



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 18, 2026 – 08:35 AM UTC

PDB ID : 1LTS / pdb_00001lts
Title : REFINED STRUCTURE OF E. COLI HEAT LABILE ENTEROTOXIN, A
CLOSE RELATIVE OF CHOLERA TOXIN
Authors : Sixma, T.K.; Hol, W.G.J.
Deposited on : 1992-07-15
Resolution : 1.95 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

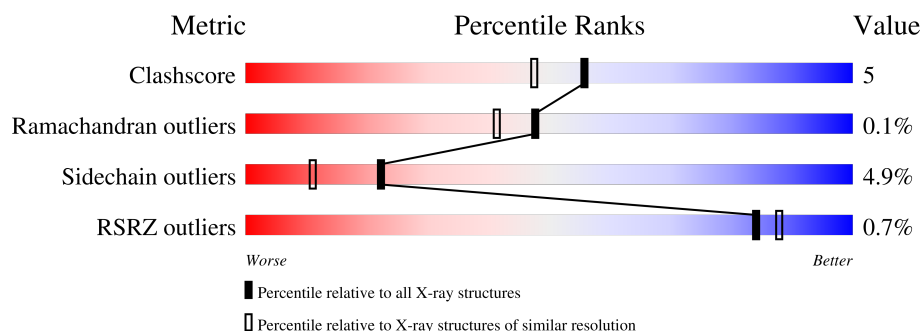
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 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	3612 (1.96-1.96)
Ramachandran outliers	187476	3587 (1.96-1.96)
Sidechain outliers	187428	3587 (1.96-1.96)
RSRZ outliers	180081	3495 (1.96-1.96)

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	D	103	81% 17% .
1	E	103	82% 17% .
1	F	103	2% 75% 20% 5%
1	G	103	78% 18% .
1	H	103	% 72% 24% .
2	A	185	% 68% 28% . .

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Mol	Chain	Length	Quality of chain
3	C	41	2% 63% 27% 10%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6271 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 HEAT-LABILE ENTEROTOXIN, SUBUNIT B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	D	103	Total	C	N	O	S	0	0	0
			824	516	139	163	6			
1	E	103	Total	C	N	O	S	0	0	0
			824	516	139	163	6			
1	F	103	Total	C	N	O	S	0	0	0
			824	516	139	163	6			
1	G	103	Total	C	N	O	S	0	0	0
			824	516	139	163	6			
1	H	103	Total	C	N	O	S	0	0	0
			824	516	139	163	6			

- Molecule 2 is a protein called HEAT-LABILE ENTEROTOXIN, SUBUNIT A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	A	185	Total	C	N	O	S	0	0	0
			1511	953	276	278	4			

- Molecule 3 is a protein called HEAT-LABILE ENTEROTOXIN, SUBUNIT A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	41	Total	C	N	O	S	0	0	0
			347	214	59	73	1			

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	47	Total	O	0	0
			47	47		
4	E	49	Total	O	0	0
			49	49		
4	F	36	Total	O	0	0
			36	36		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	G	40	Total 40	O 40	0	0
4	H	44	Total 44	O 44	0	0
4	A	53	Total 53	O 53	0	0
4	C	24	Total 24	O 24	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: HEAT-LABILE ENTEROTOXIN, SUBUNIT B

Chain D:  81% 17% .



- Molecule 1: HEAT-LABILE ENTEROTOXIN, SUBUNIT B

Chain E:  82% 17% .



- Molecule 1: HEAT-LABILE ENTEROTOXIN, SUBUNIT B

Chain F:  75% 20% 5% .



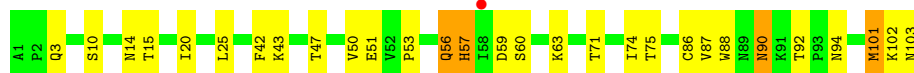
- Molecule 1: HEAT-LABILE ENTEROTOXIN, SUBUNIT B

Chain G:  78% 18% .

