



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 9, 2020 – 03:28 PM BST

PDB ID : 3VQ1  
Title : Crystal structure of mouse TLR4/MD-2/lipid IVa complex  
Authors : Ohto, U.; Shimizu, T.  
Deposited on : 2012-03-17  
Resolution : 2.70 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

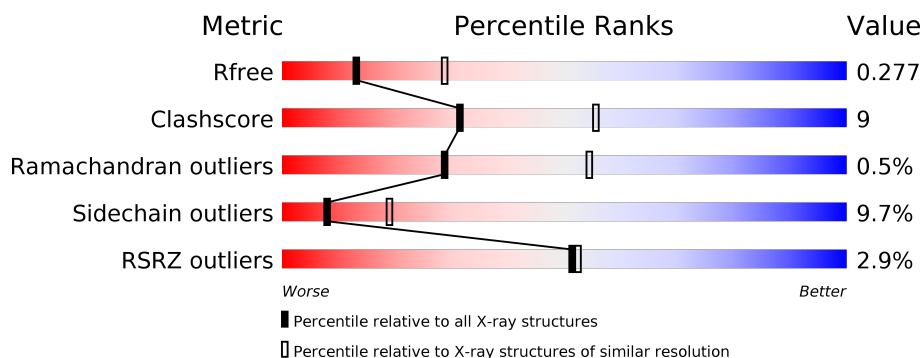
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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	606	<div> <div>2%</div> <div> <div></div> <div>72%</div> <div>22%</div> <div>• •</div> </div> </div>
1	B	606	<div> <div>4%</div> <div> <div></div> <div>74%</div> <div>19%</div> <div>• •</div> </div> </div>
2	C	144	<div> <div>3%</div> <div> <div></div> <div>65%</div> <div>24%</div> <div>• 6%</div> </div> </div>
2	D	144	<div> <div>3%</div> <div> <div></div> <div>72%</div> <div>19%</div> <div>• 6%</div> </div> </div>
3	E	2	<div> <div></div> <div>100%</div> </div>
3	F	2	<div> <div></div> <div>100%</div> </div>

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Mol	Chain	Length	Quality of chain
3	G	2	 100%

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 12017 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 Toll-like receptor 4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	596	Total	C	N	O	S	3	0	0
			4749	3040	782	900	27			
1	B	596	Total	C	N	O	S	3	0	0
			4749	3040	782	900	27			

- Molecule 2 is a protein called Lymphocyte antigen 96.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	135	Total	C	N	O	S	0	0	0
			1092	706	182	197	7			
2	D	135	Total	C	N	O	S	0	0	0
			1092	706	182	197	7			

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



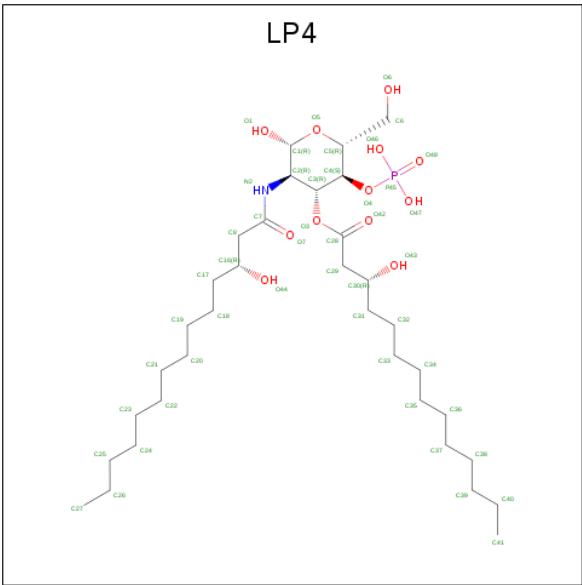
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	E	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	F	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	G	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 5 is 2-deoxy-3-O-[(3R)-3-hydroxytetradecanoyl]-2-{[(3R)-3-hydroxytetradecanoyl]amino}-4-O-phosphono-beta-D-glucopyranose (three-letter code: LP4) (formula: C<sub>34</sub>H<sub>66</sub>NO<sub>12</sub>P).



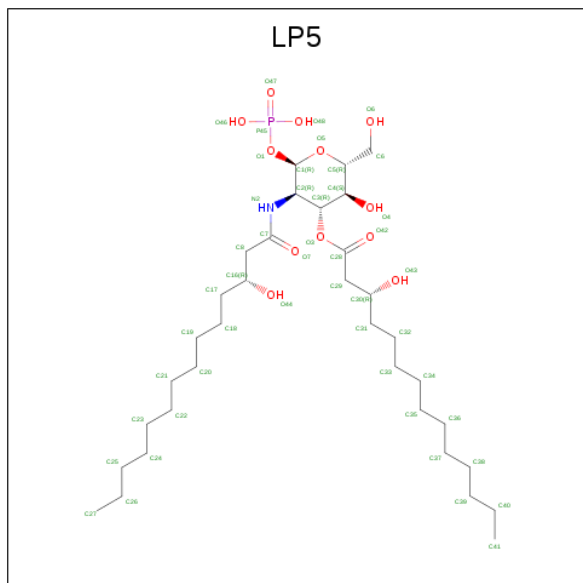
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	C	1	Total	C	N	O	P	0	0
			45	32	1	11	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	D	1	Total	C	N	O	P	0	0
			45	32	1	11	1		

- Molecule 6 is (R)-((2R,3S,4R,5R,6R)-3-HYDROXY-2-(HYDROXYMETHYL)-5-((R)-3-HYDROXYTETRADECANAMIDO)-6-(PHOSPHONOXY)TETRAHYDRO-2H-PYRAN-4-YL) 3-HYDROXYTETRADECANOATE (three-letter code: LP5) (formula: C<sub>34</sub>H<sub>66</sub>NO<sub>12</sub>P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	C	1	Total	C	N	O	P	0	0
			48	34	1	12	1		
6	D	1	Total	C	N	O	P	0	0
			48	34	1	12	1		

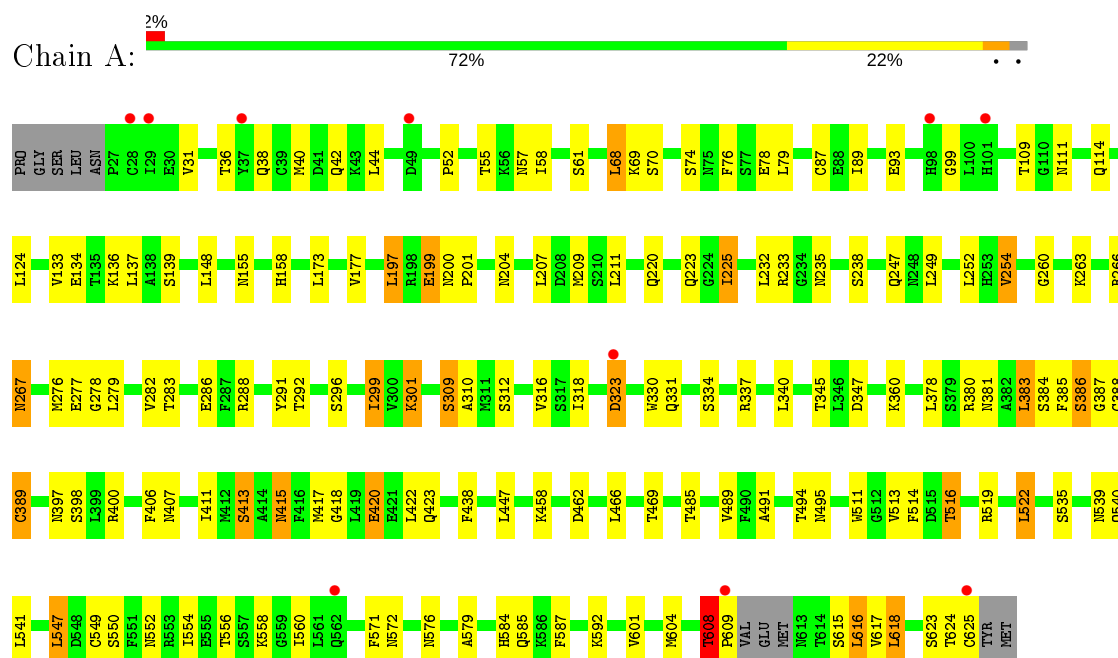
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	15	Total	O	0	0
			15	15		
7	C	4	Total	O	0	0
			4	4		
7	B	17	Total	O	0	0
			17	17		
7	D	1	Total	O	0	0
			1	1		

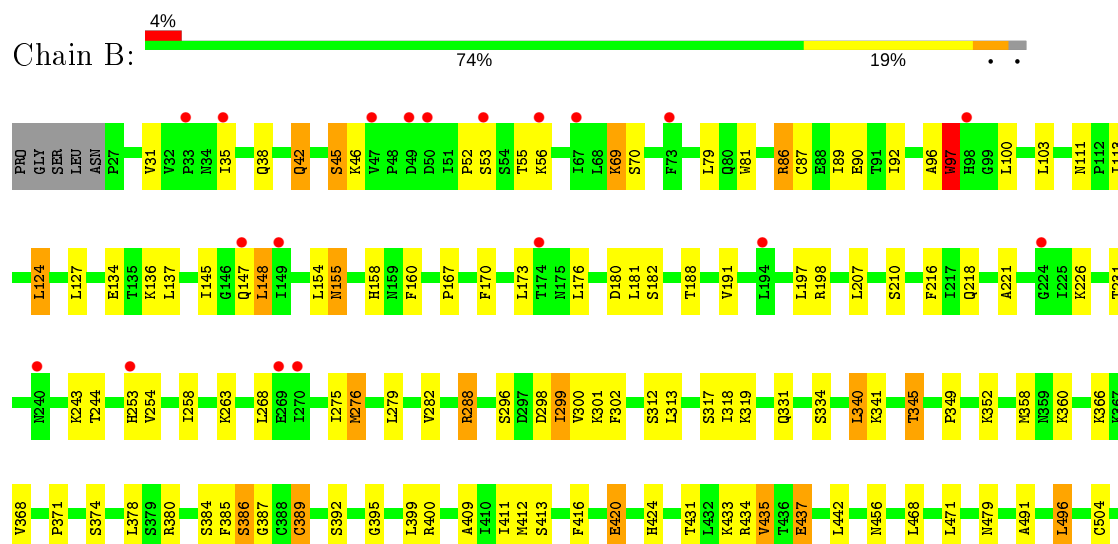
### 3 Residue-property plots

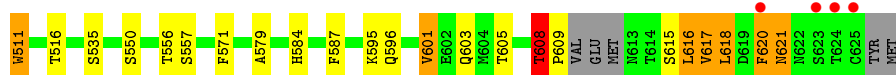
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Toll-like receptor 4

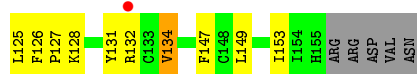
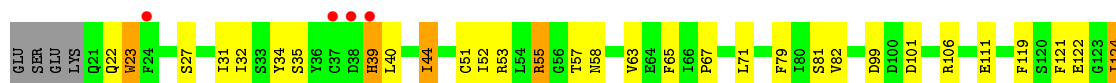


#### • Molecule 1: Toll-like receptor 4

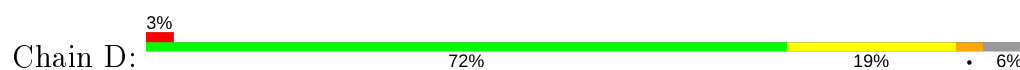




- Molecule 2: Lymphocyte antigen 96



- Molecule 2: Lymphocyte antigen 96



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	77.16Å 150.52Å 181.85Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.70 39.17 – 2.70	Depositor EDS
% Data completeness (in resolution range)	96.5 (50.00-2.70) 96.6 (39.17-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.15	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.83 (at 2.69Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, $R_{free}$	0.234 , 0.277 0.223 , 0.277	Depositor DCC
$R_{free}$ test set	2877 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	42.8	Xtriage
Anisotropy	0.034	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 35.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	12017	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	54.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.32% 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: LP5, LP4, NAG

