



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 4, 2026 – 08:13 PM EDT

PDB ID : 6DJQ / pdb_00006djq
Title : Vps1 GTPase-BSE fusion complexed with GDP.AIF4-
Authors : Varlakhanova, N.V.; Brady, T.M.; Tornabene, B.A.; Hosford, C.J.; Chappie, J.S.; Ford, M.G.J.
Deposited on : 2018-05-25
Resolution : 3.10 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

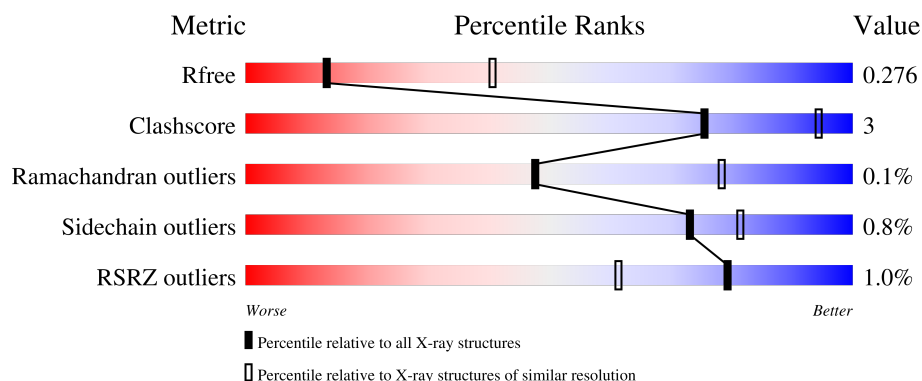
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 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	1456 (3.10-3.10)
Clashscore	190562	1539 (3.10-3.10)
Ramachandran outliers	187476	1467 (3.10-3.10)
Sidechain outliers	187428	1467 (3.10-3.10)
RSRZ outliers	180081	1456 (3.10-3.10)

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	391	79% 8% 13%
1	B	391	80% • 16%
1	C	391	82% 5% • 12%
1	D	391	77% 6% 16%

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 19891 atoms, of which 9806 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 Vps1 GTPase-BSE.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	340	Total	C	H	N	O	S	0	2	0
			5013	1601	2487	442	476	7			
1	B	330	Total	C	H	N	O	S	0	0	0
			4952	1575	2471	439	461	6			
1	C	343	Total	C	H	N	O	S	0	0	0
			4941	1603	2434	426	471	7			
1	D	327	Total	C	H	N	O	S	0	0	0
			4782	1534	2370	422	450	6			

There are 28 discrepancies between the modelled and reference sequences:

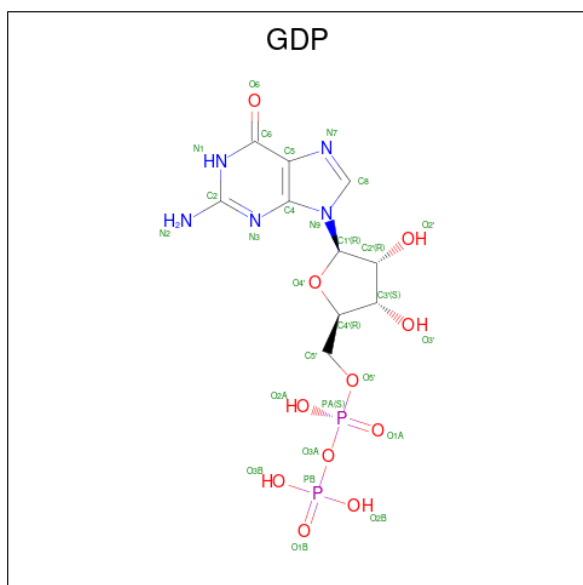
Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP G0SFF0
A	0	PRO	-	expression tag	UNP G0SFF0
A	664	ALA	-	linker	UNP G0SFF0
A	665	GLY	-	linker	UNP G0SFF0
A	666	ALA	-	linker	UNP G0SFF0
A	667	GLY	-	linker	UNP G0SFF0
A	668	ALA	-	linker	UNP G0SFF0
B	-1	GLY	-	expression tag	UNP G0SFF0
B	0	PRO	-	expression tag	UNP G0SFF0
B	664	ALA	-	linker	UNP G0SFF0
B	665	GLY	-	linker	UNP G0SFF0
B	666	ALA	-	linker	UNP G0SFF0
B	667	GLY	-	linker	UNP G0SFF0
B	668	ALA	-	linker	UNP G0SFF0
C	-1	GLY	-	expression tag	UNP G0SFF0
C	0	PRO	-	expression tag	UNP G0SFF0
C	664	ALA	-	linker	UNP G0SFF0
C	665	GLY	-	linker	UNP G0SFF0
C	666	ALA	-	linker	UNP G0SFF0
C	667	GLY	-	linker	UNP G0SFF0
C	668	ALA	-	linker	UNP G0SFF0

Continued on next page...

Continued from previous page...

