Full wwPDB X-ray Structure Validation Report ⓘ

Jun 26, 2024 – 01:59 AM EDT

PDB ID	:	6TPG
Title	:	Crystal structure of the Orexin-2 receptor in complex with EMPA at 2.74 A resolution
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Deposited on	:	2019-12-13
Resolution	:	2.74 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:

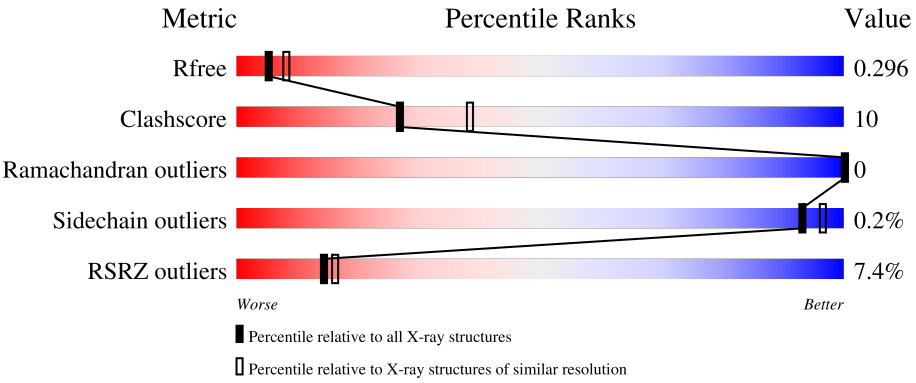
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)

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 2.74 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	1271 (2.76-2.72)
Clashscore	141614	1322 (2.76-2.72)
Ramachandran outliers	138981	1297 (2.76-2.72)
Sidechain outliers	138945	1298 (2.76-2.72)
RSRZ outliers	127900	1243 (2.76-2.72)

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	564	7%, 69%, 20%, 11%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	YCM	A	1004	X	-	-	-

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 4186 atoms, of which 26 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 Orexin receptor type 2,GlgA glycogen synthase,Hypocretin receptor-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	504	4048	2660	670	688	30	0	0	0

There are 39 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-10	GLN	-	expression tag	UNP O43614
A	-9	ASP	-	expression tag	UNP O43614
A	-8	LEU	-	expression tag	UNP O43614
A	-7	ASP	-	expression tag	UNP O43614
A	-6	TYR	-	expression tag	UNP O43614
A	-5	LYS	-	expression tag	UNP O43614
A	-4	ASP	-	expression tag	UNP O43614
A	-3	ASP	-	expression tag	UNP O43614
A	-2	ASP	-	expression tag	UNP O43614
A	-1	ASP	-	expression tag	UNP O43614
A	0	LYS	-	expression tag	UNP O43614
A	14	ASP	ASN	engineered mutation	UNP O43614
A	22	ASP	ASN	engineered mutation	UNP O43614
A	28	LEU	PHE	engineered mutation	UNP O43614
A	30	ASP	ASN	engineered mutation	UNP O43614
A	54	ALA	GLU	engineered mutation	UNP O43614
A	91	LEU	TYR	engineered mutation	UNP O43614
A	100	ALA	ASP	engineered mutation	UNP O43614
A	142	ALA	VAL	engineered mutation	UNP O43614
A	170	LEU	ARG	engineered mutation	UNP O43614
A	202	ASP	ASN	engineered mutation	UNP O43614
A	206	ALA	LEU	engineered mutation	UNP O43614
A	219	ALA	TYR	engineered mutation	UNP O43614
A	233	ALA	MET	engineered mutation	UNP O43614
A	242	LEU	ALA	engineered mutation	UNP O43614
A	310	VAL	LEU	engineered mutation	UNP Q548Y0

