Full wwPDB X-ray Structure Validation Report ⓘ

Sep 20, 2023 – 07:26 PM EDT

PDB ID	:	5HHM
Title	:	Crystal Structure of the JM22 TCR in complex with HLA-A*0201 in complex with M1-F5L
Authors	:	Gras, S.; Josephs, T.M.; Rossjohn, J.
Deposited on	:	2016-01-11
Resolution	:	2.50 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

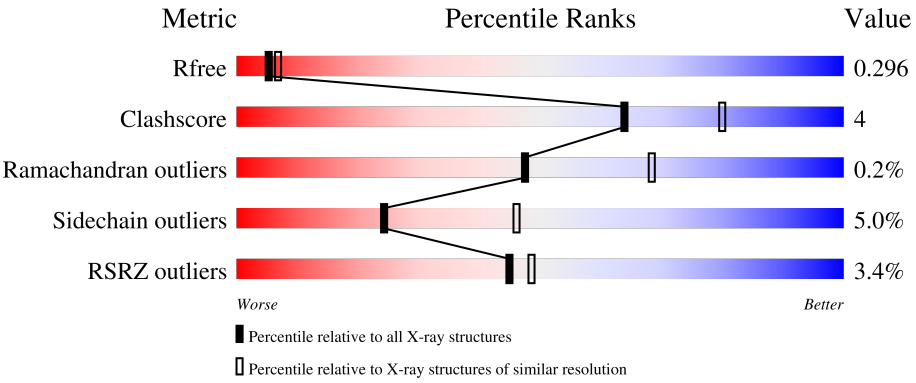
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 2.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	276	67% 9% 23%
1	F	276	2% 67% 9% 23%
2	B	100	9% 79% 18%
2	G	100	3% 81% 15%
3	C	9	100%

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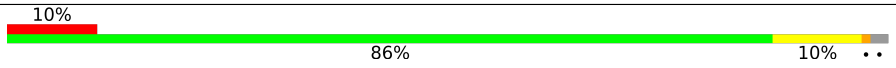
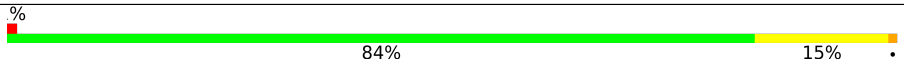
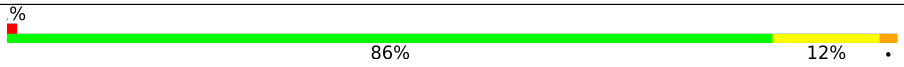
Mol	Chain	Length	Quality of chain
3	H	9	
4	D	200	
4	I	200	
5	E	241	
5	J	241	

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 12678 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 HLA class I histocompatibility antigen, A-2 alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	212	Total	C	N	O	S	0	0	0
			1727	1083	312	326	6			
1	F	212	Total	C	N	O	S	0	0	0
			1727	1083	312	326	6			

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	98	Total	C	N	O	S	0	0	0
			820	524	139	154	3			
2	G	98	Total	C	N	O	S	0	0	0
			820	524	139	154	3			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	initiating methionine	UNP P61769
G	0	MET	-	initiating methionine	UNP P61769

- Molecule 3 is a protein called M1-F5L, GILGLVFTL.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	9	Total	C	N	O	0	0	0
			66	46	9	11			
3	H	9	Total	C	N	O	0	0	0
			66	46	9	11			

- Molecule 4 is a protein called JM22 TCR alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	194	Total	C	N	O	S	0	0	0
			1495	940	249	300	6			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	I	196	Total	C	N	O	S	0	0	0
			1507	946	251	304	6			

- Molecule 5 is a protein called JM22 TCR beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	240	Total	C	N	O	S	0	1	0
			1931	1218	334	374	5			
5	J	240	Total	C	N	O	S	0	1	0
			1931	1218	334	374	5			