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	0.50	2/4848 (0.0%)	0.67	2/6569 (0.0%)
1	B	0.48	3/4848 (0.1%)	0.61	0/6569
2	C	0.50	1/1123 (0.1%)	0.61	0/1519
2	D	0.49	1/1123 (0.1%)	0.57	0/1519
All	All	0.49	7/11942 (0.1%)	0.63	2/16176 (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	0	2
1	B	0	1
All	All	0	3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	23	TRP	CD2-CE2	5.54	1.48	1.41
1	A	511	TRP	CD2-CE2	5.43	1.47	1.41
1	B	511	TRP	CD2-CE2	5.39	1.47	1.41
2	C	23	TRP	CD2-CE2	5.31	1.47	1.41
1	B	97	TRP	CD2-CE2	5.25	1.47	1.41
1	A	330	TRP	CD2-CE2	5.19	1.47	1.41
1	B	81	TRP	CD2-CE2	5.15	1.47	1.41

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	383	LEU	CA-CB-CG	5.95	128.99	115.30
1	A	522	LEU	CA-CB-CG	5.62	128.23	115.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	323	ASP	Peptide
1	A	608	THR	Peptide
1	B	608	THR	Peptide

## 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	4749	0	4714	85	0
1	B	4749	0	4714	75	0
2	C	1092	0	1051	32	0
2	D	1092	0	1051	25	0
3	E	28	0	25	0	0
3	F	28	0	24	0	0
3	G	28	0	25	1	0
4	A	14	0	13	2	0
4	B	14	0	13	1	0
5	C	45	0	55	5	0
5	D	45	0	55	4	0
6	C	48	0	63	5	0
6	D	48	0	63	4	0
7	A	15	0	0	0	0
7	B	17	0	0	2	0
7	C	4	0	0	1	0
7	D	1	0	0	0	0
All	All	12017	0	11866	214	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 9.

All (214) 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:296:SER:O	1:B:299:ILE:HG22	1.49	1.12
1:B:620:PHE:O	1:B:621:ASN:HB2	1.53	1.05
1:A:263:LYS:NZ	5:C:300:LP4:O46	2.04	0.90
1:A:572:ASN:HD22	4:A:705:NAG:C1	1.85	0.89
2:C:53:ARG:HE	2:C:55:ARG:HB3	1.44	0.80
2:C:127:PRO:HA	2:C:128:LYS:HB2	1.63	0.79
1:A:58:ILE:HG22	1:A:79:LEU:HD11	1.67	0.77
1:A:550:SER:OG	4:A:705:NAG:H82	1.85	0.76
2:C:127:PRO:HA	2:C:128:LYS:CB	2.15	0.76
1:A:556:THR:HG21	1:A:584:HIS:HB3	1.68	0.76
2:D:44:ILE:HD13	2:D:149:LEU:HD21	1.70	0.74
1:A:252:LEU:HG	1:A:254:VAL:HG22	1.70	0.73
1:A:207:LEU:HG	1:A:209:MET:HE1	1.71	0.73
1:A:608:THR:HB	1:A:609:PRO:CD	2.17	0.73
1:A:296:SER:O	1:A:299:ILE:HG22	1.88	0.72
1:A:554:ILE:H	1:A:576:ASN:HD22	1.37	0.72
1:A:388:CYS:HA	1:A:389:CYS:HB3	1.73	0.71
1:B:620:PHE:O	1:B:621:ASN:CB	2.35	0.70
2:C:79:PHE:HB2	2:C:134:VAL:HG23	1.72	0.69
1:B:556:THR:HG21	1:B:584:HIS:CG	2.29	0.68
1:B:479:ASN:O	1:B:504:CYS:HA	1.95	0.66
1:B:296:SER:O	1:B:299:ILE:CG2	2.38	0.65
2:D:54:LEU:HD12	2:D:155:HIS:CD2	2.31	0.65
2:D:63:VAL:HG21	5:D:300:LP4:H40A	1.78	0.65
1:B:556:THR:HG21	1:B:584:HIS:HB3	1.79	0.64
1:A:286:GLU:HG2	1:A:310:ALA:HB3	1.80	0.64
2:C:63:VAL:HG21	5:C:300:LP4:H40	1.80	0.64
1:B:124:LEU:O	1:B:148:LEU:HD12	1.98	0.63
1:A:381:ASN:H	1:A:407:ASN:ND2	1.96	0.63
1:A:539:ASN:O	1:A:540:GLN:HB2	1.99	0.63
1:A:388:CYS:HA	1:A:389:CYS:CB	2.28	0.63
1:B:617:VAL:HG22	7:B:912:HOH:O	2.00	0.62
1:A:554:ILE:H	1:A:576:ASN:ND2	1.97	0.62
2:D:72:LYS:HD2	2:D:73:TYR:CE1	2.34	0.62
1:B:608:THR:HB	1:B:609:PRO:CD	2.29	0.61
2:C:44:ILE:HD13	2:C:149:LEU:HD21	1.82	0.61
2:C:79:PHE:HB2	2:C:134:VAL:CG2	2.31	0.61
1:B:300:VAL:HG11	1:B:313:LEU:HD11	1.83	0.61
1:A:491:ALA:O	1:A:516:THR:HG21	2.01	0.60
2:D:44:ILE:CD1	2:D:149:LEU:HD21	2.32	0.60
1:B:97:TRP:HB3	1:B:100:LEU:HD12	1.81	0.60
1:A:296:SER:O	1:A:299:ILE:CG2	2.49	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:319:LYS:HD2	1:B:341:LYS:HE2	1.82	0.60
1:A:423:GLN:HA	1:A:447:LEU:HA	1.83	0.59
1:B:288:ARG:HG2	1:B:312:SER:HB2	1.84	0.59
1:B:155:ASN:ND2	1:B:180:ASP:HB3	2.18	0.58
2:C:67:PRO:HD2	2:C:111:GLU:O	2.02	0.58
2:D:23:TRP:HB3	2:D:34:TYR:CE1	2.38	0.58
2:D:131:TYR:HB2	2:D:153:ILE:HB	1.85	0.58
1:B:491:ALA:O	1:B:516:THR:HG21	2.04	0.58
1:A:109:THR:HA	1:A:133:VAL:O	2.04	0.58
1:B:345:THR:HG23	1:B:366:LYS:HE3	1.86	0.57
1:B:263:LYS:NZ	5:D:300:LP4:O46	2.36	0.57
1:B:424:HIS:HE1	7:B:908:HOH:O	1.86	0.57
1:B:434:ARG:O	1:B:437:GLU:HB2	2.04	0.57
1:B:35:ILE:HG23	1:B:56:LYS:HB2	1.86	0.57
1:A:266:ARG:O	1:A:267:ASN:HB2	2.03	0.57
1:A:552:ASN:HB2	1:A:576:ASN:HD21	1.69	0.57
3:G:1:NAG:H62	3:G:2:NAG:C7	2.35	0.57
1:B:87:CYS:H	1:B:111:ASN:HD21	1.52	0.56
1:A:579:ALA:HA	1:A:608:THR:OG1	2.05	0.56
1:B:89:ILE:H	1:B:111:ASN:ND2	2.04	0.56
5:C:300:LP4:H22	6:C:301:LP5:H372	1.87	0.56
2:C:121:PHE:HB2	6:C:301:LP5:H292	1.87	0.56
1:B:550:SER:OG	4:B:802:NAG:H82	2.06	0.56
1:A:623:SER:O	1:A:625:CYS:N	2.32	0.55
1:B:52:PRO:HB2	1:B:55:THR:HG23	1.89	0.55
2:C:44:ILE:HG23	2:C:65:PHE:CG	2.42	0.55
1:A:87:CYS:H	1:A:111:ASN:HD21	1.55	0.55
1:B:556:THR:HG21	1:B:584:HIS:CB	2.36	0.54
1:B:615:SER:HB3	1:B:618:LEU:HD22	1.89	0.54
1:B:374:SER:HA	1:B:399:LEU:HA	1.90	0.54
1:A:207:LEU:CG	1:A:209:MET:HE1	2.38	0.54
1:B:45:SER:HB3	1:B:46:LYS:HD2	1.88	0.54
1:A:556:THR:HG21	1:A:584:HIS:CB	2.36	0.54
1:A:197:LEU:HD23	1:A:225:ILE:HD13	1.89	0.54
1:A:207:LEU:HG	1:A:209:MET:CE	2.37	0.54
1:A:316:VAL:HG12	1:A:318:ILE:H	1.72	0.54
2:C:27:SER:HB3	2:C:51:CYS:HB3	1.90	0.53
1:A:383:LEU:H	1:A:407:ASN:HD22	1.57	0.53
1:B:173:LEU:HD23	1:B:176:LEU:HD22	1.90	0.53
1:A:604:MET:O	1:A:616:LEU:HB3	2.08	0.53
1:B:182:SER:HA	1:B:210:SER:O	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:121:PHE:HB2	6:D:301:LP5:H292	1.91	0.52
2:C:131:TYR:HB2	2:C:153:ILE:HB	1.92	0.52
1:A:134:GLU:HA	1:A:158:HIS:O	2.09	0.52
1:A:462:ASP:HA	1:A:489:VAL:HG12	1.92	0.52
2:C:22:GLN:HG2	2:C:35:SER:HA	1.92	0.51
1:A:70:SER:HB2	1:A:93:GLU:OE2	2.09	0.51
1:A:585:GLN:CD	1:A:625:CYS:HB2	2.31	0.51
1:A:199:GLU:HB3	1:A:200:ASN:ND2	2.26	0.51
1:A:608:THR:CB	1:A:609:PRO:CD	2.88	0.51
1:A:89:ILE:H	1:A:111:ASN:HD22	1.57	0.51
1:B:191:VAL:HG12	1:B:221:ALA:HA	1.92	0.51
2:C:44:ILE:HG23	2:C:65:PHE:HB3	1.92	0.51
2:C:81:SER:HB3	2:C:132:ARG:HB3	1.92	0.51
2:D:31:ILE:HG13	2:D:154:ILE:HB	1.92	0.51
1:B:579:ALA:HA	1:B:608:THR:OG1	2.11	0.50
1:B:556:THR:HG22	1:B:587:PHE:CD2	2.46	0.50
2:D:22:GLN:HG2	2:D:35:SER:HA	1.93	0.50
1:A:52:PRO:O	1:A:55:THR:HG23	2.11	0.50
1:B:42:GLN:HA	1:B:42:GLN:HE21	1.75	0.50
2:C:127:PRO:CA	2:C:128:LYS:CB	2.87	0.50
1:A:539:ASN:O	1:A:540:GLN:CB	2.59	0.50
1:A:514:PHE:HB3	1:A:541:LEU:HD21	1.94	0.49
1:A:42:GLN:HB2	1:A:44:LEU:HG	1.95	0.49
1:B:191:VAL:HG22	1:B:218:GLN:OE1	2.13	0.49
2:C:82:VAL:HG22	2:C:131:TYR:CE2	2.47	0.49
1:A:387:GLY:HA2	1:A:413:SER:HB3	1.94	0.48
2:C:32:ILE:CD1	2:C:52:ILE:HB	2.43	0.48
1:A:288:ARG:NH1	2:C:99:ASP:OD1	2.43	0.48
2:D:124:ILE:CG2	2:D:125:LEU:N	2.76	0.48
2:D:52:ILE:HD13	6:D:301:LP5:H371	1.94	0.48
1:A:415:ASN:ND2	1:A:415:ASN:H	2.10	0.48
2:C:52:ILE:HG21	6:C:301:LP5:H371	1.96	0.48
1:B:616:LEU:C	1:B:618:LEU:H	2.15	0.48
1:A:263:LYS:HE3	7:C:404:HOH:O	2.13	0.48
5:D:300:LP4:H35A	5:D:300:LP4:H21	1.94	0.48
2:D:79:PHE:HB2	2:D:134:VAL:HG13	1.96	0.48
1:A:556:THR:HG22	1:A:587:PHE:CD2	2.49	0.47
1:B:608:THR:CB	1:B:609:PRO:CD	2.92	0.47
1:A:301:LYS:HB2	1:A:323:ASP:HB2	1.95	0.47
1:B:79:LEU:HD23	1:B:103:LEU:HD13	1.97	0.47
1:B:318:ILE:HG23	1:B:340:LEU:HD13	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:126:PHE:HE1	6:C:301:LP5:H241	1.80	0.47
1:B:136:LYS:HG2	1:B:160:PHE:HE2	1.80	0.47
1:A:615:SER:OG	1:A:616:LEU:N	2.46	0.46
1:A:40:MET:HG3	1:A:61:SER:OG	2.15	0.46
1:A:337:ARG:NH1	2:C:101:ASP:OD1	2.48	0.46
1:A:386:SER:HB2	1:A:411:ILE:HD12	1.98	0.46
1:B:298:ASP:HB3	1:B:301:LYS:HE3	1.98	0.46
1:B:188:THR:HA	1:B:216:PHE:O	2.14	0.46
1:B:331:GLN:HE21	1:B:352:LYS:HE2	1.81	0.46
1:B:389:CYS:O	1:B:416:PHE:HA	2.15	0.46
1:A:233:ARG:HA	1:A:260:GLY:O	2.16	0.46
1:B:124:LEU:HB3	1:B:127:LEU:HB2	1.97	0.46
1:B:134:GLU:HA	1:B:158:HIS:O	2.15	0.46
1:B:46:LYS:HE2	1:B:69:LYS:HE3	1.96	0.46
2:C:126:PHE:CE1	6:C:301:LP5:H241	2.50	0.46
1:B:387:GLY:HA2	1:B:413:SER:OG	2.15	0.46
1:A:462:ASP:HB2	2:D:85:ILE:HG23	1.97	0.46
1:B:409:ALA:HA	1:B:431:THR:HB	1.98	0.46
2:C:44:ILE:HD11	2:C:147:PHE:HB2	1.98	0.46
1:B:331:GLN:NE2	1:B:352:LYS:HE2	2.31	0.45
2:C:39:HIS:H	2:C:39:HIS:CD2	2.35	0.45
1:A:288:ARG:HG2	1:A:312:SER:HB3	1.98	0.45
1:A:309:SER:HB2	1:A:331:GLN:HE21	1.80	0.45
1:A:31:VAL:HG22	1:A:36:THR:HB	1.99	0.44
1:A:381:ASN:HB2	1:A:383:LEU:HB2	1.97	0.44
1:A:608:THR:CB	1:A:609:PRO:HD2	2.47	0.44
1:B:386:SER:HB2	1:B:411:ILE:HD12	1.99	0.44
1:B:556:THR:HB	1:B:557:SER:H	1.64	0.44
1:A:74:SER:HA	1:A:99:GLY:HA3	2.00	0.44
1:A:547:LEU:HD22	1:A:549:CYS:SG	2.58	0.44
1:B:616:LEU:C	1:B:618:LEU:N	2.71	0.44
1:A:608:THR:HB	1:A:609:PRO:HD2	1.99	0.44
2:C:119:PHE:CB	5:C:300:LP4:H31	2.47	0.44
1:A:418:GLY:N	1:A:420:GLU:OE2	2.50	0.44
2:D:61:VAL:HG21	5:D:300:LP4:H23	2.00	0.43
2:C:124:ILE:HG23	2:C:125:LEU:N	2.33	0.43
1:A:199:GLU:O	1:A:201:PRO:HD3	2.17	0.43
2:C:44:ILE:CD1	2:C:149:LEU:HD21	2.48	0.43
2:C:23:TRP:HB3	2:C:34:TYR:CE1	2.53	0.43
1:A:36:THR:HG23	1:A:57:ASN:HB2	1.99	0.43
2:D:82:VAL:HG11	2:D:127:PRO:HG2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:247:GLN:HA	1:A:278:GLY:HA3	2.01	0.43
1:B:276:MET:HB3	1:B:302:PHE:CE2	2.53	0.43
1:A:87:CYS:H	1:A:111:ASN:ND2	2.14	0.43
1:B:496:LEU:HA	1:B:496:LEU:HD12	1.87	0.43
5:C:300:LP4:H32	5:C:300:LP4:H29A	1.49	0.43
1:B:412:MET:HG3	1:B:435:VAL:HG23	2.01	0.43
1:A:299:ILE:C	1:A:299:ILE:HD13	2.39	0.43
1:A:68:LEU:HA	1:A:68:LEU:HD12	1.93	0.43
1:B:92:ILE:HD11	1:B:113:ILE:HD13	2.00	0.43
2:D:121:PHE:CD2	6:D:301:LP5:H292	2.54	0.42
1:A:232:LEU:HA	1:A:235:ASN:HD21	1.85	0.42
2:C:127:PRO:HD3	1:B:442:LEU:HD21	2.01	0.42
1:B:243:LYS:HG3	1:B:275:ILE:HA	2.00	0.42
2:C:44:ILE:HG23	2:C:65:PHE:CB	2.50	0.42
1:A:232:LEU:HA	1:A:235:ASN:ND2	2.34	0.42
1:B:603:GLN:OE1	1:B:603:GLN:N	2.53	0.42
1:B:70:SER:HA	1:B:96:ALA:HA	2.01	0.42
2:D:31:ILE:HD11	2:D:154:ILE:HD12	2.01	0.42
1:B:468:LEU:HD13	1:B:471:LEU:HD22	2.01	0.42
1:A:415:ASN:HD21	2:D:125:LEU:H	1.68	0.42
1:A:266:ARG:O	1:A:267:ASN:CB	2.67	0.41
1:A:415:ASN:ND2	2:D:124:ILE:HG23	2.35	0.41
1:A:263:LYS:HE2	1:A:291:TYR:CE1	2.55	0.41
1:A:556:THR:HG21	1:A:584:HIS:CG	2.55	0.41
1:B:145:ILE:C	1:B:147:GLN:H	2.23	0.41
1:A:469:THR:O	1:A:495:ASN:ND2	2.50	0.41
2:D:32:ILE:HG12	2:D:153:ILE:HD12	2.02	0.41
1:B:349:PRO:HA	1:B:371:PRO:HD2	2.02	0.41
1:B:198:ARG:NH2	1:B:221:ALA:O	2.54	0.41
2:D:82:VAL:HG22	2:D:131:TYR:CE2	2.55	0.41
1:B:167:PRO:HD2	1:B:170:PHE:CE1	2.56	0.41
1:B:231:THR:HG23	1:B:258:ILE:HB	2.03	0.41
1:B:371:PRO:HA	1:B:395:GLY:O	2.21	0.41
2:C:44:ILE:HA	2:C:65:PHE:HB3	2.03	0.41
1:B:86:ARG:HD2	2:D:66:ILE:HG21	2.03	0.41
1:A:114:GLN:HG3	1:A:136:LYS:HB3	2.03	0.41
1:A:438:PHE:HB3	6:D:301:LP5:H201	2.02	0.40
1:B:420:GLU:H	1:B:420:GLU:CD	2.24	0.40
2:D:34:TYR:CD2	2:D:149:LEU:HD22	2.55	0.40
1:B:87:CYS:H	1:B:111:ASN:ND2	2.17	0.40
1:A:220:GLN:HE21	1:A:223:GLN:HG2	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:358:MET:HA	1:B:380:ARG:O	2.21	0.40
1:B:595:LYS:HB2	1:B:601:VAL:HG11	2.03	0.40
1:A:380:ARG:HG3	1:A:406:PHE:HB2	2.02	0.40
1:A:615:SER:HB3	1:A:618:LEU:HD23	2.03	0.40
1:B:226:LYS:HE3	1:B:253:HIS:CD2	2.56	0.40
1:A:177:VAL:HA	1:A:204:ASN:O	2.21	0.40
1:A:420:GLU:HG2	1:A:420:GLU:H	1.59	0.40
2:D:103:SER:O	2:D:106:ARG:HG2	2.22	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	592/606 (98%)	528 (89%)	60 (10%)	4 (1%)	22	46
1	B	592/606 (98%)	529 (89%)	60 (10%)	3 (0%)	29	54
2	C	133/144 (92%)	128 (96%)	5 (4%)	0	100	100
2	D	133/144 (92%)	129 (97%)	4 (3%)	0	100	100
All	All	1450/1500 (97%)	1314 (91%)	129 (9%)	7 (0%)	29	54

