



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 01:36 PM UTC

PDB ID : 1YAK / pdb_00001yak
Title : Complex of Bacillus subtilis TenA with 4-amino-2-methyl-5-hydroxymethylp
rimidine
Authors : Toms, A.V.; Haas, A.L.; Park, J.-H.; Begley, T.P.; Ealick, S.E.
Deposited on : 2004-12-17
Resolution : 2.50 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
Mogul : 2022.3.0, CSD as543be (2022)
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

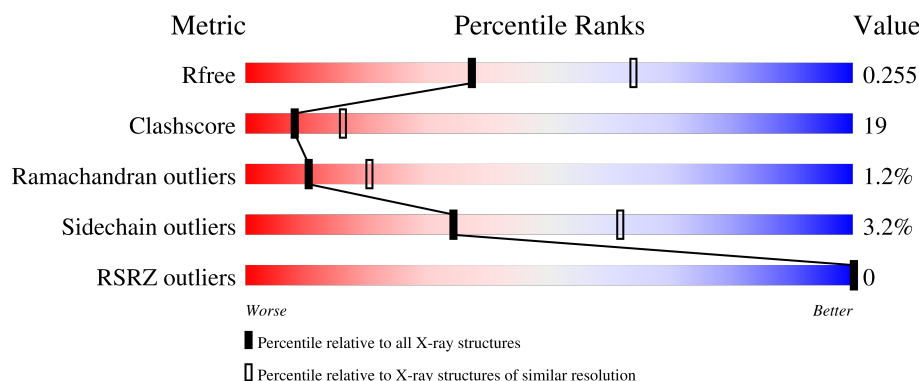
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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	263	 62% 19% 17%
1	B	263	 48% 32% 17%
1	C	263	 49% 33% 16%
1	D	263	 62% 20% 17%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	HMH	A	301	-	X	-	-
2	HMH	B	303	-	X	X	-
2	HMH	C	304	-	X	X	-
2	HMH	D	302	-	X	-	-

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 7460 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 Transcriptional activator tenA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	219	Total	C	N	O	S	0	0	0
			1810	1169	293	340	8			
1	B	218	Total	C	N	O	S	0	0	0
			1798	1163	292	335	8			
1	C	220	Total	C	N	O	S	0	0	0
			1812	1169	293	342	8			
1	D	219	Total	C	N	O	S	0	0	0
			1810	1169	293	340	8			

There are 108 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-26	MET	-	expression tag	UNP P25052
A	-25	GLY	-	expression tag	UNP P25052
A	-24	SER	-	expression tag	UNP P25052
A	-23	HIS	-	expression tag	UNP P25052
A	-22	HIS	-	expression tag	UNP P25052
A	-21	HIS	-	expression tag	UNP P25052
A	-20	HIS	-	expression tag	UNP P25052
A	-19	HIS	-	expression tag	UNP P25052
A	-18	HIS	-	expression tag	UNP P25052
A	-17	ASP	-	expression tag	UNP P25052
A	-16	ILE	-	expression tag	UNP P25052
A	-15	THR	-	expression tag	UNP P25052
A	-14	SER	-	expression tag	UNP P25052
A	-13	LEU	-	expression tag	UNP P25052
A	-12	TYR	-	expression tag	UNP P25052
A	-11	LYS	-	expression tag	UNP P25052
A	-10	LYS	-	expression tag	UNP P25052
A	-9	ALA	-	expression tag	UNP P25052
A	-8	GLY	-	expression tag	UNP P25052
A	-7	SER	-	expression tag	UNP P25052
A	-6	GLU	-	expression tag	UNP P25052

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-5	ASN	-	expression tag	UNP P25052
A	-4	LEU	-	expression tag	UNP P25052
A	-3	TYR	-	expression tag	UNP P25052
A	-2	PHE	-	expression tag	UNP P25052
A	-1	GLN	-	expression tag	UNP P25052
A	0	GLY	-	expression tag	UNP P25052
B	-26	MET	-	expression tag	UNP P25052
B	-25	GLY	-	expression tag	UNP P25052
B	-24	SER	-	expression tag	UNP P25052
B	-23	HIS	-	expression tag	UNP P25052
B	-22	HIS	-	expression tag	UNP P25052
B	-21	HIS	-	expression tag	UNP P25052
B	-20	HIS	-	expression tag	UNP P25052
B	-19	HIS	-	expression tag	UNP P25052
B	-18	HIS	-	expression tag	UNP P25052
B	-17	ASP	-	expression tag	UNP P25052
B	-16	ILE	-	expression tag	UNP P25052
B	-15	THR	-	expression tag	UNP P25052
B	-14	SER	-	expression tag	UNP P25052
B	-13	LEU	-	expression tag	UNP P25052
B	-12	TYR	-	expression tag	UNP P25052
B	-11	LYS	-	expression tag	UNP P25052
B	-10	LYS	-	expression tag	UNP P25052
B	-9	ALA	-	expression tag	UNP P25052
B	-8	GLY	-	expression tag	UNP P25052
B	-7	SER	-	expression tag	UNP P25052
B	-6	GLU	-	expression tag	UNP P25052
B	-5	ASN	-	expression tag	UNP P25052
B	-4	LEU	-	expression tag	UNP P25052
B	-3	TYR	-	expression tag	UNP P25052
B	-2	PHE	-	expression tag	UNP P25052
B	-1	GLN	-	expression tag	UNP P25052
B	0	GLY	-	expression tag	UNP P25052
C	-26	MET	-	expression tag	UNP P25052
C	-25	GLY	-	expression tag	UNP P25052
C	-24	SER	-	expression tag	UNP P25052
C	-23	HIS	-	expression tag	UNP P25052
C	-22	HIS	-	expression tag	UNP P25052
C	-21	HIS	-	expression tag	UNP P25052
C	-20	HIS	-	expression tag	UNP P25052
C	-19	HIS	-	expression tag	UNP P25052
C	-18	HIS	-	expression tag	UNP P25052

