



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 12, 2022 – 12:11 PM EDT

PDB ID : 7T31
Title : X-ray Structure of Clostridioides difficile PilW
Authors : Ronish, L.A.; Piepenbrink, K.H.
Deposited on : 2021-12-06
Resolution : 2.30 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
Xtriage (Phenix) : 1.13
EDS : 2.31.2
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) : 2.31.2

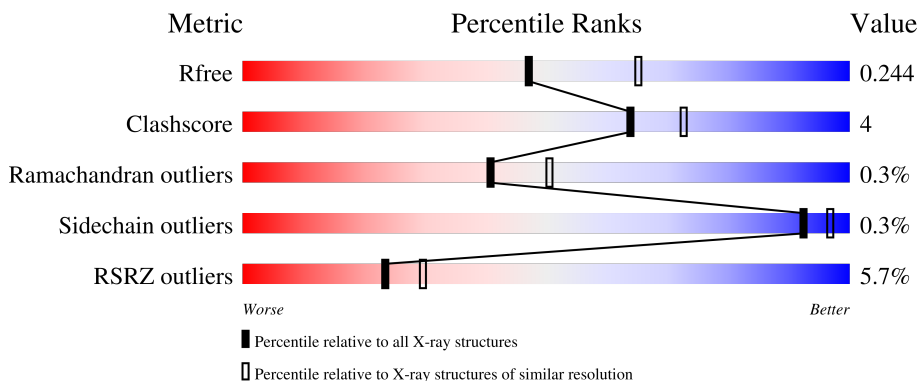
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION



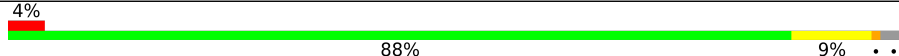
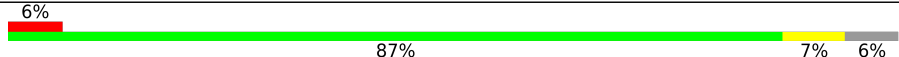
The reported resolution of this entry is 2.30 Å.

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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	512	
1	B	512	
1	C	512	
1	D	512	

2 Entry composition i

There are 2 unique types of molecules in this entry. The entry contains 16068 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 Maltose/maltodextrin-binding periplasmic protein, Putative pilin protein chimera.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	490	3731	2397	604	720	10	0	3	0
1	B	497	3810	2449	619	732	10	0	4	0
1	C	497	3824	2456	619	740	9	0	3	0
1	D	482	3708	2389	597	711	11	0	5	0

