



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 20, 2026 – 10:37 AM UTC

PDB ID : 1HU8 / pdb_00001hu8
Title : CRYSTAL STRUCTURE OF THE MOUSE P53 CORE DNA-BINDING DOMAIN AT 2.7Å RESOLUTION
Authors : Zhao, K.; Chai, X.; Johnston, K.; Clements, A.; Marmorstein, R.
Deposited on : 2001-01-04
Resolution : 2.70 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 Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

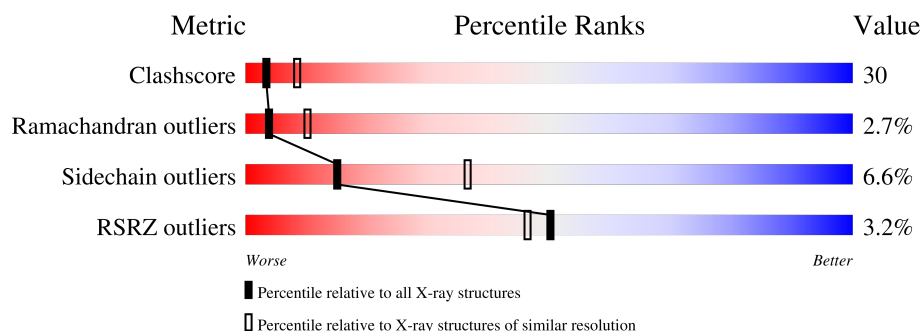
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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))
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)
RSRZ outliers	180081	3538 (2.70-2.70)

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	186	2% 53% 40% 6%
1	B	186	% 57% 38% 5%
1	C	186	7% 43% 48% 9%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4494 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 CELLULAR TUMOR ANTIGEN P53.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	186	Total	C	N	O	S	1	0	0
			1461	908	265	273	15			
1	B	186	Total	C	N	O	S	0	0	0
			1461	908	265	273	15			
1	C	186	Total	C	N	O	S	0	0	0
			1461	908	265	273	15			

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	199	ALA	TYR	engineered mutation	UNP P02340
B	199	ALA	TYR	engineered mutation	UNP P02340
C	199	ALA	TYR	engineered mutation	UNP P02340

- Molecule 2 is ZINC ION (CCD ID: 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		
2	C	1	Total	Zn	0	0
			1	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	48	Total	O	0	0
			48	48		
3	B	41	Total	O	0	0
			41	41		

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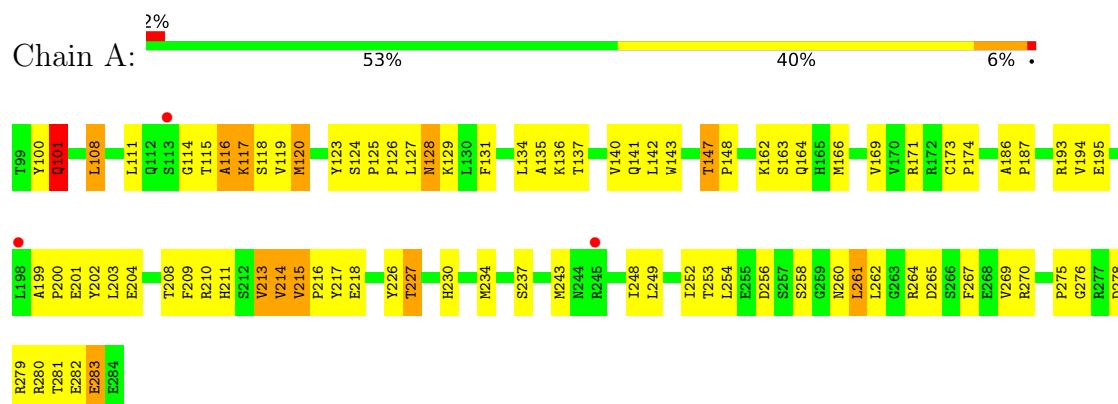
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	19	Total	O	0	0
			19	19		

