Full wwPDB X-ray Structure Validation Report (i)

Feb 20, 2023 – 03:51 pm GMT

PDB ID	:	8ATH
Title	:	CRYSTAL STRUCTURE OF LAMP1 IN COMPLEX WITH FAB-B.
Authors	:	Mathieu, M.; Dupuy, A.
Deposited on	:	2022-08-23
Resolution	:	2.37 Å(reported)

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

|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.32.1
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)	:	2.32.1

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 2.37 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.
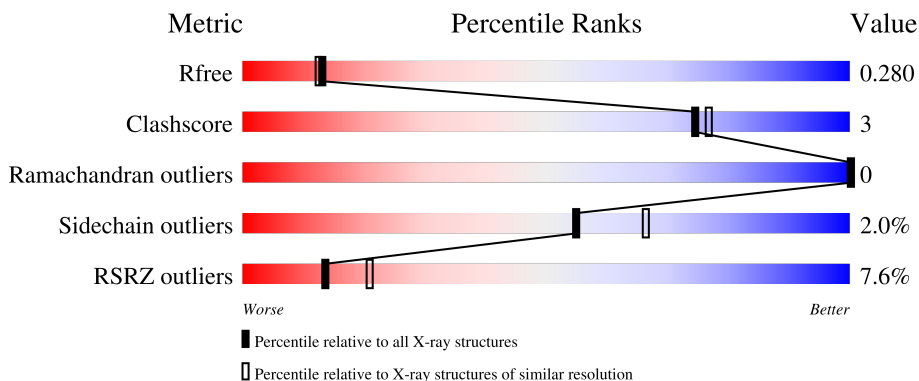
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1164 (2.36-2.36)
Clashscore	141614	1232 (2.36-2.36)
Ramachandran outliers	138981	1211 (2.36-2.36)
Sidechain outliers	138945	1212 (2.36-2.36)
RSRZ outliers	127900	1150 (2.36-2.36)

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	171	% 91% 7% ··
1	B	171	11% 84% 11% 5%
2	E	234	3% 80% 9% 11%
2	H	234	12% 82% 7% 11%
3	F	213	13% 79% 10% · 10%

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Mol	Chain	Length	Quality of chain
3	L	213	2% 84% 9% · 6%

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 8972 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 Lysosome-associated membrane glycoprotein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	168	Total	C	N	O	S	0	0	0
			1296	799	229	257	11			
1	B	162	Total	C	N	O	S	0	0	0
			1249	773	221	244	11			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	25	GLY	-	expression tag	UNP P11279
A	26	SER	-	expression tag	UNP P11279
A	27	HIS	-	expression tag	UNP P11279
A	28	MET	-	expression tag	UNP P11279
B	25	GLY	-	expression tag	UNP P11279
B	26	SER	-	expression tag	UNP P11279
B	27	HIS	-	expression tag	UNP P11279
B	28	MET	-	expression tag	UNP P11279

- Molecule 2 is a protein called Fab B Heavy Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	208	Total	C	N	O	S	0	0	0
			1562	996	255	306	5			
2	H	208	Total	C	N	O	S	0	0	0
			1566	998	256	307	5			

- Molecule 3 is a protein called Fab B Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	192	Total	C	N	O	S	0	0	0
			1473	917	246	304	6			
3	L	201	Total	C	N	O	S	0	0	0
			1557	976	260	315	6			
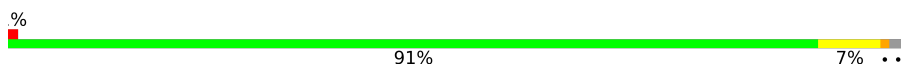
• Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	66	Total 66	O 66	0	0
4	B	18	Total 18	O 18	0	0
4	E	22	Total 22	O 22	0	0
4	F	32	Total 32	O 32	0	0
4	H	69	Total 69	O 69	0	0
4	L	62	Total 62	O 62	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.
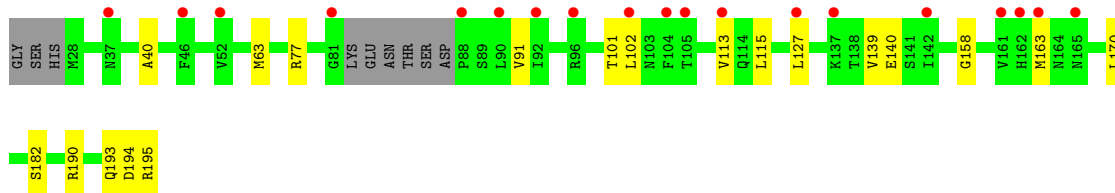
• Molecule 1: Lysosome-associated membrane glycoprotein 1