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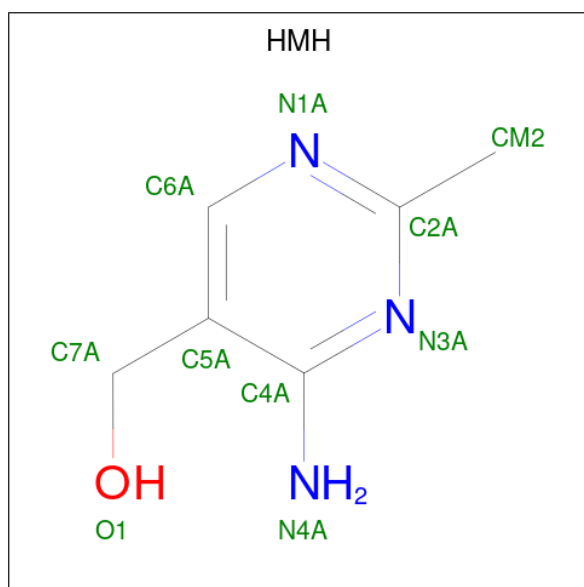
Chain	Residue	Modelled	Actual	Comment	Reference
C	-17	ASP	-	expression tag	UNP P25052
C	-16	ILE	-	expression tag	UNP P25052
C	-15	THR	-	expression tag	UNP P25052
C	-14	SER	-	expression tag	UNP P25052
C	-13	LEU	-	expression tag	UNP P25052
C	-12	TYR	-	expression tag	UNP P25052
C	-11	LYS	-	expression tag	UNP P25052
C	-10	LYS	-	expression tag	UNP P25052
C	-9	ALA	-	expression tag	UNP P25052
C	-8	GLY	-	expression tag	UNP P25052
C	-7	SER	-	expression tag	UNP P25052
C	-6	GLU	-	expression tag	UNP P25052
C	-5	ASN	-	expression tag	UNP P25052
C	-4	LEU	-	expression tag	UNP P25052
C	-3	TYR	-	expression tag	UNP P25052
C	-2	PHE	-	expression tag	UNP P25052
C	-1	GLN	-	expression tag	UNP P25052
C	0	GLY	-	expression tag	UNP P25052
D	-26	MET	-	expression tag	UNP P25052
D	-25	GLY	-	expression tag	UNP P25052
D	-24	SER	-	expression tag	UNP P25052
D	-23	HIS	-	expression tag	UNP P25052
D	-22	HIS	-	expression tag	UNP P25052
D	-21	HIS	-	expression tag	UNP P25052
D	-20	HIS	-	expression tag	UNP P25052
D	-19	HIS	-	expression tag	UNP P25052
D	-18	HIS	-	expression tag	UNP P25052
D	-17	ASP	-	expression tag	UNP P25052
D	-16	ILE	-	expression tag	UNP P25052
D	-15	THR	-	expression tag	UNP P25052
D	-14	SER	-	expression tag	UNP P25052
D	-13	LEU	-	expression tag	UNP P25052
D	-12	TYR	-	expression tag	UNP P25052
D	-11	LYS	-	expression tag	UNP P25052
D	-10	LYS	-	expression tag	UNP P25052
D	-9	ALA	-	expression tag	UNP P25052
D	-8	GLY	-	expression tag	UNP P25052
D	-7	SER	-	expression tag	UNP P25052
D	-6	GLU	-	expression tag	UNP P25052
D	-5	ASN	-	expression tag	UNP P25052
D	-4	LEU	-	expression tag	UNP P25052
D	-3	TYR	-	expression tag	UNP P25052

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-2	PHE	-	expression tag	UNP P25052
D	-1	GLN	-	expression tag	UNP P25052
D	0	GLY	-	expression tag	UNP P25052

- Molecule 2 is 4-AMINO-5-HYDROXYMETHYL-2-METHYLPYRIMIDINE (CCD ID: HMH) (formula: C₆H₉N₃O).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			10	6	3	1		
2	B	1	Total	C	N	O	0	0
			10	6	3	1		
2	C	1	Total	C	N	O	0	0
			10	6	3	1		
2	D	1	Total	C	N	O	0	0
			10	6	3	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	68	Total	O	0	0
			68	68		
3	B	30	Total	O	0	0
			30	30		
3	C	26	Total	O	0	0
			26	26		

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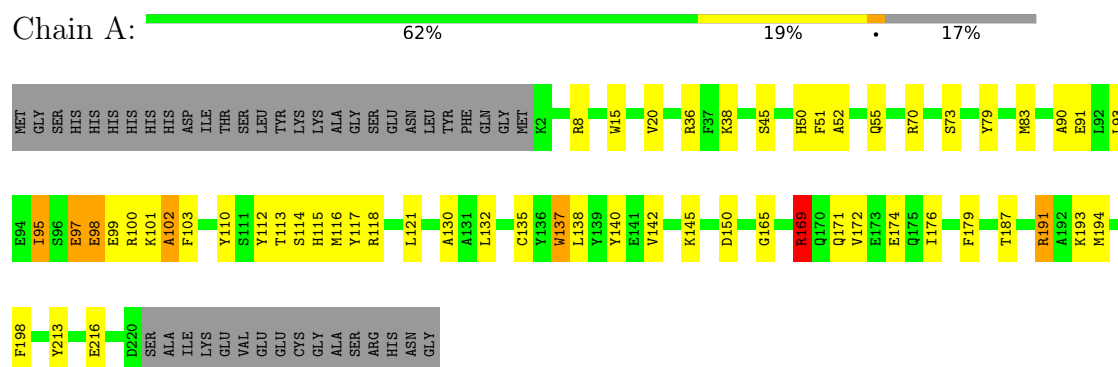
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	D	66	Total	O	0	0
			66	66		

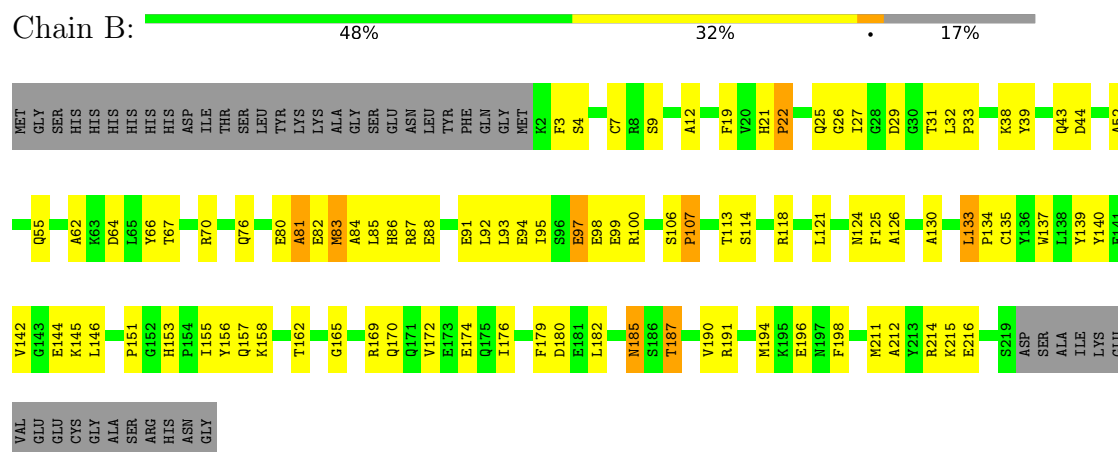
3 Residue-property plots

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.