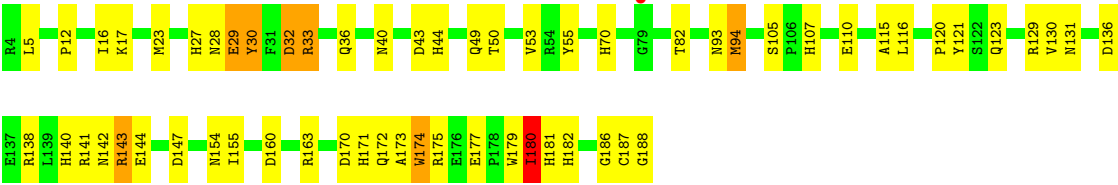


- Molecule 1: HEAT-LABILE ENTEROTOXIN, SUBUNIT B

Chain H:  72% 24% .



- Molecule 2: HEAT-LABILE ENTEROTOXIN, SUBUNIT A



● Molecule 3: HEAT-LABILE ENTEROTOXIN, SUBUNIT A



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	119.20Å 98.20Å 64.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 1.95 8.00 – 1.95	Depositor EDS
% Data completeness (in resolution range)	(Not available) (8.00-1.95) 93.2 (8.00-1.95)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	74.57 (at 1.93Å)	Xtriage
Refinement program	TNT, X-PLOR	Depositor
R, R_{free}	0.182 , (Not available) (Not available) , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	25.9	Xtriage
Anisotropy	0.111	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 78.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	6271	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.55% 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

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	D	1.01	2/835 (0.2%)	1.71	13/1124 (1.2%)
1	E	1.08	4/835 (0.5%)	1.69	9/1124 (0.8%)
1	F	0.98	3/835 (0.4%)	1.67	16/1124 (1.4%)
1	G	0.98	2/835 (0.2%)	1.76	16/1124 (1.4%)
1	H	1.00	1/835 (0.1%)	1.70	14/1124 (1.2%)
2	A	1.05	9/1559 (0.6%)	1.72	35/2120 (1.7%)
3	C	0.99	0/351	1.84	7/472 (1.5%)
All	All	1.02	21/6085 (0.3%)	1.72	110/8212 (1.3%)

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	F	0	1

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	74	ILE	CA-CB	7.45	1.64	1.54
1	E	57	HIS	CD2-NE2	-7.01	1.30	1.37
1	D	57	HIS	CD2-NE2	-6.97	1.30	1.37
2	A	27	HIS	CD2-NE2	-6.40	1.30	1.37
1	H	57	HIS	CD2-NE2	-6.26	1.30	1.37
2	A	181	HIS	CD2-NE2	-6.21	1.31	1.37
1	G	57	HIS	CD2-NE2	-6.19	1.31	1.37
2	A	16	ILE	CA-CB	6.11	1.62	1.54
2	A	182	HIS	CD2-NE2	-5.93	1.31	1.37
2	A	140	HIS	CD2-NE2	-5.81	1.31	1.37
2	A	70	HIS	CD2-NE2	-5.79	1.31	1.37
1	F	57	HIS	CD2-NE2	-5.76	1.31	1.37
1	E	24	ILE	CA-CB	5.72	1.60	1.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	107	HIS	CD2-NE2	-5.68	1.31	1.37
2	A	44	HIS	CD2-NE2	-5.59	1.31	1.37
1	D	57	HIS	CG-ND1	-5.46	1.32	1.38
1	G	24	ILE	CA-CB	5.43	1.60	1.54
1	F	57	HIS	CG-ND1	-5.25	1.32	1.38
1	E	74	ILE	CA-CB	5.23	1.61	1.54
2	A	44	HIS	CG-ND1	-5.19	1.32	1.38
1	E	57	HIS	CG-ND1	-5.03	1.32	1.38