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	621	ASN
1	A	267	ASN
1	A	624	THR
1	B	616	LEU
1	A	560	ILE
1	A	608	THR
1	B	608	THR

### 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	555/564 (98%)	493 (89%)	62 (11%)	6	13
1	B	555/564 (98%)	502 (90%)	53 (10%)	8	20
2	C	122/131 (93%)	110 (90%)	12 (10%)	8	18
2	D	122/131 (93%)	117 (96%)	5 (4%)	30	59
All	All	1354/1390 (97%)	1222 (90%)	132 (10%)	8	19

All (132) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	38	GLN
1	A	68	LEU
1	A	69	LYS
1	A	76	PHE
1	A	78	GLU
1	A	124	LEU
1	A	137	LEU
1	A	139	SER
1	A	148	LEU
1	A	155	ASN
1	A	173	LEU
1	A	197	LEU
1	A	199	GLU
1	A	211	LEU
1	A	225	ILE
1	A	238	SER
1	A	249	LEU
1	A	254	VAL
1	A	276	MET
1	A	277	GLU
1	A	279	LEU
1	A	282	VAL
1	A	283	THR
1	A	292	THR

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Mol	Chain	Res	Type
1	A	299	ILE
1	A	301	LYS
1	A	309	SER
1	A	334	SER
1	A	340	LEU
1	A	345	THR
1	A	347	ASP
1	A	360	LYS
1	A	378	LEU
1	A	384	SER
1	A	385	PHE
1	A	386	SER
1	A	389	CYS
1	A	397	ASN
1	A	398	SER
1	A	400	ARG
1	A	413	SER
1	A	415	ASN
1	A	417	MET
1	A	420	GLU
1	A	422	LEU
1	A	458	LYS
1	A	466	LEU
1	A	485	THR
1	A	494	THR
1	A	513	VAL
1	A	516	THR
1	A	519	ARG
1	A	522	LEU
1	A	535	SER
1	A	547	LEU
1	A	558	LYS
1	A	571	PHE
1	A	592	LYS
1	A	601	VAL
1	A	616	LEU
1	A	617	VAL
1	A	618	LEU
2	C	31	ILE
2	C	39	HIS
2	C	40	LEU
2	C	44	ILE

