Full wwPDB X-ray Structure Validation Report ⓘ

Dec 17, 2024 – 06:25 PM EST

PDB ID	:	8T7R
Title	:	Crystal structure of human leukocyte antigen A*0101 in complex with the Fab of alloreactive antibody E07
Authors	:	Green, T.J.; Killian Jr, J.T.; Qiu, S.; Macon, K.J.; Yang, G.; King, R.G.; Lund, F.E.
Deposited on	:	2023-06-21
Resolution	:	3.84 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:

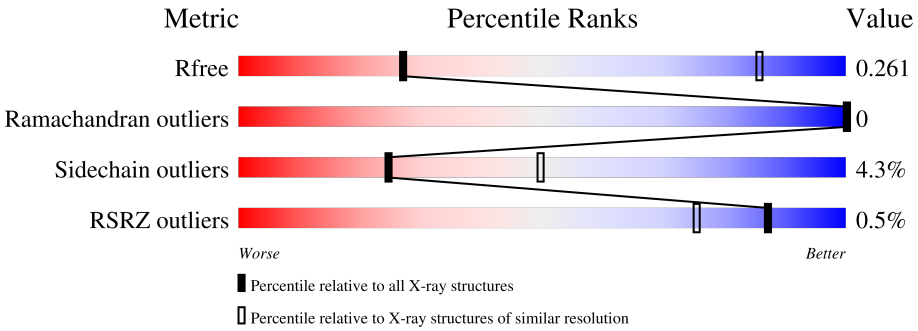
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.21
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 3.84 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	1056 (4.00-3.68)
Ramachandran outliers	177936	1080 (4.00-3.68)
Sidechain outliers	177891	1073 (4.00-3.68)
RSRZ outliers	164620	1056 (4.00-3.68)

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	214	95%
1	E	214	94%
1	I	214	94%
1	M	214	94%
1	Q	214	94%
1	U	214	94%

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Mol	Chain	Length	Quality of chain
1	Y	214	95%
1	c	214	95%
1	g	214	95%
1	k	214	94%
1	o	214	94% 5%
1	s	214	95%
2	B	240	88% 8%
2	F	240	87% 5% 8%
2	J	240	85% 6% 8%
2	N	240	87% 5% 8%
2	R	240	90% 8%
2	V	240	86% 5% 8%
2	Z	240	2% 87% 5% 8%
2	d	240	% 88% 8%
2	h	240	2% 89% 7%
2	l	240	2% 88% 9%
2	p	240	2% 88% 9%
2	t	240	2% 89% 8%
3	C	274	94% 6%
3	G	274	94% 6%
3	K	274	95% 5%
3	O	274	95% 5%
3	S	274	93% 7%
3	W	274	95% 5%
3	a	274	62% 5% 34%

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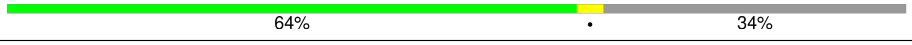
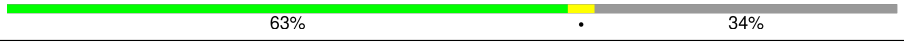
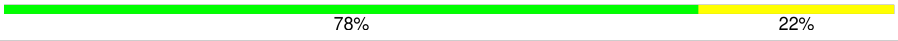
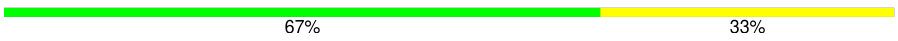
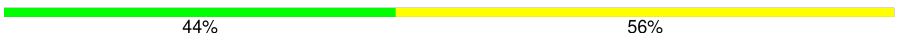
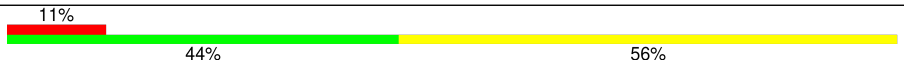
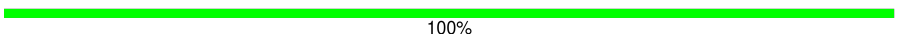
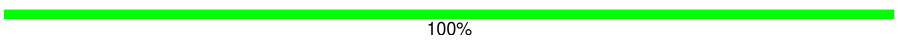
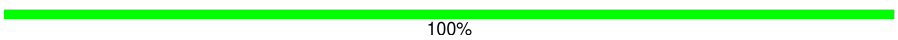
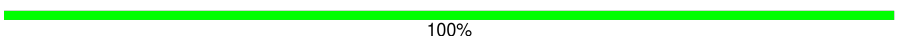
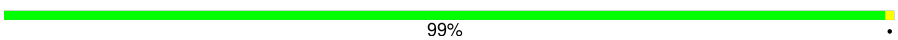
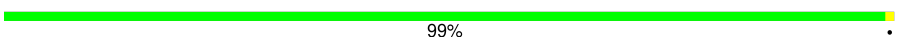
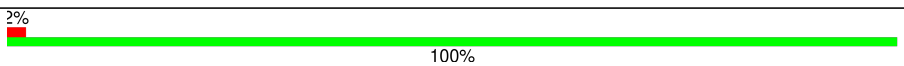
Mol	Chain	Length	Quality of chain
3	e	274	
3	i	274	
4	0	9	
4	1	9	
4	2	9	
4	3	9	
4	4	9	
4	5	9	
4	6	9	
4	7	9	
4	8	9	
5	D	99	
5	H	99	
5	L	99	
5	P	99	
5	T	99	
5	X	99	
5	b	99	
5	f	99	

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 63611 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 Light chain from antibody JTK191b E07.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	E	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	I	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	M	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	Q	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	U	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	Y	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	c	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	g	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	k	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			
1	o	203	Total	C	N	O	S	0	0	0
			1517	946	263	304	4			
1	s	205	Total	C	N	O	S	0	0	0
			1535	957	266	308	4			

- Molecule 2 is a protein called Fab heavy chain from antibody JTK191b E07.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	221	Total	C	N	O	S	0	0	0
			1680	1065	289	320	6			
2	F	221	Total	C	N	O	S	0	0	0
			1680	1065	289	320	6			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	J	220	Total	C	N	O	S	0	0	0
			1671	1059	287	319	6			
2	N	220	Total	C	N	O	S	0	0	0
			1671	1059	287	319	6			
2	R	221	Total	C	N	O	S	0	0	0
			1675	1061	288	320	6			
2	V	220	Total	C	N	O	S	0	0	0
			1671	1059	287	319	6			
2	Z	220	Total	C	N	O	S	0	0	0
			1676	1063	288	319	6			
2	d	220	Total	C	N	O	S	0	0	0
			1675	1062	288	319	6			
2	h	223	Total	C	N	O	S	0	0	0
			1690	1070	291	323	6			
2	l	219	Total	C	N	O	S	0	0	0
			1662	1054	285	317	6			
2	p	218	Total	C	N	O	S	0	0	0
			1656	1051	284	315	6			
2	t	221	Total	C	N	O	S	0	0	0
			1675	1061	288	320	6			

