



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 09:54 PM UTC

PDB ID : 8YM5 / pdb_00008ym5
Title : Structure of Caspase-8/cFLIP death effector domain assembly
Authors : Lin, S.-C.; Yang, C.-Y.
Deposited on : 2024-03-08
Resolution : 2.09 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

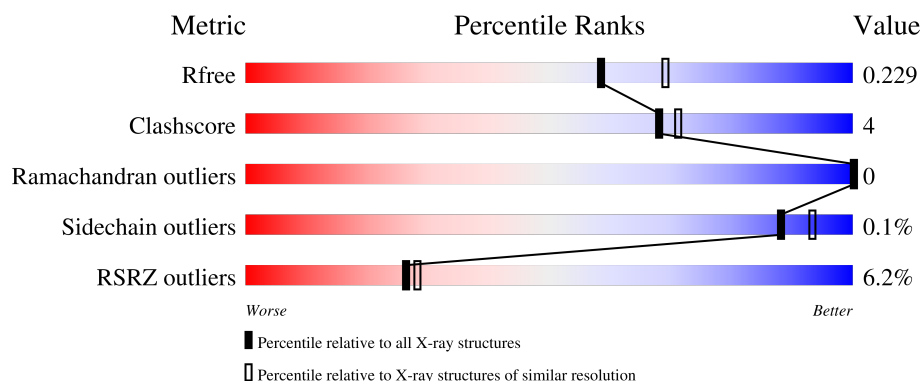
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.09 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	185	8% 87% 10% .
1	B	185	5% 87% 11% .
1	C	185	3% 93% 6% .
1	D	185	3% 94% 6% .
2	F	184	8% 83% 9% 9%

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Mol	Chain	Length	Quality of chain
2	G	184	9% 84% 9% 7%
2	H	184	5% 82% 13% 5%
2	I	184	5% 85% 6% 9%
2	J	184	8% 86% 8% 6%
2	K	184	4% 86% 10%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 14889 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 Caspase-8.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	C	184	Total	C	N	O	S	Se	0	0	0
			1528	967	258	294	2	7			
1	B	182	Total	C	N	O	S	Se	0	0	0
			1510	956	255	290	2	7			
1	D	184	Total	C	N	O	S	Se	0	0	0
			1531	968	261	294	2	6			
1	A	179	Total	C	N	O	S	Se	0	0	0
			1485	939	252	286	2	6			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	122	GLY	PHE	engineered mutation	UNP Q14790
C	123	GLY	LEU	engineered mutation	UNP Q14790
B	122	GLY	PHE	engineered mutation	UNP Q14790
B	123	GLY	LEU	engineered mutation	UNP Q14790
D	122	GLY	PHE	engineered mutation	UNP Q14790
D	123	GLY	LEU	engineered mutation	UNP Q14790
A	122	GLY	PHE	engineered mutation	UNP Q14790
A	123	GLY	LEU	engineered mutation	UNP Q14790

- Molecule 2 is a protein called CASP8 and FADD-like apoptosis regulator subunit p43.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	H	175	Total	C	N	O	S	Se	0	0	0
			1418	902	245	263	2	6			
2	G	171	Total	C	N	O	S	Se	0	0	0
			1386	882	240	256	2	6			
2	F	168	Total	C	N	O	S	Se	0	0	0
			1364	867	237	253	2	5			
2	K	176	Total	C	N	O	S	Se	0	0	0
			1428	908	248	264	2	6			

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	I	168	Total	C	N	O	S	Se	0	0	0
			1368	869	236	255	2	6			
2	J	173	Total	C	N	O	S	Se	0	0	0
			1403	893	242	260	2	6			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
H	-2	GLY	-	expression tag	UNP O15519
H	-1	SER	-	expression tag	UNP O15519
H	0	HIS	-	expression tag	UNP O15519
H	7	GLY	HIS	engineered mutation	UNP O15519
G	-2	GLY	-	expression tag	UNP O15519
G	-1	SER	-	expression tag	UNP O15519
G	0	HIS	-	expression tag	UNP O15519
G	7	GLY	HIS	engineered mutation	UNP O15519
F	-2	GLY	-	expression tag	UNP O15519
F	-1	SER	-	expression tag	UNP O15519
F	0	HIS	-	expression tag	UNP O15519
F	7	GLY	HIS	engineered mutation	UNP O15519
K	-2	GLY	-	expression tag	UNP O15519
K	-1	SER	-	expression tag	UNP O15519
K	0	HIS	-	expression tag	UNP O15519
K	7	GLY	HIS	engineered mutation	UNP O15519
I	-2	GLY	-	expression tag	UNP O15519
I	-1	SER	-	expression tag	UNP O15519
I	0	HIS	-	expression tag	UNP O15519
I	7	GLY	HIS	engineered mutation	UNP O15519
J	-2	GLY	-	expression tag	UNP O15519
J	-1	SER	-	expression tag	UNP O15519
J	0	HIS	-	expression tag	UNP O15519
J	7	GLY	HIS	engineered mutation	UNP O15519

