



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 7, 2024 – 04:29 PM EDT

PDB ID : 3OPM  
Title : Crystal Structure of Human DPP4 Bound to TAK-294  
Authors : Yano, J.K.; Aertgeerts, K.  
Deposited on : 2010-09-01  
Resolution : 2.72 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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 1.20.1  
EDS : 3.0  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.003 (Gargrove)  
Density-Fitness : 1.0.11  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

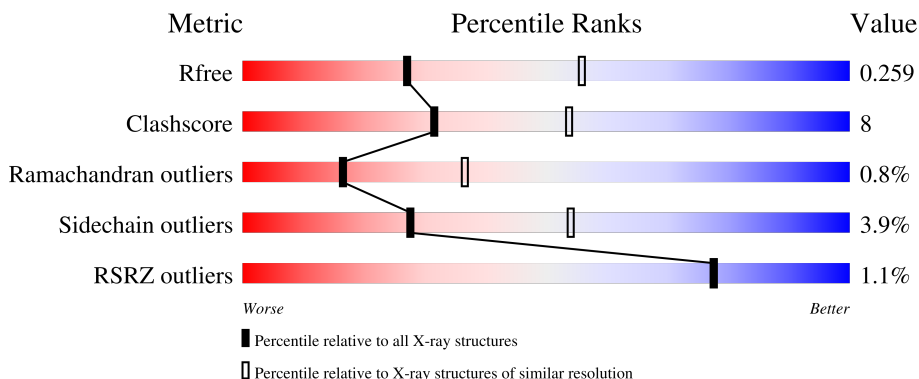
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.72 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))
$R_{free}$	164625	4050 (2.74-2.70)
Clashscore	180529	4439 (2.74-2.70)
Ramachandran outliers	177936	4374 (2.74-2.70)
Sidechain outliers	177891	4375 (2.74-2.70)
RSRZ outliers	164620	4050 (2.74-2.70)

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 of 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	740	 79% 18% ..
1	B	740	 79% 19% ..
1	C	740	 76% 20% ..
1	D	740	 82% 16% .
2	E	2	 100%

## 2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 24713 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 Dipeptidyl peptidase 4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	727	5950	3821	977	1126	26	0	0	0
1	B	733	6013	3857	997	1133	26	0	0	0
1	C	725	5937	3810	979	1122	26	0	0	0
1	D	727	5957	3824	981	1126	26	0	0	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	27	ALA	-	expression tag	UNP P27487
A	28	ASP	-	expression tag	UNP P27487
A	29	PRO	-	expression tag	UNP P27487
A	30	GLY	-	expression tag	UNP P27487
A	31	GLY	-	expression tag	UNP P27487
A	32	SER	-	expression tag	UNP P27487
A	33	HIS	-	expression tag	UNP P27487
A	34	HIS	-	expression tag	UNP P27487
A	35	HIS	-	expression tag	UNP P27487
A	36	HIS	-	expression tag	UNP P27487
A	37	HIS	-	expression tag	UNP P27487
A	38	HIS	-	expression tag	UNP P27487
B	27	ALA	-	expression tag	UNP P27487
B	28	ASP	-	expression tag	UNP P27487
B	29	PRO	-	expression tag	UNP P27487
B	30	GLY	-	expression tag	UNP P27487
B	31	GLY	-	expression tag	UNP P27487
B	32	SER	-	expression tag	UNP P27487
B	33	HIS	-	expression tag	UNP P27487
B	34	HIS	-	expression tag	UNP P27487
B	35	HIS	-	expression tag	UNP P27487

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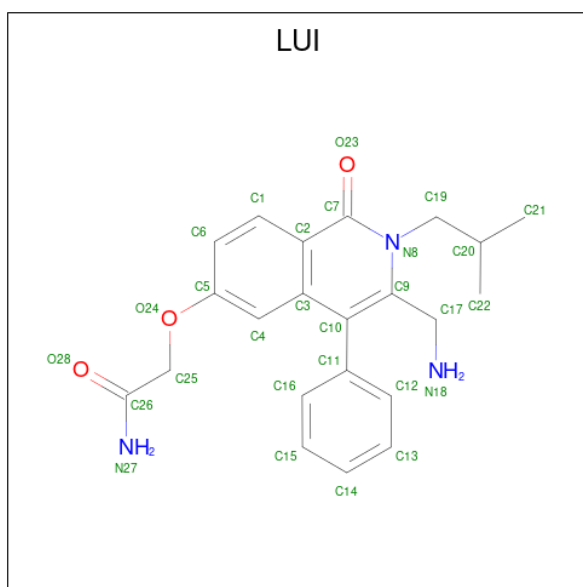
Chain	Residue	Modelled	Actual	Comment	Reference
B	36	HIS	-	expression tag	UNP P27487
B	37	HIS	-	expression tag	UNP P27487
B	38	HIS	-	expression tag	UNP P27487
C	27	ALA	-	expression tag	UNP P27487
C	28	ASP	-	expression tag	UNP P27487
C	29	PRO	-	expression tag	UNP P27487
C	30	GLY	-	expression tag	UNP P27487
C	31	GLY	-	expression tag	UNP P27487
C	32	SER	-	expression tag	UNP P27487
C	33	HIS	-	expression tag	UNP P27487
C	34	HIS	-	expression tag	UNP P27487
C	35	HIS	-	expression tag	UNP P27487
C	36	HIS	-	expression tag	UNP P27487
C	37	HIS	-	expression tag	UNP P27487
C	38	HIS	-	expression tag	UNP P27487
D	27	ALA	-	expression tag	UNP P27487
D	28	ASP	-	expression tag	UNP P27487
D	29	PRO	-	expression tag	UNP P27487
D	30	GLY	-	expression tag	UNP P27487
D	31	GLY	-	expression tag	UNP P27487
D	32	SER	-	expression tag	UNP P27487
D	33	HIS	-	expression tag	UNP P27487
D	34	HIS	-	expression tag	UNP P27487
D	35	HIS	-	expression tag	UNP P27487
D	36	HIS	-	expression tag	UNP P27487
D	37	HIS	-	expression tag	UNP P27487
D	38	HIS	-	expression tag	UNP P27487

