Full wwPDB X-ray Structure Validation Report ⓘ

Jun 15, 2024 – 08:14 PM EDT

PDB ID	:	4Q48
Title	:	Structure of the RecQ Catalytic Core from Deinococcus radiodurans
Authors	:	Chen, S.C.; Yang, C.S.; Chen, Y.
Deposited on	:	2014-04-14
Resolution	:	2.80 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:

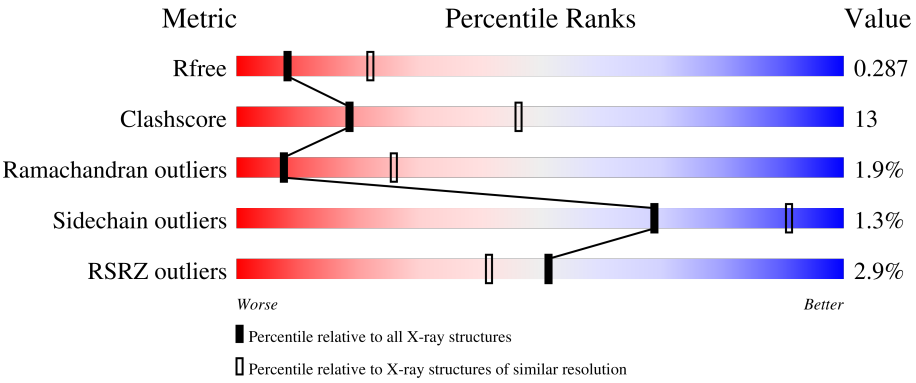
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.80 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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 <=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	525	2% 67% 26% • 5%
1	B	525	4% 65% 28% •• 5%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 7841 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 DNA helicase RecQ.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	500	Total	C	N	O	S	0	0	0
			3916	2459	711	730	16			
1	B	501	Total	C	N	O	S	0	0	0
			3923	2463	712	732	16			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	518	LEU	-	expression tag	UNP Q9RUU2
A	519	GLU	-	expression tag	UNP Q9RUU2
A	520	HIS	-	expression tag	UNP Q9RUU2
A	521	HIS	-	expression tag	UNP Q9RUU2
A	522	HIS	-	expression tag	UNP Q9RUU2
A	523	HIS	-	expression tag	UNP Q9RUU2
A	524	HIS	-	expression tag	UNP Q9RUU2
A	525	HIS	-	expression tag	UNP Q9RUU2
B	518	LEU	-	expression tag	UNP Q9RUU2
B	519	GLU	-	expression tag	UNP Q9RUU2
B	520	HIS	-	expression tag	UNP Q9RUU2
B	521	HIS	-	expression tag	UNP Q9RUU2
B	522	HIS	-	expression tag	UNP Q9RUU2
B	523	HIS	-	expression tag	UNP Q9RUU2
B	524	HIS	-	expression tag	UNP Q9RUU2
B	525	HIS	-	expression tag	UNP Q9RUU2

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

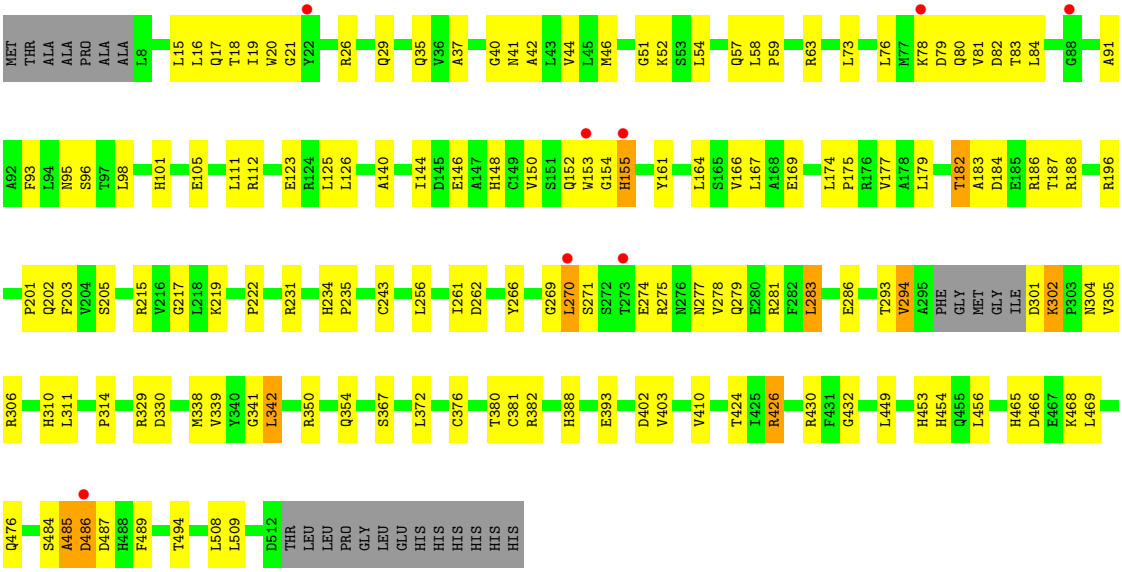
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Zn	0	0
			1	1		
2	B	1	Total	Zn	0	0
			1	1		