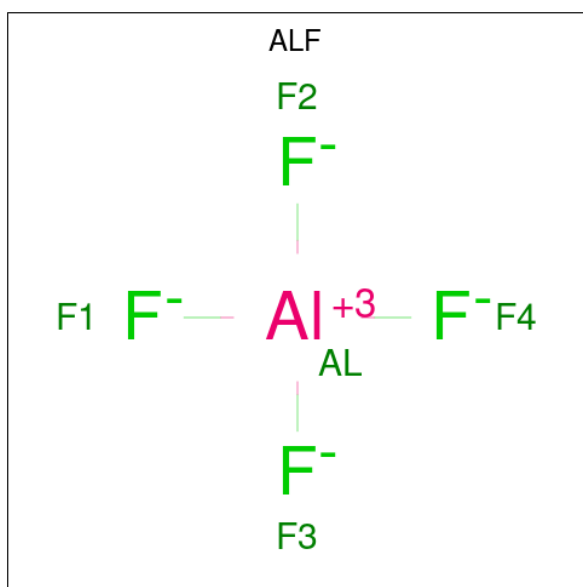
Chain	Residue	Modelled	Actual	Comment	Reference
D	-1	GLY	-	expression tag	UNP G0SFF0
D	0	PRO	-	expression tag	UNP G0SFF0
D	664	ALA	-	linker	UNP G0SFF0
D	665	GLY	-	linker	UNP G0SFF0
D	666	ALA	-	linker	UNP G0SFF0
D	667	GLY	-	linker	UNP G0SFF0
D	668	ALA	-	linker	UNP G0SFF0

- Molecule 2 is GUANOSINE-5'-DIPHOSPHATE (CCD ID: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	P	0	0
			39	10	11	5	11	2		
2	B	1	Total	C	H	N	O	P	0	0
			39	10	11	5	11	2		
2	C	1	Total	C	H	N	O	P	0	0
			39	10	11	5	11	2		
2	D	1	Total	C	H	N	O	P	0	0
			39	10	11	5	11	2		

- Molecule 3 is TETRAFLUOROALUMINATE ION (CCD ID: ALF) (formula: AlF_4).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	Al	F	0	0
			5	1	4		
3	B	1	Total	Al	F	0	0
			5	1	4		
3	C	1	Total	Al	F	0	0
			5	1	4		
3	D	1	Total	Al	F	0	0
			5	1	4		

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Mg	0	0
			1	1		
4	B	1	Total	Mg	0	0
			1	1		
4	C	1	Total	Mg	0	0
			1	1		
4	D	1	Total	Mg	0	0
			1	1		

- Molecule 5 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Na	0	0
			1	1		

Continued on next page...

Continued from previous page...

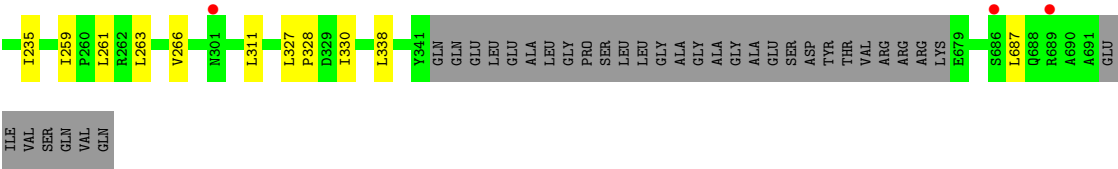
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	1	Total 1	Na 1	0	0
5	C	1	Total 1	Na 1	0	0
5	D	1	Total 1	Na 1	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	8	Total 8	O 8	0	0
6	B	4	Total 4	O 4	0	0
6	C	2	Total 2	O 2	0	0
6	D	5	Total 5	O 5	0	0

- Molecule 1: Vps1 GTPase-BSE





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	69.06Å 121.22Å 104.56Å 90.00° 90.60° 90.00°	Depositor
Resolution (Å)	39.59 – 3.10 39.59 – 3.10	Depositor EDS
% Data completeness (in resolution range)	83.1 (39.59-3.10) 83.0 (39.59-3.10)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.86 (at 3.12Å)	Xtriage
Refinement program	PHENIX (1.13_2998: ???)	Depositor
R, R_{free}	0.222 , 0.279 0.224 , 0.276	Depositor DCC
R_{free} test set	1271 reflections (4.05%)	wwPDB-VP
Wilson B-factor (Å ²)	59.9	Xtriage
Anisotropy	0.571	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 53.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.049 for h,-k,-l	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	19891	wwPDB-VP
Average B, all atoms (Å ²)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.72% 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: GDP, NA, MG, ALF

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	0.14	0/2569	0.33	0/3504
1	B	0.14	0/2516	0.32	0/3422
1	C	0.13	0/2547	0.30	0/3483
1	D	0.13	0/2450	0.32	0/3347
All	All	0.14	0/10082	0.32	0/13756

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	2526	2487	2484	25	0
1	B	2481	2471	2470	10	0
1	C	2507	2434	2434	11	0
1	D	2412	2370	2370	15	0
2	A	28	11	12	0	0
2	B	28	11	12	0	0
2	C	28	11	12	1	0
2	D	28	11	12	0	0
3	A	5	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	5	0	0	0	0
3	C	5	0	0	0	0
3	D	5	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	8	0	0	0	0
6	B	4	0	0	0	0
6	C	2	0	0	0	0
6	D	5	0	0	0	0
All	All	10085	9806	9806	60	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 3.