There are 112 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	MET	-	initiating methionine	UNP P0AEX9
A	82	ALA	ASP	conflict	UNP P0AEX9
A	83	ALA	LYS	conflict	UNP P0AEX9
A	172	ALA	GLU	conflict	UNP P0AEX9
A	173	ALA	ASN	conflict	UNP P0AEX9
A	239	ALA	LYS	conflict	UNP P0AEX9
A	359	ALA	GLU	conflict	UNP P0AEX9
A	362	ALA	LYS	conflict	UNP P0AEX9
A	363	ALA	ASP	conflict	UNP P0AEX9
A	367	ASN	ARG	conflict	UNP P0AEX9
A	368	ALA	-	linker	UNP P0AEX9
A	369	ALA	-	linker	UNP P0AEX9
A	370	ALA	-	linker	UNP P0AEX9
A	1083	ALA	LEU	conflict	UNP Q185H8
A	1130	ASN	SER	conflict	UNP Q185H8
A	1134	ASN	SER	conflict	UNP Q185H8
A	1135	LEU	SER	conflict	UNP Q185H8
A	1139	THR	LYS	conflict	UNP Q185H8
A	1146	ASN	ASP	conflict	UNP Q185H8
A	1154	ASN	ASP	conflict	UNP Q185H8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1159	LEU	-	expression tag	UNP Q185H8
A	1160	GLU	-	expression tag	UNP Q185H8
A	1161	HIS	-	expression tag	UNP Q185H8
A	1162	HIS	-	expression tag	UNP Q185H8
A	1163	HIS	-	expression tag	UNP Q185H8
A	1164	HIS	-	expression tag	UNP Q185H8
A	1165	HIS	-	expression tag	UNP Q185H8
A	1166	HIS	-	expression tag	UNP Q185H8
B	0	MET	-	initiating methionine	UNP P0AEX9
B	82	ALA	ASP	conflict	UNP P0AEX9
B	83	ALA	LYS	conflict	UNP P0AEX9
B	172	ALA	GLU	conflict	UNP P0AEX9
B	173	ALA	ASN	conflict	UNP P0AEX9
B	239	ALA	LYS	conflict	UNP P0AEX9
B	359	ALA	GLU	conflict	UNP P0AEX9
B	362	ALA	LYS	conflict	UNP P0AEX9
B	363	ALA	ASP	conflict	UNP P0AEX9
B	367	ASN	ARG	conflict	UNP P0AEX9
B	368	ALA	-	linker	UNP P0AEX9
B	369	ALA	-	linker	UNP P0AEX9
B	370	ALA	-	linker	UNP P0AEX9
B	1083	ALA	LEU	conflict	UNP Q185H8
B	1130	ASN	SER	conflict	UNP Q185H8
B	1134	ASN	SER	conflict	UNP Q185H8
B	1135	LEU	SER	conflict	UNP Q185H8
B	1139	THR	LYS	conflict	UNP Q185H8
B	1146	ASN	ASP	conflict	UNP Q185H8
B	1154	ASN	ASP	conflict	UNP Q185H8
B	1159	LEU	-	expression tag	UNP Q185H8
B	1160	GLU	-	expression tag	UNP Q185H8
B	1161	HIS	-	expression tag	UNP Q185H8
B	1162	HIS	-	expression tag	UNP Q185H8
B	1163	HIS	-	expression tag	UNP Q185H8
B	1164	HIS	-	expression tag	UNP Q185H8
B	1165	HIS	-	expression tag	UNP Q185H8
B	1166	HIS	-	expression tag	UNP Q185H8
C	0	MET	-	initiating methionine	UNP P0AEX9
C	82	ALA	ASP	conflict	UNP P0AEX9
C	83	ALA	LYS	conflict	UNP P0AEX9
C	172	ALA	GLU	conflict	UNP P0AEX9
C	173	ALA	ASN	conflict	UNP P0AEX9
C	239	ALA	LYS	conflict	UNP P0AEX9

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Chain	Residue	Modelled	Actual	Comment	Reference
C	359	ALA	GLU	conflict	UNP P0AEX9
C	362	ALA	LYS	conflict	UNP P0AEX9
C	363	ALA	ASP	conflict	UNP P0AEX9
C	367	ASN	ARG	conflict	UNP P0AEX9
C	368	ALA	-	linker	UNP P0AEX9
C	369	ALA	-	linker	UNP P0AEX9
C	370	ALA	-	linker	UNP P0AEX9
C	1083	ALA	LEU	conflict	UNP Q185H8
C	1130	ASN	SER	conflict	UNP Q185H8
C	1134	ASN	SER	conflict	UNP Q185H8
C	1135	LEU	SER	conflict	UNP Q185H8
C	1139	THR	LYS	conflict	UNP Q185H8
C	1146	ASN	ASP	conflict	UNP Q185H8
C	1154	ASN	ASP	conflict	UNP Q185H8
C	1159	LEU	-	expression tag	UNP Q185H8
C	1160	GLU	-	expression tag	UNP Q185H8
C	1161	HIS	-	expression tag	UNP Q185H8
C	1162	HIS	-	expression tag	UNP Q185H8
C	1163	HIS	-	expression tag	UNP Q185H8
C	1164	HIS	-	expression tag	UNP Q185H8
C	1165	HIS	-	expression tag	UNP Q185H8
C	1166	HIS	-	expression tag	UNP Q185H8
D	0	MET	-	initiating methionine	UNP P0AEX9
D	82	ALA	ASP	conflict	UNP P0AEX9
D	83	ALA	LYS	conflict	UNP P0AEX9
D	172	ALA	GLU	conflict	UNP P0AEX9
D	173	ALA	ASN	conflict	UNP P0AEX9
D	239	ALA	LYS	conflict	UNP P0AEX9
D	359	ALA	GLU	conflict	UNP P0AEX9
D	362	ALA	LYS	conflict	UNP P0AEX9
D	363	ALA	ASP	conflict	UNP P0AEX9
D	367	ASN	ARG	conflict	UNP P0AEX9
D	368	ALA	-	linker	UNP P0AEX9
D	369	ALA	-	linker	UNP P0AEX9
D	370	ALA	-	linker	UNP P0AEX9
D	1083	ALA	LEU	conflict	UNP Q185H8
D	1130	ASN	SER	conflict	UNP Q185H8
D	1134	ASN	SER	conflict	UNP Q185H8
D	1135	LEU	SER	conflict	UNP Q185H8
D	1139	THR	LYS	conflict	UNP Q185H8
D	1146	ASN	ASP	conflict	UNP Q185H8
D	1154	ASN	ASP	conflict	UNP Q185H8