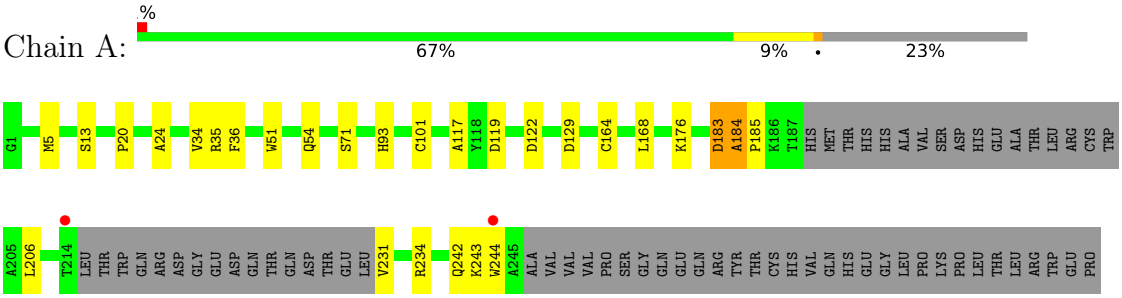
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	109	Total	O	0	0
			109	109		
6	B	37	Total	O	0	0
			37	37		
6	C	3	Total	O	0	0
			3	3		
6	D	57	Total	O	0	0
			57	57		
6	E	107	Total	O	0	0
			107	107		
6	F	82	Total	O	0	0
			82	82		
6	G	22	Total	O	0	0
			22	22		
6	H	2	Total	O	0	0
			2	2		
6	I	68	Total	O	0	0
			68	68		
6	J	101	Total	O	0	0
			101	101		

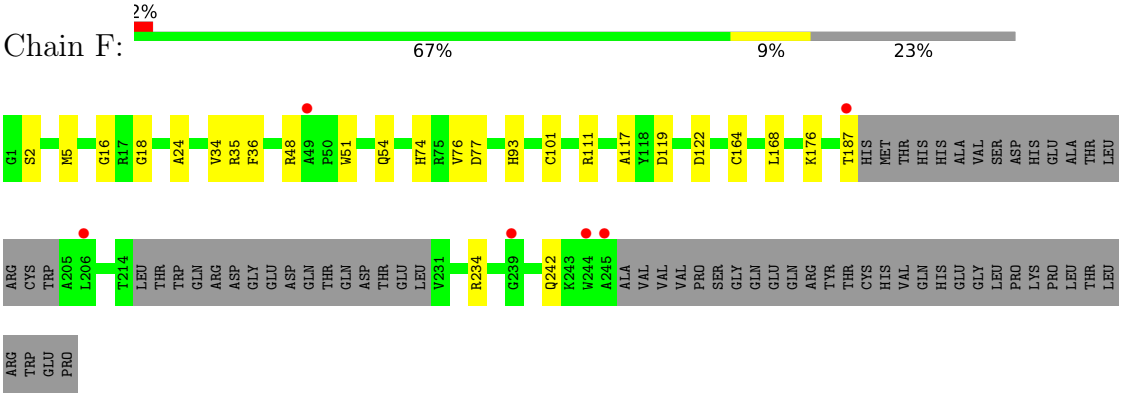
3 Residue-property plots (i)

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.

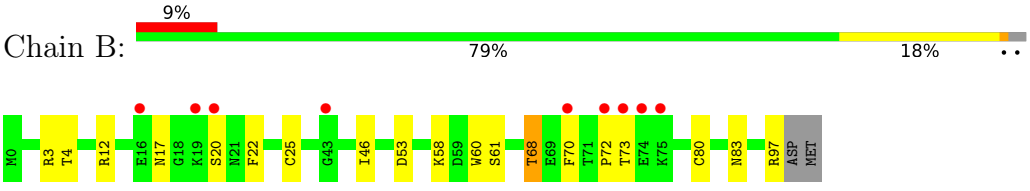
• Molecule 1: HLA class I histocompatibility antigen, A-2 alpha chain



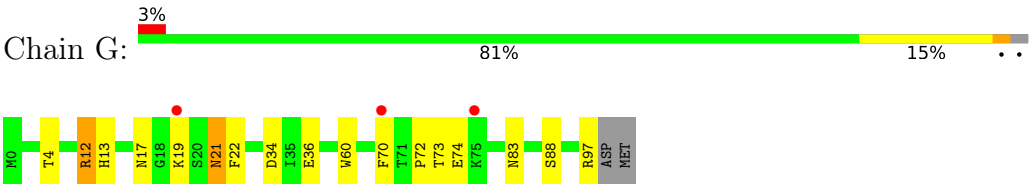
• Molecule 1: HLA class I histocompatibility antigen, A-2 alpha chain