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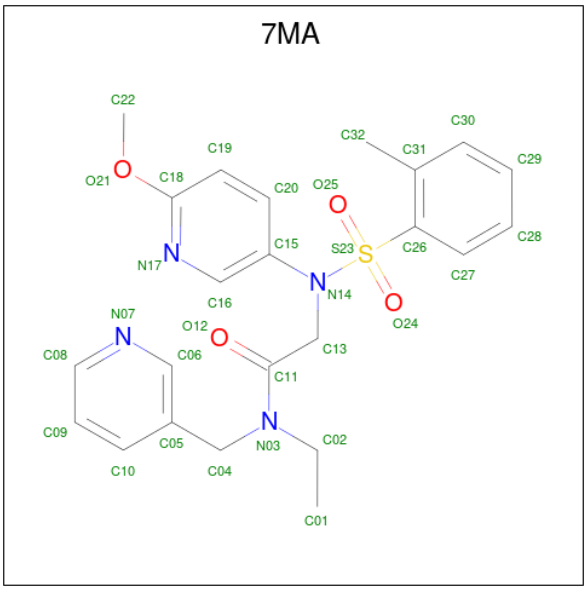
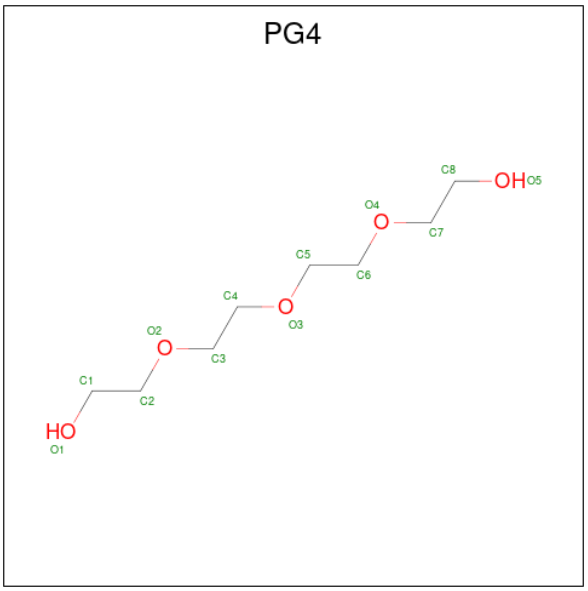
Chain	Residue	Modelled	Actual	Comment	Reference
A	318	ALA	LEU	engineered mutation	UNP Q548Y0
A	347	ALA	THR	engineered mutation	UNP Q548Y0
A	381	TRP	CYS	engineered mutation	UNP Q548Y0
A	382	TRP	CYS	engineered mutation	UNP Q548Y0
A	383	TRP	CYS	engineered mutation	UNP Q548Y0
A	389	HIS	-	expression tag	UNP Q548Y0
A	390	HIS	-	expression tag	UNP Q548Y0
A	391	HIS	-	expression tag	UNP Q548Y0
A	392	HIS	-	expression tag	UNP Q548Y0
A	393	HIS	-	expression tag	UNP Q548Y0
A	394	HIS	-	expression tag	UNP Q548Y0
A	395	HIS	-	expression tag	UNP Q548Y0
A	396	HIS	-	expression tag	UNP Q548Y0

- Molecule 2 is N-ethyl-2-[(6-methoxypyridin-3-yl)-(2-methylphenyl)sulfonyl-amino]-N-(pyridin-3-ylmethyl)ethanamide (three-letter code: 7MA) (formula: $C_{23}H_{26}N_4O_4S$) (labeled as "Ligand of Interest" by depositor).



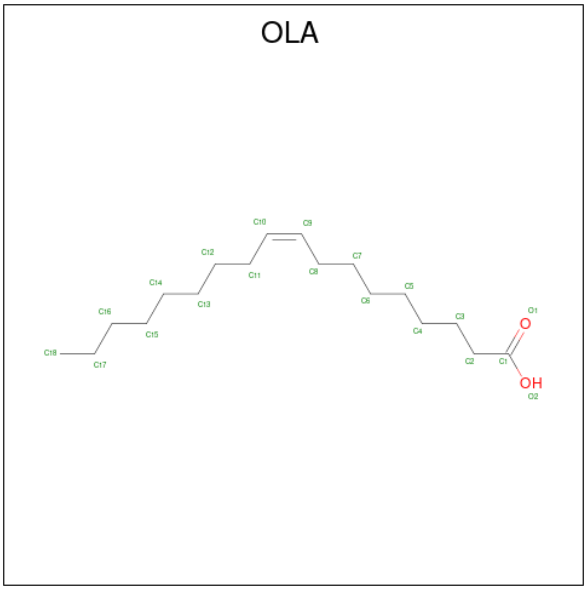
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	S	0	0
			58	23	26	4	4	1		

- Molecule 3 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 13 8 5	0	0

- Molecule 4 is OLEIC ACID (three-letter code: OLA) (formula: $C_{18}H_{34}O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C 11 11	0	0

- Molecule 5 is water.

