Full wwPDB X-ray Structure Validation Report ⓘ

Apr 29, 2025 – 08:24 AM EDT

PDB ID	:	3CJH / pdb_00003cjh
Title	:	Tim8-Tim13 complex
Authors	:	Sawaya, M.R.; Schmid, E.; Beverly, K.N.; Koehler, C.M.
Deposited on	:	2008-03-12
Resolution	:	2.60 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:

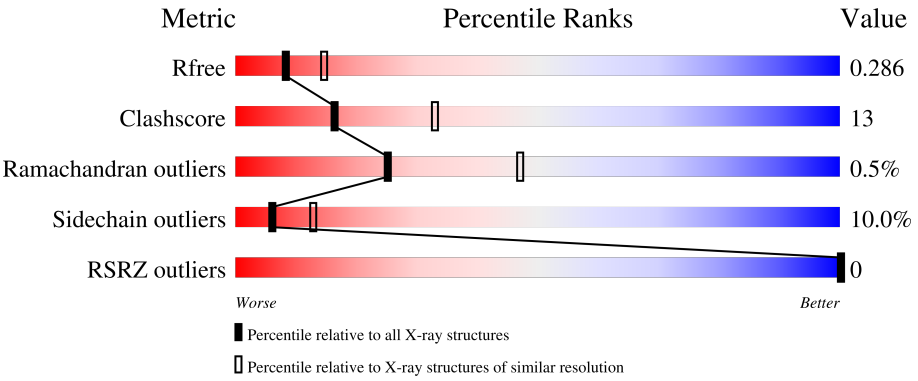
MolProbity	:	4-5-2 with Phenix2.0rc1
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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}	164625	3775 (2.60-2.60)
Clashscore	180529	4181 (2.60-2.60)
Ramachandran outliers	177936	4129 (2.60-2.60)
Sidechain outliers	177891	4129 (2.60-2.60)
RSRZ outliers	164620	3775 (2.60-2.60)

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 <=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	64	59% 17% 5% 19%
1	C	64	67% 11% • 19%
1	E	64	61% 19% • 19%
1	G	64	61% 17% • 19%
1	I	64	59% 23% • 16%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	K	64	
2	B	64	
2	D	64	
2	F	64	
2	H	64	
2	J	64	
2	L	64	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 5279 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 Mitochondrial import inner membrane translocase subunit TIM13.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	52	Total	C	N	O	S	0	0	0
			416	260	72	79	5			
1	C	52	Total	C	N	O	S	0	0	0
			416	260	72	79	5			
1	E	52	Total	C	N	O	S	0	0	0
			416	260	72	79	5			
1	G	52	Total	C	N	O	S	0	0	0
			416	260	72	79	5			
1	I	54	Total	C	N	O	S	0	0	0
			426	266	74	81	5			
1	K	52	Total	C	N	O	S	0	0	0
			416	260	72	79	5			

- Molecule 2 is a protein called Mitochondrial import inner membrane translocase subunit TIM8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	59	Total	C	N	O	S	0	0	0
			465	282	85	93	5			
2	D	55	Total	C	N	O	S	0	0	0
			436	266	79	86	5			
2	F	58	Total	C	N	O	S	0	0	0
			458	278	84	91	5			
2	H	58	Total	C	N	O	S	0	0	0
			460	279	84	92	5			
2	J	57	Total	C	N	O	S	0	0	0
			453	275	83	90	5			
2	L	58	Total	C	N	O	S	0	0	0
			460	279	84	92	5			

- Molecule 3 is water.

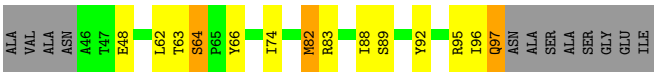
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	2	Total O 2 2	0	0
3	B	3	Total O 3 3	0	0
3	C	2	Total O 2 2	0	0
3	D	3	Total O 3 3	0	0
3	E	5	Total O 5 5	0	0
3	F	3	Total O 3 3	0	0
3	G	4	Total O 4 4	0	0
3	H	3	Total O 3 3	0	0
3	I	5	Total O 5 5	0	0
3	J	7	Total O 7 7	0	0
3	K	2	Total O 2 2	0	0
3	L	2	Total O 2 2	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.