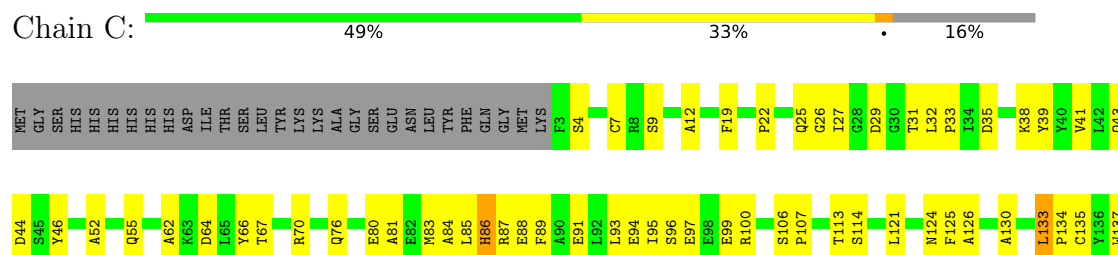
• Molecule 1: Transcriptional activator tenA

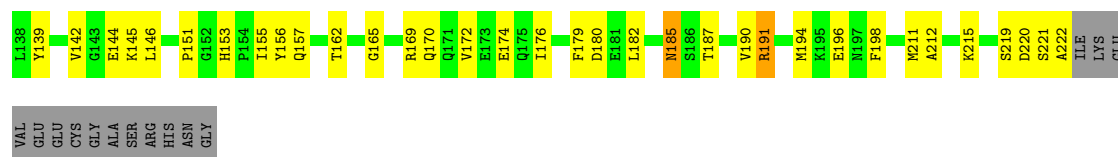


• Molecule 1: Transcriptional activator tenA

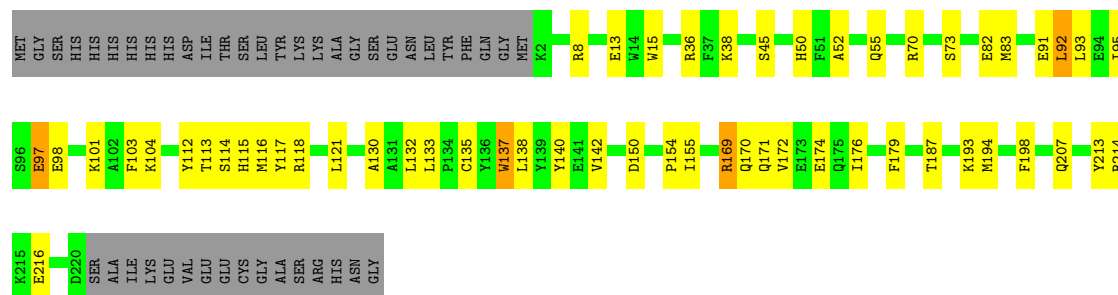


• Molecule 1: Transcriptional activator tenA





- Molecule 1: Transcriptional activator tenA



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	82.96Å 82.93Å 296.36Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.39 – 2.50 49.39 – 2.50	Depositor EDS
% Data completeness (in resolution range)	93.3 (49.39-2.50) 93.3 (49.39-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.06 (at 2.51Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.217 , 0.255 0.217 , 0.255	Depositor DCC
R_{free} test set	1681 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	43.6	Xtriage
Anisotropy	0.805	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 60.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.480 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	7460	wwPDB-VP
Average B, all atoms (Å ²)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.66% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: HMH

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	0.50	0/1869	0.99	13/2532 (0.5%)
1	B	0.43	0/1857	0.93	7/2516 (0.3%)
1	C	0.42	0/1871	0.95	8/2536 (0.3%)
1	D	0.50	0/1869	0.96	8/2532 (0.3%)
All	All	0.46	0/7466	0.96	36/10116 (0.4%)

There are no bond length outliers.

All (36) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	98	GLU	N-CA-C	-7.55	104.53	113.21
1	A	97	GLU	N-CA-C	-7.46	104.42	113.97
1	C	86	HIS	N-CA-C	-7.01	104.60	113.72
1	A	191	ARG	NE-CZ-NH2	6.99	125.49	119.20
1	B	97	GLU	N-CA-C	-6.90	104.90	113.38
1	C	191	ARG	NE-CZ-NH2	6.75	125.28	119.20
1	B	137	TRP	N-CA-C	6.53	118.94	111.11
1	C	137	TRP	N-CA-C	6.53	118.94	111.11
1	D	137	TRP	N-CA-C	6.49	118.36	111.28
1	A	191	ARG	NE-CZ-NH1	-6.47	115.03	121.50
1	D	97	GLU	N-CA-C	-6.41	104.94	112.89
1	A	137	TRP	N-CA-C	6.33	118.18	111.28
1	A	45	SER	N-CA-C	-6.29	104.51	111.36
1	A	169	ARG	NE-CZ-NH2	6.25	124.83	119.20
1	C	191	ARG	NE-CZ-NH1	-6.14	115.36	121.50
1	A	216	GLU	N-CA-C	6.12	118.92	110.35
1	D	216	GLU	N-CA-C	6.08	118.87	110.35
1	A	169	ARG	NE-CZ-NH1	-6.05	115.45	121.50
1	D	45	SER	N-CA-C	-6.01	104.81	111.36
1	B	214	ARG	NE-CZ-NH2	5.90	124.51	119.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	214	ARG	NE-CZ-NH1	-5.81	115.69	121.50
1	C	169	ARG	NE-CZ-NH2	5.78	124.40	119.20
1	A	95	ILE	N-CA-C	5.75	114.88	106.55
1	D	150	ASP	CA-C-N	5.61	125.07	119.24
1	D	150	ASP	C-N-CA	5.61	125.07	119.24
1	C	169	ARG	NE-CZ-NH1	-5.48	116.02	121.50
1	A	150	ASP	CA-C-N	5.47	124.93	119.24
1	A	150	ASP	C-N-CA	5.47	124.93	119.24
1	A	98	GLU	N-CA-C	-5.42	106.75	113.19
1	D	214	ARG	NE-CZ-NH2	5.39	124.05	119.20
1	C	133	LEU	N-CA-C	5.19	119.81	112.75
1	B	216	GLU	N-CA-C	5.17	117.59	110.35
1	C	46	TYR	N-CA-C	-5.16	105.66	111.28
1	D	133	LEU	N-CA-C	5.15	119.76	112.75
1	A	51	PHE	N-CA-C	-5.13	105.69	111.28
1	B	133	LEU	N-CA-C	5.12	119.71	112.75