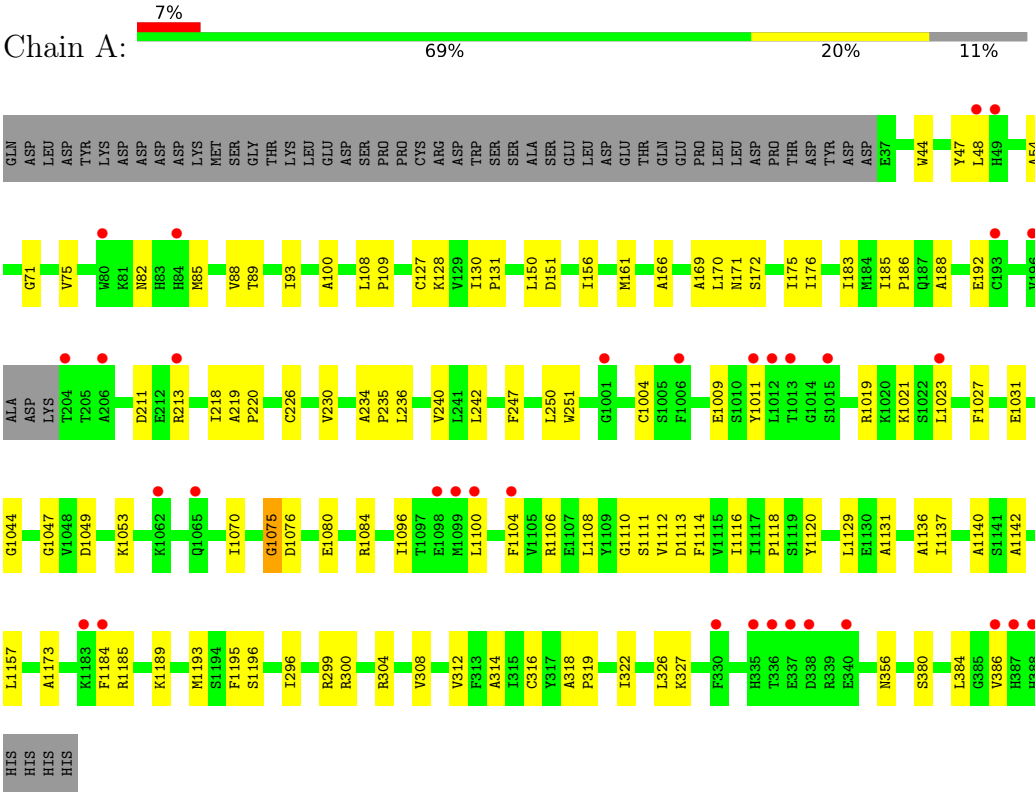
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	56	Total	O	0	0
			56	56		

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: Orexin receptor type 2,GlgA glycogen synthase,Hypocretin receptor-2

Chain A:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	91.10Å 172.91Å 77.81Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.55 – 2.74 48.71 – 2.73	Depositor EDS
% Data completeness (in resolution range)	68.6 (45.55-2.74) 81.5 (48.71-2.73)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.38 (at 2.73Å)	Xtriage
Refinement program	PHENIX 1.14_3260	Depositor
R, R_{free}	0.218 , 0.275 0.246 , 0.296	Depositor DCC
R_{free} test set	754 reflections (4.62%)	wwPDB-VP
Wilson B-factor (Å^2)	32.4	Xtriage
Anisotropy	0.843	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 48.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.87	EDS
Total number of atoms	4186	wwPDB-VP
Average B, all atoms (Å^2)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.59% 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

Bond lengths and bond angles in the following residue types are not validated in this section: 7MA, OLA, PG4, YCM

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	0.32	0/4139	0.49	1/5609 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	1	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	A	1075	GLY	N-CA-C	-5.68	98.89	113.10

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	1004	YCM	CA

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	4048	0	4134	83	0
2	A	32	26	0	0	0
3	A	13	0	18	2	0
4	A	11	0	19	0	0
5	A	56	0	0	1	0
All	All	4160	26	4171	84	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 10.

