Full wwPDB X-ray Structure Validation Report ⓘ

May 27, 2024 – 08:54 PM EDT

PDB ID	:	6ME1
Title	:	Crystal structure of the clade B isolate B41 mutant fusion peptide (residues 512-521) in complex with VRC34.01
Authors	:	Kumar, S.; Sarkar, A.; Wilson, I.A.
Deposited on	:	2018-09-05
Resolution	:	1.97 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:

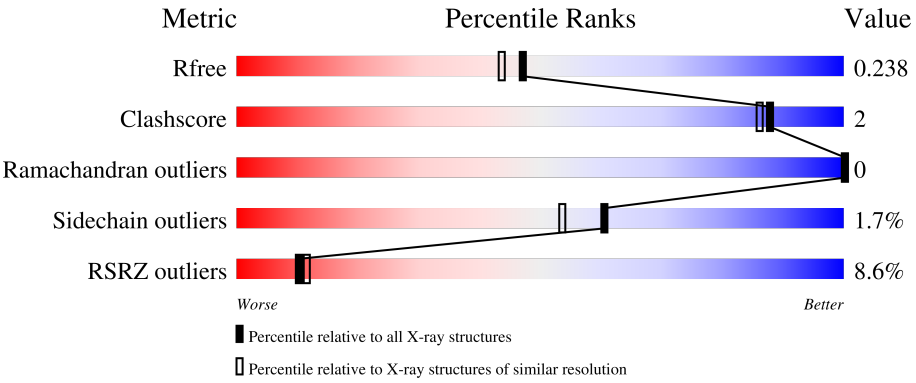
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 1.97 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.



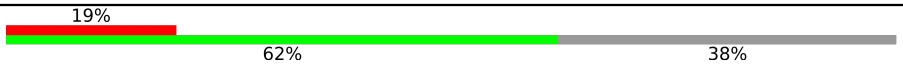
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	11647 (2.00-1.96)
Clashscore	141614	1014 (1.98-1.98)
Ramachandran outliers	138981	1006 (1.98-1.98)
Sidechain outliers	138945	1006 (1.98-1.98)
RSRZ outliers	127900	11410 (2.00-1.96)

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	223	13% 94% 6%
1	C	223	9% 93% 7%
2	B	212	6% 93% 7%
2	D	212	4% 94% 6%
3	E	16	19% 100%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	F	16	

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 7368 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 VRC34.01 Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	223	Total	C	N	O	S	0	0	0
			1674	1054	285	329	6			
1	C	223	Total	C	N	O	S	0	0	0
			1674	1054	285	329	6			

- Molecule 2 is a protein called VRC34.01 Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	212	Total	C	N	O	S	0	0	0
			1628	1024	274	325	5			
2	D	212	Total	C	N	O	S	0	1	0
			1634	1028	274	327	5			

- Molecule 3 is a protein called Envelope glycoprotein gp160.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	F	10	Total	C	N	O	0	0	0
			63	43	10	10			
3	E	16	Total	C	N	O	0	0	0
			123	79	28	16			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	515	LEU	ILE	conflict	UNP P03375
F	518	VAL	LEU	conflict	UNP P03375
F	522	HIS	-	expression tag	UNP P03375
F	523	HIS	-	expression tag	UNP P03375
F	524	HIS	-	expression tag	UNP P03375
F	525	HIS	-	expression tag	UNP P03375
F	526	HIS	-	expression tag	UNP P03375
F	527	HIS	-	expression tag	UNP P03375

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
E	515	LEU	ILE	conflict	UNP P03375
E	518	VAL	LEU	conflict	UNP P03375
E	522	HIS	-	expression tag	UNP P03375
E	523	HIS	-	expression tag	UNP P03375
E	524	HIS	-	expression tag	UNP P03375
E	525	HIS	-	expression tag	UNP P03375
E	526	HIS	-	expression tag	UNP P03375
E	527	HIS	-	expression tag	UNP P03375

- Molecule 4 is water.