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.

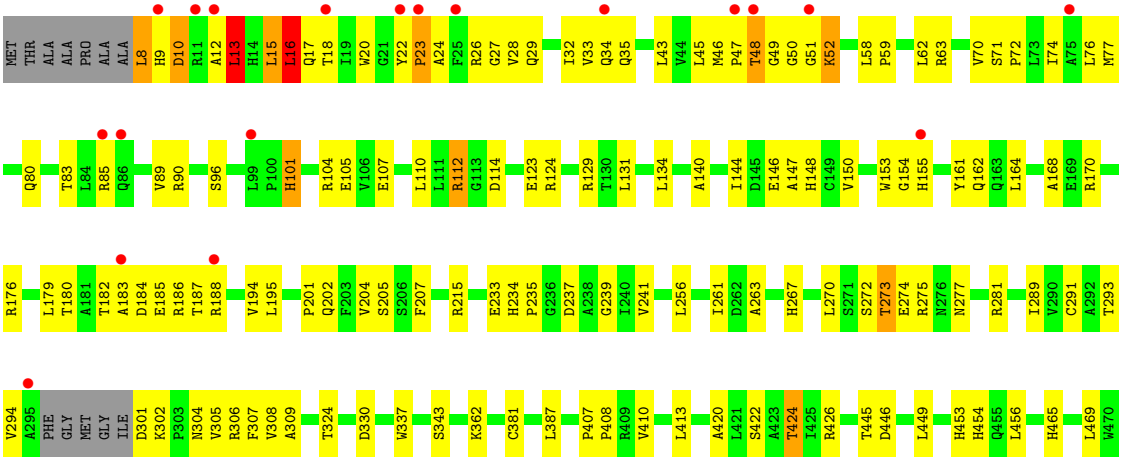
• Molecule 1: DNA helicase RecQ

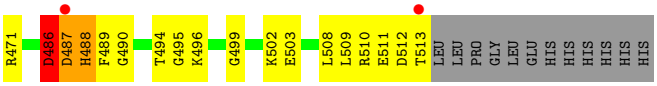
Chain A:



• Molecule 1: DNA helicase RecQ

Chain B:




R471
D486
D487
H488
F489
G490
T494
G495
K496
G499
K502
E503
L508
L509
R510
E511
D512
T513
LEU
LEU
PRO
GLY
LEU
GLU
HIS
HIS
HIS
HIS
HIS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	85.79Å 98.53Å 152.88Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	27.31 – 2.80 27.31 – 2.80	Depositor EDS
% Data completeness (in resolution range)	96.2 (27.31-2.80) 92.7 (27.31-2.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.67 (at 2.80Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.4_1496)	Depositor
R, R_{free}	0.213 , 0.286 0.216 , 0.287	Depositor DCC
R_{free} test set	2000 reflections (6.35%)	wwPDB-VP
Wilson B-factor (Å^2)	54.8	Xtriage
Anisotropy	0.236	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 36.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	7841	wwPDB-VP
Average B, all atoms (Å^2)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.63% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: ZN

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	0.52	0/3990	0.73	3/5408 (0.1%)
1	B	0.51	0/3997	0.79	7/5418 (0.1%)
All	All	0.51	0/7987	0.76	10/10826 (0.1%)