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Mol	Chain	Res	Type
2	C	55	ARG
2	C	57	THR
2	C	58	ASN
2	C	71	LEU
2	C	106	ARG
2	C	122	GLU
2	C	124	ILE
2	C	134	VAL
1	B	31	VAL
1	B	38	GLN
1	B	42	GLN
1	B	45	SER
1	B	53	SER
1	B	69	LYS
1	B	86	ARG
1	B	90	GLU
1	B	97	TRP
1	B	124	LEU
1	B	137	LEU
1	B	148	LEU
1	B	154	LEU
1	B	155	ASN
1	B	181	LEU
1	B	197	LEU
1	B	207	LEU
1	B	244	THR
1	B	254	VAL
1	B	268	LEU
1	B	276	MET
1	B	279	LEU
1	B	282	VAL
1	B	288	ARG
1	B	299	ILE
1	B	317	SER
1	B	334	SER
1	B	340	LEU
1	B	345	THR
1	B	360	LYS
1	B	368	VAL
1	B	378	LEU
1	B	384	SER
1	B	385	PHE

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Mol	Chain	Res	Type
1	B	386	SER
1	B	389	CYS
1	B	392	SER
1	B	400	ARG
1	B	420	GLU
1	B	433	LYS
1	B	435	VAL
1	B	437	GLU
1	B	456	ASN
1	B	496	LEU
1	B	511	TRP
1	B	535	SER
1	B	571	PHE
1	B	596	GLN
1	B	601	VAL
1	B	605	THR
1	B	617	VAL
1	B	618	LEU
1	B	620	PHE
2	D	33	SER
2	D	44	ILE
2	D	120	SER
2	D	124	ILE
2	D	134	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (45) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	42	GLN
1	A	111	ASN
1	A	129	ASN
1	A	155	ASN
1	A	200	ASN
1	A	220	GLN
1	A	223	GLN
1	A	235	ASN
1	A	247	GLN
1	A	255	HIS
1	A	293	ASN
1	A	397	ASN
1	A	407	ASN
1	A	415	ASN

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Mol	Chain	Res	Type
1	A	456	ASN
1	A	539	ASN
1	A	563	HIS
1	A	576	ASN
2	C	39	HIS
2	C	155	HIS
1	B	42	GLN
1	B	57	ASN
1	B	105	ASN
1	B	111	ASN
1	B	129	ASN
1	B	155	ASN
1	B	235	ASN
1	B	253	HIS
1	B	255	HIS
1	B	267	ASN
1	B	331	GLN
1	B	339	GLN
1	B	359	ASN
1	B	424	HIS
1	B	456	ASN
1	B	472	ASN
1	B	518	HIS
1	B	521	GLN
1	B	539	ASN
1	B	562	GLN
1	B	584	HIS
1	B	600	ASN
1	B	621	ASN
2	D	21	GLN
2	D	62	HIS

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates ⓘ

6 monosaccharides 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	NAG	E	1	1,3	14,14,15	1.67	1 (7%)	17,19,21	1.29	3 (17%)
3	NAG	E	2	3	14,14,15	0.35	0	17,19,21	1.86	5 (29%)
3	NAG	F	1	1,3	14,14,15	0.40	0	17,19,21	2.68	4 (23%)
3	NAG	F	2	3	14,14,15	0.58	0	17,19,21	1.55	2 (11%)
3	NAG	G	1	1,3	14,14,15	0.44	0	17,19,21	1.62	4 (23%)
3	NAG	G	2	3	14,14,15	0.59	0	17,19,21	1.82	3 (17%)

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	NAG	E	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	E	2	3	-	2/6/23/26	0/1/1/1
3	NAG	F	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	F	2	3	-	2/6/23/26	0/1/1/1
3	NAG	G	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	G	2	3	-	4/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	1	NAG	O5-C1	-6.01	1.34	1.43

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	1	NAG	C1-O5-C5	8.39	123.56	112.19
3	G	1	NAG	C1-O5-C5	4.41	118.17	112.19
3	G	2	NAG	O5-C5-C6	4.36	114.05	107.20
3	E	2	NAG	C1-C2-N2	4.32	117.88	110.49
3	G	2	NAG	C3-C4-C5	-4.17	102.80	110.24
3	F	1	NAG	O5-C1-C2	-4.09	104.83	111.29
3	F	2	NAG	C1-O5-C5	3.95	117.55	112.19
3	F	1	NAG	C6-C5-C4	-3.61	104.55	113.00
3	G	1	NAG	C6-C5-C4	-2.88	106.27	113.00
3	E	2	NAG	C4-C3-C2	-2.86	106.83	111.02
3	E	2	NAG	O5-C1-C2	-2.85	106.79	111.29
3	E	2	NAG	O5-C5-C6	2.82	111.62	107.20
3	E	2	NAG	C1-O5-C5	2.69	115.84	112.19
3	F	1	NAG	O5-C5-C4	2.39	116.64	110.83
3	G	1	NAG	C4-C3-C2	2.34	114.45	111.02
3	E	1	NAG	O5-C1-C2	-2.15	107.89	111.29
3	F	2	NAG	O3-C3-C4	-2.12	105.46	110.35
3	G	1	NAG	O5-C5-C4	2.08	115.89	110.83
3	G	2	NAG	O5-C5-C4	-2.06	105.82	110.83
3	E	1	NAG	C3-C4-C5	2.05	113.89	110.24
3	E	1	NAG	C6-C5-C4	-2.03	108.25	113.00

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	E	2	NAG	O5-C5-C6-O6
3	F	1	NAG	C4-C5-C6-O6
3	F	1	NAG	O5-C5-C6-O6
3	F	2	NAG	O5-C5-C6-O6
3	E	1	NAG	O5-C5-C6-O6
3	E	2	NAG	C4-C5-C6-O6
3	E	1	NAG	C4-C5-C6-O6
3	G	2	NAG	C8-C7-N2-C2
3	G	2	NAG	O7-C7-N2-C2
3	F	2	NAG	C4-C5-C6-O6
3	G	2	NAG	O5-C5-C6-O6
3	G	1	NAG	O5-C5-C6-O6
3	G	2	NAG	C4-C5-C6-O6

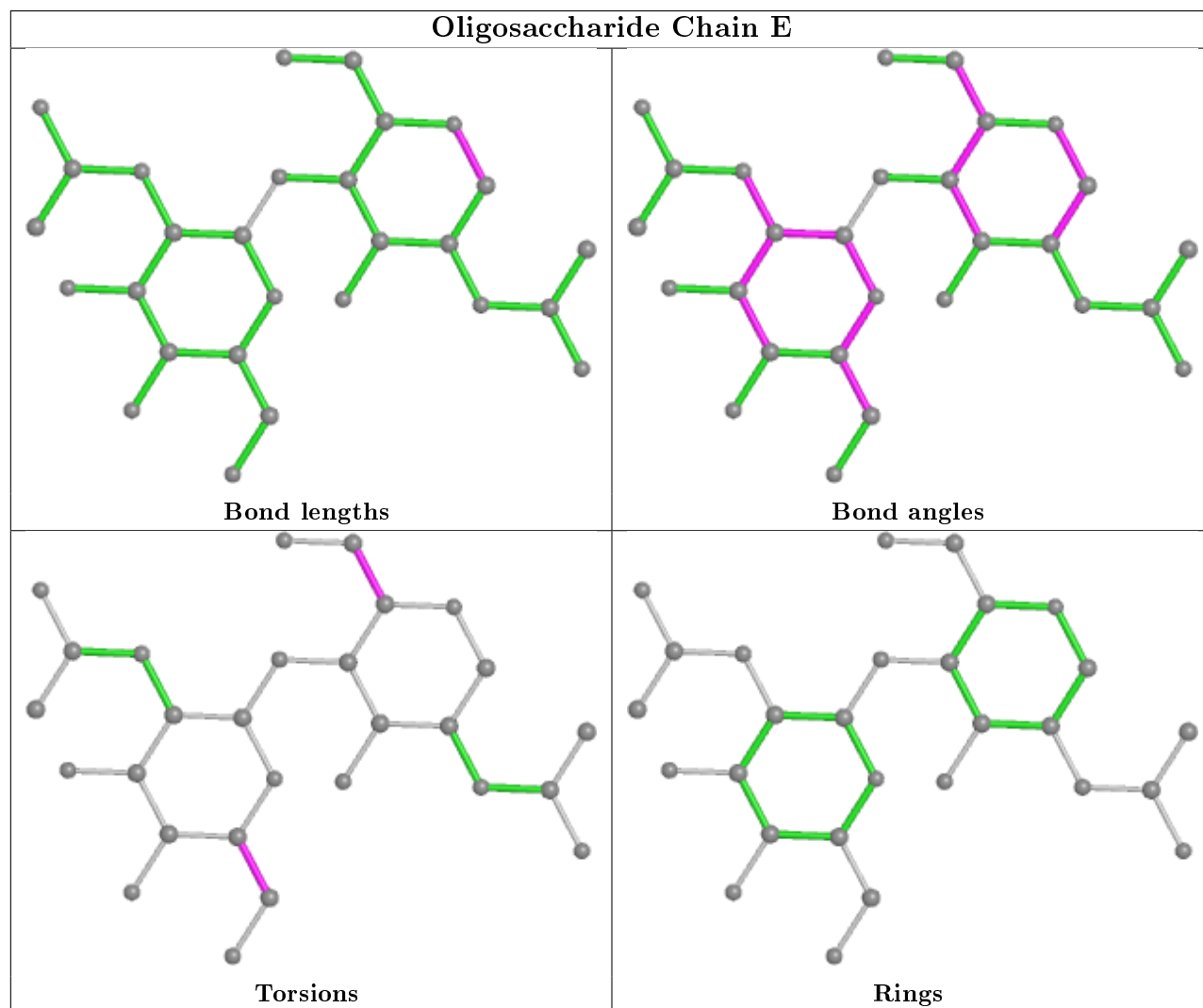
There are no ring outliers.

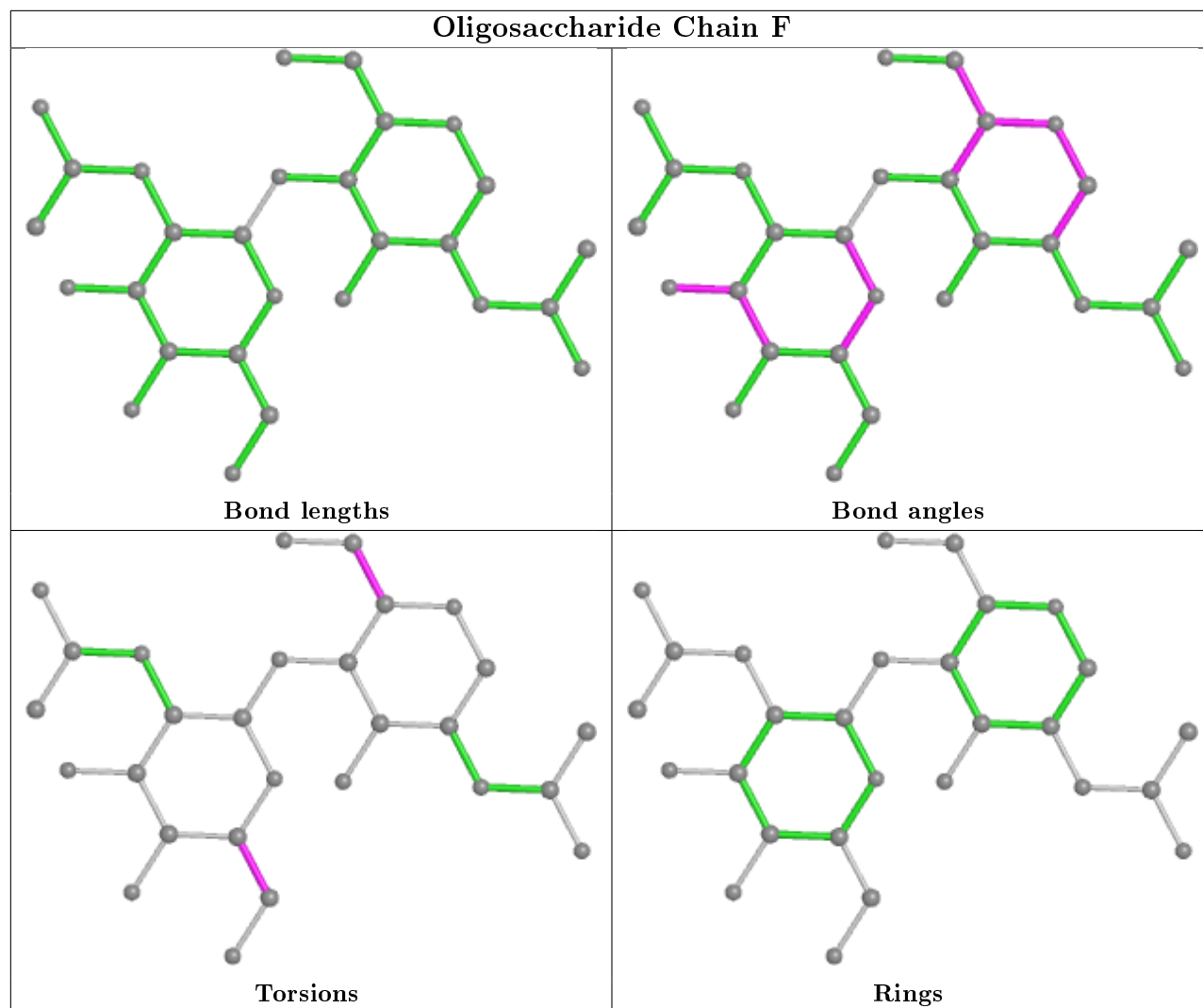
2 monomers are involved in 1 short contact:

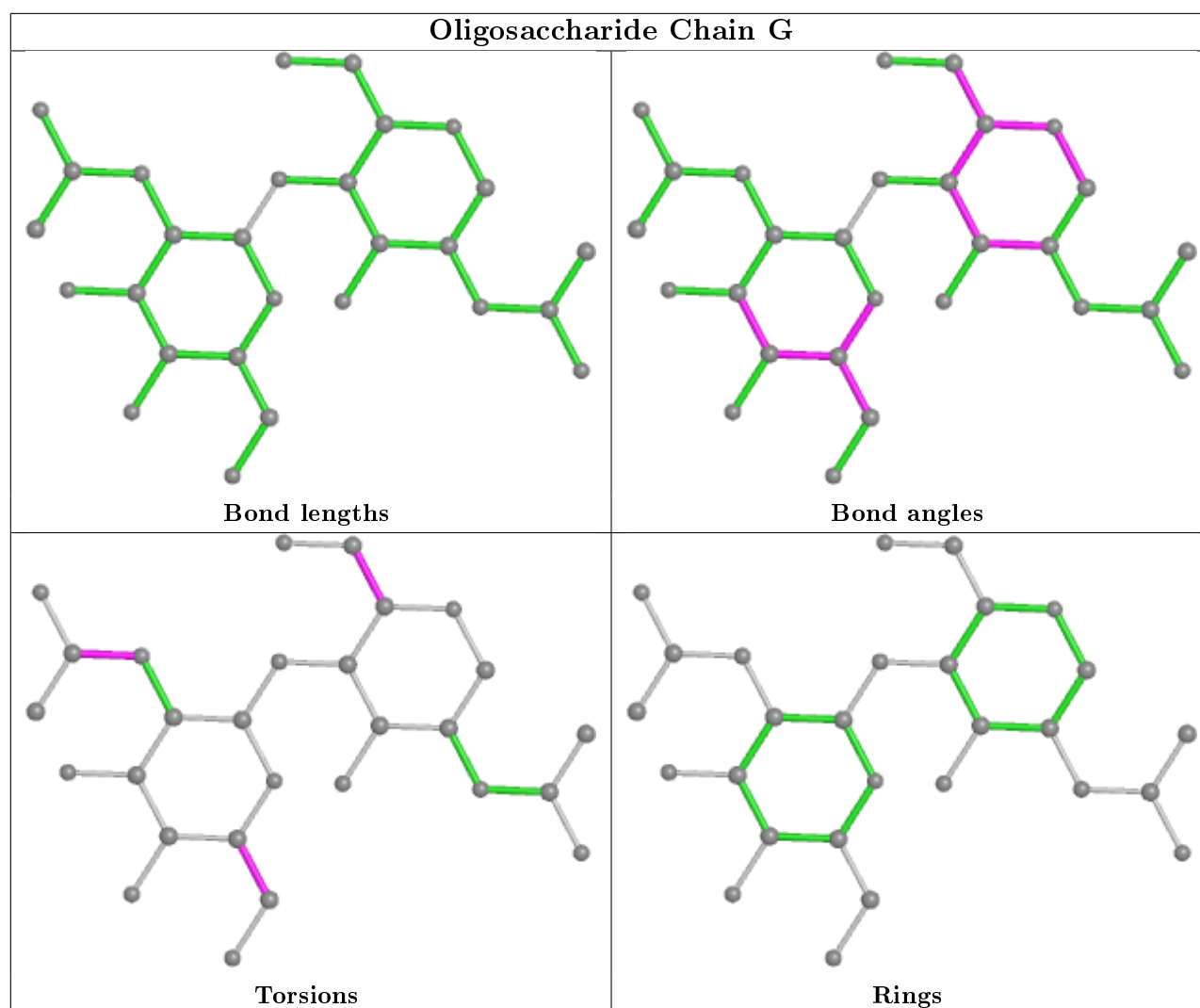


Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	G	1	NAG	1	0
3	G	2	NAG	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.







## 5.6 Ligand geometry [i](#)

6 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	NAG	A	705	-	14,14,15	0.51	0	17,19,21	1.19	1 (5%)
5	LP4	C	300	6	45,45,48	0.76	0	54,56,60	1.05	3 (5%)
6	LP5	D	301	5	47,48,48	0.89	1 (2%)	57,60,60	1.20	3 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	B	802	1	14,14,15	0.50	0	17,19,21	0.98	1 (5%)
6	LP5	C	301	5	47,48,48	0.89	3 (6%)	57,60,60	1.28	4 (7%)
5	LP4	D	300	6	45,45,48	0.72	0	54,56,60	0.94	2 (3%)

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	NAG	A	705	-	-	1/6/23/26	0/1/1/1
5	LP4	C	300	6	-	17/43/60/65	0/1/1/1
6	LP5	D	301	5	-	17/44/65/65	0/1/1/1
4	NAG	B	802	1	-	2/6/23/26	0/1/1/1
6	LP5	C	301	5	-	29/44/65/65	0/1/1/1
5	LP4	D	300	6	-	17/43/60/65	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	D	301	LP5	P45-O47	4.18	1.64	1.50
6	C	301	LP5	P45-O47	3.79	1.62	1.50
6	C	301	LP5	O3-C3	-2.75	1.40	1.44
6	C	301	LP5	P45-O46	2.15	1.63	1.54

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	301	LP5	O5-C1-O1	-5.07	104.73	111.36
6	D	301	LP5	C3-O3-C28	-4.86	109.43	117.53
5	D	300	LP4	C3-O3-C28	-3.77	111.24	117.53
5	C	300	LP4	O5-C5-C6	3.23	112.26	107.20
4	A	705	NAG	O7-C7-C8	-2.67	117.09	122.06
6	C	301	LP5	C30-C29-C28	-2.50	107.41	112.81
6	D	301	LP5	C3-C2-N2	-2.48	106.80	110.91
4	B	802	NAG	O5-C5-C6	2.35	110.89	107.20
5	C	300	LP4	O46-P45-O48	2.22	119.39	110.68
5	D	300	LP4	O46-P45-O48	2.13	119.02	110.68
6	C	301	LP5	C8-C7-N2	-2.13	113.54	116.33
6	C	301	LP5	C3-O3-C28	-2.05	114.11	117.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	D	301	LP5	O46-P45-O48	2.05	115.47	107.64
5	C	300	LP4	O5-C5-C4	-2.04	106.25	110.07

There are no chirality outliers.

All (83) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	300	LP4	N2-C7-C8-C16
5	C	300	LP4	O7-C7-C8-C16
5	C	300	LP4	C28-C29-C30-O43
6	D	301	LP5	C28-C29-C30-O43
6	D	301	LP5	C28-C29-C30-C31
6	C	301	LP5	O5-C1-O1-P45
6	C	301	LP5	O44-C16-C8-C7
6	C	301	LP5	C28-C29-C30-O43
6	C	301	LP5	C28-C29-C30-C31
6	C	301	LP5	C29-C30-C31-C32
5	D	300	LP4	C8-C16-C17-C18
5	D	300	LP4	O44-C16-C17-C18
6	C	301	LP5	O5-C5-C6-O6
6	C	301	LP5	C4-C5-C6-O6
6	D	301	LP5	O44-C16-C17-C18
6	D	301	LP5	O43-C30-C31-C32
6	C	301	LP5	O44-C16-C17-C18
5	C	300	LP4	C29-C30-C31-C32
6	D	301	LP5	C21-C22-C23-C24
5	C	300	LP4	C37-C38-C39-C40
5	C	300	LP4	C18-C19-C20-C21
5	D	300	LP4	C31-C32-C33-C34
5	C	300	LP4	C32-C33-C34-C35
6	C	301	LP5	C36-C37-C38-C39
6	D	301	LP5	C17-C18-C19-C20
6	C	301	LP5	C31-C32-C33-C34
6	D	301	LP5	C36-C37-C38-C39
5	C	300	LP4	C34-C35-C36-C37
4	A	705	NAG	O5-C5-C6-O6
6	D	301	LP5	C23-C24-C25-C26
5	D	300	LP4	C34-C35-C36-C37
5	D	300	LP4	C35-C36-C37-C38
6	D	301	LP5	C18-C19-C20-C21
5	D	300	LP4	C32-C33-C34-C35
6	C	301	LP5	O43-C30-C31-C32

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Mol	Chain	Res	Type	Atoms
5	D	300	LP4	O43-C30-C31-C32
5	D	300	LP4	C29-C28-O3-C3
6	C	301	LP5	C1-C2-N2-C7
5	C	300	LP4	C19-C20-C21-C22
6	C	301	LP5	C33-C34-C35-C36
4	B	802	NAG	C4-C5-C6-O6
5	D	300	LP4	O42-C28-O3-C3
6	C	301	LP5	C17-C18-C19-C20
6	D	301	LP5	C31-C32-C33-C34
6	D	301	LP5	C32-C33-C34-C35
6	C	301	LP5	C21-C22-C23-C24
5	D	300	LP4	C33-C34-C35-C36
6	C	301	LP5	C23-C24-C25-C26
6	D	301	LP5	C24-C25-C26-C27
6	C	301	LP5	C24-C25-C26-C27
5	D	300	LP4	C22-C23-C24-C25
6	D	301	LP5	C8-C16-C17-C18
6	C	301	LP5	C37-C38-C39-C40
5	D	300	LP4	C38-C39-C40-C41
5	D	300	LP4	C21-C22-C23-C24
4	B	802	NAG	O5-C5-C6-O6
6	C	301	LP5	C19-C20-C21-C22
6	C	301	LP5	C38-C39-C40-C41
6	C	301	LP5	C8-C16-C17-C18
6	C	301	LP5	C20-C21-C22-C23
5	C	300	LP4	C35-C36-C37-C38
5	D	300	LP4	C16-C17-C18-C19
5	C	300	LP4	C28-C29-C30-C31
5	C	300	LP4	C4-O4-P45-O46
6	C	301	LP5	C30-C31-C32-C33
6	D	301	LP5	C37-C38-C39-C40
6	C	301	LP5	C17-C16-C8-C7
6	C	301	LP5	C18-C19-C20-C21
5	D	300	LP4	C37-C38-C39-C40
5	D	300	LP4	C20-C21-C22-C23
6	D	301	LP5	C33-C34-C35-C36
5	C	300	LP4	C30-C31-C32-C33
5	C	300	LP4	C22-C23-C24-C25
5	C	300	LP4	C17-C18-C19-C20
5	C	300	LP4	C31-C32-C33-C34
6	D	301	LP5	C30-C31-C32-C33
5	D	300	LP4	C29-C30-C31-C32