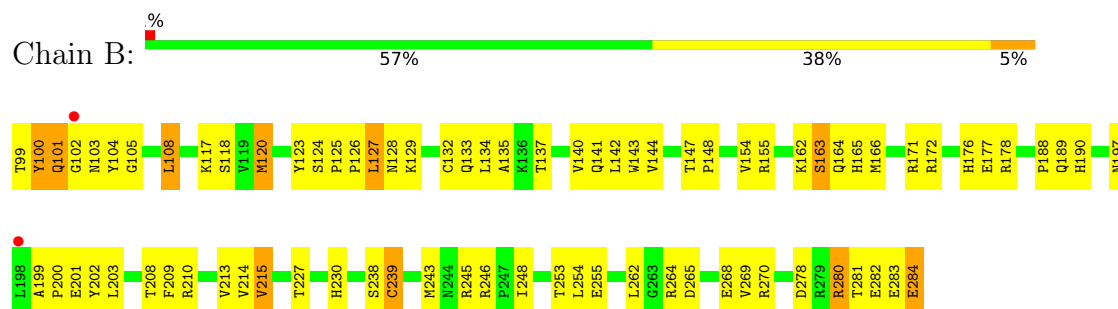
3 Residue-property plots

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.

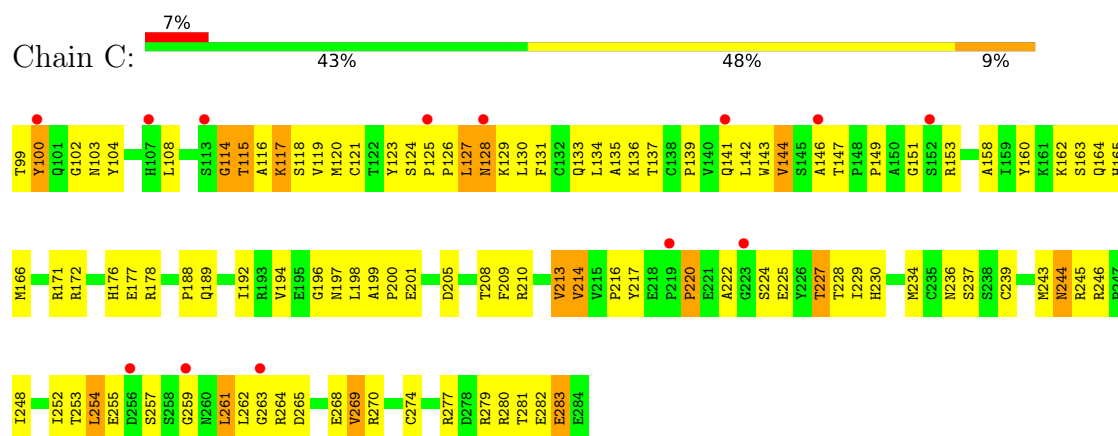
• Molecule 1: CELLULAR TUMOR ANTIGEN P53



• Molecule 1: CELLULAR TUMOR ANTIGEN P53



• Molecule 1: CELLULAR TUMOR ANTIGEN P53



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	73.68Å 119.99Å 184.24Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	10.00 – 2.70 10.00 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.5 (10.00-2.70) 97.5 (10.00-2.70)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.19 (at 2.68Å)	Xtriage
Refinement program	CNS 0.9	Depositor
R, R_{free}	0.239 , 0.299 0.249 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	59.9	Xtriage
Anisotropy	0.194	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 75.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	4494	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.62% 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](#)

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	0.46	0/1497	0.93	4/2027 (0.2%)
1	B	0.48	0/1497	0.92	0/2027
1	C	0.43	0/1497	0.95	3/2027 (0.1%)
All	All	0.46	0/4491	0.93	7/6081 (0.1%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	147	THR	CA-C-N	6.58	127.16	120.38
1	C	147	THR	C-N-CA	6.58	127.16	120.38
1	C	128	ASN	N-CA-C	-5.75	103.48	111.52
1	A	147	THR	CA-C-N	5.51	123.68	119.66
1	A	147	THR	C-N-CA	5.51	123.68	119.66
1	A	128	ASN	N-CA-C	-5.28	104.11	111.39
1	A	101	GLN	N-CA-C	-5.26	101.89	110.20

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	1461	0	1419	73	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1461	0	1419	75	0
1	C	1461	0	1420	114	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
3	A	48	0	0	3	0
3	B	41	0	0	4	0
3	C	19	0	0	7	0
All	All	4494	0	4258	259	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 30.

