Full wwPDB X-ray Structure Validation Report ⓘ

Nov 17, 2026 – 05:15 PM JST

PDB ID	:	46DX / pdb_000046dx
Title	:	Crystal structure of BcABA4 from Botrytis cinerea
Authors	:	Li, S.Y.; Liang, B.Y.; Huang, J.-W.; Chen, C.-C.; Guo, R.-T.
Deposited on	:	2026-09-19
Resolution	:	1.47 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

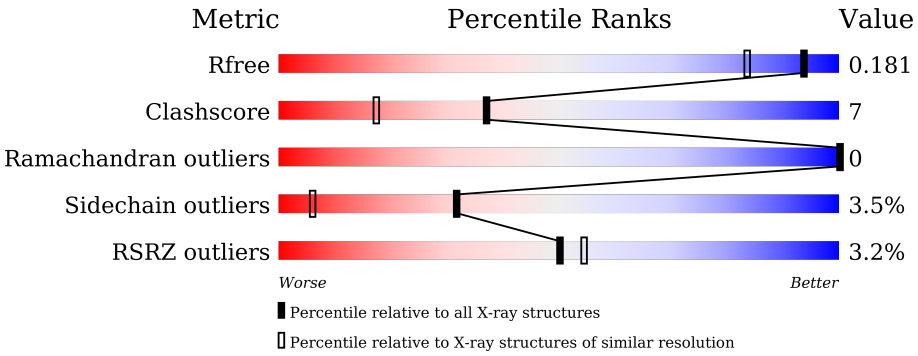
MolProbity	:	4-5-2 with Phenix2.2
Xtriage (Phenix)	:	2.2
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

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 1.47 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	6779 (1.50-1.46)
Clashscore	190562	7025 (1.50-1.46)
Ramachandran outliers	187476	6917 (1.50-1.46)
Sidechain outliers	187428	6914 (1.50-1.46)
RSRZ outliers	180081	6781 (1.50-1.46)

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	281	3% 69% 9% • 21%
1	B	281	3% 70% 8% • 19%
1	C	281	3% 68% 10% • 20%
1	D	281	2% 72% 6% • 20%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 7484 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 Short-chain dehydrogenase/reductase aba4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	221	Total	C	N	O	S	0	0	0
			1652	1039	284	326	3			
1	B	227	Total	C	N	O	S	0	0	0
			1693	1063	293	334	3			
1	C	224	Total	C	N	O	S	0	1	0
			1672	1050	288	331	3			
1	D	224	Total	C	N	O	S	0	0	0
			1669	1046	289	330	4			

There are 92 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-22	HIS	-	expression tag	UNP A0A384JQF5
A	-21	HIS	-	expression tag	UNP A0A384JQF5
A	-20	HIS	-	expression tag	UNP A0A384JQF5
A	-19	HIS	-	expression tag	UNP A0A384JQF5
A	-18	HIS	-	expression tag	UNP A0A384JQF5
A	-17	HIS	-	expression tag	UNP A0A384JQF5
A	-16	GLU	-	expression tag	UNP A0A384JQF5
A	-15	ASN	-	expression tag	UNP A0A384JQF5
A	-14	LEU	-	expression tag	UNP A0A384JQF5
A	-13	TYR	-	expression tag	UNP A0A384JQF5
A	-12	PHE	-	expression tag	UNP A0A384JQF5
A	-11	GLN	-	expression tag	UNP A0A384JQF5
A	-10	GLY	-	expression tag	UNP A0A384JQF5
A	-9	ALA	-	expression tag	UNP A0A384JQF5
A	-8	GLY	-	expression tag	UNP A0A384JQF5
A	-7	ALA	-	expression tag	UNP A0A384JQF5
A	-6	GLY	-	expression tag	UNP A0A384JQF5
A	-5	ALA	-	expression tag	UNP A0A384JQF5
A	-4	GLY	-	expression tag	UNP A0A384JQF5
A	-3	ALA	-	expression tag	UNP A0A384JQF5
A	-2	GLY	-	expression tag	UNP A0A384JQF5

