



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 05:41 PM UTC

PDB ID : 1F13 / pdb_00001f13
Title : RECOMBINANT HUMAN CELLULAR COAGULATION FACTOR XIII
Authors : Weiss, M.S.; Hilgenfeld, R.
Deposited on : 1998-01-16
Resolution : 2.10 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

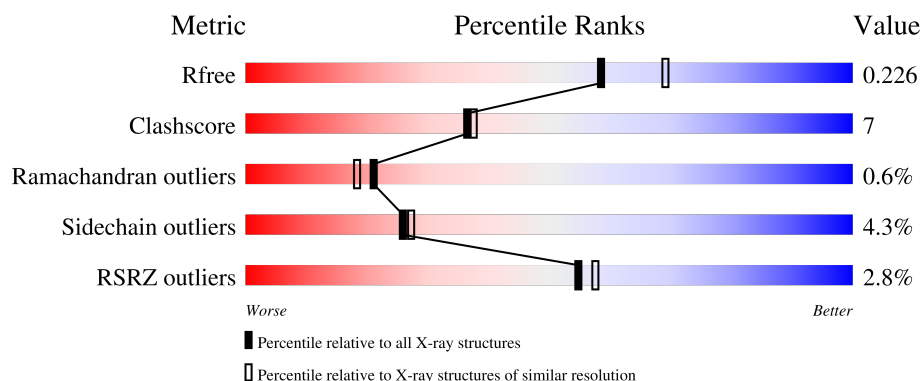
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

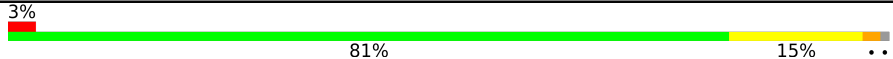
The reported resolution of this entry is 2.10 Å.

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	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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	731	
1	B	731	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 12043 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 COAGULATION FACTOR XIII ZYMOGEN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	722	Total	C	N	O	S	0	0	0
			5791	3670	1001	1093	27			
1	B	719	Total	C	N	O	S	0	0	0
			5765	3655	994	1089	27			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	651	GLU	GLN	conflict	UNP P00488
B	651	GLU	GLN	conflict	UNP P00488

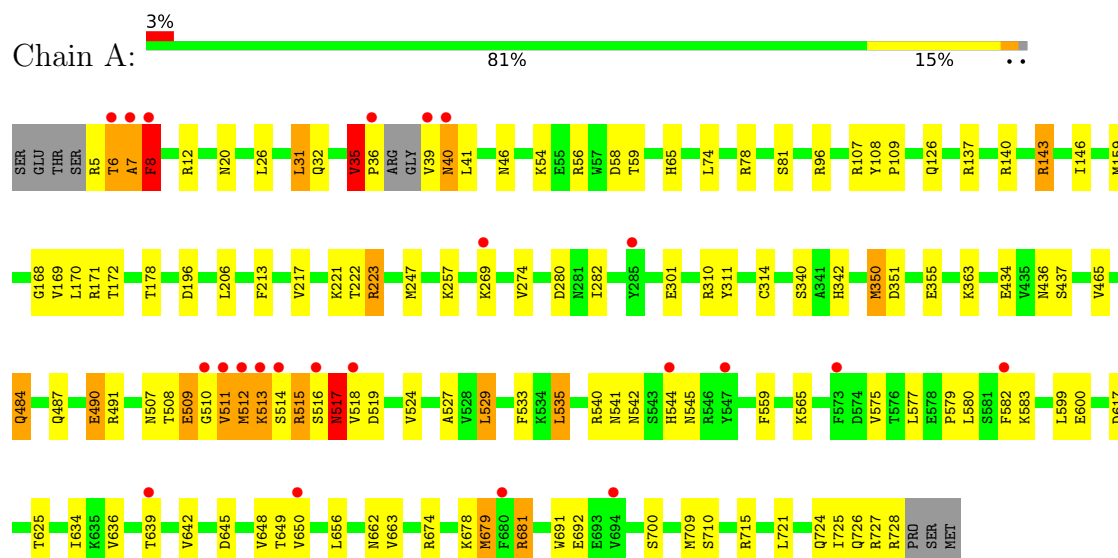
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	263	Total	O	0	0
			263	263		
2	B	224	Total	O	0	0
			224	224		

