



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 9, 2020 – 07:57 PM BST

PDB ID : 4OPP  
Title : Crystal structure of the ternary complex of camel peptidoglycan recognition protein PGRP-S with 11-cyclohexylundecanoic acid and N- acetylglucosamine at 2.30 Å resolution  
Authors : Yamini, S.; Sharma, P.; Yadav, S.P.; Sinha, M.; Bhushan, A.; Kaur, P.; Sharma, S.; Singh, T.P.  
Deposited on : 2014-02-06  
Resolution : 2.30 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](mailto: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.

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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 : 2.13.1  
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)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

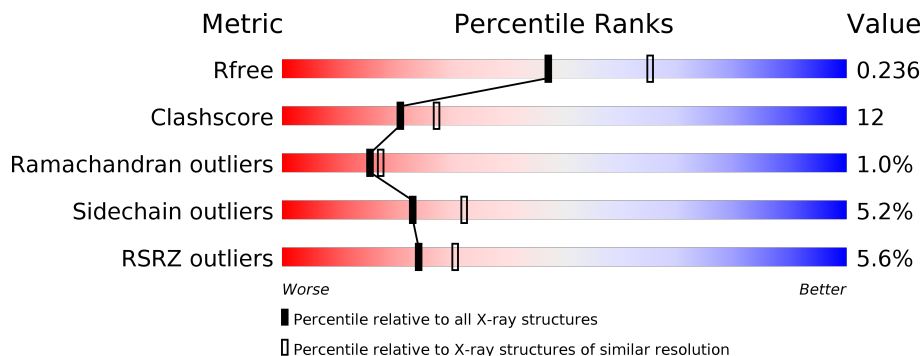
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	171	
1	B	171	
1	C	171	
1	D	171	

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	11Z	B	201	-	-	X	-

## 2 Entry composition [i](#)

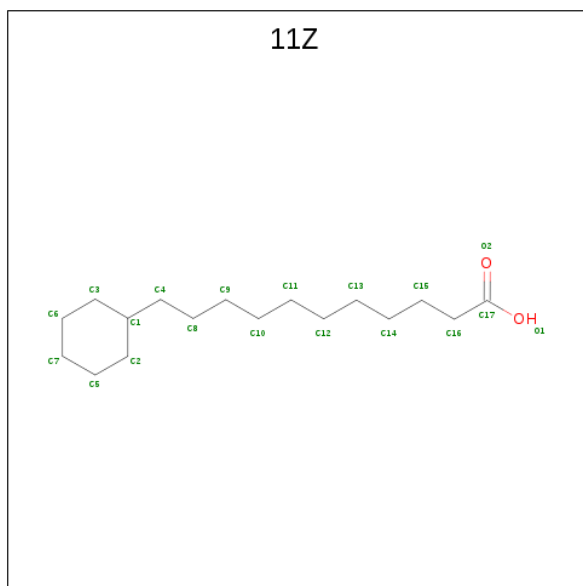
There are 6 unique types of molecules in this entry. The entry contains 5862 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Peptidoglycan recognition protein 1.

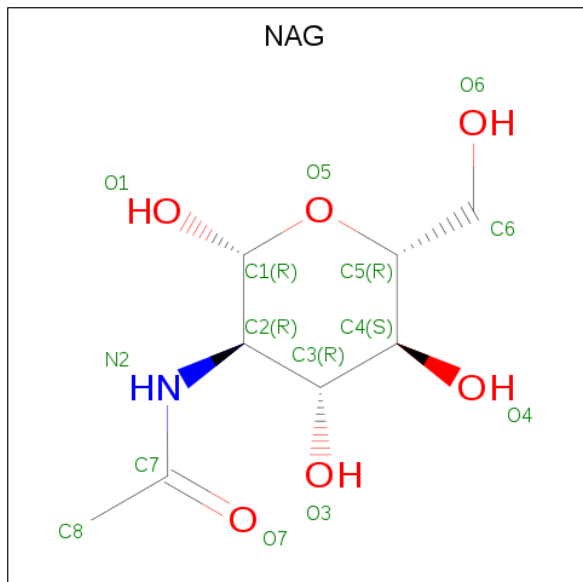
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	171	1337	834	254	241	8	0	0	0
1	B	171	1337	834	254	241	8	0	0	0
1	C	171	1337	834	254	241	8	0	0	0
1	D	171	1337	834	254	241	8	0	0	0

- Molecule 2 is 11-cyclohexylundecanoic acid (three-letter code: 11Z) (formula: C<sub>17</sub>H<sub>32</sub>O<sub>2</sub>).



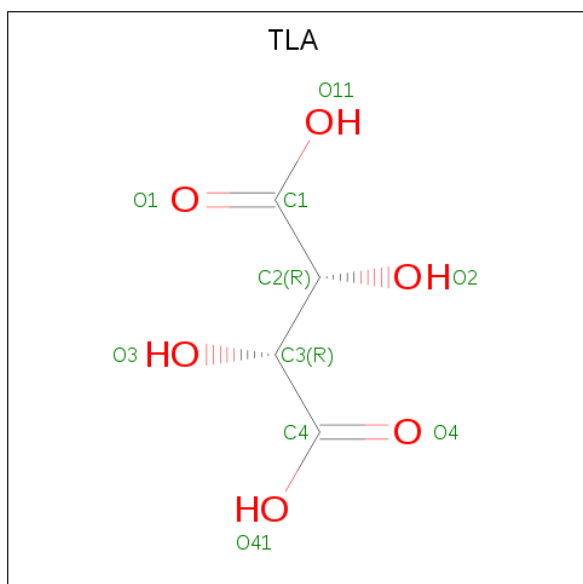
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	B	1	19	17	2	0	0
2	D	1	19	17	2	0	0