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	ALA	-	expression tag	UNP A0A384JQF5
A	0	GLY	-	expression tag	UNP A0A384JQF5
B	-22	HIS	-	expression tag	UNP A0A384JQF5
B	-21	HIS	-	expression tag	UNP A0A384JQF5
B	-20	HIS	-	expression tag	UNP A0A384JQF5
B	-19	HIS	-	expression tag	UNP A0A384JQF5
B	-18	HIS	-	expression tag	UNP A0A384JQF5
B	-17	HIS	-	expression tag	UNP A0A384JQF5
B	-16	GLU	-	expression tag	UNP A0A384JQF5
B	-15	ASN	-	expression tag	UNP A0A384JQF5
B	-14	LEU	-	expression tag	UNP A0A384JQF5
B	-13	TYR	-	expression tag	UNP A0A384JQF5
B	-12	PHE	-	expression tag	UNP A0A384JQF5
B	-11	GLN	-	expression tag	UNP A0A384JQF5
B	-10	GLY	-	expression tag	UNP A0A384JQF5
B	-9	ALA	-	expression tag	UNP A0A384JQF5
B	-8	GLY	-	expression tag	UNP A0A384JQF5
B	-7	ALA	-	expression tag	UNP A0A384JQF5
B	-6	GLY	-	expression tag	UNP A0A384JQF5
B	-5	ALA	-	expression tag	UNP A0A384JQF5
B	-4	GLY	-	expression tag	UNP A0A384JQF5
B	-3	ALA	-	expression tag	UNP A0A384JQF5
B	-2	GLY	-	expression tag	UNP A0A384JQF5
B	-1	ALA	-	expression tag	UNP A0A384JQF5
B	0	GLY	-	expression tag	UNP A0A384JQF5
C	-22	HIS	-	expression tag	UNP A0A384JQF5
C	-21	HIS	-	expression tag	UNP A0A384JQF5
C	-20	HIS	-	expression tag	UNP A0A384JQF5
C	-19	HIS	-	expression tag	UNP A0A384JQF5
C	-18	HIS	-	expression tag	UNP A0A384JQF5
C	-17	HIS	-	expression tag	UNP A0A384JQF5
C	-16	GLU	-	expression tag	UNP A0A384JQF5
C	-15	ASN	-	expression tag	UNP A0A384JQF5
C	-14	LEU	-	expression tag	UNP A0A384JQF5
C	-13	TYR	-	expression tag	UNP A0A384JQF5
C	-12	PHE	-	expression tag	UNP A0A384JQF5
C	-11	GLN	-	expression tag	UNP A0A384JQF5
C	-10	GLY	-	expression tag	UNP A0A384JQF5
C	-9	ALA	-	expression tag	UNP A0A384JQF5
C	-8	GLY	-	expression tag	UNP A0A384JQF5
C	-7	ALA	-	expression tag	UNP A0A384JQF5
C	-6	GLY	-	expression tag	UNP A0A384JQF5

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-5	ALA	-	expression tag	UNP A0A384JQF5
C	-4	GLY	-	expression tag	UNP A0A384JQF5
C	-3	ALA	-	expression tag	UNP A0A384JQF5
C	-2	GLY	-	expression tag	UNP A0A384JQF5
C	-1	ALA	-	expression tag	UNP A0A384JQF5
C	0	GLY	-	expression tag	UNP A0A384JQF5
D	-22	HIS	-	expression tag	UNP A0A384JQF5
D	-21	HIS	-	expression tag	UNP A0A384JQF5
D	-20	HIS	-	expression tag	UNP A0A384JQF5
D	-19	HIS	-	expression tag	UNP A0A384JQF5
D	-18	HIS	-	expression tag	UNP A0A384JQF5
D	-17	HIS	-	expression tag	UNP A0A384JQF5
D	-16	GLU	-	expression tag	UNP A0A384JQF5
D	-15	ASN	-	expression tag	UNP A0A384JQF5
D	-14	LEU	-	expression tag	UNP A0A384JQF5
D	-13	TYR	-	expression tag	UNP A0A384JQF5
D	-12	PHE	-	expression tag	UNP A0A384JQF5
D	-11	GLN	-	expression tag	UNP A0A384JQF5
D	-10	GLY	-	expression tag	UNP A0A384JQF5
D	-9	ALA	-	expression tag	UNP A0A384JQF5
D	-8	GLY	-	expression tag	UNP A0A384JQF5
D	-7	ALA	-	expression tag	UNP A0A384JQF5
D	-6	GLY	-	expression tag	UNP A0A384JQF5
D	-5	ALA	-	expression tag	UNP A0A384JQF5
D	-4	GLY	-	expression tag	UNP A0A384JQF5
D	-3	ALA	-	expression tag	UNP A0A384JQF5
D	-2	GLY	-	expression tag	UNP A0A384JQF5
D	-1	ALA	-	expression tag	UNP A0A384JQF5
D	0	GLY	-	expression tag	UNP A0A384JQF5

- Molecule 2 is water.