- Molecule 3 is a protein called MHC class I antigen (Fragment).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	274	Total	C	N	O	S	0	0	0
			2227	1383	408	426	10			
3	G	274	Total	C	N	O	S	0	0	0
			2227	1383	408	426	10			
3	K	274	Total	C	N	O	S	0	0	0
			2227	1383	408	426	10			
3	O	274	Total	C	N	O	S	0	0	0
			2227	1383	408	426	10			
3	S	274	Total	C	N	O	S	0	0	0
			2227	1383	408	426	10			
3	W	274	Total	C	N	O	S	0	0	0
			2227	1383	408	426	10			
3	a	182	Total	C	N	O	S	0	0	0
			1483	915	276	285	7			
3	e	182	Total	C	N	O	S	0	0	0
			1483	915	276	285	7			
3	i	182	Total	C	N	O	S	0	0	0
			1483	915	276	285	7			

- Molecule 4 is a protein called peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	0	9	Total	C	N	O	0	0	0
			76	49	11	16			
4	1	9	Total	C	N	O	0	0	0
			76	49	11	16			
4	2	9	Total	C	N	O	0	0	0
			76	49	11	16			
4	3	9	Total	C	N	O	0	0	0
			76	49	11	16			
4	4	9	Total	C	N	O	0	0	0
			76	49	11	16			
4	5	9	Total	C	N	O	0	0	0
			76	49	11	16			
4	6	9	Total	C	N	O	0	0	0
			76	49	11	16			
4	7	9	Total	C	N	O	0	0	0
			76	49	11	16			
4	8	9	Total	C	N	O	0	0	0
			76	49	11	16			

- Molecule 5 is a protein called Beta-2-microglobulin.

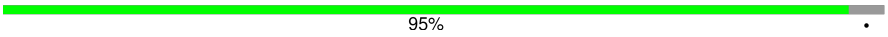
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	D	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			
5	H	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			
5	L	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			
5	P	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			
5	T	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			
5	X	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			
5	b	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			
5	f	99	Total	C	N	O	S	0	0	0
			829	528	140	158	3			

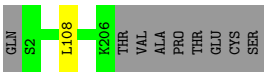
3 Residue-property plots (i)

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: Light chain from antibody JTK191b E07

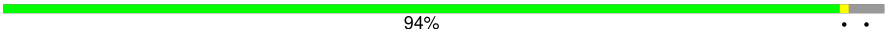
Chain A:

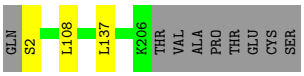




• Molecule 1: Light chain from antibody JTK191b E07

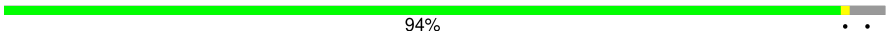
Chain E:

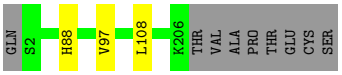




• Molecule 1: Light chain from antibody JTK191b E07

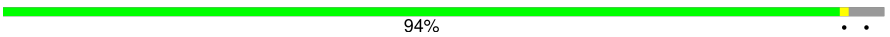
Chain I:





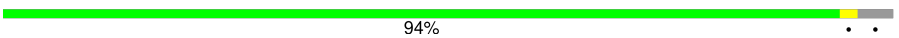
• Molecule 1: Light chain from antibody JTK191b E07

Chain M:



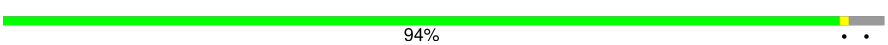
• Molecule 1: Light chain from antibody JTK191b E07

Chain Q:



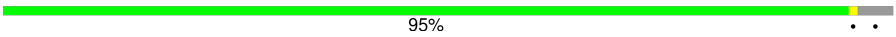
• Molecule 1: Light chain from antibody JTK191b E07

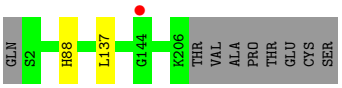
Chain U:



• Molecule 1: Light chain from antibody JTK191b E07

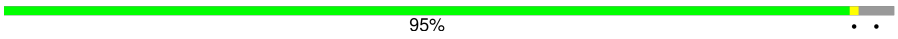
Chain Y:

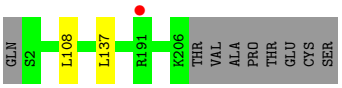




• Molecule 1: Light chain from antibody JTK191b E07

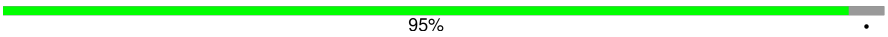
Chain c:

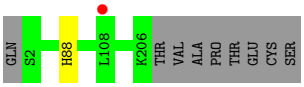




• Molecule 1: Light chain from antibody JTK191b E07

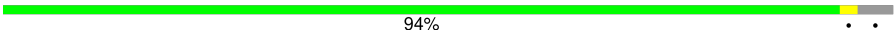
Chain g:





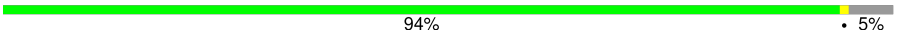
• Molecule 1: Light chain from antibody JTK191b E07

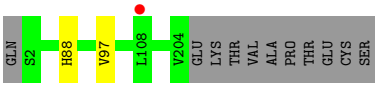
Chain k:



• Molecule 1: Light chain from antibody JTK191b E07

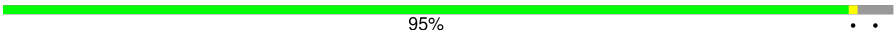
Chain o:

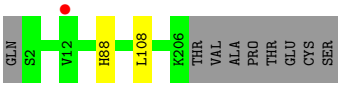




• Molecule 1: Light chain from antibody JTK191b E07

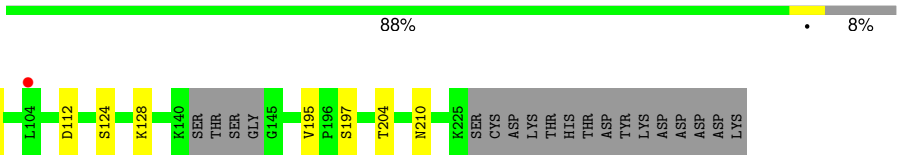
Chain s:





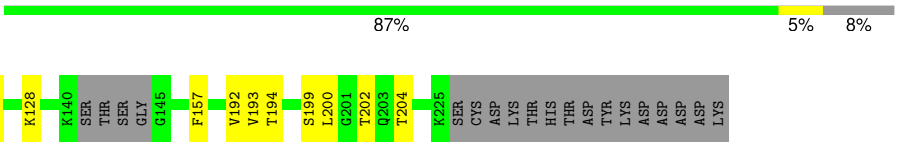
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain B:



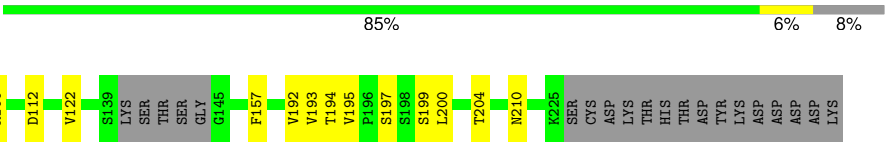
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain F:



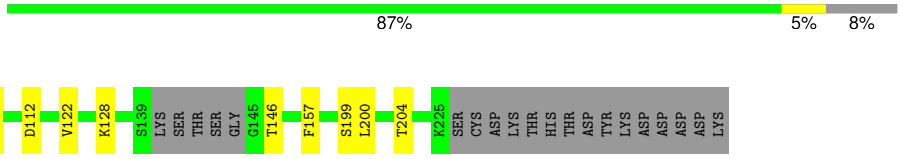
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain J:



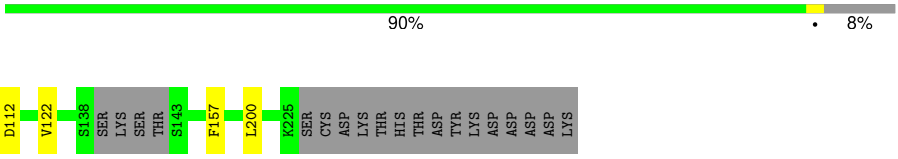
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain N:



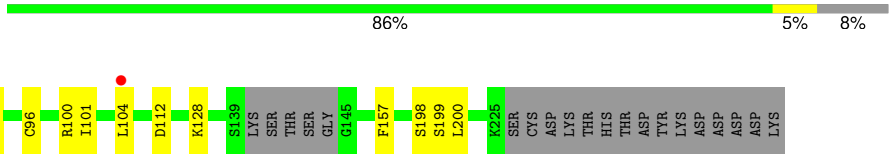
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain R:



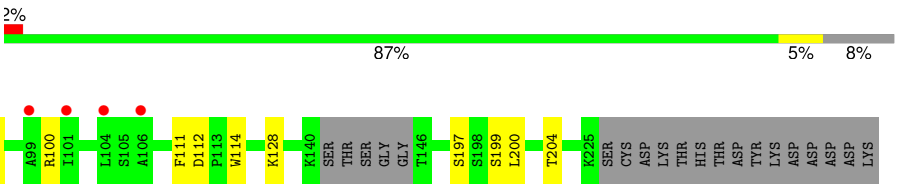
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain V:



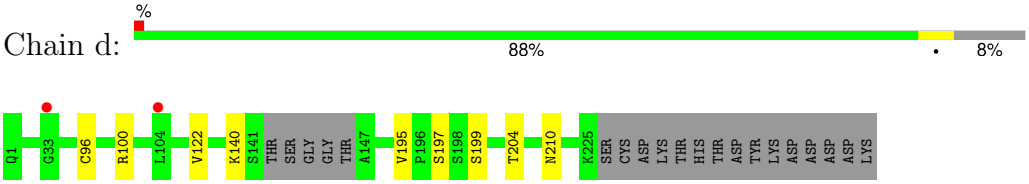
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain Z:



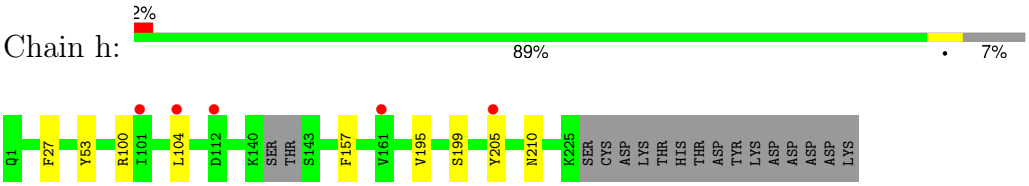
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain d:



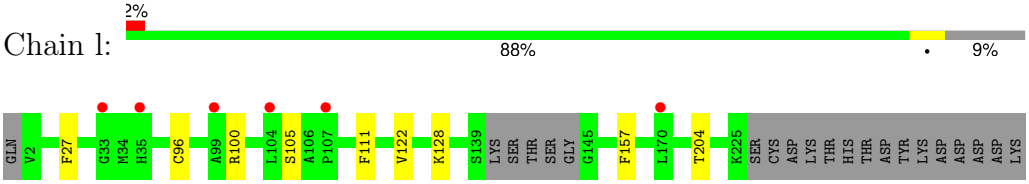
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain h:



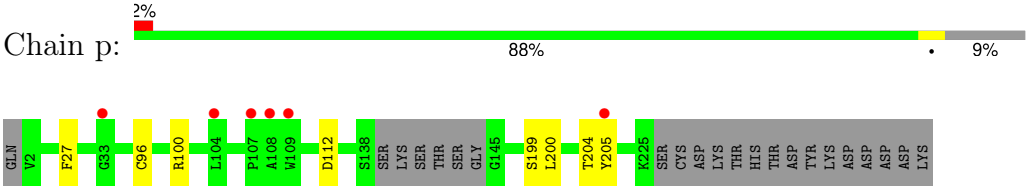
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain l:



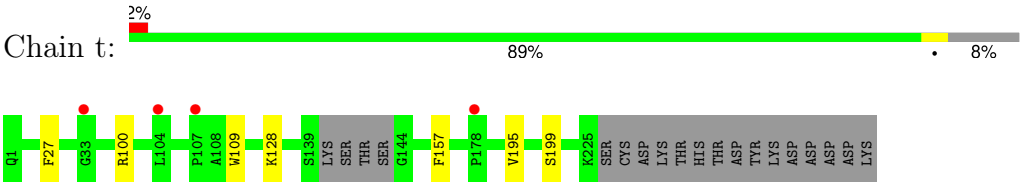
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain p:



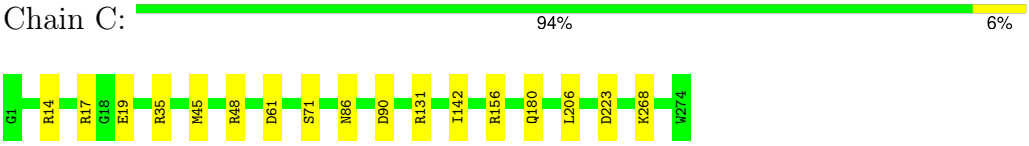
• Molecule 2: Fab heavy chain from antibody JTK191b E07

Chain t:



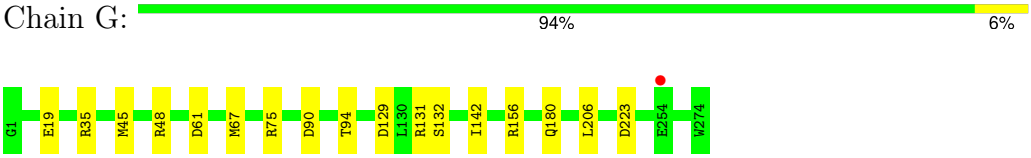
• Molecule 3: MHC class I antigen (Fragment)