• Molecule 2: Beta-2-microglobulin



• Molecule 2: Beta-2-microglobulin



• Molecule 3: M1-F5L, GILGLVFTL

Chain C:

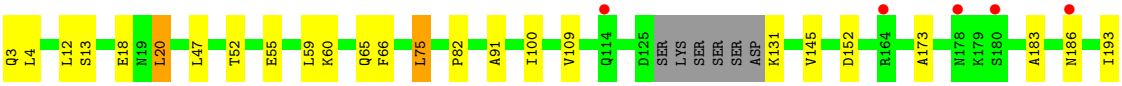
There are no outlier residues recorded for this chain.

• Molecule 3: M1-F5L, GILGLVFTL

Chain H:

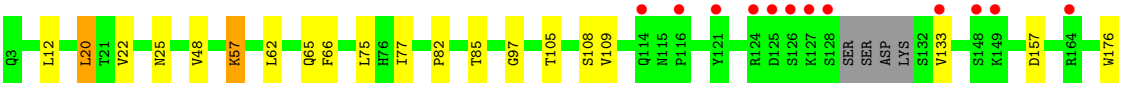
• Molecule 4: JM22 TCR alpha chain

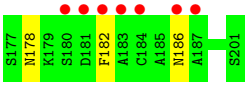
Chain D:



• Molecule 4: JM22 TCR alpha chain

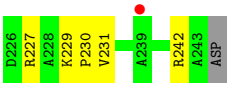
Chain I:





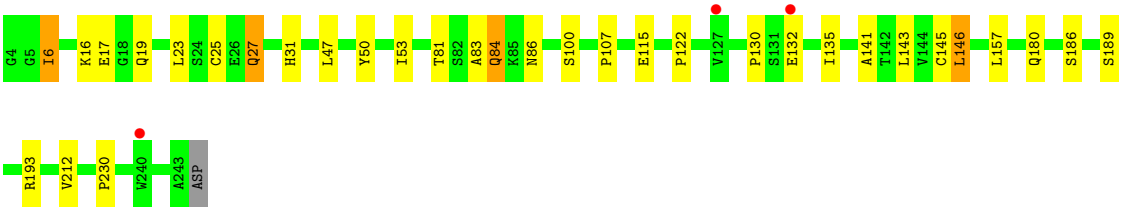
• Molecule 5: JM22 TCR beta chain

Chain E:



• Molecule 5: JM22 TCR beta chain

Chain J:


G4
G5
I6
K16
E17
G18
Q19
L23
S24
C25
E26
Q27
H31
L47
Y50
I53
T81
S82
A83
Q84
K85
N86
S100
P107
E115
P122
V127
P130
S131
E132
I135
A141
T142
L143
V144
C145
L146
L157
Q180
S186
S189
R193
V212
P230
W240
A243
ASP

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	242.88Å 47.30Å 185.94Å 90.00° 115.49° 90.00°	Depositor
Resolution (Å)	43.58 – 2.50 43.58 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.8 (43.58-2.50) 99.8 (43.58-2.50)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	0.12	Depositor
$< I/\sigma(I) >$ [1]	2.43 (at 2.51Å)	Xtriage
Refinement program	BUSTER-TNT BUSTER 2.10.0	Depositor
R, R_{free}	0.216 , 0.289 0.227 , 0.296	Depositor DCC
R_{free} test set	3250 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å^2)	34.9	Xtriage
Anisotropy	0.415	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 61.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	12678	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 56.01 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.9098e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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	0.49	0/1774	0.73	1/2399 (0.0%)
1	F	0.49	0/1774	0.73	0/2399
2	B	0.53	0/843	0.74	0/1141
2	G	0.47	0/843	0.74	0/1141
3	C	0.74	0/66	0.90	0/87
3	H	0.64	0/66	0.71	0/87
4	D	0.51	0/1524	0.74	0/2064
4	I	0.50	0/1536	0.73	0/2080
5	E	0.54	0/1987	0.76	0/2702
5	J	0.50	0/1987	0.73	0/2702
All	All	0.51	0/12400	0.74	1/16802 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	183	ASP	C-N-CA	7.15	139.56	121.70