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



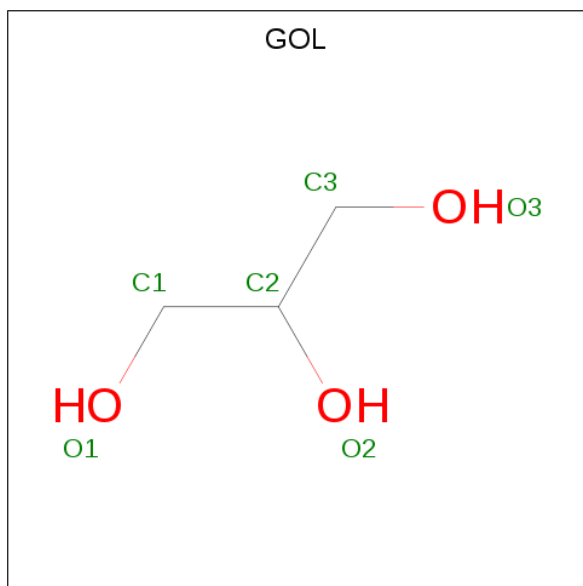
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	C	1	15	8	1	6	0	0

- Molecule 4 is L(+)-TARTARIC ACID (three-letter code: TLA) (formula:  $C_4H_6O_6$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
4	D	1	10	4	6	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).

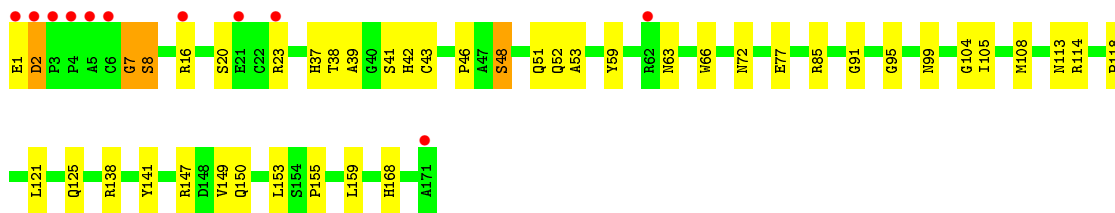


Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	D	1	Total	C O	0	0
			6	3 3		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	143	Total	O	0	0
			143	143		
6	B	110	Total	O	0	0
			110	110		
6	C	116	Total	O	0	0
			116	116		
6	D	76	Total	O	0	0
			76	76		







## 4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	88.66Å 101.52Å 162.97Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	34.22 – 2.30 34.22 – 2.30	Depositor EDS
% Data completeness (in resolution range)	97.9 (34.22-2.30) 98.0 (34.22-2.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.17 (at 2.31Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.212 , 0.239 0.206 , 0.236	Depositor DCC
$R_{free}$ test set	1636 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	34.8	Xtrriage
Anisotropy	0.987	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 54.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	5862	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.28% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup> Intensities estimated from amplitudes.

<sup>2</sup> Theoretical 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: GOL, TLA, NAG, 11Z

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	0.40	0/1374	0.76	2/1871 (0.1%)
1	B	0.48	1/1374 (0.1%)	0.75	1/1871 (0.1%)
1	C	0.45	0/1374	0.74	0/1871
1	D	0.56	1/1374 (0.1%)	0.91	7/1871 (0.4%)
All	All	0.48	2/5496 (0.0%)	0.80	10/7484 (0.1%)

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	B	0	1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	1	GLU	CG-CD	5.21	1.59	1.51
1	B	4	PRO	N-CD	5.14	1.55	1.47

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	D	2	ASP	N-CA-CB	-9.41	93.67	110.60
1	D	2	ASP	N-CA-C	-8.72	87.46	111.00
1	D	1	GLU	CA-C-N	-7.64	100.39	117.20
1	A	92	ALA	CB-CA-C	-7.13	99.41	110.10
1	A	22	CYS	CB-CA-C	-6.37	97.66	110.40
1	D	7	GLY	N-CA-C	6.10	128.35	113.10
1	D	8	SER	N-CA-C	-5.83	95.25	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	1	GLU	CB-CA-C	5.80	121.99	110.40
1	B	3	PRO	C-N-CD	5.76	140.50	128.40
1	D	1	GLU	CA-C-O	5.05	130.71	120.10

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	114	ARG	Sidechain

## 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	1337	0	1288	23	0
1	B	1337	0	1288	41	0
1	C	1337	0	1288	36	0
1	D	1337	0	1288	29	0
2	B	19	0	31	9	0
2	D	19	0	31	7	0
3	C	15	0	15	5	0
4	D	10	0	4	0	0
5	D	6	0	8	1	0
6	A	143	0	0	5	0
6	B	110	0	0	1	0
6	C	116	0	0	2	0
6	D	76	0	0	1	0
All	All	5862	0	5241	130	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 12.