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



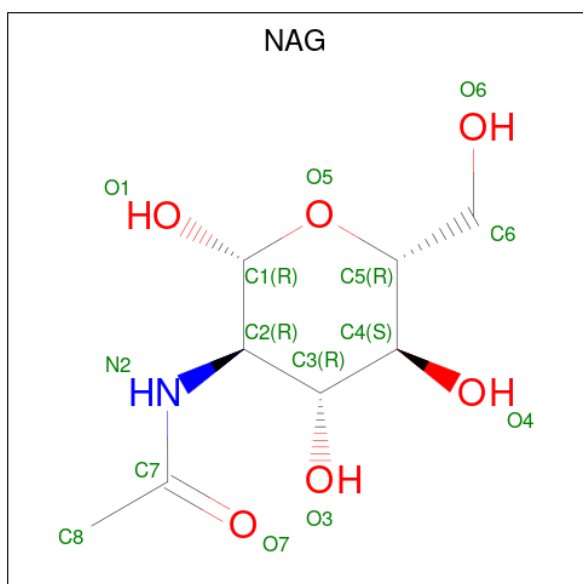
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace	
			Total	C	N				O
2	E	2	28	16	2	10	0	0	0

- Molecule 3 is 2-{[3-(aminomethyl)-2-(2-methylpropyl)-1-oxo-4-phenyl-1,2-dihydroisoquinolin-6-yl]oxy}acetamide (three-letter code: LUI) (formula: C<sub>22</sub>H<sub>25</sub>N<sub>3</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	Total	C	N	O	0	0
			28	22	3	3		
3	B	1	Total	C	N	O	0	0
			28	22	3	3		
3	C	1	Total	C	N	O	0	0
			28	22	3	3		
3	D	1	Total	C	N	O	0	0
			28	22	3	3		

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



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

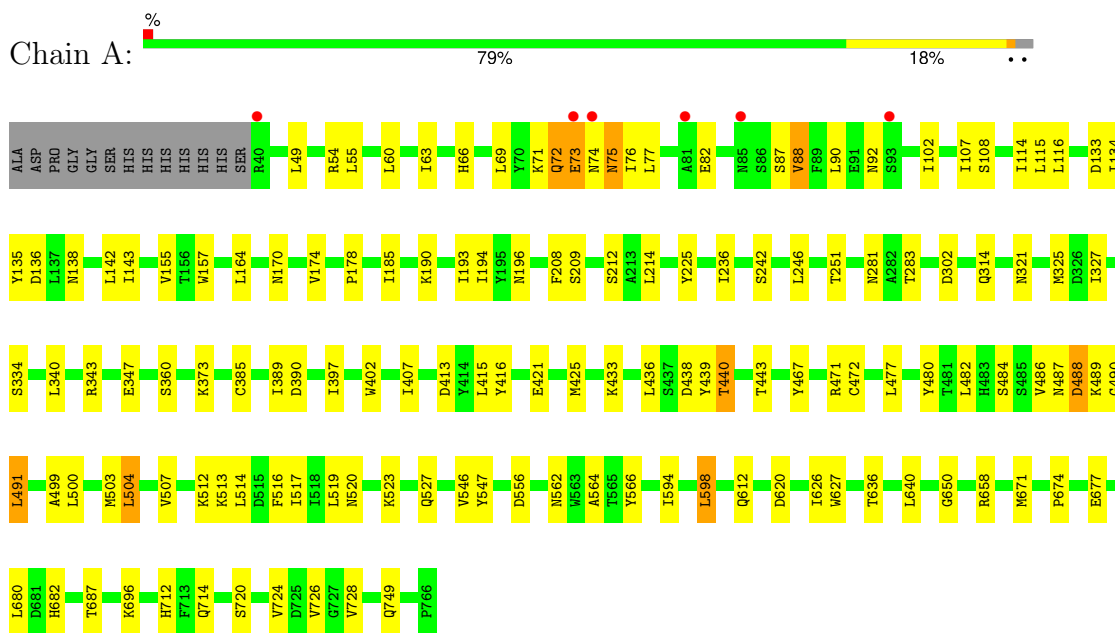
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	152	Total	O	0	0
			152	152		
5	B	142	Total	O	0	0
			142	142		
5	C	84	Total	O	0	0
			84	84		
5	D	128	Total	O	0	0
			128	128		