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	1727	0	1618	15	0
1	F	1727	0	1618	12	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	820	0	792	8	0
2	G	820	0	792	9	0
3	C	66	0	77	0	0
3	H	66	0	77	0	0
4	D	1495	0	1449	11	0
4	I	1507	0	1459	10	0
5	E	1931	0	1835	19	0
5	J	1931	0	1835	16	0
6	A	109	0	0	0	0
6	B	37	0	0	0	0
6	C	3	0	0	0	0
6	D	57	0	0	0	0
6	E	107	0	0	0	0
6	F	82	0	0	0	0
6	G	22	0	0	0	0
6	H	2	0	0	0	0
6	I	68	0	0	1	0
6	J	101	0	0	0	0
All	All	12678	0	11552	94	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 (94) 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:F:101:CYS:HG	1:F:164:CYS:HG	1.24	0.84
2:G:17:ASN:OD1	2:G:97:ARG:NH2	2.12	0.83
1:A:234:ARG:HE	1:A:242:GLN:HE21	1.28	0.80
2:B:25:CYS:HG	2:B:80:CYS:HG	0.81	0.78
5:E:148:THR:HG22	5:E:189:SER:OG	1.96	0.65
1:A:234:ARG:HE	1:A:242:GLN:NE2	1.95	0.65
1:F:16:GLY:HA3	1:F:18:GLY:H	1.61	0.65
1:A:5:MET:HB2	1:A:168:LEU:HD13	1.80	0.63
4:I:62:LEU:HD23	4:I:75:LEU:HD11	1.80	0.63
1:F:234:ARG:HE	1:F:242:GLN:HE21	1.48	0.61
4:D:52:THR:O	4:D:55:GLU:HB3	2.00	0.61
1:F:93:HIS:HD2	1:F:119:ASP:OD2	1.84	0.60
1:A:231:VAL:HG22	1:A:244:TRP:HB3	1.83	0.60
4:I:182:PHE:HA	4:I:186:ASN:HD21	1.66	0.60
5:J:16:LYS:H	5:J:19:GLN:HE21	1.50	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:16:LYS:H	5:E:19:GLN:HE21	1.52	0.57
1:A:93:HIS:HD2	1:A:119:ASP:OD2	1.87	0.56
5:J:81:THR:HG22	5:J:83:ALA:H	1.70	0.55
1:F:234:ARG:HE	1:F:242:GLN:NE2	2.04	0.55
2:G:12:ARG:HB2	2:G:22:PHE:HB2	1.88	0.55
5:J:27:GLN:HE22	5:J:31:HIS:H	1.55	0.54
5:E:227:ARG:HH12	5:E:230:PRO:HG3	1.72	0.54
4:D:91:ALA:HA	4:D:100:ILE:O	2.08	0.53
4:D:12:LEU:HD23	4:D:20:LEU:HD13	1.91	0.53
2:G:17:ASN:HD21	2:G:74:GLU:HG3	1.73	0.53
1:A:51:TRP:O	1:A:54:GLN:HG2	2.09	0.52
4:D:145:VAL:HG21	4:D:173:ALA:HB2	1.91	0.52
5:E:16:LYS:HE3	5:E:117:LEU:HG	1.93	0.51
4:I:22:VAL:HG11	4:I:105:THR:HG21	1.91	0.51
5:J:130:PRO:HD3	5:J:143:LEU:HG	1.92	0.51
4:D:75:LEU:C	4:D:75:LEU:HD12	2.32	0.50
4:I:85:THR:HG23	4:I:108:SER:HA	1.94	0.50
1:F:51:TRP:O	1:F:54:GLN:HG2	2.11	0.50
5:E:16:LYS:H	5:E:19:GLN:NE2	2.10	0.49
5:E:16:LYS:HE2	5:E:116:ASP:HA	1.94	0.49
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.48	0.49
2:B:17:ASN:OD1	2:B:97:ARG:NH2	2.45	0.48
5:E:202:GLN:HA	5:E:242:ARG:O	2.13	0.48
5:E:203:ASN:OD1	5:E:205:ARG:HG2	2.13	0.48
2:G:13:HIS:CD2	2:G:21:ASN:HD21	2.31	0.48
1:A:24:ALA:HB3	1:A:36:PHE:HB3	1.94	0.48
4:D:183:ALA:H	4:D:186:ASN:HD21	1.59	0.48
2:G:36:GLU:HB2	2:G:83:ASN:HB3	1.94	0.48
5:J:130:PRO:HG3	5:J:141:ALA:HB1	1.94	0.48
4:I:12:LEU:HD23	4:I:20:LEU:HD13	1.95	0.48
4:D:3:GLN:O	4:D:4:LEU:HD23	2.14	0.48