All (130) 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:B:5:ALA:HB1	1:B:6:CYS:CB	1.66	1.24

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:5:ALA:CB	1:B:6:CYS:HB2	1.75	1.16
1:B:1:GLU:C	1:B:3:PRO:HD3	1.66	1.15
1:B:2:ASP:N	1:B:3:PRO:HD3	1.73	1.00
1:C:72:ASN:HD22	1:C:104:GLY:H	1.12	0.95
1:B:2:ASP:N	1:B:3:PRO:CD	2.35	0.88
1:D:72:ASN:HD22	1:D:104:GLY:H	1.25	0.85
1:B:5:ALA:HA	2:B:201:11Z:H17	1.58	0.83
1:B:6:CYS:HA	2:B:201:11Z:C12	2.10	0.82
1:B:5:ALA:HB1	1:B:6:CYS:HB2	0.84	0.82
1:C:37:HIS:HD2	1:C:111:TYR:H	1.26	0.79
1:B:6:CYS:HA	2:B:201:11Z:H18	1.65	0.78
1:B:72:ASN:HD22	1:B:104:GLY:H	1.32	0.76
1:D:95:GLY:H	2:D:203:11Z:H7	1.50	0.76
1:A:3:PRO:HB2	1:A:4:PRO:HD3	1.69	0.75
1:A:138:ARG:HB3	1:A:140:ASN:OD1	1.89	0.72
1:D:43:CYS:O	1:D:77:GLU:HB2	1.90	0.71
1:B:37:HIS:HD2	1:B:111:TYR:H	1.39	0.69
1:C:72:ASN:ND2	1:C:104:GLY:H	1.87	0.68
1:C:43:CYS:O	1:C:77:GLU:HB2	1.94	0.68
1:B:43:CYS:O	1:B:77:GLU:HB2	1.92	0.68
1:A:72:ASN:HD22	1:A:104:GLY:H	1.40	0.67
1:C:28:ARG:HH21	1:C:88:ASN:HD21	1.41	0.66
1:C:99:ASN:ND2	3:C:201:NAG:H4	2.10	0.65
1:D:99:ASN:HD21	2:D:203:11Z:C7	2.12	0.63
1:D:72:ASN:ND2	1:D:104:GLY:H	1.93	0.63
1:D:85:ARG:HD2	1:D:91:GLY:HA2	1.81	0.62
1:C:99:ASN:HD22	3:C:201:NAG:H4	1.66	0.61
1:B:6:CYS:HA	2:B:201:11Z:H17	1.82	0.61
1:D:41:SER:O	1:D:52:GLN:NE2	2.33	0.60
1:B:38:THR:O	1:B:39:ALA:HB3	2.01	0.60
1:B:85:ARG:HD2	1:B:91:GLY:HA2	1.83	0.60
1:B:161:GLU:HG3	6:B:378:HOH:O	2.00	0.60
1:C:112:MET:CE	1:C:153:LEU:HB3	2.32	0.59
1:B:155:PRO:HB2	1:B:159:LEU:HD23	1.84	0.59
1:B:72:ASN:ND2	1:B:104:GLY:H	2.00	0.59
1:C:112:MET:HE2	1:C:157:ASP:N	2.18	0.58
1:C:37:HIS:CD2	1:C:111:TYR:H	2.14	0.58
1:C:152:THR:HA	5:D:202:GOL:H32	1.85	0.57
1:A:28:ARG:HG2	6:A:280:HOH:O	2.04	0.57
1:C:12:ARG:HG3	1:C:83:GLU:OE1	2.06	0.56
1:D:147:ARG:NH2	1:D:153:LEU:O	2.29	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:112:MET:SD	1:B:156:GLY:HA2	2.46	0.54
1:B:5:ALA:C	2:B:201:11Z:H23	2.28	0.54
1:C:142:GLU:OE1	1:C:170:ARG:HG2	2.08	0.54
1:D:150:GLN:HG3	6:D:369:HOH:O	2.07	0.54
1:C:113:ASN:HA	1:C:158:ARG:NH1	2.23	0.54
1:A:72:ASN:ND2	1:A:104:GLY:H	2.04	0.53
1:A:15:TRP:CH2	1:A:17:ALA:HB2	2.43	0.53
3:C:201:NAG:H1	3:C:201:NAG:O7	2.09	0.53
1:C:112:MET:CE	1:C:156:GLY:HA2	2.38	0.53
1:A:30:VAL:HG13	1:A:101:ILE:O	2.09	0.52
1:C:99:ASN:N	1:C:100:PRO:HD2	2.25	0.51
1:D:59:TYR:O	1:D:63:ASN:HB2	2.10	0.51
1:D:141:TYR:O	1:D:168:HIS:HD2	1.93	0.51
1:A:25:ARG:NH2	6:A:229:HOH:O	2.39	0.50
1:B:68:ASP:O	1:B:69:VAL:C	2.50	0.50
1:B:5:ALA:CB	1:B:6:CYS:CB	2.58	0.50
1:A:15:TRP:CZ3	1:A:17:ALA:HB2	2.46	0.50
1:C:85:ARG:HD2	1:C:91:GLY:HA2	1.93	0.50
1:D:121:LEU:O	1:D:125:GLN:HG3	2.12	0.50
1:A:125:GLN:HB2	2:B:201:11Z:H27	1.94	0.50
1:C:9:ILE:HG13	6:C:318:HOH:O	2.12	0.50
1:D:42:HIS:H	1:D:42:HIS:CD2	2.29	0.49
1:A:68:ASP:O	1:A:69:VAL:C	2.51	0.48
6:A:327:HOH:O	1:B:126:ASN:HB2	2.13	0.48
1:D:38:THR:OG1	1:D:108:MET:HA	2.14	0.48
1:C:112:MET:HE3	1:C:153:LEU:HB3	1.95	0.47