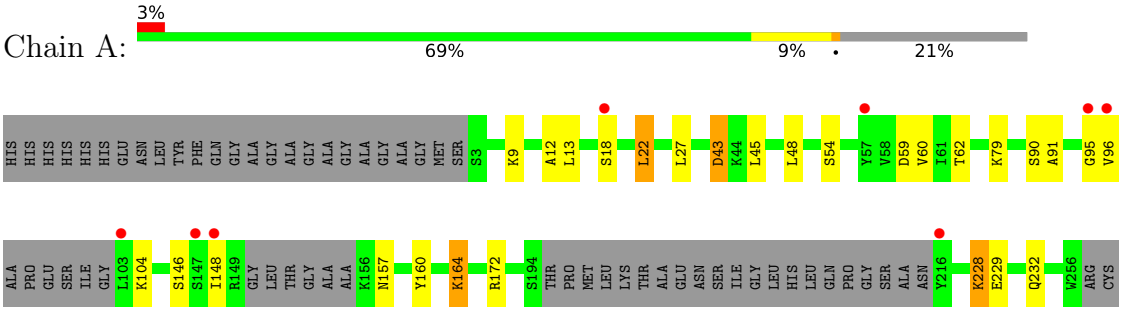
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	160	Total O 160 160	0	0
2	B	217	Total O 217 217	0	0
2	C	234	Total O 234 234	0	0
2	D	187	Total O 187 187	0	0

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.

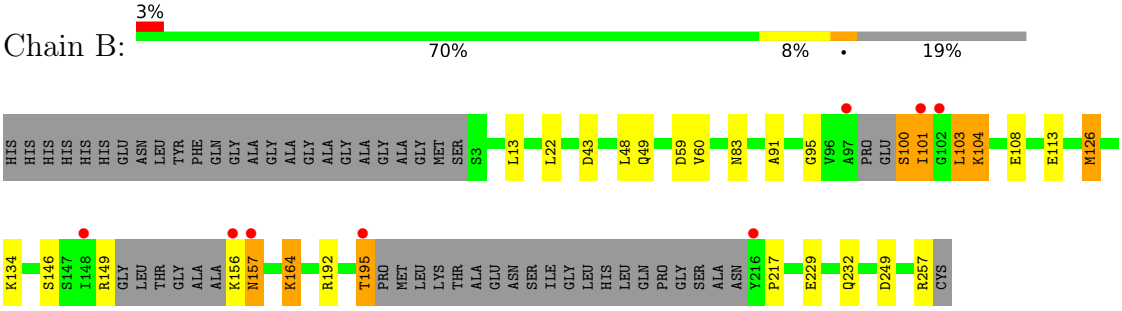
• Molecule 1: Short-chain dehydrogenase/reductase aba4

Chain A:



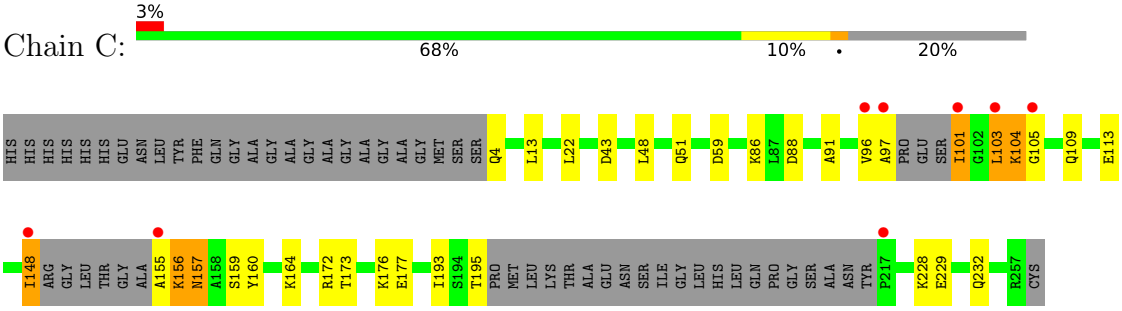
• Molecule 1: Short-chain dehydrogenase/reductase aba4