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Chain	Residue	Modelled	Actual	Comment	Reference
D	1159	LEU	-	expression tag	UNP Q185H8
D	1160	GLU	-	expression tag	UNP Q185H8
D	1161	HIS	-	expression tag	UNP Q185H8
D	1162	HIS	-	expression tag	UNP Q185H8
D	1163	HIS	-	expression tag	UNP Q185H8
D	1164	HIS	-	expression tag	UNP Q185H8
D	1165	HIS	-	expression tag	UNP Q185H8
D	1166	HIS	-	expression tag	UNP Q185H8

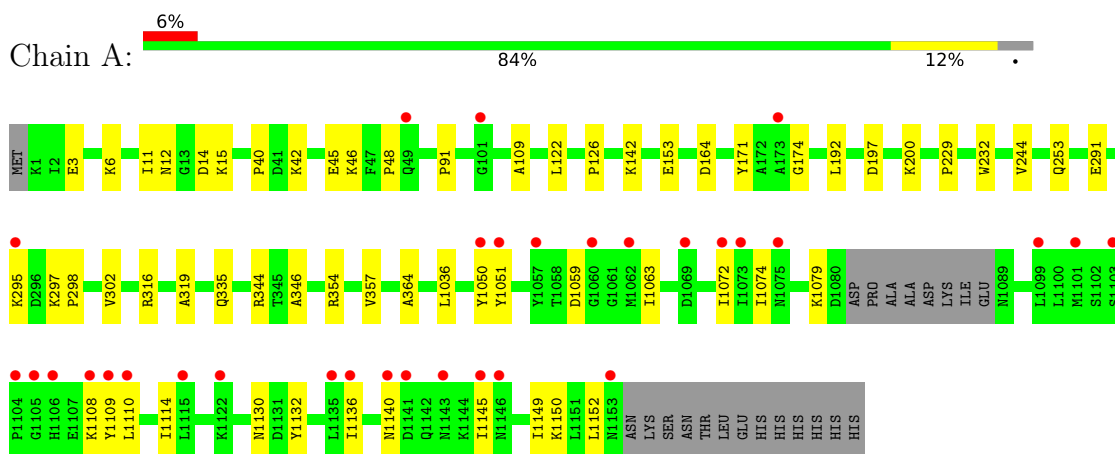
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	160	Total	O	0	0
			160	160		
2	B	270	Total	O	0	0
			270	270		
2	C	292	Total	O	0	0
			292	292		
2	D	273	Total	O	0	0
			273	273		

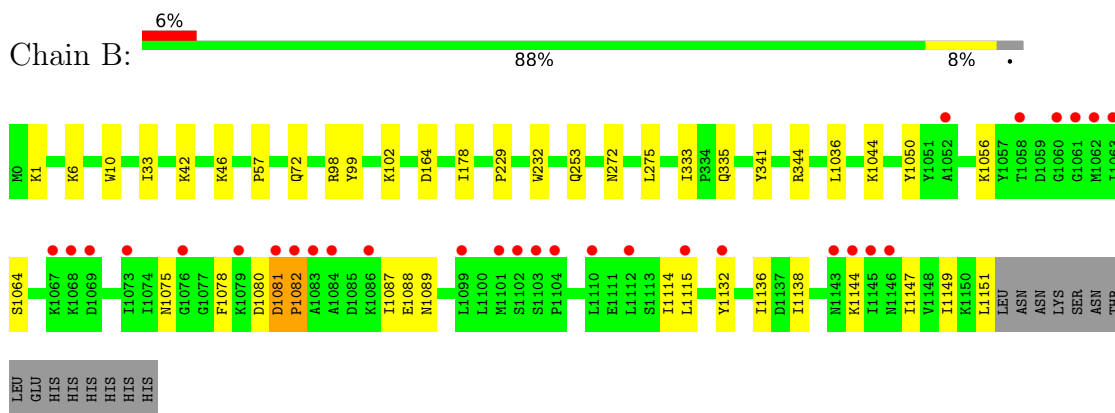
3 Residue-property plots [i](#)

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.

