3	1:D:180:LYS:HE3	1.86	0.43
1:F:94:LYS:HE3	1:G:96:GLU:CG	2.46	0.43
1:G:181:ASN:HB3	1:G:194:ASP:OD1	2.17	0.43
1:A:163:GLU:OE2	1:E:185:TYR:HA	2.19	0.43
1:B:89:TYR:OH	3:B:302:TI9:H112	2.17	0.43
1:G:177:THR:OG1	1:G:198:SER:HB2	2.18	0.43
1:E:125:VAL:HG12	1:E:125:VAL:O	2.18	0.43
1:G:83:VAL:CG1	1:G:84:PRO:HD2	2.49	0.43
1:F:41:VAL:CG1	1:F:125:VAL:CG1	2.97	0.43
1:F:83:VAL:CG1	1:F:84:PRO:HD2	2.48	0.43
1:A:125:VAL:HG12	1:A:125:VAL:O	2.18	0.43
1:B:41:VAL:CG1	1:B:125:VAL:HG11	2.49	0.42
1:B:41:VAL:HG13	1:B:125:VAL:HG11	2.01	0.42
1:F:41:VAL:HG13	1:F:125:VAL:HG11	2.01	0.42
1:C:12:GLN:HG2	4:C:523:HOH:O	2.18	0.42
1:B:157:GLU:O	1:B:177:THR:HA	2.20	0.42
1:F:168:TYR:CE1	1:J:124:ASP:HB2	2.54	0.42
1:D:41:VAL:HG13	1:D:125:VAL:CG1	2.49	0.42
1:A:88:ALA:HB3	1:A:91:ALA:HB2	2.02	0.42
1:D:19:ILE:HD12	1:D:21:THR:HG23	2.02	0.42
1:D:88:ALA:HB3	1:D:91:ALA:HB2	2.01	0.42
1:H:88:ALA:HB3	1:H:91:ALA:HB2	2.01	0.42
1:F:145:HIS:HE1	2:F:302:PO4:O3	2.03	0.42
1:H:42:ASN:HB3	1:H:45:THR:OG1	2.20	0.42
1:J:134:ALA:O	1:J:200:ASN:HA	2.20	0.41
1:A:139:LYS:NZ	1:A:181:ASN:OD1	2.45	0.41
1:G:183:VAL:HG13	1:G:194:ASP:OD2	2.20	0.41
1:E:29:VAL:O	1:E:152:VAL:HA	2.20	0.41
1:A:15:ARG:HD3	4:A:1919:HOH:O	2.19	0.41
1:B:70:SER:HB2	1:B:71:PRO:CD	2.49	0.41
1:D:125:VAL:O	1:D:125:VAL:HG12	2.20	0.41
1:A:170:ARG:NH2	4:A:1806:HOH:O	2.43	0.41
1:C:147[B]:SER:OG	1:C:193:GLU:HG3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:152:VAL:HG11	1:H:195:VAL:HG23	1.99	0.41
1:A:170:ARG:NH1	4:A:1814:HOH:O	2.54	0.41
1:J:19:ILE:HD12	1:J:21:THR:HG23	2.03	0.41
1:A:152:VAL:HG21	1:A:194:ASP:HA	2.02	0.41
1:A:89:TYR:CE2	3:A:303:TI9:H112	2.55	0.41
1:D:170:ARG:NH1	4:D:411:HOH:O	2.53	0.41
1:G:39:LEU:CD1	1:G:118:ARG:CZ	2.99	0.41
1:E:89:TYR:CE2	3:E:301:TI9:H112	2.56	0.41
1:I:89:TYR:CZ	3:I:303:TI9:H112	2.56	0.40
1:C:30:SER:HB3	1:C:155:THR:HG22	2.04	0.40
1:H:157:GLU:O	1:H:177:THR:HA	2.21	0.40
1:G:39:LEU:HD12	1:G:118:ARG:NE	2.37	0.40
1:G:41:VAL:CG1	1:G:125:VAL:HG11	2.51	0.40
1:A:21:THR:OG1	1:B:-2:ASP:HB3	2.21	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:1872:HOH:O	4:B:446:HOH:O[2_646]	2.12	0.08
1:G:135:THR:OG1	1:H:148:ARG:NH2[2_657]	2.14	0.06