All (259) 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:253:THR:HG22	1:A:264:ARG:HG3	1.37	1.07
1:A:117:LYS:HD3	1:A:118:SER:H	1.22	1.03
1:B:108:LEU:HD22	1:B:265:ASP:HB3	1.41	0.99
1:C:104:TYR:HA	1:C:146:ALA:HB3	1.47	0.93
1:B:141:GLN:HE21	1:B:143:TRP:HE1	1.12	0.93
1:C:261:LEU:HD13	1:C:263:GLY:H	1.37	0.87
1:C:163:SER:HA	1:C:166:MET:HE2	1.57	0.85
1:B:141:GLN:NE2	1:B:143:TRP:HE1	1.75	0.84
1:C:143:TRP:O	1:C:144:VAL:HG13	1.77	0.84
1:A:117:LYS:HD3	1:A:118:SER:N	1.93	0.83
1:C:253:THR:HG22	1:C:264:ARG:HG3	1.61	0.83
1:A:141:GLN:HE21	1:A:143:TRP:HE1	1.27	0.82
1:A:208:THR:OG1	1:A:210:ARG:HG3	1.82	0.80
1:B:124:SER:OG	1:B:127:LEU:HD13	1.82	0.79
1:A:115:THR:HG23	1:A:280:ARG:HH21	1.47	0.79
1:B:120:MET:HB3	1:B:133:GLN:NE2	1.98	0.79
1:A:201:GLU:HB3	1:A:214:VAL:HG13	1.65	0.78
1:C:116:ALA:HB3	1:C:119:VAL:HG23	1.66	0.77
1:C:108:LEU:HD13	1:C:265:ASP:HB3	1.67	0.76
1:A:243:MET:SD	1:A:248:ILE:HD13	2.26	0.75
1:C:261:LEU:HD13	1:C:263:GLY:N	2.00	0.75
1:B:123:TYR:O	1:B:125:PRO:HD3	1.87	0.74
1:A:129:LYS:HE2	1:A:270:ARG:HB2	1.72	0.71
1:B:102:GLY:C	1:B:104:TYR:H	1.99	0.71
1:A:137:THR:HG23	1:A:230:HIS:HB3	1.71	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:204:GLU:HG2	1:A:211:HIS:ND1	2.06	0.70
1:B:253:THR:HG22	1:B:264:ARG:HG3	1.75	0.69
1:B:105:GLY:O	1:B:144:VAL:HA	1.93	0.68
1:A:124:SER:OG	1:A:127:LEU:HD13	1.94	0.68
1:A:142:LEU:HB2	1:A:227:THR:HG23	1.74	0.67
1:C:126:PRO:HG2	1:C:127:LEU:HD12	1.77	0.67
1:C:261:LEU:HD13	1:C:262:LEU:N	2.09	0.67
1:A:162:LYS:HB3	1:A:164:GLN:OE1	1.96	0.66
1:C:102:GLY:HA3	1:C:262:LEU:O	1.97	0.64
1:C:261:LEU:CD1	1:C:263:GLY:H	2.10	0.64
1:B:117:LYS:O	1:B:118:SER:HB3	1.97	0.64
1:C:120:MET:HA	1:C:133:GLN:HE21	1.61	0.64
1:A:141:GLN:NE2	1:A:143:TRP:HE1	1.93	0.64
1:A:194:VAL:HG23	1:A:213:VAL:HG11	1.78	0.64
1:B:264:ARG:HH11	1:B:264:ARG:HB3	1.63	0.63
1:B:172:ARG:HD3	1:B:188:PRO:O	1.98	0.63
1:C:208:THR:OG1	1:C:210:ARG:HG3	1.97	0.63
1:B:163:SER:HA	1:B:166:MET:HB2	1.81	0.63
1:C:171:ARG:HB3	3:C:66:HOH:O	1.98	0.62
1:A:171:ARG:NH1	1:B:178:ARG:HG2	2.14	0.62
1:B:264:ARG:HB3	1:B:264:ARG:NH1	2.15	0.62
1:A:120:MET:HG3	1:A:136:LYS:HG2	1.82	0.62
1:C:137:THR:HG23	1:C:230:HIS:HB3	1.82	0.62
1:A:249:LEU:HD12	1:A:267:PHE:C	2.24	0.62
1:B:137:THR:HG21	1:B:230:HIS:HD2	1.65	0.61
1:B:201:GLU:HB3	1:B:214:VAL:HG13	1.82	0.61
1:C:127:LEU:HD12	1:C:127:LEU:H	1.64	0.61
1:B:280:ARG:HG2	1:B:281:THR:N	2.15	0.61
1:C:279:ARG:O	1:C:283:GLU:HB2	2.00	0.60
1:C:151:GLY:HA3	1:C:257:SER:HB3	1.83	0.60
1:A:115:THR:HG23	1:A:280:ARG:NH2	2.17	0.59
1:B:125:PRO:N	1:B:126:PRO:HD2	2.17	0.59
1:B:117:LYS:HG2	1:B:118:SER:H	1.67	0.59
1:B:155:ARG:HH12	1:B:203:LEU:HD12	1.68	0.58
1:A:163:SER:HA	1:A:166:MET:HB2	1.85	0.58
1:C:124:SER:C	1:C:126:PRO:HD2	2.28	0.58
1:B:248:ILE:HG13	1:B:269:VAL:HG13	1.84	0.58
1:C:220:PRO:HG2	3:C:45:HOH:O	2.03	0.58
1:C:141:GLN:HE21	1:C:143:TRP:HE1	1.52	0.58
1:B:108:LEU:HD22	1:B:265:ASP:CB	2.25	0.58