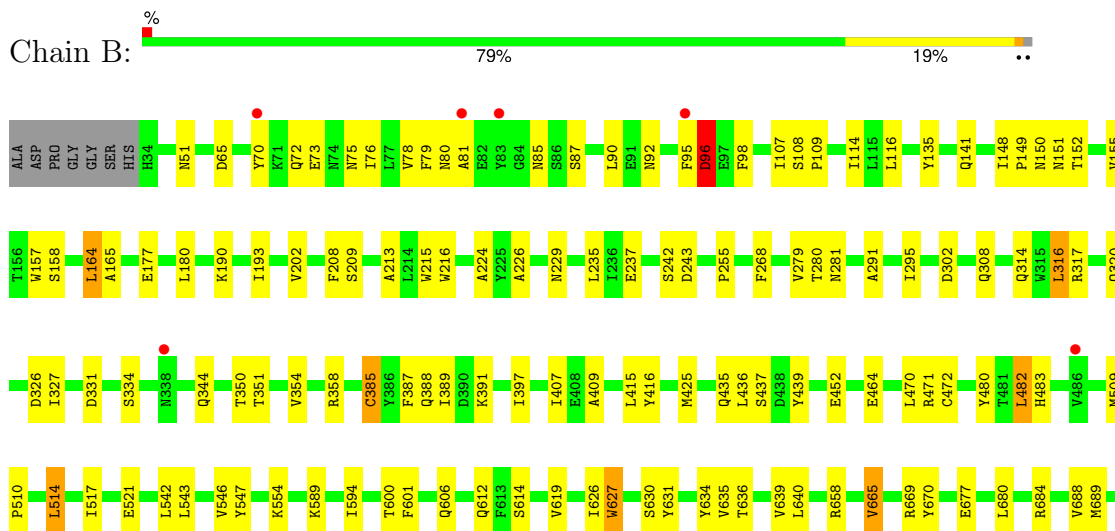
### 3 Residue-property plots

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: Dipeptidyl peptidase 4

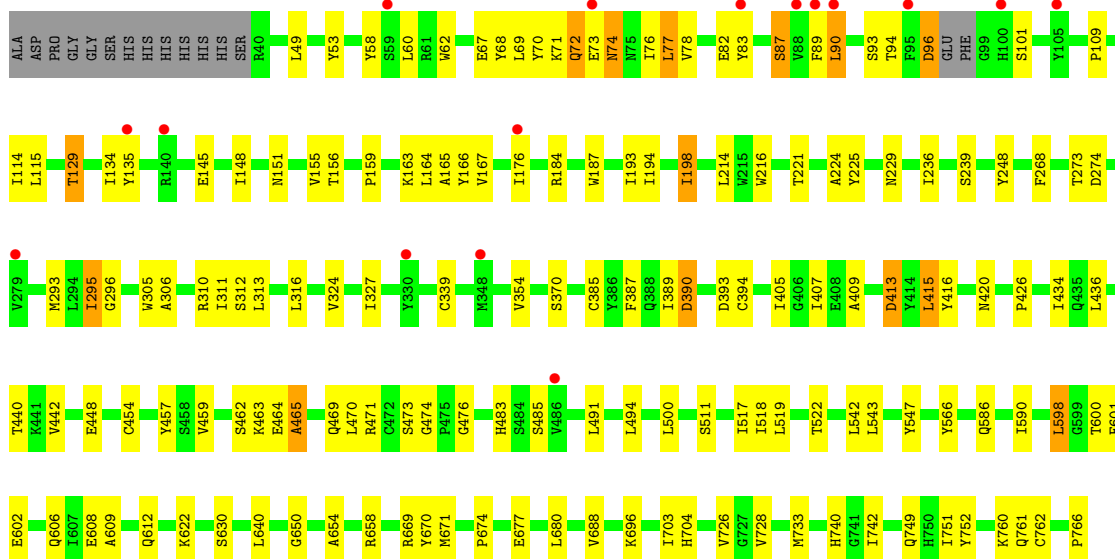
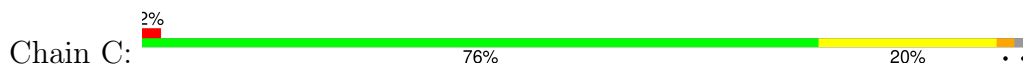


