



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 12:36 AM GMT

PDB ID : 2B1A
Title : Crystal structure analysis of anti-HIV-1 V3 Fab 2219 in complex with UG1033 peptide
Authors : Stanfield, R.L.; Gorny, M.K.; Zolla-Pazner, S.; Wilson, I.A.
Deposited on : 2005-09-15
Resolution : 2.35 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

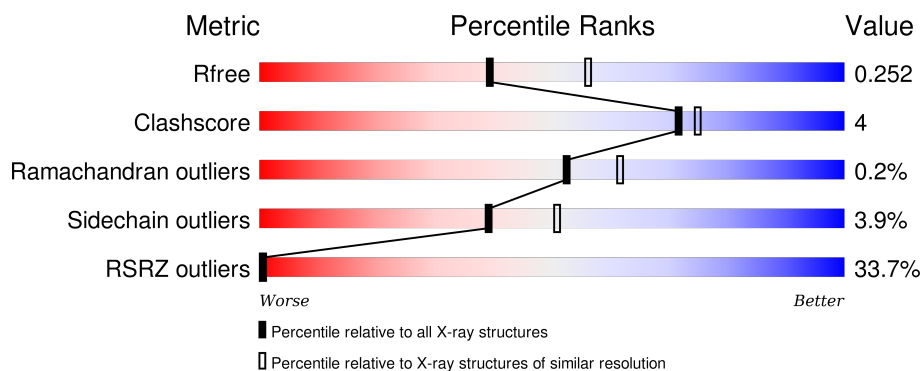
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.35 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}	91344	1406 (2.36-2.32)
Clashscore	102246	1509 (2.36-2.32)
Ramachandran outliers	100387	1490 (2.36-2.32)
Sidechain outliers	100360	1491 (2.36-2.32)
RSRZ outliers	91569	1412 (2.36-2.32)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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 $\leq 5\%$. 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	L	215	<div> <div>30%</div> <div> <div>87%</div> <div>13%</div> </div> </div>
2	H	226	<div> <div>38%</div> <div> <div>89%</div> <div>11%</div> </div> </div>
3	P	23	<div> <div>22%</div> <div> <div>48%</div> <div>22%</div> <div>30%</div> </div> </div>

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 3500 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 Fab 2219, light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	215	Total	C	N	O	S	0	0	0
			1616	1011	274	327	4			

- Molecule 2 is a protein called Fab 2219, heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	226	Total	C	N	O	S	0	0	0
			1699	1070	277	345	7			

- Molecule 3 is a protein called UG1033 peptide of Exterior membrane glycoprotein GP120.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	P	16	Total	C	N	O	0	0	0
			125	80	25	20			

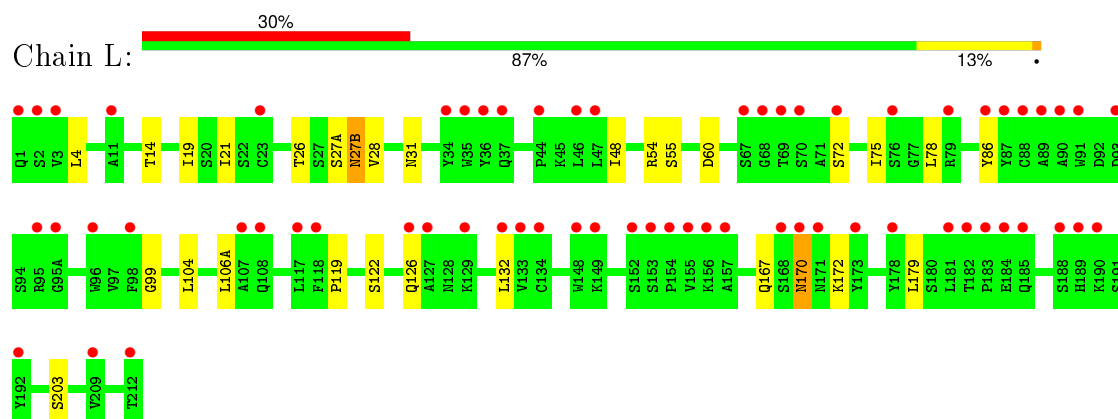
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	H	49	Total	O	0	0
			49	49		
4	L	11	Total	O	0	0
			11	11		