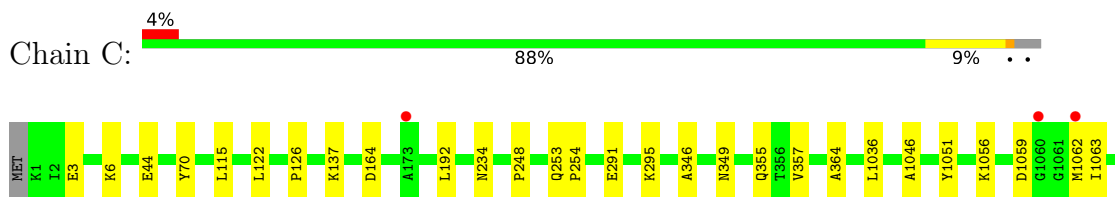
- Molecule 1: Maltose/maltodextrin-binding periplasmic protein,Putative pilin protein chimera

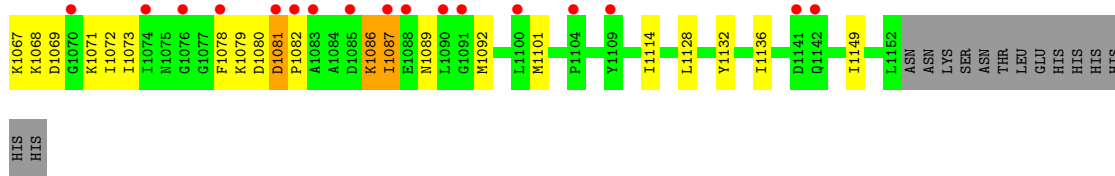


- Molecule 1: Maltose/maltodextrin-binding periplasmic protein,Putative pilin protein chimera

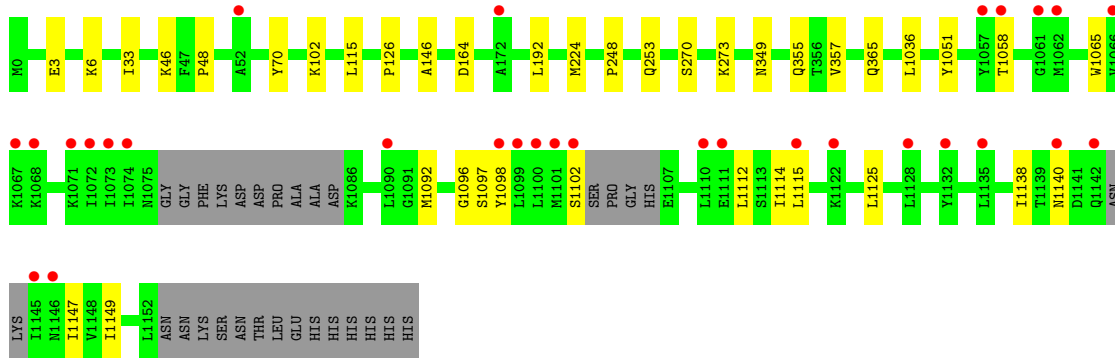
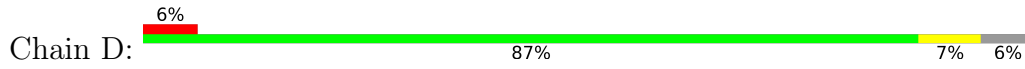


- Molecule 1: Maltose/maltodextrin-binding periplasmic protein,Putative pilin protein chimera





● Molecule 1: Maltose/maltodextrin-binding periplasmic protein, Putative pilin protein chimera



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	65.24Å 81.75Å 102.80Å 92.31° 91.05° 113.37°	Depositor
Resolution (Å)	39.70 – 2.30 39.70 – 2.30	Depositor EDS
% Data completeness (in resolution range)	81.7 (39.70-2.30) 81.7 (39.70-2.30)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.84 (at 2.29Å)	Xtrriage
Refinement program	PHENIX (1.19.2_4158: ???)	Depositor
R, R_{free}	0.196 , 0.245 0.196 , 0.244	Depositor DCC
R_{free} test set	3522 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	28.4	Xtrriage
Anisotropy	0.016	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 38.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.199 for h,-h-k,-l	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	16068	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.04% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.25	0/3820	0.45	0/5187
1	B	0.25	0/3905	0.43	0/5296
1	C	0.25	0/3917	0.44	0/5312
1	D	0.25	0/3800	0.45	0/5151
All	All	0.25	0/15442	0.44	0/20946

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	3731	0	3689	44	0
1	B	3810	0	3796	27	0
1	C	3824	0	3811	36	0
1	D	3708	0	3700	24	0
2	A	160	0	0	2	0
2	B	270	0	0	3	0
2	C	292	0	0	2	0
2	D	273	0	0	2	0
All	All	16068	0	14996	127	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 4.

