Full wwPDB X-ray Structure Validation Report (i)

Jun 25, 2024 – 09:32 AM EDT

PDB ID	:	6D11
Title	:	Crystal structure of 1450 Fab in complex with circumsporozoite protein NANP5
Authors	:	Scally, S.W.; Bosch, A.; Imkeller, K.; Wardemann, H.; Julien, J.P.
Deposited on	:	2018-04-11
Resolution	:	3.40 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 (i) 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 (1)) were used in the production of this report:

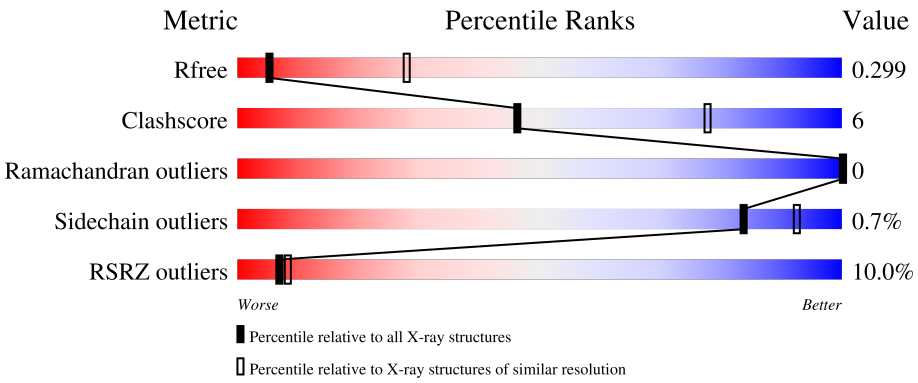
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 3.40 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	1026 (3.48-3.32)
Clashscore	141614	1055 (3.48-3.32)
Ramachandran outliers	138981	1038 (3.48-3.32)
Sidechain outliers	138945	1038 (3.48-3.32)
RSRZ outliers	127900	2173 (3.50-3.30)

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	228	14%, 79%, 15%, 5%
1	C	228	78%, 19%, •
2	B	213	26%, 87%, 12%, •
2	D	213	85%, 15%, •
3	E	20	70%, 25%, 5%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 6524 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 1450 Antibody, Heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	216	1560	978	257	316	9	0	0	0
1	C	221	1613	1011	268	324	10	0	0	0

- Molecule 2 is a protein called 1450 Antibody, Light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	211	1603	1004	266	328	5	0	0	0
2	D	211	1615	1011	272	327	5	0	0	0

- Molecule 3 is a protein called NANP5.

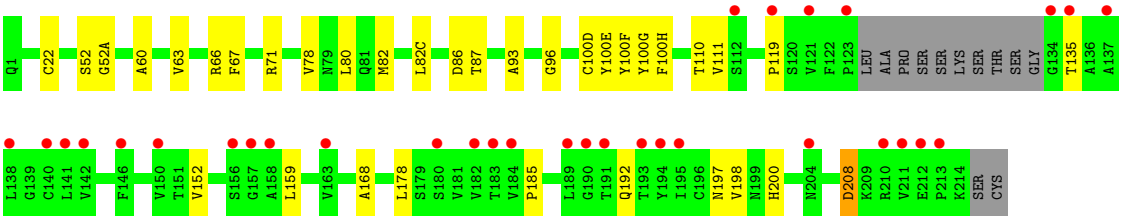
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	E	19	133	75	29	29	0	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

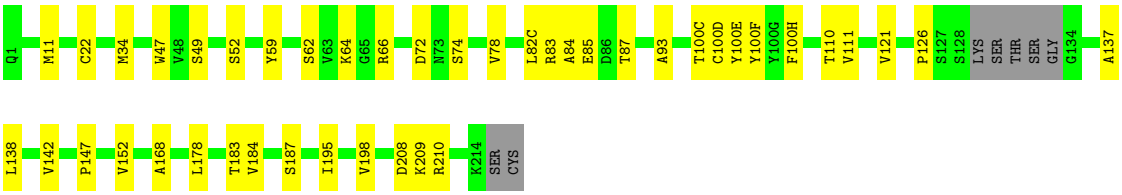
• Molecule 1: 1450 Antibody, Heavy chain

Chain A:



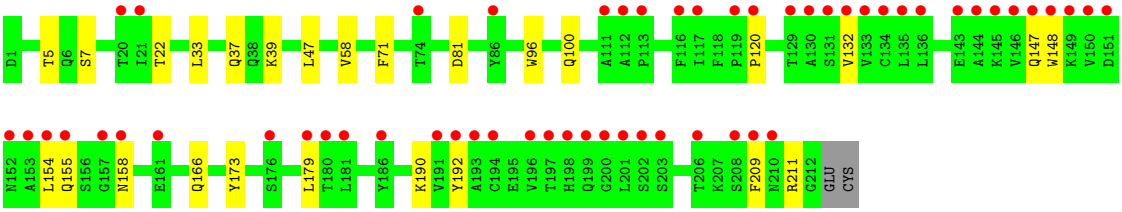
• Molecule 1: 1450 Antibody, Heavy chain