1:A:140:ASN:O	1:A:141:TYR:O	2.32	0.47
1:B:164:GLN:HA	1:B:169:TYR:CD2	2.49	0.47
1:C:38:THR:C	1:C:40:GLY:N	2.66	0.47
1:A:99:ASN:N	1:A:100:PRO:HD2	2.30	0.47
1:D:53:ALA:HA	1:D:108:MET:CE	2.45	0.47
1:D:48:SER:O	1:D:51:GLN:HB3	2.16	0.46
1:C:38:THR:C	1:C:40:GLY:H	2.19	0.46
1:D:16:ARG:HG3	1:D:16:ARG:HH11	1.80	0.46
1:B:81:VAL:HG11	1:B:127:LEU:HD13	1.98	0.46
1:D:85:ARG:HH12	2:D:203:11Z:H24	1.81	0.46
1:C:112:MET:HE2	1:C:156:GLY:HA2	1.98	0.45
1:C:28:ARG:HH21	1:C:88:ASN:ND2	2.11	0.45
1:B:138:ARG:O	1:B:141:TYR:N	2.46	0.45
2:B:201:11Z:H3	1:D:138:ARG:NH2	2.31	0.45
1:B:5:ALA:CA	2:B:201:11Z:H23	2.47	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:43:CYS:HB2	1:B:48:SER:OG	2.17	0.45
1:D:85:ARG:HH12	2:D:203:11Z:C15	2.29	0.45
1:C:112:MET:HE2	1:C:157:ASP:H	1.81	0.45
1:C:127:LEU:O	1:C:130:CYS:HB3	2.17	0.45
1:A:111:TYR:CE1	1:A:116:PRO:HB3	2.52	0.44
1:B:114:ARG:O	1:B:158:ARG:HB3	2.16	0.44
1:C:112:MET:HE1	1:C:153:LEU:HB3	1.99	0.44
1:A:138:ARG:HD2	6:A:233:HOH:O	2.16	0.44
1:B:12:ARG:NH2	1:B:18:LEU:O	2.50	0.44
1:A:125:GLN:NE2	6:A:318:HOH:O	2.50	0.44
1:B:140:ASN:N	1:B:140:ASN:OD1	2.51	0.44
1:C:115:VAL:HG12	1:C:158:ARG:HB3	1.99	0.44
6:C:328:HOH:O	2:D:203:11Z:H10	2.18	0.43
1:A:85:ARG:HD2	1:A:91:GLY:HA2	2.01	0.43
1:C:151:PRO:HD3	1:D:66:TRP:CH2	2.54	0.43
1:D:105:ILE:HG13	1:D:105:ILE:O	2.18	0.43
1:D:149:VAL:HG23	1:D:150:GLN:HG2	2.00	0.43
1:B:141:TYR:C	1:B:141:TYR:CD1	2.91	0.43
1:B:37:HIS:CD2	1:B:110:ASN:HA	2.54	0.43
1:C:51:GLN:O	1:C:54:GLN:HB2	2.19	0.43
1:C:97:THR:OG1	2:D:203:11Z:H11	2.17	0.43
1:C:90:LYS:HZ3	3:C:201:NAG:H62	1.84	0.42
1:A:7:GLY:N	1:A:130:CYS:SG	2.92	0.42
1:D:38:THR:O	1:D:39:ALA:HB3	2.18	0.42
1:B:134:LEU:HD21	2:B:201:11Z:H29	2.01	0.42
1:D:99:ASN:HD21	2:D:203:11Z:H7	1.84	0.42
1:C:26:LEU:HG	1:C:90:LYS:HA	2.02	0.42
1:B:160:TYR:O	1:B:164:GLN:HG3	2.20	0.42
1:A:103:ILE:HA	1:A:103:ILE:HD13	1.92	0.42
1:D:155:PRO:HB2	1:D:159:LEU:HD23	2.01	0.42
1:B:30:VAL:HG23	1:B:136:ALA:O	2.20	0.42
1:C:3:PRO:HA	1:C:4:PRO:HD3	1.99	0.42
1:B:38:THR:O	1:B:39:ALA:CB	2.67	0.41
1:B:99:ASN:N	1:B:100:PRO:HD2	2.35	0.41
1:B:1:GLU:O	1:B:3:PRO:HD3	2.15	0.41
1:C:66:TRP:HE1	3:C:201:NAG:H83	1.85	0.41
1:C:57:GLN:O	1:C:61:VAL:HG23	2.21	0.41
1:A:60:HIS:O	1:A:64:LEU:HB2	2.21	0.41
1:A:160:TYR:O	1:A:164:GLN:HG3	2.21	0.41
1:A:99:ASN:N	1:A:100:PRO:CD	2.84	0.40
1:A:140:ASN:O	1:A:141:TYR:C	2.59	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:53:ALA:HA	1:D:108:MET:HE3	2.02	0.40
1:D:53:ALA:N	1:D:108:MET:HE1	2.37	0.40
1:D:141:TYR:O	1:D:168:HIS:CD2	2.72	0.40
1:B:77:GLU:HG2	1:B:117:PRO:HD2	2.03	0.40
1:B:99:ASN:N	1:B:100:PRO:CD	2.85	0.40
1:C:59:TYR:O	1:C:63:ASN:HB2	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	169/171 (99%)	166 (98%)	1 (1%)	2 (1%)	13	14
1	B	169/171 (99%)	160 (95%)	6 (4%)	3 (2%)	8	7
1	C	169/171 (99%)	164 (97%)	4 (2%)	1 (1%)	25	31
1	D	169/171 (99%)	159 (94%)	9 (5%)	1 (1%)	25	31
All	All	676/684 (99%)	649 (96%)	20 (3%)	7 (1%)	15	17

