



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 12:45 PM UTC

PDB ID : 8DY1 / pdb_00008dy1
Title : Crystal Structure of scFv CAT2200 LH in complex with IL-17A
Authors : Luo, J.; Armstrong, A.A.
Deposited on : 2022-08-03
Resolution : 2.68 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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

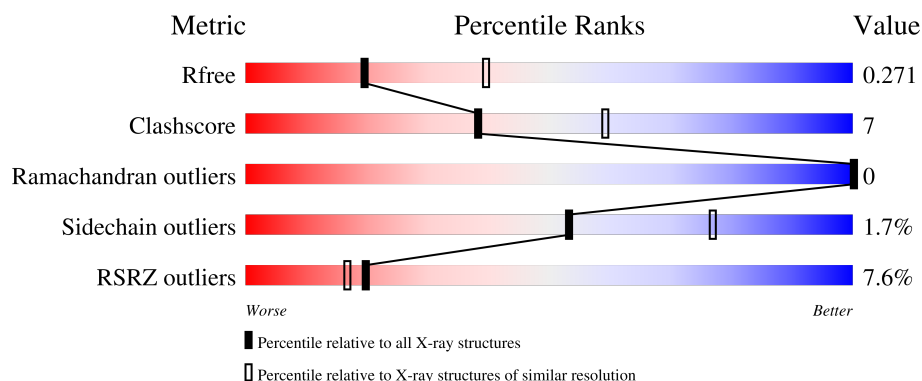
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.68 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}	180053	5070 (2.70-2.66)
Clashscore	190562	5409 (2.70-2.66)
Ramachandran outliers	187476	5324 (2.70-2.66)
Sidechain outliers	187428	5324 (2.70-2.66)
RSRZ outliers	180081	5070 (2.70-2.66)

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 $\leq 5\%$. 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	A	122	11% 73% 7% • 20%
1	B	122	9% 63% 11% 25%
2	C	255	7% 75% 15% 11%
2	D	255	3% 72% 18% 10%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4943 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 Interleukin-17A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	98	Total	C	N	O	S	0	0	0
			773	482	140	145	6			
1	B	91	Total	C	N	O	S	0	0	0
			664	418	119	122	5			

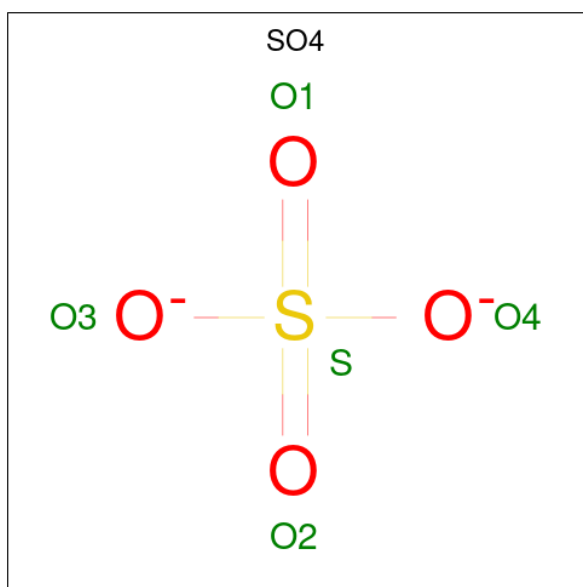
There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	11	MET	-	initiating methionine	UNP Q16552
A	70	GLN	LYS	engineered mutation	UNP Q16552
A	106	SER	CYS	engineered mutation	UNP Q16552
A	132	GLN	ALA	engineered mutation	UNP Q16552
B	11	MET	-	initiating methionine	UNP Q16552
B	70	GLN	LYS	engineered mutation	UNP Q16552
B	106	SER	CYS	engineered mutation	UNP Q16552
B	132	GLN	ALA	engineered mutation	UNP Q16552

- Molecule 2 is a protein called scFv CAT2200 LH.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	228	Total	C	N	O	S	0	0	0
			1701	1061	293	340	7			
2	D	229	Total	C	N	O	S	0	0	0
			1712	1068	295	342	7			

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	C	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	9	Total	O	0	0
			9	9		
4	B	15	Total	O	0	0
			15	15		
4	C	29	Total	O	0	0
			29	29		
4	D	20	Total	O	0	0
			20	20		

- Molecule 1: Interleukin-17A



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	51.93Å 62.05Å 111.71Å 90.00° 99.69° 90.00°	Depositor
Resolution (Å)	43.69 – 2.68 43.69 – 2.68	Depositor EDS
% Data completeness (in resolution range)	92.1 (43.69-2.68) 92.2 (43.69-2.68)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.43 (at 2.69Å)	Xtriage
Refinement program	PHENIX 1.18_3855	Depositor
R, R_{free}	0.221 , 0.268 0.223 , 0.271	Depositor DCC
R_{free} test set	858 reflections (4.30%)	wwPDB-VP
Wilson B-factor (Å ²)	48.5	Xtriage
Anisotropy	0.616	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 44.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	4943	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.04% 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, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	0.10	0/792	0.30	0/1082
1	B	0.12	0/676	0.28	0/927
2	C	0.10	0/1738	0.30	0/2360
2	D	0.10	0/1749	0.30	0/2375
All	All	0.10	0/4955	0.29	0/6744

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	773	0	727	7	0
1	B	664	0	587	10	0
2	C	1701	0	1614	23	0
2	D	1712	0	1629	30	0
3	C	10	0	0	1	0
3	D	10	0	0	1	0
4	A	9	0	0	0	0
4	B	15	0	0	1	0
4	C	29	0	0	5	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	20	0	0	6	0
All	All	4943	0	4557	65	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 7.