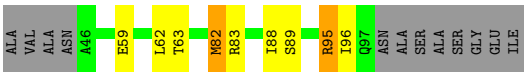
• Molecule 1: Mitochondrial import inner membrane translocase subunit TIM13

Chain A:



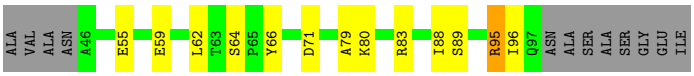
• Molecule 1: Mitochondrial import inner membrane translocase subunit TIM13

Chain C:



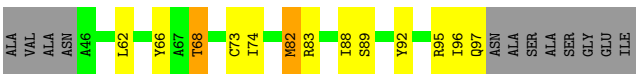
• Molecule 1: Mitochondrial import inner membrane translocase subunit TIM13

Chain E:



• Molecule 1: Mitochondrial import inner membrane translocase subunit TIM13

Chain G:

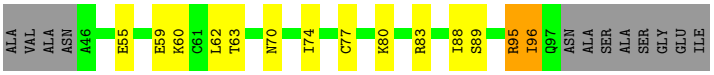


• Molecule 1: Mitochondrial import inner membrane translocase subunit TIM13

Chain I:

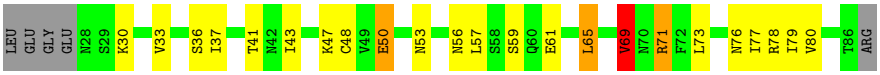
• Molecule 1: Mitochondrial import inner membrane translocase subunit TIM13

Chain K:



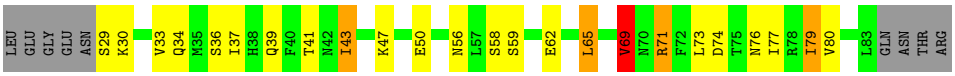
• Molecule 2: Mitochondrial import inner membrane translocase subunit TIM8

Chain B:



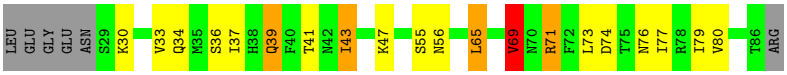
• Molecule 2: Mitochondrial import inner membrane translocase subunit TIM8

Chain D:



• Molecule 2: Mitochondrial import inner membrane translocase subunit TIM8

Chain F:

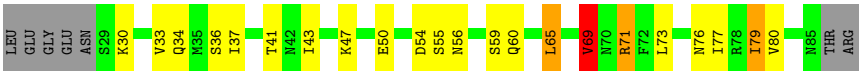


• Molecule 2: Mitochondrial import inner membrane translocase subunit TIM8

Chain H:

• Molecule 2: Mitochondrial import inner membrane translocase subunit TIM8

Chain J:



• Molecule 2: Mitochondrial import inner membrane translocase subunit TIM8

Chain L:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	55.66Å 56.30Å 59.84Å 89.18° 89.65° 60.30°	Depositor
Resolution (Å)	19.94 – 2.60 19.94 – 2.60	Depositor EDS
% Data completeness (in resolution range)	75.7 (19.94-2.60) 75.6 (19.94-2.60)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	5.87 (at 2.59Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.244 , 0.289 0.246 , 0.286	Depositor DCC
R_{free} test set	777 reflections (5.12%)	wwPDB-VP
Wilson B-factor (Å^2)	30.9	Xtriage
Anisotropy	0.246	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 49.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	0.011 for k,-h+k,l 0.011 for h-k,h,l 0.044 for -h+k,-h,l 0.044 for -k,h-k,l 0.439 for h,h-k,-l 0.046 for -k,-h,-l 0.028 for -h,-k,l 0.039 for -h+k,k,-l 0.013 for h-k,-k,-l 0.028 for -h,-h+k,-l 0.012 for k,h,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	5279	wwPDB-VP
Average B, all atoms (Å^2)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.99% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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	A	0.93	1/422 (0.2%)	1.07	1/569 (0.2%)
1	C	0.75	0/422	0.98	0/569
1	E	0.73	0/422	0.99	0/569
1	G	0.73	0/422	0.96	0/569
1	I	0.79	0/432	0.98	0/583
1	K	0.72	0/422	0.96	0/569
2	B	0.76	0/468	1.06	1/628 (0.2%)
2	D	0.82	0/439	1.04	1/588 (0.2%)
2	F	0.83	1/461 (0.2%)	1.05	1/618 (0.2%)
2	H	0.74	0/463	1.01	0/621
2	J	0.79	0/456	1.09	1/611 (0.2%)
2	L	0.77	0/463	1.07	1/621 (0.2%)
All	All	0.78	2/5292 (0.0%)	1.02	6/7115 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	82	MET	SD-CE	11.64	2.08	1.79
2	F	39	GLN	C-O	-5.69	1.17	1.24

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	82	MET	CG-SD-CE	-9.59	79.81	100.90
2	L	69	VAL	CB-CA-C	-6.32	103.88	111.97
2	F	69	VAL	CB-CA-C	-5.89	104.44	111.97
2	J	69	VAL	CB-CA-C	-5.82	104.53	111.97
2	B	69	VAL	CB-CA-C	-5.52	104.90	111.97
2	D	69	VAL	CB-CA-C	-5.14	105.39	111.97

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	416	0	411	14	0
1	C	416	0	411	15	0
1	E	416	0	411	17	0
1	G	416	0	411	11	0
1	I	426	0	418	17	0
1	K	416	0	411	15	0
2	B	465	0	452	20	0
2	D	436	0	429	18	0
2	F	458	0	449	24	0
2	H	460	0	450	15	0
2	J	453	0	443	18	0
2	L	460	0	450	19	0
3	A	2	0	0	0	0
3	B	3	0	0	0	0
3	C	2	0	0	0	0
3	D	3	0	0	0	0
3	E	5	0	0	0	0
3	F	3	0	0	0	0
3	G	4	0	0	0	0
3	H	3	0	0	0	0
3	I	5	0	0	0	0
3	J	7	0	0	0	0
3	K	2	0	0	1	0
3	L	2	0	0	0	0
All	All	5279	0	5146	133	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 13.

All (133) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:82:MET:CE	1:A:82:MET:SD	2.08	1.41
2:B:30:LYS:O	2:B:33:VAL:HG12	1.74	0.88
1:A:82:MET:CE	1:A:82:MET:CG	2.56	0.83