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	207/218 (95%)	207 (100%)	0	0	100 100
1	B	210/218 (96%)	210 (100%)	0	0	100 100
1	C	205/218 (94%)	204 (100%)	1 (0%)	0	100 100
1	D	206/218 (94%)	206 (100%)	0	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	E	205/218 (94%)	203 (99%)	2 (1%)	0	100	100
1	F	210/218 (96%)	209 (100%)	1 (0%)	0	100	100
1	G	195/218 (89%)	194 (100%)	1 (0%)	0	100	100
1	H	199/218 (91%)	199 (100%)	0	0	100	100
1	I	199/218 (91%)	197 (99%)	2 (1%)	0	100	100
1	J	200/218 (92%)	200 (100%)	0	0	100	100
All	All	2036/2180 (93%)	2029 (100%)	7 (0%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	183/204 (90%)	183 (100%)	0	100	100
1	B	191/204 (94%)	190 (100%)	1 (0%)	88	89
1	C	186/204 (91%)	185 (100%)	1 (0%)	88	89
1	D	186/204 (91%)	185 (100%)	1 (0%)	88	89
1	E	182/204 (89%)	182 (100%)	0	100	100
1	F	182/204 (89%)	181 (100%)	1 (0%)	88	89
1	G	177/204 (87%)	177 (100%)	0	100	100
1	H	177/204 (87%)	177 (100%)	0	100	100
1	I	178/204 (87%)	175 (98%)	3 (2%)	60	57
1	J	176/204 (86%)	176 (100%)	0	100	100
All	All	1818/2040 (89%)	1811 (100%)	7 (0%)	91	91

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	188	CYS

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Mol	Chain	Res	Type
1	C	180	LYS
1	D	59	SER
1	F	184	THR
1	I	37	ASN
1	I	101	GLN
1	I	182	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	158	ASN
1	I	101	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

20 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	PO4	I	301	-	4,4,4	0.85	0	6,6,6	0.70	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	PO4	A	301	-	4,4,4	0.79	0	6,6,6	0.37	0
2	PO4	F	301	-	4,4,4	0.83	0	6,6,6	0.56	0
3	TI9	D	302	-	14,14,14	1.79	3 (21%)	14,17,17	1.90	5 (35%)
2	PO4	A	302	-	4,4,4	1.09	0	6,6,6	0.81	0
3	TI9	E	301	-	14,14,14	1.68	3 (21%)	14,17,17	1.71	5 (35%)
3	TI9	J	301	-	14,14,14	1.62	3 (21%)	14,17,17	1.59	4 (28%)
3	TI9	F	303	-	14,14,14	1.62	3 (21%)	14,17,17	1.67	6 (42%)
2	PO4	I	302	-	4,4,4	0.89	0	6,6,6	0.79	0
2	PO4	F	302	-	4,4,4	0.67	0	6,6,6	0.57	0
2	PO4	G	301	-	4,4,4	0.85	0	6,6,6	0.53	0
2	PO4	C	301	-	4,4,4	0.92	0	6,6,6	0.48	0
3	TI9	B	302	-	14,14,14	1.67	3 (21%)	14,17,17	1.68	4 (28%)
3	TI9	C	302	-	14,14,14	1.64	3 (21%)	14,17,17	1.88	6 (42%)
3	TI9	G	302	-	14,14,14	1.62	3 (21%)	14,17,17	2.07	6 (42%)
3	TI9	H	301	-	14,14,14	1.62	3 (21%)	14,17,17	1.80	4 (28%)
3	TI9	A	303	-	14,14,14	1.82	4 (28%)	14,17,17	1.73	5 (35%)
2	PO4	B	301	-	4,4,4	0.84	0	6,6,6	0.45	0
3	TI9	I	303	-	14,14,14	1.64	3 (21%)	14,17,17	1.80	5 (35%)
2	PO4	D	301	-	4,4,4	0.74	0	6,6,6	0.55	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	TI9	D	302	-	-	0/3/12/12	0/2/2/2
3	TI9	A	303	-	-	0/3/12/12	0/2/2/2
3	TI9	E	301	-	-	0/3/12/12	0/2/2/2
3	TI9	J	301	-	-	0/3/12/12	0/2/2/2
3	TI9	I	303	-	-	0/3/12/12	0/2/2/2
3	TI9	B	302	-	-	1/3/12/12	0/2/2/2
3	TI9	F	303	-	-	0/3/12/12	0/2/2/2
3	TI9	C	302	-	-	0/3/12/12	0/2/2/2
3	TI9	G	302	-	-	0/3/12/12	0/2/2/2
3	TI9	H	301	-	-	0/3/12/12	0/2/2/2