Chain B:



• Molecule 1: Short-chain dehydrogenase/reductase aba4

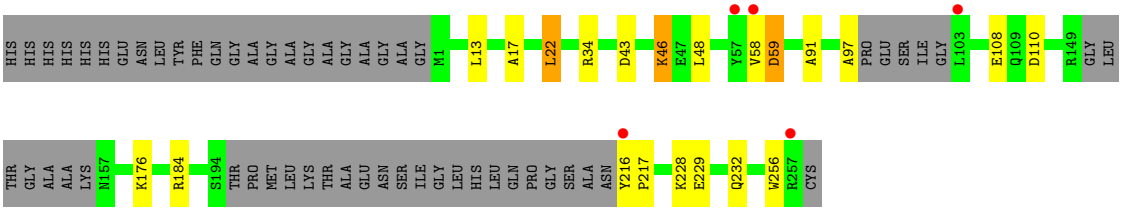
Chain C:



• Molecule 1: Short-chain dehydrogenase/reductase aba4

Chain D:




HIS HIS HIS HIS HIS GLU ASN LEU TYR PHE GLN GLY ALA GLY ALA GLY ALA GLY ALA GLY ALA GLY
M1 L13 A17 L22 R34 D43 K46 E47 L48 Y57 V58 D59 A91 A97
PRO GLU SER ILE GLY L103 E108 Q109 D110 R149 GLY LEU
THR GLY ALA ALA LYS M157 K176 R184 S194 THR PRO MET LEU LYS THR ALA GLU ASN SER ILE GLY LEU HIS LEU GLN PRO GLY SER ALA ASN
Y216 P217 K228 E229 Q232 W256 R257 CYS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	51.83Å 62.87Å 250.41Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.76 – 1.47 24.76 – 1.47	Depositor EDS
% Data completeness (in resolution range)	93.3 (24.76-1.47) 93.3 (24.76-1.47)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.38 (at 1.48Å)	Xtriage
Refinement program	REFMAC 5.8.0430	Depositor
R, R_{free}	0.127 , 0.181 0.127 , 0.181	Depositor DCC
R_{free} test set	6557 reflections (4.69%)	wwPDB-VP
Wilson B-factor (Å^2)	17.3	Xtriage
Anisotropy	0.337	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 47.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.98	EDS
Total number of atoms	7484	wwPDB-VP
Average B, all atoms (Å^2)	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.12% 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 (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	0.73	0/1669	1.15	5/2249 (0.2%)
1	B	0.86	1/1710 (0.1%)	1.27	10/2304 (0.4%)
1	C	0.84	1/1688 (0.1%)	1.17	3/2274 (0.1%)
1	D	0.80	0/1686	1.17	4/2271 (0.2%)
All	All	0.81	2/6753 (0.0%)	1.19	22/9098 (0.2%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	126	MET	CB-CG	8.28	1.77	1.52
1	C	172	ARG	NE-CZ	-5.03	1.27	1.33

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	157	ASN	CA-CB-CG	-10.89	101.71	112.60
1	D	59	ASP	CB-CA-C	-9.44	94.45	110.22
1	D	59	ASP	CA-CB-CG	8.67	121.27	112.60
1	B	126	MET	CB-CG-SD	-8.18	88.15	112.70
1	B	59	ASP	N-CA-CB	-7.95	96.81	110.17
1	A	79	LYS	CB-CA-C	-7.42	99.22	110.88
1	A	43	ASP	CA-CB-CG	6.95	119.55	112.60
1	B	43	ASP	CA-CB-CG	6.52	119.12	112.60
1	C	164	LYS	CB-CA-C	6.20	121.38	110.85
1	B	149	ARG	CA-C-O	-6.00	110.60	120.80
1	D	184	ARG	NE-CZ-NH2	-5.62	114.14	119.20
1	B	104	LYS	CA-C-N	-5.52	114.34	121.96
1	B	104	LYS	C-N-CA	-5.52	114.34	121.96
1	C	43	ASP	CA-CB-CG	5.45	118.05	112.60
1	A	59	ASP	CB-CA-C	-5.36	101.96	110.81
1	C	59	ASP	CA-CB-CG	5.36	117.96	112.60
1	B	164	LYS	CB-CA-C	-5.24	102.58	110.92
1	A	172	ARG	NE-CZ-NH1	-5.21	116.29	121.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	146	SER	N-CA-C	5.12	117.13	110.53
1	B	249	ASP	CA-CB-CG	5.05	117.65	112.60
1	D	110	ASP	CA-CB-CG	5.03	117.63	112.60
1	B	126	MET	N-CA-CB	5.01	117.28	110.01