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:66:TYR:OH	2:D:47:LYS:HD3	1.80	0.81
1:I:63:THR:HG22	1:I:64:SER:O	1.81	0.80
1:K:89:SER:HA	2:L:37:ILE:HD12	1.69	0.75
1:E:89:SER:HA	2:F:37:ILE:HD12	1.73	0.71
1:K:88:ILE:HD13	2:L:41:THR:HA	1.71	0.70
1:G:88:ILE:HD13	2:H:41:THR:HA	1.75	0.68
1:G:89:SER:HA	2:H:37:ILE:HD12	1.75	0.68
1:I:89:SER:HA	2:J:37:ILE:HD12	1.76	0.67
1:I:83:ARG:HH11	2:J:56:ASN:HA	1.59	0.67
1:E:88:ILE:HD13	2:F:41:THR:HA	1.77	0.67
1:K:95:ARG:NH2	2:L:74:ASP:OD1	2.28	0.66
2:B:47:LYS:HZ3	1:E:59:GLU:HG2	1.61	0.66
1:G:66:TYR:OH	2:J:47:LYS:HD3	1.97	0.65
1:I:83:ARG:NH1	2:J:56:ASN:HA	2.13	0.64
1:C:83:ARG:NH1	2:D:56:ASN:OD1	2.30	0.63
1:C:82:MET:HE3	1:C:82:MET:HA	1.79	0.63
1:C:83:ARG:HH11	2:D:56:ASN:HA	1.63	0.63
1:C:83:ARG:NH1	2:D:56:ASN:HA	2.16	0.61
1:E:83:ARG:HH11	2:F:56:ASN:HA	1.66	0.61
1:C:89:SER:HA	2:D:37:ILE:HD12	1.83	0.61
1:K:83:ARG:HH11	2:L:56:ASN:HA	1.66	0.60
1:I:59:GLU:HG2	2:L:47:LYS:HZ3	1.65	0.60
2:H:47:LYS:NZ	1:K:59:GLU:HG2	2.17	0.60
1:A:88:ILE:HD13	2:B:41:THR:HA	1.84	0.59
1:E:95:ARG:NH2	2:F:74:ASP:OD1	2.35	0.59
1:A:82:MET:CE	1:A:82:MET:HG3	2.32	0.59
1:A:89:SER:HA	2:B:37:ILE:HD12	1.83	0.59
2:H:71:ARG:HG3	1:K:62:LEU:HD13	1.83	0.59
1:C:62:LEU:HD13	2:F:71:ARG:HG3	1.84	0.59
2:B:47:LYS:NZ	1:E:59:GLU:HG2	2.18	0.59
1:K:60:LYS:HE2	3:K:107:HOH:O	2.03	0.58
1:I:62:LEU:HD13	2:L:71:ARG:HG3	1.84	0.58
1:C:96:ILE:CG2	1:C:96:ILE:O	2.51	0.58
1:K:83:ARG:NH1	2:L:56:ASN:HA	2.18	0.58
1:I:46:ALA:HB3	1:I:50:VAL:HG21	1.86	0.57
1:I:88:ILE:HD13	2:J:41:THR:HA	1.86	0.57
1:I:59:GLU:HG2	2:L:47:LYS:NZ	2.19	0.57
1:K:89:SER:HA	2:L:37:ILE:CD1	2.33	0.57
1:I:83:ARG:NH1	2:J:56:ASN:OD1	2.33	0.56
1:C:59:GLU:HG2	2:F:47:LYS:HZ3	1.71	0.56
1:G:92:TYR:CD2	2:H:37:ILE:HD11	2.41	0.55

