Full wwPDB X-ray Structure Validation Report ⓘ

Aug 27, 2024 – 07:16 pm BST

PDB ID	:	8RYQ
Title	:	Structure of S8-9F3 TCR in complex with HLA-A*11:01 bound to ELF-SYLIEK peptide
Authors	:	Karuppiah, V.
Deposited on	:	2024-02-09
Resolution	:	2.49 Å(reported)

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

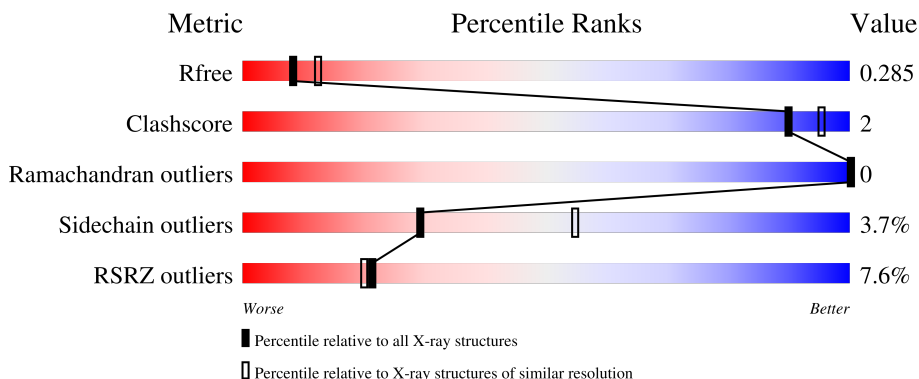|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.002 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.38.2

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 2.49 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	Percentile Ranks	Value
Rfree		0.285
Clashscore		2
Ramachandran outliers		0
Sidechain outliers		3.7%
RSRZ outliers		7.6%

Worse   *Better*

▮ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	5504 (2.50-2.50)
Clashscore	180529	6282 (2.50-2.50)
Ramachandran outliers	177936	6191 (2.50-2.50)
Sidechain outliers	177891	6193 (2.50-2.50)
RSRZ outliers	164620	5504 (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	3% / 95% · ·
1	F	276	4% / 92% 7% ·
2	B	100	% / 92% 7% ·
2	G	100	4% / 92% 7% ·
3	C	9	78% 22%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	H	9	44% / 89% 11%
4	D	200	18% / 84% 8% · 7%
4	I	200	10% / 84% 9% 6%
5	E	244	5% / 90% 7% ··
5	J	244	10% / 93% 5% ·

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 13006 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 MHC class I antigen.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	275	Total	C	N	O	S	0	0	0
			2244	1394	408	433	9			
1	F	275	Total	C	N	O	S	0	0	0
			2244	1394	408	433	9			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	276	PRO	-	expression tag	UNP A0A583ZB34
F	276	PRO	-	expression tag	UNP A0A583ZB34

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	99	Total	C	N	O	S	0	0	0
			828	528	140	157	3			
2	G	99	Total	C	N	O	S	0	0	0
			829	528	140	158	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 ELFSYLIEK peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	9	Total	C	N	O	0	0	0
			81	55	10	16			
3	H	9	Total	C	N	O	0	0	0
			81	55	10	16			

- Molecule 4 is a protein called TCR alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	186	Total 1421	C 879	N 245	O 290	S 7	0	0	0
4	I	188	Total 1437	C 889	N 248	O 293	S 7	0	0	0

- Molecule 5 is a protein called TCR beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	241	Total 1919	C 1209	N 334	O 371	S 5	0	1	0
5	J	239	Total 1900	C 1199	N 329	O 367	S 5	0	1	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	10	Total 10	O 10	0	0
6	D	2	Total 2	O 2	0	0
6	E	4	Total 4	O 4	0	0
6	G	2	Total 2	O 2	0	0
6	I	2	Total 2	O 2	0	0
6	J	2	Total 2	O 2	0	0

3 Residue-property plots ⓘ
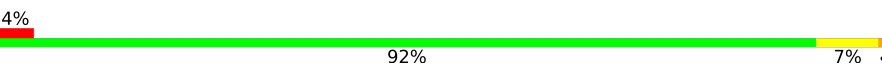
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: MHC class I antigen

Chain A:
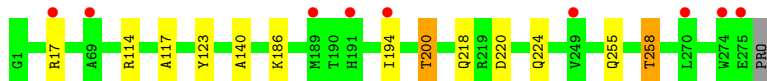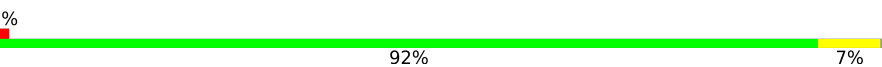
• Molecule 1: MHC class I antigen