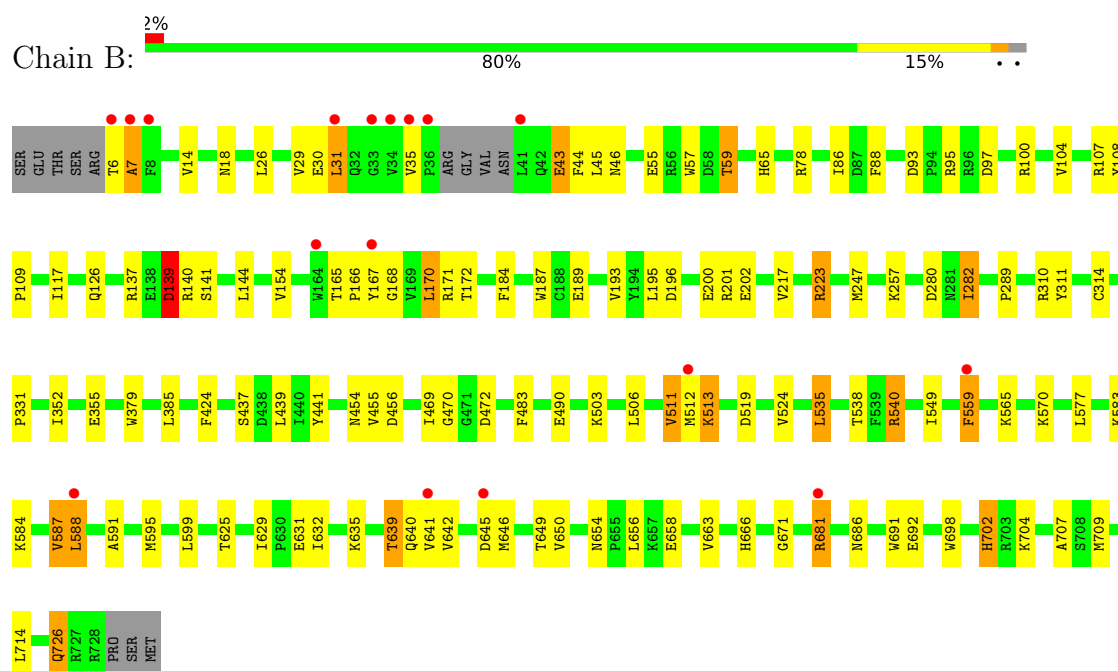
3 Residue-property plots [i](#)

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: CELLULAR COAGULATION FACTOR XIII ZYMOGEN



• Molecule 1: CELLULAR COAGULATION FACTOR XIII ZYMOGEN



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	134.59Å 72.78Å 101.05Å 90.00° 106.08° 90.00°	Depositor
Resolution (Å)	40.00 – 2.10 40.00 – 2.10	Depositor EDS
% Data completeness (in resolution range)	82.0 (40.00-2.10) 81.6 (40.00-2.10)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.51 (at 2.10Å)	Xtriage
Refinement program	X-PLOR 3.1	Depositor
R, R_{free}	0.183 , 0.236 0.177 , 0.226	Depositor DCC
R_{free} test set	1796 reflections (2.00%)	wwPDB-VP
Wilson B-factor (Å ²)	32.9	Xtriage
Anisotropy	0.395	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 50.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	12043	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

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

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](#)

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	0.64	0/5926	1.02	26/8041 (0.3%)
1	B	0.63	1/5900 (0.0%)	1.00	21/8006 (0.3%)
All	All	0.64	1/11826 (0.0%)	1.01	47/16047 (0.3%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	14	VAL	CA-CB	5.49	1.58	1.54