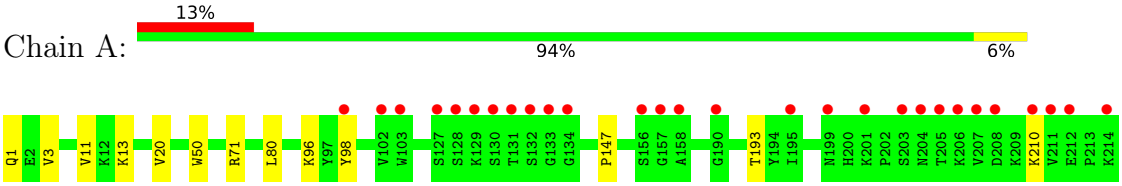
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	131	Total O 131 131	0	0
4	B	151	Total O 151 151	0	0
4	F	9	Total O 9 9	0	0
4	C	143	Total O 143 143	0	0
4	D	126	Total O 126 126	0	0
4	E	12	Total O 12 12	0	0

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.

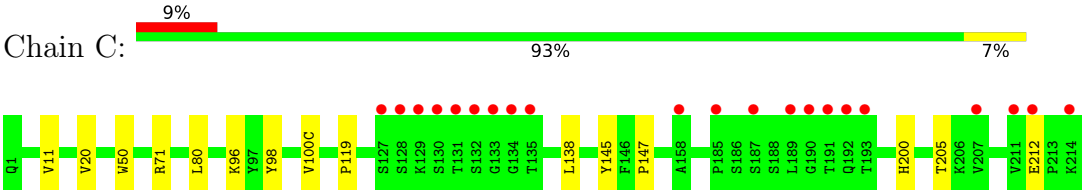
• Molecule 1: VRC34.01 Fab heavy chain

Chain A:



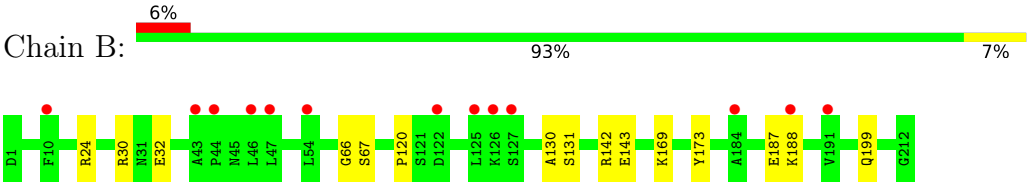
• Molecule 1: VRC34.01 Fab heavy chain

Chain C:



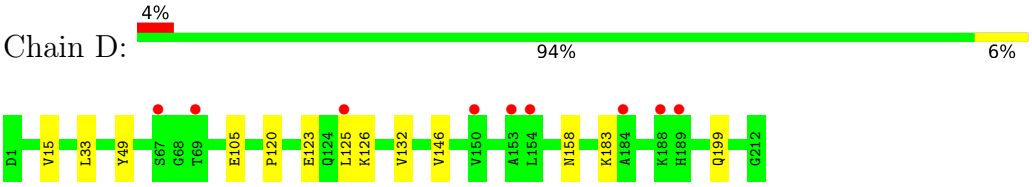
• Molecule 2: VRC34.01 Fab light chain

Chain B:



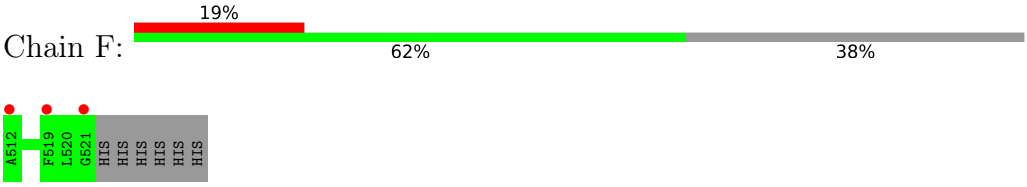
• Molecule 2: VRC34.01 Fab light chain

Chain D:



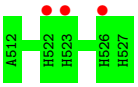
• Molecule 3: Envelope glycoprotein gp160

Chain F:



• Molecule 3: Envelope glycoprotein gp160

Chain E:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	42.42Å 123.67Å 101.25Å 90.00° 90.87° 90.00°	Depositor
Resolution (Å)	38.18 – 1.97 38.18 – 1.97	Depositor EDS
% Data completeness (in resolution range)	98.6 (38.18-1.97) 98.6 (38.18-1.97)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.11 (at 1.97Å)	Xtriage
Refinement program	PHENIX (1.12_2829)	Depositor
R, R_{free}	0.199 , 0.238 0.199 , 0.238	Depositor DCC
R_{free} test set	3665 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	29.5	Xtriage
Anisotropy	0.487	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 46.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.033 for h,-k,-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7368	wwPDB-VP
Average B, all atoms (Å^2)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.83% 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	0.27	0/1715	0.48	0/2337
1	C	0.26	0/1715	0.48	0/2337
2	B	0.27	0/1665	0.49	0/2262
2	D	0.27	0/1674	0.49	0/2274
3	E	0.27	0/129	0.51	0/174
3	F	0.28	0/63	0.51	0/84
All	All	0.27	0/6961	0.49	0/9468

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	1674	0	1638	7	0
1	C	1674	0	1638	6	0
2	B	1628	0	1588	9	0
2	D	1634	0	1594	7	0
3	E	123	0	109	0	0
3	F	63	0	67	0	0
4	A	131	0	0	1	0
4	B	151	0	0	6	0
4	C	143	0	0	0	0
4	D	126	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	E	12	0	0	0	0
4	F	9	0	0	0	0
All	All	7368	0	6634	27	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (27) 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)
1:A:1:GLN:NE2	4:A:301:HOH:O	2.20	0.75
1:A:20:VAL:HG22	1:A:80:LEU:HB3	1.75	0.69
1:A:1:GLN:OE1	1:A:1:GLN:N	2.26	0.65
2:D:123:GLU:HA	2:D:126:LYS:HE2	1.79	0.65
2:B:24:ARG:NH1	4:B:310:HOH:O	2.31	0.62
2:B:169:LYS:NZ	4:B:312:HOH:O	2.37	0.57
1:C:11:VAL:HG21	1:C:147:PRO:HG3	1.87	0.56
1:A:11:VAL:HG21	1:A:147:PRO:HG3	1.91	0.53
2:B:66:GLY:N	4:B:311:HOH:O	2.35	0.53
2:B:173:TYR:OH	4:B:301:HOH:O	2.19	0.51
2:B:30:ARG:NH2	2:B:32:GLU:OE1	2.46	0.49
1:C:119:PRO:HB3	1:C:145:TYR:HB3	1.95	0.48
1:C:20:VAL:HG23	1:C:80:LEU:HB3	1.97	0.47
2:D:120:PRO:HD3	2:D:132:VAL:HG22	1.99	0.44
1:C:200:HIS:HB3	1:C:205:THR:OG1	2.18	0.44
2:D:125:LEU:O	2:D:183:LYS:HD2	2.18	0.44
2:D:158:ASN:OD1	2:D:158:ASN:N	2.49	0.43
1:A:193:THR:HG23	1:A:210:LYS:NZ	2.33	0.43
2:B:142:ARG:HG2	2:B:143:GLU:OE1	2.18	0.43
1:C:98:TYR:HB2	1:C:100(C):VAL:HG21	2.00	0.43
2:B:120:PRO:HG3	2:B:130:ALA:HB1	2.00	0.42
2:D:199:GLN:H	2:D:199:GLN:HG2	1.66	0.41
1:A:96:LYS:HE2	1:A:98:TYR:CZ	2.55	0.41
2:B:131:SER:O	4:B:302:HOH:O	2.22	0.41
1:C:96:LYS:HE2	2:D:49:TYR:CE2	2.56	0.40
1:A:3:VAL:HG21	2:D:15:VAL:O	2.21	0.40
2:B:188:LYS:NZ	4:B:323:HOH:O	2.55	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	221/223 (99%)	214 (97%)	7 (3%)	0	100	100
1	C	221/223 (99%)	216 (98%)	5 (2%)	0	100	100
2	B	210/212 (99%)	200 (95%)	10 (5%)	0	100	100
2	D	211/212 (100%)	203 (96%)	8 (4%)	0	100	100
3	E	14/16 (88%)	13 (93%)	1 (7%)	0	100	100
3	F	8/16 (50%)	8 (100%)	0	0	100	100
All	All	885/902 (98%)	854 (96%)	31 (4%)	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	187/187 (100%)	184 (98%)	3 (2%)	62	56
1	C	187/187 (100%)	183 (98%)	4 (2%)	53	47
2	B	185/185 (100%)	182 (98%)	3 (2%)	62	56
2	D	186/185 (100%)	182 (98%)	4 (2%)	52	46
3	E	11/11 (100%)	11 (100%)	0	100	100
3	F	5/11 (46%)	5 (100%)	0	100	100
All	All	761/766 (99%)	747 (98%)	14 (2%)	60	51