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	2	ASP
1	D	7	GLY
1	A	4	PRO
1	A	141	TYR
1	B	6	CYS
1	B	4	PRO
1	C	3	PRO

### 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	139/139 (100%)	134 (96%)	5 (4%)	35	49
1	B	139/139 (100%)	131 (94%)	8 (6%)	20	27
1	C	139/139 (100%)	133 (96%)	6 (4%)	29	40
1	D	139/139 (100%)	129 (93%)	10 (7%)	14	18
All	All	556/556 (100%)	527 (95%)	29 (5%)	23	32

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	PRO
1	A	37	HIS
1	A	58	SER
1	A	155	PRO
1	A	170	ARG
1	B	2	ASP
1	B	8	SER
1	B	37	HIS
1	B	58	SER
1	B	130	CYS
1	B	140	ASN
1	B	155	PRO
1	B	158	ARG
1	C	2	ASP
1	C	4	PRO
1	C	8	SER
1	C	13	ARG
1	C	16	ARG
1	C	37	HIS
1	D	2	ASP
1	D	8	SER
1	D	20	SER
1	D	23	ARG
1	D	37	HIS

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Mol	Chain	Res	Type
1	D	46	PRO
1	D	48	SER
1	D	113	ASN
1	D	114	ARG
1	D	118	PRO

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	72	ASN
1	B	37	HIS
1	B	72	ASN
1	C	37	HIS
1	C	72	ASN
1	C	88	ASN
1	D	42	HIS
1	D	63	ASN
1	D	72	ASN
1	D	88	ASN
1	D	150	GLN
1	D	168	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 monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

5 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
4	TLA	D	201	-	3,9,9	1.09	0	6,12,12	1.40	2 (33%)
3	NAG	C	201	-	15,15,15	0.71	0	21,21,21	1.27	2 (9%)
2	11Z	B	201	-	16,19,19	0.36	0	17,21,21	1.30	2 (11%)
5	GOL	D	202	-	5,5,5	0.37	0	5,5,5	0.41	0
2	11Z	D	203	-	16,19,19	0.55	0	17,21,21	0.95	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
4	TLA	D	201	-	-	0/4/12/12	-
3	NAG	C	201	-	-	5/6/26/26	0/1/1/1
2	11Z	B	201	-	-	7/11/21/21	0/1/1/1
5	GOL	D	202	-	-	4/4/4/4	-
2	11Z	D	203	-	-	8/11/21/21	0/1/1/1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	201	NAG	C4-C3-C2	3.27	115.14	110.34
2	B	201	11Z	C7-C5-C2	3.02	117.58	111.42
3	C	201	NAG	C3-C4-C5	2.92	115.45	110.24
2	B	201	11Z	C5-C2-C1	2.66	117.18	112.15
4	D	201	TLA	C4-C3-C2	-2.14	108.50	113.11
4	D	201	TLA	O3-C3-C4	-2.12	105.99	111.10

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	201	NAG	C1-C2-N2-C7
2	B	201	11Z	C14-C15-C16-C17
5	D	202	GOL	O1-C1-C2-O2
5	D	202	GOL	O1-C1-C2-C3
5	D	202	GOL	C1-C2-C3-O3
2	D	203	11Z	C14-C15-C16-C17
3	C	201	NAG	O5-C5-C6-O6
3	C	201	NAG	C8-C7-N2-C2
3	C	201	NAG	O7-C7-N2-C2
3	C	201	NAG	C4-C5-C6-O6
2	D	203	11Z	C13-C14-C15-C16
2	B	201	11Z	C4-C8-C9-C10
2	D	203	11Z	C9-C10-C11-C12
2	B	201	11Z	C9-C10-C11-C12
2	B	201	11Z	C12-C13-C14-C15
2	D	203	11Z	C1-C4-C8-C9
5	D	202	GOL	O2-C2-C3-O3
2	B	201	11Z	C11-C12-C13-C14
2	B	201	11Z	C13-C14-C15-C16
2	D	203	11Z	C11-C10-C9-C8
2	B	201	11Z	C10-C11-C12-C13
2	D	203	11Z	C10-C11-C12-C13
2	D	203	11Z	C11-C12-C13-C14
2	D	203	11Z	C12-C13-C14-C15