All (47) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	512	MET	N-CA-C	-9.17	102.28	113.19
1	A	517	ASN	N-CA-C	-9.12	100.95	112.90
1	B	314	CYS	N-CA-C	8.78	121.95	111.33
1	A	314	CYS	N-CA-C	8.42	121.51	111.33
1	A	274	VAL	N-CA-C	8.25	118.29	110.53
1	B	59	THR	N-CA-C	6.96	118.86	111.28
1	B	217	VAL	N-CA-C	6.68	120.39	111.17
1	A	217	VAL	N-CA-C	6.52	120.16	111.17
1	A	559	PHE	N-CA-C	-6.48	101.19	110.59
1	A	674	ARG	N-CA-C	-6.41	101.98	109.93
1	B	355	GLU	N-CA-C	-6.34	102.34	110.53
1	A	56	ARG	N-CA-C	6.24	120.00	112.38
1	B	196	ASP	N-CA-C	6.09	120.21	113.21
1	A	280	ASP	N-CA-C	5.99	120.59	113.16
1	B	117	ILE	N-CA-C	5.99	114.08	108.15
1	B	559	PHE	N-CA-C	-5.96	102.84	110.53
1	A	351	ASP	N-CA-C	5.92	118.90	109.24
1	A	8	PHE	N-CA-C	5.92	123.41	110.80
1	A	59	THR	N-CA-C	5.91	119.75	112.54
1	B	631	GLU	N-CA-C	5.85	117.61	110.41
1	A	196	ASP	N-CA-C	5.84	120.27	113.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	645	ASP	N-CA-C	5.80	118.23	110.35
1	A	206	LEU	N-CA-C	5.75	119.48	112.23
1	B	645	ASP	N-CA-C	5.70	117.89	110.43
1	B	139	ASP	CB-CA-C	-5.63	109.57	117.23
1	A	169	VAL	N-CA-C	5.61	116.66	108.53
1	A	465	VAL	N-CA-C	5.60	116.92	108.96
1	A	35	VAL	N-CA-C	5.59	120.95	108.88
1	A	437	SER	N-CA-C	5.57	117.88	110.53
1	B	437	SER	N-CA-C	5.50	117.83	110.35
1	A	436	ASN	N-CA-C	5.43	120.59	112.94
1	B	18	ASN	N-CA-C	5.39	119.41	112.41
1	B	282	ILE	CB-CA-C	-5.36	107.16	111.71
1	B	95	ARG	N-CA-C	-5.34	100.54	109.24
1	A	96	ARG	N-CA-C	5.32	121.52	114.12
1	B	35	VAL	N-CA-C	5.30	120.32	108.88
1	B	483	PHE	N-CA-C	-5.25	102.75	110.52
1	B	141	SER	N-CA-C	5.23	118.08	109.72
1	B	583	LYS	N-CA-C	5.20	117.64	108.75
1	B	78	ARG	N-CA-C	5.19	117.41	110.35
1	A	35	VAL	CA-C-N	5.14	139.33	127.00
1	A	35	VAL	C-N-CA	5.14	139.33	127.00
1	B	503	LYS	N-CA-C	5.13	117.61	109.50
1	A	355	GLU	N-CA-C	-5.11	103.94	110.53
1	A	78	ARG	N-CA-C	5.07	117.25	110.35
1	A	269	LYS	N-CA-C	-5.05	100.29	108.52
1	B	280	ASP	N-CA-C	5.01	119.08	112.92

