wwPDB X-ray Structure Validation Summary Report (i)

Sep 25, 2023 – 05:54 PM EDT

PDB ID	:	6AXQ
Title	:	CREBBP bromodomain in complex with Cpd6 (methyl 1H-indole-3-carboxyl ate)
Authors	:	Murray, J.M.; Jayaram, H.
Deposited on	:	2017-09-07
Resolution	:	1.30 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 (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 (i)) were used in the production of this report:

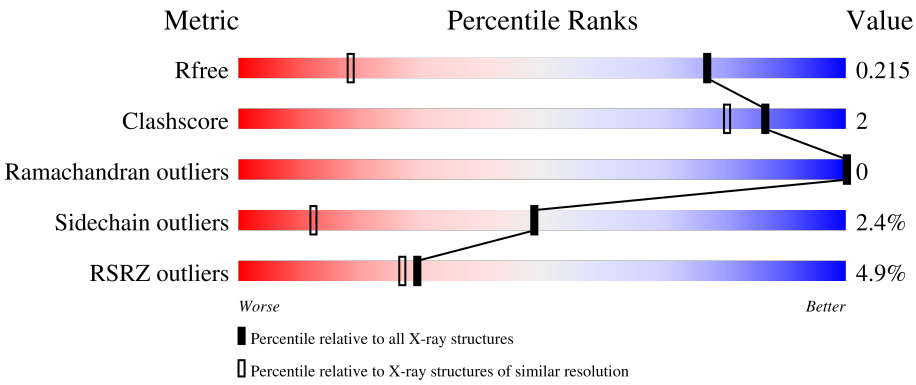
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 1.30 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	1058 (1.30-1.30)
Clashscore	141614	1101 (1.30-1.30)
Ramachandran outliers	138981	1058 (1.30-1.30)
Sidechain outliers	138945	1058 (1.30-1.30)
RSRZ outliers	127900	1029 (1.30-1.30)

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	114	4% 91% 7% •
1	B	114	7% 91% 7% •
1	C	114	4% 95% • •
1	D	114	4% 95% 5%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 4415 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.

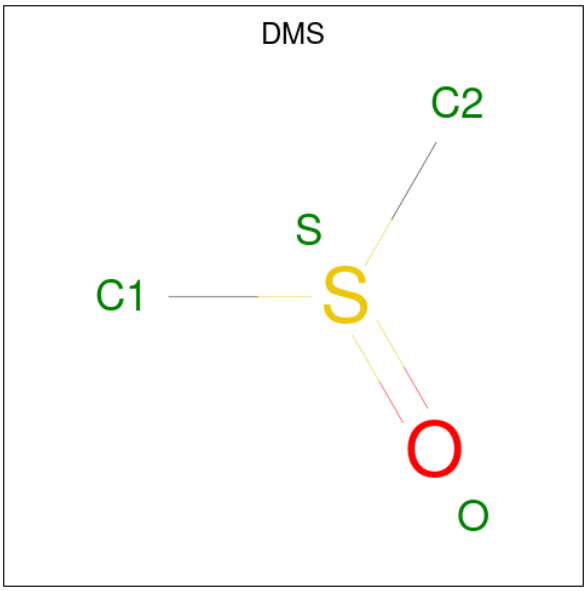
- Molecule 1 is a protein called CREB-binding protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	112	966	629	157	175	5	0	3	0
1	B	112	955	619	156	175	5	0	2	0
1	C	112	952	617	153	177	5	0	1	0
1	D	114	955	619	155	176	5	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

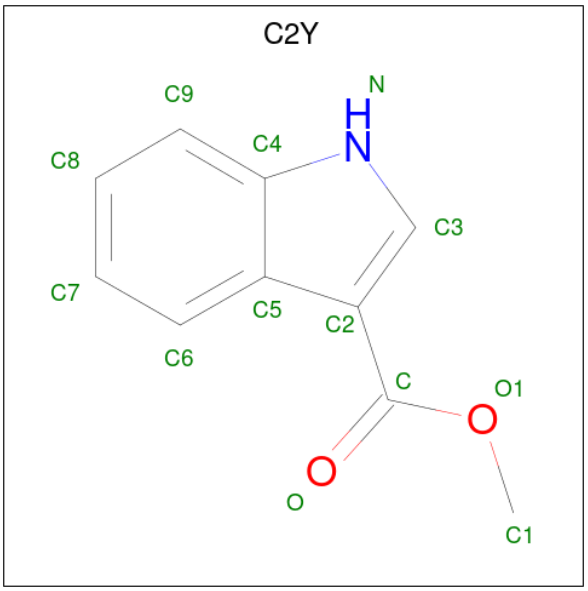
Chain	Residue	Modelled	Actual	Comment	Reference
A	1083	ALA	-	expression tag	UNP Q92793
A	1084	ALA	-	expression tag	UNP Q92793
B	1083	ALA	-	expression tag	UNP Q92793
B	1084	ALA	-	expression tag	UNP Q92793
C	1083	ALA	-	expression tag	UNP Q92793
C	1084	ALA	-	expression tag	UNP Q92793
D	1083	ALA	-	expression tag	UNP Q92793
D	1084	ALA	-	expression tag	UNP Q92793