Chain F:
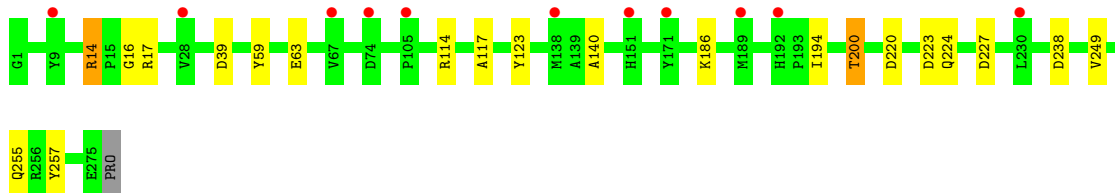
• Molecule 2: Beta-2-microglobulin

Chain B:

• Molecule 2: Beta-2-microglobulin

Chain G:

• Molecule 3: ELFSYLIEK peptide

Chain C:

E1 L2 F3 S4 Y5 K9

• Molecule 3: ELFSYLIEK peptide

Chain H:

44%

89%   11%

E1 L2 Y5 L6 I7 E8 K9

• Molecule 4: TCR alpha

Chain D:

18%

84%   8%   •   7%

MET K2 Q3 E4 V5 P9 N19 L20 V21 L22 A30 I31 L34 Q35 W36 F37 G44 I51 Q52 S53 R56 A65 K69 S70 S71 T75 I78 A79 C91 A92 Q95 F104 T108 K109 L110 P114 V123 Y124 K134 S135 V136 C137

L138 F139 T140 D141 PHE D143 S144 Q145 T146 S149 Y157 D160 K161 C162 V163 L164 M169 N174 V177 A178 W179 F185 A186 C187 A188 ASN ALA PHE ASN ASN SER ILE ILE PRO GLU ASP THR

• Molecule 4: TCR alpha

Chain I:

10%

84%   9%   6%

MET K2 Q3 N19 L34 I51 A65 K69 Y77 I78 A79 Q95 P114 Y124 R127 D128 S129 K130 S131 L138 F139 T140 D141 PHE D143 S144 Q145 T146 N147 V148 S149 GLN SER LYS D153 I158 C162 V163 L164 D165 M166 N174 S175 A176 V177 A178

W179 F185 N192 N193 SER ILE ILE PRO GLU ASP THR

• Molecule 5: TCR beta

Chain E:

5%

90%   7%   ••

MET ASP SER G4 K10 T14 Q18 L22 R23 C24 S25 S32 H74 L79 L82 S95 T109 K118 P130 Q139 K140 A141 T142 L146 D153 L157 S158 W159 V166 C171 T172 P176 A182 L190 S191 R193 W201

I234 W240 A243 D244

• Molecule 5: TCR beta

Chain J:

10%

93%   5%   •

MET ASP S3 K10 T14 Q18 L22 H74 G98 T109 K118 A126 V127 F128 E129 P130 A133 A141 T142 L143 V144 C145 L146 D153 W159 G163 V166 V170 C171 P176 L183 N184 S192 R193 L194 R195 V196 S197 A198 W201

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	46.02Å 88.89Å 121.86Å 90.90° 98.54° 97.72°	Depositor
Resolution (Å)	45.07 – 2.49 45.07 – 2.49	Depositor EDS
% Data completeness (in resolution range)	98.4 (45.07-2.49) 98.4 (45.07-2.49)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.17 (at 2.48Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.245 , 0.283 0.249 , 0.285	Depositor DCC
R_{free} test set	3169 reflections (4.86%)	wwPDB-VP
Wilson B-factor (Å^2)	69.8	Xtriage
Anisotropy	0.247	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.25 , 25.7	EDS
L-test for twinning[2]	$< |L| > = 0.51$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	13006	wwPDB-VP
Average B, all atoms (Å^2)	86.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.00% 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 (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	0.62	0/2305	0.72	0/3129
1	F	0.63	0/2305	0.72	0/3129
2	B	0.62	0/851	0.70	0/1152
2	G	0.62	0/852	0.69	0/1152
3	C	0.65	0/82	0.64	0/107
3	H	0.62	0/82	0.66	0/107
4	D	0.67	0/1443	0.76	0/1952
4	I	0.66	0/1459	0.75	0/1974
5	E	0.63	0/1974	0.72	0/2686
5	J	0.63	0/1955	0.72	0/2662
All	All	0.64	0/13308	0.73	0/18050

There are no bond length outliers.