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	5791	0	5656	92	0
1	B	5765	0	5628	80	0
2	A	263	0	0	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	224	0	0	8	0
All	All	12043	0	11284	165	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 (165) 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:538:THR:HG22	1:B:584:LYS:HG2	1.41	0.99
1:B:535:LEU:HB3	1:B:587:VAL:HG22	1.51	0.91
1:A:515:ARG:NE	1:A:515:ARG:HA	1.89	0.87
1:A:40:ASN:HD22	1:A:40:ASN:H	1.18	0.87
1:A:143:ARG:HB2	1:A:143:ARG:HH11	1.48	0.79
1:A:575:VAL:HG13	1:A:583:LYS:HD3	1.67	0.76
1:B:681:ARG:HA	1:B:681:ARG:NH1	2.01	0.76
1:B:649:THR:HG22	1:B:692:GLU:HG2	1.68	0.75
1:A:511:VAL:C	1:A:513:LYS:H	1.94	0.74
1:A:524:VAL:HG22	1:A:535:LEU:HD22	1.69	0.73
1:A:512:MET:C	1:A:514:SER:H	1.96	0.73
1:A:636:VAL:HG12	1:A:648:VAL:HG22	1.73	0.71
1:B:524:VAL:HG22	1:B:535:LEU:HD22	1.73	0.70
1:A:507:ASN:OD1	1:A:509:GLU:HG3	1.91	0.70
1:B:513:LYS:NZ	1:B:513:LYS:HA	2.07	0.69
1:A:35:VAL:HB	1:A:36:PRO:C	2.17	0.69
1:A:40:ASN:H	1:A:40:ASN:ND2	1.90	0.69
1:B:588:LEU:HB3	2:B:2137:HOH:O	1.93	0.67
1:B:642:VAL:HG23	1:B:726:GLN:O	1.94	0.67
1:A:159:MET:SD	2:A:2189:HOH:O	2.53	0.66
1:A:663:VAL:HG13	1:A:709:MET:HE3	1.77	0.66
1:B:519:ASP:HB2	1:B:540:ARG:HB3	1.78	0.66
1:A:681:ARG:HA	1:A:681:ARG:NH1	2.10	0.65
1:B:331:PRO:HB2	1:B:379:TRP:HB3	1.78	0.65
1:B:513:LYS:HA	1:B:513:LYS:HZ3	1.62	0.64
1:B:635:LYS:HB2	1:B:649:THR:OG1	1.97	0.64
1:B:663:VAL:HG13	1:B:709:MET:HE3	1.80	0.63
1:A:39:VAL:HG12	1:A:40:ASN:H	1.63	0.63
1:A:511:VAL:C	1:A:513:LYS:N	2.58	0.61
1:A:513:LYS:C	1:A:515:ARG:H	2.09	0.60
1:B:202:GLU:HG3	2:B:2212:HOH:O	2.01	0.59
1:A:510:GLY:C	1:A:512:MET:H	2.10	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:137:ARG:HD2	2:B:1921:HOH:O	2.02	0.58
1:A:515:ARG:HA	1:A:515:ARG:CZ	2.34	0.58
1:A:529:LEU:HD21	1:A:656:LEU:HD21	1.86	0.57
1:A:727:ARG:O	1:A:728:ARG:HB2	2.05	0.57
1:A:213:PHE:CD1	1:A:222:THR:HG22	2.40	0.56
1:B:189:GLU:HG3	2:B:2216:HOH:O	2.05	0.56
1:B:107:ARG:HD2	1:B:108:TYR:CZ	2.41	0.56
1:A:484:GLN:HB3	1:A:487:GLN:HE21	1.71	0.56
1:B:43:GLU:O	1:B:43:GLU:HG2	2.05	0.55
1:A:39:VAL:HG12	1:A:40:ASN:N	2.22	0.55
1:A:524:VAL:HG22	1:A:535:LEU:CD2	2.36	0.55
1:A:223:ARG:NH2	2:A:857:HOH:O	2.40	0.55
1:A:178:THR:HB	2:A:2189:HOH:O	2.07	0.54
1:A:8:PHE:HE2	1:B:559:PHE:CD1	2.26	0.54
1:A:649:THR:HG22	1:A:692:GLU:HG3	1.90	0.54
1:B:570:LYS:HE2	2:B:2264:HOH:O	2.07	0.54
1:B:44:PHE:CZ	1:B:166:PRO:HD2	2.43	0.54
1:A:282:ILE:HD11	1:B:7:ALA:N	2.23	0.53
1:B:663:VAL:HG13	1:B:709:MET:CE	2.38	0.53
2:A:2248:HOH:O	1:B:282:ILE:HD12	2.09	0.52