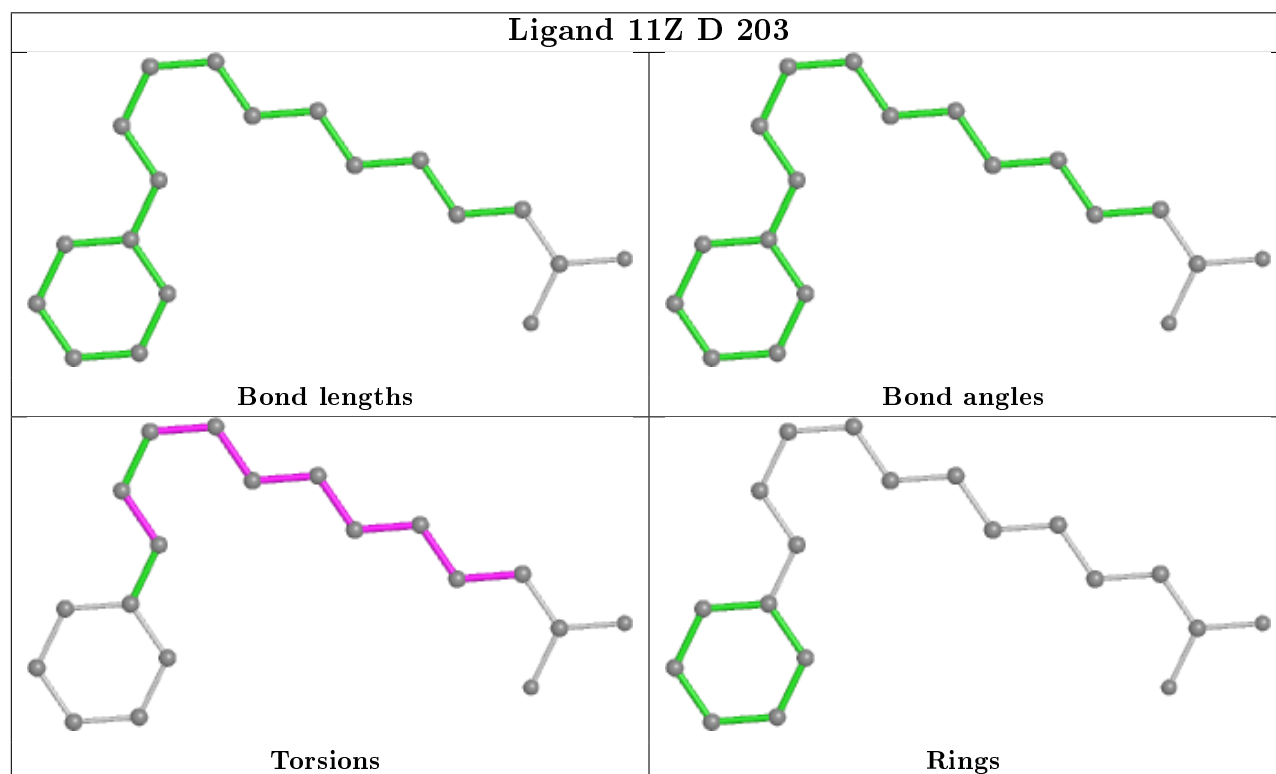
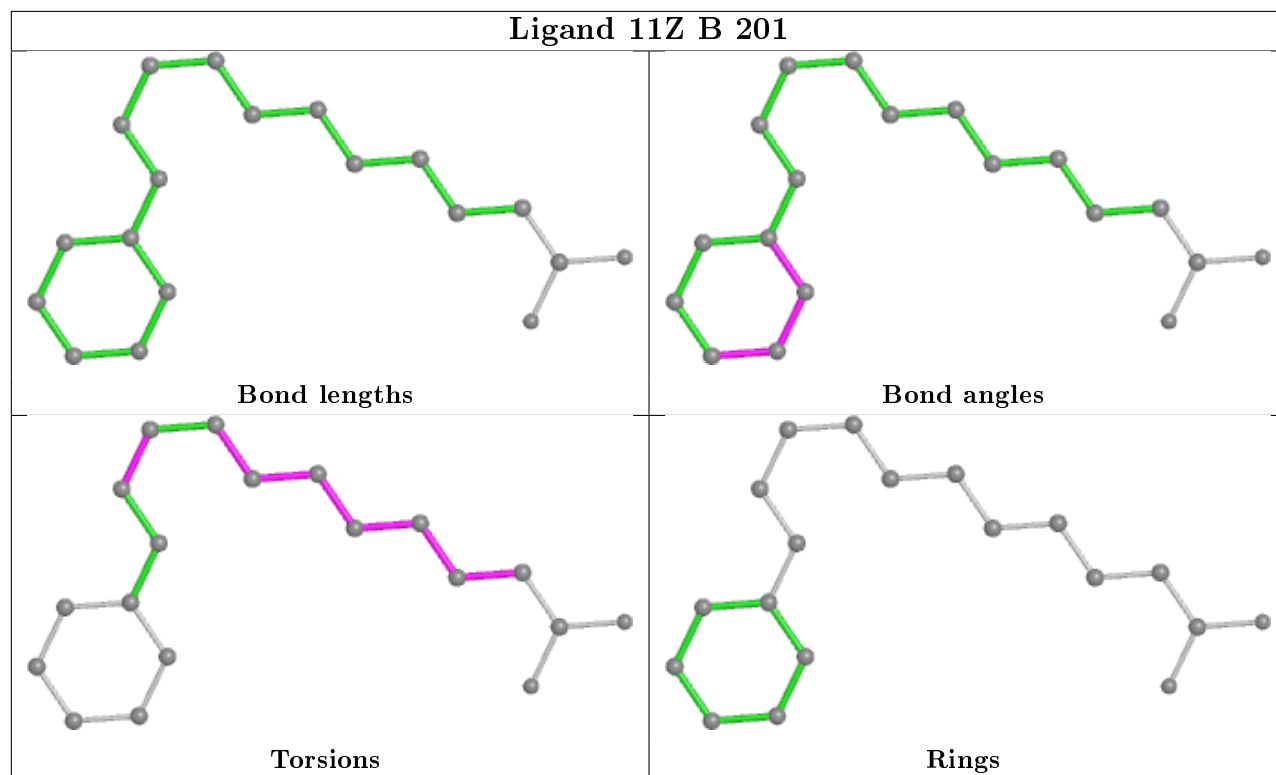
There are no ring outliers.