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1810	0	1671	49	0
1	B	1798	0	1663	91	0
1	C	1812	0	1668	86	0
1	D	1810	0	1671	46	0
2	A	10	0	9	3	0
2	B	10	0	9	4	0
2	C	10	0	9	4	0
2	D	10	0	9	2	0
3	A	68	0	0	5	0
3	B	30	0	0	7	0
3	C	26	0	0	7	0
3	D	66	0	0	5	0
All	All	7460	0	6709	272	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 19.

All (272) 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)
2:A:301:HMH:C7A	2:A:301:HMH:O1	1.63	1.45
2:D:302:HMH:O1	2:D:302:HMH:C7A	1.63	1.44
2:C:304:HMH:C7A	2:C:304:HMH:O1	1.63	1.42
2:B:303:HMH:C7A	2:B:303:HMH:O1	1.64	1.41
1:A:98:GLU:HA	1:A:101:LYS:HE2	1.25	1.16
1:B:156:TYR:HB3	3:B:2051:HOH:O	1.60	1.01
1:C:185:ASN:HD22	1:C:185:ASN:H	1.20	0.89
1:B:83:MET:HA	1:B:83:MET:HE2	1.56	0.88
1:B:185:ASN:H	1:B:185:ASN:HD22	1.20	0.88
1:B:27:ILE:HG23	3:B:2051:HOH:O	1.75	0.87
1:B:151:PRO:HG2	1:B:157:GLN:HG2	1.54	0.87
1:C:151:PRO:HG2	1:C:157:GLN:HG2	1.54	0.86
1:B:85:LEU:HD11	1:B:162:THR:HG21	1.64	0.79
1:B:91:GLU:HG3	1:B:92:LEU:H	1.52	0.74
1:C:85:LEU:HD21	1:C:162:THR:HG21	1.70	0.73
1:B:190:VAL:O	1:B:194:MET:HG3	1.91	0.70
1:B:43:GLN:HG3	1:B:211:MET:HE3	1.73	0.70
1:C:4:SER:HB2	1:C:180:ASP:OD2	1.91	0.70
1:B:185:ASN:H	1:B:185:ASN:ND2	1.90	0.69
1:C:185:ASN:H	1:C:185:ASN:ND2	1.90	0.69
1:D:169:ARG:HB3	3:D:2186:HOH:O	1.93	0.69
1:C:190:VAL:O	1:C:194:MET:HG3	1.93	0.69
1:D:97:GLU:HG3	1:D:101:LYS:NZ	2.08	0.68
1:C:84:ALA:HA	1:C:87:ARG:HG3	1.76	0.68
1:B:85:LEU:CD1	1:B:162:THR:HG21	2.23	0.68
1:B:4:SER:HB2	1:B:180:ASP:OD2	1.93	0.67
1:A:20:VAL:HG13	1:D:92:LEU:HD13	1.76	0.67
1:B:97:GLU:C	1:B:99:GLU:H	2.03	0.67
1:D:38:LYS:HE2	1:D:93:LEU:O	1.95	0.67
1:B:87:ARG:O	1:B:91:GLU:HG2	1.96	0.66
1:C:43:GLN:HG3	1:C:211:MET:HE3	1.76	0.66
1:A:113:THR:HA	1:A:116:MET:HE2	1.76	0.66
1:D:113:THR:HA	1:D:116:MET:HE2	1.75	0.66
2:B:303:HMH:C7A	2:B:303:HMH:HO1	2.08	0.66
1:B:88:GLU:CD	1:B:158:LYS:HG2	2.21	0.65
1:A:98:GLU:CA	1:A:101:LYS:HE2	2.17	0.65
1:D:97:GLU:HG3	1:D:101:LYS:HZ1	1.62	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:153:HIS:HB3	1:B:155:ILE:HG22	1.79	0.64
1:D:194:MET:HA	3:D:2097:HOH:O	1.97	0.63
1:A:171:GLN:HA	1:A:171:GLN:HE21	1.64	0.63
1:C:153:HIS:HB3	1:C:155:ILE:HG22	1.79	0.63
1:D:171:GLN:HE21	1:D:171:GLN:HA	1.64	0.63
1:B:155:ILE:HG23	1:B:156:TYR:N	2.14	0.62
1:D:171:GLN:HA	1:D:171:GLN:NE2	2.14	0.62
1:B:88:GLU:HG2	1:B:158:LYS:HG2	1.81	0.62
1:A:171:GLN:HA	1:A:171:GLN:NE2	2.15	0.62
1:B:185:ASN:HD22	1:B:185:ASN:N	1.87	0.62
1:A:20:VAL:CG1	1:D:92:LEU:HD13	2.30	0.62
1:A:194:MET:HA	3:A:2079:HOH:O	2.00	0.62
1:C:185:ASN:HD22	1:C:185:ASN:N	1.86	0.62
1:C:25:GLN:HE21	1:C:25:GLN:HA	1.64	0.61
1:B:25:GLN:HA	1:B:25:GLN:HE21	1.65	0.61
1:C:155:ILE:HG23	1:C:156:TYR:N	2.14	0.61
1:C:96:SER:OG	1:C:99:GLU:HG3	2.01	0.60
1:A:50:HIS:HD2	1:A:117:TYR:OH	1.84	0.60
1:A:100:ARG:HH21	1:A:100:ARG:HG2	1.66	0.60
1:B:52:ALA:HA	1:B:55:GLN:HE21	1.66	0.60
2:D:302:HMH:C7A	2:D:302:HMH:HO1	2.07	0.60
1:D:170:GLN:HG3	3:D:2186:HOH:O	2.02	0.60
1:C:52:ALA:HA	1:C:55:GLN:HE21	1.67	0.60
1:B:91:GLU:HG3	1:B:92:LEU:N	2.17	0.59
1:C:170:GLN:HA	3:C:2036:HOH:O	2.00	0.59
1:C:62:ALA:HB1	1:C:67:THR:HB	1.84	0.58
1:C:32:LEU:HB3	3:C:2089:HOH:O	2.02	0.58
1:C:91:GLU:C	1:C:93:LEU:N	2.61	0.58
1:C:135:CYS:O	2:C:304:HMH:HC6	2.02	0.58
2:C:304:HMH:C7A	2:C:304:HMH:HO1	2.07	0.58
1:B:62:ALA:HB1	1:B:67:THR:HB	1.86	0.57
1:D:50:HIS:HD2	1:D:117:TYR:OH	1.87	0.57
1:B:88:GLU:CG	1:B:158:LYS:HG2	2.35	0.57
1:C:113:THR:OG1	1:D:118:ARG:NH2	2.37	0.57
1:B:27:ILE:HA	3:B:2064:HOH:O	2.03	0.57
1:C:191:ARG:HG2	3:C:2087:HOH:O	2.04	0.57
1:D:140:TYR:CE1	1:D:169:ARG:HG2	2.39	0.57
1:C:27:ILE:HA	3:C:2089:HOH:O	2.04	0.56
1:D:38:LYS:HZ1	1:D:95:ILE:HA	1.68	0.56
1:D:83:MET:HE2	1:D:83:MET:HA	1.86	0.56
1:A:118:ARG:NH2	1:B:113:THR:OG1	2.37	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:32:LEU:HB3	3:B:2064:HOH:O	2.06	0.56
1:C:185:ASN:ND2	1:C:185:ASN:N	2.49	0.56
2:A:301:HMH:C7A	2:A:301:HMH:HO1	2.07	0.56
1:D:140:TYR:HB2	1:D:172:VAL:HG21	1.86	0.56
1:A:140:TYR:HB2	1:A:172:VAL:HG21	1.86	0.56
1:B:187:THR:O	1:B:191:ARG:HG3	2.05	0.56
1:B:83:MET:HA	1:B:83:MET:CE	2.33	0.55