1:A:508:THR:O	1:A:511:VAL:HG12	2.09	0.52
1:B:441:TYR:HD2	1:B:454:ASN:HD22	1.57	0.52
1:A:515:ARG:HB3	1:A:617:ASP:OD2	2.10	0.52
1:A:517:ASN:H	1:A:517:ASN:ND2	2.08	0.52
1:B:26:LEU:HD11	1:B:104:VAL:HG21	1.91	0.52
1:A:575:VAL:CG1	1:A:583:LYS:HD3	2.40	0.51
1:A:663:VAL:HG13	1:A:709:MET:CE	2.40	0.51
1:A:5:ARG:HH11	1:A:5:ARG:HG3	1.76	0.51
1:A:545:ASN:C	1:A:579:PRO:HG3	2.36	0.51
1:A:519:ASP:HB2	1:A:540:ARG:HB3	1.93	0.51
1:A:35:VAL:HB	1:A:36:PRO:CA	2.41	0.51
1:A:143:ARG:HH11	1:A:143:ARG:CB	2.18	0.51
1:A:527:ALA:HB2	1:A:533:PHE:HB3	1.93	0.50
1:B:45:LEU:HD22	1:B:88:PHE:HB3	1.93	0.50
1:A:512:MET:C	1:A:514:SER:N	2.67	0.49
1:B:30:GLU:O	1:B:168:GLY:HA3	2.12	0.49
1:B:86:ILE:CD1	1:B:144:LEU:HD12	2.42	0.49
1:A:107:ARG:HD2	1:A:108:TYR:CZ	2.48	0.49
1:A:301:GLU:HG2	2:A:2273:HOH:O	2.13	0.49
1:B:511:VAL:HG12	1:B:512:MET:H	1.77	0.49
1:A:81:SER:HA	1:A:146:ILE:O	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:45:LEU:HD22	1:B:88:PHE:CG	2.49	0.48
1:B:107:ARG:O	1:B:107:ARG:HG2	2.13	0.48
1:A:509:GLU:CD	1:A:510:GLY:H	2.22	0.48
1:B:629:ILE:HD13	1:B:714:LEU:HD11	1.96	0.48
1:B:656:LEU:C	1:B:658:GLU:H	2.22	0.48
1:A:221:LYS:HG3	2:A:2266:HOH:O	2.13	0.47
1:B:588:LEU:HD22	1:B:588:LEU:N	2.29	0.47
1:A:247:MET:HE3	1:A:257:LYS:HG2	1.97	0.47
1:B:385:LEU:HD22	1:B:424:PHE:HB3	1.96	0.47
1:A:7:ALA:N	1:B:282:ILE:HD11	2.30	0.47
1:A:107:ARG:C	1:A:109:PRO:HD3	2.40	0.47
1:A:350:MET:HE3	1:A:350:MET:HB2	1.68	0.46
1:A:514:SER:C	1:A:516:SER:H	2.23	0.46
1:A:678:LYS:HB2	1:A:691:TRP:CE2	2.49	0.46
1:B:649:THR:HG22	1:B:692:GLU:CG	2.43	0.46
1:A:8:PHE:CE2	1:B:559:PHE:CD1	3.03	0.46
1:B:681:ARG:HA	1:B:681:ARG:CZ	2.45	0.46
1:B:439:LEU:HB2	1:B:456:ASP:HB3	1.97	0.46
1:A:40:ASN:HD22	1:A:40:ASN:N	1.98	0.46
1:A:600:GLU:OE1	1:A:715:ARG:HD2	2.16	0.46
1:B:247:MET:HE3	1:B:257:LYS:HG2	1.98	0.46
1:A:662:ASN:HD22	1:A:679:MET:HE1	1.80	0.46
1:B:352:ILE:HD11	1:B:439:LEU:HD22	1.98	0.46
1:B:154:VAL:HG21	1:B:184:PHE:CE2	2.51	0.45
1:A:529:LEU:HD21	1:A:656:LEU:CD2	2.46	0.45
1:B:702:HIS:ND1	1:B:702:HIS:C	2.74	0.45
1:B:55:GLU:HG3	1:B:57:TRP:CZ2	2.52	0.45
1:A:8:PHE:HE2	1:B:559:PHE:HD1	1.64	0.45
1:B:65:HIS:HD2	2:B:1810:HOH:O	1.99	0.45
1:B:223:ARG:NH2	2:B:1857:HOH:O	2.49	0.45
1:A:517:ASN:OD1	1:A:518:VAL:HG23	2.17	0.45
1:B:93:ASP:O	1:B:97:ASP:HB2	2.17	0.45
1:A:8:PHE:CE2	1:B:559:PHE:HD1	2.35	0.44
1:B:31:LEU:HA	1:B:167:TYR:O	2.16	0.44
1:A:171:ARG:HG2	1:A:172:THR:O	2.17	0.44
1:B:455:VAL:HB	1:B:512:MET:HG2	1.98	0.44
1:A:509:GLU:CD	1:A:510:GLY:N	2.75	0.44
1:A:540:ARG:HD2	1:A:582:PHE:CB	2.47	0.44