1:A:125:PRO:N	1:A:126:PRO:HD2	2.19	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:209:PHE:CE1	1:C:188:PRO:HD3	2.39	0.57
1:C:253:THR:HB	1:C:261:LEU:HD21	1.87	0.57
1:C:160:TYR:OH	1:C:243:MET:HA	2.05	0.57
1:A:117:LYS:O	1:A:118:SER:HB3	2.05	0.57
1:C:129:LYS:HE3	1:C:268:GLU:HG2	1.87	0.56
1:C:172:ARG:HD3	1:C:188:PRO:O	2.04	0.56
1:C:201:GLU:HB3	1:C:214:VAL:HG13	1.86	0.56
1:A:137:THR:CG2	1:A:230:HIS:HB3	2.36	0.56
1:C:126:PRO:HG2	1:C:127:LEU:CD1	2.35	0.56
1:C:189:GLN:HB2	3:C:49:HOH:O	2.05	0.55
1:C:225:GLU:H	1:C:225:GLU:CD	2.14	0.55
1:C:244:ASN:C	1:C:246:ARG:H	2.14	0.55
1:A:279:ARG:O	1:A:283:GLU:HB2	2.05	0.55
1:B:127:LEU:HD12	1:B:127:LEU:N	2.22	0.55
1:C:120:MET:HG2	1:C:133:GLN:NE2	2.22	0.55
1:A:227:THR:HG22	3:A:537:HOH:O	2.07	0.55
1:C:124:SER:OG	1:C:127:LEU:HD13	2.07	0.55
1:A:129:LYS:NZ	1:A:270:ARG:HD2	2.21	0.55
1:B:102:GLY:C	1:B:104:TYR:N	2.65	0.55
1:B:280:ARG:HG2	1:B:281:THR:H	1.72	0.54
1:C:116:ALA:HB3	1:C:119:VAL:CG2	2.35	0.54
1:B:248:ILE:HG13	1:B:269:VAL:CG1	2.38	0.54
1:C:127:LEU:HD12	1:C:127:LEU:N	2.21	0.54
1:B:162:LYS:HB3	1:B:164:GLN:OE1	2.07	0.53
1:C:217:TYR:HE1	1:C:227:THR:HG21	1.74	0.53
1:C:196:GLY:O	1:C:198:LEU:HD22	2.09	0.53
1:C:222:ALA:C	1:C:224:SER:H	2.16	0.53
1:A:218:GLU:HG2	3:A:540:HOH:O	2.08	0.53
1:B:137:THR:CG2	1:B:230:HIS:HD2	2.21	0.53
1:C:153:ARG:HG2	1:C:216:PRO:HA	1.90	0.53
1:C:163:SER:HA	1:C:166:MET:HB2	1.91	0.53
1:A:280:ARG:C	1:A:282:GLU:H	2.17	0.52
1:C:119:VAL:HG12	1:C:120:MET:N	2.23	0.52
1:A:108:LEU:HD21	1:A:252:ILE:HG13	1.91	0.52
1:A:134:LEU:HD23	1:A:134:LEU:C	2.35	0.52
1:B:264:ARG:HG2	1:B:265:ASP:N	2.24	0.52
1:B:284:GLU:O	1:B:284:GLU:OE1	2.27	0.52
1:C:280:ARG:O	1:C:283:GLU:N	2.41	0.52
1:A:256:ASP:OD2	1:A:260:ASN:N	2.40	0.51
1:B:215:VAL:HG13	3:B:508:HOH:O	2.10	0.51
1:B:248:ILE:CG1	1:B:269:VAL:HG13	2.40	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:124:SER:HG	1:A:126:PRO:HG2	1.75	0.51
1:C:120:MET:HB3	1:C:136:LYS:HG2	1.93	0.51
1:C:129:LYS:HA	1:C:268:GLU:O	2.10	0.51
1:B:99:THR:O	1:B:100:TYR:HB2	2.11	0.51
1:C:237:SER:HA	1:C:243:MET:HE3	1.93	0.51
1:B:102:GLY:HA3	1:B:262:LEU:O	2.11	0.50
1:B:124:SER:HG	1:B:127:LEU:HD13	1.74	0.50
1:C:162:LYS:HB3	1:C:164:GLN:OE1	2.11	0.50
1:C:253:THR:HG23	3:C:57:HOH:O	2.11	0.50
1:C:205:ASP:OD2	1:C:208:THR:HG23	2.12	0.50
1:C:153:ARG:HD2	1:C:214:VAL:HG22	1.94	0.50
1:C:117:LYS:HD3	1:C:280:ARG:NH1	2.27	0.50
1:C:176:HIS:C	1:C:178:ARG:H	2.19	0.50
1:C:280:ARG:HG3	1:C:281:THR:N	2.27	0.49
1:A:127:LEU:HD12	1:A:127:LEU:N	2.27	0.49
1:B:208:THR:O	1:B:209:PHE:HB2	2.11	0.49
1:C:220:PRO:HG3	1:C:227:THR:HG22	1.94	0.49
1:B:142:LEU:HD21	1:B:154:VAL:HG21	1.95	0.49
1:C:127:LEU:H	1:C:127:LEU:CD1	2.26	0.49
1:C:261:LEU:CD1	1:C:263:GLY:N	2.72	0.49
1:C:127:LEU:O	1:C:128:ASN:HB3	2.12	0.49
1:C:176:HIS:C	1:C:178:ARG:N	2.71	0.49
1:A:169:VAL:HG12	1:A:171:ARG:HG3	1.93	0.49
1:B:278:ASP:O	1:B:282:GLU:HG3	2.13	0.48