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	A	0	3
1	B	0	4
All	All	0	7

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	16	LEU	CA-CB-CG	11.47	141.69	115.30
1	A	270	LEU	CA-CB-CG	7.24	131.95	115.30
1	B	16	LEU	CB-CG-CD1	6.94	122.79	111.00
1	B	15	LEU	CA-CB-CG	6.56	130.40	115.30
1	A	342	LEU	CA-CB-CG	6.39	130.01	115.30
1	B	488	HIS	N-CA-C	-5.92	95.03	111.00
1	B	8	LEU	CA-CB-CG	5.81	128.67	115.30
1	B	13	LEU	CA-CB-CG	-5.43	102.82	115.30
1	B	24	ALA	N-CA-C	-5.14	97.11	111.00
1	A	283	LEU	CA-CB-CG	5.07	126.96	115.30

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	341	GLY	Peptide
1	A	485	ALA	Peptide
1	A	486	ASP	Peptide
1	B	10	ASP	Peptide
1	B	13	LEU	Peptide
1	B	34	GLN	Peptide
1	B	486	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	3916	0	3915	85	1
1	B	3923	0	3922	123	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
All	All	7841	0	7837	207	1

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 13.

All (207) 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:B:13:LEU:HG	1:B:16:LEU:H	1.24	1.03
1:B:13:LEU:HG	1:B:16:LEU:N	1.74	1.02
1:B:185:GLU:HG3	1:B:188:ARG:HB2	1.47	0.93
1:B:45:LEU:HD22	1:B:188:ARG:HD3	1.54	0.89
1:A:183:ALA:O	1:A:188:ARG:NH1	2.04	0.89
1:A:169:GLU:HG3	1:A:196:ARG:HH12	1.37	0.88
1:B:13:LEU:HD12	1:B:15:LEU:HB2	1.55	0.86
1:A:46:MET:HG2	1:A:205:SER:HB3	1.57	0.86
1:B:9:HIS:O	1:B:9:HIS:ND1	2.12	0.83
1:B:13:LEU:HD13	1:B:58:LEU:HD11	1.59	0.83
1:B:47:PRO:O	1:B:48:THR:OG1	2.03	0.76