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	LYS
1	A	50	TRP
1	A	71	ARG
2	B	67	SER
2	B	187	GLU
2	B	199	GLN
1	C	50	TRP
1	C	71	ARG
1	C	138	LEU
1	C	212	GLU
2	D	33	LEU
2	D	105[A]	GLU
2	D	105[B]	GLU
2	D	146	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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

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	223/223 (100%)	0.77	28 (12%) 3 4	20, 33, 71, 103	0
1	C	223/223 (100%)	0.71	21 (9%) 8 9	21, 33, 73, 98	0
2	B	212/212 (100%)	0.58	13 (6%) 21 23	21, 35, 57, 68	0
2	D	212/212 (100%)	0.39	9 (4%) 36 38	23, 34, 58, 67	0
3	E	16/16 (100%)	1.18	3 (18%) 1 1	27, 41, 50, 58	0
3	F	10/16 (62%)	0.94	3 (30%) 0 0	26, 33, 48, 49	0
All	All	896/902 (99%)	0.63	77 (8%) 10 11	20, 34, 64, 103	0

All (77) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	133	GLY	9.7
1	C	132	SER	9.2
1	A	132	SER	9.0
1	C	130	SER	8.7
1	A	190	GLY	8.2
1	C	131	THR	7.9
1	C	129	LYS	7.8
1	A	130	SER	7.8
1	C	128	SER	7.4
1	A	134	GLY	6.5
1	A	133	GLY	6.1
1	C	190	GLY	6.1
1	A	129	LYS	6.0
1	C	214	LYS	5.7
1	A	206	LYS	5.1
2	B	126	LYS	4.9
1	C	189	LEU	4.8
1	A	128	SER	4.7
2	D	188	LYS	4.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	204	ASN	4.5
1	A	131	THR	4.5
1	C	193	THR	4.4
2	B	184	ALA	4.0
2	B	125	LEU	3.9
1	A	214	LYS	3.8
1	C	191	THR	3.7
1	C	212	GLU	3.6
3	E	522	HIS	3.5
1	A	205	THR	3.5
2	D	184	ALA	3.3
1	A	158	ALA	3.3
1	C	134	GLY	3.2
1	C	187	SER	3.2
2	D	150	VAL	3.0
1	A	157	GLY	3.0
2	B	191	VAL	3.0
2	B	188	LYS	3.0
1	A	195	ILE	2.9
2	B	127	SER	2.9
2	D	153	ALA	2.9
1	A	201	LYS	2.8
2	D	154	LEU	2.8
1	A	207	VAL	2.8
2	B	47	LEU	2.8
3	F	519	PHE	2.8
1	A	208	ASP	2.7
3	F	512	ALA	2.7
1	C	185	PRO	2.6
2	D	69	THR	2.6
1	A	199	ASN	2.6
1	C	207	VAL	2.6
2	B	44	PRO	2.5
1	C	135	THR	2.5
1	C	127	SER	2.5
1	A	212	GLU	2.4
2	D	67	SER	2.3
1	A	103	TRP	2.3
3	E	526	HIS	2.3
2	B	54	LEU	2.3
2	B	46	LEU	2.3
3	F	521	GLY	2.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	127	SER	2.2
2	B	10	PHE	2.2
1	C	158	ALA	2.2
2	B	43	ALA	2.2
1	A	210	LYS	2.2
1	A	156	SER	2.1
3	E	523	HIS	2.1
1	A	211	VAL	2.1
1	A	102	VAL	2.1
1	C	211	VAL	2.1
1	A	98	TYR	2.1
2	D	125	LEU	2.0
1	C	192	GLN	2.0
2	B	122	ASP	2.0
1	A	203	SER	2.0
2	D	189	HIS	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.