1:B:140:TYR:CZ	1:B:169:ARG:HG3	2.41	0.55
1:A:70:ARG:HD3	1:A:174:GLU:OE1	2.07	0.55
1:B:86:HIS:HE1	1:B:100:ARG:NH1	2.05	0.55
1:C:144:GLU:C	1:C:146:LEU:H	2.14	0.55
1:C:91:GLU:C	1:C:93:LEU:H	2.15	0.55
1:A:52:ALA:HA	1:A:55:GLN:HE21	1.72	0.54
1:D:52:ALA:HA	1:D:55:GLN:HE21	1.72	0.54
1:C:172:VAL:O	1:C:176:ILE:HG13	2.08	0.54
1:B:82:GLU:O	1:B:86:HIS:HB2	2.09	0.53
1:B:70:ARG:HD3	1:B:174:GLU:OE1	2.08	0.53
1:D:92:LEU:HD21	1:D:154:PRO:HB2	1.89	0.53
1:D:70:ARG:HD3	1:D:174:GLU:OE1	2.07	0.53
1:B:172:VAL:O	1:B:176:ILE:HG13	2.09	0.53
1:B:155:ILE:HG23	1:B:156:TYR:H	1.73	0.53
1:C:85:LEU:HD21	1:C:162:THR:CG2	2.38	0.53
1:C:86:HIS:CE1	1:C:100:ARG:NH1	2.77	0.52
1:C:155:ILE:HG23	1:C:156:TYR:H	1.73	0.52
1:C:85:LEU:CD2	1:C:162:THR:HG21	2.37	0.52
1:A:172:VAL:O	1:A:176:ILE:HG13	2.09	0.52
1:C:86:HIS:HE1	1:C:100:ARG:NH1	2.08	0.52
1:C:70:ARG:HD3	1:C:174:GLU:OE1	2.09	0.52
1:C:39:TYR:CE1	1:C:211:MET:HE3	2.45	0.51
1:C:64:ASP:OD2	1:C:66:TYR:HB3	2.10	0.51
1:C:86:HIS:HE1	1:C:100:ARG:HH11	1.56	0.51
1:A:191:ARG:HD3	3:A:2020:HOH:O	2.09	0.51
1:B:135:CYS:O	2:B:303:HMH:HC6	2.10	0.51
1:B:39:TYR:CE1	1:B:212:ALA:HA	2.45	0.51
1:B:39:TYR:CE1	1:B:211:MET:HE3	2.46	0.51
1:B:76:GLN:O	1:B:80:GLU:HG2	2.11	0.51
1:B:38:LYS:HA	1:B:93:LEU:HD13	1.92	0.51
1:D:138:LEU:O	1:D:142:VAL:HG23	2.11	0.51
1:C:4:SER:OG	1:C:176:ILE:HG23	2.11	0.51
1:C:133:LEU:HB3	1:C:134:PRO:HD3	1.92	0.51
1:A:101:LYS:C	1:A:103:PHE:H	2.19	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:64:ASP:OD2	1:B:66:TYR:HB3	2.11	0.50
1:B:153:HIS:C	1:B:155:ILE:H	2.19	0.50
1:D:198:PHE:CD1	1:D:198:PHE:C	2.89	0.50
1:C:76:GLN:O	1:C:80:GLU:HG2	2.10	0.50
1:D:140:TYR:CZ	1:D:169:ARG:HG2	2.46	0.50
1:C:39:TYR:CE1	1:C:212:ALA:HA	2.46	0.49
1:C:27:ILE:HG12	3:C:2089:HOH:O	2.12	0.49
1:C:153:HIS:C	1:C:155:ILE:H	2.18	0.49
1:A:198:PHE:CD1	1:A:198:PHE:C	2.90	0.49
1:C:29:ASP:O	1:C:31:THR:HG23	2.12	0.49
1:B:133:LEU:HB3	1:B:134:PRO:HD3	1.94	0.49
1:A:38:LYS:NZ	1:A:95:ILE:HA	2.28	0.49
1:A:90:ALA:O	1:A:93:LEU:O	2.31	0.49
1:C:125:PHE:CD2	1:C:182:LEU:HD11	2.48	0.49
1:C:130:ALA:HB1	1:C:194:MET:O	2.13	0.49
1:C:93:LEU:C	1:C:95:ILE:H	2.20	0.48
1:D:172:VAL:O	1:D:176:ILE:HG13	2.13	0.48
1:B:43:GLN:HG3	1:B:211:MET:CE	2.40	0.48
1:B:169:ARG:NH2	1:B:170:GLN:HG3	2.28	0.48
1:D:101:LYS:C	1:D:103:PHE:H	2.21	0.48
1:D:15:TRP:HH2	1:D:137:TRP:CG	2.32	0.48
1:B:29:ASP:O	1:B:31:THR:HG23	2.13	0.48
1:B:93:LEU:C	1:B:95:ILE:H	2.21	0.48
1:B:85:LEU:HD21	1:B:162:THR:CG2	2.43	0.48
1:C:43:GLN:HG3	1:C:211:MET:CE	2.43	0.48
1:B:4:SER:OG	1:B:176:ILE:HG23	2.13	0.48
1:C:153:HIS:C	1:C:155:ILE:N	2.71	0.48
1:B:153:HIS:C	1:B:155:ILE:N	2.71	0.48
1:D:8:ARG:NE	1:D:15:TRP:CE3	2.81	0.48
1:A:8:ARG:NE	1:A:15:TRP:CE3	2.82	0.48
1:C:83:MET:O	1:C:86:HIS:HB3	2.14	0.48
1:A:138:LEU:O	1:A:142:VAL:HG23	2.14	0.47
1:B:185:ASN:ND2	1:B:185:ASN:N	2.49	0.47
1:C:85:LEU:HD11	1:C:162:THR:HG21	1.96	0.47
1:A:132:LEU:O	1:A:135:CYS:HB3	2.14	0.47
1:B:88:GLU:OE1	1:B:158:LYS:HG2	2.14	0.47
1:D:132:LEU:O	1:D:135:CYS:HB3	2.14	0.47
1:B:93:LEU:HD21	1:B:155:ILE:CD1	2.45	0.47
1:C:32:LEU:HD12	1:C:33:PRO:HD2	1.96	0.47
1:B:125:PHE:CD2	1:B:182:LEU:HD11	2.50	0.47
1:C:142:VAL:O	1:C:146:LEU:HD12	2.13	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:124:ASN:OD1	1:B:126:ALA:HB3	2.15	0.47
1:C:91:GLU:O	1:C:93:LEU:N	2.47	0.47
1:B:130:ALA:HB1	1:B:194:MET:O	2.14	0.46
1:A:15:TRP:HH2	1:A:137:TRP:CG	2.33	0.46
1:B:7:CYS:HB3	1:B:198:PHE:CD1	2.49	0.46
1:C:9:SER:O	1:C:12:ALA:HB2	2.16	0.46
1:D:97:GLU:O	1:D:101:LYS:HG3	2.15	0.46
1:B:172:VAL:HG12	1:B:176:ILE:CD1	2.45	0.46
1:B:32:LEU:HD12	1:B:33:PRO:HD2	1.97	0.46
1:C:25:GLN:HA	1:C:25:GLN:NE2	2.30	0.46
1:B:85:LEU:HD21	1:B:162:THR:HG21	1.97	0.46
1:B:142:VAL:O	1:B:146:LEU:HD12	2.16	0.46
1:C:86:HIS:CE1	1:C:100:ARG:HH11	2.33	0.46
1:C:88:GLU:HG2	1:C:89:PHE:H	1.81	0.46
1:D:171:GLN:HE21	1:D:171:GLN:CA	2.24	0.46
1:C:84:ALA:C	1:C:86:HIS:H	2.25	0.45
1:C:41:VAL:HG21	1:C:93:LEU:CD1	2.46	0.45
1:C:124:ASN:OD1	1:C:126:ALA:HB3	2.17	0.45
1:B:80:GLU:O	1:B:81:ALA:C	2.59	0.45
1:B:151:PRO:HB2	3:B:2049:HOH:O	2.15	0.45
1:A:135:CYS:O	2:A:301:HMH:HC6	2.17	0.45
1:C:88:GLU:HG2	1:C:89:PHE:CD1	2.51	0.45