There are no bond angle outliers.

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	2244	0	2091	4	0
1	F	2244	0	2091	8	0
2	B	828	0	794	3	0
2	G	829	0	794	4	0
3	C	81	0	83	1	0
3	H	81	0	83	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	1421	0	1388	10	0
4	I	1437	0	1393	6	0
5	E	1919	0	1816	10	0
5	J	1900	0	1799	4	0
6	A	10	0	0	0	0
6	D	2	0	0	0	0
6	E	4	0	0	0	0
6	G	2	0	0	0	0
6	I	2	0	0	0	0
6	J	2	0	0	0	0
All	All	13006	0	12332	43	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 2.

All (43) 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)
4:I:128:ASP:HB3	4:I:131:SER:O	1.83	0.77
5:E:22:LEU:HD22	5:E:109:THR:HG21	1.86	0.58
5:J:22:LEU:HD22	5:J:109:THR:HG21	1.86	0.56
4:D:53:SER:O	4:D:56:ARG:NH2	2.39	0.55
4:D:162:CYS:C	5:E:171:CYS:SG	2.86	0.54
1:F:14:ARG:NH2	1:F:39:ASP:OD2	2.27	0.54
4:I:51:ILE:HD11	4:I:65:ALA:HB1	1.90	0.54
4:D:51:ILE:HD11	4:D:65:ALA:HB1	1.89	0.53
5:E:79:LEU:HB3	5:E:82:LEU:HD21	1.91	0.52
3:C:3:PHE:CZ	3:C:5:TYR:HB3	2.44	0.52
5:E:23:ARG:NH1	1:F:16:GLY:O	2.42	0.51
4:I:114:PRO:HG2	4:I:163:VAL:HG11	1.92	0.51
5:E:14:THR:HG21	5:E:82:LEU:HD13	1.95	0.49
4:D:164:LEU:HB3	5:E:171:CYS:HB2	1.96	0.48
1:F:238:ASP:HB3	2:G:12:ARG:HD3	1.95	0.48
2:G:45:ARG:NH2	2:G:47:GLU:OE2	2.47	0.47
1:F:117:ALA:HB2	2:G:60:TRP:CE2	2.50	0.47
2:B:45:ARG:NH2	2:B:47:GLU:OE2	2.47	0.46
4:D:114:PRO:HG2	4:D:163:VAL:HG11	1.97	0.46
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.52	0.45
4:I:164:LEU:HB3	5:J:171:CYS:HB2	2.00	0.44
1:A:123:TYR:CZ	1:A:140:ALA:HA	2.52	0.44
5:E:130:PRO:HD2	5:E:201:TRP:CZ2	2.52	0.44

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:J:153:ASP:HB2	5:J:176:PRO:HG2	1.99	0.44
4:D:19:ASN:HD22	4:D:79:ALA:HA	1.83	0.44
4:I:19:ASN:HD22	4:I:79:ALA:HA	1.83	0.44
5:J:130:PRO:HD2	5:J:201:TRP:CZ2	2.53	0.44
5:E:153:ASP:HB2	5:E:176:PRO:HG2	1.99	0.43
1:A:194:ILE:HD11	1:A:200:THR:HG23	2.00	0.43
4:I:3:GLN:HE21	4:I:95:GLN:NE2	2.17	0.43
1:F:123:TYR:CZ	1:F:140:ALA:HA	2.53	0.43
1:A:218:GLN:HB2	1:A:258:THR:HG23	2.00	0.42
1:F:194:ILE:HD11	1:F:200:THR:HG23	2.00	0.42
4:D:21:VAL:HG13	4:D:75:THR:CG2	2.50	0.42
4:D:3:GLN:HE21	4:D:95:GLN:NE2	2.17	0.42
5:E:139:GLN:O	5:E:140:LYS:HG3	2.20	0.42
1:F:59:TYR:O	1:F:63:GLU:HG2	2.20	0.41
2:B:24:ASN:HB3	2:B:65:LEU:HD11	2.02	0.41
4:D:22:LEU:HD12	4:D:22:LEU:HA	1.92	0.41
5:E:32:SER:HB2	5:E:95:SER:HB3	2.02	0.41
4:D:3:GLN:HE21	4:D:95:GLN:HE22	1.69	0.41
2:G:4:THR:HG22	2:G:5:PRO:HD2	2.02	0.40
1:F:249:VAL:HG13	1:F:257:TYR:CE1	2.57	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	273/276 (99%)	264 (97%)	9 (3%)	0	100	100
1	F	273/276 (99%)	266 (97%)	7 (3%)	0	100	100
2	B	97/100 (97%)	94 (97%)	3 (3%)	0	100	100
2	G	97/100 (97%)	94 (97%)	3 (3%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	C	7/9 (78%)	7 (100%)	0	0	100	100
3	H	7/9 (78%)	7 (100%)	0	0	100	100
4	D	182/200 (91%)	175 (96%)	7 (4%)	0	100	100
4	I	182/200 (91%)	174 (96%)	8 (4%)	0	100	100
5	E	240/244 (98%)	227 (95%)	13 (5%)	0	100	100
5	J	238/244 (98%)	228 (96%)	10 (4%)	0	100	100
All	All	1596/1658 (96%)	1536 (96%)	60 (4%)	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	232/233 (100%)	224 (97%)	8 (3%)	32	58
1	F	232/233 (100%)	222 (96%)	10 (4%)	25	48
2	B	94/95 (99%)	92 (98%)	2 (2%)	48	74
2	G	94/95 (99%)	93 (99%)	1 (1%)	70	87
3	C	9/9 (100%)	9 (100%)	0	100	100
3	H	9/9 (100%)	8 (89%)	1 (11%)	5	10
4	D	163/176 (93%)	158 (97%)	5 (3%)	35	62
4	I	164/176 (93%)	155 (94%)	9 (6%)	18	37
5	E	209/211 (99%)	200 (96%)	9 (4%)	25	48
5	J	208/211 (99%)	201 (97%)	7 (3%)	32	58
All	All	1414/1448 (98%)	1362 (96%)	52 (4%)	29	55