- Molecule 2 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C_2H_6OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	S		
2	A	1	4	2	1	1	0	0
			Total	C	O	S		
2	A	1	4	2	1	1	0	0
			Total	C	O	S		
2	B	1	4	2	1	1	0	0
			Total	C	O	S		
2	C	1	4	2	1	1	0	0
			Total	C	O	S		
2	C	1	4	2	1	1	0	0
			Total	C	O	S		
2	D	1	4	2	1	1	0	0

- Molecule 3 is methyl 1H-indole-3-carboxylate (three-letter code: C2Y) (formula: $C_{10}H_9NO_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	13	10	1	2	0	0
			Total	C	N	O		
3	B	1	13	10	1	2	0	0
			Total	C	N	O		
3	C	1	13	10	1	2	0	0
			Total	C	N	O		
3	D	1	13	10	1	2	0	0

- Molecule 4 is water.

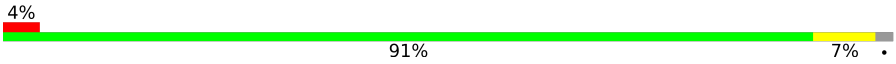
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	123	123	123	0	0
			Total	O		
4	B	122	122	122	0	0
			Total	O		
4	C	136	136	136	0	0
			Total	O		
4	D	130	130	130	0	0

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.

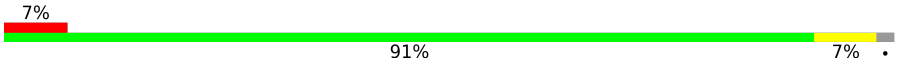
• Molecule 1: CREB-binding protein

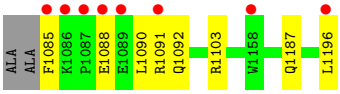
Chain A:



• Molecule 1: CREB-binding protein

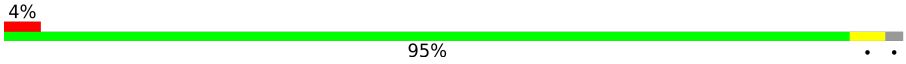
Chain B:

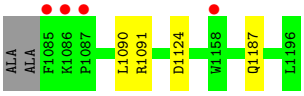




• Molecule 1: CREB-binding protein

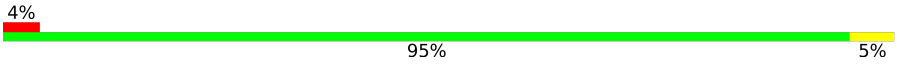
Chain C:

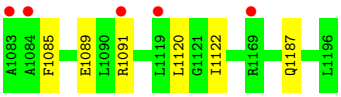




• Molecule 1: CREB-binding protein

Chain D:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 2 21	Depositor
Cell constants a, b, c, α, β, γ	68.71Å 69.98Å 110.28Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.54 – 1.30 29.54 – 1.30	Depositor EDS
% Data completeness (in resolution range)	99.9 (29.54-1.30) 99.9 (29.54-1.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.54 (at 1.30Å)	Xtriage
Refinement program	PHENIX dev_2747	Depositor
R, R_{free}	0.200 , 0.216 0.199 , 0.215	Depositor DCC
R_{free} test set	6590 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	13.3	Xtriage
Anisotropy	0.109	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 46.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.015 for k,h,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	4415	wwPDB-VP
Average B, all atoms (Å^2)	17.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 53.82 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.9905e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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)

Bond lengths and bond angles in the following residue types are not validated in this section: C2Y, DMS

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	0.49	0/1006	0.62	0/1368
1	B	0.46	0/990	0.62	0/1345
1	C	0.60	0/979	0.69	1/1332 (0.1%)
1	D	0.47	0/982	0.63	0/1335
All	All	0.51	0/3957	0.64	1/5380 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	1091	ARG	NE-CZ-NH2	-8.80	115.90	120.30

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	A	966	0	942	5	0
1	B	955	0	932	6	0
1	C	952	0	925	2	0
1	D	955	0	936	3	0
2	A	8	0	12	1	0
2	B	4	0	6	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	8	0	12	2	0
2	D	4	0	6	0	0
3	A	13	0	0	0	0
3	B	13	0	0	0	0
3	C	13	0	0	0	0
3	D	13	0	0	0	0
4	A	123	0	0	2	2
4	B	122	0	0	2	1
4	C	136	0	0	0	2
4	D	130	0	0	0	1
All	All	4415	0	3771	16	3

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.