All (84) 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:226:CYS:O	1:A:230:VAL:HG23	1.49	1.11
1:A:1023:LEU:HD11	1:A:1108:LEU:HD23	1.48	0.96
1:A:192:GLU:HB2	1:A:213:ARG:HG3	1.53	0.88
1:A:1021:LYS:HG2	1:A:1031:GLU:HG2	1.60	0.83
1:A:1116:ILE:HG22	1:A:1118:PRO:HD3	1.67	0.76
1:A:1023:LEU:HD11	1:A:1108:LEU:CD2	2.17	0.74
1:A:1129:LEU:HG	1:A:1149:ILE:HD13	1.76	0.66
1:A:1137:ILE:HG23	1:A:1184:PHE:CE2	2.31	0.65
1:A:47:TYR:CE2	1:A:48:LEU:HG	2.33	0.63
1:A:234:ALA:HB3	1:A:235:PRO:HD3	1.80	0.62
1:A:1140:ALA:HB1	1:A:1146:LEU:HD13	1.82	0.61
1:A:1047:GLY:HA3	1:A:1118:PRO:O	2.01	0.61
1:A:1044:GLY:O	1:A:1120:TYR:HB2	2.00	0.60
1:A:1142:ALA:HB2	1:A:1157:LEU:HB3	1.84	0.60
1:A:1049:ASP:O	1:A:1053:LYS:HG3	2.01	0.59
1:A:211:ASP:HB3	1:A:213:ARG:NH1	2.17	0.59
1:A:150:LEU:HD23	1:A:242:LEU:HD11	1.84	0.59
1:A:1137:ILE:HG23	1:A:1184:PHE:HE2	1.66	0.59
1:A:1027:PHE:CE1	1:A:1096:ILE:HD11	2.38	0.58
1:A:192:GLU:HB2	1:A:213:ARG:CG	2.31	0.58
1:A:1113:ASP:HA	1:A:1185:ARG:HH21	1.69	0.57
1:A:1100:LEU:HD13	1:A:1104:PHE:CE2	2.39	0.57
1:A:218:ILE:HG13	1:A:219:ALA:N	2.21	0.56
1:A:156:ILE:HD13	1:A:250:LEU:HD11	1.88	0.55
1:A:100:ALA:HB2	5:A:1325:HOH:O	2.05	0.55
1:A:1027:PHE:HE1	1:A:1096:ILE:HD11	1.72	0.54
1:A:1189:LYS:O	1:A:1193:MET:HG3	2.08	0.53
1:A:236:LEU:O	1:A:240:VAL:HG23	2.08	0.53
1:A:314:ALA:O	1:A:318:ALA:HB2	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:82:ASN:ND2	1:A:85:MET:HG2	2.25	0.51
1:A:1100:LEU:HD13	1:A:1104:PHE:CD2	2.45	0.51
1:A:247:PHE:HA	1:A:251:TRP:CE3	2.46	0.50
1:A:318:ALA:O	1:A:322:ILE:HG12	2.11	0.49
1:A:384:LEU:CB	1:A:386:VAL:HG23	2.42	0.49
1:A:88:VAL:HG13	1:A:169:ALA:HB2	1.95	0.48
1:A:316:CYS:SG	1:A:356:ASN:HB2	2.54	0.48
1:A:380:SER:HB3	1:A:386:VAL:HB	1.95	0.48
1:A:308:VAL:O	1:A:312:VAL:HG23	2.14	0.48
1:A:1009:GLU:OE1	1:A:1009:GLU:N	2.25	0.48
1:A:1004:YCM:HD2	1:A:1196:SER:HB2	1.96	0.47
1:A:384:LEU:HB2	1:A:386:VAL:HG23	1.96	0.47
1:A:108:LEU:C	1:A:108:LEU:HD23	2.34	0.47
1:A:128:LYS:HD2	1:A:188:ALA:O	2.14	0.47
1:A:304:ARG:O	1:A:308:VAL:HG23	2.14	0.47
1:A:71:GLY:O	1:A:75:VAL:HG23	2.15	0.47
1:A:127:CYS:O	1:A:131:PRO:HG2	2.15	0.47
1:A:1075:GLY:O	1:A:1080:GLU:OE1	2.33	0.47
1:A:150:LEU:HD23	1:A:242:LEU:CD1	2.45	0.47
1:A:161:MET:HE1	1:A:299:ARG:HH12	1.80	0.47
1:A:130:ILE:HB	1:A:131:PRO:HD3	1.96	0.46
1:A:247:PHE:HA	1:A:251:TRP:HE3	1.80	0.46
1:A:89:THR:O	1:A:93:ILE:HG13	2.16	0.46
1:A:185:ILE:N	1:A:186:PRO:HD2	2.30	0.46
1:A:219:ALA:N	1:A:220:PRO:HD2	2.32	0.45
1:A:1104:PHE:CE2	1:A:1108:LEU:HD11	2.52	0.45
1:A:1108:LEU:O	1:A:1112:VAL:HG22	2.17	0.44
1:A:1011:TYR:CD2	1:A:1106:ARG:NH1	2.86	0.44
1:A:44:TRP:O	1:A:47:TYR:HE1	2.01	0.44
1:A:1023:LEU:CD1	1:A:1108:LEU:HD23	2.34	0.44
1:A:1114:PHE:CD2	1:A:1137:ILE:HB	2.53	0.44
1:A:327:LYS:HG3	3:A:1202:PG4:H82	1.98	0.44
1:A:1114:PHE:CZ	1:A:1173:ALA:HB1	2.53	0.44
1:A:150:LEU:CD2	1:A:242:LEU:HD11	2.48	0.44
1:A:1195:PHE:CE1	1:A:296:ILE:HD11	2.52	0.44
3:A:1202:PG4:H32	3:A:1202:PG4:H51	1.85	0.43
1:A:251:TRP:HA	1:A:300:ARG:HH11	1.84	0.43
1:A:108:LEU:HB3	1:A:109:PRO:HD3	2.01	0.43
1:A:183:ILE:O	1:A:186:PRO:HD2	2.18	0.43
1:A:172:SER:O	1:A:176:ILE:HG13	2.19	0.42
1:A:1019:ARG:HB3	1:A:1111:SER:OG	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1131:ALA:HB1	1:A:1136:ALA:HB3	2.01	0.42
1:A:1075:GLY:O	1:A:1076:ASP:C	2.58	0.41
1:A:1129:LEU:HG	1:A:1149:ILE:CD1	2.49	0.41
1:A:1137:ILE:HG12	1:A:1184:PHE:CD2	2.56	0.41
1:A:1019:ARG:NH1	1:A:1110:GLY:O	2.53	0.41
1:A:54:ALA:O	1:A:58:ILE:HG13	2.19	0.41
1:A:171:ASN:O	1:A:175:ILE:HG13	2.20	0.41
1:A:166:ALA:O	1:A:170:LEU:HD12	2.20	0.41
1:A:44:TRP:O	1:A:47:TYR:CE1	2.74	0.41
1:A:211:ASP:HB3	1:A:213:ARG:HH12	1.84	0.41
1:A:1080:GLU:O	1:A:1084:ARG:HG2	2.21	0.41
1:A:316:CYS:O	1:A:319:PRO:HD2	2.21	0.41
1:A:322:ILE:O	1:A:326:LEU:HG	2.21	0.41
1:A:1036:MET:HA	1:A:1070:ILE:O	2.22	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	499/564 (88%)	487 (98%)	12 (2%)	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	435/491 (89%)	434 (100%)	1 (0%)	93 96