1:B:139:ASP:HB3	1:B:140:ARG:H	1.49	0.44
1:B:549:ILE:HD11	1:B:577:LEU:HD12	2.00	0.44
1:A:20:ASN:HD22	1:A:20:ASN:C	2.24	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:55:GLU:HG2	2:B:2103:HOH:O	2.17	0.44
1:A:513:LYS:C	1:A:515:ARG:N	2.76	0.44
1:B:588:LEU:HD22	1:B:588:LEU:H	1.83	0.44
1:B:29:VAL:HG12	1:B:31:LEU:HD12	2.00	0.43
1:B:107:ARG:C	1:B:109:PRO:HD3	2.43	0.43
1:B:591:ALA:O	1:B:595:MET:HG2	2.18	0.43
1:A:31:LEU:HD12	1:A:168:GLY:HA3	2.01	0.43
1:B:6:THR:O	1:B:7:ALA:HB3	2.19	0.43
1:B:654:ASN:O	1:B:686:ASN:HA	2.19	0.43
1:A:213:PHE:HD1	1:A:222:THR:HG22	1.83	0.43
1:A:540:ARG:NH1	1:A:582:PHE:HB3	2.34	0.43
1:B:666:HIS:O	1:B:707:ALA:HA	2.19	0.43
1:A:137:ARG:HD2	2:A:2315:HOH:O	2.18	0.43
1:A:310:ARG:HA	1:A:311:TYR:HA	1.83	0.43
1:B:184:PHE:HB3	1:B:193:VAL:HG21	1.99	0.43
1:B:565:LYS:HD2	1:B:599:LEU:HD21	2.01	0.43
1:B:472:ASP:OD2	1:B:704:LYS:NZ	2.52	0.42
1:B:632:ILE:HD11	1:B:709:MET:HB2	2.00	0.42
1:A:577:LEU:H	1:A:577:LEU:HD23	1.83	0.42
1:A:650:VAL:HB	1:A:691:TRP:HB3	2.01	0.42
1:A:12:ARG:HD2	2:A:2251:HOH:O	2.18	0.42
1:B:31:LEU:H	1:B:31:LEU:HD13	1.83	0.42
1:A:342:HIS:ND1	1:A:434:GLU:OE2	2.43	0.42
1:A:517:ASN:O	1:A:542:ASN:HB2	2.19	0.42
1:A:490:GLU:HG3	1:A:491:ARG:N	2.34	0.42
1:A:65:HIS:HD2	2:A:810:HOH:O	2.01	0.42
1:A:709:MET:HE2	1:A:710:SER:C	2.44	0.42
1:B:310:ARG:HA	1:B:311:TYR:HA	1.81	0.42
1:A:544:HIS:CD2	1:A:544:HIS:H	2.38	0.41
1:A:700:SER:HA	1:A:725:ILE:HB	2.02	0.41
1:B:511:VAL:HG12	1:B:512:MET:N	2.35	0.41
1:A:515:ARG:HH12	1:A:517:ASN:HB3	1.84	0.41
1:A:580:LEU:HD22	1:A:580:LEU:N	2.34	0.41
1:A:541:ASN:O	1:A:580:LEU:HA	2.21	0.41
1:B:171:ARG:HG2	1:B:172:THR:O	2.20	0.41
1:B:671:GLY:HA2	1:B:698:TRP:NE1	2.36	0.41
1:A:282:ILE:HD12	1:B:7:ALA:HB2	2.03	0.41
1:B:187:TRP:CE2	1:B:201:ARG:HD3	2.56	0.41
1:B:650:VAL:HB	1:B:691:TRP:HB3	2.02	0.41
1:A:143:ARG:HH11	1:A:143:ARG:CG	2.33	0.41
1:A:565:LYS:HD2	1:A:599:LEU:HD21	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:634:ILE:O	1:A:721:LEU:HD22	2.21	0.41
1:A:54:LYS:HB3	1:A:74:LEU:HD13	2.03	0.41
1:A:727:ARG:NH1	1:A:727:ARG:HB3	2.35	0.41
1:B:639:THR:O	1:B:640:GLN:HB2	2.21	0.41
1:A:6:THR:O	1:A:7:ALA:HB2	2.20	0.40
1:B:165:THR:CG2	1:B:170:LEU:HD22	2.51	0.40
1:B:646:MET:HE2	1:B:646:MET:HB3	1.87	0.40
1:B:200:GLU:HG2	1:B:469:ILE:HD11	2.03	0.40
1:A:724:GLN:HE21	1:A:724:GLN:HB2	1.70	0.40
1:B:31:LEU:H	1:B:31:LEU:CD1	2.34	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	718/731 (98%)	680 (95%)	32 (4%)	6 (1%)	16	12
1	B	715/731 (98%)	679 (95%)	34 (5%)	2 (0%)	36	36
All	All	1433/1462 (98%)	1359 (95%)	66 (5%)	8 (1%)	21	18