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:194:VAL:HG13	1:B:195:LEU:HG	1.67	0.75
1:B:183:ALA:HB1	1:B:188:ARG:HH11	1.52	0.75
1:A:485:ALA:O	1:A:487:ASP:N	2.20	0.75
1:B:13:LEU:HD23	1:B:16:LEU:HD12	1.70	0.74
1:B:184:ASP:OD2	1:B:186:ARG:NH2	2.21	0.74
1:A:274:GLU:HA	1:A:277:ASN:HB3	1.70	0.73
1:B:13:LEU:CD1	1:B:15:LEU:HB2	2.19	0.72
1:A:63:ARG:NH1	1:A:140:ALA:O	2.23	0.72
1:B:176:ARG:NH1	1:B:195:LEU:O	2.23	0.71
1:B:184:ASP:HB3	1:B:187:THR:HG23	1.73	0.71
1:A:279:GLN:O	1:A:283:LEU:HG	1.91	0.71
1:B:16:LEU:HD23	1:B:22:TYR:O	1.91	0.70
1:B:52:LYS:NZ	1:B:180:THR:O	2.20	0.69
1:A:256:LEU:HD22	1:A:261:ILE:HD12	1.75	0.69
1:A:169:GLU:HG3	1:A:196:ARG:NH1	2.08	0.69
1:B:150:VAL:HG21	1:B:194:VAL:HG11	1.74	0.69
1:A:76:LEU:O	1:A:80:GLN:NE2	2.26	0.68
1:A:78:LYS:HA	1:A:93:PHE:CE2	2.28	0.68
1:B:16:LEU:O	1:B:20:TRP:N	2.25	0.68
1:A:286:GLU:OE1	1:A:304:ASN:ND2	2.25	0.68
1:B:22:TYR:CD1	1:B:23:PRO:HD2	2.29	0.67
1:B:33:VAL:HG21	1:B:58:LEU:HD23	1.76	0.67
1:B:168:ALA:HB2	1:B:176:ARG:NH1	2.08	0.67
1:A:302:LYS:HE3	1:A:304:ASN:HB3	1.76	0.66
1:A:15:LEU:HA	1:A:18:THR:HG22	1.78	0.66
1:A:376:CYS:O	1:A:382:ARG:NH2	2.29	0.66
1:B:272:SER:HA	1:B:275:ARG:HB3	1.79	0.65
1:A:101:HIS:O	1:A:105:GLU:HG3	1.95	0.65
1:A:262:ASP:OD2	1:A:281:ARG:NH2	2.29	0.65
1:B:96:SER:OG	1:B:123:GLU:OE2	2.15	0.65
1:B:107:GLU:OE2	1:B:124:ARG:NH2	2.29	0.65
1:B:153:TRP:HB2	1:B:187:THR:HG22	1.77	0.64
1:A:453:HIS:HA	1:A:456:LEU:HD13	1.79	0.64
1:B:13:LEU:CD2	1:B:16:LEU:HD12	2.28	0.64
1:A:350:ARG:NH1	1:A:354:GLN:OE1	2.31	0.64
1:A:215:ARG:HG2	1:A:402:ASP:HB3	1.78	0.63
1:B:58:LEU:HB3	1:B:59:PRO:HD3	1.82	0.62
1:B:13:LEU:CD1	1:B:58:LEU:HD11	2.29	0.61
1:B:70:VAL:HG22	1:B:144:ILE:HA	1.81	0.61
1:B:28:VAL:O	1:B:32:ILE:HG13	2.00	0.61
1:A:306:ARG:NH2	1:A:330:ASP:OD2	2.34	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:112:ARG:NH1	1:B:114:ASP:OD2	2.34	0.60
1:B:9:HIS:O	1:B:12:ALA:HB3	2.02	0.59
1:B:144:ILE:HD13	1:B:195:LEU:HD13	1.84	0.59
1:A:26:ARG:O	1:A:29:GLN:HG3	2.03	0.58
1:A:37:ALA:HA	1:A:63:ARG:HD2	1.86	0.58
1:B:147:ALA:O	1:B:150:VAL:HG12	2.03	0.58
1:B:185:GLU:O	1:B:185:GLU:HG2	2.04	0.57
1:A:184:ASP:HB3	1:A:187:THR:OG1	2.04	0.57
1:B:410:VAL:HG21	1:B:508:LEU:HD13	1.87	0.57
1:B:487:ASP:O	1:B:488:HIS:ND1	2.38	0.56
1:B:13:LEU:HD22	1:B:58:LEU:CD2	2.35	0.56
1:B:306:ARG:NH2	1:B:330:ASP:OD2	2.38	0.56
1:A:78:LYS:HA	1:A:93:PHE:CZ	2.41	0.56
1:B:215:ARG:NH2	1:B:233:GLU:OE2	2.26	0.55
1:B:16:LEU:HB3	1:B:17:GLN:OE1	2.07	0.55
1:A:96:SER:OG	1:A:123:GLU:OE2	2.17	0.54
1:A:274:GLU:O	1:A:278:VAL:N	2.39	0.54
1:A:18:THR:HG23	1:A:19:ILE:HG13	1.89	0.54
1:B:413:LEU:HD12	1:B:509:LEU:HD13	1.90	0.54
1:B:15:LEU:HA	1:B:18:THR:OG1	2.08	0.54
1:B:161:TYR:HA	1:B:164:LEU:HD13	1.89	0.54
1:B:8:LEU:HD12	1:B:9:HIS:N	2.23	0.54
1:A:222:PRO:HB2	1:A:311:LEU:HD22	1.90	0.53
1:B:13:LEU:HD22	1:B:58:LEU:HD22	1.90	0.53