1:C:123:TYR:O	1:C:125:PRO:HD3	2.13	0.48
1:C:255:GLU:HB2	1:C:259:GLY:C	2.38	0.48
1:A:134:LEU:HD23	1:A:135:ALA:HB2	1.95	0.48
1:C:143:TRP:O	1:C:144:VAL:CG1	2.56	0.48
1:A:117:LYS:C	1:A:119:VAL:H	2.20	0.48
1:C:197:ASN:OD1	1:C:199:ALA:N	2.31	0.48
1:B:171:ARG:HD2	3:B:521:HOH:O	2.14	0.47
1:C:119:VAL:HG12	1:C:120:MET:H	1.78	0.47
1:C:141:GLN:C	1:C:142:LEU:HD12	2.39	0.47
1:C:158:ALA:HB2	1:C:192:ILE:HD11	1.96	0.47
1:B:197:ASN:ND2	3:B:508:HOH:O	2.47	0.47
1:C:114:GLY:C	1:C:116:ALA:H	2.21	0.47
1:C:208:THR:O	1:C:209:PHE:HB2	2.14	0.47
1:C:125:PRO:N	1:C:126:PRO:HD2	2.29	0.47
1:A:101:GLN:O	1:A:101:GLN:HG2	2.14	0.47
1:A:261:LEU:C	1:A:261:LEU:HD13	2.40	0.47
1:B:141:GLN:HE21	1:B:143:TRP:NE1	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:202:TYR:CE2	1:B:213:VAL:HG13	2.49	0.47
1:C:165:HIS:CD2	1:C:246:ARG:HH11	2.33	0.47
1:A:141:GLN:C	1:A:142:LEU:HD12	2.40	0.47
1:A:186:ALA:HB2	1:A:202:TYR:CZ	2.50	0.47
1:C:135:ALA:HB2	1:C:234:MET:HE1	1.96	0.47
1:B:102:GLY:O	1:B:104:TYR:N	2.47	0.47
1:C:194:VAL:HG23	1:C:213:VAL:HG11	1.97	0.47
1:C:269:VAL:CG2	1:C:270:ARG:N	2.78	0.47
1:B:134:LEU:HD23	1:B:135:ALA:HB2	1.96	0.46
1:C:239:CYS:O	1:C:244:ASN:HA	2.16	0.46
1:A:129:LYS:HZ1	1:A:270:ARG:HD2	1.80	0.46
1:C:120:MET:HE3	1:C:136:LYS:NZ	2.29	0.46
1:A:127:LEU:HD13	1:A:283:GLU:OE1	2.16	0.46
1:B:99:THR:O	1:B:100:TYR:CB	2.63	0.46
1:B:117:LYS:HG2	1:B:118:SER:N	2.30	0.46
1:B:199:ALA:N	1:B:200:PRO:CD	2.79	0.46
1:C:120:MET:HA	1:C:133:GLN:NE2	2.29	0.46
1:C:255:GLU:OE2	1:C:259:GLY:HA2	2.16	0.46
1:B:123:TYR:OH	1:B:128:ASN:ND2	2.43	0.46
1:C:244:ASN:O	1:C:246:ARG:N	2.48	0.46
1:B:129:LYS:HG3	1:B:268:GLU:HG2	1.98	0.46
1:C:199:ALA:N	1:C:200:PRO:CD	2.78	0.46
1:A:209:PHE:CE1	1:B:188:PRO:HD3	2.49	0.46
1:B:108:LEU:CD2	1:B:265:ASP:HB3	2.29	0.46
1:C:243:MET:O	1:C:246:ARG:HB2	2.16	0.46
1:B:201:GLU:OE2	1:B:203:LEU:HD21	2.16	0.45
1:C:134:LEU:HD23	1:C:134:LEU:C	2.41	0.45
1:A:123:TYR:OH	1:A:128:ASN:ND2	2.49	0.45
1:C:99:THR:HG22	3:C:91:HOH:O	2.15	0.45
1:C:177:GLU:O	1:C:177:GLU:HG2	2.16	0.45
1:B:177:GLU:HG3	1:B:189:GLN:HG2	1.99	0.45
1:B:254:LEU:O	1:B:262:LEU:HB2	2.16	0.45
1:C:115:THR:HB	1:C:279:ARG:HD3	1.97	0.45
1:C:274:CYS:HB3	1:C:277:ARG:HB3	1.97	0.45
1:C:130:LEU:HD12	1:C:131:PHE:H	1.82	0.45
1:C:176:HIS:CE1	1:C:239:CYS:SG	3.10	0.45
1:A:147:THR:HA	1:A:148:PRO:HD3	1.88	0.45
1:A:215:VAL:HG13	1:A:216:PRO:HD2	1.99	0.45
1:A:137:THR:HG21	1:A:230:HIS:HD2	1.83	0.44
1:B:101:GLN:NE2	3:B:530:HOH:O	2.49	0.44
1:B:238:SER:HB3	1:B:245:ARG:NH1	2.32	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:264:ARG:HG2	1:B:265:ASP:H	1.81	0.44
1:C:244:ASN:C	1:C:246:ARG:N	2.75	0.44
1:A:215:VAL:HG13	3:A:533:HOH:O	2.18	0.44
1:B:134:LEU:HD23	1:B:134:LEU:C	2.43	0.44
1:A:129:LYS:CE	1:A:270:ARG:HB2	2.42	0.44
1:A:186:ALA:HA	1:A:187:PRO:HD3	1.89	0.44
1:A:114:GLY:C	1:A:116:ALA:H	2.26	0.44
1:A:237:SER:HA	1:A:243:MET:HE3	1.99	0.44
1:C:137:THR:HG22	1:C:139:PRO:HD3	2.00	0.44