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	151	ASP

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)

1 non-standard protein/DNA/RNA residue is 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	$\#\|Z\| > 2$
1	YCM	A	1004	1	7,9,10	0.57	0	4,10,12	0.54	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
1	YCM	A	1004	1	1/1/2/3	2/6/8/10	-

There are no bond length outliers.

There are no bond angle outliers.

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	1004	YCM	CA

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1004	YCM	SG-CD-CE-NZ2
1	A	1004	YCM	SG-CD-CE-OZ1

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	1004	YCM	1	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

3 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	PG4	A	1202	-	12,12,12	0.17	0	11,11,11	0.12	0
2	7MA	A	1201	-	34,34,34	0.89	2 (5%)	45,47,47	0.76	1 (2%)
4	OLA	A	1203	-	10,10,19	0.22	0	9,9,19	0.36	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	PG4	A	1202	-	-	5/10/10/10	-
2	7MA	A	1201	-	-	6/32/32/32	0/3/3/3
4	OLA	A	1203	-	-	2/8/8/17	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1201	7MA	C15-N14	-3.76	1.39	1.44
2	A	1201	7MA	S23-N14	2.50	1.68	1.65

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1201	7MA	C13-N14-C15	3.31	121.05	116.59

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1201	7MA	C13-N14-S23-O24
2	A	1201	7MA	C13-N14-S23-C26
2	A	1201	7MA	C13-N14-S23-O25
2	A	1201	7MA	N03-C11-C13-N14
4	A	1203	OLA	C10-C11-C12-C13
2	A	1201	7MA	C11-C13-N14-C15
2	A	1201	7MA	O12-C11-C13-N14
3	A	1202	PG4	C1-C2-O2-C3
3	A	1202	PG4	C3-C4-O3-C5
4	A	1203	OLA	C9-C10-C11-C12
3	A	1202	PG4	C8-C7-O4-C6
3	A	1202	PG4	O2-C3-C4-O3
3	A	1202	PG4	O3-C5-C6-O4

There are no ring outliers.