1:B:85:LEU:HD11	1:B:162:THR:CG2	2.40	0.45
1:C:125:PHE:CE2	1:C:182:LEU:HD11	2.51	0.45
1:D:130:ALA:HB3	3:D:2097:HOH:O	2.16	0.45
1:B:85:LEU:CD2	1:B:162:THR:HG21	2.47	0.45
1:D:113:THR:HG22	1:D:116:MET:CE	2.47	0.45
1:D:112:TYR:O	1:D:115:HIS:HB3	2.17	0.44
1:B:19:PHE:CD2	1:B:145:LYS:HD2	2.52	0.44
1:B:83:MET:O	1:B:86:HIS:HB3	2.17	0.44
1:B:155:ILE:CG2	1:B:156:TYR:N	2.80	0.44
1:C:93:LEU:O	1:C:95:ILE:N	2.48	0.44
1:B:3:PHE:CD2	1:B:191:ARG:NH1	2.85	0.44
1:A:130:ALA:HA	1:A:179:PHE:HE1	1.82	0.44
1:B:125:PHE:CE2	1:B:182:LEU:HD11	2.52	0.44
1:D:113:THR:HA	1:D:116:MET:CE	2.44	0.44
1:A:97:GLU:C	1:A:99:GLU:H	2.25	0.44
1:A:113:THR:HG22	1:A:116:MET:CE	2.47	0.44
1:B:44:ASP:OD1	2:B:303:HMH:N3A	2.50	0.44
1:B:155:ILE:C	1:B:157:GLN:H	2.25	0.44
1:C:172:VAL:HG12	1:C:176:ILE:CD1	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:219:SER:O	1:C:221:SER:N	2.51	0.44
1:A:169:ARG:HD2	1:A:169:ARG:C	2.43	0.44
1:B:32:LEU:O	1:B:33:PRO:C	2.61	0.44
1:B:91:GLU:C	1:B:93:LEU:N	2.75	0.44
1:C:7:CYS:HB3	1:C:198:PHE:CD1	2.52	0.44
1:C:35:ASP:HA	3:C:2099:HOH:O	2.17	0.44
1:A:79:TYR:OH	1:A:83:MET:HE2	2.18	0.44
1:A:101:LYS:C	1:A:103:PHE:N	2.76	0.44
1:B:9:SER:O	1:B:12:ALA:HB2	2.17	0.44
1:B:172:VAL:CG1	1:B:176:ILE:HD11	2.48	0.44
1:C:38:LYS:HA	1:C:93:LEU:HD13	2.00	0.44
1:A:112:TYR:O	1:A:115:HIS:HB3	2.17	0.44
1:C:32:LEU:O	1:C:33:PRO:C	2.61	0.44
1:D:82:GLU:CD	1:D:82:GLU:C	2.87	0.43
1:A:100:ARG:HG2	1:A:100:ARG:NH2	2.31	0.43
1:B:106:SER:O	1:B:107:PRO:C	2.62	0.43
1:C:19:PHE:CD2	1:C:145:LYS:HD2	2.53	0.43
1:D:130:ALA:HA	1:D:179:PHE:HE1	1.83	0.43
1:A:101:LYS:HG3	1:A:102:ALA:H	1.83	0.43
1:A:145:LYS:HG3	3:A:2057:HOH:O	2.18	0.43
1:D:92:LEU:HD23	1:D:155:ILE:HB	2.00	0.43
1:A:38:LYS:HZ3	1:A:95:ILE:HG12	1.83	0.43
1:A:130:ALA:HB3	3:A:2079:HOH:O	2.17	0.43
1:C:155:ILE:C	1:C:157:GLN:H	2.26	0.43
1:C:144:GLU:C	1:C:146:LEU:N	2.76	0.43
1:C:179:PHE:CE1	1:C:194:MET:HE2	2.54	0.43
1:C:155:ILE:CG2	1:C:156:TYR:N	2.80	0.43
1:B:215:LYS:HD2	3:B:2019:HOH:O	2.18	0.43
1:D:98:GLU:C	1:D:98:GLU:OE2	2.61	0.43
1:A:38:LYS:HZ1	1:A:95:ILE:HA	1.84	0.42
1:C:114:SER:HB3	1:D:114:SER:HB3	2.00	0.42
1:B:84:ALA:C	1:B:86:HIS:H	2.27	0.42
1:C:88:GLU:HG2	1:C:89:PHE:N	2.34	0.42
1:C:172:VAL:CG1	1:C:176:ILE:HD11	2.48	0.42
1:D:101:LYS:C	1:D:103:PHE:N	2.77	0.42
1:B:86:HIS:O	1:B:87:ARG:C	2.62	0.42
1:D:70:ARG:O	1:D:73:SER:HB3	2.20	0.42
1:C:106:SER:O	1:C:107:PRO:C	2.63	0.42
1:A:97:GLU:C	1:A:99:GLU:N	2.77	0.42
1:B:21:HIS:HA	1:B:22:PRO:HD3	1.94	0.42
1:B:25:GLN:HA	1:B:25:GLN:NE2	2.31	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:52:ALA:HA	1:C:55:GLN:NE2	2.34	0.42
1:A:114:SER:HB3	1:B:114:SER:HB3	2.01	0.42
1:C:215:LYS:HD2	3:C:2018:HOH:O	2.19	0.42
1:A:187:THR:HG23	3:A:2015:HOH:O	2.20	0.41
1:B:97:GLU:OE2	1:B:97:GLU:HA	2.20	0.41
1:D:36:ARG:HD3	1:D:213:TYR:O	2.21	0.41
1:A:101:LYS:HG3	1:A:102:ALA:N	2.34	0.41
1:A:140:TYR:CE1	1:A:169:ARG:HG2	2.54	0.41
1:B:26:GLY:HA3	1:B:32:LEU:HB2	2.03	0.41
1:A:70:ARG:O	1:A:73:SER:HB3	2.21	0.41
1:A:113:THR:HA	1:A:116:MET:CE	2.46	0.41
1:A:140:TYR:CZ	1:A:169:ARG:HG2	2.56	0.41
1:C:222:ALA:HB3	1:D:13:GLU:OE2	2.20	0.41
1:D:207:GLN:NE2	1:D:207:GLN:HA	2.36	0.41
1:B:52:ALA:HA	1:B:55:GLN:NE2	2.34	0.41
1:B:80:GLU:HA	1:B:80:GLU:OE2	2.20	0.41
1:B:179:PHE:CE1	1:B:194:MET:HE2	2.55	0.41
1:C:80:GLU:OE2	1:C:80:GLU:HA	2.21	0.41
1:A:36:ARG:HD3	1:A:213:TYR:O	2.21	0.41
1:C:44:ASP:OD1	2:C:304:HMH:N3A	2.54	0.41
1:C:55:GLN:HE21	1:C:55:GLN:HB2	1.73	0.41
1:A:110:TYR:O	1:B:118:ARG:NH2	2.54	0.40
1:A:165:GLY:O	1:A:169:ARG:HB2	2.22	0.40
1:C:4:SER:CB	1:C:180:ASP:OD2	2.66	0.40
1:C:26:GLY:HA3	1:C:32:LEU:HB2	2.03	0.40
1:B:191:ARG:HG2	3:B:2094:HOH:O	2.21	0.40
1:D:187:THR:HG23	3:D:2029:HOH:O	2.20	0.40
1:B:144:GLU:C	1:B:146:LEU:H	2.30	0.40
1:D:97:GLU:HG3	1:D:101:LYS:HZ2	1.85	0.40
1:C:26:GLY:C	1:C:32:LEU:HB2	2.46	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	217/263 (82%)	207 (95%)	9 (4%)	1 (0%)	24	43
1	B	216/263 (82%)	182 (84%)	30 (14%)	4 (2%)	6	11
1	C	218/263 (83%)	186 (85%)	27 (12%)	5 (2%)	5	8
1	D	217/263 (82%)	206 (95%)	11 (5%)	0	100	100
All	All	868/1052 (82%)	781 (90%)	77 (9%)	10 (1%)	10	20