All (65) 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:240:GLN:O	4:D:401:HOH:O	1.98	0.80
2:C:47:ILE:HD11	2:C:50:PHE:HB3	1.63	0.80
1:B:50:PRO:HB2	1:B:72:ARG:HE	1.49	0.76
2:D:150:LEU:O	4:D:402:HOH:O	2.04	0.75
2:D:213:MET:HB3	2:D:216:LEU:HD21	1.68	0.74
2:D:228:ARG:NH1	2:D:237:ASN:OD1	2.20	0.74
2:C:228:ARG:NH1	2:C:237:ASN:OD1	2.24	0.71
2:D:102:GLY:O	4:D:403:HOH:O	2.13	0.66
2:C:9:SER:O	4:C:402:HOH:O	2.12	0.66
2:C:139:GLY:O	4:C:403:HOH:O	2.14	0.66
1:A:95:GLU:OE1	1:A:114:LYS:NZ	2.34	0.61
2:D:149:ARG:NH1	4:D:406:HOH:O	2.33	0.61
2:D:4:LEU:HD11	2:D:93:THR:HG22	1.82	0.61
1:B:52:ASN:OD1	1:B:72:ARG:NH1	2.34	0.60
2:C:149:ARG:NH2	4:C:405:HOH:O	2.35	0.59
2:C:184:SER:OG	3:C:302:SO4:O1	2.20	0.59
2:C:166:TRP:NE1	2:C:211:LEU:HB2	2.20	0.57
2:D:84:GLU:OE1	2:D:84:GLU:N	2.37	0.56
2:C:168:ARG:NH2	2:C:224:TYR:OH	2.27	0.56
1:A:120:GLY:HA3	1:B:92:ILE:HD13	1.87	0.56
1:B:88:ASN:HD21	2:D:232:HIS:H	1.52	0.56
2:D:37:TYR:HE2	2:D:92:GLN:HB3	1.71	0.55
2:D:142:VAL:HG11	2:D:216:LEU:HD12	1.90	0.53
1:B:88:ASN:ND2	2:D:232:HIS:H	2.08	0.52
2:C:62:ARG:NH1	2:C:85:ASP:OD2	2.34	0.51
2:D:178:VAL:HG13	2:D:194:VAL:HG11	1.91	0.51
2:C:140:GLY:HA2	4:C:403:HOH:O	2.12	0.50
2:D:152:CYS:HB3	2:D:209:LEU:HB3	1.93	0.50
2:C:4:LEU:HD11	2:C:93:THR:HG22	1.93	0.50
2:D:219:GLU:OE1	2:D:219:GLU:N	2.42	0.50
2:C:48:VAL:HG12	2:C:49:ILE:HG12	1.93	0.49
1:B:51:TRP:HB3	1:B:121:CYS:SG	2.52	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:146:GLY:O	2:C:216:LEU:HD13	2.13	0.49
2:C:35:GLN:HG3	2:C:50:PHE:HA	1.95	0.48
2:D:162:TYR:HA	4:D:407:HOH:O	2.13	0.48
1:A:57:GLU:HG2	1:A:65:VAL:HG22	1.97	0.47
2:D:159:PHE:O	2:D:202:ARG:NH2	2.47	0.47
2:D:99:VAL:HB	2:D:177:TRP:CG	2.50	0.47
2:C:219:GLU:OE1	2:C:219:GLU:N	2.42	0.46
2:D:29:LEU:HD23	2:D:67:ILE:HG23	1.97	0.45
2:C:132:VAL:HG21	2:C:228:ARG:NH1	2.31	0.45
2:D:56:PRO:HB3	2:D:236:ARG:NH2	2.31	0.45
1:A:23:MET:HE3	1:B:21:THR:HG22	1.97	0.45
2:D:150:LEU:HD22	2:D:242:THR:HG21	1.98	0.45
1:A:111:ARG:HA	1:B:25:ASN:HB3	1.98	0.44
2:C:17:THR:HG22	2:C:79:SER:HA	1.99	0.44
2:C:168:ARG:HG2	2:C:176:GLU:HB3	1.99	0.44
2:D:36:TRP:CZ3	2:D:91:CYS:HB3	2.52	0.44
1:A:88:ASN:HD22	1:A:88:ASN:HA	1.69	0.44
2:D:62:ARG:HB2	2:D:79:SER:O	2.17	0.44
2:C:64:SER:OG	2:C:77:THR:OG1	2.35	0.43
1:B:76:CYS:O	1:B:84:ASP:N	2.39	0.43
2:C:36:TRP:HB2	2:C:49:ILE:HB	2.00	0.43
2:D:199:THR:HB	2:D:212:GLN:HB3	2.00	0.43
2:D:95:ASP:OD1	2:D:98:SER:N	2.42	0.42
2:C:36:TRP:CZ3	2:C:91:CYS:HB3	2.55	0.42
1:A:102:GLU:HG2	1:A:111:ARG:HH21	1.86	0.41
2:D:232:HIS:HB3	4:D:408:HOH:O	2.20	0.41
1:B:53:LEU:HD11	4:B:204:HOH:O	2.21	0.41
2:D:221:THR:HG23	2:D:245:THR:HA	2.02	0.41
2:D:31:ASN:ND2	3:D:302:SO4:O4	2.33	0.41
2:C:195:LYS:NZ	4:C:406:HOH:O	2.51	0.40
2:C:199:THR:HB	2:C:212:GLN:HB3	2.02	0.40
2:D:157:PHE:CZ	2:D:228:ARG:HD2	2.57	0.40
2:D:197:ARG:HB3	2:D:214:ASN:O	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	94/122 (77%)	90 (96%)	4 (4%)	0	100	100
1	B	83/122 (68%)	82 (99%)	1 (1%)	0	100	100
2	C	224/255 (88%)	217 (97%)	7 (3%)	0	100	100
2	D	225/255 (88%)	216 (96%)	9 (4%)	0	100	100
All	All	626/754 (83%)	605 (97%)	21 (3%)	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	88/117 (75%)	87 (99%)	1 (1%)	65	83
1	B	67/117 (57%)	65 (97%)	2 (3%)	36	63
2	C	183/200 (92%)	178 (97%)	5 (3%)	39	67
2	D	185/200 (92%)	184 (100%)	1 (0%)	81	91
All	All	523/634 (82%)	514 (98%)	9 (2%)	53	77