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	ARG

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	114	ARG
1	A	186	LYS
1	A	200	THR
1	A	220	ASP
1	A	224	GLN
1	A	255	GLN
1	A	258	THR
2	B	4	THR
2	B	70	PHE
4	D	22	LEU
4	D	134	LYS
4	D	144	SER
4	D	163	VAL
4	D	177	VAL
5	E	10	LYS
5	E	14	THR
5	E	18	GLN
5	E	25	SER
5	E	74	HIS
5	E	79	LEU
5	E	118	LYS
5	E	171	CYS
5	E	193	ARG
1	F	14	ARG
1	F	17	ARG
1	F	114	ARG
1	F	186	LYS
1	F	200	THR
1	F	220	ASP
1	F	223	ASP
1	F	224	GLN
1	F	227	ASP
1	F	255	GLN
2	G	70	PHE
3	H	7	ILE
4	I	2	LYS
4	I	69	LYS
4	I	127	ARG
4	I	130	LYS
4	I	144	SER
4	I	162	CYS
4	I	163	VAL

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
4	I	177	VAL
4	I	192	ASN
5	J	10	LYS
5	J	14	THR
5	J	18	GLN
5	J	74	HIS
5	J	118	LYS
5	J	171	CYS
5	J	193	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	70	GLN
1	A	174	ASN
1	A	218	GLN
1	A	226	GLN
1	A	260	HIS
1	A	263	HIS
2	B	89	GLN
4	D	19	ASN
4	D	95	GLN
5	E	18	GLN
5	E	119	ASN
5	E	220	ASN
1	F	70	GLN
1	F	174	ASN
1	F	263	HIS
2	G	89	GLN
4	I	19	ASN
4	I	55	GLN
4	I	95	GLN
5	J	18	GLN
5	J	101	ASN
5	J	119	ASN
5	J	220	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, 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(Å²)	Q<0.9
1	A	275/276 (99%)	0.41	9 (3%)	49	46	48, 64, 114, 128	0
1	F	275/276 (99%)	0.71	11 (4%)	43	39	66, 89, 111, 125	0
2	B	99/100 (99%)	0.15	1 (1%)	79	76	51, 68, 87, 90	0
2	G	99/100 (99%)	0.52	4 (4%)	43	39	68, 79, 94, 100	0
3	C	9/9 (100%)	0.16	0	100	100	58, 61, 63, 67	0
3	H	9/9 (100%)	1.45	4 (44%)	1	1	79, 82, 86, 86	0
4	D	186/200 (93%)	1.19	36 (19%)	4	4	58, 115, 157, 174	0
4	I	188/200 (94%)	0.91	21 (11%)	11	11	55, 80, 143, 163	0
5	E	241/244 (98%)	0.53	12 (4%)	35	32	49, 84, 127, 148	1 (0%)
5	J	239/244 (97%)	0.70	25 (10%)	13	12	50, 84, 133, 145	1 (0%)
All	All	1620/1658 (97%)	0.66	123 (7%)	21	20	48, 81, 137, 174	2 (0%)