All (110) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	59	ASP	CA-CB-CG	11.26	123.86	112.60
1	H	56	GLN	N-CA-C	-10.71	97.84	112.94
1	E	73	ARG	NE-CZ-NH2	-9.50	110.65	119.20
1	H	101	MET	CG-SD-CE	-9.29	80.46	100.90
2	A	180	ILE	CB-CA-C	-9.21	99.97	112.04
2	A	28	ASN	N-CA-C	9.10	120.81	111.07
2	A	32	ASP	CA-CB-CG	9.04	121.64	112.60
3	C	197	ASP	CA-CB-CG	8.67	121.27	112.60
1	G	50	VAL	N-CA-C	-8.57	95.37	107.80
1	G	101	MET	CG-SD-CE	-8.50	82.21	100.90
1	G	46	GLU	CA-CB-CG	-8.18	97.75	114.10
1	G	103	ASN	CA-CB-CG	-7.80	104.80	112.60
1	H	50	VAL	N-CA-C	-7.63	96.74	107.80
1	G	102	LYS	O-C-N	7.53	132.12	123.31
2	A	179	TRP	CG-CD2-CE3	7.45	141.35	133.90
2	A	30	TYR	N-CA-C	7.42	119.37	111.28
1	E	59	ASP	N-CA-C	7.33	120.33	111.82
1	F	56	GLN	OE1-CD-NE2	-7.29	115.31	122.60
1	F	11	GLU	N-CA-CB	-7.19	99.84	110.49
1	F	60	SER	N-CA-C	-7.19	103.44	111.28
1	F	21	ASN	OD1-CG-ND2	-7.17	115.43	122.60
1	G	31	MET	N-CA-C	-7.13	102.88	112.94
1	H	90	ASN	OD1-CG-ND2	-6.97	115.63	122.60
2	A	136	ASP	CA-CB-CG	6.92	119.52	112.60
1	D	101	MET	CG-SD-CE	-6.91	85.70	100.90
2	A	181	HIS	CB-CG-CD2	-6.88	122.26	131.20
1	F	86	CYS	N-CA-C	-6.75	98.20	109.07
3	C	213	GLU	CA-CB-CG	-6.68	100.75	114.10
1	G	102	LYS	CA-C-N	6.67	133.71	121.70
1	G	102	LYS	C-N-CA	6.67	133.71	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	73	ARG	NE-CZ-NH1	6.63	128.13	121.50
3	C	204	GLN	CA-CB-CG	-6.63	100.84	114.10
1	D	50	VAL	N-CA-C	-6.62	98.20	107.80
2	A	154	ASN	CA-CB-CG	-6.45	106.15	112.60
1	G	103	ASN	N-CA-C	6.44	129.04	111.00
1	E	50	VAL	N-CA-C	-6.44	98.46	107.80
1	F	50	VAL	N-CA-C	-6.39	98.67	107.99
1	F	83	ASP	CA-CB-CG	6.38	118.98	112.60
1	G	57	HIS	CB-CG-CD2	-6.24	123.08	131.20
1	D	94	ASN	OD1-CG-ND2	-6.12	116.47	122.60
2	A	27	HIS	CB-CG-CD2	-6.08	123.30	131.20
2	A	142	ASN	OD1-CG-ND2	-6.06	116.54	122.60
2	A	144	GLU	CA-CB-CG	-6.06	101.98	114.10
2	A	179	TRP	CB-CG-CD1	-6.00	117.90	126.90
1	D	70	ASP	CA-CB-CG	5.99	118.59	112.60
1	E	57	HIS	CB-CG-CD2	-5.99	123.42	131.20
2	A	180	ILE	N-CA-CB	5.97	117.94	110.47
1	H	63	LYS	CB-CA-C	-5.93	101.57	110.88
2	A	172	GLN	OE1-CD-NE2	-5.91	116.69	122.60
2	A	182	HIS	CB-CG-CD2	-5.89	123.54	131.20
1	H	71	THR	CA-CB-OG1	-5.88	100.78	109.60
2	A	94	MET	CA-CB-CG	5.87	125.83	114.10
1	H	90	ASN	CB-CG-ND2	5.81	125.12	116.40
1	G	90	ASN	CA-CB-CG	5.79	118.39	112.60
1	D	3	GLN	OE1-CD-NE2	-5.79	116.81	122.60
1	E	56	GLN	OE1-CD-NE2	-5.72	116.88	122.60