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	82	Total	O	0	0
			82	82		
3	B	59	Total	O	0	0
			59	59		
3	D	58	Total	O	0	0
			58	58		

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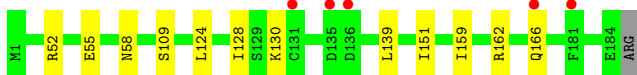
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	H	33	Total 33	O 33	0	0
3	G	25	Total 25	O 25	0	0
3	F	19	Total 19	O 19	0	0
3	K	59	Total 59	O 59	0	0
3	I	39	Total 39	O 39	0	0
3	J	62	Total 62	O 62	0	0
3	A	32	Total 32	O 32	0	0

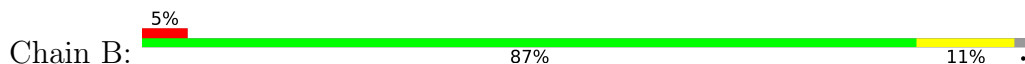
3 Residue-property plots [i](#)

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: Caspase-8



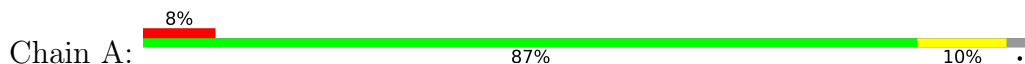
- Molecule 1: Caspase-8



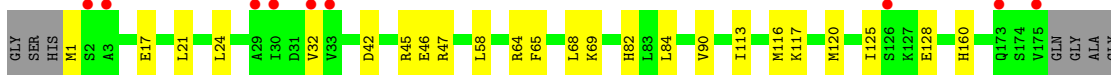
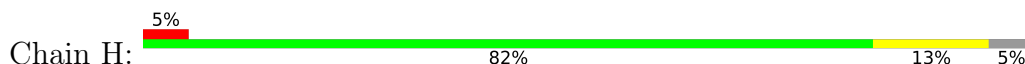
- Molecule 1: Caspase-8



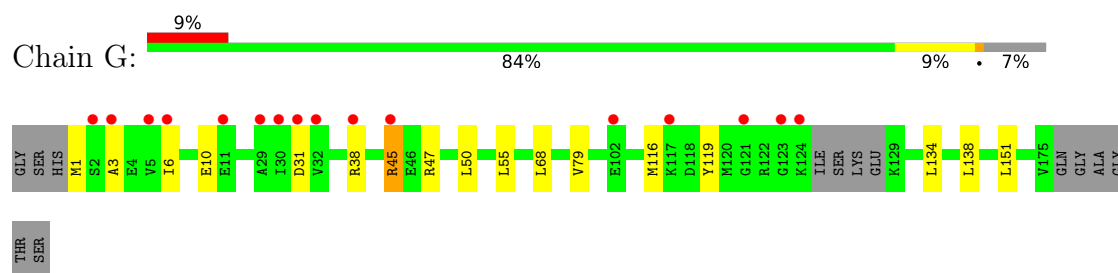
- Molecule 1: Caspase-8



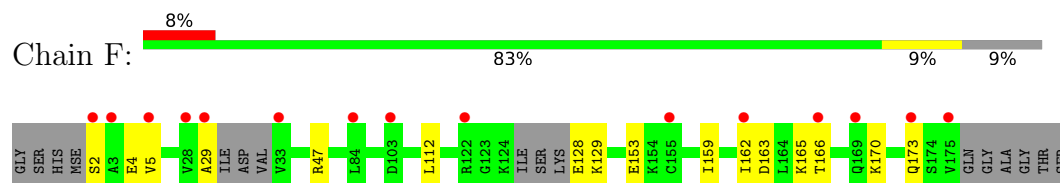
- Molecule 2: CASP8 and FADD-like apoptosis regulator subunit p43