Chain A:

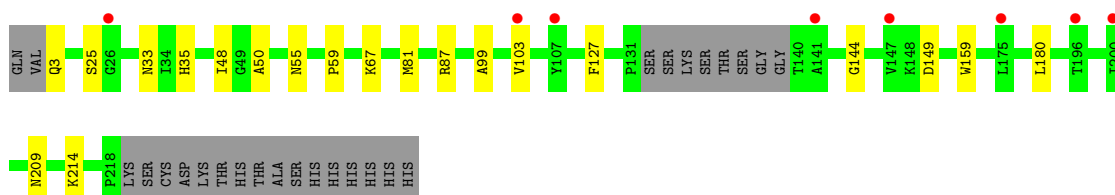

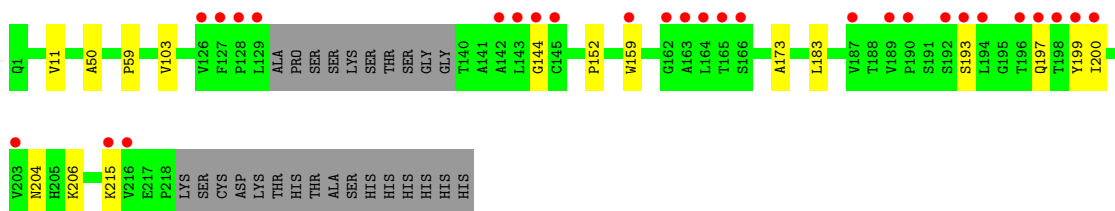• Molecule 1: Lysosome-associated membrane glycoprotein 1

Chain B:

• Molecule 2: Fab B Heavy Chain

Chain E:

• Molecule 2: Fab B Heavy Chain

Chain H:

• Molecule 3: Fab B Light Chain

Chain F:
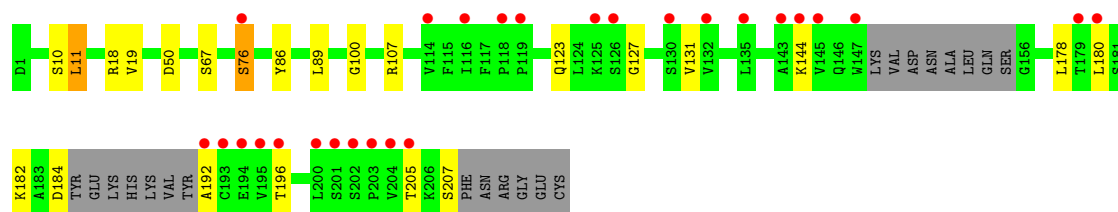
• Molecule 3: Fab B Light Chain