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	1652	0	1680	24	0
1	B	1693	0	1724	32	0
1	C	1672	0	1703	38	0
1	D	1669	0	1692	12	0
2	A	160	0	0	7	0
2	B	217	0	0	10	0
2	C	234	0	0	15	0
2	D	187	0	0	5	0
All	All	7484	0	6799	96	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

All (96) 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:126:MET:CG	1:B:126:MET:CB	1.77	1.56
1:A:18:SER:HB3	2:A:306:HOH:O	1.18	1.31
1:C:228:LYS:HG3	2:C:441:HOH:O	1.56	1.02
1:C:113[A]:GLU:HG2	2:C:306:HOH:O	1.57	1.01
1:B:83:ASN:HB2	2:B:327:HOH:O	1.61	0.99
1:B:126:MET:HE2	1:C:109:GLN:HG2	1.45	0.99
1:B:126:MET:CB	1:B:126:MET:SD	2.53	0.96
1:D:228:LYS:HG3	2:D:424:HOH:O	1.71	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:95:GLY:HA2	2:B:321:HOH:O	1.75	0.84
1:A:9:LYS:HE2	2:A:382:HOH:O	1.75	0.84
1:C:148:ILE:HG22	2:C:327:HOH:O	1.78	0.84
1:C:160:TYR:OH	2:C:301:HOH:O	1.98	0.81
1:A:22:LEU:HD13	1:A:48:LEU:HD13	1.68	0.75
1:D:97:ALA:O	2:D:301:HOH:O	2.04	0.75
1:A:27:LEU:HD13	1:A:228:LYS:NZ	2.01	0.73
1:A:160:TYR:O	1:A:164:LYS:HG3	1.89	0.73
1:A:13:LEU:HD22	1:A:91:ALA:HB3	1.71	0.72
1:B:156:LYS:HG3	1:C:173:THR:HG23	1.71	0.72
1:B:126:MET:CE	1:C:109:GLN:HG2	2.18	0.72
1:C:148:ILE:C	1:C:148:ILE:HD13	2.14	0.72
1:B:108:GLU:O	2:B:301:HOH:O	2.08	0.71
1:C:97:ALA:C	2:C:304:HOH:O	2.32	0.70
1:A:228:LYS:HD3	2:A:302:HOH:O	1.91	0.70
1:C:228:LYS:CG	2:C:441:HOH:O	2.29	0.68
1:B:101:ILE:HG23	1:B:113:GLU:HB3	1.76	0.67
1:C:157:ASN:ND2	1:C:159:SER:OG	2.27	0.66
1:D:13:LEU:HD22	1:D:91:ALA:HB3	1.77	0.65
1:D:216:TYR:N	2:D:303:HOH:O	2.32	0.62
1:B:126:MET:SD	1:B:126:MET:HB2	2.39	0.61
1:C:105:GLY:N	2:C:302:HOH:O	2.29	0.61
1:D:13:LEU:CD2	1:D:91:ALA:HB3	2.30	0.61
1:C:105:GLY:CA	2:C:302:HOH:O	2.50	0.60
1:A:96:VAL:CG1	1:A:148:ILE:H	2.15	0.60
1:B:13:LEU:HD22	1:B:91:ALA:HB3	1.83	0.59
1:A:18:SER:CB	2:A:306:HOH:O	2.01	0.58
1:B:195:THR:O	1:B:195:THR:OG1	2.20	0.58
1:C:97:ALA:C	2:C:414:HOH:O	2.47	0.58
1:A:96:VAL:HG12	1:A:148:ILE:H	1.69	0.57
1:C:22:LEU:CD1	1:C:48:LEU:HD13	2.34	0.57
1:C:13:LEU:HD22	1:C:91:ALA:HB3	1.86	0.57
1:A:228:LYS:O	1:A:228:LYS:HE2	2.05	0.57
1:A:43:ASP:HB3	2:A:414:HOH:O	2.06	0.56
1:C:86:LYS:HE3	1:C:88:ASP:OD2	2.05	0.56
1:A:27:LEU:HD22	1:A:228:LYS:NZ	2.20	0.56
1:A:27:LEU:HD22	1:A:228:LYS:HZ1	1.70	0.56
1:A:164:LYS:HG2	2:A:391:HOH:O	2.06	0.54
1:B:146:SER:HB3	2:B:358:HOH:O	2.07	0.54
1:C:96:VAL:HG22	2:C:337:HOH:O	2.07	0.54
1:A:22:LEU:CD1	1:A:48:LEU:HD13	2.37	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:103:LEU:HD12	1:B:157:ASN:HD22	1.72	0.54