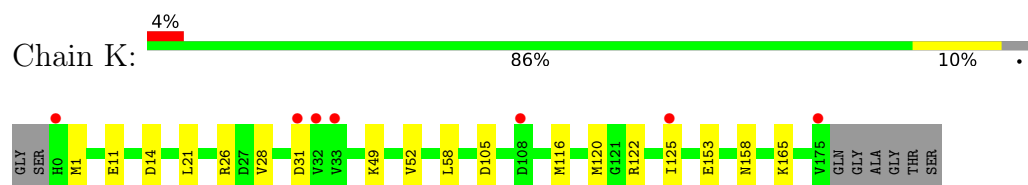
- Molecule 2: CASP8 and FADD-like apoptosis regulator subunit p43



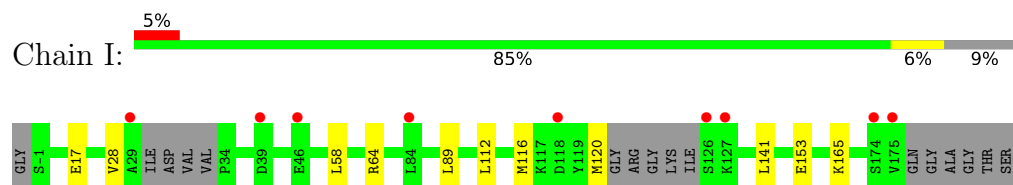
- Molecule 2: CASP8 and FADD-like apoptosis regulator subunit p43



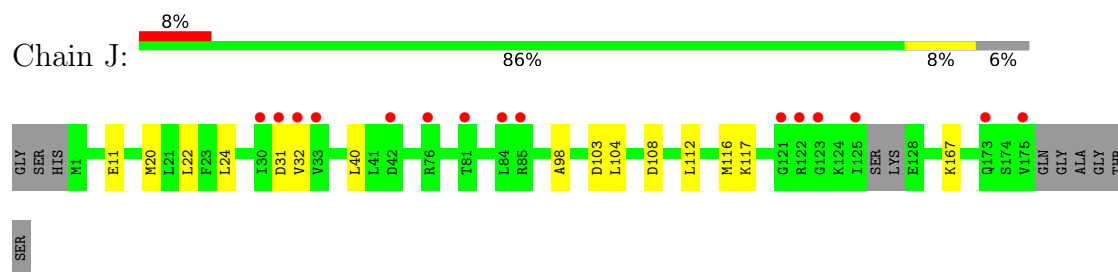
- Molecule 2: CASP8 and FADD-like apoptosis regulator subunit p43



- Molecule 2: CASP8 and FADD-like apoptosis regulator subunit p43



- Molecule 2: CASP8 and FADD-like apoptosis regulator subunit p43



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	82.15Å 166.22Å 179.41Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	32.88 – 2.09 32.88 – 2.09	Depositor EDS
% Data completeness (in resolution range)	98.5 (32.88-2.09) 98.5 (32.88-2.09)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.03 (at 2.08Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.194 , 0.231 0.193 , 0.229	Depositor DCC
R_{free} test set	7327 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	30.5	Xtriage
Anisotropy	0.771	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 45.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	14889	wwPDB-VP
Average B, all atoms (Å ²)	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.57% 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	0.36	0/1494	0.58	0/1987
1	B	0.41	0/1520	0.55	0/2021
1	C	0.46	0/1538	0.58	0/2044
1	D	0.48	0/1541	0.64	0/2048
2	F	0.29	0/1371	0.43	0/1828
2	G	0.36	0/1394	0.55	1/1861 (0.1%)
2	H	0.32	0/1427	0.49	0/1906
2	I	0.34	0/1375	0.50	0/1831
2	J	0.38	0/1411	0.57	0/1884
2	K	0.36	0/1437	0.50	0/1918
All	All	0.38	0/14508	0.54	1/19328 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	45	ARG	CB-CA-C	-5.04	102.96	110.88