All (127) 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:91:PRO:HB3	1:C:1078:PHE:CE1	1.79	1.18
1:A:1108:LYS:HA	1:A:1152:LEU:HD22	1.53	0.89
1:A:1108:LYS:C	1:A:1152:LEU:HD21	2.01	0.79
1:C:1082:PRO:HD2	1:C:1086:LYS:HA	1.69	0.73
1:A:1109:TYR:N	1:A:1152:LEU:HD21	2.06	0.70
1:C:3:GLU:HB2	1:C:6:LYS:HE2	1.73	0.69
1:C:1136:ILE:HG12	1:C:1149:ILE:HG12	1.75	0.69
1:C:1068:LYS:HG2	1:C:1069:ASP:H	1.58	0.67
1:A:1136:ILE:HG12	1:A:1149:ILE:HG12	1.77	0.66
1:D:1065:TRP:HB2	1:D:1098:TYR:HB2	1.79	0.65
1:B:1088:GLU:HG3	1:B:1089:ASN:H	1.62	0.64
1:A:1108:LYS:HA	1:A:1152:LEU:CD2	2.27	0.63
1:D:192:LEU:HD23	1:D:357:VAL:HG13	1.82	0.60
1:A:91:PRO:HB3	1:C:1078:PHE:CZ	2.34	0.59
1:A:354:ARG:NH1	1:B:1:LYS:O	2.35	0.59
1:D:102:LYS:NZ	2:D:1205:HOH:O	2.35	0.58
1:A:1063:ILE:HG12	1:A:1079:LYS:HD3	1.85	0.57
1:D:1065:TRP:O	1:D:1098:TYR:N	2.29	0.56
1:D:164:ASP:OD1	1:D:253:GLN:NE2	2.35	0.56
1:C:1046:ALA:HB1	1:C:1082:PRO:HG3	1.88	0.56
1:A:45:GLU:O	1:A:48:PRO:HD2	2.07	0.55
1:A:197:ASP:HA	1:A:200:LYS:HG2	1.88	0.55
1:A:1152:LEU:HD12	1:A:1152:LEU:C	2.26	0.55
1:A:1152:LEU:HD12	1:A:1152:LEU:O	2.07	0.55
1:A:1036:LEU:HD11	1:A:1114:ILE:HD13	1.89	0.55
1:C:349:ASN:HB3	1:C:355:GLN:HG2	1.87	0.55
1:A:11:ILE:HG12	1:A:15:LYS:HB2	1.89	0.54
1:D:1096:GLY:HA3	1:D:1115:LEU:O	2.08	0.54
1:A:1132:TYR:HD2	1:A:1136:ILE:HD11	1.73	0.53
1:C:44:GLU:O	1:C:70:TYR:OH	2.26	0.53
1:A:192:LEU:HD23	1:A:357:VAL:HG13	1.91	0.53
1:C:1132:TYR:CD2	1:C:1136:ILE:HD11	2.44	0.53
1:D:365:GLN:NE2	2:D:1213:HOH:O	2.42	0.53
1:B:164:ASP:OD1	1:B:253:GLN:NE2	2.39	0.52
1:B:1078:PHE:HD2	1:B:1087:ILE:HD13	1.74	0.52
1:B:72:GLN:HG2	1:B:99:TYR:CZ	2.44	0.52
1:C:192:LEU:HD23	1:C:357:VAL:HG13	1.92	0.52
1:C:1128:LEU:O	1:C:1136:ILE:HD12	2.09	0.52
1:A:12:ASN:ND2	1:A:14:ASP:OD1	2.32	0.52
1:A:297:LYS:HD2	1:A:298:PRO:HD2	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:1132:TYR:HD2	1:C:1136:ILE:HD11	1.74	0.52
1:B:1081:ASP:H	1:B:1082:PRO:HD3	1.74	0.52
1:D:48:PRO:HG3	1:D:70:TYR:CE1	2.46	0.51
1:D:1097:SER:HB3	1:D:1115:LEU:HD12	1.93	0.51