- Molecule 1: Dipeptidyl peptidase 4

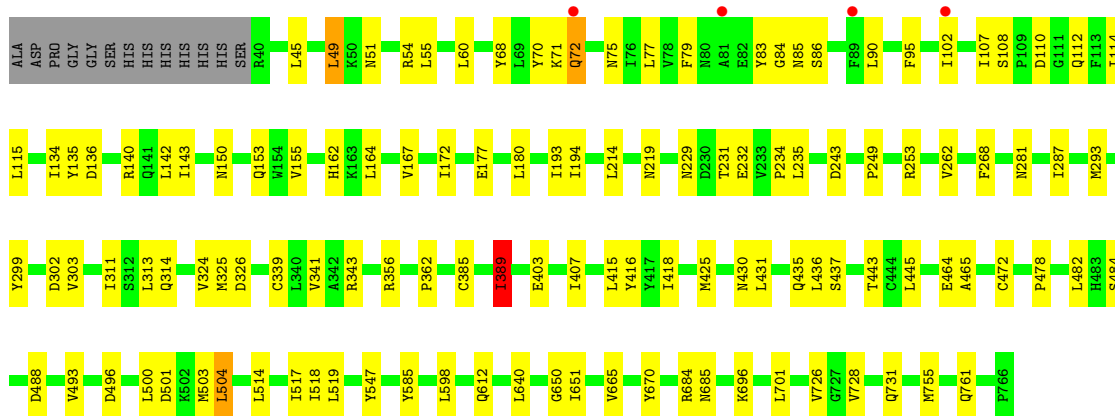
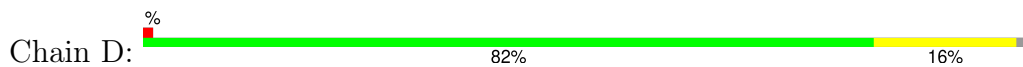




- Molecule 1: Dipeptidyl peptidase 4



- Molecule 1: Dipeptidyl peptidase 4



- Molecule 2: 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 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	121.77Å 122.56Å 144.74Å 90.00° 115.00° 90.00°	Depositor
Resolution (Å)	35.00 – 2.72 35.00 – 2.72	Depositor EDS
% Data completeness (in resolution range)	97.5 (35.00-2.72) 97.4 (35.00-2.72)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.37 (at 2.72Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.195 , 0.254 0.199 , 0.259	Depositor DCC
$R_{free}$ test set	5038 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	43.8	Xtrriage
Anisotropy	0.419	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 40.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.013 for h,-k,-h-l	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	24713	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	51.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.08% 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: NAG, LUI

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	0.52	0/6122	0.63	0/8327
1	B	0.50	0/6190	0.61	0/8419
1	C	0.46	0/6107	0.58	0/8305
1	D	0.49	0/6129	0.62	1/8336 (0.0%)
All	All	0.49	0/24548	0.61	1/33387 (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	B	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	356	ARG	NE-CZ-NH1	5.34	122.97	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	96	ASP	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	5950	0	5664	84	0
1	B	6013	0	5718	95	0
1	C	5937	0	5664	100	0
1	D	5957	0	5679	81	0
2	E	28	0	26	5	0
3	A	28	0	25	0	0
3	B	28	0	25	0	0
3	C	28	0	25	3	0
3	D	28	0	25	0	0
4	A	84	0	78	9	0
4	B	70	0	65	10	0
4	D	56	0	52	9	0
5	A	152	0	0	1	0
5	B	142	0	0	4	0
5	C	84	0	0	2	0
5	D	128	0	0	3	0
All	All	24713	0	23046	365	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 8.

All (365) 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:150:ASN:HD21	4:B:1501:NAG:C1	1.09	1.57
1:C:229:ASN:HD21	2:E:1:NAG:C1	1.07	1.55
1:B:229:ASN:HD21	4:B:2291:NAG:C1	0.94	1.54
1:B:281:ASN:HD21	4:B:2811:NAG:C1	1.16	1.51
1:D:229:ASN:HD21	4:D:2291:NAG:C1	1.15	1.51
1:A:281:ASN:HD21	4:A:2811:NAG:C1	0.89	1.50
1:D:281:ASN:HD21	4:D:2811:NAG:C1	1.29	1.42
1:D:219:ASN:HD21	4:D:2191:NAG:C1	1.44	1.27
1:B:150:ASN:HD21	4:B:1501:NAG:C2	1.72	1.02
1:D:193:ILE:HG22	1:D:194:ILE:HD12	1.45	0.99
4:A:2291:NAG:O4	4:A:2292:NAG:C1	2.21	0.88