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	1485	0	1525	16	0
1	B	1510	0	1551	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	1528	0	1570	8	0
1	D	1531	0	1571	7	0
2	F	1364	0	1436	9	0
2	G	1386	0	1467	11	0
2	H	1418	0	1503	21	0
2	I	1368	0	1438	6	0
2	J	1403	0	1484	10	0
2	K	1428	0	1510	12	0
3	A	32	0	0	1	0
3	B	59	0	0	0	0
3	C	82	0	0	1	0
3	D	58	0	0	0	0
3	F	19	0	0	0	0
3	G	25	0	0	0	0
3	H	33	0	0	2	0
3	I	39	0	0	0	0
3	J	62	0	0	0	0
3	K	59	0	0	2	0
All	All	14889	0	15055	105	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 4.

All (105) 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:J:20:MSE:HE2	2:J:24:LEU:HD11	1.55	0.89
2:G:10:GLU:HG3	2:G:38:ARG:HG3	1.57	0.85
2:G:68:LEU:HD21	2:G:79:VAL:HG21	1.71	0.72
2:H:117:LYS:HE3	2:H:125:ILE:HG23	1.72	0.71
1:A:81:THR:HG21	1:A:86:MSE:HE3	1.72	0.71
2:K:1:MSE:HE1	2:K:52:VAL:HA	1.74	0.68
1:A:109:SER:HA	1:A:139:LEU:HD23	1.74	0.68
2:G:116:MSE:HG3	2:G:134:LEU:HD11	1.78	0.65
1:B:146:MSE:HE2	1:B:152:LEU:HB2	1.80	0.63
2:H:117:LYS:CE	2:H:125:ILE:HG23	2.28	0.63
2:H:117:LYS:HB2	3:H:222:HOH:O	1.98	0.62
2:I:120:MSE:HE3	2:I:141:LEU:HD12	1.80	0.62
2:F:29:ALA:HB3	2:F:47:ARG:HH12	1.64	0.62
1:A:40:ASP:OD2	1:A:42:LEU:HB2	1.99	0.62
2:G:1:MSE:HE1	2:G:55:LEU:HB2	1.82	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:I:112:LEU:O	2:I:116:MSE:HG3	2.00	0.61
1:C:52:ARG:HD3	3:C:278:HOH:O	2.00	0.60
2:I:153:GLU:HG3	2:I:165:LYS:HG3	1.82	0.60
1:B:18:ASP:OD2	1:B:71:ARG:NH1	2.34	0.60
1:D:83:LYS:HE2	1:D:87:GLU:OE2	2.02	0.59
2:H:42:ASP:O	2:H:46:GLU:HG3	2.04	0.58
2:J:31:ASP:OD2	2:J:32:VAL:HG13	2.04	0.57
2:H:69:LYS:HD3	1:A:52:ARG:HH11	1.69	0.57
1:A:81:THR:HG21	1:A:86:MSE:CE	2.33	0.57
1:C:52:ARG:HD2	1:C:55:GLU:OE2	2.07	0.55
2:H:117:LYS:CE	2:H:125:ILE:CG2	2.85	0.55
2:J:103:ASP:OD2	2:J:167:LYS:NZ	2.35	0.54
1:C:55:GLU:HG2	1:C:58:ASN:HB3	1.90	0.54
1:B:159:ILE:O	1:B:163:VAL:HG23	2.08	0.54
2:H:82:HIS:HE1	3:H:210:HOH:O	1.91	0.53
1:A:76:ILE:HG13	1:A:77:THR:N	2.24	0.53
2:H:117:LYS:HE3	2:H:125:ILE:CG2	2.37	0.53
2:J:112:LEU:O	2:J:116:MSE:HG3	2.09	0.53
2:G:31:ASP:OD1	2:G:47:ARG:NH2	2.41	0.53
2:H:21:LEU:HD11	2:H:58:LEU:HB3	1.92	0.52
1:B:45:PHE:O	1:B:49:GLN:HG3	2.10	0.52
1:D:92:THR:OG1	1:D:95:ARG:HG3	2.10	0.52
2:K:153:GLU:HG3	2:K:165:LYS:HG3	1.92	0.51
2:H:69:LYS:HD3	1:A:52:ARG:NH1	2.26	0.51
1:D:127:GLU:HG2	1:D:159:ILE:HD13	1.93	0.50
1:B:46:GLN:HE21	2:J:117:LYS:NZ	2.09	0.50
2:H:128:GLU:OE2	2:H:128:GLU:N	2.32	0.49
2:K:122:ARG:CZ	2:K:125:ILE:HD12	2.43	0.49
2:K:28:VAL:CG1	2:K:49:LYS:HD3	2.43	0.49
2:K:14:ASP:OD1	1:A:132:LYS:NZ	2.45	0.49
2:K:26:ARG:NH1	3:K:203:HOH:O	2.34	0.48
2:F:4:GLU:OE2	2:F:4:GLU:HA	2.13	0.47
1:D:155:GLY:C	1:D:156:LYS:HD2	2.39	0.47
2:F:170:LYS:O	2:F:173:GLN:HG3	2.13	0.47
2:H:117:LYS:HE2	2:H:125:ILE:CG2	2.45	0.47
1:D:151:ILE:HB	1:D:159:ILE:HD12	1.97	0.47
1:C:130:LYS:HB2	1:C:130:LYS:HE3	1.50	0.47
2:H:160:HIS:HE2	2:K:11:GLU:CD	2.23	0.46
2:K:116:MSE:O	2:K:120:MSE:HG3	2.16	0.46
1:A:125:GLN:HG2	1:A:133:LEU:HD12	1.97	0.46
1:B:34:LYS:HD2	1:B:47:ARG:HH21	1.80	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:1:MSE:HG3	2:H:45:ARG:NH1	2.31	0.46