Chain C:



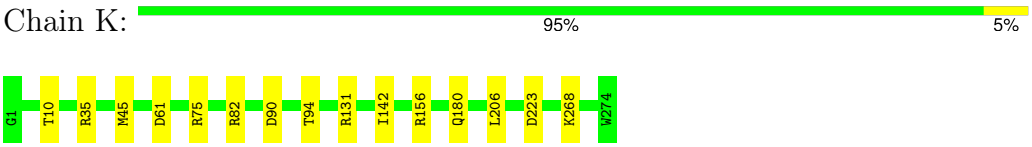
• Molecule 3: MHC class I antigen (Fragment)

Chain G:



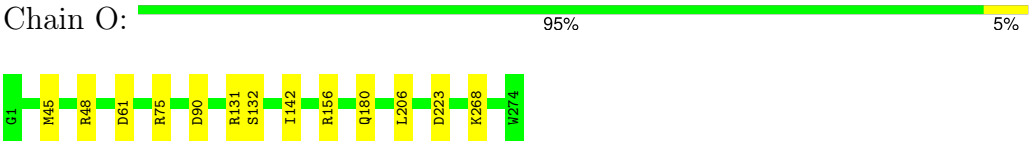
• Molecule 3: MHC class I antigen (Fragment)

Chain K:



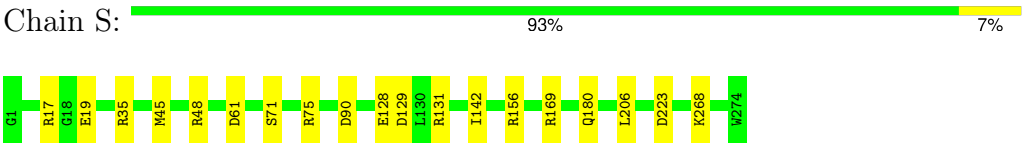
• Molecule 3: MHC class I antigen (Fragment)

Chain O:



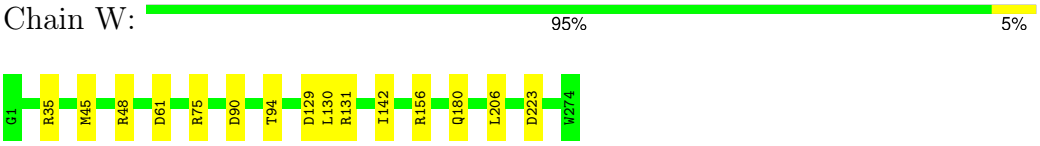
• Molecule 3: MHC class I antigen (Fragment)

Chain S:



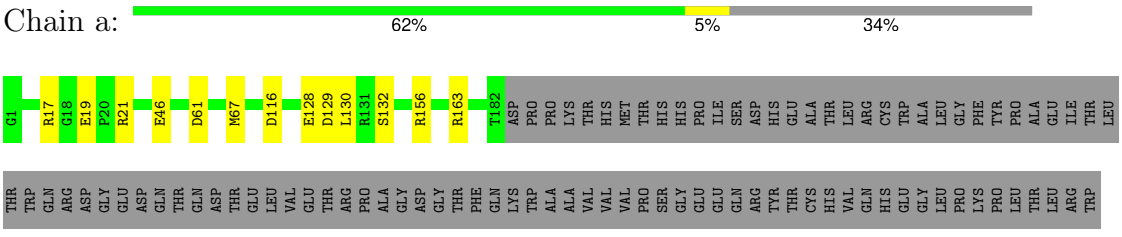
• Molecule 3: MHC class I antigen (Fragment)

Chain W:



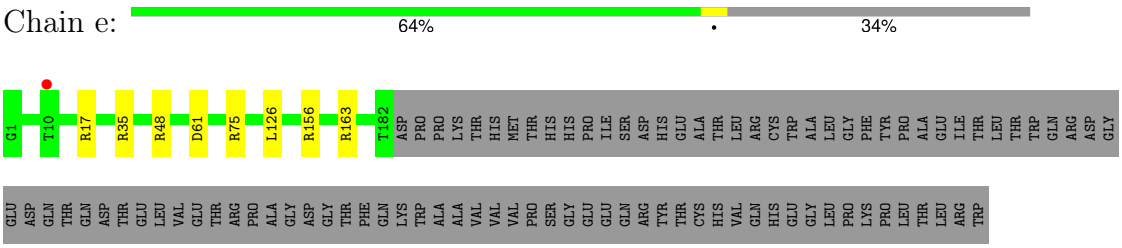
• Molecule 3: MHC class I antigen (Fragment)

Chain a:



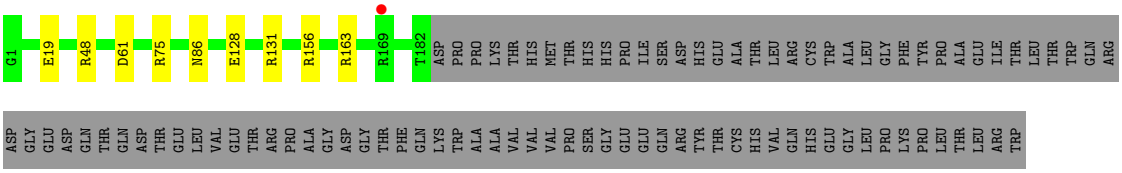
• Molecule 3: MHC class I antigen (Fragment)

Chain e:



• Molecule 3: MHC class I antigen (Fragment)

Chain i:



• Molecule 4: peptide

Chain 0:

• Molecule 4: peptide

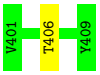
Chain 1:

• Molecule 4: peptide

Chain 2:

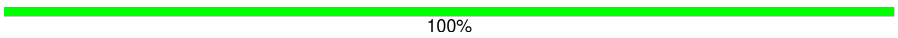
• Molecule 4: peptide

Chain 3:



• Molecule 4: peptide

Chain 4:



There are no outlier residues recorded for this chain.

• Molecule 4: peptide

Chain 5:

• Molecule 4: peptide

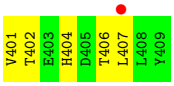
Chain 6:

• Molecule 4: peptide

Chain 7:

• Molecule 4: peptide

Chain 8:



• Molecule 5: Beta-2-microglobulin

Chain D:

There are no outlier residues recorded for this chain.

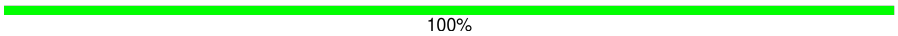
• Molecule 5: Beta-2-microglobulin

Chain H:

There are no outlier residues recorded for this chain.