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:89:SER:HA	2:J:37:ILE:CD1	2.37	0.55
1:E:79:ALA:HB3	2:F:55:SER:HB2	1.89	0.54
1:A:83:ARG:NH1	2:B:56:ASN:OD1	2.41	0.54
1:C:88:ILE:HD13	2:D:41:THR:HA	1.90	0.53
2:H:47:LYS:HZ3	1:K:59:GLU:HG2	1.74	0.53
2:F:39:GLN:O	2:F:39:GLN:HG3	2.08	0.53
1:C:63:THR:HG21	2:J:54:ASP:OD1	2.09	0.52
2:L:30:LYS:O	2:L:33:VAL:HG12	2.10	0.52
1:E:80:LYS:NZ	2:F:56:ASN:O	2.42	0.52
1:C:59:GLU:HG2	2:F:47:LYS:NZ	2.24	0.52
1:E:89:SER:HA	2:F:37:ILE:CD1	2.38	0.52
2:B:78:ARG:HE	1:E:71:ASP:HB3	1.75	0.51
1:G:82:MET:HE3	1:G:82:MET:HA	1.91	0.51
2:B:71:ARG:HG3	1:E:62:LEU:HD13	1.91	0.51
2:H:76:ASN:O	2:H:80:VAL:HG12	2.10	0.50
1:C:96:ILE:O	1:C:96:ILE:HG22	2.11	0.50
2:H:65:LEU:O	2:H:69:VAL:HG23	2.11	0.50
1:G:62:LEU:HD13	2:J:71:ARG:HG3	1.92	0.50
2:J:76:ASN:O	2:J:80:VAL:HG12	2.12	0.50
2:L:76:ASN:O	2:L:80:VAL:HG12	2.12	0.49
1:C:89:SER:HA	2:D:37:ILE:CD1	2.42	0.49
2:D:76:ASN:O	2:D:80:VAL:HG12	2.13	0.49
2:F:33:VAL:O	2:F:37:ILE:HG12	2.12	0.49
2:B:65:LEU:O	2:B:69:VAL:HG23	2.12	0.49
1:E:83:ARG:NH1	2:F:56:ASN:HA	2.28	0.49
2:B:53:ASN:HD21	1:G:73:CYS:HB2	1.79	0.48
1:I:84:SER:OG	2:J:65:LEU:HD21	2.14	0.48
1:E:79:ALA:CB	2:F:55:SER:HB2	2.44	0.47
2:L:65:LEU:O	2:L:69:VAL:HG23	2.14	0.47
1:I:93:ILE:C	1:I:95:ARG:H	2.21	0.47
2:B:50:GLU:CB	1:G:68:THR:HG21	2.45	0.47
2:B:57:LEU:HD22	2:B:61:GLU:HG3	1.95	0.47
2:J:33:VAL:HG13	2:J:34:GLN:N	2.30	0.47
1:A:96:ILE:C	1:A:97:GLN:HG2	2.40	0.47
2:H:30:LYS:O	2:H:33:VAL:HG12	2.15	0.47
1:I:88:ILE:HG12	2:J:69:VAL:HG22	1.97	0.47
2:B:76:ASN:O	2:B:80:VAL:HG12	2.14	0.46
2:J:59:SER:OG	2:J:60:GLN:N	2.48	0.46
1:K:80:LYS:NZ	2:L:56:ASN:O	2.46	0.46
1:C:88:ILE:HG12	2:D:69:VAL:HG22	1.98	0.46
1:I:64:SER:HA	1:I:66:TYR:CD1	2.50	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:76:ASN:O	2:F:80:VAL:HG12	2.15	0.46
2:J:30:LYS:O	2:J:33:VAL:HG12	2.16	0.46
2:F:65:LEU:O	2:F:69:VAL:HG23	2.15	0.45
1:K:96:ILE:O	1:K:96:ILE:HG13	2.16	0.45
2:D:65:LEU:O	2:D:69:VAL:HG23	2.17	0.45
2:F:33:VAL:CG1	2:F:34:GLN:N	2.80	0.45
2:J:73:LEU:O	2:J:77:ILE:HG13	2.17	0.45
1:A:83:ARG:NH1	2:B:56:ASN:HA	2.32	0.44
2:F:73:LEU:O	2:F:77:ILE:HG13	2.17	0.44
2:H:33:VAL:O	2:H:37:ILE:HG12	2.17	0.44
2:D:73:LEU:O	2:D:77:ILE:HG13	2.17	0.44