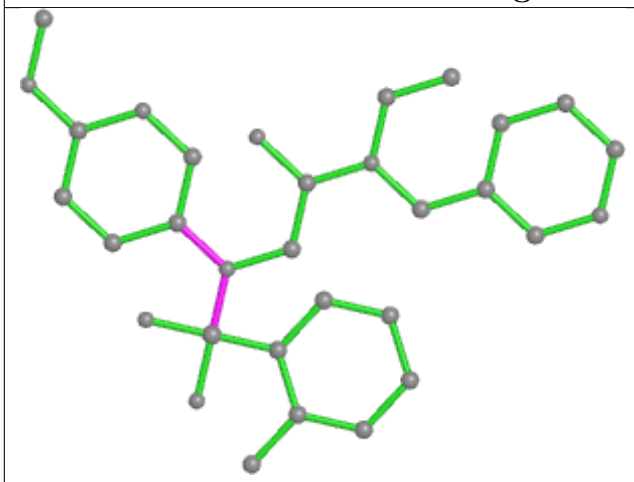
1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1202	PG4	2	0

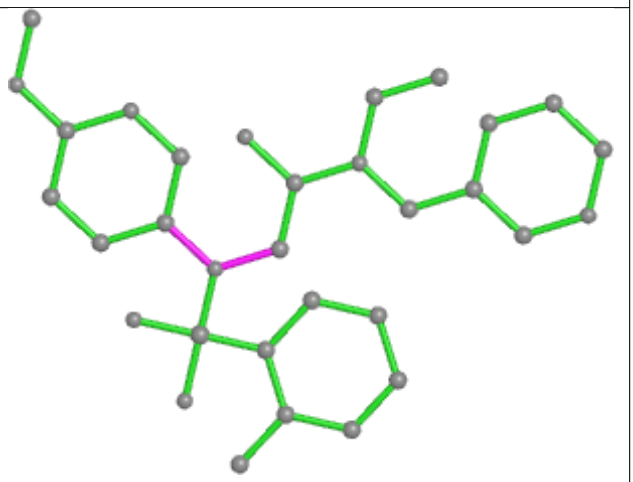
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