• Molecule 5: Beta-2-microglobulin

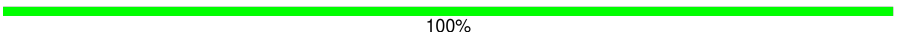
Chain L:



There are no outlier residues recorded for this chain.

• Molecule 5: Beta-2-microglobulin

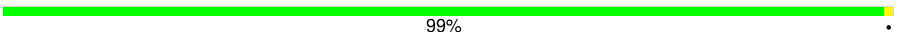
Chain P:



There are no outlier residues recorded for this chain.

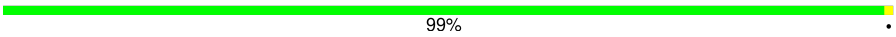
• Molecule 5: Beta-2-microglobulin

Chain T:



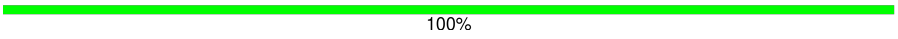
• Molecule 5: Beta-2-microglobulin

Chain X:



• Molecule 5: Beta-2-microglobulin

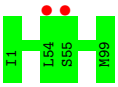
Chain b:



There are no outlier residues recorded for this chain.

• Molecule 5: Beta-2-microglobulin

Chain f:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	357.08Å 259.58Å 255.36Å 90.00° 133.13° 90.00°	Depositor
Resolution (Å)	30.13 – 3.84 30.13 – 3.84	Depositor EDS
% Data completeness (in resolution range)	95.7 (30.13-3.84) 90.6 (30.13-3.84)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.86 (at 3.86Å)	Xtriage
Refinement program	PHENIX v1.20.1_4487	Depositor
R, R_{free}	0.216 , 0.263 0.217 , 0.261	Depositor DCC
R_{free} test set	152406 reflections (1.30%)	wwPDB-VP
Wilson B-factor (Å^2)	95.5	Xtriage
Anisotropy	0.211	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 83.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.016 for h+2*l,k,-h-l 0.018 for k+l,h+l,-l 0.017 for -k+l,-h-l,-l 0.020 for -h+k-l,-l,-k 0.017 for -h-k-l,l,k 0.077 for h-k+l,l,-h-l 0.054 for -k-l,-h-l,k 0.045 for h+k+l,-l,-h-l 0.068 for k-l,h+l,-k 0.023 for h,-k,-h-l 0.044 for -h-2*l,-k,l	Xtriage
F_o,F_c correlation	0.88	EDS
Total number of atoms	63611	wwPDB-VP
Average B, all atoms (Å^2)	122.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.92% 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	0.30	0/1574	0.52	0/2152
1	E	0.30	0/1574	0.53	0/2152
1	I	0.31	0/1574	0.53	0/2152
1	M	0.31	0/1574	0.56	0/2152
1	Q	0.30	0/1574	0.53	0/2152
1	U	0.31	0/1574	0.55	0/2152
1	Y	0.29	0/1574	0.52	0/2152
1	c	0.28	0/1574	0.53	0/2152
1	g	0.28	0/1574	0.55	0/2152
1	k	0.27	0/1574	0.52	0/2152
1	o	0.27	0/1556	0.53	0/2129
1	s	0.27	0/1574	0.52	0/2152
2	B	0.31	0/1728	0.56	0/2357
2	F	0.31	0/1728	0.57	0/2357
2	J	0.32	0/1719	0.57	0/2346
2	N	0.37	0/1719	0.62	0/2346
2	R	0.32	0/1723	0.57	0/2351
2	V	0.31	0/1719	0.58	0/2346
2	Z	0.32	0/1724	0.54	0/2352
2	d	0.30	0/1723	0.56	0/2350
2	h	0.29	0/1738	0.57	0/2370
2	l	0.28	0/1710	0.53	0/2334
2	p	0.28	0/1704	0.52	0/2326
2	t	0.29	0/1723	0.56	0/2351
3	C	0.32	0/2287	0.57	0/3101
3	G	0.32	0/2287	0.56	0/3101
3	K	0.32	0/2287	0.59	0/3101
3	O	0.32	0/2287	0.58	0/3101
3	S	0.32	0/2287	0.58	0/3101
3	W	0.33	0/2287	0.58	0/3101
3	a	0.29	0/1517	0.57	0/2045
3	e	0.32	0/1517	0.60	0/2045
3	i	0.28	0/1517	0.58	0/2045
4	0	0.29	0/77	0.70	0/105

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
4	1	0.34	0/77	0.60	0/105
4	2	0.37	0/77	0.61	0/105
4	3	0.34	0/77	0.65	0/105
4	4	0.33	0/77	0.80	0/105
4	5	0.35	0/77	0.69	0/105
4	6	0.25	0/77	0.49	0/105
4	7	0.30	0/77	0.53	0/105
4	8	0.37	0/77	0.56	0/105
5	D	0.29	0/852	0.52	0/1152
5	H	0.31	0/852	0.53	0/1152
5	L	0.28	0/852	0.51	0/1152
5	P	0.30	0/852	0.53	0/1152
5	T	0.30	0/852	0.54	0/1152
5	X	0.29	0/852	0.54	0/1152
5	b	0.28	0/852	0.55	0/1152
5	f	0.27	0/852	0.55	0/1152
All	All	0.30	0/65310	0.56	0/88889

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

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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	203/214 (95%)	188 (93%)	15 (7%)	0	100	100