1:B:51:GLY:O	1:B:52:LYS:HB2	2.09	0.53
1:A:126:LEU:HD21	1:A:164:LEU:HD23	1.90	0.53
1:A:125:LEU:HD21	1:A:167:LEU:HD21	1.89	0.53
1:B:494:THR:HG22	1:B:496:LYS:H	1.74	0.53
1:A:42:ALA:HB3	1:A:177:VAL:HG23	1.91	0.53
1:A:57:GLN:NE2	1:A:84:LEU:HD11	2.24	0.53
1:B:302:LYS:HE3	1:B:304:ASN:HB3	1.91	0.53
1:A:148:HIS:CD2	1:A:155:HIS:HB3	2.44	0.52
1:A:465:HIS:CG	1:A:469:LEU:HD22	2.44	0.52
1:B:46:MET:HA	1:B:205:SER:HB3	1.90	0.52
1:B:46:MET:HB3	1:B:47:PRO:HD2	1.91	0.52
1:B:449:LEU:HD23	1:B:454:HIS:ND1	2.25	0.52
1:A:186:ARG:HH22	1:A:367:SER:CB	2.23	0.52
1:B:494:THR:HG22	1:B:495:GLY:N	2.26	0.51
1:B:183:ALA:HB1	1:B:188:ARG:NH1	2.22	0.51
1:B:453:HIS:HA	1:B:456:LEU:HD13	1.93	0.51
1:B:74:ILE:O	1:B:77:MET:HB2	2.10	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:154:GLY:HA2	1:B:182:THR:HG21	1.92	0.50
1:B:239:GLY:HA3	1:B:307:PHE:CE1	2.46	0.50
1:A:201:PRO:HB2	1:A:203:PHE:CE1	2.47	0.50
1:A:266:TYR:CE1	1:A:275:ARG:HG3	2.47	0.49
1:A:306:ARG:HH22	1:A:330:ASP:CG	2.16	0.49
1:B:486:ASP:HA	1:B:489:PHE:H	1.77	0.49
1:A:293:THR:O	1:A:294:VAL:HG23	2.13	0.49
1:B:131:LEU:HD23	1:B:170:ARG:HG3	1.95	0.48
1:B:13:LEU:HD12	1:B:13:LEU:HA	1.73	0.48
1:B:420:ALA:O	1:B:424:THR:HG22	2.12	0.48
1:B:52:LYS:HZ1	1:B:180:THR:C	2.10	0.48
1:A:217:GLY:O	1:A:339:VAL:HA	2.13	0.48
1:B:35:GLN:CD	1:B:201:PRO:HG3	2.33	0.48
1:A:58:LEU:HB3	1:A:59:PRO:HD3	1.95	0.48
1:A:79:ASP:O	1:A:83:THR:OG1	2.26	0.48
1:B:26:ARG:O	1:B:29:GLN:HG3	2.14	0.48
1:A:302:LYS:HB3	1:A:305:VAL:HG23	1.95	0.48
1:B:46:MET:HG2	1:B:205:SER:HB3	1.95	0.48
1:A:35:GLN:NE2	1:A:41:ASN:O	2.43	0.47
1:B:445:THR:HG22	1:B:446:ASP:H	1.79	0.47
1:A:73:LEU:HD11	1:A:146:GLU:OE2	2.15	0.47
1:A:243:CYS:O	1:A:293:THR:HA	2.14	0.47
1:A:310:HIS:HB2	1:A:338:MET:HB2	1.96	0.47
1:B:85:ARG:HG3	1:B:89:VAL:O	2.14	0.47
1:A:144:ILE:HD11	1:A:167:LEU:HD12	1.95	0.47
1:A:274:GLU:CA	1:A:277:ASN:HB3	2.43	0.46
1:B:12:ALA:O	1:B:13:LEU:HD13	2.15	0.46
1:B:422:SER:O	1:B:426:ARG:HG2	2.15	0.46
1:A:432:GLY:HA2	1:A:489:PHE:O	2.15	0.46
1:A:17:GLN:HG3	1:A:21:GLY:HA2	1.96	0.46
1:A:388:HIS:ND1	1:A:393:GLU:OE2	2.41	0.46
1:B:76:LEU:O	1:B:80:GLN:HG3	2.15	0.46
1:B:80:GLN:HA	1:B:83:THR:HG22	1.98	0.46
1:B:101:HIS:O	1:B:105:GLU:HG3	2.15	0.46
1:B:293:THR:O	1:B:294:VAL:HG23	2.16	0.46
1:A:314:PRO:HD2	1:A:372:LEU:HD21	1.97	0.46
1:B:26:ARG:HD2	1:B:27:GLY:N	2.31	0.46
1:A:63:ARG:NH1	1:A:175:PRO:HG2	2.31	0.45
1:B:13:LEU:HD23	1:B:16:LEU:CD1	2.43	0.45
1:B:52:LYS:HE2	1:B:179:LEU:HB3	1.97	0.45
1:A:150:VAL:HG12	1:A:161:TYR:O	2.15	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:410:VAL:HG21	1:A:508:LEU:HD13	1.98	0.45
1:A:476:GLN:HG2	1:A:509:LEU:HD11	1.98	0.45
1:B:237:ASP:HB3	1:B:306:ARG:HB2	1.99	0.45
1:A:329:ARG:O	1:B:362:LYS:HD2	2.17	0.45
1:A:382:ARG:HD2	1:A:402:ASP:OD1	2.17	0.45
1:A:152:GLN:HG2	1:A:153:TRP:CD1	2.51	0.45
1:B:9:HIS:O	1:B:9:HIS:CG	2.67	0.45