All (123) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
5	J	142	THR	5.4
4	I	176	ALA	5.3
4	I	174	ASN	4.4
5	J	144	VAL	4.3
4	I	77	TYR	4.2
5	J	128	PHE	4.1
5	J	166	VAL	4.0
1	F	9	TYR	4.0
4	D	188	ALA	3.8
4	D	160	ASP	3.6
1	A	189	MET	3.5
4	D	179	TRP	3.5
5	E	190	LEU	3.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
5	E	157	LEU	3.5
5	J	183	LEU	3.3
4	D	53	SER	3.3
4	I	179	TRP	3.3
3	H	6	LEU	3.3
4	D	5	VAL	3.2
4	I	148	VAL	3.2
4	I	163	VAL	3.2
5	J	241	GLY	3.1
1	A	249	VAL	3.1
5	J	170	VAL	3.1
2	B	1	ILE	3.1
5	J	141	ALA	3.1
4	I	139	PHE	3.0
4	D	123	VAL	3.0
4	D	134	LYS	3.0
1	A	275	GLU	3.0
4	D	108	THR	3.0
5	J	159	TRP	2.9
4	D	163	VAL	2.9
3	H	7	ILE	2.9
4	D	30	ALA	2.9
4	D	174	ASN	2.9
5	J	3	SER	2.9
1	F	151	HIS	2.9
5	J	195	ARG	2.8
4	D	9	PRO	2.8
1	F	67	VAL	2.8
5	E	191	SER	2.8
4	D	34	LEU	2.7
4	D	110	LEU	2.7
4	D	138	LEU	2.7
5	J	146	LEU	2.7
5	J	239	ALA	2.7
1	A	274	TRP	2.7
4	D	44	GLY	2.7
5	J	208	PHE	2.7
4	I	141	ASP	2.7
1	A	191	HIS	2.7
4	I	149	SER	2.7
4	D	91	CYS	2.6
4	I	162	CYS	2.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
4	D	36	TRP	2.6
4	D	37	PHE	2.6
1	F	28	VAL	2.6
2	G	54	LEU	2.6
1	F	171	TYR	2.6
5	E	240	TRP	2.6
4	D	139	PHE	2.6
5	E	159	TRP	2.5
3	H	2	LEU	2.5
5	J	127	VAL	2.5
5	E	166	VAL	2.5
1	A	69	ALA	2.5
5	J	126	ALA	2.5
5	J	198	ALA	2.5
4	D	146	THR	2.5
4	I	124	TYR	2.5
5	J	196	VAL	2.5
1	A	270	LEU	2.4
5	E	146	LEU	2.4
5	J	143	LEU	2.4
4	D	69	LYS	2.4
5	J	192	SER	2.4
5	J	98	GLY	2.4
5	J	163	GLY	2.4
1	F	138	MET	2.4
4	D	35	GLN	2.3
4	D	157	TYR	2.3
4	I	138	LEU	2.3
4	I	51	ILE	2.3
5	J	171	CYS	2.3
4	D	104	PHE	2.3
1	F	74	ASP	2.3
1	A	194	ILE	2.2
3	H	5	TYR	2.2
5	E	243	ALA	2.2
4	D	136	VAL	2.2
5	E	234	ILE	2.2
1	F	230	LEU	2.2
4	I	146	THR	2.2
5	E	142	THR	2.2
1	A	17	ARG	2.2
2	G	56	PHE	2.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
4	D	71	SER	2.2
5	J	184	ASN	2.2
4	I	158	ILE	2.2
4	D	186	ALA	2.2
1	F	189	MET	2.1
4	D	185	PHE	2.1
4	D	92	ALA	2.1
4	D	135	SER	2.1
4	D	169	MET	2.1
4	I	166	MET	2.1
4	D	124	TYR	2.1
4	I	140	THR	2.1
4	I	144	SER	2.1
5	E	182	ALA	2.1
1	F	105	PRO	2.1
4	I	95	GLN	2.1
2	G	92	ILE	2.1
4	D	31	ILE	2.1
5	J	133	ALA	2.0
4	D	149	SER	2.0
1	F	192	HIS	2.0
4	D	78	ILE	2.0
4	I	34	LEU	2.0
4	I	185	PHE	2.0
5	E	172	THR	2.0
2	G	1	ILE	2.0

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 (i)

There are no such residues in this entry.