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Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	E	203/214 (95%)	187 (92%)	16 (8%)	0	100	100
1	I	203/214 (95%)	189 (93%)	14 (7%)	0	100	100
1	M	203/214 (95%)	188 (93%)	15 (7%)	0	100	100
1	Q	203/214 (95%)	190 (94%)	13 (6%)	0	100	100
1	U	203/214 (95%)	189 (93%)	14 (7%)	0	100	100
1	Y	203/214 (95%)	187 (92%)	16 (8%)	0	100	100
1	c	203/214 (95%)	188 (93%)	15 (7%)	0	100	100
1	g	203/214 (95%)	188 (93%)	15 (7%)	0	100	100
1	k	203/214 (95%)	187 (92%)	16 (8%)	0	100	100
1	o	201/214 (94%)	187 (93%)	14 (7%)	0	100	100
1	s	203/214 (95%)	186 (92%)	17 (8%)	0	100	100
2	B	217/240 (90%)	207 (95%)	10 (5%)	0	100	100
2	F	217/240 (90%)	205 (94%)	12 (6%)	0	100	100
2	J	216/240 (90%)	204 (94%)	12 (6%)	0	100	100
2	N	216/240 (90%)	207 (96%)	9 (4%)	0	100	100
2	R	217/240 (90%)	208 (96%)	9 (4%)	0	100	100
2	V	216/240 (90%)	206 (95%)	10 (5%)	0	100	100
2	Z	216/240 (90%)	206 (95%)	10 (5%)	0	100	100
2	d	216/240 (90%)	206 (95%)	10 (5%)	0	100	100
2	h	219/240 (91%)	209 (95%)	10 (5%)	0	100	100
2	l	215/240 (90%)	205 (95%)	10 (5%)	0	100	100
2	p	214/240 (89%)	205 (96%)	9 (4%)	0	100	100
2	t	217/240 (90%)	205 (94%)	12 (6%)	0	100	100
3	C	272/274 (99%)	256 (94%)	16 (6%)	0	100	100
3	G	272/274 (99%)	258 (95%)	14 (5%)	0	100	100
3	K	272/274 (99%)	257 (94%)	15 (6%)	0	100	100
3	O	272/274 (99%)	259 (95%)	13 (5%)	0	100	100
3	S	272/274 (99%)	258 (95%)	14 (5%)	0	100	100
3	W	272/274 (99%)	259 (95%)	13 (5%)	0	100	100
3	a	180/274 (66%)	170 (94%)	10 (6%)	0	100	100
3	e	180/274 (66%)	171 (95%)	9 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	i	180/274 (66%)	167 (93%)	13 (7%)	0	100	100
4	0	7/9 (78%)	7 (100%)	0	0	100	100
4	1	7/9 (78%)	7 (100%)	0	0	100	100
4	2	7/9 (78%)	7 (100%)	0	0	100	100
4	3	7/9 (78%)	7 (100%)	0	0	100	100
4	4	7/9 (78%)	7 (100%)	0	0	100	100
4	5	7/9 (78%)	7 (100%)	0	0	100	100
4	6	7/9 (78%)	7 (100%)	0	0	100	100
4	7	7/9 (78%)	7 (100%)	0	0	100	100
4	8	7/9 (78%)	7 (100%)	0	0	100	100
5	D	97/99 (98%)	92 (95%)	5 (5%)	0	100	100
5	H	97/99 (98%)	92 (95%)	5 (5%)	0	100	100
5	L	97/99 (98%)	91 (94%)	6 (6%)	0	100	100
5	P	97/99 (98%)	90 (93%)	7 (7%)	0	100	100
5	T	97/99 (98%)	92 (95%)	5 (5%)	0	100	100
5	X	97/99 (98%)	92 (95%)	5 (5%)	0	100	100
5	b	97/99 (98%)	92 (95%)	5 (5%)	0	100	100
5	f	97/99 (98%)	93 (96%)	4 (4%)	0	100	100
All	All	8041/8787 (92%)	7579 (94%)	462 (6%)	0	100	100

There are no Ramachandran outliers to report.

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	172/180 (96%)	171 (99%)	1 (1%)	84	88
1	E	172/180 (96%)	169 (98%)	3 (2%)	56	72
1	I	172/180 (96%)	169 (98%)	3 (2%)	56	72

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	M	172/180 (96%)	169 (98%)	3 (2%)	56 72
1	Q	172/180 (96%)	168 (98%)	4 (2%)	45 64
1	U	172/180 (96%)	169 (98%)	3 (2%)	56 72
1	Y	172/180 (96%)	170 (99%)	2 (1%)	67 78
1	c	172/180 (96%)	170 (99%)	2 (1%)	67 78
1	g	172/180 (96%)	171 (99%)	1 (1%)	84 88
1	k	172/180 (96%)	168 (98%)	4 (2%)	45 64
1	o	170/180 (94%)	168 (99%)	2 (1%)	67 78
1	s	172/180 (96%)	170 (99%)	2 (1%)	67 78
2	B	187/205 (91%)	177 (95%)	10 (5%)	19 45
2	F	187/205 (91%)	175 (94%)	12 (6%)	14 40
2	J	186/205 (91%)	171 (92%)	15 (8%)	9 33
2	N	186/205 (91%)	174 (94%)	12 (6%)	14 39
2	R	186/205 (91%)	180 (97%)	6 (3%)	34 57
2	V	186/205 (91%)	173 (93%)	13 (7%)	12 37
2	Z	187/205 (91%)	176 (94%)	11 (6%)	16 42
2	d	187/205 (91%)	178 (95%)	9 (5%)	21 47
2	h	188/205 (92%)	179 (95%)	9 (5%)	21 47
2	l	185/205 (90%)	176 (95%)	9 (5%)	21 46
2	p	184/205 (90%)	176 (96%)	8 (4%)	25 50
2	t	186/205 (91%)	179 (96%)	7 (4%)	28 53
3	C	231/231 (100%)	214 (93%)	17 (7%)	11 35
3	G	231/231 (100%)	214 (93%)	17 (7%)	11 35
3	K	231/231 (100%)	216 (94%)	15 (6%)	14 39
3	O	231/231 (100%)	218 (94%)	13 (6%)	17 44
3	S	231/231 (100%)	212 (92%)	19 (8%)	9 33
3	W	231/231 (100%)	216 (94%)	15 (6%)	14 39
3	a	151/231 (65%)	138 (91%)	13 (9%)	8 32
3	e	151/231 (65%)	143 (95%)	8 (5%)	19 45
3	i	151/231 (65%)	142 (94%)	9 (6%)	16 42
4	0	9/9 (100%)	7 (78%)	2 (22%)	1 5

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
4	1	9/9 (100%)	7 (78%)	2 (22%)	1 5
4	2	9/9 (100%)	7 (78%)	2 (22%)	1 5
4	3	9/9 (100%)	8 (89%)	1 (11%)	5 21
4	4	9/9 (100%)	9 (100%)	0	100 100
4	5	9/9 (100%)	6 (67%)	3 (33%)	0 1
4	6	9/9 (100%)	6 (67%)	3 (33%)	0 1
4	7	9/9 (100%)	4 (44%)	5 (56%)	0 0
4	8	9/9 (100%)	4 (44%)	5 (56%)	0 0
5	D	94/94 (100%)	94 (100%)	0	100 100
5	H	94/94 (100%)	94 (100%)	0	100 100
5	L	94/94 (100%)	94 (100%)	0	100 100
5	P	94/94 (100%)	94 (100%)	0	100 100
5	T	94/94 (100%)	93 (99%)	1 (1%)	70 79
5	X	94/94 (100%)	93 (99%)	1 (1%)	70 79
5	b	94/94 (100%)	94 (100%)	0	100 100
5	f	94/94 (100%)	94 (100%)	0	100 100
All	All	6969/7532 (92%)	6667 (96%)	302 (4%)	25 50

All (302) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	108	LEU
2	B	27	PHE
2	B	96	CYS
2	B	100	ARG
2	B	112	ASP
2	B	124	SER
2	B	128	LYS
2	B	195	VAL
2	B	197	SER
2	B	204	THR
2	B	210	ASN
3	C	14	ARG
3	C	17	ARG
3	C	19	GLU
3	C	35	ARG