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	303	TI9	C13-C9	-4.87	1.47	1.53
3	D	302	TI9	C13-C9	-4.83	1.47	1.53
3	J	301	TI9	C13-C9	-4.37	1.48	1.53
3	E	301	TI9	C13-C9	-4.28	1.48	1.53
3	C	302	TI9	C13-C9	-4.13	1.48	1.53
3	F	303	TI9	C13-C9	-4.03	1.48	1.53
3	I	303	TI9	C13-C9	-3.93	1.48	1.53
3	B	302	TI9	C9-N10	-3.67	1.41	1.48
3	G	302	TI9	C13-C9	-3.61	1.48	1.53
3	H	301	TI9	C9-N10	-3.44	1.42	1.48
3	B	302	TI9	C13-C9	-3.40	1.49	1.53
3	H	301	TI9	C13-C9	-3.33	1.49	1.53
3	C	302	TI9	C9-N10	-3.09	1.42	1.48
3	G	302	TI9	C9-N10	-2.97	1.43	1.48
3	D	302	TI9	C9-N10	-2.91	1.43	1.48
3	I	303	TI9	C9-N10	-2.88	1.43	1.48
3	A	303	TI9	C9-N10	-2.87	1.43	1.48
3	F	303	TI9	C9-N10	-2.70	1.43	1.48
3	E	301	TI9	C5-C7	2.58	1.50	1.44
3	E	301	TI9	C9-N10	-2.57	1.43	1.48
3	F	303	TI9	C5-C7	2.51	1.50	1.44
3	J	301	TI9	C5-C7	2.48	1.50	1.44
3	J	301	TI9	C9-N10	-2.48	1.43	1.48
3	I	303	TI9	C5-C7	2.48	1.50	1.44
3	B	302	TI9	C5-C7	2.48	1.50	1.44
3	A	303	TI9	C5-C7	2.35	1.49	1.44
3	A	303	TI9	C4-C5	-2.31	1.36	1.39
3	H	301	TI9	C4-C5	-2.30	1.36	1.39
3	D	302	TI9	C5-C7	2.22	1.49	1.44
3	C	302	TI9	C5-C7	2.21	1.49	1.44
3	G	302	TI9	C4-C5	-2.18	1.36	1.39

All (50) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	302	TI9	C6-C5-C4	3.29	121.72	117.26
3	B	302	TI9	C12-C13-C9	-3.29	98.70	104.08
3	D	302	TI9	C6-C5-C4	3.15	121.53	117.26
3	D	302	TI9	C4-C5-C7	-3.14	115.26	120.83
3	I	303	TI9	C12-C13-C9	-3.09	99.02	104.08
3	C	302	TI9	C6-C5-C4	3.04	121.38	117.26
3	H	301	TI9	C6-C5-C4	3.04	121.38	117.26
3	G	302	TI9	C5-C4-N3	-2.93	119.09	123.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	303	TI9	C6-C5-C4	2.91	121.20	117.26
3	C	302	TI9	C5-C7-C8	-2.86	173.25	177.33
3	E	301	TI9	C6-C5-C4	2.83	121.10	117.26
3	G	302	TI9	C2-N3-C4	2.83	121.75	116.85
3	G	302	TI9	C12-C13-C9	-2.83	99.45	104.08
3	D	302	TI9	C2-N3-C4	2.82	121.72	116.85
3	I	303	TI9	C2-N3-C4	2.81	121.71	116.85
3	H	301	TI9	C2-N3-C4	2.80	121.69	116.85
3	D	302	TI9	C5-C4-N3	-2.80	119.29	123.49
3	E	301	TI9	C12-C13-C9	-2.77	99.54	104.08
3	G	302	TI9	C5-C7-C8	-2.77	173.37	177.33
3	C	302	TI9	C5-C4-N3	-2.75	119.36	123.49
3	B	302	TI9	C2-N3-C4	2.75	121.60	116.85
3	E	301	TI9	C4-C5-C7	-2.74	115.97	120.83
3	J	301	TI9	C12-C13-C9	-2.68	99.69	104.08
3	J	301	TI9	C6-C5-C4	2.67	120.89	117.26
3	H	301	TI9	C4-C5-C7	-2.66	116.11	120.83
3	F	303	TI9	C6-C5-C4	2.64	120.84	117.26
3	C	302	TI9	C2-N3-C4	2.62	121.38	116.85
3	A	303	TI9	C2-N3-C4	2.56	121.28	116.85
3	H	301	TI9	C5-C4-N3	-2.56	119.65	123.49
3	C	302	TI9	C4-C5-C7	-2.55	116.30	120.83
3	I	303	TI9	C6-C5-C4	2.54	120.70	117.26
3	I	303	TI9	C4-C5-C7	-2.51	116.38	120.83
3	F	303	TI9	C4-C5-C7	-2.51	116.39	120.83
3	A	303	TI9	C12-C13-C9	-2.50	99.98	104.08
3	F	303	TI9	C2-N3-C4	2.50	121.18	116.85
3	D	302	TI9	C12-C13-C9	-2.48	100.03	104.08
3	C	302	TI9	C12-C13-C9	-2.46	100.06	104.08
3	B	302	TI9	C5-C4-N3	-2.42	119.86	123.49
3	J	301	TI9	C2-N3-C4	2.41	121.01	116.85
3	J	301	TI9	C5-C4-N3	-2.38	119.92	123.49
3	A	303	TI9	C4-C5-C7	-2.38	116.61	120.83
3	I	303	TI9	C5-C4-N3	-2.36	119.95	123.49
3	A	303	TI9	C5-C4-N3	-2.36	119.95	123.49
3	G	302	TI9	C4-C5-C7	-2.34	116.67	120.83
3	F	303	TI9	C12-C13-C9	-2.32	100.29	104.08
3	B	302	TI9	C6-C5-C4	2.26	120.33	117.26
3	F	303	TI9	C5-C4-N3	-2.19	120.20	123.49
3	E	301	TI9	C5-C4-N3	-2.16	120.24	123.49
3	E	301	TI9	C2-N3-C4	2.15	120.57	116.85
3	F	303	TI9	C5-C7-C8	-2.01	174.46	177.33