4 monomers are involved in 22 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	201	NAG	5	0
2	B	201	11Z	9	0
5	D	202	GOL	1	0
2	D	203	11Z	7	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 than 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.



## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	171/171 (100%)	0.30	7 (4%) 37 44	25, 37, 57, 83	0
1	B	171/171 (100%)	0.42	12 (7%) 16 21	25, 47, 68, 82	0
1	C	171/171 (100%)	0.26	8 (4%) 31 38	22, 33, 57, 77	0
1	D	171/171 (100%)	0.25	11 (6%) 19 25	23, 36, 60, 78	0
All	All	684/684 (100%)	0.31	38 (5%) 24 30	22, 37, 64, 83	0

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	5	ALA	13.3
1	A	3	PRO	12.5
1	B	2	ASP	12.0
1	A	2	ASP	10.7
1	B	3	PRO	10.6
1	B	4	PRO	10.4
1	D	3	PRO	10.3
1	C	5	ALA	10.1
1	D	1	GLU	8.9
1	A	4	PRO	8.8
1	C	3	PRO	8.4
1	A	1	GLU	8.1
1	B	1	GLU	7.4
1	D	2	ASP	7.1
1	D	4	PRO	6.0
1	C	4	PRO	5.8
1	C	2	ASP	5.6
1	D	6	CYS	5.4
1	B	171	ALA	5.3
1	C	1	GLU	5.3
1	C	6	CYS	4.5

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Mol	Chain	Res	Type	RSRZ
1	A	5	ALA	4.3
1	C	171	ALA	3.6
1	A	171	ALA	3.4
1	D	171	ALA	3.2
1	A	23	ARG	3.1
1	D	16	ARG	2.8
1	B	28	ARG	2.8
1	C	8	SER	2.6
1	B	151	PRO	2.6
1	B	170	ARG	2.5
1	B	6	CYS	2.5
1	B	27	THR	2.4
1	D	5	ALA	2.4
1	D	23	ARG	2.3
1	D	21	GLU	2.3
1	B	23	ARG	2.2
1	D	62	ARG	2.2

## 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](#)

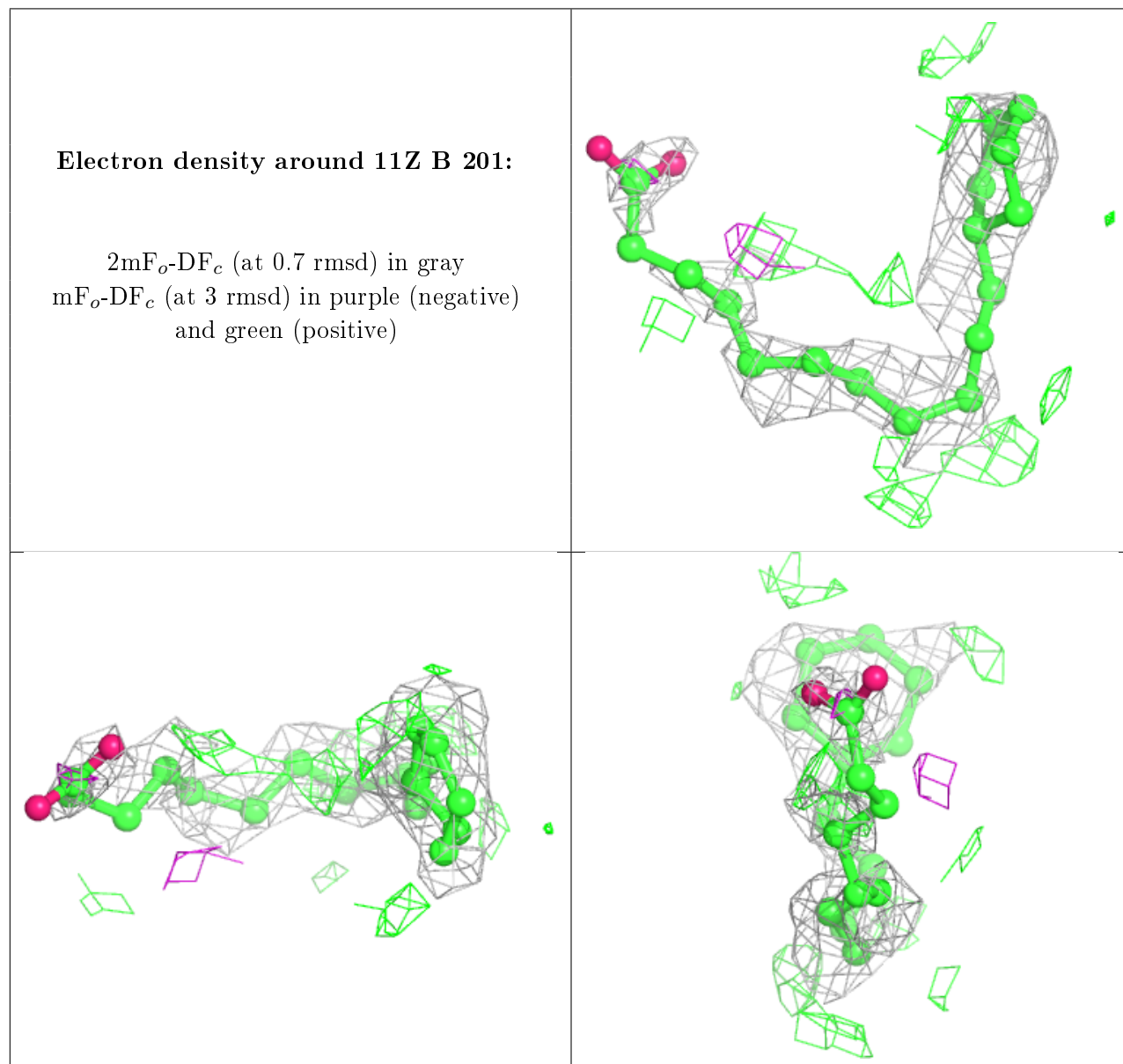
There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