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Mol	Chain	Res	Type
3	C	45	MET
3	C	48	ARG
3	C	61	ASP
3	C	71	SER
3	C	86	ASN
3	C	90	ASP
3	C	131	ARG
3	C	142	ILE
3	C	156	ARG
3	C	180	GLN
3	C	206	LEU
3	C	223	ASP
3	C	268	LYS
4	0	404	HIS
4	0	407	LEU
1	E	2	SER
1	E	108	LEU
1	E	137	LEU
2	F	96	CYS
2	F	98	LYS
2	F	100	ARG
2	F	128	LYS
2	F	157	PHE
2	F	192	VAL
2	F	193	VAL
2	F	194	THR
2	F	199	SER
2	F	200	LEU
2	F	202	THR
2	F	204	THR
3	G	19	GLU
3	G	35	ARG
3	G	45	MET
3	G	48	ARG
3	G	61	ASP
3	G	67	MET
3	G	75	ARG
3	G	90	ASP
3	G	94	THR
3	G	129	ASP
3	G	131	ARG
3	G	132	SER

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Mol	Chain	Res	Type
3	G	142	ILE
3	G	156	ARG
3	G	180	GLN
3	G	206	LEU
3	G	223	ASP
4	1	404	HIS
4	1	406	THR
1	I	88	HIS
1	I	97	VAL
1	I	108	LEU
2	J	27	PHE
2	J	96	CYS
2	J	100	ARG
2	J	112	ASP
2	J	122	VAL
2	J	157	PHE
2	J	192	VAL
2	J	193	VAL
2	J	194	THR
2	J	195	VAL
2	J	197	SER
2	J	199	SER
2	J	200	LEU
2	J	204	THR
2	J	210	ASN
3	K	10	THR
3	K	35	ARG
3	K	45	MET
3	K	61	ASP
3	K	75	ARG
3	K	82	ARG
3	K	90	ASP
3	K	94	THR
3	K	131	ARG
3	K	142	ILE
3	K	156	ARG
3	K	180	GLN
3	K	206	LEU
3	K	223	ASP
3	K	268	LYS
4	2	404	HIS
4	2	406	THR

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Mol	Chain	Res	Type
1	M	88	HIS
1	M	108	LEU
1	M	137	LEU
2	N	1	GLN
2	N	29	PHE
2	N	72	ARG
2	N	104	LEU
2	N	112	ASP
2	N	122	VAL
2	N	128	LYS
2	N	146	THR
2	N	157	PHE
2	N	199	SER
2	N	200	LEU
2	N	204	THR
3	O	45	MET
3	O	48	ARG
3	O	61	ASP
3	O	75	ARG
3	O	90	ASP
3	O	131	ARG
3	O	132	SER
3	O	142	ILE
3	O	156	ARG
3	O	180	GLN
3	O	206	LEU
3	O	223	ASP
3	O	268	LYS
4	3	406	THR
1	Q	88	HIS
1	Q	97	VAL
1	Q	108	LEU
1	Q	137	LEU
2	R	100	ARG
2	R	111	PHE
2	R	112	ASP
2	R	122	VAL
2	R	157	PHE
2	R	200	LEU
3	S	17	ARG
3	S	19	GLU
3	S	35	ARG

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Mol	Chain	Res	Type
3	S	45	MET
3	S	48	ARG
3	S	61	ASP
3	S	71	SER
3	S	75	ARG
3	S	90	ASP
3	S	128	GLU
3	S	129	ASP
3	S	131	ARG
3	S	142	ILE
3	S	156	ARG
3	S	169	ARG
3	S	180	GLN
3	S	206	LEU
3	S	223	ASP
3	S	268	LYS
5	T	28	SER
1	U	104	LYS
1	U	108	LEU
1	U	137	LEU
2	V	27	PHE
2	V	30	SER
2	V	53	TYR
2	V	96	CYS
2	V	100	ARG
2	V	101	ILE
2	V	104	LEU
2	V	112	ASP
2	V	128	LYS
2	V	157	PHE
2	V	198	SER
2	V	199	SER
2	V	200	LEU
3	W	35	ARG
3	W	45	MET
3	W	48	ARG
3	W	61	ASP
3	W	75	ARG
3	W	90	ASP
3	W	94	THR
3	W	129	ASP
3	W	130	LEU

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Mol	Chain	Res	Type
3	W	131	ARG
3	W	142	ILE
3	W	156	ARG
3	W	180	GLN
3	W	206	LEU
3	W	223	ASP
4	5	404	HIS
4	5	406	THR
4	5	408	LEU
5	X	28	SER
1	Y	88	HIS
1	Y	137	LEU
2	Z	27	PHE
2	Z	96	CYS
2	Z	100	ARG
2	Z	111	PHE
2	Z	112	ASP
2	Z	114	TRP
2	Z	128	LYS
2	Z	197	SER
2	Z	199	SER
2	Z	200	LEU
2	Z	204	THR
3	a	17	ARG
3	a	19	GLU
3	a	21	ARG
3	a	46	GLU
3	a	61	ASP
3	a	67	MET
3	a	116	ASP
3	a	128	GLU
3	a	129	ASP
3	a	130	LEU
3	a	132	SER
3	a	156	ARG
3	a	163	ARG
4	6	404	HIS
4	6	406	THR
4	6	407	LEU
1	c	108	LEU
1	c	137	LEU
2	d	96	CYS

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Mol	Chain	Res	Type
2	d	100	ARG
2	d	122	VAL
2	d	140	LYS
2	d	195	VAL
2	d	197	SER
2	d	199	SER
2	d	204	THR
2	d	210	ASN
3	e	17	ARG
3	e	35	ARG
3	e	48	ARG
3	e	61	ASP
3	e	75	ARG
3	e	126	LEU
3	e	156	ARG
3	e	163	ARG
4	7	402	THR
4	7	404	HIS
4	7	406	THR
4	7	407	LEU
4	7	408	LEU
1	g	88	HIS
2	h	27	PHE
2	h	53	TYR
2	h	100	ARG
2	h	104	LEU
2	h	157	PHE
2	h	195	VAL
2	h	199	SER
2	h	205	TYR
2	h	210	ASN
3	i	19	GLU
3	i	48	ARG
3	i	61	ASP
3	i	75	ARG
3	i	86	ASN
3	i	128	GLU
3	i	131	ARG
3	i	156	ARG
3	i	163	ARG
4	8	401	VAL
4	8	402	THR

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Mol	Chain	Res	Type
4	8	404	HIS
4	8	406	THR
4	8	407	LEU
1	k	16	GLN
1	k	88	HIS
1	k	108	LEU
1	k	137	LEU
2	l	27	PHE
2	l	96	CYS
2	l	100	ARG
2	l	105	SER
2	l	111	PHE
2	l	122	VAL
2	l	128	LYS
2	l	157	PHE
2	l	204	THR
1	o	88	HIS
1	o	97	VAL
2	p	27	PHE
2	p	96	CYS
2	p	100	ARG
2	p	112	ASP
2	p	199	SER
2	p	200	LEU
2	p	204	THR
2	p	205	TYR
1	s	88	HIS
1	s	108	LEU
2	t	27	PHE
2	t	100	ARG
2	t	109	TRP
2	t	128	LYS
2	t	157	PHE
2	t	195	VAL
2	t	199	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
3	C	70	HIS
3	C	224	GLN
3	G	62	GLN