1:E:83:ARG:NH1	2:F:56:ASN:OD1	2.50	0.44
2:J:65:LEU:O	2:J:69:VAL:HG23	2.18	0.44
2:F:30:LYS:O	2:F:33:VAL:HG12	2.18	0.43
1:A:92:TYR:CD2	2:B:37:ILE:HD11	2.53	0.43
2:B:53:ASN:O	2:H:53:ASN:O	2.36	0.43
1:C:95:ARG:HH22	2:D:74:ASP:CG	2.27	0.43
2:F:33:VAL:HG13	2:F:34:GLN:N	2.33	0.42
1:G:74:ILE:CG2	2:J:79:ILE:CD1	2.97	0.42
1:A:62:LEU:HD13	2:D:71:ARG:HG3	2.01	0.42
2:D:58:SER:O	2:D:62:GLU:HB2	2.19	0.42
1:G:89:SER:HA	2:H:37:ILE:CD1	2.48	0.42
2:H:33:VAL:CG1	2:H:34:GLN:N	2.81	0.42
1:I:66:TYR:O	2:L:67:ASN:HB3	2.19	0.42
2:D:39:GLN:O	2:D:43:ILE:HG13	2.19	0.42
1:K:55:GLU:O	1:K:59:GLU:HG3	2.19	0.42
2:D:33:VAL:HG13	2:D:34:GLN:N	2.34	0.42
2:B:73:LEU:O	2:B:77:ILE:HG13	2.20	0.42
1:E:64:SER:HA	1:E:66:TYR:CD1	2.54	0.42
2:L:33:VAL:HG13	2:L:34:GLN:N	2.34	0.42
2:B:48:CYS:HB2	2:B:65:LEU:HD13	2.01	0.41
2:L:71:ARG:HD3	2:L:71:ARG:HA	1.90	0.41
1:A:64:SER:HA	1:A:66:TYR:N	2.35	0.41
2:H:57:LEU:HD22	2:H:61:GLU:HG3	2.01	0.41
2:B:71:ARG:HD3	2:B:71:ARG:HA	1.92	0.41
2:L:33:VAL:O	2:L:37:ILE:HG12	2.21	0.41
1:A:74:ILE:CG2	2:D:79:ILE:CD1	2.99	0.41
1:I:47:THR:O	1:I:49:LEU:N	2.53	0.41
2:F:39:GLN:O	2:F:43:ILE:HG13	2.21	0.41
1:K:70:ASN:O	1:K:74:ILE:HG12	2.21	0.41
1:K:77:CYS:N	2:L:52:VAL:HG11	2.36	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:55:GLU:O	1:E:59:GLU:HG3	2.21	0.40
1:G:83:ARG:NH1	2:H:56:ASN:HA	2.35	0.40
1:A:83:ARG:HH11	2:B:56:ASN:HA	1.85	0.40
2:D:29:SER:OG	2:D:30:LYS:N	2.55	0.40
2:F:71:ARG:HD3	2:F:71:ARG:HA	1.90	0.40
2:L:73:LEU:O	2:L:77:ILE:HG13	2.21	0.40
1:E:83:ARG:NH1	2:F:56:ASN:CG	2.80	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	A	50/64 (78%)	46 (92%)	4 (8%)	0	100 100
1	C	50/64 (78%)	48 (96%)	2 (4%)	0	100 100
1	E	50/64 (78%)	48 (96%)	1 (2%)	1 (2%)	6 12
1	G	50/64 (78%)	47 (94%)	3 (6%)	0	100 100
1	I	52/64 (81%)	47 (90%)	4 (8%)	1 (2%)	6 13
1	K	50/64 (78%)	47 (94%)	2 (4%)	1 (2%)	6 12
2	B	57/64 (89%)	52 (91%)	5 (9%)	0	100 100
2	D	53/64 (83%)	52 (98%)	1 (2%)	0	100 100
2	F	56/64 (88%)	55 (98%)	1 (2%)	0	100 100
2	H	56/64 (88%)	55 (98%)	1 (2%)	0	100 100
2	J	55/64 (86%)	53 (96%)	2 (4%)	0	100 100
2	L	56/64 (88%)	55 (98%)	1 (2%)	0	100 100
All	All	635/768 (83%)	605 (95%)	27 (4%)	3 (0%)	25 47