Chain L:
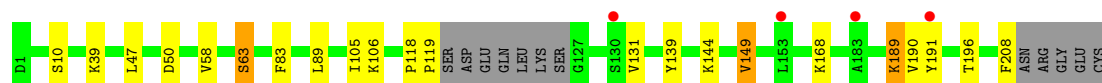
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	149.93Å　　93.68Å　　108.01Å 90.00°　　115.93°　　90.00°	Depositor
Resolution (Å)	72.08　–　2.37 72.08　–　2.37	Depositor EDS
% Data completeness (in resolution range)	99.0 (72.08-2.37) 98.9 (72.08-2.37)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.22 (at 2.37Å)	Xtriage
Refinement program	BUSTER 2.11.8	Depositor
R, R_{free}	0.251　,　0.290 0.243　,　0.280	Depositor DCC
R_{free} test set	2767 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	49.8	Xtriage
Anisotropy	0.388	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 41.6	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	8972	wwPDB-VP
Average B, all atoms (Å^2)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.65% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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	0.45	0/1317	0.66	0/1780
1	B	0.38	0/1269	0.62	0/1713
2	E	0.38	0/1603	0.58	0/2190
2	H	0.45	0/1606	0.62	0/2193
3	F	0.39	0/1502	0.59	0/2039
3	L	0.47	0/1591	0.65	0/2161
All	All	0.42	0/8888	0.62	0/12076

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 ⓘ

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	1296	0	1260	6	1
1	B	1249	0	1219	9	1
2	E	1562	0	1529	12	0
2	H	1566	0	1537	9	0
3	F	1473	0	1420	11	0
3	L	1557	0	1505	11	0
4	A	66	0	0	0	0
4	B	18	0	0	0	0
4	E	22	0	0	0	0
4	F	32	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	H	69	0	0	0	0
4	L	62	0	0	2	0
All	All	8972	0	8470	55	1

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 3.

All (55) 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)
3:F:192:ALA:HA	3:F:207:SER:HB3	1.74	0.69
2:E:48:ILE:HG21	2:E:81:MET:HE3	1.76	0.68
3:F:11:LEU:HD13	3:F:19:VAL:HG13	1.78	0.66
3:L:119:PRO:HG3	3:L:131:VAL:HB	1.77	0.66
1:A:158:GLY:HA2	1:A:170:LEU:O	2.03	0.59
3:L:63:SER:HB3	4:L:318:HOH:O	2.01	0.59
1:B:158:GLY:HA2	1:B:170:LEU:O	2.03	0.58
3:F:127:GLY:HA2	3:F:182:LYS:HD2	1.86	0.58
3:F:18:ARG:HH21	3:F:76:SER:HG	1.54	0.56
2:E:48:ILE:HD13	2:E:81:MET:CE	2.37	0.54