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	220	ASP
1	B	165	GLY
1	C	94	GLU
1	B	81	ALA
1	B	94	GLU
1	B	187	THR
1	C	165	GLY
1	C	187	THR
1	C	81	ALA
1	A	102	ALA

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	183/220 (83%)	179 (98%)	4 (2%)	45	73
1	B	181/220 (82%)	174 (96%)	7 (4%)	28	55
1	C	183/220 (83%)	177 (97%)	6 (3%)	33	61
1	D	183/220 (83%)	177 (97%)	6 (3%)	33	61
All	All	730/880 (83%)	707 (97%)	23 (3%)	34	62

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	91	GLU
1	A	121	LEU
1	A	169	ARG
1	A	193	LYS
1	B	22	PRO
1	B	83	MET
1	B	107	PRO
1	B	121	LEU
1	B	139	TYR
1	B	185	ASN
1	B	196	GLU
1	C	22	PRO
1	C	97	GLU
1	C	121	LEU
1	C	139	TYR
1	C	185	ASN
1	C	196	GLU
1	D	91	GLU
1	D	92	LEU
1	D	104	LYS
1	D	121	LEU
1	D	169	ARG
1	D	193	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	50	HIS
1	A	55	GLN
1	A	124	ASN
1	A	157	GLN
1	A	170	GLN
1	A	171	GLN
1	A	197	ASN
1	A	207	GLN
1	B	25	GLN
1	B	50	HIS
1	B	55	GLN
1	B	86	HIS
1	B	185	ASN
1	B	197	ASN
1	B	207	GLN
1	C	25	GLN