The worst 5 of 16 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:1171:THR:OG1	4:A:1301:HOH:O	2.01	0.78
1:B:1085:PHE:HD1	1:B:1090:LEU:HD13	1.50	0.76
1:B:1103[A]:ARG:HH11	1:B:1103[A]:ARG:HG3	1.55	0.70
1:C:1124:ASP:H	2:C:1201:DMS:H23	1.60	0.66
1:B:1085:PHE:CD1	1:B:1090:LEU:HD13	2.30	0.66

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:1386:HOH:O	4:C:1360:HOH:O[3_554]	2.14	0.06
4:A:1406:HOH:O	4:D:1409:HOH:O[3_554]	2.17	0.03
4:A:1400:HOH:O	4:C:1393:HOH:O[2_555]	2.18	0.02

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	113/114 (99%)	113 (100%)	0	0	100	100
1	B	112/114 (98%)	112 (100%)	0	0	100	100
1	C	111/114 (97%)	111 (100%)	0	0	100	100
1	D	112/114 (98%)	112 (100%)	0	0	100	100
All	All	448/456 (98%)	448 (100%)	0	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	108/106 (102%)	104 (96%)	4 (4%)	34	3
1	B	107/106 (101%)	104 (97%)	3 (3%)	43	8
1	C	106/106 (100%)	104 (98%)	2 (2%)	57	20
1	D	106/106 (100%)	104 (98%)	2 (2%)	57	20
All	All	427/424 (101%)	416 (97%)	11 (3%)	49	10

5 of 11 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	1090	LEU
1	C	1187	GLN
1	D	1187	GLN
1	D	1091	ARG
1	B	1091	ARG

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)

10 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	$\#\|Z\| > 2$
2	DMS	C	1202	-	3,3,3	0.70	0	3,3,3	0.47	0
3	C2Y	A	1203	-	13,14,14	1.41	1 (7%)	17,19,19	0.68	0
3	C2Y	D	1202	-	13,14,14	1.43	1 (7%)	17,19,19	0.81	1 (5%)
2	DMS	D	1201	-	3,3,3	0.59	0	3,3,3	0.27	0
2	DMS	C	1201	-	3,3,3	0.59	0	3,3,3	0.33	0
3	C2Y	B	1202	-	13,14,14	1.23	2 (15%)	17,19,19	0.74	0
2	DMS	B	1201	-	3,3,3	0.61	0	3,3,3	0.43	0
2	DMS	A	1201	-	3,3,3	0.71	0	3,3,3	0.71	0
3	C2Y	C	1203	-	13,14,14	1.31	2 (15%)	17,19,19	0.89	1 (5%)
2	DMS	A	1202	-	3,3,3	0.75	0	3,3,3	0.59	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
3	C2Y	B	1202	-	-	0/6/6/6	0/2/2/2
3	C2Y	C	1203	-	-	0/6/6/6	0/2/2/2
3	C2Y	A	1203	-	-	0/6/6/6	0/2/2/2
3	C2Y	D	1202	-	-	0/6/6/6	0/2/2/2

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1203	C2Y	C2-C5	4.23	1.46	1.42
3	D	1202	C2Y	C2-C5	4.18	1.46	1.42
3	C	1203	C2Y	C2-C5	3.06	1.45	1.42
3	B	1202	C2Y	C2-C5	2.88	1.45	1.42
3	C	1203	C2Y	C2-C	-2.32	1.45	1.50

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	1203	C2Y	C3-C2-C	-2.14	124.59	127.78
3	D	1202	C2Y	C3-C2-C	-2.09	124.68	127.78

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1201	DMS	2	0
2	A	1201	DMS	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	112/114 (98%)	0.20	5 (4%)	33	31	9, 14, 31, 44	0
1	B	112/114 (98%)	0.36	8 (7%)	16	13	9, 15, 39, 71	0
1	C	112/114 (98%)	0.18	4 (3%)	42	39	9, 13, 32, 40	0
1	D	114/114 (100%)	0.25	5 (4%)	34	32	9, 14, 31, 54	0
All	All	450/456 (98%)	0.25	22 (4%)	29	27	9, 14, 34, 71	0

The worst 5 of 22 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	1085	PHE	14.1
1	D	1083	ALA	10.5
1	C	1085	PHE	5.5
1	B	1087	PRO	5.0
1	A	1085	PHE	4.9

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)

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
2	DMS	C	1201	4/4	0.78	0.19	12,17,25,33	0
2	DMS	A	1201	4/4	0.88	0.22	18,32,37,43	0
2	DMS	A	1202	4/4	0.93	0.18	18,24,24,24	0
2	DMS	B	1201	4/4	0.94	0.12	18,23,25,31	0
3	C2Y	D	1202	13/13	0.94	0.08	13,14,19,20	0
2	DMS	D	1201	4/4	0.95	0.11	19,29,32,34	0
3	C2Y	A	1203	13/13	0.95	0.07	13,14,17,19	0
3	C2Y	C	1203	13/13	0.95	0.09	9,11,14,16	0
2	DMS	C	1202	4/4	0.95	0.18	16,30,31,33	0
3	C2Y	B	1202	13/13	0.96	0.07	9,11,14,14	0

6.5 Other polymers (i)

There are no such residues in this entry.