The worst 5 of 60 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:27:LYS:O	1:A:31:VAL:HG23	1.97	0.64
1:A:40:PRO:CG	1:A:330:ILE:HD11	2.28	0.63
1:B:75:ILE:HD11	1:B:149:ILE:HD11	1.82	0.60
1:A:40:PRO:HG2	1:A:330:ILE:HD11	1.85	0.58
1:A:75:ILE:HD11	1:A:149:ILE:HD11	1.84	0.58

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	336/391 (86%)	324 (96%)	12 (4%)	0	100	100
1	B	322/391 (82%)	313 (97%)	8 (2%)	1 (0%)	36	67
1	C	337/391 (86%)	326 (97%)	11 (3%)	0	100	100
1	D	321/391 (82%)	311 (97%)	10 (3%)	0	100	100
All	All	1316/1564 (84%)	1274 (97%)	41 (3%)	1 (0%)	48	78

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	68	PHE

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	262/330 (79%)	260 (99%)	2 (1%)	73	81
1	B	256/330 (78%)	256 (100%)	0	100	100
1	C	252/330 (76%)	247 (98%)	5 (2%)	48	72
1	D	247/330 (75%)	246 (100%)	1 (0%)	84	86
All	All	1017/1320 (77%)	1009 (99%)	8 (1%)	73	81

5 of 8 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	261	LEU
1	C	672	TYR
1	C	246	GLU
1	C	149	ILE
1	C	322	HIS

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

Mol	Chain	Res	Type
1	A	155	ASN
1	B	155	ASN
1	B	165	ASN
1	C	296	HIS

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](#)

Of 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 for Mogul analysis.

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	ALF	A	1002	2,6	4,4,4	1.50	0	-		
2	GDP	B	1001	4,3,5	29,30,30	0.54	0	45,47,47	0.54	0
3	ALF	C	1002	2,6	4,4,4	1.50	0	-		
2	GDP	A	1001	4,3,5	29,30,30	0.30	0	45,47,47	0.31	0
3	ALF	B	1002	2,6	4,4,4	1.50	0	-		
2	GDP	D	1001	4,3,5	29,30,30	0.53	0	45,47,47	0.53	0
2	GDP	C	1001	4,3,5	29,30,30	0.28	0	45,47,47	0.31	0
3	ALF	D	1002	2,6	4,4,4	1.50	0	-		

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the

Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.
'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GDP	C	1001	4,3,5	-	0/16/32/32	0/3/3/3
2	GDP	B	1001	4,3,5	-	0/16/32/32	0/3/3/3
2	GDP	D	1001	4,3,5	-	0/16/32/32	0/3/3/3
2	GDP	A	1001	4,3,5	-	0/16/32/32	0/3/3/3

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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1001	GDP	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 [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	340/391 (86%)	-0.16	3 (0%)	81 63	16, 48, 101, 156	1 (0%)
1	B	330/391 (84%)	0.04	3 (0%)	81 63	22, 62, 101, 158	0
1	C	343/391 (87%)	0.08	5 (1%)	72 52	26, 64, 98, 154	0
1	D	327/391 (83%)	-0.04	3 (0%)	81 63	27, 56, 117, 325	0
All	All	1340/1564 (85%)	-0.02	14 (1%)	79 61	16, 59, 105, 325	1 (0%)

The worst 5 of 14 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	686	SER	3.5
1	B	348	LEU	2.8
1	D	301	ASN	2.5
1	C	305	TYR	2.3
1	C	329	ASP	2.3

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($\text{\AA}^2$)	Q<0.9
5	NA	C	1004	1/1	0.89	0.11	41,41,41,41	0
5	NA	A	1004	1/1	0.93	0.10	31,31,31,31	0
5	NA	D	1004	1/1	0.94	0.14	69,69,69,69	0
2	GDP	C	1001	28/28	0.95	0.08	37,44,52,53	0
4	MG	C	1003	1/1	0.96	0.06	48,48,48,48	0
2	GDP	A	1001	28/28	0.96	0.08	19,28,36,40	0
2	GDP	B	1001	28/28	0.97	0.06	16,29,40,41	0
2	GDP	D	1001	28/28	0.97	0.07	19,29,46,54	0
3	ALF	A	1002	5/5	0.97	0.06	26,27,29,33	0
3	ALF	C	1002	5/5	0.97	0.06	48,49,53,58	0
3	ALF	B	1002	5/5	0.98	0.07	25,27,34,36	0
4	MG	A	1003	1/1	0.98	0.05	27,27,27,27	0
4	MG	B	1003	1/1	0.99	0.03	27,27,27,27	0
5	NA	B	1004	1/1	0.99	0.12	25,25,25,25	0
3	ALF	D	1002	5/5	0.99	0.04	18,19,25,25	0
4	MG	D	1003	1/1	0.99	0.02	24,24,24,24	0

6.5 Other polymers [i](#)

There are no such residues in this entry.