Chain C:



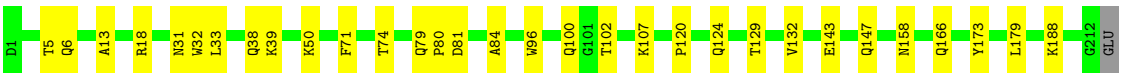
• Molecule 2: 1450 Antibody, Light chain

Chain B:



• Molecule 2: 1450 Antibody, Light chain

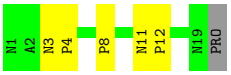
Chain D:



CYS

- Molecule 3: NANP5

Chain E:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	51.62Å 135.06Å 344.09Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.49 – 3.40 39.49 – 3.39	Depositor EDS
% Data completeness (in resolution range)	92.7 (39.49-3.40) 82.7 (39.49-3.39)	Depositor EDS
R_{merge}	0.31	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.89 (at 3.40Å)	Xtriage
Refinement program	PHENIX (1.13_2998: ???)	Depositor
R, R_{free}	0.254 , 0.299 0.254 , 0.299	Depositor DCC
R_{free} test set	797 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	57.4	Xtriage
Anisotropy	0.623	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.27 , 44.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.45$, $< L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.85	EDS
Total number of atoms	6524	wwPDB-VP
Average B, all atoms (Å^2)	89.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.62% 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	0.26	0/1598	0.46	0/2183
1	C	0.27	0/1652	0.46	0/2252
2	B	0.25	0/1638	0.51	0/2230
2	D	0.26	0/1650	0.54	0/2243
3	E	0.27	0/136	0.41	0/190
All	All	0.26	0/6674	0.49	0/9098

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	1560	0	1442	20	0
1	C	1613	0	1521	25	0
2	B	1603	0	1525	17	0
2	D	1615	0	1552	21	0
3	E	133	0	115	7	0
All	All	6524	0	6155	80	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 6.