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:350:THR:HG23	1:B:351:THR:HG23	1.54	0.88
1:A:82:GLU:OE2	1:A:467:TYR:OH	1.93	0.87
1:C:268:PHE:CD2	1:C:313:LEU:HD21	2.11	0.85
2:E:1:NAG:HO4	2:E:2:NAG:C1	1.92	0.82
1:C:193:ILE:HG22	1:C:194:ILE:HD12	1.62	0.81
1:A:640:LEU:HD11	1:A:650:GLY:HA3	1.62	0.80
1:C:470:LEU:HD12	1:C:483:HIS:NE2	1.98	0.79
1:B:327:ILE:HD13	1:B:389:ILE:CD1	2.12	0.79
1:A:63:ILE:HD11	1:A:69:LEU:HD12	1.63	0.79
1:A:626:ILE:HG23	1:A:636:THR:HG23	1.64	0.78
1:C:72:GLN:HB2	1:C:77:LEU:HD11	1.66	0.77
1:C:630:SER:OG	1:C:740:HIS:NE2	2.19	0.75
1:A:347:GLU:OE1	1:A:373:LYS:NZ	2.18	0.74
1:B:327:ILE:HD13	1:B:389:ILE:HD11	1.70	0.74
1:B:327:ILE:HG21	1:B:389:ILE:HD11	1.69	0.73
1:A:321:ASN:CG	4:A:3211:NAG:C1	2.56	0.73
1:B:229:ASN:CG	4:B:2291:NAG:C1	2.58	0.72
1:D:193:ILE:HG22	1:D:194:ILE:CD1	2.19	0.72
1:C:407:ILE:HG23	1:C:415:LEU:HD21	1.73	0.70
1:A:726:VAL:HG23	1:A:728:VAL:HG23	1.72	0.70
1:C:71:LYS:HA	1:C:76:ILE:HD13	1.73	0.70
1:C:115:LEU:HD21	1:C:155:VAL:HG11	1.74	0.70
1:D:45:LEU:HG	1:D:49:LEU:HD22	1.72	0.69
1:D:107:ILE:HG22	1:D:108:SER:O	1.92	0.69
1:C:156:THR:HG23	1:C:216:TRP:HE1	1.57	0.69
1:A:658:ARG:HB2	1:A:687:THR:HG22	1.75	0.68
1:A:115:LEU:HD21	1:A:155:VAL:HG21	1.76	0.68
4:A:2291:NAG:HO4	4:A:2292:NAG:C1	2.06	0.68
1:A:407:ILE:HG23	1:A:415:LEU:HD21	1.76	0.67
1:D:95:PHE:O	1:D:102:ILE:HD11	1.94	0.67
1:B:152:THR:HG21	1:B:155:VAL:HG22	1.75	0.67
1:C:434:ILE:HG13	1:C:442:VAL:HG22	1.76	0.67
1:D:517:ILE:HD12	1:D:612:GLN:HG3	1.77	0.67
1:B:517:ILE:HD12	1:B:612:GLN:HG3	1.77	0.67
1:D:114:ILE:HG23	1:D:135:TYR:HB3	1.76	0.67
1:D:407:ILE:HG23	1:D:415:LEU:HD21	1.77	0.66
1:C:511:SER:HB3	5:C:816:HOH:O	1.96	0.66
1:B:157:TRP:CE3	1:B:164:LEU:HD13	2.31	0.65
1:C:94:THR:HA	1:C:101:SER:HA	1.78	0.65
1:C:598:LEU:HD22	1:C:671:MET:HG2	1.79	0.65
1:C:415:LEU:O	1:C:434:ILE:HG22	1.97	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:219:ASN:CG	4:D:2191:NAG:C1	2.64	0.65
1:C:114:ILE:HG22	1:C:135:TYR:HB2	1.77	0.65
1:B:407:ILE:HG23	1:B:415:LEU:HD21	1.79	0.64
1:C:518:ILE:O	1:C:519:LEU:HD23	1.97	0.64
1:A:598:LEU:HD22	1:A:671:MET:HG2	1.80	0.64
1:A:55:LEU:HD23	1:A:500:LEU:CD2	2.27	0.64
1:A:504:LEU:HA	1:A:507:VAL:HG12	1.79	0.64
1:A:194:ILE:HD12	4:A:2291:NAG:H82	1.81	0.63
1:C:542:LEU:HD23	1:C:543:LEU:N	2.13	0.63
1:C:464:GLU:O	1:C:465:ALA:CB	2.47	0.63
1:D:60:LEU:HD12	1:D:60:LEU:C	2.19	0.62
1:A:157:TRP:CE3	1:A:164:LEU:HD13	2.34	0.62
1:A:546:VAL:HG12	1:A:627:TRP:O	1.99	0.62
1:B:327:ILE:HD13	1:B:389:ILE:HD12	1.81	0.62
1:A:49:LEU:HD22	1:A:749:GLN:HA	1.82	0.62
1:A:114:ILE:HG23	1:A:135:TYR:HB3	1.81	0.62
1:C:726:VAL:HG23	1:C:728:VAL:HG23	1.82	0.62
3:C:800:LUI:C16	3:C:800:LUI:HN18	2.12	0.62
1:A:214:LEU:HD23	1:A:225:TYR:HB3	1.83	0.61
1:B:281:ASN:ND2	5:B:891:HOH:O	2.35	0.60
1:C:184:ARG:HD2	1:C:187:TRP:CE2	2.36	0.60
1:C:94:THR:HG22	5:C:809:HOH:O	2.00	0.60