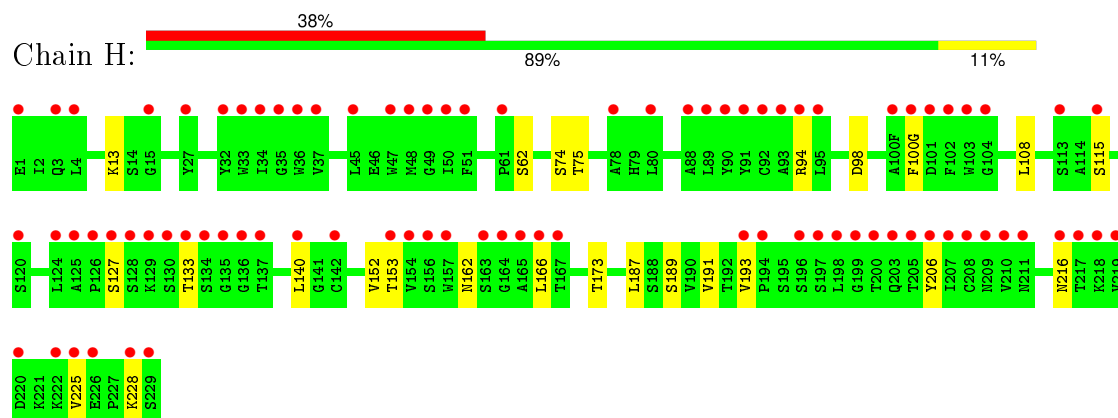
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

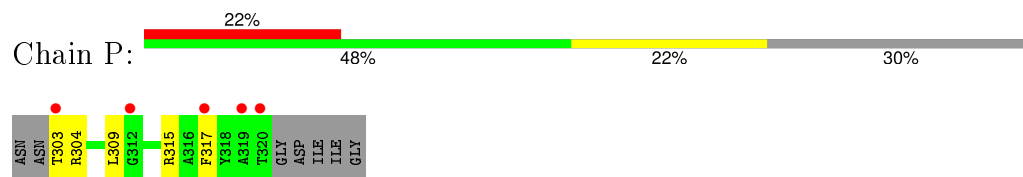
- Molecule 1: Fab 2219, light chain



- Molecule 2: Fab 2219, heavy chain



- Molecule 3: UG1033 peptide of Exterior membrane glycoprotein GP120



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	62.72Å 96.89Å 97.02Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	31.31 – 2.35 31.36 – 2.35	Depositor EDS
% Data completeness (in resolution range)	100.0 (31.31-2.35) 98.5 (31.36-2.35)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.62 (at 2.34Å)	Xtriage
Refinement program	REFMAC 5.2	Depositor
R, R_{free}	0.211 , 0.244 0.218 , 0.252	Depositor DCC
R_{free} test set	1208 reflections (5.09%)	DCC
Wilson B-factor (Å ²)	43.9	Xtriage
Anisotropy	0.101	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 62.0	EDS
Estimated twinning fraction	0.017 for -h,l,k	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 24942 reflections	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	3500	wwPDB-VP
Average B, all atoms (Å ²)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.94% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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	L	0.47	0/1660	0.60	0/2269
2	H	0.67	3/1744 (0.2%)	0.69	1/2373 (0.0%)
3	P	1.82	1/128 (0.8%)	1.07	0/171
All	All	0.67	4/3532 (0.1%)	0.67	1/4813 (0.0%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	P	309	LEU	C-N	18.86	1.67	1.33
2	H	162	ASN	CG-ND2	9.35	1.56	1.32
2	H	162	ASN	CG-OD1	8.48	1.42	1.24
2	H	13	LYS	CD-CE	5.12	1.64	1.51

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	98	ASP	CB-CG-OD1	5.18	122.97	118.30