2:F:163:ASP:N	2:F:163:ASP:OD1	2.49	0.46
2:G:1:MSE:HE1	2:G:55:LEU:CB	2.45	0.45
2:K:158:ASN:ND2	3:K:201:HOH:O	2.33	0.45
1:A:42:LEU:HD23	1:A:42:LEU:HA	1.73	0.45
2:F:162:ILE:O	2:F:166:THR:HG22	2.17	0.45
1:C:162:ARG:O	1:C:166:GLN:HG2	2.17	0.45
1:D:92:THR:OG1	1:D:95:ARG:CG	2.65	0.45
2:G:45:ARG:HG3	2:G:50:LEU:HD23	1.99	0.44
1:A:63:LYS:HD3	1:A:86:MSE:CE	2.48	0.44
2:H:116:MSE:HB3	2:H:120:MSE:HE3	1.99	0.44
2:G:116:MSE:HE3	2:G:138:LEU:HD11	1.99	0.44
2:J:104:LEU:HD22	2:J:108:ASP:HB3	1.99	0.44
2:H:32:VAL:HG23	2:H:47:ARG:HH22	1.83	0.44
2:F:128:GLU:HB3	2:F:129:LYS:H	1.52	0.44
2:H:113:ILE:O	2:H:117:LYS:HG2	2.17	0.43
1:A:124:LEU:HA	1:A:124:LEU:HD12	1.66	0.43
1:C:109:SER:HA	1:C:139:LEU:HD23	2.00	0.43
1:B:72:LEU:O	1:B:76:ILE:HG22	2.17	0.43
1:B:130:LYS:HD2	1:B:130:LYS:HA	1.72	0.43
1:A:124:LEU:HD21	1:A:146:MSE:HG3	2.01	0.43
1:A:158:ASP:HB2	3:A:226:HOH:O	2.17	0.43
2:K:31:ASP:O	2:J:11:GLU:HG3	2.18	0.43
2:J:31:ASP:OD1	2:J:31:ASP:N	2.49	0.43
1:A:124:LEU:HD21	1:A:146:MSE:CG	2.49	0.43
2:I:58:LEU:HD21	2:I:89:LEU:HD23	2.01	0.43
2:H:68:LEU:HD23	2:H:68:LEU:HA	1.87	0.42
2:G:45:ARG:CG	2:G:50:LEU:HD23	2.49	0.42
2:G:3:ALA:HA	2:G:6:ILE:HD13	2.00	0.42
2:J:22:LEU:HD23	2:J:40:LEU:HD22	2.01	0.42
1:B:134:ASP:HB3	1:B:136:ASP:OD1	2.19	0.42
2:F:2:SER:O	2:F:5:VAL:HG22	2.18	0.42
2:H:65:PHE:N	2:H:65:PHE:CD2	2.87	0.42
2:K:105:ASP:N	2:K:105:ASP:OD1	2.39	0.42
2:H:17:GLU:OE1	2:H:64:ARG:HD3	2.19	0.42
2:F:153:GLU:HG2	2:F:165:LYS:HG3	2.02	0.42
2:G:119:TYR:CE2	2:G:151:LEU:HD11	2.55	0.42
2:J:20:MSE:HE3	2:J:98:ALA:CB	2.50	0.42
1:A:137:MSE:HE2	1:A:141:ASP:HB3	2.03	0.41
2:I:28:VAL:HG11	2:I:89:LEU:HG	2.02	0.41
1:B:55:GLU:HG2	1:B:58:ASN:HB3	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:124:LEU:HD13	1:C:128:ILE:HD12	2.02	0.41
1:D:146:MSE:HE2	1:D:152:LEU:HB2	2.03	0.41
2:H:24:LEU:HD22	2:H:90:VAL:HG11	2.02	0.41
2:F:112:LEU:HG	2:F:159:ILE:HD13	2.02	0.41
1:C:151:ILE:HB	1:C:159:ILE:HD12	2.03	0.41
2:I:17:GLU:OE2	2:I:64:ARG:HD3	2.22	0.40
2:K:21:LEU:HD21	2:K:58:LEU:HB3	2.02	0.40
1:B:109:SER:HA	1:B:139:LEU:HD23	2.03	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	177/185 (96%)	173 (98%)	4 (2%)	0	100	100
1	B	180/185 (97%)	176 (98%)	4 (2%)	0	100	100
1	C	182/185 (98%)	178 (98%)	4 (2%)	0	100	100
1	D	182/185 (98%)	180 (99%)	2 (1%)	0	100	100
2	F	162/184 (88%)	158 (98%)	4 (2%)	0	100	100
2	G	167/184 (91%)	164 (98%)	3 (2%)	0	100	100
2	H	173/184 (94%)	168 (97%)	5 (3%)	0	100	100
2	I	162/184 (88%)	158 (98%)	4 (2%)	0	100	100
2	J	169/184 (92%)	164 (97%)	5 (3%)	0	100	100
2	K	174/184 (95%)	169 (97%)	5 (3%)	0	100	100
All	All	1728/1844 (94%)	1688 (98%)	40 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	168/167 (101%)	168 (100%)	0	100	100
1	B	171/167 (102%)	170 (99%)	1 (1%)	78	86
1	C	173/167 (104%)	173 (100%)	0	100	100
1	D	173/167 (104%)	173 (100%)	0	100	100
2	F	155/161 (96%)	155 (100%)	0	100	100
2	G	158/161 (98%)	158 (100%)	0	100	100
2	H	162/161 (101%)	161 (99%)	1 (1%)	78	86
2	I	157/161 (98%)	157 (100%)	0	100	100
2	J	160/161 (99%)	160 (100%)	0	100	100
2	K	163/161 (101%)	163 (100%)	0	100	100
All	All	1640/1634 (100%)	1638 (100%)	2 (0%)	88	93