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	88	ASN
1	B	45	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	90	VAL
2	C	150	LEU
2	C	194	VAL
2	C	209	LEU
2	C	216	LEU
2	C	246	VAL
2	D	243	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
2	C	232	HIS
2	D	38	GLN
2	D	133	GLN
2	D	169	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	SO4	D	302	-	4,4,4	0.24	0	6,6,6	0.09	0
3	SO4	C	302	-	4,4,4	0.24	0	6,6,6	0.12	0
3	SO4	C	301	-	4,4,4	0.23	0	6,6,6	0.12	0
3	SO4	D	301	-	4,4,4	0.25	0	6,6,6	0.07	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	302	SO4	1	0
3	C	302	SO4	1	0

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, 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	98/122 (80%)	0.84	13 (13%) 7 6	31, 46, 76, 84	0
1	B	91/122 (74%)	1.13	11 (12%) 8 7	35, 48, 71, 76	0
2	C	228/255 (89%)	0.96	18 (7%) 18 15	32, 49, 71, 82	0
2	D	229/255 (89%)	0.65	7 (3%) 51 47	29, 43, 59, 81	0
All	All	646/754 (85%)	0.85	49 (7%) 20 17	29, 46, 70, 84	0

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	111	GLY	4.9
2	C	172	GLY	4.3
1	B	19	PRO	3.9
2	C	247	SER	3.8
2	D	41	PRO	3.8
1	A	20	ARG	3.7
2	D	248	SER	3.4
1	B	110	PHE	3.4
1	B	100	ARG	3.2
2	C	1	ASN	3.0
2	C	79	SER	3.0
1	A	106	SER	2.9
2	D	111	GLY	2.9
2	C	58	GLY	2.9
1	A	40	SER	2.9
1	A	21	THR	2.8
1	B	99	LEU	2.8
2	C	142	VAL	2.8
1	A	107	PRO	2.7
2	C	109	VAL	2.7
2	D	42	GLY	2.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	104	PRO	2.7
1	B	68	GLU	2.6
1	A	129	HIS	2.6
2	C	42	GLY	2.6
1	B	20	ARG	2.6
1	B	67	TRP	2.5
2	C	57	SER	2.5
2	C	246	VAL	2.5
1	B	38	LYS	2.4
2	C	63	PHE	2.4
1	A	19	PRO	2.4
1	B	131	VAL	2.3
1	A	26	LEU	2.3
2	D	148	LEU	2.3
2	C	141	LEU	2.2
1	A	105	HIS	2.2
2	D	110	LEU	2.2
2	C	56	PRO	2.1
2	D	109	VAL	2.1
1	A	108	ASN	2.1
1	A	22	VAL	2.1
1	A	110	PHE	2.1
2	C	160	SER	2.1
2	C	206	LYS	2.1
1	B	24	VAL	2.1
2	C	59	VAL	2.1
2	C	14	PRO	2.1
1	B	39	ARG	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 oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	SO4	C	302	5/5	0.86	0.12	43,45,57,62	0
3	SO4	C	301	5/5	0.93	0.08	39,42,44,49	0
3	SO4	D	302	5/5	0.93	0.18	48,60,64,66	0
3	SO4	D	301	5/5	0.94	0.14	47,49,55,61	0

6.5 Other polymers [i](#)

There are no such residues in this entry.