1	H	47	THR	CA-CB-OG1	-5.69	101.06	109.60
2	A	107	HIS	CB-CG-CD2	-5.69	123.80	131.20
2	A	105	SER	CA-C-N	5.67	125.20	119.19
2	A	105	SER	C-N-CA	5.67	125.20	119.19
2	A	141	ARG	CA-CB-CG	-5.67	102.77	114.10
1	F	103	ASN	OD1-CG-ND2	-5.63	116.97	122.60
3	C	216	SER	N-CA-C	-5.63	104.77	111.69
1	F	88	TRP	CG-CD2-CE3	5.62	139.51	133.90
1	F	102	LYS	CA-C-N	5.59	131.77	121.70
1	F	102	LYS	C-N-CA	5.59	131.77	121.70
1	E	62	LYS	CA-CB-CG	-5.52	103.06	114.10
1	H	86	CYS	N-CA-C	-5.49	100.29	109.24
2	A	171	HIS	CB-CG-CD2	-5.48	124.08	131.20
2	A	147	ASP	N-CA-C	5.47	116.92	111.07
1	D	84	LYS	CG-CD-CE	-5.47	98.73	111.30
2	A	49	GLN	OE1-CD-NE2	-5.41	117.19	122.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	140	HIS	CB-CG-CD2	-5.41	124.17	131.20
3	C	198	THR	CA-CB-OG1	-5.39	101.52	109.60
1	H	10	SER	CA-CB-OG	-5.38	100.33	111.10
2	A	173	ALA	N-CA-C	5.34	117.79	111.33
1	D	102	LYS	O-C-N	5.33	129.45	123.27
1	H	51	GLU	CA-CB-CG	5.32	124.73	114.10
1	F	88	TRP	CB-CG-CD1	-5.31	118.94	126.90
1	E	94	ASN	OD1-CG-ND2	-5.27	117.33	122.60
1	D	102	LYS	CA-CB-CG	5.27	124.64	114.10
1	E	14	ASN	OD1-CG-ND2	-5.26	117.33	122.60
1	H	92	THR	CA-CB-OG1	-5.22	101.77	109.60
1	H	94	ASN	OD1-CG-ND2	-5.21	117.39	122.60
2	A	140	HIS	CA-CB-CG	-5.21	108.59	113.80
2	A	174	TRP	CE2-CD2-CG	-5.19	100.97	107.20
1	D	58	ILE	CA-C-N	5.19	127.48	120.38
1	D	58	ILE	C-N-CA	5.19	127.48	120.38
1	H	63	LYS	N-CA-CB	5.18	117.53	110.01
1	F	101	MET	CG-SD-CE	-5.18	89.50	100.90
1	G	42	PHE	CA-CB-CG	-5.18	108.62	113.80
2	A	174	TRP	CG-CD2-CE3	5.18	139.08	133.90
1	G	58	ILE	CB-CG1-CD1	5.17	124.65	113.80
2	A	107	HIS	CB-CG-ND1	5.16	130.44	122.70
1	G	73	ARG	NE-CZ-NH2	-5.16	114.56	119.20
1	G	90	ASN	OD1-CG-ND2	-5.14	117.45	122.60
2	A	12	PRO	CA-C-N	5.14	125.18	119.32
2	A	12	PRO	C-N-CA	5.14	125.18	119.32
3	C	204	GLN	OE1-CD-NE2	-5.12	117.48	122.60
2	A	170	ASP	CA-CB-CG	5.11	117.71	112.60
1	D	43	LYS	CA-CB-CG	5.11	124.31	114.10
3	C	200	ASN	OD1-CG-ND2	-5.10	117.50	122.60
2	A	53	VAL	N-CA-C	-5.08	103.02	109.58
1	F	61	GLN	CA-CB-CG	-5.08	103.95	114.10
1	D	95	SER	N-CA-CB	-5.07	102.17	110.43
1	F	11	GLU	CB-CG-CD	-5.06	104.00	112.60
2	A	179	TRP	CE2-CD2-CG	-5.05	101.14	107.20
2	A	93	ASN	CA-CB-CG	5.05	117.65	112.60
1	F	94	ASN	OD1-CG-ND2	-5.05	117.55	122.60
1	G	94	ASN	OD1-CG-ND2	-5.02	117.58	122.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	F	76	TYR	Sidechain