1:B:188:ARG:HE	1:B:202:GLN:NE2	2.15	0.45
1:B:8:LEU:HD12	1:B:9:HIS:HB2	2.00	0.44
1:B:267:HIS:CE1	1:B:270:LEU:HG	2.53	0.44
1:B:510:ARG:O	1:B:513:THR:HG23	2.18	0.44
1:B:58:LEU:HD12	1:B:58:LEU:O	2.18	0.44
1:B:309:ALA:HA	1:B:337:TRP:O	2.17	0.44
1:B:407:PRO:HA	1:B:408:PRO:HD3	1.90	0.44
1:A:44:VAL:O	1:A:179:LEU:HA	2.17	0.44
1:A:466:ASP:OD1	1:A:468:LYS:HG2	2.18	0.44
1:A:81:VAL:HG22	1:A:91:ALA:HB3	2.00	0.44
1:A:16:LEU:O	1:A:20:TRP:HB2	2.18	0.43
1:A:51:GLY:O	1:A:54:LEU:HB3	2.18	0.43
1:A:270:LEU:HB3	1:A:274:GLU:OE2	2.17	0.43
1:B:47:PRO:HG2	1:B:50:GLY:H	1.83	0.43
1:B:168:ALA:HB2	1:B:176:ARG:CZ	2.47	0.43
1:A:182:THR:O	1:A:182:THR:OG1	2.36	0.43
1:B:487:ASP:HB3	1:B:490:GLY:HA3	1.99	0.43
1:A:306:ARG:HA	1:A:306:ARG:HD3	1.57	0.43
1:B:12:ALA:HA	1:B:62:LEU:HD21	1.99	0.43
1:B:263:ALA:HA	1:B:289:ILE:O	2.19	0.43
1:A:484:SER:HB2	1:A:494:THR:HG22	2.01	0.43
1:B:124:ARG:HH22	1:B:129:ARG:NH1	2.17	0.43
1:B:146:GLU:HG3	1:B:148:HIS:CE1	2.53	0.43
1:B:499:GLY:HA2	1:B:503:GLU:HB2	2.01	0.43
1:B:256:LEU:HD23	1:B:256:LEU:HA	1.83	0.43
1:B:104:ARG:HA	1:B:107:GLU:HB2	1.99	0.42
1:B:150:VAL:HG23	1:B:162:GLN:HB3	1.99	0.42
1:B:302:LYS:HB3	1:B:305:VAL:HG23	2.02	0.42
1:B:308:VAL:HG11	1:B:324:THR:HA	2.01	0.42
1:B:63:ARG:HB2	1:B:140:ALA:HB1	2.01	0.42
1:A:426:ARG:HE	1:A:426:ARG:HB3	1.68	0.42
1:B:277:ASN:O	1:B:281:ARG:HG3	2.20	0.42
1:A:231:ARG:O	1:A:235:PRO:HG3	2.19	0.42
1:B:45:LEU:HD23	1:B:204:VAL:HG13	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:387:LEU:HD23	1:B:387:LEU:HA	1.89	0.42
1:A:95:ASN:H	1:A:98:LEU:HD12	1.84	0.41
1:A:380:THR:C	1:A:403:VAL:HG11	2.40	0.41
1:B:12:ALA:HA	1:B:62:LEU:CD2	2.50	0.41
1:B:123:GLU:OE1	1:B:124:ARG:HG2	2.20	0.41
1:A:46:MET:HB2	1:A:52:LYS:HG3	2.01	0.41
1:B:465:HIS:CG	1:B:469:LEU:HD22	2.55	0.41
1:A:449:LEU:HD23	1:A:454:HIS:ND1	2.35	0.41
1:B:471:ARG:HA	1:B:471:ARG:HD2	1.90	0.41
1:B:110:LEU:HD21	1:B:134:LEU:HD23	2.02	0.41
1:B:241:VAL:O	1:B:291:CYS:HA	2.20	0.41
1:B:273:THR:HG22	1:B:274:GLU:N	2.35	0.41
1:A:219:LYS:HD2	1:A:222:PRO:HB3	2.03	0.41
1:A:111:LEU:HD23	1:A:111:LEU:HA	1.76	0.41
1:B:234:HIS:N	1:B:235:PRO:HD3	2.35	0.41
1:B:261:ILE:CG2	1:B:289:ILE:HD12	2.50	0.41
1:A:154:GLY:O	1:A:155:HIS:HB2	2.20	0.41
1:B:71:SER:HA	1:B:72:PRO:HD3	1.88	0.41
1:B:502:LYS:HE3	1:B:502:LYS:HB3	1.75	0.41
1:B:301:ASP:O	1:B:302:LYS:HB2	2.21	0.41
1:A:234:HIS:N	1:A:235:PRO:HD3	2.36	0.41
1:B:58:LEU:HD12	1:B:58:LEU:C	2.37	0.41
1:A:301:ASP:O	1:A:302:LYS:HB2	2.21	0.41
1:B:43:LEU:HD23	1:B:202:GLN:HG3	2.03	0.41
1:B:90:ARG:HD2	1:B:114:ASP:O	2.21	0.41
1:B:183:ALA:HB3	1:B:207:PHE:CZ	2.56	0.41
1:A:174:LEU:HA	1:A:175:PRO:HD3	1.93	0.40
1:B:449:LEU:HD23	1:B:454:HIS:CG	2.56	0.40
1:B:511:GLU:O	1:B:513:THR:N	2.43	0.40
1:A:40:GLY:O	1:A:175:PRO:HB3	2.21	0.40
1:A:79:ASP:HA	1:A:82:ASP:HB2	2.03	0.40
1:A:449:LEU:HD23	1:A:454:HIS:CG	2.57	0.40