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	125	GLN
2	H	84	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	6	ASN
1	B	46	GLN
1	B	97	GLN
1	B	125	GLN
2	H	86	ASN
2	G	82	HIS
2	G	86	ASN
2	G	158	ASN
2	G	169	GLN

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Mol	Chain	Res	Type
2	F	8	GLN
2	I	169	GLN
2	J	8	GLN
2	J	142	ASN
1	A	32	GLN
1	A	46	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	173/185 (93%)	0.63	14 (8%) 18 19	27, 49, 94, 112	0
1	B	175/185 (94%)	0.31	10 (5%) 29 31	20, 40, 80, 106	0
1	C	177/185 (95%)	-0.04	5 (2%) 55 57	19, 31, 59, 93	0
1	D	178/185 (96%)	0.20	6 (3%) 48 50	23, 37, 67, 85	0
2	F	163/184 (88%)	0.73	15 (9%) 14 15	31, 51, 82, 100	0
2	G	165/184 (89%)	0.57	16 (9%) 13 14	29, 44, 82, 104	0
2	H	169/184 (91%)	0.50	9 (5%) 32 34	31, 47, 81, 93	0
2	I	162/184 (88%)	0.41	9 (5%) 30 32	30, 44, 80, 100	0
2	J	167/184 (90%)	0.32	15 (8%) 15 16	21, 39, 71, 93	0
2	K	170/184 (92%)	0.14	7 (4%) 41 43	24, 36, 59, 84	0
All	All	1699/1844 (92%)	0.37	106 (6%) 26 28	19, 42, 80, 112	0