1:A:1108:LYS:C	1:A:1152:LEU:CD2	2.77	0.50
1:A:45:GLU:C	1:A:48:PRO:HD2	2.32	0.50
1:C:1056:LYS:HE2	1:C:1059:ASP:HA	1.93	0.50
1:B:1044:LYS:HB2	1:B:1151:LEU:HD13	1.92	0.50
1:C:1081:ASP:HB3	1:C:1082:PRO:HD3	1.93	0.50
1:D:115:LEU:HD22	1:D:248:PRO:HD3	1.93	0.49
1:A:153:GLU:OE2	1:A:344:ARG:NH2	2.44	0.49
1:B:1136:ILE:HG12	1:B:1149:ILE:HG12	1.96	0.48
1:D:1036:LEU:HD11	1:D:1114:ILE:HD13	1.94	0.48
1:A:291:GLU:O	1:A:295:LYS:HG2	2.13	0.48
1:D:1058:THR:OG1	1:D:1102:SER:HB3	2.14	0.47
1:A:1050:TYR:CE2	1:A:1059:ASP:HB2	2.50	0.47
1:B:1050:TYR:HE2	1:B:1056:LYS:HE2	1.79	0.47
1:B:102:LYS:NZ	2:B:1220:HOH:O	2.42	0.47
1:B:1081:ASP:N	1:B:1082:PRO:HD3	2.30	0.47
1:C:1067:LYS:HD2	1:C:1092:MET:HB2	1.97	0.47
1:B:1115:LEU:HB3	1:B:1144:LYS:HE2	1.96	0.46
1:D:1092:MET:HG2	1:D:1098:TYR:CE2	2.49	0.46
1:A:3:GLU:HB2	1:A:6:LYS:HE2	1.97	0.46
1:C:137:LYS:NZ	2:C:1225:HOH:O	2.48	0.46
1:D:146:ALA:O	1:D:224[B]:MET:HG3	2.16	0.46
1:B:1036:LEU:HD11	1:B:1114:ILE:HD13	1.96	0.46
1:C:1071:LYS:HE2	1:C:1072:ILE:HD12	1.97	0.46
1:D:349:ASN:HB3	1:D:355:GLN:HG2	1.98	0.46
1:D:3:GLU:HB2	1:D:6:LYS:HE2	1.96	0.46
1:C:346:ALA:HB2	1:C:364:ALA:HB2	1.98	0.46
1:D:1114:ILE:HB	1:D:1147:ILE:HG23	1.97	0.46
1:C:1071:LYS:HG3	1:C:1072:ILE:H	1.81	0.45
1:C:1087:ILE:HG22	1:C:1089:ASN:H	1.81	0.45
1:B:178:ILE:HG22	1:B:333:ILE:HD12	1.98	0.45
1:A:122:LEU:HD21	1:A:126:PRO:HD3	1.97	0.45
1:C:1079:LYS:O	1:C:1086:LYS:HG2	2.16	0.45
1:A:109:ALA:HA	1:A:302:VAL:HA	1.99	0.45
1:A:1130:ASN:HA	1:B:341:TYR:CE2	2.51	0.45
1:B:6:LYS:HA	1:B:33:ILE:HG23	1.98	0.45
1:A:1063:ILE:HG23	1:A:1079:LYS:HD3	1.99	0.44
1:C:291:GLU:HG2	1:C:295:LYS:HE2	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:1068:LYS:HB2	1:C:1073:ILE:HD13	1.99	0.44
1:D:270:SER:O	1:D:273:LYS:NZ	2.44	0.44
1:D:1097:SER:HB3	1:D:1115:LEU:HB2	1.99	0.44
1:A:1108:LYS:CA	1:A:1152:LEU:CD2	2.93	0.44
1:A:40:PRO:HB2	1:A:46:LYS:NZ	2.33	0.44
1:A:142:LYS:NZ	2:A:1212:HOH:O	2.51	0.44
1:A:1140:ASN:O	1:A:1145:ILE:HA	2.17	0.44
1:B:42:LYS:HG3	1:B:46:LYS:HG2	1.99	0.44