1:C:167:VAL:HG11	1:C:198:ILE:HD13	1.83	0.60
1:B:635:VAL:O	1:B:639:VAL:HG23	2.02	0.60
1:C:517:ILE:HD12	1:C:612:GLN:HG3	1.83	0.60
1:B:152:THR:HG21	1:B:155:VAL:CG2	2.31	0.60
1:D:640:LEU:HD11	1:D:650:GLY:HA3	1.82	0.60
1:C:464:GLU:O	1:C:465:ALA:HB2	2.02	0.60
1:D:268:PHE:CD2	1:D:313:LEU:HD11	2.37	0.60
1:C:327:ILE:HD13	1:C:389:ILE:HD12	1.84	0.60
1:A:512:LYS:HE2	1:A:556:ASP:O	2.02	0.60
3:C:800:LUI:HN18	3:C:800:LUI:C11	2.15	0.59
1:D:84:GLY:O	1:D:86:SER:N	2.35	0.59
1:B:208:PHE:O	1:B:209:SER:C	2.42	0.59
1:C:193:ILE:HG22	1:C:194:ILE:CD1	2.30	0.58
1:D:299:TYR:CE1	1:D:665:VAL:HG22	2.38	0.58
1:B:95:PHE:CZ	1:B:116:LEU:HD11	2.38	0.58
1:C:71:LYS:HZ2	1:C:74:ASN:HA	1.68	0.58
1:D:518:ILE:O	1:D:519:LEU:HD23	2.03	0.58
1:C:229:ASN:CG	2:E:1:NAG:C1	2.69	0.58
1:D:60:LEU:HB2	1:D:68:TYR:CD2	2.38	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:390:ASP:OD1	1:C:390:ASP:N	2.35	0.58
1:C:96:ASP:N	1:C:96:ASP:OD2	2.36	0.58
1:D:55:LEU:HD12	1:D:500:LEU:CD2	2.34	0.58
1:C:306:ALA:HB3	1:C:310:ARG:HB3	1.85	0.58
1:B:150:ASN:CG	4:B:1501:NAG:C1	2.68	0.57
1:B:279:VAL:HG23	1:B:280:THR:HG23	1.86	0.57
1:B:471:ARG:HG2	1:B:480:TYR:CE1	2.39	0.57
1:D:302:ASP:HB3	1:D:314:GLN:HB2	1.87	0.57
1:B:85:ASN:CG	4:B:901:NAG:C1	2.64	0.57
1:C:53:TYR:HB3	1:C:500:LEU:HD11	1.86	0.57
2:E:1:NAG:C4	2:E:2:NAG:C1	2.83	0.57
1:A:517:ILE:HD12	1:A:612:GLN:HG3	1.88	0.56
1:B:542:LEU:C	1:B:542:LEU:HD23	2.26	0.56
1:A:174:VAL:HG23	1:A:185:ILE:HD11	1.86	0.56
1:B:190:LYS:HD3	1:B:193:ILE:HD12	1.88	0.56
1:C:608:GLU:O	1:C:612:GLN:HG2	2.06	0.56
1:A:486:VAL:HG13	1:A:487:ASN:H	1.71	0.56
1:C:640:LEU:HD11	1:C:650:GLY:HA3	1.88	0.56
4:A:2291:NAG:C4	4:A:2292:NAG:C1	2.84	0.56
1:C:459:VAL:HG23	1:C:469:GLN:O	2.05	0.56
1:D:229:ASN:CG	4:D:2291:NAG:C1	2.70	0.55
1:B:202:VAL:HG22	1:B:665:VAL:HG13	1.89	0.55
1:D:136:ASP:HB2	1:D:143:ILE:HD11	1.88	0.55
1:D:75:ASN:O	1:D:77:LEU:HD12	2.07	0.55
1:A:325:MET:CE	1:A:327:ILE:HD11	2.36	0.55
4:D:1501:NAG:H81	5:D:835:HOH:O	2.08	0.54
1:B:397:ILE:HG22	1:B:439:TYR:CE2	2.43	0.54
4:A:2811:NAG:H2	5:A:866:HOH:O	2.08	0.54
1:D:281:ASN:HD21	4:D:2811:NAG:C2	2.12	0.54
1:B:202:VAL:HG22	1:B:665:VAL:CG1	2.38	0.54
1:D:79:PHE:HA	1:D:86:SER:HB3	1.89	0.54
1:B:242:SER:OG	1:B:243:ASP:N	2.40	0.53
1:B:425:MET:CE	1:B:514:LEU:HD13	2.38	0.53
1:B:95:PHE:CE1	1:B:116:LEU:HD11	2.44	0.53
1:B:224:ALA:HB1	1:B:268:PHE:CZ	2.43	0.53
1:C:71:LYS:NZ	1:C:74:ASN:HA	2.24	0.53
1:A:55:LEU:HD23	1:A:500:LEU:HD23	1.88	0.53
1:A:500:LEU:HA	1:A:503:MET:HE3	1.89	0.53
1:D:435:GLN:HE21	1:D:437:SER:HG	1.57	0.53
1:A:415:LEU:HD23	1:A:416:TYR:N	2.24	0.53
1:A:69:LEU:HD22	1:A:76:ILE:HG22	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:316:LEU:HD13	1:B:320:GLN:HG2	1.91	0.52
1:C:69:LEU:HD22	1:C:76:ILE:CG2	2.39	0.52
1:C:70:TYR:O	1:C:77:LEU:HD12	2.10	0.52
1:C:224:ALA:HB1	1:C:268:PHE:CZ	2.44	0.52
1:D:500:LEU:HG	1:D:504:LEU:HD22	1.92	0.52