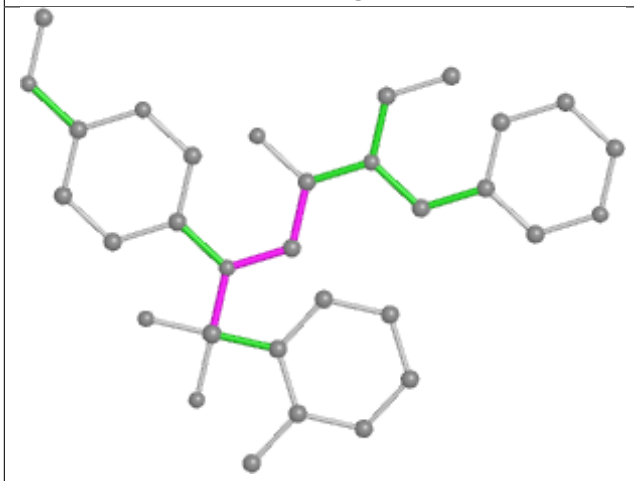
Ligand 7MA A 1201



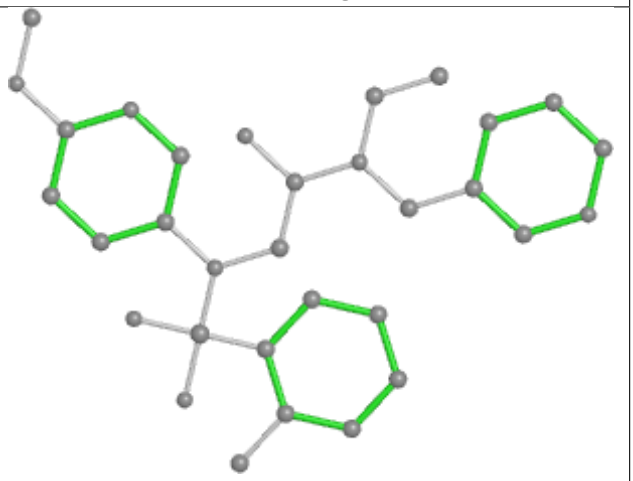
Bond lengths



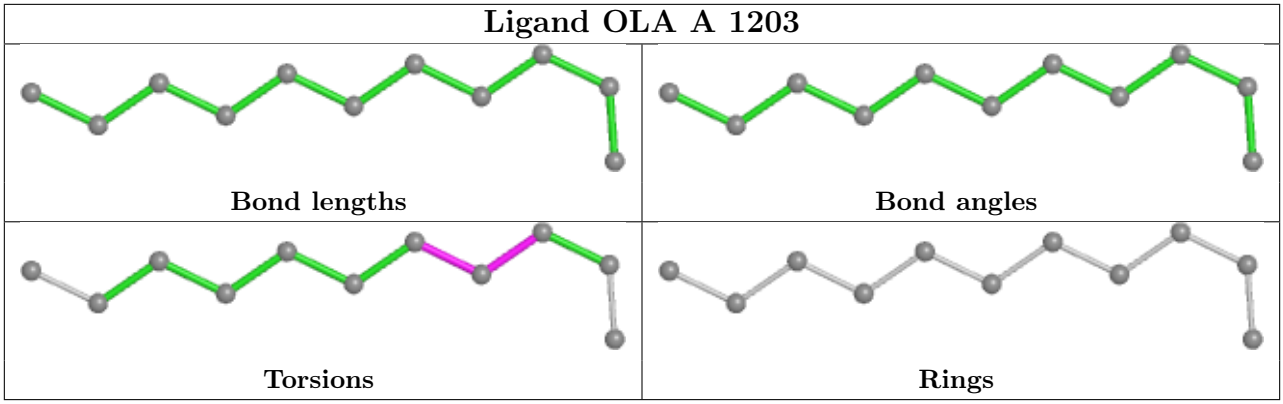
Bond angles



Torsions



Rings



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, 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	503/564 (89%)	0.46	37 (7%)	14	16	20, 38, 72, 101	0

All (37) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1012	LEU	6.7
1	A	337	GLU	5.8
1	A	1013	THR	5.2
1	A	338	ASP	5.1
1	A	198	PRO	5.1
1	A	335	HIS	4.6
1	A	336	THR	4.5
1	A	387	HIS	4.5
1	A	388	HIS	4.5
1	A	1099	MET	3.6
1	A	386	VAL	3.4
1	A	1065	GLN	3.1
1	A	1104	PHE	3.1
1	A	1015	SER	3.1
1	A	213	ARG	3.0
1	A	1062	LYS	3.0
1	A	62	ILE	2.9
1	A	1098	GLU	2.9
1	A	84	HIS	2.7
1	A	1184	PHE	2.6
1	A	206	ALA	2.6
1	A	193	CYS	2.5
1	A	49	HIS	2.5
1	A	1040	ARG	2.5
1	A	1023	LEU	2.5
1	A	204	THR	2.4
1	A	196	VAL	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	1100	LEU	2.3
1	A	80	TRP	2.3
1	A	1011	TYR	2.3
1	A	340	GLU	2.1
1	A	48	LEU	2.1
1	A	1183	LYS	2.1
1	A	1001	GLY	2.1
1	A	1006	PHE	2.1
1	A	197	PHE	2.1
1	A	330	PHE	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (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, 95^{th} 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
1	YCM	A	1004	10/11	0.91	0.21	61,63,66,69	0

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

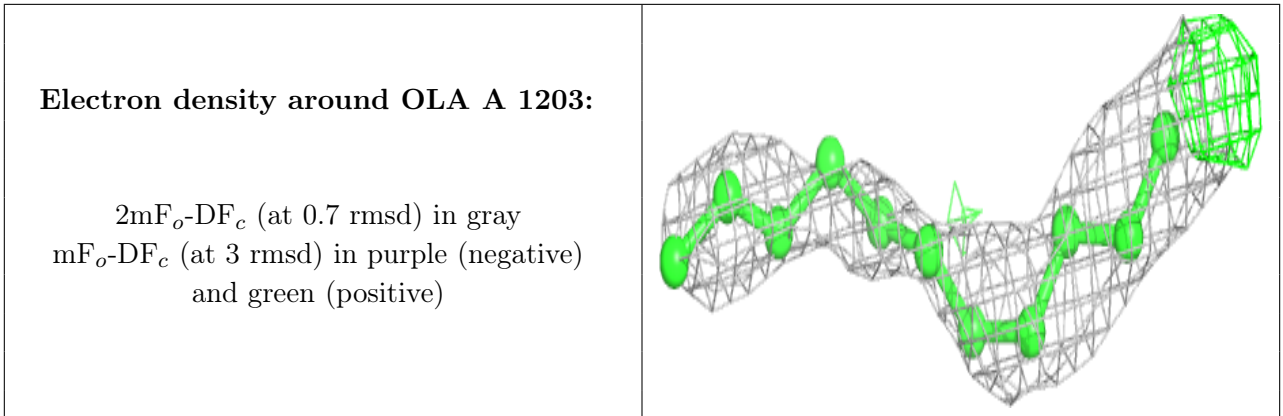
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
4	OLA	A	1203	11/20	0.75	0.39	33,33,35,35	0
3	PG4	A	1202	13/13	0.79	0.22	51,51,53,53	0
2	7MA	A	1201	32/32	0.86	0.30	36,41,49,49	3