1:B:335:GLN:OE1	1:B:335:GLN:N	2.48	0.44
1:B:1064:SER:OG	1:B:1075:ASN:ND2	2.44	0.43
1:C:1132:TYR:HB2	1:C:1136:ILE:HG13	2.01	0.43
1:B:98:ARG:NH2	2:B:1209:HOH:O	2.33	0.43
1:A:346:ALA:HB2	1:A:364:ALA:HB2	2.01	0.43
1:B:341:TYR:HD2	1:B:344:ARG:HH11	1.66	0.43
1:C:1036:LEU:HD11	1:C:1114:ILE:HD13	2.00	0.43
1:C:1080:ASP:OD1	1:C:1080:ASP:N	2.47	0.43
1:A:244:VAL:HB	1:A:316:ARG:HA	2.01	0.43
1:A:1074:ILE:HG22	1:A:1074:ILE:O	2.18	0.43
1:C:1063:ILE:HG23	1:C:1079:LYS:HG2	2.00	0.43
1:A:42:LYS:NZ	2:A:1204:HOH:O	2.36	0.43
1:C:1071:LYS:HD2	1:C:1071:LYS:HA	1.80	0.42
1:C:1072:ILE:HG12	1:C:1092:MET:SD	2.59	0.42
1:A:335:GLN:OE1	1:A:335:GLN:N	2.52	0.42
1:A:164:ASP:OD1	1:A:253:GLN:NE2	2.50	0.42
1:A:1110:LEU:O	1:A:1150:LYS:HA	2.19	0.42
1:B:1132:TYR:OH	2:B:1201:HOH:O	2.21	0.42
1:C:122:LEU:HD21	1:C:126:PRO:HD3	2.02	0.42
1:D:46:LYS:HE3	1:D:46:LYS:HB2	1.77	0.42
1:B:272:ASN:HB3	1:B:275:LEU:HD12	2.01	0.42
1:D:6:LYS:HA	1:D:33:ILE:HG23	2.01	0.42
1:D:126:PRO:HD2	1:D:224[B]:MET:HE1	2.02	0.42
1:A:229:PRO:HA	1:A:232:TRP:CE2	2.55	0.41
1:C:1046:ALA:CB	1:C:1082:PRO:HG3	2.49	0.41
1:B:229:PRO:HA	1:B:232:TRP:CE2	2.54	0.41
1:C:164:ASP:OD1	1:C:253:GLN:NE2	2.47	0.41
1:B:1138:ILE:HG12	1:B:1147:ILE:HG12	2.03	0.41
1:A:244:VAL:HG12	1:A:319:ALA:HB3	2.02	0.41
1:B:1080:ASP:HB2	1:B:1082:PRO:HD3	2.02	0.41
1:C:1062:MET:HG2	1:C:1101:MET:HB3	2.02	0.41
1:D:1112:LEU:HB3	1:D:1149:ILE:HG23	2.03	0.41
1:A:171:TYR:OH	1:A:174:GLY:HA2	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:254:PRO:HG3	2:C:1437:HOH:O	2.20	0.40
1:C:115:LEU:HD22	1:C:248:PRO:HD3	2.03	0.40
1:A:1072:ILE:H	1:A:1072:ILE:HG13	1.76	0.40
1:B:10:TRP:CD2	1:B:57:PRO:HG3	2.57	0.40
1:D:1125:LEU:HD22	1:D:1138:ILE:HD13	2.03	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	489/512 (96%)	458 (94%)	31 (6%)	0	100	100
1	B	499/512 (98%)	467 (94%)	30 (6%)	2 (0%)	34	42
1	C	498/512 (97%)	466 (94%)	30 (6%)	2 (0%)	34	42
1	D	479/512 (94%)	453 (95%)	25 (5%)	1 (0%)	47	58
All	All	1965/2048 (96%)	1844 (94%)	116 (6%)	5 (0%)	41	50