1:A:185:PRO:HA	1:A:206:LEU:O	2.13	0.47
4:I:97:GLY:HA2	5:J:100:SER:OG	2.14	0.47
4:D:198:PHE:HE2	5:E:133:ALA:HB1	1.79	0.47
2:B:25:CYS:CB	2:B:80:CYS:HG	2.26	0.47
1:A:101:CYS:SG	1:A:164:CYS:SG	3.09	0.47
5:E:180:GLN:O	5:E:186:SER:HB2	2.15	0.47
4:I:82:PRO:HA	4:I:109:VAL:HB	1.96	0.47
2:B:3:ARG:HE	2:B:61:SER:HB3	1.79	0.46
2:G:13:HIS:HD2	2:G:21:ASN:HD21	1.62	0.46
5:J:157:LEU:HG	5:J:212:VAL:HG22	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:132:GLU:HA	5:J:135:ILE:HD12	1.98	0.46
5:E:15:ARG:O	5:E:113:VAL:HA	2.16	0.45
5:J:47:LEU:HD21	5:J:50:TYR:CD2	2.52	0.45
4:I:62:LEU:HG	4:I:77:ILE:HG12	1.98	0.45
1:A:183:ASP:HA	1:A:184:ALA:CB	2.46	0.45
5:E:90:PHE:HD2	5:E:110:ARG:HG3	1.82	0.45
1:F:5:MET:HB2	1:F:168:LEU:HD13	1.98	0.44
5:E:153:ASP:HB2	5:E:176:PRO:HG2	2.00	0.44
5:J:122:PRO:HD3	5:J:230:PRO:HB3	1.99	0.44
1:A:13:SER:HA	1:A:20:PRO:HB3	2.00	0.44
4:D:59:LEU:HG	4:D:60:LYS:HG3	2.00	0.44
2:B:46:ILE:HG21	2:B:68:THR:HG21	1.99	0.44
5:E:183:LEU:HD23	5:E:186:SER:HA	2.00	0.44
5:E:203:ASN:HA	5:E:204:PRO:HD3	1.91	0.43
4:D:82:PRO:HA	4:D:109:VAL:HB	2.00	0.43
2:G:17:ASN:ND2	2:G:74:GLU:HG3	2.34	0.42
5:J:180:GLN:O	5:J:186:SER:HB2	2.19	0.42
5:J:6:ILE:HD11	5:J:25:CYS:SG	2.59	0.42
1:F:24:ALA:HB3	1:F:36:PHE:HB3	2.01	0.42
1:A:35:ARG:HD3	2:B:53:ASP:OD2	2.20	0.42
1:F:117:ALA:HB2	2:G:60:TRP:CE2	2.55	0.42
5:E:16:LYS:N	5:E:19:GLN:HE21	2.16	0.41
1:A:184:ALA:H	1:A:185:PRO:HD3	1.84	0.41
1:F:35:ARG:HG2	1:F:48:ARG:HD3	2.01	0.41
5:J:84:GLN:NE2	5:J:86:ASN:H	2.18	0.41
5:J:146:LEU:HD23	5:J:146:LEU:HA	1.94	0.41
5:E:229:LYS:HG2	5:E:231:VAL:HG13	2.03	0.41
1:F:74:HIS:HA	1:F:77:ASP:HB2	2.03	0.41
4:I:57:LYS:HG2	6:I:315:HOH:O	2.20	0.41
5:J:145:CYS:SG	5:J:146:LEU:N	2.94	0.40
2:B:12:ARG:HB2	2:B:22:PHE:HB2	2.02	0.40
5:E:145:CYS:HB2	5:E:159:TRP:CZ2	2.56	0.40
4:I:133:VAL:HG12	4:I:176:TRP:HB3	2.03	0.40
1:A:101:CYS:HG	1:A:164:CYS:HG	1.58	0.40
5:E:13:LEU:HD23	5:E:13:LEU:HA	2.00	0.40
1:F:76:VAL:HG21	5:J:53:ILE:HD11	2.04	0.40
2:G:19:LYS:O	2:G:72:PRO:HD2	2.21	0.40
4:D:47:LEU:O	4:D:59:LEU:HD22	2.22	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	206/276 (75%)	198 (96%)	7 (3%)	1 (0%)	29 48
1	F	206/276 (75%)	194 (94%)	12 (6%)	0	100 100
2	B	96/100 (96%)	92 (96%)	2 (2%)	2 (2%)	7 11
2	G	96/100 (96%)	93 (97%)	3 (3%)	0	100 100
3	C	7/9 (78%)	6 (86%)	1 (14%)	0	100 100
3	H	7/9 (78%)	6 (86%)	1 (14%)	0	100 100
4	D	190/200 (95%)	181 (95%)	9 (5%)	0	100 100
4	I	192/200 (96%)	185 (96%)	7 (4%)	0	100 100
5	E	239/241 (99%)	230 (96%)	9 (4%)	0	100 100
5	J	239/241 (99%)	229 (96%)	10 (4%)	0	100 100
All	All	1478/1652 (90%)	1414 (96%)	61 (4%)	3 (0%)	47 68