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	D	824	0	841	8	0
1	E	824	0	841	7	0
1	F	824	0	841	8	0
1	G	824	0	841	7	0
1	H	824	0	841	10	0
2	A	1511	0	1407	22	0
3	C	347	0	327	7	0
4	A	53	0	0	0	0
4	C	24	0	0	0	0
4	D	47	0	0	0	0
4	E	49	0	0	0	0
4	F	36	0	0	0	0
4	G	40	0	0	0	0
4	H	44	0	0	0	0
All	All	6271	0	5939	56	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 5.

All (56) 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:177:GLU:HG2	2:A:180:ILE:HD11	1.64	0.78
1:H:75:THR:HG21	1:H:101:MET:HE1	1.68	0.76
2:A:129:ARG:NH1	2:A:131:ASN:HD21	1.86	0.73
2:A:129:ARG:HH11	2:A:131:ASN:HD21	1.38	0.72
2:A:94:MET:SD	2:A:115:ALA:HB2	2.32	0.69
1:G:54:GLY:H	1:G:57:HIS:HD2	1.46	0.64
1:H:75:THR:CG2	1:H:101:MET:HE1	2.28	0.64
2:A:33:ARG:HH11	2:A:33:ARG:HG2	1.67	0.59
1:D:93:PRO:HG3	1:H:3:GLN:HG2	1.86	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:94:MET:HB2	2:A:155:ILE:HG12	1.86	0.57
2:A:175:ARG:HE	2:A:188:GLY:HA2	1.69	0.57
2:A:120:PRO:HG2	2:A:123:GLN:HB2	1.89	0.54
2:A:5:LEU:HD13	2:A:94:MET:HE2	1.90	0.54
1:H:74:ILE:HD11	3:C:228:SER:HB2	1.91	0.53
2:A:29:GLU:HG3	2:A:32:ASP:HB2	1.92	0.52
2:A:33:ARG:HG2	2:A:33:ARG:NH1	2.26	0.51
1:E:3:GLN:NE2	1:F:92:THR:HG22	2.25	0.51
2:A:40:ASN:HB3	2:A:43:ASP:HB2	1.93	0.51
1:D:103:ASN:HB2	1:E:76:TYR:CE1	2.46	0.50
3:C:232:ILE:O	3:C:236:ILE:HG12	2.11	0.50
1:F:15:THR:HA	1:F:87:VAL:O	2.12	0.49
1:E:65:ILE:HG22	1:E:69:LYS:HE2	1.95	0.49
2:A:82:THR:HA	2:A:130:VAL:O	2.13	0.48
1:H:14:ASN:O	1:H:88:TRP:HA	2.14	0.48
2:A:186:GLY:O	3:C:199:CYS:HB2	2.13	0.48
1:H:43:LYS:HA	1:H:43:LYS:HD2	1.73	0.48
2:A:175:ARG:NE	2:A:188:GLY:HA2	2.29	0.48
1:D:3:GLN:HG2	1:E:93:PRO:HG3	1.97	0.47
1:G:34:LYS:HA	1:G:34:LYS:HD3	1.70	0.47
1:H:15:THR:HA	1:H:87:VAL:O	2.15	0.46
3:C:198:THR:O	3:C:202:GLU:HB2	2.16	0.46
2:A:186:GLY:O	3:C:196:GLY:N	2.49	0.45
1:F:58:ILE:HG12	1:F:61:GLN:HB2	1.99	0.45
1:F:46:GLU:HB3	1:F:48:PHE:CE2	2.53	0.44
3:C:208:THR:O	3:C:212:ARG:HG2	2.16	0.44
2:A:17:LYS:HG3	2:A:121:TYR:CZ	2.52	0.44
2:A:174:TRP:CD1	2:A:187:CYS:HB3	2.53	0.44
1:D:1:ALA:HB1	1:E:37:MET:HE1	1.99	0.44
1:D:15:THR:HA	1:D:87:VAL:O	2.18	0.43
1:H:53:PRO:HA	1:H:57:HIS:ND1	2.33	0.43
2:A:121:TYR:OH	2:A:143:ARG:NH2	2.52	0.43
2:A:23:MET:HE1	2:A:30:TYR:CD1	2.54	0.43
1:H:20:ILE:HG21	1:H:42:PHE:CE1	2.54	0.42
1:D:63:LYS:HB2	3:C:235:ARG:HD3	2.00	0.42
2:A:23:MET:HE1	2:A:30:TYR:HD1	1.85	0.42
1:F:11:GLU:CD	1:G:35:ARG:HH12	2.28	0.42
1:F:58:ILE:HD11	1:G:36:GLU:OE2	2.20	0.42
1:E:15:THR:HA	1:E:87:VAL:O	2.20	0.41
1:G:33:GLY:O	1:G:34:LYS:HB2	2.19	0.41
1:H:25:LEU:HD22	1:H:43:LYS:HD2	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:55:SER:C	1:D:57:HIS:H	2.29	0.41
1:F:14:ASN:O	1:F:88:TRP:HA	2.20	0.41
1:G:54:GLY:N	1:G:57:HIS:HD2	2.14	0.41
1:F:1:ALA:HB3	1:G:93:PRO:HD2	2.03	0.41
2:A:160:ASP:HB3	2:A:163:ARG:HH21	1.86	0.40
1:D:103:ASN:HB2	1:E:76:TYR:HE1	1.85	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	D	101/103 (98%)	98 (97%)	2 (2%)	1 (1%)	12	5
1	E	101/103 (98%)	100 (99%)	1 (1%)	0	100	100
1	F	101/103 (98%)	97 (96%)	4 (4%)	0	100	100
1	G	101/103 (98%)	100 (99%)	1 (1%)	0	100	100
1	H	101/103 (98%)	97 (96%)	4 (4%)	0	100	100
2	A	183/185 (99%)	178 (97%)	5 (3%)	0	100	100
3	C	39/41 (95%)	39 (100%)	0	0	100	100
All	All	727/741 (98%)	709 (98%)	17 (2%)	1 (0%)	48	41