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	8	PHE
1	A	35	VAL
1	A	6	THR
1	A	7	ALA
1	B	470	GLY
1	B	7	ALA
1	A	513	LYS
1	A	511	VAL

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	636/644 (99%)	607 (95%)	29 (5%)	24	25
1	B	633/644 (98%)	608 (96%)	25 (4%)	28	31
All	All	1269/1288 (98%)	1215 (96%)	54 (4%)	26	27

All (54) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	LEU
1	A	31	LEU
1	A	32	GLN
1	A	35	VAL
1	A	40	ASN
1	A	41	LEU
1	A	46	ASN
1	A	58	ASP
1	A	126	GLN
1	A	140	ARG
1	A	143	ARG
1	A	170	LEU
1	A	223	ARG
1	A	340	SER
1	A	350	MET
1	A	363	LYS
1	A	484	GLN
1	A	490	GLU
1	A	509	GLU
1	A	515	ARG
1	A	517	ASN
1	A	529	LEU
1	A	535	LEU
1	A	625	THR
1	A	639	THR
1	A	642	VAL
1	A	679	MET

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Mol	Chain	Res	Type
1	A	681	ARG
1	A	726	GLN
1	B	31	LEU
1	B	43	GLU
1	B	46	ASN
1	B	59	THR
1	B	100	ARG
1	B	126	GLN
1	B	139	ASP
1	B	170	LEU
1	B	195	LEU
1	B	223	ARG
1	B	289	PRO
1	B	490	GLU
1	B	506	LEU
1	B	511	VAL
1	B	513	LYS
1	B	535	LEU
1	B	540	ARG
1	B	587	VAL
1	B	588	LEU
1	B	625	THR
1	B	639	THR
1	B	641	VAL
1	B	681	ARG
1	B	702	HIS
1	B	726	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	40	ASN
1	A	46	ASN
1	A	65	HIS
1	A	126	GLN
1	A	218	ASN
1	A	267	ASN
1	A	313	GLN
1	A	450	HIS
1	A	484	GLN
1	A	487	GLN
1	A	526	ASN

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Mol	Chain	Res	Type
1	A	544	HIS
1	A	590	GLN
1	A	640	GLN
1	A	662	ASN
1	A	724	GLN
1	B	65	HIS
1	B	110	GLN
1	B	126	GLN
1	B	468	GLN
1	B	507	ASN
1	B	526	ASN
1	B	662	ASN
1	B	724	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](#)

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

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	722/731 (98%)	-0.12	23 (3%) 50 53	16, 34, 72, 96	0
1	B	719/731 (98%)	-0.08	17 (2%) 59 62	19, 37, 68, 92	0
All	All	1441/1462 (98%)	-0.10	40 (2%) 55 57	16, 35, 71, 96	0

All (40) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	36	PRO	5.5
1	B	34	VAL	5.1
1	B	33	GLY	4.8
1	A	36	PRO	4.6
1	A	6	THR	4.2
1	B	164	TRP	3.7
1	B	35	VAL	3.7
1	A	8	PHE	3.5
1	B	8	PHE	3.5
1	A	547	TYR	3.4
1	B	512	MET	3.2
1	B	588	LEU	3.2
1	B	7	ALA	3.1
1	A	511	VAL	3.1
1	A	39	VAL	2.9
1	A	582	PHE	2.8
1	A	544	HIS	2.7
1	A	513	LYS	2.7
1	A	512	MET	2.6
1	A	7	ALA	2.6
1	B	167	TYR	2.5
1	B	681	ARG	2.5
1	A	516	SER	2.4
1	B	6	THR	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	559	PHE	2.4
1	A	514	SER	2.3
1	A	285	TYR	2.3
1	A	510	GLY	2.3
1	A	573	PHE	2.3
1	B	641	VAL	2.3
1	A	694	VAL	2.2
1	A	650	VAL	2.2
1	B	645	ASP	2.2
1	A	518	VAL	2.1
1	B	31	LEU	2.1
1	A	40	ASN	2.1
1	A	639	THR	2.1
1	B	41	LEU	2.0
1	A	680	PHE	2.0
1	A	269	LYS	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.