1:C:104:TYR:CD2	1:C:104:TYR:N	2.86	0.44
1:C:114:GLY:O	1:C:116:ALA:N	2.48	0.43
1:A:143:TRP:CE2	1:A:226:TYR:HB3	2.53	0.43
1:B:127:LEU:HD11	1:B:283:GLU:HA	2.00	0.43
1:C:135:ALA:HB2	1:C:234:MET:CE	2.48	0.43
1:C:120:MET:CE	1:C:136:LYS:HZ2	2.32	0.43
1:C:228:THR:CG2	1:C:229:ILE:N	2.81	0.43
1:A:134:LEU:HD23	1:A:135:ALA:N	2.33	0.43
1:A:264:ARG:HG2	1:A:265:ASP:N	2.33	0.43
1:C:100:TYR:CZ	1:C:102:GLY:HA2	2.54	0.43
1:B:129:LYS:HE2	1:B:270:ARG:HB2	2.00	0.43
1:A:280:ARG:HG3	1:A:281:THR:N	2.34	0.43
1:B:147:THR:HA	1:B:148:PRO:HD3	1.91	0.43
1:B:165:HIS:CD2	1:B:246:ARG:HH11	2.37	0.43
1:A:123:TYR:HE1	1:A:128:ASN:HD22	1.66	0.42
1:A:193:ARG:NE	1:A:234:MET:HG3	2.34	0.42
1:B:238:SER:O	1:B:239:CYS:C	2.61	0.42
1:C:116:ALA:C	1:C:118:SER:H	2.26	0.42
1:B:190:HIS:CE1	1:B:202:TYR:HB3	2.54	0.42
1:B:120:MET:HB3	1:B:133:GLN:CD	2.45	0.42
1:C:280:ARG:C	1:C:282:GLU:N	2.76	0.42
1:C:269:VAL:HG22	1:C:270:ARG:N	2.34	0.42
1:C:163:SER:CA	1:C:166:MET:HE2	2.37	0.42
1:C:243:MET:SD	1:C:248:ILE:HG21	2.60	0.42
1:A:208:THR:CB	1:A:210:ARG:HG3	2.49	0.42
1:A:248:ILE:HG13	1:A:269:VAL:HG13	2.02	0.42
1:B:176:HIS:C	1:B:178:ARG:N	2.78	0.41
1:C:130:LEU:HD12	1:C:131:PHE:N	2.34	0.41
1:A:164:GLN:H	1:A:164:GLN:CD	2.27	0.41
1:B:120:MET:O	1:B:132:CYS:HA	2.21	0.41
1:C:119:VAL:HG12	1:C:121:CYS:H	1.84	0.41
1:A:117:LYS:NZ	1:A:117:LYS:HA	2.35	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:270:ARG:HH12	1:A:278:ASP:CG	2.28	0.41
1:C:217:TYR:CE1	1:C:227:THR:HG21	2.53	0.41
1:A:194:VAL:HG12	1:A:195:GLU:N	2.34	0.41
1:C:99:THR:O	1:C:100:TYR:CB	2.68	0.41
1:C:225:GLU:HA	3:C:61:HOH:O	2.20	0.41
1:A:254:LEU:O	1:A:262:LEU:HB2	2.20	0.41
1:C:100:TYR:HD1	3:C:46:HOH:O	2.04	0.41
1:C:141:GLN:NE2	1:C:143:TRP:HE1	2.17	0.41
1:C:142:LEU:HB2	1:C:227:THR:HG23	2.01	0.41
1:C:208:THR:CB	1:C:210:ARG:HG3	2.51	0.41
1:C:254:LEU:C	1:C:254:LEU:HD12	2.46	0.41
1:C:134:LEU:HD11	1:C:176:HIS:CD2	2.56	0.41
1:A:129:LYS:HD3	1:A:131:PHE:CZ	2.55	0.41
1:B:141:GLN:NE2	1:B:143:TRP:NE1	2.57	0.41
1:B:243:MET:SD	1:B:248:ILE:HD13	2.61	0.41
1:C:134:LEU:HD12	1:C:236:ASN:ND2	2.36	0.41
1:C:153:ARG:HB3	1:C:214:VAL:HG23	2.02	0.41
1:A:201:GLU:HG2	1:A:203:LEU:HD21	2.01	0.41
1:A:275:PRO:HG2	1:A:276:GLY:H	1.85	0.41
1:B:125:PRO:CD	1:B:126:PRO:HD2	2.51	0.41
1:A:173:CYS:O	1:A:174:PRO:C	2.64	0.41
1:A:261:LEU:HD13	1:A:262:LEU:N	2.36	0.40
1:C:108:LEU:HD21	1:C:252:ILE:HG13	2.04	0.40
1:A:148:PRO:HD2	1:A:217:TYR:CE2	2.56	0.40
1:B:117:LYS:O	1:B:118:SER:CB	2.65	0.40
1:A:199:ALA:N	1:A:200:PRO:CD	2.84	0.40
1:B:208:THR:C	1:B:210:ARG:H	2.29	0.40
1:B:127:LEU:N	1:B:127:LEU:CD1	2.85	0.40
1:C:129:LYS:NZ	1:C:282:GLU:OE2	2.54	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	184/186 (99%)	166 (90%)	16 (9%)	2 (1%)	11	29
1	B	184/186 (99%)	156 (85%)	24 (13%)	4 (2%)	5	14
1	C	184/186 (99%)	149 (81%)	26 (14%)	9 (5%)	1	3
All	All	552/558 (99%)	471 (85%)	66 (12%)	15 (3%)	4	10