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	L	1616	0	1554	19	0
2	H	1699	0	1624	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	P	125	0	127	3	0
4	H	49	0	0	0	0
4	L	11	0	0	0	0
All	All	3500	0	3305	29	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (29) 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:P:303:THR:OG1	3:P:304:ARG:N	2.15	0.79
1:L:31:ASN:OD1	3:P:315:ARG:NH2	2.30	0.64
3:P:303:THR:HG1	3:P:304:ARG:H	1.49	0.61
2:H:166:LEU:HD21	2:H:191:VAL:HG21	1.85	0.58
1:L:167:GLN:HE21	1:L:170:ASN:HD21	1.52	0.57
1:L:14:THR:HG22	1:L:106(A):LEU:HD12	1.88	0.55
1:L:27(B):ASN:HD22	1:L:28:VAL:H	1.54	0.53
1:L:119:PRO:HA	1:L:132:LEU:HD23	1.90	0.53
1:L:170:ASN:HD22	1:L:170:ASN:C	2.11	0.52
2:H:187:LEU:C	2:H:187:LEU:HD12	2.30	0.52
1:L:26:THR:H	1:L:27(B):ASN:ND2	2.09	0.50
1:L:21:ILE:HD13	1:L:86:TYR:HB2	1.93	0.50
1:L:122:SER:O	1:L:126:GLN:HG3	2.12	0.50
1:L:78:LEU:HD11	1:L:104:LEU:HD21	1.95	0.49
2:H:94:ARG:O	2:H:100(G):PHE:HA	2.11	0.49
1:L:4:LEU:HB2	1:L:99:GLY:HA2	1.94	0.49
1:L:54:ARG:NE	1:L:60:ASP:HA	2.27	0.49
2:H:140:LEU:HD13	2:H:225:VAL:HG11	1.96	0.47
2:H:193:VAL:HG11	2:H:206:TYR:CE1	2.51	0.46
1:L:167:GLN:HE21	1:L:170:ASN:ND2	2.13	0.46
1:L:26:THR:H	1:L:27(B):ASN:HD21	1.64	0.45
1:L:170:ASN:ND2	1:L:172:LYS:H	2.14	0.45
1:L:170:ASN:HD22	1:L:172:LYS:H	1.65	0.44
2:H:140:LEU:HD13	2:H:225:VAL:CG1	2.48	0.44
2:H:74:SER:OG	2:H:75:THR:HG23	2.18	0.44
1:L:132:LEU:HD12	1:L:179:LEU:HD23	2.01	0.43
1:L:48:ILE:HD13	1:L:54:ARG:HA	2.00	0.42
2:H:173:THR:HA	2:H:189:SER:HA	2.03	0.41
1:L:19:ILE:HD11	1:L:75:ILE:HD12	2.03	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	L	213/215 (99%)	206 (97%)	7 (3%)	0	100	100
2	H	224/226 (99%)	210 (94%)	13 (6%)	1 (0%)	39	45
3	P	14/23 (61%)	13 (93%)	1 (7%)	0	100	100
All	All	451/464 (97%)	429 (95%)	21 (5%)	1 (0%)	52	61

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	H	127	SER

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	L	180/180 (100%)	174 (97%)	6 (3%)	45	57
2	H	191/191 (100%)	183 (96%)	8 (4%)	36	46
3	P	12/17 (71%)	11 (92%)	1 (8%)	14	14
All	All	383/388 (99%)	368 (96%)	15 (4%)	39	51

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	27(A)	SER
1	L	27(B)	ASN
1	L	55	SER
1	L	72	SER
1	L	170	ASN
1	L	203	SER
2	H	62	SER
2	H	108	LEU
2	H	115	SER
2	H	133	THR
2	H	152	VAL
2	H	153	THR
2	H	216	ASN
2	H	228	LYS
3	P	317	PHE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	L	27(B)	ASN
1	L	170	ASN
2	H	79	HIS
2	H	203	GLN
2	H	216	ASN
3	P	308	HIS

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 carbohydrates 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(Å ²)	Q<0.9
1	L	215/215 (100%)	1.64	64 (29%)  	65, 71, 74, 80	0
2	H	226/226 (100%)	2.16	85 (37%)  	64, 71, 77, 81	0
3	P	16/23 (69%)	2.65	5 (31%)  	66, 71, 83, 87	0
All	All	457/464 (98%)	1.93	154 (33%)  	64, 71, 77, 87	0

All (154) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	133	THR	14.8
2	H	165	ALA	14.6
3	P	320	THR	13.9
2	H	136	GLY	12.9
2	H	130	SER	11.9
2	H	166	LEU	11.1
2	H	134	SER	9.9
2	H	198	LEU	8.1
3	P	303	THR	7.8
2	H	135	GLY	7.8
2	H	229	SER	7.7
2	H	205	THR	7.4
2	H	100(G)	PHE	6.6
2	H	222	LYS	6.4
1	L	156	LYS	6.2
2	H	128	SER	6.1
2	H	207	ILE	6.1
2	H	219	VAL	6.0
2	H	217	THR	5.9
1	L	36	TYR	5.9
2	H	129	LYS	5.7
2	H	37	VAL	5.7
2	H	210	VAL	5.7