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	302	TI9	C5-C7-C8-C9

There are no ring outliers.

10 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	302	PO4	1	0
3	E	301	TI9	1	0
3	J	301	TI9	1	0
2	F	302	PO4	1	0
3	B	302	TI9	2	0
3	C	302	TI9	1	0
3	G	302	TI9	2	0
3	H	301	TI9	3	0
3	A	303	TI9	1	0
3	I	303	TI9	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	211/218 (96%)	-0.21	1 (0%) 91 92	14, 24, 40, 52	0
1	B	209/218 (95%)	-0.29	0 100 100	14, 22, 36, 48	0
1	C	203/218 (93%)	-0.27	0 100 100	14, 22, 34, 40	0
1	D	206/218 (94%)	-0.26	1 (0%) 91 92	14, 22, 38, 50	0
1	E	204/218 (93%)	-0.25	2 (0%) 82 84	13, 21, 38, 45	0
1	F	211/218 (96%)	-0.28	1 (0%) 91 92	16, 25, 41, 57	0
1	G	201/218 (92%)	-0.20	1 (0%) 91 92	17, 27, 41, 52	0
1	H	203/218 (93%)	-0.27	0 100 100	16, 27, 44, 51	0
1	I	203/218 (93%)	-0.25	2 (0%) 82 84	16, 27, 39, 53	0
1	J	203/218 (93%)	-0.26	0 100 100	17, 26, 40, 51	0
All	All	2054/2180 (94%)	-0.25	8 (0%) 92 93	13, 24, 40, 57	0

All (8) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	155	THR	4.8
1	I	156	THR	4.0
1	G	162	SER	3.0
1	A	155	THR	2.7
1	E	155	THR	2.6
1	F	-4	ASP	2.4
1	E	156	THR	2.3
1	D	155	THR	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 monosaccharides 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(Å ²)	Q<0.9
3	TI9	B	302	13/13	0.94	0.12	17,24,33,40	0
3	TI9	G	302	13/13	0.94	0.16	22,30,37,38	0
3	TI9	F	303	13/13	0.95	0.12	18,27,33,35	0
3	TI9	H	301	13/13	0.95	0.13	16,25,30,32	0
2	PO4	D	301	5/5	0.96	0.09	20,22,26,27	0
3	TI9	D	302	13/13	0.97	0.09	15,21,27,28	0
3	TI9	E	301	13/13	0.97	0.08	17,20,24,28	0
3	TI9	A	303	13/13	0.97	0.10	18,23,28,29	0
2	PO4	I	302	5/5	0.97	0.09	22,25,27,27	0
3	TI9	C	302	13/13	0.97	0.08	16,23,30,32	0
3	TI9	I	303	13/13	0.97	0.11	21,26,34,37	0
3	TI9	J	301	13/13	0.97	0.12	20,25,33,35	0
2	PO4	I	301	5/5	0.98	0.07	19,23,23,24	0
2	PO4	B	301	5/5	0.98	0.09	23,26,28,28	0
2	PO4	A	301	5/5	0.98	0.08	18,20,22,22	0
2	PO4	G	301	5/5	0.98	0.08	18,21,23,24	0
2	PO4	A	302	5/5	0.99	0.08	15,15,16,17	0
2	PO4	F	301	5/5	0.99	0.06	20,21,22,23	0
2	PO4	F	302	5/5	0.99	0.07	22,22,24,24	0
2	PO4	C	301	5/5	0.99	0.08	20,22,22,23	0

6.5 Other polymers [i](#)

There are no such residues in this entry.