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	56	GLN

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	D	95/95 (100%)	94 (99%)	1 (1%)	65	64
1	E	95/95 (100%)	93 (98%)	2 (2%)	47	41
1	F	95/95 (100%)	91 (96%)	4 (4%)	26	16
1	G	95/95 (100%)	88 (93%)	7 (7%)	13	4
1	H	95/95 (100%)	89 (94%)	6 (6%)	16	6
2	A	155/155 (100%)	145 (94%)	10 (6%)	15	6
3	C	40/40 (100%)	37 (92%)	3 (8%)	12	4
All	All	670/670 (100%)	637 (95%)	33 (5%)	22	11

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	103	ASN
1	E	55	SER
1	E	56	GLN
1	F	10	SER
1	F	56	GLN
1	F	59	ASP
1	F	60	SER
1	G	13	ARG
1	G	35	ARG
1	G	43	LYS
1	G	58	ILE
1	G	62	LYS
1	G	91	LYS
1	G	103	ASN
1	H	56	GLN
1	H	59	ASP
1	H	60	SER
1	H	90	ASN
1	H	102	LYS
1	H	103	ASN

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Mol	Chain	Res	Type
2	A	29	GLU
2	A	33	ARG
2	A	36	GLN
2	A	50	THR
2	A	55	TYR
2	A	110	GLU
2	A	116	LEU
2	A	138	ARG
2	A	143	ARG
2	A	180	ILE
3	C	197	ASP
3	C	204	GLN
3	C	235	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	E	49	GLN
1	E	89	ASN
1	E	103	ASN
1	F	14	ASN
1	F	56	GLN
1	F	61	GLN
1	F	103	ASN
1	G	21	ASN
1	G	57	HIS
1	H	21	ASN
2	A	27	HIS
2	A	38	ASN
2	A	131	ASN
2	A	172	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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [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	D	103/103 (100%)	-0.81	0 100 100	13, 24, 48, 68	0
1	E	103/103 (100%)	-0.80	0 100 100	14, 23, 53, 71	0
1	F	103/103 (100%)	-0.54	2 (1%) 66 74	14, 27, 63, 106	0
1	G	103/103 (100%)	-0.63	0 100 100	15, 29, 55, 68	0
1	H	103/103 (100%)	-0.71	1 (0%) 79 84	13, 24, 58, 80	0
2	A	185/185 (100%)	-0.44	1 (0%) 87 90	18, 32, 65, 88	0
3	C	41/41 (100%)	-0.51	1 (2%) 59 66	16, 26, 60, 83	0
All	All	741/741 (100%)	-0.62	5 (0%) 84 88	13, 28, 61, 106	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	196	GLY	3.1
1	F	58	ILE	2.8
1	F	54	GLY	2.3
1	H	58	ILE	2.0
2	A	79	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.