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Mol	Chain	Res	Type
3	G	66	ASN
3	G	127	ASN
5	L	8	GLN
1	M	65	ASN
2	N	57	HIS
1	Y	68	ASN
3	a	54	GLN
1	c	65	ASN
3	i	72	GLN
1	o	65	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	205/214 (95%)	-0.35	0	100	100	83, 110, 158, 171	0
1	E	205/214 (95%)	-0.40	0	100	100	80, 106, 145, 172	0
1	I	205/214 (95%)	-0.34	0	100	100	77, 102, 149, 163	0
1	M	205/214 (95%)	-0.37	0	100	100	74, 104, 138, 154	0
1	Q	205/214 (95%)	-0.40	0	100	100	72, 97, 133, 165	0
1	U	205/214 (95%)	-0.33	0	100	100	69, 103, 155, 171	0
1	Y	205/214 (95%)	-0.26	1 (0%)	87	75	97, 120, 142, 163	0
1	c	205/214 (95%)	-0.06	1 (0%)	87	75	106, 143, 164, 183	0
1	g	205/214 (95%)	0.14	1 (0%)	87	75	111, 152, 169, 174	0
1	k	205/214 (95%)	-0.08	1 (0%)	87	75	135, 159, 176, 183	0
1	o	203/214 (94%)	-0.09	1 (0%)	87	75	137, 160, 176, 181	0
1	s	205/214 (95%)	0.02	1 (0%)	87	75	140, 167, 181, 190	0
2	B	221/240 (92%)	-0.19	1 (0%)	87	75	82, 114, 163, 184	0
2	F	221/240 (92%)	-0.26	0	100	100	77, 115, 163, 193	0
2	J	220/240 (91%)	-0.29	0	100	100	76, 114, 160, 187	0
2	N	220/240 (91%)	-0.24	1 (0%)	87	75	74, 110, 150, 179	0
2	R	221/240 (92%)	-0.28	1 (0%)	87	75	77, 107, 143, 174	0
2	V	220/240 (91%)	-0.25	1 (0%)	87	75	73, 110, 158, 175	0
2	Z	220/240 (91%)	-0.08	5 (2%)	61	46	100, 126, 160, 179	0
2	d	220/240 (91%)	-0.07	2 (0%)	81	67	112, 135, 164, 179	0
2	h	223/240 (92%)	0.21	5 (2%)	62	47	118, 146, 172, 190	0
2	l	219/240 (91%)	0.01	6 (2%)	56	44	138, 161, 177, 182	0
2	p	218/240 (90%)	0.02	6 (2%)	55	43	129, 160, 179, 190	0
2	t	221/240 (92%)	0.12	4 (1%)	67	51	132, 159, 180, 189	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
3	C	274/274 (100%)	-0.31	0 100 100	78, 102, 151, 170	0
3	G	274/274 (100%)	-0.33	1 (0%) 89 79	74, 97, 147, 175	0
3	K	274/274 (100%)	-0.41	0 100 100	70, 94, 137, 164	0
3	O	274/274 (100%)	-0.40	0 100 100	69, 93, 142, 166	0
3	S	274/274 (100%)	-0.41	0 100 100	70, 91, 146, 177	0
3	W	274/274 (100%)	-0.32	0 100 100	72, 92, 150, 187	0
3	a	182/274 (66%)	-0.07	0 100 100	104, 125, 142, 162	0
3	e	182/274 (66%)	0.07	1 (0%) 87 75	118, 135, 152, 166	0
3	i	182/274 (66%)	0.21	1 (0%) 87 75	126, 147, 167, 180	0
4	0	9/9 (100%)	-0.31	0 100 100	84, 89, 104, 109	0
4	1	9/9 (100%)	-0.17	0 100 100	76, 92, 101, 106	0
4	2	9/9 (100%)	-0.21	0 100 100	78, 84, 105, 110	0
4	3	9/9 (100%)	-0.24	0 100 100	76, 83, 98, 100	0
4	4	9/9 (100%)	-0.49	0 100 100	70, 83, 97, 99	0
4	5	9/9 (100%)	-0.03	0 100 100	77, 79, 96, 100	0
4	6	9/9 (100%)	0.13	0 100 100	118, 126, 137, 147	0
4	7	9/9 (100%)	0.41	0 100 100	118, 131, 136, 141	0
4	8	9/9 (100%)	0.74	1 (11%) 12 14	130, 142, 150, 151	0
5	D	99/99 (100%)	-0.33	0 100 100	89, 110, 138, 149	0
5	H	99/99 (100%)	-0.33	0 100 100	76, 105, 131, 141	0
5	L	99/99 (100%)	-0.34	0 100 100	73, 103, 131, 152	0
5	P	99/99 (100%)	-0.45	0 100 100	76, 99, 128, 143	0
5	T	99/99 (100%)	-0.43	0 100 100	74, 95, 125, 141	0
5	X	99/99 (100%)	-0.31	0 100 100	78, 106, 140, 153	0
5	b	99/99 (100%)	-0.26	0 100 100	106, 125, 146, 165	0
5	f	99/99 (100%)	0.03	2 (2%) 64 49	122, 140, 158, 173	0
All	All	8165/8787 (92%)	-0.20	44 (0%) 87 75	69, 122, 170, 193	0

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	Z	33	GLY	4.9
2	h	101	ILE	4.4

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Mol	Chain	Res	Type	RSRZ
2	Z	99	ALA	4.2
2	l	104	LEU	3.9
2	l	33	GLY	3.5
2	t	107	PRO	3.3
2	h	104	LEU	3.3
2	h	205	TYR	3.3
2	Z	104	LEU	3.0
2	p	104	LEU	3.0
1	g	108	LEU	2.9
2	p	205	TYR	2.9
2	d	33	GLY	2.7
2	p	107	PRO	2.7
2	h	161	VAL	2.7
2	t	33	GLY	2.6
2	d	104	LEU	2.6
1	Y	144	GLY	2.5
2	p	33	GLY	2.5
2	N	104	LEU	2.5
2	h	112	ASP	2.5
2	p	108	ALA	2.4
3	e	10	THR	2.4
2	l	99	ALA	2.4
2	l	107	PRO	2.4
2	l	35	HIS	2.4
2	p	109	TRP	2.3
2	t	178	PRO	2.3
2	R	33	GLY	2.3
2	V	104	LEU	2.3
5	f	54	LEU	2.3
1	o	108	LEU	2.2
2	Z	101	ILE	2.2
2	B	104	LEU	2.2
2	l	170	LEU	2.2
3	i	169	ARG	2.1
2	Z	106	ALA	2.1
3	G	254	GLU	2.1
1	k	4	SER	2.0
5	f	55	SER	2.0
2	t	104	LEU	2.0
1	s	12	VAL	2.0
1	c	191	ARG	2.0
4	8	407	LEU	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.