1:B:63:MET:HG2	1:B:127:LEU:O	2.09	0.53
2:E:3:GLN:OE1	2:E:25:SER:OG	2.26	0.52
3:L:118:PRO:HB3	3:L:191:TYR:OH	2.10	0.52
2:E:103:VAL:HG11	3:F:89:LEU:HD23	1.92	0.52
3:F:192:ALA:HA	3:F:207:SER:CB	2.38	0.52
2:H:204:ASN:HD21	2:H:206:LYS:HE3	1.75	0.51
2:E:35:HIS:CD2	2:E:99:ALA:HB3	2.46	0.51
2:E:33:ASN:HB2	2:E:99:ALA:O	2.11	0.50
1:B:115:LEU:HD11	1:B:140:GLU:HB3	1.95	0.48
1:A:63:MET:HG2	1:A:127:LEU:O	2.13	0.47
1:B:102:LEU:HD22	1:B:113:VAL:HG11	1.97	0.47
2:E:50:ALA:O	2:E:59:PRO:HD2	2.16	0.46
1:A:195:ARG:HA	1:A:195:ARG:HD3	1.70	0.46
1:A:40:ALA:HB3	1:A:182:SER:HA	1.98	0.46
1:B:77:ARG:HD3	1:B:91:VAL:HG11	1.97	0.46
3:F:180:LEU:HD13	3:F:184:ASP:HB2	1.98	0.46
1:B:40:ALA:HB3	1:B:182:SER:HA	1.97	0.46
2:H:50:ALA:O	2:H:59:PRO:HD2	2.16	0.45
2:H:144:GLY:HA2	2:H:159:TRP:CZ2	2.51	0.45
2:H:173:ALA:HA	2:H:183:LEU:HB3	1.98	0.45
2:E:149:ASP:HB3	2:E:180:LEU:HD13	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:48:ILE:HD13	2:E:81:MET:HE3	1.99	0.44
1:B:139:VAL:HB	1:B:163:MET:HB3	1.99	0.44
3:L:144:LYS:HB3	3:L:196:THR:HB	1.99	0.44
3:L:149:VAL:HA	3:L:190:VAL:O	2.18	0.44
1:B:194:ASP:O	1:B:195:ARG:HB2	2.18	0.44
3:F:144:LYS:HB3	3:F:196:THR:HB	1.99	0.44
3:L:47:LEU:HA	3:L:58:VAL:HG21	2.01	0.43
2:E:144:GLY:HA2	2:E:159:TRP:CZ2	2.54	0.43
3:L:83:PHE:HB3	3:L:105:ILE:HG12	2.01	0.43
2:H:200:ILE:HG12	2:H:215:LYS:HG2	2.01	0.42
3:F:131:VAL:HG13	3:F:178:LEU:HB3	2.01	0.42
3:L:106:LYS:HA	3:L:139:TYR:OH	2.20	0.42
2:E:127:PHE:CE1	3:F:123:GLN:HA	2.54	0.42
2:H:11:VAL:HG21	2:H:152:PRO:HG3	2.01	0.42
2:H:199:TYR:O	2:H:215:LYS:HA	2.20	0.41
1:A:139:VAL:HB	1:A:163:MET:HB3	2.01	0.41
1:A:105:THR:HG22	1:A:114:GLN:HB2	2.03	0.41
2:H:193:SER:OG	2:H:197:GLN:HB3	2.21	0.41
2:E:67:LYS:HZ3	2:E:87:ARG:NH1	2.19	0.41
3:L:39:LYS:HE2	4:L:302:HOH:O	2.20	0.41
3:L:189:LYS:HD2	3:L:190:VAL:HG23	2.02	0.40
1:B:91:VAL:HG13	1:B:101:THR:HG22	2.03	0.40
2:H:103:VAL:HG11	3:L:89:LEU:HD23	2.02	0.40
3:F:86:TYR:O	3:F:100:GLY:HA2	2.22	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:188:GLU:OE1	1:B:190:ARG:NH2[3_455]	2.14	0.06