1:A:54:ARG:O	1:A:500:LEU:HD22	2.09	0.52
1:D:303:VAL:HG22	1:D:313:LEU:HD22	1.92	0.52
1:D:325:MET:HE1	1:D:362:PRO:HB3	1.91	0.52
1:C:78:VAL:HG13	1:C:78:VAL:O	2.10	0.52
1:C:293:MET:CE	1:C:324:VAL:HG23	2.40	0.52
3:C:800:LUI:C11	3:C:800:LUI:N18	2.72	0.52
1:D:232:GLU:CB	1:D:262:VAL:HG11	2.40	0.51
1:A:720:SER:O	1:A:724:VAL:HG23	2.11	0.51
1:C:184:ARG:HD2	1:C:187:TRP:CZ2	2.45	0.51
1:B:546:VAL:HG12	1:B:606:GLN:OE1	2.10	0.51
1:B:723:LEU:HD22	1:B:728:VAL:HG11	1.93	0.51
1:A:71:LYS:O	1:A:73:GLU:N	2.44	0.51
1:C:60:LEU:HD22	1:C:68:TYR:CG	2.45	0.51
1:B:81:ALA:HB1	1:B:482:LEU:HD11	1.93	0.51
1:B:658:ARG:HB2	1:B:689:MET:HE1	1.93	0.50
1:C:229:ASN:ND2	2:E:1:NAG:O5	2.43	0.50
1:C:518:ILE:HA	1:C:522:THR:O	2.11	0.50
1:D:153:GLN:OE1	1:D:167:VAL:HG12	2.10	0.50
1:A:620:ASP:OD2	1:A:620:ASP:C	2.49	0.50
1:B:752:TYR:CD2	1:B:755:MET:HE3	2.46	0.50
1:D:235:LEU:HD13	1:D:253:ARG:HB3	1.93	0.50
1:C:60:LEU:C	1:C:60:LEU:HD12	2.32	0.50
1:C:312:SER:C	1:C:313:LEU:HD12	2.32	0.50
1:B:92:ASN:ND2	5:B:854:HOH:O	2.44	0.50
1:D:232:GLU:HB2	1:D:262:VAL:HG11	1.93	0.49
1:D:425:MET:HE3	1:D:514:LEU:HD12	1.94	0.49
1:A:107:ILE:HD11	1:A:114:ILE:HD12	1.94	0.49
1:D:343:ARG:HD2	1:D:389:ILE:HG23	1.94	0.49
1:A:321:ASN:ND2	4:A:3211:NAG:C2	2.64	0.49
1:A:598:LEU:O	1:A:682:HIS:NE2	2.44	0.49
1:A:325:MET:HE2	1:A:327:ILE:HD11	1.93	0.49
1:A:562:ASN:OD1	1:A:564:ALA:HB3	2.12	0.49
1:D:194:ILE:HG12	4:D:2291:NAG:H82	1.94	0.49
1:A:114:ILE:CG2	1:A:135:TYR:HB3	2.41	0.49
1:B:107:ILE:HD12	1:B:107:ILE:N	2.27	0.49
1:D:343:ARG:HD2	1:D:389:ILE:CG2	2.43	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:477:LEU:HD12	1:A:477:LEU:H	1.77	0.49
1:D:72:GLN:HG3	1:D:77:LEU:HD13	1.95	0.49
1:A:69:LEU:HD22	1:A:76:ILE:CG2	2.43	0.48
1:B:107:ILE:HG22	1:B:108:SER:O	2.13	0.48
1:B:470:LEU:HD12	1:B:483:HIS:NE2	2.28	0.48
1:A:185:ILE:N	1:A:185:ILE:HD12	2.28	0.48
1:C:387:PHE:CD1	1:C:394:CYS:HB3	2.47	0.48
1:D:172:ILE:HD13	1:D:214:LEU:HD21	1.95	0.48
1:A:107:ILE:HG22	1:A:108:SER:O	2.13	0.48
1:C:248:TYR:OH	1:D:234:PRO:HG2	2.14	0.48
1:C:163:LYS:HE2	1:C:176:ILE:HD12	1.96	0.48
1:C:465:ALA:O	1:C:485:SER:OG	2.20	0.48
1:B:70:TYR:HB3	1:B:79:PHE:HE1	1.79	0.48
1:C:49:LEU:HD22	1:C:749:GLN:HA	1.96	0.48
1:C:216:TRP:CZ3	1:C:273:THR:HG21	2.49	0.48
1:A:484:SER:O	1:A:488:ASP:HA	2.14	0.47
1:C:696:LYS:HG3	1:C:728:VAL:HG22	1.96	0.47
1:C:760:LYS:NZ	1:C:766:PRO:O	2.46	0.47
1:C:159:PRO:HD3	1:C:216:TRP:CB	2.45	0.47
1:D:303:VAL:CG1	1:D:311:ILE:HD11	2.45	0.47
1:A:302:ASP:HB3	1:A:314:GLN:HB2	1.95	0.47
1:A:425:MET:CE	1:A:514:LEU:HD23	2.44	0.47
1:C:586:GLN:HB3	1:C:590:ILE:HD12	1.97	0.47
1:A:242:SER:HB3	1:A:246:LEU:HD23	1.97	0.47
1:A:516:PHE:CD1	1:A:523:LYS:HG2	2.49	0.47
1:B:640:LEU:HB3	1:B:698:VAL:HG21	1.96	0.47
1:C:78:VAL:HG12	1:C:87:SER:O	2.13	0.47
1:B:150:ASN:ND2	4:B:1501:NAG:C2	2.54	0.47
1:B:626:ILE:HG23	1:B:636:THR:HG23	1.96	0.47
1:C:293:MET:HE2	1:C:324:VAL:HG23	1.97	0.47