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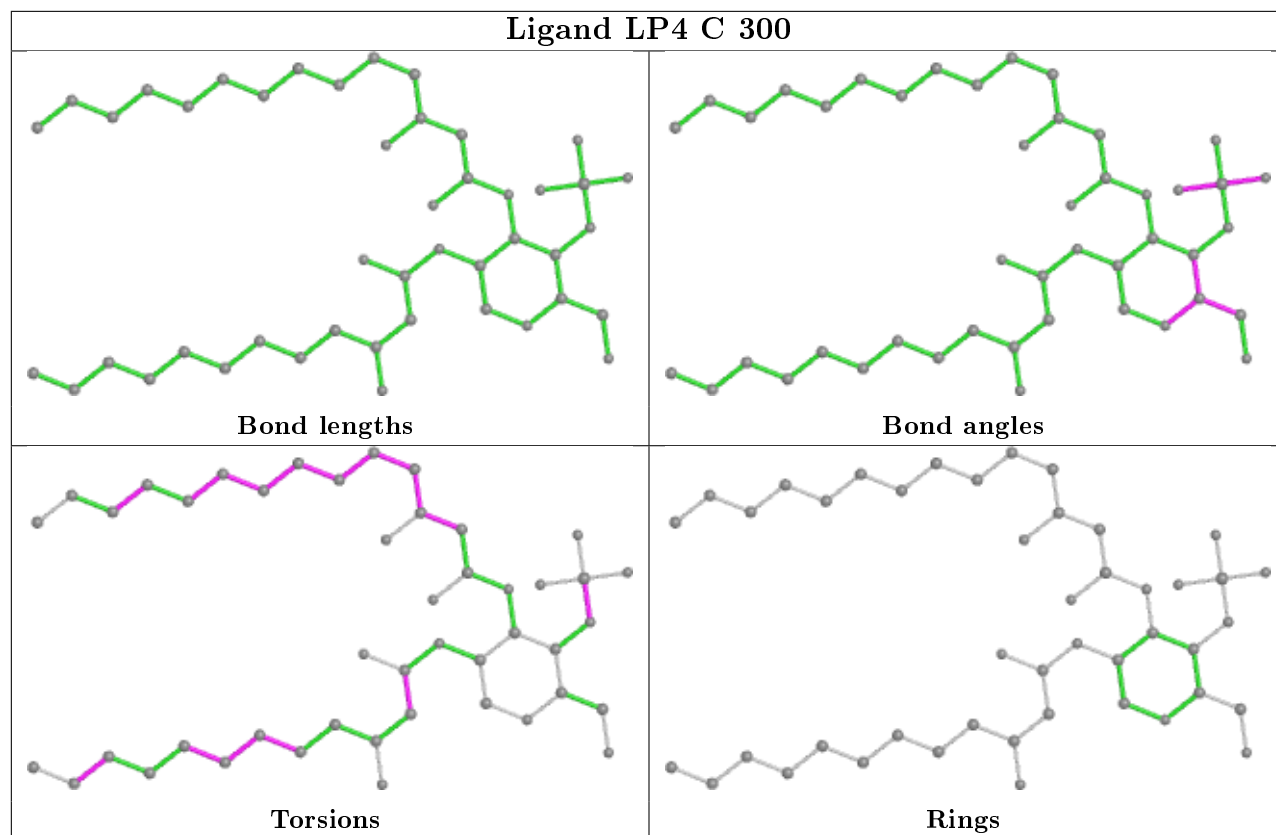
Mol	Chain	Res	Type	Atoms
6	C	301	LP5	C22-C23-C24-C25
6	D	301	LP5	C20-C21-C22-C23
6	C	301	LP5	C3-C2-N2-C7
6	C	301	LP5	O42-C28-C29-C30
5	C	300	LP4	C33-C34-C35-C36
6	C	301	LP5	O7-C7-C8-C16

There are no ring outliers.

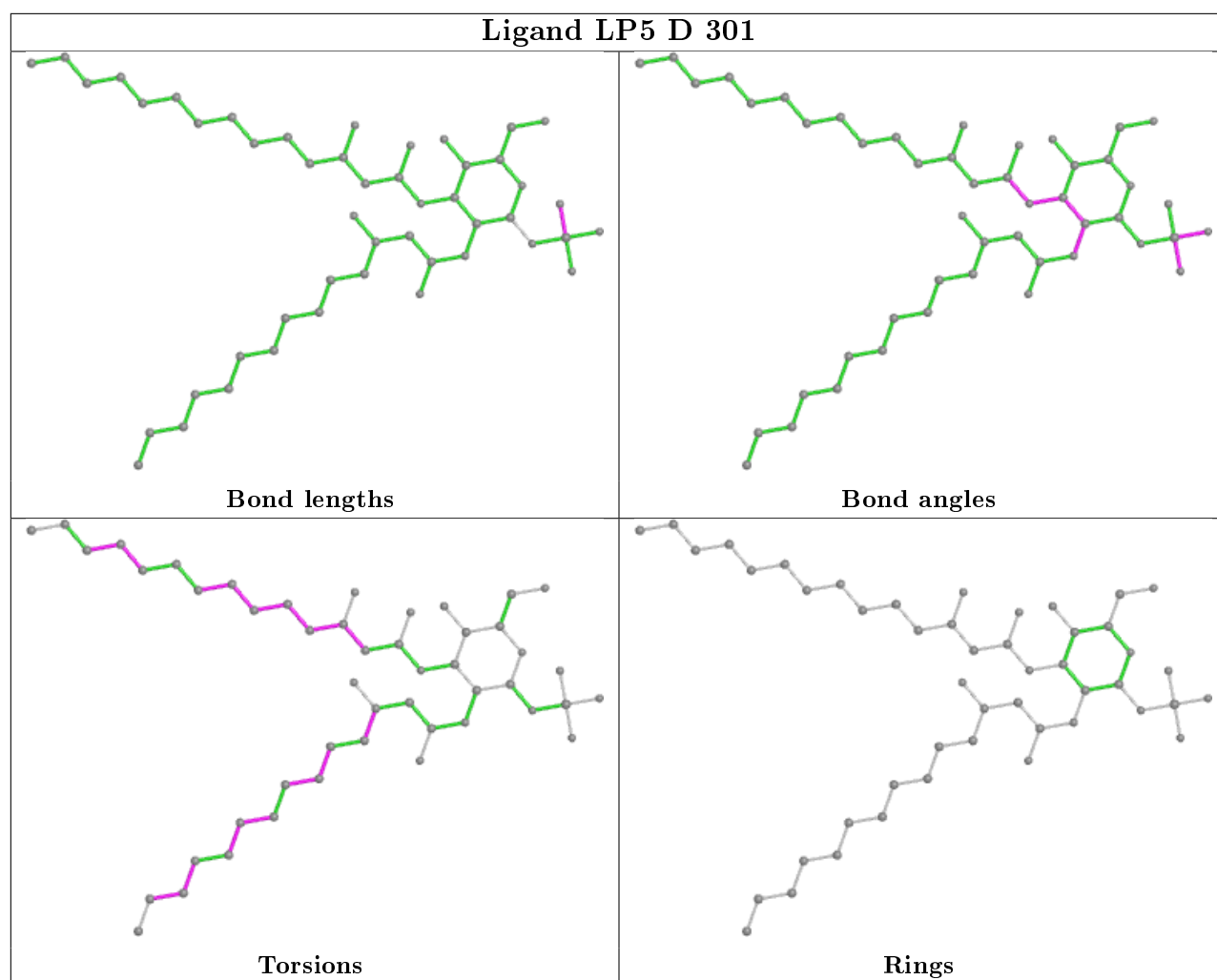
6 monomers are involved in 20 short contacts:

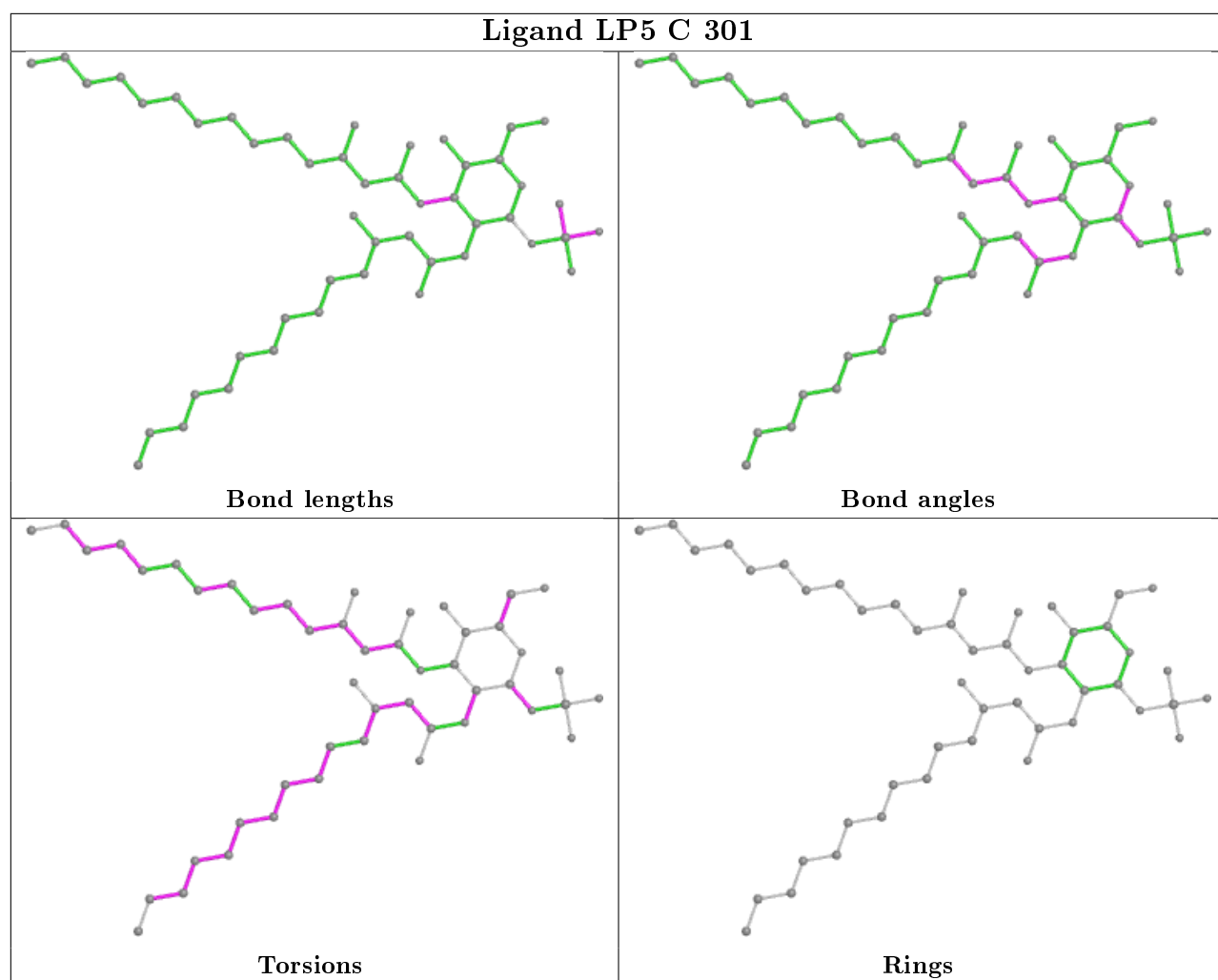
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	705	NAG	2	0
5	C	300	LP4	5	0
6	D	301	LP5	4	0
4	B	802	NAG	1	0
6	C	301	LP5	5	0
5	D	300	LP4	4	0