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	I	48	GLU
1	E	96	ILE
1	K	96	ILE

5.3.2 Protein sidechains (i)

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	47/54 (87%)	42 (89%)	5 (11%)	5 11
1	C	47/54 (87%)	45 (96%)	2 (4%)	25 49
1	E	47/54 (87%)	46 (98%)	1 (2%)	48 73
1	G	47/54 (87%)	42 (89%)	5 (11%)	5 11
1	I	47/54 (87%)	46 (98%)	1 (2%)	48 73
1	K	47/54 (87%)	45 (96%)	2 (4%)	25 49
2	B	57/62 (92%)	49 (86%)	8 (14%)	3 5
2	D	54/62 (87%)	46 (85%)	8 (15%)	2 4
2	F	57/62 (92%)	51 (90%)	6 (10%)	5 11
2	H	57/62 (92%)	48 (84%)	9 (16%)	2 3
2	J	56/62 (90%)	48 (86%)	8 (14%)	2 5
2	L	57/62 (92%)	50 (88%)	7 (12%)	4 8
All	All	620/696 (89%)	558 (90%)	62 (10%)	6 13

All (62) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	48	GLU
1	A	63	THR
1	A	64	SER
1	A	95	ARG
1	A	97	GLN
2	B	36	SER
2	B	43	ILE
2	B	50	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	B	59	SER
2	B	65	LEU
2	B	69	VAL
2	B	71	ARG
2	B	79	ILE
1	C	82	MET
1	C	95	ARG
2	D	36	SER
2	D	43	ILE
2	D	50	GLU
2	D	59	SER
2	D	65	LEU
2	D	69	VAL
2	D	71	ARG
2	D	79	ILE
1	E	95	ARG
2	F	36	SER
2	F	43	ILE
2	F	65	LEU
2	F	69	VAL
2	F	71	ARG
2	F	79	ILE
1	G	68	THR
1	G	82	MET
1	G	95	ARG
1	G	96	ILE
1	G	97	GLN
2	H	36	SER
2	H	43	ILE
2	H	50	GLU
2	H	56	ASN
2	H	59	SER
2	H	65	LEU
2	H	69	VAL
2	H	71	ARG
2	H	79	ILE
1	I	95	ARG
2	J	36	SER
2	J	43	ILE
2	J	50	GLU
2	J	55	SER
2	J	65	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	J	69	VAL
2	J	71	ARG
2	J	79	ILE
1	K	63	THR
1	K	95	ARG
2	L	36	SER
2	L	43	ILE
2	L	50	GLU
2	L	65	LEU
2	L	69	VAL
2	L	71	ARG
2	L	79	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	56	ASN
1	A	86	ASN
1	A	97	GLN
2	B	34	GLN
2	B	53	ASN
1	C	56	ASN
1	C	86	ASN
1	E	56	ASN
1	E	86	ASN
2	F	70	ASN
1	G	86	ASN
1	I	51	ASN
1	I	86	ASN
2	J	34	GLN
1	K	56	ASN
1	K	86	ASN
2	L	31	GLN
2	L	42	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

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, 95^{th} 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	52/64 (81%)	-1.82	0	100	100	5, 20, 39, 60	0
1	C	52/64 (81%)	-1.86	0	100	100	5, 18, 46, 59	0
1	E	52/64 (81%)	-1.84	0	100	100	5, 18, 39, 55	0
1	G	52/64 (81%)	-1.81	0	100	100	5, 20, 47, 57	0
1	I	54/64 (84%)	-1.83	0	100	100	6, 17, 56, 64	0
1	K	52/64 (81%)	-1.81	0	100	100	5, 20, 49, 57	0
2	B	59/64 (92%)	-1.80	0	100	100	7, 19, 66, 75	0
2	D	55/64 (85%)	-1.77	0	100	100	7, 19, 61, 69	0
2	F	58/64 (90%)	-1.83	0	100	100	8, 18, 61, 69	0
2	H	58/64 (90%)	-1.79	0	100	100	7, 20, 61, 70	0
2	J	57/64 (89%)	-1.78	0	100	100	8, 19, 61, 74	0
2	L	58/64 (90%)	-1.83	0	100	100	7, 19, 63, 70	0
All	All	659/768 (85%)	-1.81	0	100	100	5, 19, 57, 75	0

There are no RSRZ outliers to report.

6.2 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.