All (80) 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)
2:D:50:LYS:NZ	3:E:8:PRO:O	2.20	0.74
1:A:100(D):CYS:HB2	3:E:4:PRO:O	1.90	0.72
1:C:121:VAL:HG22	1:C:142:VAL:HG12	1.77	0.66
1:A:197:ASN:ND2	1:A:208:ASP:OD2	2.28	0.65
1:C:100(F):TYR:H	2:D:96:TRP:HE1	1.42	0.65
1:A:100(F):TYR:H	2:B:96:TRP:HE1	1.45	0.63
2:D:32:TRP:CD2	3:E:12:PRO:HG3	2.36	0.61
2:B:39:LYS:NZ	2:B:81:ASP:OD1	2.27	0.60
1:C:52:SER:HB2	1:C:100(C):THR:HB	1.84	0.59
2:B:120:PRO:HD3	2:B:132:VAL:HG22	1.83	0.59
1:C:87:THR:HG23	1:C:110:THR:HA	1.83	0.59
1:C:126:PRO:HG3	1:C:138:LEU:HB3	1.83	0.58
1:C:100(D):CYS:HB2	3:E:12:PRO:O	2.03	0.58
1:A:87:THR:HG23	1:A:110:THR:HA	1.87	0.57
1:C:93:ALA:HB1	1:C:100(H):PHE:HB3	1.87	0.56
2:D:120:PRO:HD3	2:D:132:VAL:HG22	1.87	0.56
1:A:135:THR:HG22	1:A:185:PRO:HA	1.87	0.56
1:A:152:VAL:HG22	1:A:198:VAL:HG22	1.90	0.54
2:B:47:LEU:HA	2:B:58:VAL:HG21	1.89	0.54
1:C:137:ALA:HB2	1:C:183:THR:HG22	1.91	0.53
1:C:195:ILE:HG12	1:C:210:ARG:HA	1.90	0.52
2:B:37:GLN:HB2	2:B:47:LEU:HD11	1.92	0.51
2:D:79:GLN:HG2	2:D:80:PRO:HD2	1.93	0.51
2:D:33:LEU:HD22	2:D:71:PHE:CG	2.47	0.50
1:A:93:ALA:HB1	1:A:100(H):PHE:HB3	1.94	0.50
1:C:152:VAL:HG22	1:C:198:VAL:HG22	1.93	0.49
1:A:22:CYS:HB3	1:A:78:VAL:HG13	1.93	0.49
1:A:60:ALA:HB3	1:A:63:VAL:HG22	1.94	0.49
2:B:7:SER:HB3	2:B:22:THR:OG1	2.13	0.49
2:D:5:THR:HA	2:D:100:GLN:OE1	2.13	0.48
2:B:192:TYR:HB2	2:B:209:PHE:CZ	2.48	0.48
2:B:166:GLN:HG3	2:B:173:TYR:CE2	2.49	0.48
2:D:32:TRP:CE2	3:E:12:PRO:HG3	2.49	0.47
1:C:22:CYS:HB3	1:C:78:VAL:HG13	1.97	0.47
1:C:83:ARG:HG3	1:C:84:ALA:H	1.79	0.47
2:D:18:ARG:NH2	2:D:74:THR:HG21	2.30	0.46
1:C:62:SER:O	1:C:66:ARG:NH1	2.49	0.46
1:C:209:LYS:HA	1:C:209:LYS:HD2	1.77	0.45
2:D:143:GLU:OE1	2:D:143:GLU:N	2.46	0.45
1:C:47:TRP:NE1	1:C:49:SER:O	2.49	0.45
2:B:147:GLN:HB3	2:B:154:LEU:HD13	1.98	0.45
1:C:82(C):LEU:HD12	1:C:82(C):LEU:HA	1.77	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:148:TRP:O	2:B:155:GLN:N	2.36	0.45
2:B:190:LYS:HG2	2:B:211:ARG:NH2	2.31	0.45
1:C:59:TYR:HB2	1:C:64:LYS:HG3	1.99	0.45
2:B:5:THR:HA	2:B:100:GLN:OE1	2.18	0.44
2:D:158:ASN:O	2:D:179:LEU:HD12	2.17	0.44
1:A:82:MET:HB3	1:A:82(C):LEU:HD21	2.00	0.44
2:B:166:GLN:HG3	2:B:173:TYR:CZ	2.53	0.43
1:A:67:PHE:HB3	1:A:80:LEU:HD11	2.00	0.43
1:A:100(E):TYR:O	3:E:3:ASN:HB3	2.18	0.43
2:B:33:LEU:HD22	2:B:71:PHE:CG	2.53	0.43
2:D:13:ALA:O	2:D:107:LYS:N	2.45	0.43
1:A:168:ALA:HB2	1:A:178:LEU:HD23	2.00	0.43
2:D:6:GLN:NE2	2:D:102:THR:OG1	2.52	0.43
2:D:79:GLN:HG2	2:D:80:PRO:CD	2.48	0.43
1:A:96:GLY:HA3	1:A:100(G):TYR:CE2	2.53	0.43
2:B:190:LYS:HD3	2:B:211:ARG:HG3	1.99	0.43
1:C:34:MET:O	1:C:100(F):TYR:OH	2.36	0.43
1:C:72:ASP:OD1	1:C:74:SER:OG	2.32	0.43
1:A:52(A):GLY:HA2	1:A:71:ARG:NH2	2.34	0.43
1:A:119:PRO:HG3	1:A:200:HIS:HB2	2.00	0.42
2:D:188:LYS:HA	2:D:188:LYS:HD3	1.76	0.42
1:A:82(C):LEU:HB3	1:A:111:VAL:HG21	2.02	0.42
2:D:124:GLN:HG2	2:D:129:THR:O	2.19	0.42
1:C:11:MET:HE1	1:C:147:PRO:HG3	2.02	0.42
2:D:39:LYS:NZ	2:D:81:ASP:OD1	2.50	0.42
1:A:159:LEU:HD11	1:A:192:GLN:HE21	1.84	0.42
1:C:100(E):TYR:O	3:E:11:ASN:HB3	2.20	0.42
1:C:168:ALA:HB2	1:C:178:LEU:HD23	2.01	0.41
1:A:66:ARG:NH2	1:A:86:ASP:OD2	2.50	0.41
1:C:83:ARG:HG2	1:C:85:GLU:OE1	2.21	0.41
2:D:166:GLN:HG3	2:D:173:TYR:CZ	2.56	0.41
2:D:38:GLN:O	2:D:84:ALA:HB1	2.21	0.41
1:A:52:SER:O	1:A:71:ARG:NH2	2.54	0.41
2:D:31:ASN:OD1	2:D:31:ASN:N	2.54	0.41
2:B:190:LYS:HA	2:B:211:ARG:NE	2.35	0.41
1:C:100(E):TYR:HA	2:D:96:TRP:CZ2	2.56	0.41
1:C:82(C):LEU:HG	1:C:111:VAL:HG21	2.03	0.40
2:B:158:ASN:O	2:B:179:LEU:HD12	2.21	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	212/228 (93%)	201 (95%)	11 (5%)	0	100	100
1	C	217/228 (95%)	206 (95%)	11 (5%)	0	100	100
2	B	209/213 (98%)	201 (96%)	8 (4%)	0	100	100
2	D	209/213 (98%)	200 (96%)	9 (4%)	0	100	100
3	E	17/20 (85%)	15 (88%)	2 (12%)	0	100	100
All	All	864/902 (96%)	823 (95%)	41 (5%)	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	169/190 (89%)	168 (99%)	1 (1%)	86	94
1	C	178/190 (94%)	175 (98%)	3 (2%)	60	80
2	B	179/187 (96%)	179 (100%)	0	100	100
2	D	181/187 (97%)	180 (99%)	1 (1%)	86	94
3	E	14/15 (93%)	14 (100%)	0	100	100
All	All	721/769 (94%)	716 (99%)	5 (1%)	84	92