All (1) 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)
1:A:112:ARG:O	1:A:430:ARG:NH1[4_445]	2.11	0.09

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	496/525 (94%)	471 (95%)	17 (3%)	8 (2%)	9 31
1	B	497/525 (95%)	471 (95%)	15 (3%)	11 (2%)	6 22
All	All	993/1050 (95%)	942 (95%)	32 (3%)	19 (2%)	8 26

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	155	HIS
1	A	271	SER
1	A	486	ASP
1	B	48	THR
1	B	155	HIS
1	B	273	THR
1	B	486	ASP
1	B	487	ASP
1	B	512	ASP
1	B	52	LYS
1	A	342	LEU
1	A	381	CYS
1	B	381	CYS
1	A	269	GLY
1	B	23	PRO
1	B	13	LEU
1	B	49	GLY
1	A	294	VAL
1	A	302	LYS

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	418/436 (96%)	413 (99%)	5 (1%)	71	92
1	B	419/436 (96%)	413 (99%)	6 (1%)	67	90
All	All	837/872 (96%)	826 (99%)	11 (1%)	69	91

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	166	VAL
1	A	182	THR
1	A	202	GLN
1	A	424	THR
1	A	426	ARG
1	B	10	ASP
1	B	16	LEU
1	B	101	HIS
1	B	112	ARG
1	B	343	SER
1	B	424	THR

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	80	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

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

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, 95^{th} 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	500/525 (95%)	-0.13	8 (1%) 72 66	27, 50, 82, 97	0
1	B	501/525 (95%)	0.06	21 (4%) 36 26	30, 57, 92, 110	0
All	All	1001/1050 (95%)	-0.04	29 (2%) 51 41	27, 53, 89, 110	0

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	85	ARG	5.1
1	B	23	PRO	4.2
1	A	486	ASP	4.0
1	B	513	THR	3.9
1	B	188	ARG	3.7
1	B	12	ALA	3.6
1	B	48	THR	3.3
1	B	51	GLY	3.2
1	B	22	TYR	3.1
1	B	25	PHE	3.0
1	B	295	ALA	3.0
1	B	487	ASP	2.9
1	B	86	GLN	2.9
1	A	153	TRP	2.9
1	B	99	LEU	2.6
1	A	88	GLY	2.5
1	A	78	LYS	2.4
1	A	155	HIS	2.4
1	A	270	LEU	2.4
1	A	22	TYR	2.3
1	B	18	THR	2.3
1	B	9	HIS	2.3
1	B	47	PRO	2.3
1	B	183	ALA	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	34	GLN	2.2
1	B	155	HIS	2.0
1	B	11	ARG	2.0
1	B	75	ALA	2.0
1	A	273	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, 95^{th} 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
2	ZN	A	801	1/1	0.99	0.12	35,35,35,35	0
2	ZN	B	801	1/1	0.99	0.09	37,37,37,37	0

6.5 Other polymers (i)

There are no such residues in this entry.