All (106) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	128	ILE	6.2
1	A	131	CYS	5.7
2	I	29	ALA	5.4
2	F	175	VAL	5.4
2	H	30	ILE	4.9
2	I	126	SER	4.9
1	A	180	GLU	4.6
1	B	181	PHE	4.3
1	A	133	LEU	4.2
2	G	30	ILE	4.2
2	H	175	VAL	4.2
2	J	32	VAL	4.2
2	F	2	SER	4.1

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Mol	Chain	Res	Type	RSRZ
2	I	127	LYS	4.0
2	H	2	SER	3.9
2	I	175	VAL	3.9
2	F	33	VAL	3.8
2	H	29	ALA	3.6
1	B	172	LEU	3.6
2	I	84	LEU	3.6
2	G	6	ILE	3.5
2	G	32	VAL	3.5
2	J	76	ARG	3.5
2	J	125	ILE	3.4
1	A	130	LYS	3.4
2	K	0	HIS	3.4
2	G	29	ALA	3.4
2	G	123	GLY	3.3
2	F	29	ALA	3.3
1	D	138	ASN	3.3
2	F	5	VAL	3.3
2	K	31	ASP	3.3
1	A	125	GLN	3.3
2	G	38	ARG	3.2
2	F	162	ILE	3.2
2	J	121	GLY	3.2
2	G	117	LYS	3.2
2	F	28	VAL	3.2
2	H	3	ALA	3.1
2	F	3	ALA	3.1
1	B	169	LYS	3.1
2	J	30	ILE	3.1
2	J	175	VAL	3.0
2	F	103	ASP	2.9
2	H	33	VAL	2.9
2	K	108	ASP	2.9
2	K	33	VAL	2.8
1	A	172	LEU	2.8
2	F	155	CYS	2.8
2	J	122	ARG	2.8
1	C	135	ASP	2.8
2	F	84	LEU	2.8
2	J	173	GLN	2.7
2	F	166	THR	2.7
2	G	102	GLU	2.7

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Mol	Chain	Res	Type	RSRZ
2	F	169	GLN	2.7
2	J	33	VAL	2.7
2	H	32	VAL	2.7
2	G	5	VAL	2.7
1	B	130	LYS	2.7
1	B	123	GLY	2.7
2	G	3	ALA	2.6
1	D	93	PRO	2.6
2	G	124	LYS	2.6
2	G	11	GLU	2.6
2	H	126	SER	2.6
1	C	181	PHE	2.5
1	C	131	CYS	2.5
1	B	131	CYS	2.5
2	G	2	SER	2.4
1	A	129	SER	2.4
1	A	154	GLU	2.4
2	J	31	ASP	2.4
1	B	136	ASP	2.4
2	K	32	VAL	2.3
2	K	175	VAL	2.3
1	A	163	VAL	2.3
2	G	31	ASP	2.3
1	D	131	CYS	2.3
2	J	84	LEU	2.3
2	K	125	ILE	2.2
1	D	92	THR	2.2
1	A	134	ASP	2.2
2	J	42	ASP	2.2
2	G	45	ARG	2.2
2	F	122	ARG	2.2
2	G	121	GLY	2.2
1	A	136	ASP	2.2
2	I	118	ASP	2.2
1	B	114	ARG	2.1
1	A	124	LEU	2.1
2	I	39	ASP	2.1
2	F	173	GLN	2.1
2	J	123	GLY	2.1
1	B	165	ALA	2.1
2	I	174	SER	2.1
1	C	136	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	166	GLN	2.1
1	D	94	GLY	2.1
1	A	132	LYS	2.1
1	B	164	CYS	2.1
2	I	46	GLU	2.1
2	J	85	ARG	2.1
1	D	5	ARG	2.0
2	H	173	GLN	2.0
2	J	81	THR	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.