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	1081	ASP
1	C	1087	ILE
1	D	1140	ASN
1	B	1082	PRO
1	B	1081	ASP

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	380/409 (93%)	379 (100%)	1 (0%)	92	97
1	B	390/409 (95%)	390 (100%)	0	100	100
1	C	395/409 (97%)	392 (99%)	3 (1%)	81	91
1	D	381/409 (93%)	380 (100%)	1 (0%)	92	97
All	All	1546/1636 (94%)	1541 (100%)	5 (0%)	92	97

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1051	TYR
1	C	234	ASN
1	C	1051	TYR
1	C	1086	LYS
1	D	1051	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	49	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](#)

There are no ligands in this entry.

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	490/512 (95%)	0.07	32 (6%) 18 24	30, 58, 120, 205	0
1	B	497/512 (97%)	-0.20	30 (6%) 21 28	14, 36, 122, 194	0
1	C	497/512 (97%)	-0.27	20 (4%) 38 45	17, 38, 115, 177	0
1	D	482/512 (94%)	-0.24	30 (6%) 20 26	16, 37, 120, 176	0
All	All	1966/2048 (95%)	-0.16	112 (5%) 23 30	14, 43, 120, 205	0

All (112) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	1082	PRO	13.3
1	D	1115	LEU	10.5
1	B	1143	ASN	8.3
1	D	1102	SER	7.8
1	B	1068	LYS	7.7
1	C	1078	PHE	6.7
1	A	1143	ASN	6.6
1	A	1108	LYS	5.7
1	B	1083	ALA	5.6
1	D	1067	LYS	5.6
1	C	1082	PRO	5.5
1	D	1062	MET	5.1
1	B	1104	PRO	5.1
1	D	1145	ILE	4.9
1	C	1081	ASP	4.9
1	B	1110	LEU	4.9
1	B	1062	MET	4.9
1	A	1104	PRO	4.6
1	B	1099	LEU	4.6
1	B	1058	THR	4.5
1	D	1068	LYS	4.4

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Mol	Chain	Res	Type	RSRZ
1	D	1101	MET	4.4
1	B	1061	GLY	4.3
1	D	1071	LYS	4.2
1	D	1061	GLY	4.2
1	C	1142	GLN	4.1
1	B	1079	LYS	4.1
1	D	1142	GLN	4.1
1	B	1081	ASP	4.1
1	A	1105	GLY	4.0
1	C	1109	TYR	3.9
1	D	1073	ILE	3.9
1	A	1115	LEU	3.9
1	B	1102	SER	3.9
1	C	1060	GLY	3.9
1	B	1144	LYS	3.8
1	A	1099	LEU	3.7
1	A	1103	SER	3.7
1	D	1146	ASN	3.7
1	A	1141	ASP	3.6
1	B	1115	LEU	3.6
1	A	1073	ILE	3.6
1	D	1128	LEU	3.5
1	B	1101	MET	3.5
1	A	1057	TYR	3.5
1	A	1075	ASN	3.4
1	D	1100	LEU	3.4
1	A	1145	ILE	3.4
1	B	1060	GLY	3.4
1	A	173	ALA	3.4
1	B	1132	TYR	3.3
1	A	1135	LEU	3.3
1	B	1112	LEU	3.3
1	C	1074	ILE	3.2
1	C	1085	ASP	3.2
1	D	1072	ILE	3.1
1	A	1069	ASP	3.0
1	D	1058	THR	3.0
1	B	1073	ILE	3.0
1	A	1051	TYR	2.9
1	A	1106	HIS	2.9
1	C	1091	GLY	2.9
1	C	1062	MET	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	1072	ILE	2.7
1	C	1076	GLY	2.7
1	B	1103	SER	2.7
1	D	1122	LYS	2.7
1	A	1060	GLY	2.7
1	B	1069	ASP	2.7
1	A	1140	ASN	2.7
1	A	1101	MET	2.7
1	B	1146	ASN	2.6
1	D	172	ALA	2.6
1	A	1109	TYR	2.6
1	A	1136	ILE	2.6
1	A	1153	ASN	2.6
1	D	1057	TYR	2.5
1	A	1062	MET	2.5
1	B	1086	LYS	2.5
1	D	1090	LEU	2.5
1	A	49	GLN	2.5
1	C	173	ALA	2.4
1	C	1088	GLU	2.4
1	B	1076	GLY	2.4
1	D	1111	GLU	2.4
1	C	1087	ILE	2.4
1	A	295	LYS	2.4
1	C	1083	ALA	2.3
1	D	1110	LEU	2.3
1	A	1110	LEU	2.3
1	C	1090	LEU	2.3
1	D	52	ALA	2.3
1	B	1145	ILE	2.3
1	D	1140	ASN	2.2
1	A	1050	TYR	2.2
1	A	101	GLY	2.2
1	B	1063	ILE	2.2
1	D	1099	LEU	2.2
1	D	1098	TYR	2.1
1	B	1052	ALA	2.1
1	C	1100	LEU	2.1
1	D	1132	TYR	2.1
1	A	1146	ASN	2.1
1	C	1070	GLY	2.1
1	C	1141	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	1122	LYS	2.1
1	C	1104	PRO	2.1
1	D	1135	LEU	2.1
1	B	1084	ALA	2.1
1	D	1074	ILE	2.0
1	B	1067	LYS	2.0
1	D	1066	VAL	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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.