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	208	ASP
1	C	184	VAL
1	C	187	SER
1	C	208	ASP
2	D	147	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
2	D	6	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

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(Å^2)	Q<0.9
1	A	216/228 (94%)	0.71	32 (14%)	2	3	45, 87, 183, 195	0
1	C	221/228 (96%)	-0.22	0	100	100	34, 50, 70, 91	0
2	B	211/213 (99%)	1.27	56 (26%)	0	0	57, 143, 201, 213	0
2	D	211/213 (99%)	-0.12	0	100	100	32, 58, 75, 89	0
3	E	19/20 (95%)	0.22	0	100	100	46, 55, 84, 85	0
All	All	878/902 (97%)	0.40	88 (10%)	7	8	32, 68, 191, 213	0

All (88) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	138	LEU	6.7
1	A	194	TYR	6.7
2	B	144	ALA	6.3
1	A	180	SER	6.0
2	B	146	VAL	5.7
2	B	180	THR	5.4
2	B	152	ASN	5.4
2	B	201	LEU	5.2
2	B	147	GLN	5.0
2	B	131	SER	5.0
2	B	199	GLN	5.0
1	A	213	PRO	4.9
2	B	194	CYS	4.7
1	A	123	PRO	4.5
2	B	119	PRO	4.5
2	B	209	PHE	4.2
2	B	196	VAL	4.2
1	A	134	GLY	4.2
1	A	184	VAL	4.1
1	A	212	GLU	4.1

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Mol	Chain	Res	Type	RSRZ
1	A	137	ALA	4.0
2	B	154	LEU	4.0
2	B	208	SER	4.0
2	B	202	SER	4.0
1	A	150	VAL	3.9
2	B	151	ASP	3.9
1	A	163	VAL	3.9
2	B	134	CYS	3.8
2	B	192	TYR	3.8
2	B	200	GLY	3.7
1	A	121	VAL	3.7
2	B	20	THR	3.7
1	A	140	CYS	3.6
2	B	179	LEU	3.6
2	B	186	TYR	3.5
2	B	135	LEU	3.5
2	B	149	LYS	3.5
2	B	197	THR	3.5
2	B	176	SER	3.4
2	B	116	PHE	3.4
2	B	161	GLU	3.4
1	A	182	VAL	3.4
2	B	155	GLN	3.2
2	B	158	ASN	3.2
1	A	157	GLY	3.1
1	A	183	THR	3.1
2	B	117	ILE	3.1
1	A	156	SER	3.1
2	B	113	PRO	3.1
2	B	145	LYS	3.0
1	A	141	LEU	3.0
2	B	129	THR	3.0
2	B	21	ILE	2.9
1	A	193	THR	2.9
2	B	181	LEU	2.9
1	A	135	THR	2.9
2	B	111	ALA	2.8
1	A	158	ALA	2.8
2	B	203	SER	2.8
1	A	189	LEU	2.8
1	A	211	VAL	2.7
2	B	150	VAL	2.7

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Mol	Chain	Res	Type	RSRZ
2	B	193	ALA	2.7
2	B	198	HIS	2.7
2	B	153	ALA	2.6
1	A	119	PRO	2.6
1	A	210	ARG	2.5
2	B	132	VAL	2.4
2	B	143	GLU	2.4
2	B	157	GLY	2.4
2	B	86	TYR	2.4
2	B	74	THR	2.4
1	A	146	PHE	2.3
1	A	191	THR	2.3
2	B	133	VAL	2.3
2	B	210	ASN	2.3
2	B	191	VAL	2.3
2	B	130	ALA	2.2
2	B	112	ALA	2.2
1	A	195	ILE	2.2
2	B	148	TRP	2.2
2	B	136	LEU	2.2
1	A	204	ASN	2.1
2	B	206	THR	2.1
1	A	112	SER	2.1
1	A	190	GLY	2.1
2	B	120	PRO	2.0
1	A	142	VAL	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.