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Mol	Chain	Res	Type	RSRZ
2	H	197	SER	5.6
2	H	216	ASN	5.4
1	L	96	TRP	5.3
2	H	157	TRP	5.2
2	H	206	TYR	5.0
2	H	93	ALA	5.0
2	H	45	LEU	4.9
2	H	103	TRP	4.9
2	H	164	GLY	4.8
1	L	190	LYS	4.7
1	L	47	LEU	4.6
1	L	67	SER	4.4
1	L	1	GLN	4.4
2	H	91	TYR	4.3
2	H	95	LEU	4.3
1	L	168	SER	4.3
1	L	126	GLN	4.3
1	L	154	PRO	4.3
2	H	193	VAL	4.2
1	L	107	ALA	4.2
1	L	98	PHE	4.2
1	L	192	TYR	4.2
3	P	319	ALA	4.0
1	L	212	THR	4.0
2	H	126	PRO	4.0
2	H	218	LYS	4.0
1	L	184	GLU	4.0
1	L	155	VAL	4.0
2	H	211	ASN	3.9
1	L	3	VAL	3.9
1	L	157	ALA	3.8
1	L	70	SER	3.8
2	H	92	CYS	3.7
2	H	142	CYS	3.7
2	H	124	LEU	3.6
1	L	87	TYR	3.6
1	L	72	SER	3.6
1	L	185	GLN	3.6
1	L	89	ALA	3.6
2	H	196	SER	3.6
1	L	118	PHE	3.6
2	H	226	GLU	3.6

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Mol	Chain	Res	Type	RSRZ
1	L	91	TRP	3.5
1	L	68	GLY	3.5
2	H	36	TRP	3.4
1	L	182	THR	3.3
2	H	100(F)	ALA	3.3
2	H	35	GLY	3.3
1	L	188	SER	3.3
2	H	125	ALA	3.2
2	H	47	TRP	3.2
1	L	129	LYS	3.2
1	L	2	SER	3.1
1	L	46	LEU	3.1
2	H	228	LYS	3.1
2	H	127	SER	3.1
2	H	50	ILE	3.0
2	H	34	ILE	3.0
1	L	133	VAL	2.9
1	L	153	SER	2.9
1	L	171	ASN	2.9
1	L	189	HIS	2.9
2	H	104	GLY	2.8
1	L	35	TRP	2.8
1	L	34	TYR	2.8
2	H	194	PRO	2.8
1	L	149	LYS	2.8
2	H	80	LEU	2.7
1	L	132	LEU	2.7
2	H	4	LEU	2.7
1	L	127	ALA	2.7
2	H	209	ASN	2.7
1	L	173	TYR	2.7
2	H	94	ARG	2.6
1	L	88	CYS	2.6
1	L	93	ASP	2.6
2	H	48	MET	2.6
1	L	152	SER	2.6
1	L	170	ASN	2.6
2	H	199	GLY	2.6
2	H	167	THR	2.6
3	P	317	PHE	2.6
1	L	86	TYR	2.6
2	H	203	GLN	2.6

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Mol	Chain	Res	Type	RSRZ
2	H	137	THR	2.6
1	L	117	LEU	2.5
2	H	225	VAL	2.5
2	H	49	GLY	2.5
1	L	95	ARG	2.5
2	H	154	VAL	2.5
2	H	90	TYR	2.5
2	H	140	LEU	2.5
2	H	113	SER	2.4
2	H	102	PHE	2.4
2	H	120	SER	2.4
1	L	69	THR	2.4
2	H	220	ASP	2.4
2	H	1	GLU	2.4
2	H	163	SER	2.3
2	H	61	PRO	2.3
2	H	32	TYR	2.3
1	L	148	TRP	2.3
2	H	33	TRP	2.3
3	P	312	GLY	2.3
1	L	44	PRO	2.2
1	L	90	ALA	2.2
1	L	37	GLN	2.2
2	H	200	THR	2.2
2	H	51	PHE	2.2
1	L	181	LEU	2.2
2	H	115	SER	2.2
2	H	88	ALA	2.2
2	H	156	SER	2.1
2	H	89	LEU	2.1
2	H	15	GLY	2.1
1	L	79	ARG	2.1
2	H	101	ASP	2.1
2	H	3	GLN	2.1
2	H	208	CYS	2.1
1	L	209	VAL	2.1
2	H	153	THR	2.1
1	L	108	GLN	2.1
1	L	23	CYS	2.1
1	L	178	TYR	2.1
1	L	76	SER	2.1
2	H	27	TYR	2.0

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Mol	Chain	Res	Type	RSRZ
1	L	183	PRO	2.0
1	L	95(A)	GLY	2.0
1	L	11	ALA	2.0
2	H	78	ALA	2.0
1	L	134	CYS	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 carbohydrates 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.