1:B:103:LEU:HD12	1:B:157:ASN:ND2	2.23	0.54
1:B:22:LEU:CD1	1:B:48:LEU:HD13	2.39	0.53
1:A:18:SER:O	1:A:22:LEU:HB3	2.08	0.53
1:A:27:LEU:HD13	1:A:228:LYS:HZ2	1.73	0.52
1:B:13:LEU:CD2	1:B:91:ALA:HB3	2.40	0.52
1:C:193:ILE:O	1:C:195:THR:HG23	2.09	0.52
1:C:4:GLN:N	2:C:305:HOH:O	2.42	0.51
1:B:95:GLY:CA	2:B:321:HOH:O	2.46	0.50
1:A:12:ALA:O	1:A:90:SER:HA	2.12	0.49
1:B:100:SER:O	1:B:101:ILE:HD12	2.12	0.49
1:C:13:LEU:CD2	1:C:91:ALA:HB3	2.42	0.49
1:A:45:LEU:HD13	1:A:62:THR:HB	1.93	0.48
1:C:103:LEU:HD12	1:C:103:LEU:H	1.78	0.48
1:D:34:ARG:CZ	2:D:307:HOH:O	2.61	0.48
1:B:126:MET:HE3	1:C:109:GLN:HB3	1.95	0.47
1:B:156:LYS:HG2	1:C:177:GLU:CG	2.45	0.47
1:D:43:ASP:O	1:D:46:LYS:HG3	2.15	0.46
2:B:302:HOH:O	1:C:156:LYS:HA	2.15	0.46
1:D:22:LEU:HD12	1:D:48:LEU:HD22	1.98	0.46
1:A:95:GLY:O	1:A:96:VAL:HB	2.16	0.46
1:B:126:MET:CE	1:C:109:GLN:CG	2.92	0.46
1:B:156:LYS:HG3	1:C:173:THR:CG2	2.43	0.46
1:B:134:LYS:NZ	2:B:320:HOH:O	2.49	0.45
1:D:34:ARG:NH1	2:D:307:HOH:O	2.48	0.45
1:C:101:ILE:N	2:C:310:HOH:O	2.49	0.45
1:A:13:LEU:CD2	1:A:91:ALA:HB3	2.44	0.45
1:C:148:ILE:C	1:C:148:ILE:CD1	2.84	0.44
1:B:126:MET:HE2	1:C:109:GLN:CG	2.31	0.44
1:B:164:LYS:HG3	2:B:358:HOH:O	2.16	0.44
1:B:229:GLU:HA	1:B:232:GLN:HE21	1.83	0.44
1:B:126:MET:CE	1:C:109:GLN:CB	2.96	0.43
1:C:229:GLU:HA	1:C:232:GLN:HE21	1.83	0.43
1:C:104:LYS:HB3	1:C:104:LYS:HE3	1.79	0.43
1:A:229:GLU:HA	1:A:232:GLN:HE21	1.84	0.43
1:C:113[A]:GLU:CG	2:C:306:HOH:O	2.38	0.42
1:D:229:GLU:HA	1:D:232:GLN:HE21	1.84	0.42
1:B:49:GLN:HG3	1:B:60:VAL:HG13	2.02	0.42
1:D:217:PRO:HB3	1:D:256:TRP:CZ2	2.55	0.42
1:C:51:GLN:NE2	2:C:303:HOH:O	2.36	0.41
1:B:192:ARG:HD3	1:B:217:PRO:HG2	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:95:GLY:N	2:B:321:HOH:O	2.53	0.41
2:B:302:HOH:O	1:C:156:LYS:HG3	2.20	0.41
1:C:155:ALA:HB1	2:C:429:HOH:O	2.21	0.41
1:D:17:ALA:HA	1:D:22:LEU:HD13	2.02	0.41
1:A:157:ASN:N	2:A:309:HOH:O	2.54	0.40
1:B:126:MET:CE	1:C:109:GLN:HB3	2.51	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	213/281 (76%)	208 (98%)	5 (2%)	0	100	100
1	B	219/281 (78%)	213 (97%)	6 (3%)	0	100	100
1	C	217/281 (77%)	213 (98%)	4 (2%)	0	100	100
1	D	216/281 (77%)	214 (99%)	2 (1%)	0	100	100
All	All	865/1124 (77%)	848 (98%)	17 (2%)	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	175/214 (82%)	169 (97%)	6 (3%)	32 6
1	B	179/214 (84%)	173 (97%)	6 (3%)	32 6
1	C	176/214 (82%)	169 (96%)	7 (4%)	28 4
1	D	176/214 (82%)	170 (97%)	6 (3%)	32 6
All	All	706/856 (82%)	681 (96%)	25 (4%)	32 6