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	116	ALA
1	B	100	TYR
1	C	100	TYR
1	B	103	ASN
1	B	163	SER
1	C	115	THR
1	C	245	ARG
1	C	117	LYS
1	B	239	CYS
1	C	244	ASN
1	A	100	TYR
1	C	114	GLY
1	C	144	VAL
1	C	149	PRO
1	C	220	PRO

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	162/162 (100%)	149 (92%)	13 (8%)	11	28
1	B	162/162 (100%)	152 (94%)	10 (6%)	16	39
1	C	162/162 (100%)	153 (94%)	9 (6%)	19	44
All	All	486/486 (100%)	454 (93%)	32 (7%)	15	36

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	101	GLN
1	A	108	LEU
1	A	111	LEU
1	A	117	LYS
1	A	120	MET
1	A	140	VAL
1	A	213	VAL
1	A	214	VAL
1	A	215	VAL
1	A	227	THR
1	A	258	SER
1	A	261	LEU
1	A	283	GLU
1	B	101	GLN
1	B	108	LEU
1	B	120	MET
1	B	127	LEU
1	B	140	VAL
1	B	215	VAL
1	B	227	THR
1	B	255	GLU
1	B	280	ARG
1	B	284	GLU
1	C	103	ASN
1	C	127	LEU
1	C	213	VAL
1	C	214	VAL
1	C	227	THR
1	C	254	LEU
1	C	261	LEU
1	C	269	VAL
1	C	283	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	101	GLN
1	A	128	ASN
1	A	141	GLN
1	A	189	GLN
1	A	207	GLN
1	A	230	HIS
1	B	101	GLN