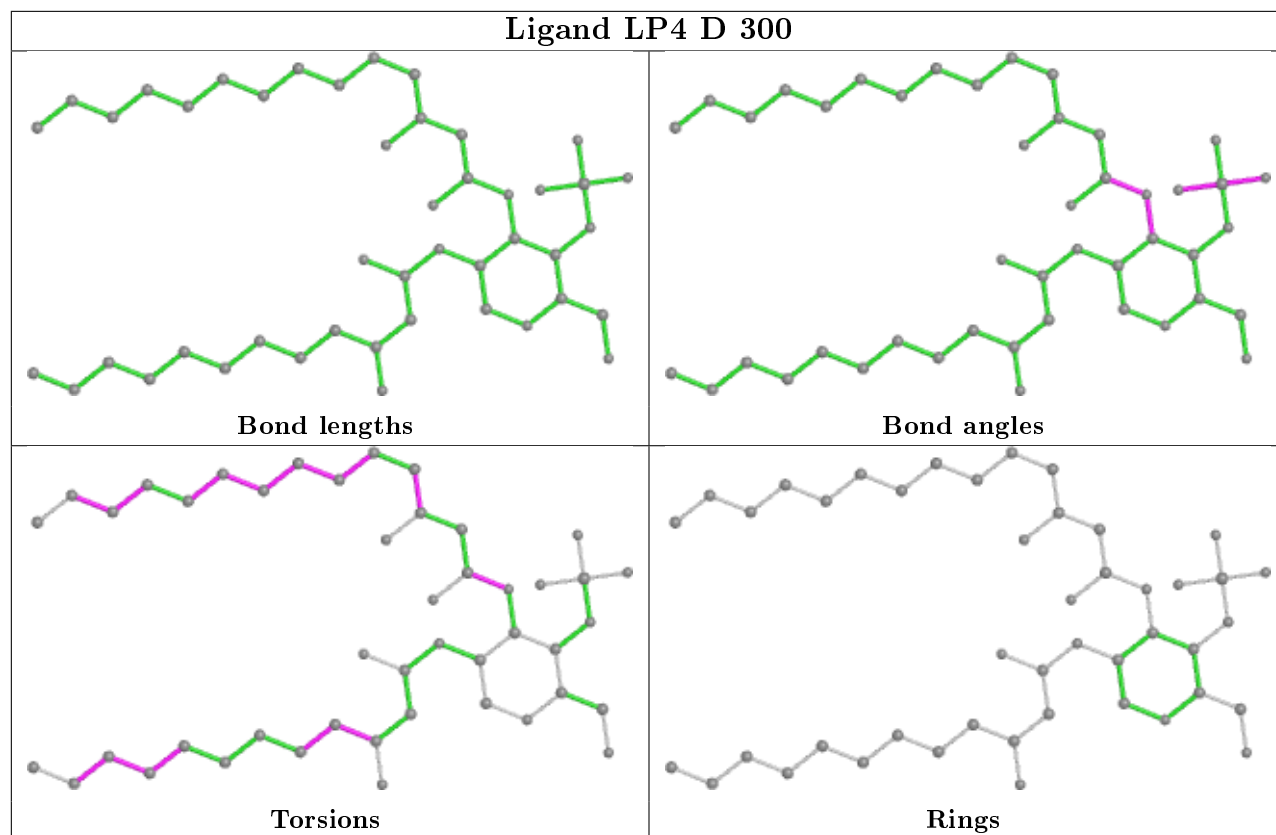
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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 ⓘ

### 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<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	596/606 (98%)	-0.10	10 (1%) 70 72	23, 43, 90, 127	1 (0%)
1	B	596/606 (98%)	0.05	23 (3%) 39 38	27, 56, 103, 136	1 (0%)
2	C	135/144 (93%)	0.09	5 (3%) 41 41	35, 51, 72, 85	1 (0%)
2	D	135/144 (93%)	0.03	5 (3%) 41 41	42, 57, 76, 96	2 (1%)
All	All	1462/1500 (97%)	-0.01	43 (2%) 51 52	23, 50, 94, 136	5 (0%)

All (43) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	623	SER	8.0
1	B	270	ILE	5.3
1	B	624	THR	5.3
1	B	98	HIS	4.8
1	B	625	CYS	4.7
1	A	49	ASP	4.0
1	A	29	ILE	3.9
1	A	323	ASP	3.9
1	B	49	ASP	3.9
1	B	35	ILE	3.7
2	D	39	HIS	3.4
1	B	147	GLN	3.3
2	C	24	PHE	3.2
2	D	23	TRP	3.1
2	C	39	HIS	3.0
1	A	28	CYS	2.9
1	A	98	HIS	2.8
1	A	625	CYS	2.8
1	B	149	ILE	2.8
1	B	620	PHE	2.8
1	A	609	PRO	2.8

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Mol	Chain	Res	Type	RSRZ
1	B	33	PRO	2.7
1	B	50	ASP	2.7
1	B	67	ILE	2.6
1	B	73	PHE	2.6
1	B	224	GLY	2.5
1	B	56	LYS	2.5
1	B	240	ASN	2.4
2	C	132	ARG	2.4
1	A	101	HIS	2.4
1	B	47	VAL	2.3
2	D	24	PHE	2.3
1	B	53	SER	2.2
1	B	174	THR	2.2
1	B	253	HIS	2.2
1	A	562	GLN	2.2
1	B	194	LEU	2.2
2	D	38	ASP	2.1
2	D	122	GLU	2.1
1	A	37	TYR	2.1
2	C	38	ASP	2.1
1	B	269	GLU	2.0
2	C	37	CYS	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

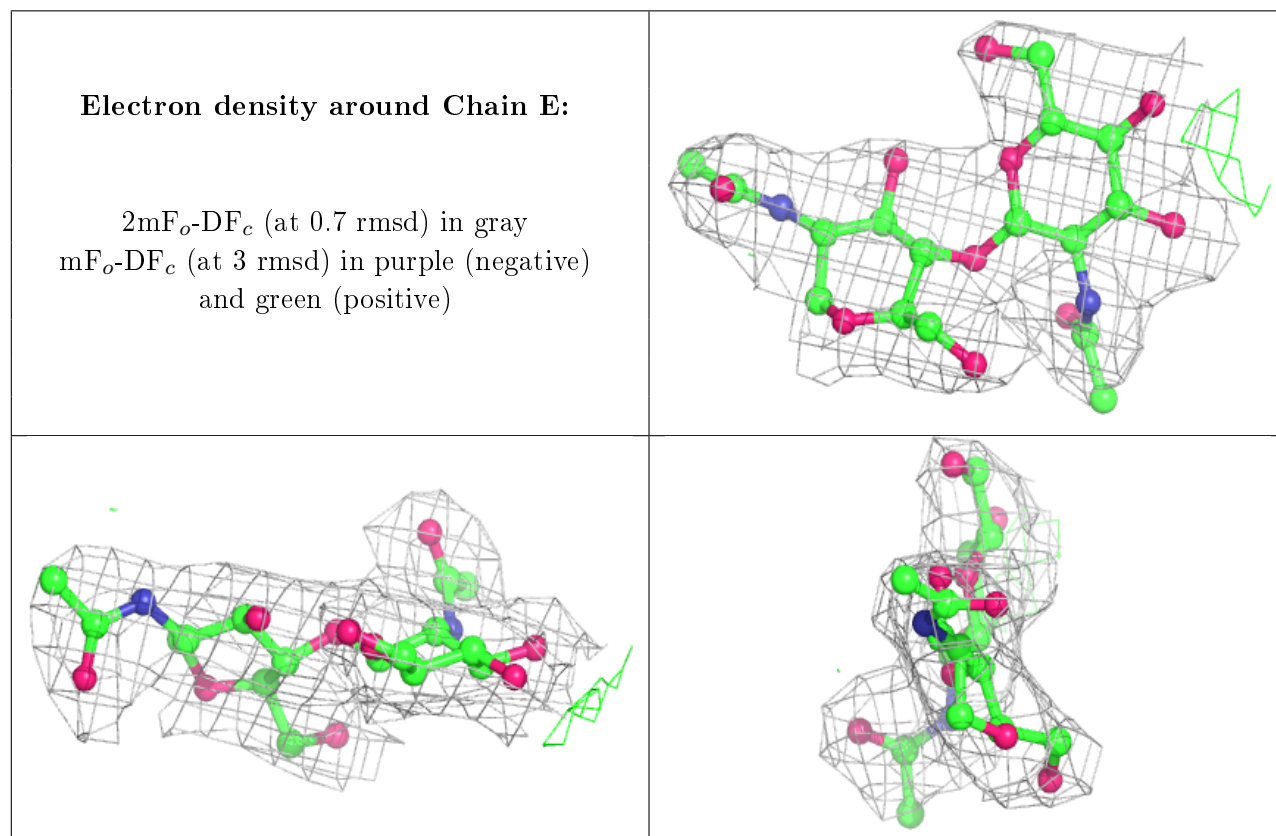
There are no non-standard protein/DNA/RNA residues in this entry.

## 6.3 Carbohydrates [i](#)

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.

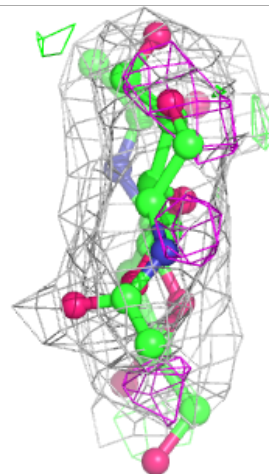
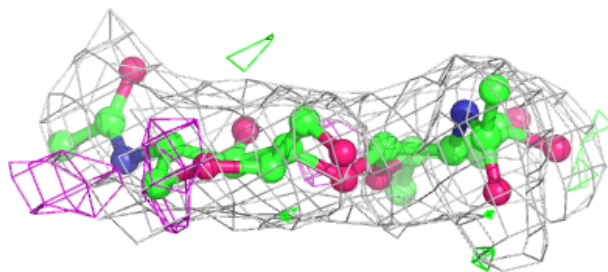
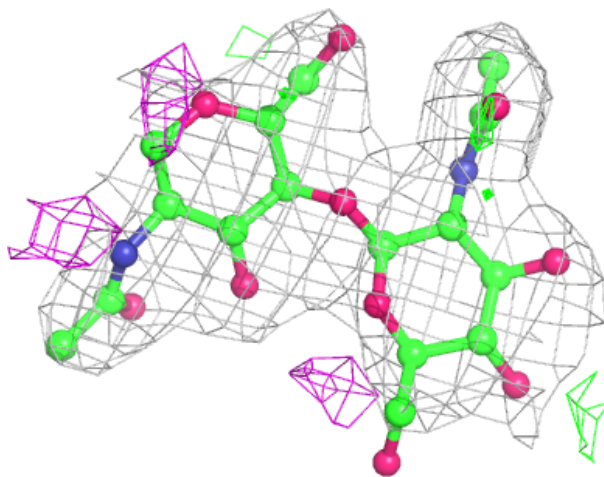
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	NAG	F	2	14/15	0.87	0.17	54,58,72,83	0
3	NAG	E	2	14/15	0.88	0.16	41,56,58,61	0
3	NAG	G	2	14/15	0.89	0.17	46,58,63,67	0
3	NAG	F	1	14/15	0.93	0.20	39,43,49,50	0
3	NAG	E	1	14/15	0.95	0.17	46,48,52,53	0
3	NAG	G	1	14/15	0.96	0.13	35,38,43,48	0