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	166/171 (97%)	161 (97%)	5 (3%)	0	100	100
1	B	158/171 (92%)	155 (98%)	3 (2%)	0	100	100
2	E	204/234 (87%)	195 (96%)	9 (4%)	0	100	100
2	H	204/234 (87%)	197 (97%)	7 (3%)	0	100	100
3	F	186/213 (87%)	179 (96%)	7 (4%)	0	100	100
3	L	197/213 (92%)	190 (96%)	7 (4%)	0	100	100
All	All	1115/1236 (90%)	1077 (97%)	38 (3%)	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	148/150 (99%)	146 (99%)	2 (1%)	67	78
1	B	142/150 (95%)	141 (99%)	1 (1%)	84	91
2	E	175/198 (88%)	172 (98%)	3 (2%)	60	72
2	H	176/198 (89%)	176 (100%)	0	100	100
3	F	169/188 (90%)	162 (96%)	7 (4%)	30	37
3	L	177/188 (94%)	170 (96%)	7 (4%)	31	39
All	All	987/1072 (92%)	967 (98%)	20 (2%)	55	66

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	193	GLN
1	A	195	ARG
1	B	193	GLN
2	E	55	ASN
2	E	209	ASN

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Mol	Chain	Res	Type
2	E	214	LYS
3	F	10	SER
3	F	11	LEU
3	F	50	ASP
3	F	67	SER
3	F	76	SER
3	F	107	ARG
3	F	205	THR
3	L	10	SER
3	L	50	ASP
3	L	63	SER
3	L	149	VAL
3	L	168	LYS
3	L	189	LYS
3	L	208	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	114	GLN
2	H	204	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 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, 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	168/171 (98%)	0.09	1 (0%)	89	93	31, 46, 66, 83	0
1	B	162/171 (94%)	0.92	19 (11%)	4	7	42, 82, 102, 108	0
2	E	208/234 (88%)	0.40	8 (3%)	40	53	48, 70, 88, 99	0
2	H	208/234 (88%)	0.61	28 (13%)	3	4	30, 46, 93, 102	0
3	F	192/213 (90%)	0.67	27 (14%)	2	4	40, 68, 120, 126	0
3	L	201/213 (94%)	0.21	4 (1%)	65	75	33, 48, 85, 108	0
All	All	1139/1236 (92%)	0.48	87 (7%)	13	21	30, 60, 101, 126	0

All (87) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	199	TYR	9.6
2	H	189	VAL	6.2
2	H	216	VAL	6.1
1	B	161	VAL	5.8
2	H	128	PRO	5.7
3	L	153	LEU	5.7
2	H	163	ALA	5.6
2	H	164	LEU	5.6
3	F	195	VAL	5.5
2	H	198	THR	5.3
1	B	37	ASN	5.0
3	F	126	SER	4.9
3	F	204	VAL	4.7
2	H	159	TRP	4.7
1	B	90	LEU	4.4
3	F	192	ALA	4.4
2	H	143	LEU	4.4
3	F	114	VAL	4.2
2	E	107	TYR	4.0

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Mol	Chain	Res	Type	RSRZ
3	F	147	TRP	4.0
2	H	144	GLY	3.9
2	H	193	SER	3.9
2	H	215	LYS	3.8
3	F	194	GLU	3.8
3	F	116	ILE	3.8
1	B	81	GLY	3.8
3	F	179	THR	3.8
1	B	137	LYS	3.6
3	F	145	VAL	3.6
2	H	196	THR	3.6
2	H	145	CYS	3.5
1	B	104	PHE	3.5
3	F	203	PRO	3.4
1	B	162	HIS	3.4
3	F	135	LEU	3.4
1	B	127	LEU	3.2
3	F	125	LYS	3.2
2	H	165	THR	3.1
2	H	200	ILE	3.1
3	F	143	ALA	3.1
2	H	162	GLY	3.1
3	F	130	SER	3.0
2	H	197	GLN	2.9
2	E	26	GLY	2.9
2	H	126	VAL	2.9
3	F	196	THR	2.9
1	B	165	ASN	2.9
3	F	119	PRO	2.8
2	H	190	PRO	2.8
1	B	102	LEU	2.7
2	H	203	VAL	2.7
3	F	118	PRO	2.7
2	H	129	LEU	2.7
1	B	105	THR	2.7
3	F	200	LEU	2.7
3	L	183	ALA	2.6
2	E	141	ALA	2.6
3	F	205	THR	2.6
1	B	52	VAL	2.6
2	E	200	ILE	2.6
3	F	201	SER	2.5

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Mol	Chain	Res	Type	RSRZ
2	H	127	PHE	2.5
3	F	144	LYS	2.5
3	F	202	SER	2.5
3	F	193	CYS	2.4
2	E	175	LEU	2.3
1	B	163	MET	2.3
2	H	142	ALA	2.3
3	F	76	SER	2.3
1	B	113	VAL	2.3
2	E	196	THR	2.3
3	L	130	SER	2.3
1	B	46	PHE	2.2
2	H	192	SER	2.2
1	B	92	ILE	2.2
1	B	96	ARG	2.2
2	H	166	SER	2.1
2	E	147	VAL	2.1
2	H	187	VAL	2.1
3	L	191	TYR	2.1
2	H	194	LEU	2.1
3	F	180	LEU	2.1
3	F	132	VAL	2.1
1	B	142	ILE	2.0
1	B	88	PRO	2.0
2	E	103	VAL	2.0
1	A	84	ASN	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.