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	184	ALA
2	B	73	THR
2	B	72	PRO

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	174/232 (75%)	168 (97%)	6 (3%)	37	63
1	F	174/232 (75%)	168 (97%)	6 (3%)	37	63
2	B	93/95 (98%)	87 (94%)	6 (6%)	17	33
2	G	93/95 (98%)	86 (92%)	7 (8%)	13	26
3	C	7/7 (100%)	7 (100%)	0	100	100
3	H	7/7 (100%)	5 (71%)	2 (29%)	0	0
4	D	170/176 (97%)	161 (95%)	9 (5%)	22	43
4	I	172/176 (98%)	164 (95%)	8 (5%)	26	49
5	E	212/212 (100%)	201 (95%)	11 (5%)	23	44
5	J	212/212 (100%)	202 (95%)	10 (5%)	26	49
All	All	1314/1444 (91%)	1249 (95%)	65 (5%)	24	47

All (65) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	34	VAL
1	A	71	SER
1	A	122	ASP
1	A	129	ASP
1	A	176	LYS
1	A	243	LYS
2	B	4	THR
2	B	20	SER
2	B	58	LYS
2	B	68	THR
2	B	70	PHE
2	B	83	ASN
4	D	13	SER
4	D	18	GLU
4	D	20	LEU
4	D	65	GLN
4	D	66	PHE
4	D	75	LEU
4	D	131	LYS
4	D	152	ASP
4	D	193	ILE
5	E	20	ASN
5	E	23	LEU
5	E	27	GLN

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Mol	Chain	Res	Type
5	E	82	SER
5	E	146	LEU
5	E	153	ASP
5	E	164	LYS
5	E	189	SER
5	E	193	ARG
5	E	208	PHE
5	E	225	GLN
1	F	2	SER
1	F	34	VAL
1	F	111	ARG
1	F	122	ASP
1	F	176	LYS
1	F	187	THR
2	G	4	THR
2	G	12	ARG
2	G	21	ASN
2	G	34	ASP
2	G	70	PHE
2	G	73	THR
2	G	88	SER
3	H	5	LEU
3	H	9	LEU
4	I	20	LEU
4	I	25	ASN
4	I	48	VAL
4	I	57	LYS
4	I	65	GLN
4	I	66	PHE
4	I	157	ASP
4	I	178	ASN
5	J	6	ILE
5	J	17	GLU
5	J	23	LEU
5	J	27	GLN
5	J	84	GLN
5	J	107	PRO
5	J	115	GLU
5	J	146	LEU
5	J	189	SER
5	J	193	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27)