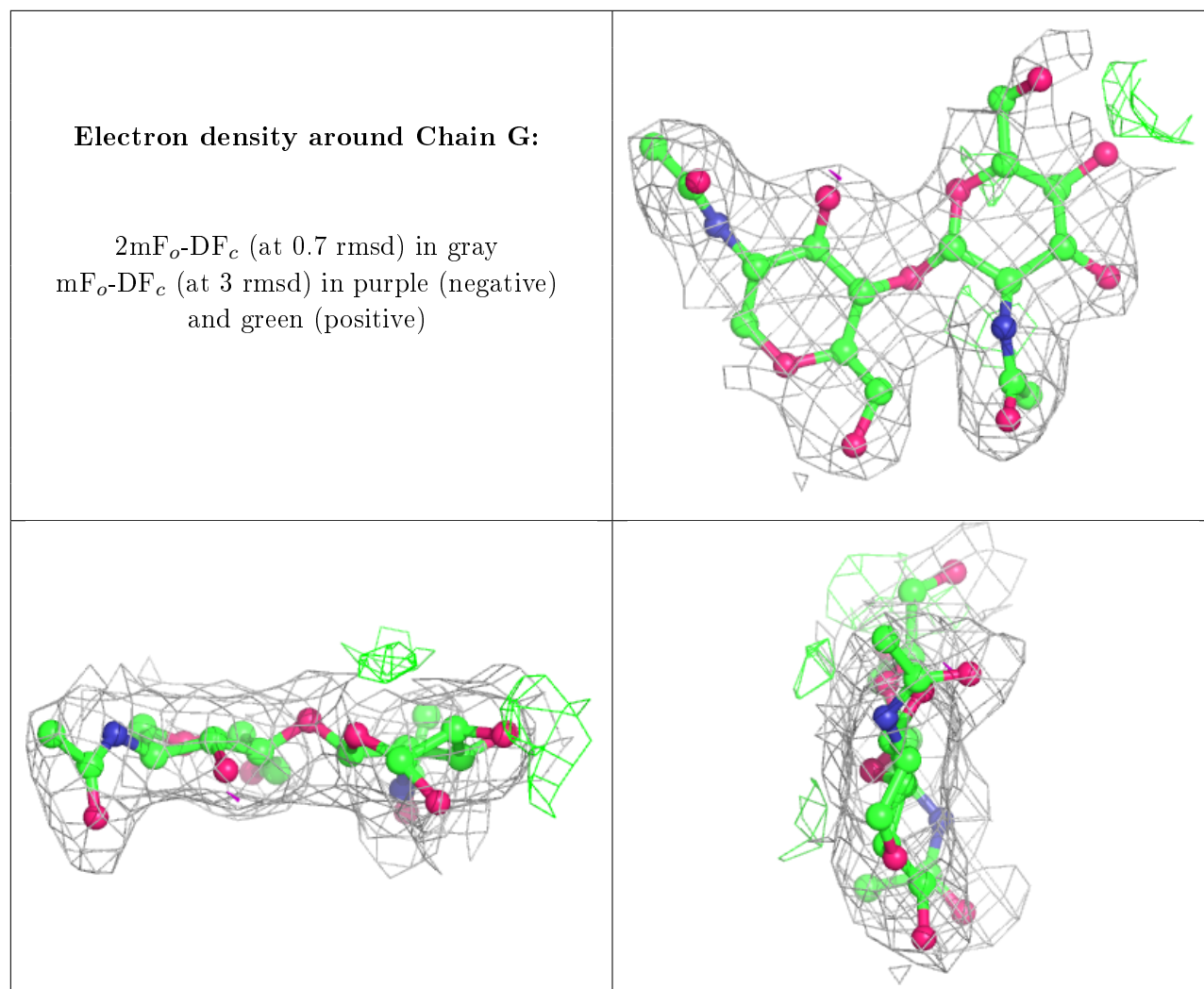
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



**Electron density around Chain F:**

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





## 6.4 Ligands ⓘ

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
4	NAG	A	705	14/15	0.79	0.25	50,66,86,87	0
6	LP5	D	301	48/48	0.91	0.21	63,70,78,89	0
4	NAG	B	802	14/15	0.93	0.27	46,50,55,59	0
6	LP5	C	301	48/48	0.93	0.22	43,56,77,82	0
5	LP4	C	300	45/48	0.94	0.18	37,52,58,63	0
5	LP4	D	300	45/48	0.94	0.17	54,67,73,77	0

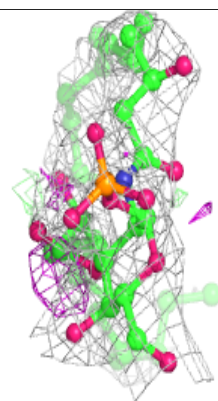
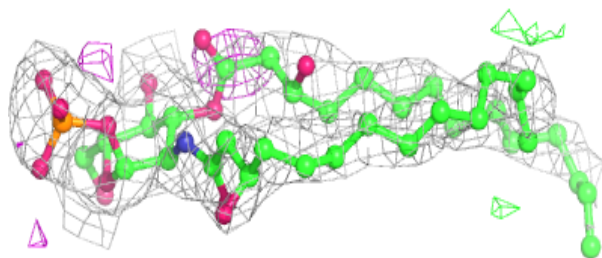
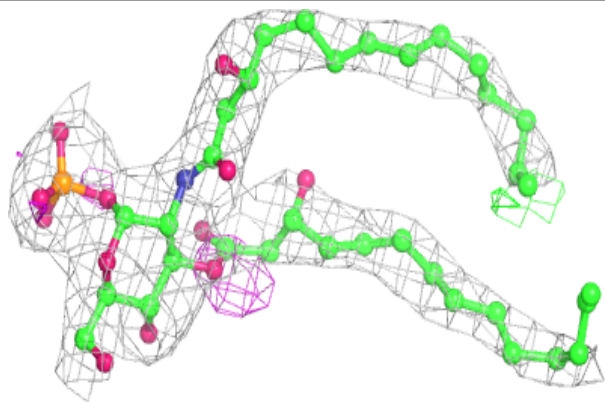
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers



as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

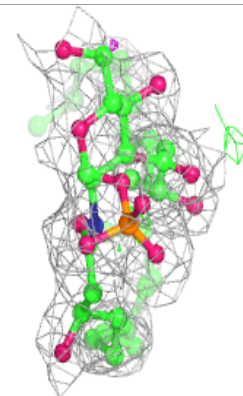
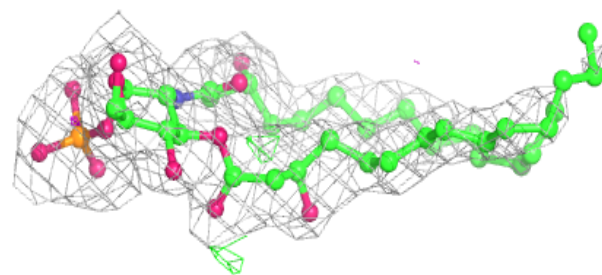
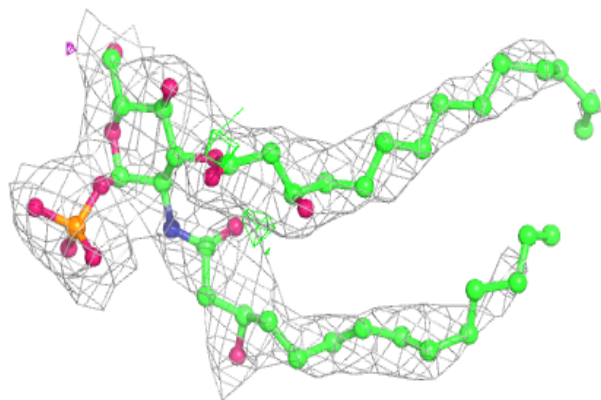
**Electron density around LP5 D 301:**

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



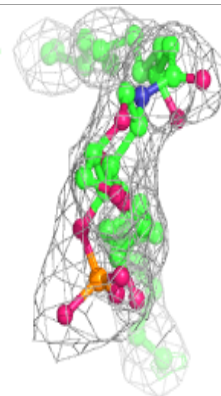
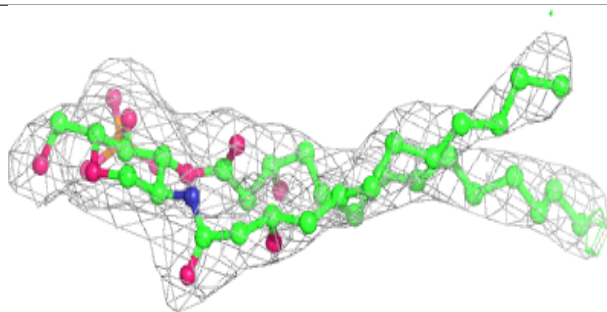
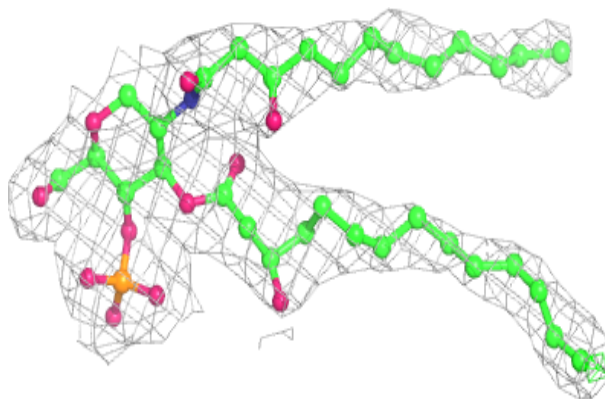
**Electron density around LP5 C 301:**

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

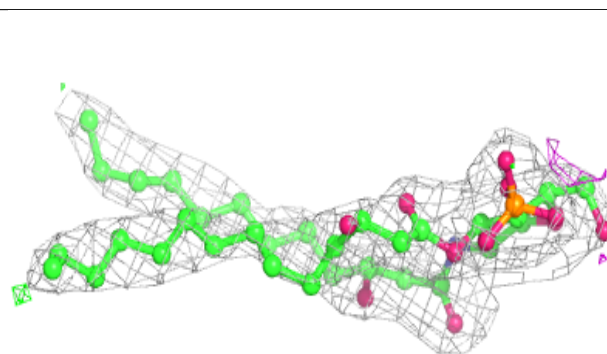
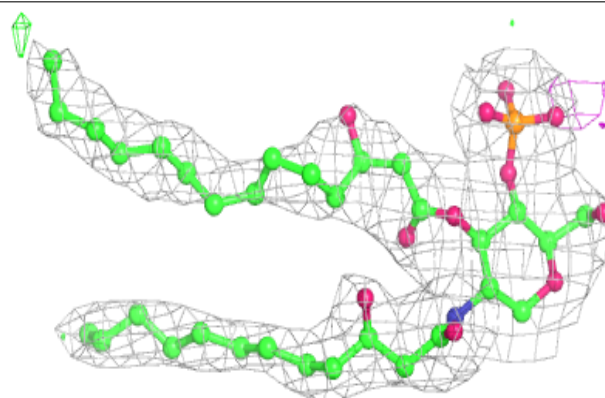


**Electron density around LP4 C 300:**

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

**Electron density around LP4 D 300:**

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



## 6.5 Other polymers ⓘ

There are no such residues in this entry.