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Mol	Chain	Res	Type
1	C	50	HIS
1	C	55	GLN
1	C	86	HIS
1	C	185	ASN
1	C	197	ASN
1	C	207	GLN
1	D	50	HIS
1	D	55	GLN
1	D	124	ASN
1	D	157	GLN
1	D	170	GLN
1	D	171	GLN
1	D	197	ASN
1	D	207	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	HMH	B	303	-	10,10,10	4.45	6 (60%)	12,13,13	2.32	6 (50%)
2	HMH	D	302	-	10,10,10	4.55	6 (60%)	12,13,13	2.38	6 (50%)
2	HMH	A	301	-	10,10,10	4.57	6 (60%)	12,13,13	2.35	6 (50%)
2	HMH	C	304	-	10,10,10	4.59	6 (60%)	12,13,13	2.33	6 (50%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	HMH	B	303	-	-	1/2/2/2	0/1/1/1
2	HMH	D	302	-	-	0/2/2/2	0/1/1/1
2	HMH	A	301	-	-	0/2/2/2	0/1/1/1
2	HMH	C	304	-	-	1/2/2/2	0/1/1/1

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	302	HMH	C4A-N3A	8.70	1.46	1.35
2	C	304	HMH	C4A-N3A	8.51	1.46	1.35
2	A	301	HMH	C4A-N3A	8.37	1.46	1.35
2	B	303	HMH	C4A-N3A	7.73	1.45	1.35
2	A	301	HMH	C5A-C4A	6.98	1.54	1.42
2	B	303	HMH	C5A-C4A	6.84	1.54	1.42
2	D	302	HMH	C5A-C4A	6.69	1.53	1.42
2	C	304	HMH	C5A-C4A	6.63	1.53	1.42
2	C	304	HMH	C2A-N1A	5.91	1.43	1.34
2	B	303	HMH	C2A-N1A	5.63	1.42	1.34
2	B	303	HMH	O1-C7A	5.40	1.64	1.41
2	A	301	HMH	C2A-N1A	5.39	1.42	1.34
2	C	304	HMH	O1-C7A	5.23	1.63	1.41
2	D	302	HMH	O1-C7A	5.19	1.63	1.41
2	A	301	HMH	O1-C7A	5.17	1.63	1.41
2	D	302	HMH	C2A-N1A	5.14	1.42	1.34
2	A	301	HMH	C6A-N1A	4.67	1.43	1.34
2	C	304	HMH	C6A-N1A	4.66	1.43	1.34
2	D	302	HMH	C6A-N1A	4.59	1.43	1.34
2	B	303	HMH	C6A-N1A	4.43	1.43	1.34
2	A	301	HMH	C6A-C5A	3.40	1.44	1.37
2	D	302	HMH	C6A-C5A	3.37	1.44	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	303	HMH	C6A-C5A	3.16	1.44	1.37
2	C	304	HMH	C6A-C5A	3.09	1.43	1.37

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	302	HMH	C7A-C5A-C6A	5.34	128.00	119.36
2	B	303	HMH	C7A-C5A-C6A	5.34	128.00	119.36
2	C	304	HMH	C7A-C5A-C6A	5.32	127.97	119.36
2	A	301	HMH	C7A-C5A-C6A	5.28	127.90	119.36
2	D	302	HMH	CM2-C2A-N3A	3.37	122.17	117.13
2	A	301	HMH	CM2-C2A-N3A	3.29	122.06	117.13
2	C	304	HMH	CM2-C2A-N3A	3.12	121.80	117.13
2	B	303	HMH	CM2-C2A-N3A	3.00	121.61	117.13
2	C	304	HMH	O1-C7A-C5A	2.78	119.69	111.94
2	B	303	HMH	O1-C7A-C5A	2.66	119.36	111.94
2	A	301	HMH	C2A-N3A-C4A	2.56	122.04	118.10
2	D	302	HMH	C2A-N3A-C4A	2.50	121.94	118.10
2	D	302	HMH	N1A-C2A-N3A	-2.44	121.48	125.53
2	A	301	HMH	N1A-C2A-N3A	-2.42	121.50	125.53
2	C	304	HMH	N1A-C2A-N3A	-2.39	121.55	125.53
2	B	303	HMH	C2A-N3A-C4A	2.37	121.75	118.10
2	B	303	HMH	N1A-C2A-N3A	-2.36	121.60	125.53
2	D	302	HMH	O1-C7A-C5A	2.36	118.52	111.94
2	A	301	HMH	O1-C7A-C5A	2.33	118.45	111.94
2	C	304	HMH	C2A-N3A-C4A	2.21	121.50	118.10
2	C	304	HMH	C6A-N1A-C2A	2.16	119.62	116.07
2	B	303	HMH	C6A-N1A-C2A	2.15	119.60	116.07
2	D	302	HMH	C6A-N1A-C2A	2.10	119.52	116.07
2	A	301	HMH	C6A-N1A-C2A	2.08	119.48	116.07

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	303	HMH	C6A-C5A-C7A-O1
2	C	304	HMH	C6A-C5A-C7A-O1

There are no ring outliers.

4 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	303	HMH	4	0
2	D	302	HMH	2	0
2	A	301	HMH	3	0
2	C	304	HMH	4	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	219/263 (83%)	-1.35	0 100 100	28, 46, 88, 133	0
1	B	218/263 (82%)	-1.18	0 100 100	33, 67, 126, 155	0
1	C	220/263 (83%)	-1.19	0 100 100	35, 69, 123, 142	0
1	D	219/263 (83%)	-1.40	0 100 100	29, 46, 85, 110	0
All	All	876/1052 (83%)	-1.28	0 100 100	28, 55, 114, 155	0

There are no RSRZ outliers to report.

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(Å ²)	Q<0.9
2	HMH	A	301	10/10	0.99	0.03	54,54,54,54	0
2	HMH	B	303	10/10	0.99	0.04	54,54,54,54	0
2	HMH	C	304	10/10	0.99	0.03	54,54,54,54	0
2	HMH	D	302	10/10	0.99	0.04	54,54,54,54	0

6.5 Other polymers [i](#)

There are no such residues in this entry.