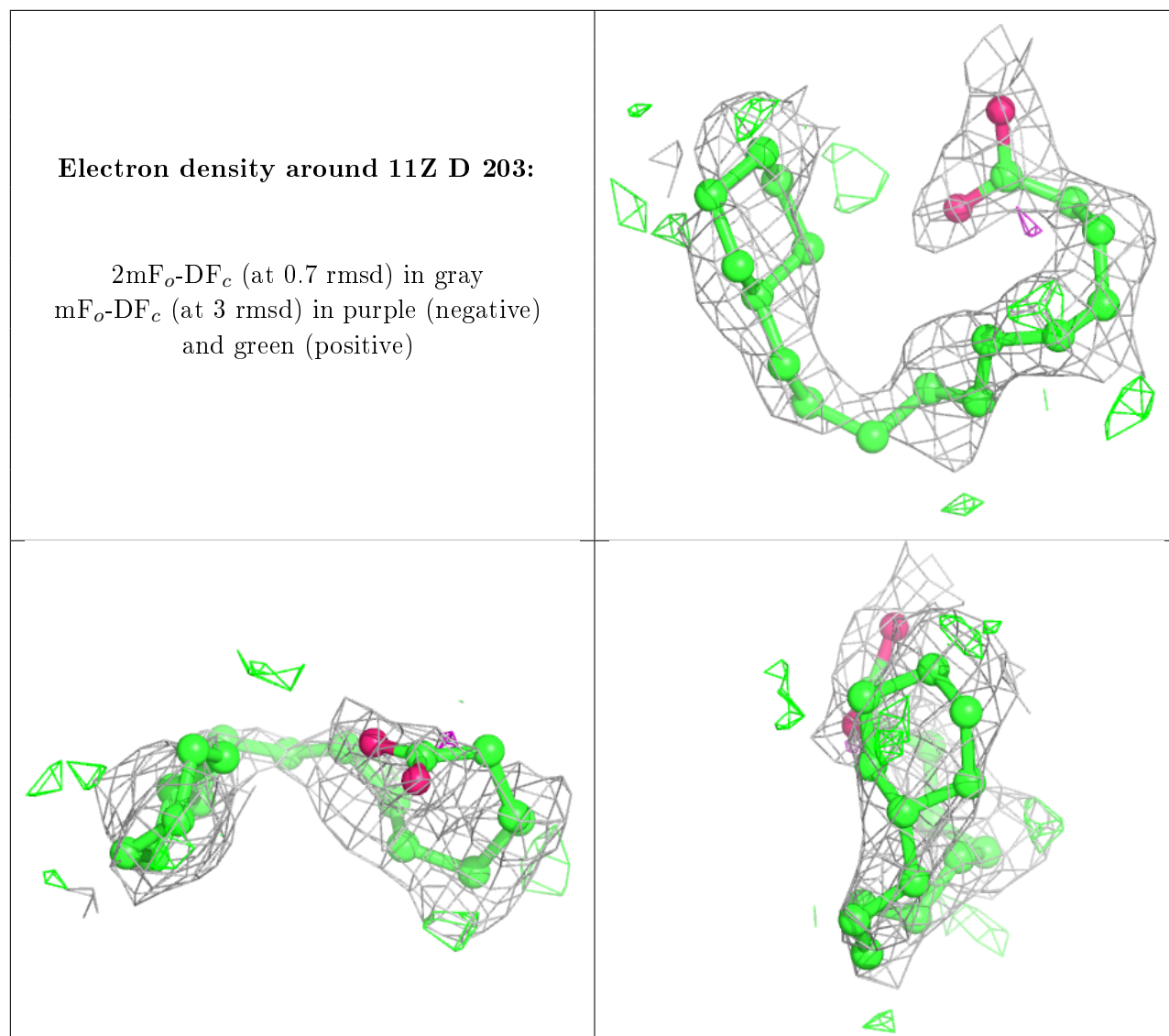
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	NAG	C	201	15/15	0.53	0.33	56,58,60,60	0
2	11Z	B	201	19/19	0.60	0.32	60,63,69,69	0
2	11Z	D	203	19/19	0.65	0.27	55,56,57,58	0
4	TLA	D	201	10/10	0.88	0.19	55,58,60,64	0
5	GOL	D	202	6/6	0.90	0.19	40,42,43,46	0

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.







## 6.5 Other polymers [i](#)

There are no such residues in this entry.