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

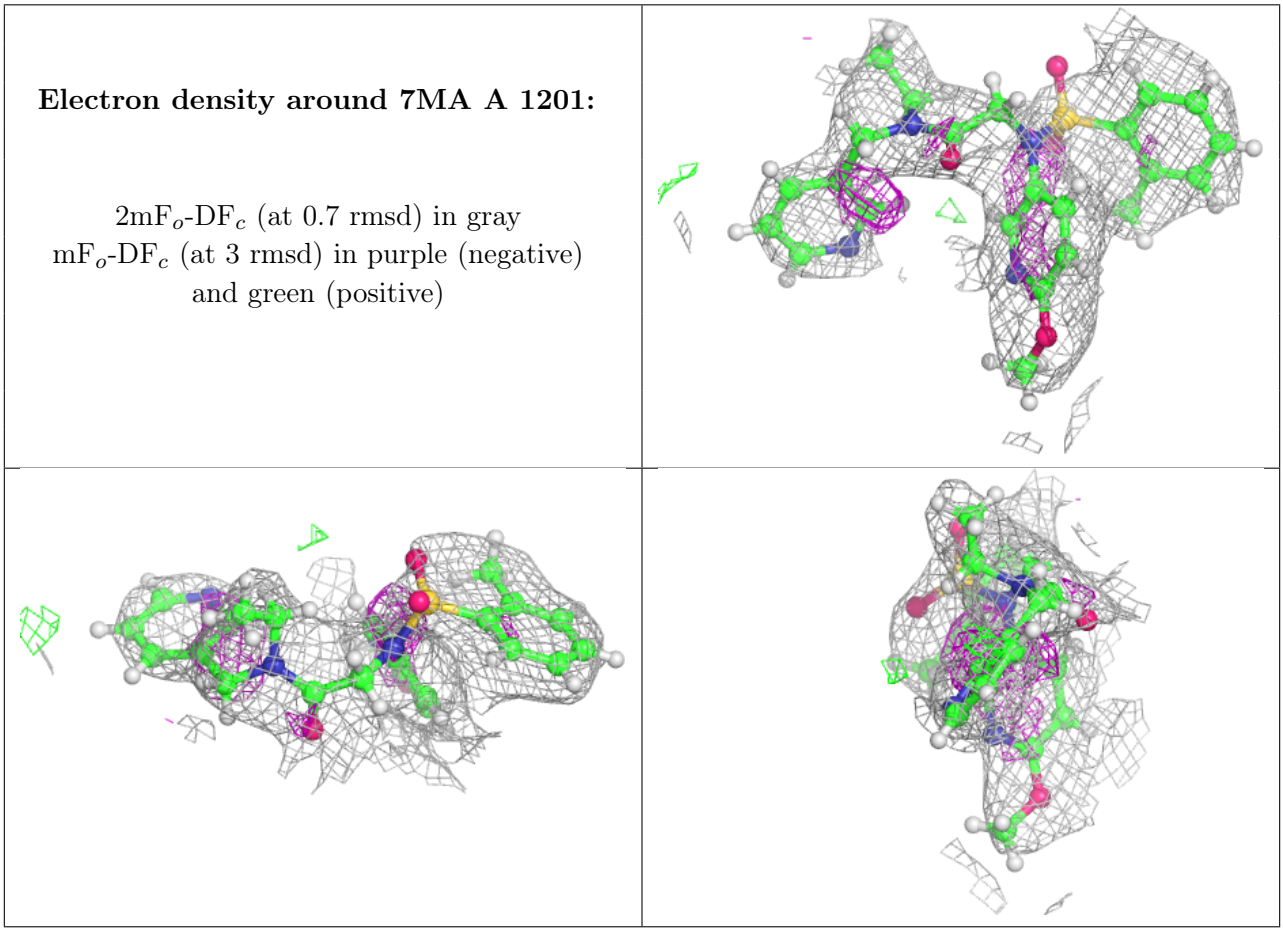
Electron density around OLA A 1203:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



Electron density around 7MA A 1201:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.