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	LEU
1	A	54	SER
1	A	60	VAL
1	A	104	LYS
1	A	164	LYS
1	A	228	LYS
1	B	100	SER
1	B	101	ILE
1	B	103	LEU
1	B	104	LYS
1	B	195	THR
1	B	257	ARG
1	C	101	ILE
1	C	103	LEU
1	C	104	LYS
1	C	148	ILE
1	C	156	LYS
1	C	157	ASN
1	C	176	LYS
1	D	22	LEU
1	D	46	LYS
1	D	58	VAL
1	D	59	ASP
1	D	108	GLU
1	D	176	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	8	ASN
1	A	78	ASN

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Mol	Chain	Res	Type
1	A	127	ASN
1	A	138	ASN
1	A	139	ASN
1	A	232	GLN
1	B	8	ASN
1	B	41	GLN
1	B	78	ASN
1	B	127	ASN
1	B	139	ASN
1	B	232	GLN
1	C	4	GLN
1	C	51	GLN
1	C	78	ASN
1	C	127	ASN
1	C	139	ASN
1	C	157	ASN
1	C	165	HIS
1	C	232	GLN
1	D	4	GLN
1	D	78	ASN
1	D	83	ASN
1	D	109	GLN
1	D	127	ASN
1	D	138	ASN
1	D	232	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

There are no ligands in this entry.

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, 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	221/281 (78%)	-0.06	8 (3%)	46	50	13, 22, 50, 72	0
1	B	227/281 (80%)	-0.31	8 (3%)	47	51	11, 18, 41, 61	0
1	C	224/281 (79%)	-0.32	8 (3%)	46	50	8, 17, 38, 59	1 (0%)
1	D	224/281 (79%)	-0.18	5 (2%)	62	66	12, 21, 45, 67	0
All	All	896/1124 (79%)	-0.22	29 (3%)	50	54	8, 19, 45, 72	1 (0%)

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	101	ILE	4.9
1	A	95	GLY	3.7
1	A	57	TYR	3.5
1	D	58	VAL	3.4
1	A	103	LEU	3.2
1	C	97	ALA	3.0
1	C	155	ALA	2.9
1	B	216	TYR	2.8
1	C	217	PRO	2.8
1	D	103	LEU	2.8
1	A	148	ILE	2.7
1	C	103	LEU	2.7
1	C	148	ILE	2.7
1	A	216	TYR	2.7
1	A	96	VAL	2.6
1	B	101	ILE	2.6
1	D	57	TYR	2.6
1	B	148	ILE	2.5
1	D	257	ARG	2.5
1	C	96	VAL	2.5
1	B	156	LYS	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	18	SER	2.3
1	B	195	THR	2.3
1	B	102	GLY	2.2
1	B	157	ASN	2.1
1	D	216	TYR	2.1
1	A	147	SER	2.1
1	B	97	ALA	2.0
1	C	105	GLY	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

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

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.