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Mol	Chain	Res	Type
1	B	107	HIS
1	B	128	ASN
1	B	141	GLN
1	B	165	HIS
1	B	189	GLN
1	B	207	GLN
1	B	230	HIS
1	B	244	ASN
1	C	101	GLN
1	C	128	ASN
1	C	133	GLN
1	C	141	GLN
1	C	165	HIS
1	C	175	HIS
1	C	189	GLN
1	C	207	GLN
1	C	230	HIS
1	C	244	ASN

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 ⓘ

Of 3 ligands modelled in this entry, 3 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 [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	186/186 (100%)	-0.21	3 (1%) 70 68	28, 51, 96, 104	1 (0%)
1	B	186/186 (100%)	-0.20	2 (1%) 78 76	24, 51, 95, 106	0
1	C	186/186 (100%)	0.63	13 (6%) 22 19	36, 82, 118, 134	0
All	All	558/558 (100%)	0.07	18 (3%) 50 46	24, 58, 107, 134	1 (0%)

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	146	ALA	3.8
1	C	223	GLY	3.7
1	C	141	GLN	2.8
1	C	259	GLY	2.8
1	C	263	GLY	2.8
1	B	198	LEU	2.6
1	C	152	SER	2.4
1	A	245	ARG	2.3
1	C	100	TYR	2.2
1	C	219	PRO	2.2
1	A	198	LEU	2.1
1	C	107	HIS	2.1
1	C	125	PRO	2.1
1	C	128	ASN	2.1
1	C	256	ASP	2.0
1	C	113	SER	2.0
1	B	102	GLY	2.0
1	A	113	SER	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](#)

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($\text{\AA}^2$)	Q<0.9
2	ZN	C	503	1/1	0.98	0.04	66,66,66,66	0
2	ZN	B	502	1/1	0.99	0.05	53,53,53,53	0
2	ZN	A	501	1/1	0.99	0.05	60,60,60,60	0

6.5 Other polymers [i](#)

There are no such residues in this entry.