such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3	HIS
1	A	72	GLN
1	A	93	HIS
1	A	242	GLN
2	B	51	HIS
2	B	83	ASN
4	D	76	HIS
4	D	142	GLN
5	E	19	GLN
5	E	27	GLN
5	E	84	GLN
5	E	225	GLN
5	E	233	GLN
1	F	72	GLN
1	F	93	HIS
1	F	180	GLN
1	F	242	GLN
2	G	2	GLN
2	G	13	HIS
4	I	122	GLN
4	I	142	GLN
4	I	186	ASN
5	J	19	GLN
5	J	27	GLN
5	J	43	GLN
5	J	84	GLN
5	J	233	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

There are no monosaccharides 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	212/276 (76%)	-0.11	2 (0%) 84 86	17, 37, 66, 87	1 (0%)
1	F	212/276 (76%)	-0.07	6 (2%) 53 56	13, 38, 66, 96	1 (0%)
2	B	98/100 (98%)	0.49	9 (9%) 9 9	21, 47, 81, 96	0
2	G	98/100 (98%)	0.24	3 (3%) 49 52	23, 45, 80, 88	0
3	C	9/9 (100%)	-0.01	0 100 100	18, 24, 29, 31	0
3	H	9/9 (100%)	-0.40	0 100 100	15, 23, 27, 27	0
4	D	194/200 (97%)	0.08	8 (4%) 37 40	12, 42, 95, 120	0
4	I	196/200 (98%)	0.28	19 (9%) 7 7	14, 43, 92, 116	0
5	E	240/241 (99%)	-0.16	2 (0%) 86 87	11, 36, 68, 79	0
5	J	240/241 (99%)	-0.18	3 (1%) 77 79	9, 36, 76, 98	0
All	All	1508/1652 (91%)	0.01	52 (3%) 45 48	9, 38, 83, 120	2 (0%)

All (52) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	70	PHE	5.4
1	A	244	TRP	5.1
4	I	126	SER	5.0
4	I	186	ASN	4.4
2	B	20	SER	4.0
2	B	75	LYS	3.9
4	D	201	SER	3.9
1	F	187	THR	3.9
2	B	19	LYS	3.5
4	I	124	ARG	3.5
4	I	180	SER	3.4
5	J	132	GLU	3.4
4	D	198	PHE	3.3

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Mol	Chain	Res	Type	RSRZ
4	I	183	ALA	3.2
4	I	128	SER	3.2
4	I	187	ALA	3.1
1	F	245	ALA	3.0
2	B	43	GLY	3.0
4	D	114	GLN	3.0
4	I	114	GLN	2.9
4	I	116	PRO	2.9
4	I	184	CYS	2.7
5	J	127	VAL	2.7
5	E	239	ALA	2.7
2	G	75	LYS	2.6
2	G	70	PHE	2.5
4	I	127	LYS	2.5
2	B	73	THR	2.5
4	I	182	PHE	2.5
4	I	164	ARG	2.4
4	D	164	ARG	2.4
4	D	178	ASN	2.4
4	D	200	PRO	2.4
5	E	220	ASN	2.3
2	B	72	PRO	2.3
1	A	214	THR	2.3
2	B	16	GLU	2.3
2	G	19	LYS	2.3
4	D	180	SER	2.2
1	F	244	TRP	2.2
4	I	181	ASP	2.2
4	I	133	VAL	2.2
2	B	74	GLU	2.2
4	I	121	TYR	2.1
5	J	240	TRP	2.1
4	D	186	ASN	2.1
4	I	149	LYS	2.1
1	F	206	LEU	2.1
1	F	49	ALA	2.1
4	I	148	SER	2.0
1	F	239	GLY	2.0
4	I	125	ASP	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 monosaccharides 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.