1:D:472:CYS:O	1:D:478:PRO:HA	2.15	0.47
1:B:165:ALA:HB2	1:B:216:TRP:CZ2	2.50	0.47
1:C:295:ILE:HG13	1:C:296:GLY:N	2.30	0.47
1:D:696:LYS:HG3	1:D:728:VAL:HG22	1.95	0.47
1:B:85:ASN:ND2	4:B:901:NAG:O5	2.41	0.47
1:B:409:ALA:HB3	1:B:416:TYR:HB2	1.97	0.47
1:C:327:ILE:HD13	1:C:389:ILE:CD1	2.45	0.46
1:C:474:GLY:HA2	1:C:476:GLY:O	2.15	0.46
1:C:248:TYR:CZ	1:D:234:PRO:HG2	2.50	0.46
1:B:81:ALA:CB	1:B:482:LEU:HD11	2.45	0.46
1:B:600:THR:OG1	1:B:601:PHE:N	2.47	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:134:ILE:HD11	1:C:148:ILE:HD11	1.96	0.46
1:D:484:SER:O	1:D:488:ASP:HA	2.15	0.46
1:D:701:LEU:HD13	1:D:731:GLN:HB2	1.97	0.46
1:A:75:ASN:ND2	1:A:88:VAL:HG13	2.30	0.46
1:A:327:ILE:HD13	1:A:389:ILE:HD12	1.96	0.46
1:C:214:LEU:HD23	1:C:225:TYR:HB3	1.97	0.46
1:D:162:HIS:NE2	1:D:177:GLU:OE1	2.43	0.46
1:A:281:ASN:CG	4:A:2811:NAG:C1	2.70	0.46
1:A:696:LYS:HG3	1:A:728:VAL:HG22	1.97	0.46
1:B:385:CYS:HB3	1:B:387:PHE:CE2	2.51	0.46
1:B:723:LEU:HB3	1:B:728:VAL:HG13	1.98	0.46
1:C:115:LEU:HD21	1:C:155:VAL:CG1	2.42	0.46
1:C:268:PHE:CE2	1:C:313:LEU:HD21	2.50	0.46
1:D:110:ASP:OD2	1:D:112:GLN:NE2	2.49	0.46
1:C:89:PHE:O	1:C:90:LEU:CB	2.63	0.46
1:D:114:ILE:CG2	1:D:135:TYR:HB3	2.42	0.46
1:A:415:LEU:HB2	1:A:436:LEU:HD21	1.98	0.46
1:B:235:LEU:HD23	1:B:255:PRO:HA	1.97	0.46
1:C:602:GLU:OE2	1:C:602:GLU:N	2.44	0.46
1:D:598:LEU:HD21	1:D:670:TYR:HB3	1.98	0.46
1:B:78:VAL:HG12	1:B:87:SER:O	2.16	0.46
1:C:600:THR:OG1	1:C:601:PHE:N	2.48	0.46
1:D:268:PHE:CZ	1:D:313:LEU:HD21	2.51	0.45
1:B:542:LEU:HD23	1:B:543:LEU:N	2.31	0.45
1:D:155:VAL:HG12	1:D:164:LEU:HD22	1.99	0.45
1:A:519:LEU:O	1:A:520:ASN:C	2.54	0.45
1:B:81:ALA:HB1	1:B:482:LEU:CD1	2.47	0.45
1:D:415:LEU:HD23	1:D:416:TYR:N	2.32	0.45
1:D:726:VAL:HG23	1:D:728:VAL:HG23	1.99	0.45
1:A:327:ILE:HD12	1:A:343:ARG:O	2.17	0.45
1:A:402:TRP:CD2	1:A:421:GLU:HB2	2.51	0.45
1:A:63:ILE:CD1	1:A:69:LEU:HD12	2.42	0.45
1:B:177:GLU:HB2	1:B:180:LEU:HD22	1.98	0.45
1:D:431:LEU:CD2	1:D:445:LEU:HD12	2.47	0.45
1:D:231:THR:HG23	5:D:861:HOH:O	2.17	0.45
1:D:403:GLU:OE2	1:D:585:TYR:HA	2.16	0.45
1:A:486:VAL:HG13	1:A:487:ASN:N	2.31	0.45
1:B:114:ILE:CG2	1:B:135:TYR:HB3	2.47	0.45
1:B:281:ASN:HD21	4:B:2811:NAG:C2	2.10	0.45
1:B:614:SER:HA	1:B:619:VAL:HB	1.99	0.45
1:C:221:THR:HG23	1:C:274:ASP:OD1	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:598:LEU:HD22	1:A:671:MET:CG	2.45	0.45
1:D:418:ILE:HA	1:D:430:ASN:O	2.17	0.45
1:C:457:TYR:HA	1:C:471:ARG:O	2.18	0.44
1:B:658:ARG:NH1	5:B:817:HOH:O	2.43	0.44
1:D:293:MET:HE2	1:D:324:VAL:HG23	1.98	0.44
1:D:299:TYR:CZ	1:D:665:VAL:HG22	2.53	0.44
1:B:543:LEU:HD21	1:B:627:TRP:CD1	2.52	0.44
1:D:293:MET:CE	1:D:324:VAL:HG23	2.48	0.44
1:A:134:ILE:HG21	1:A:178:PRO:HB3	1.99	0.44
1:A:598:LEU:HB2	1:A:671:MET:SD	2.57	0.44
1:B:744:SER:HB2	1:B:747:ALA:HB3	1.98	0.44
1:B:302:ASP:HB3	1:B:314:GLN:HB2	2.00	0.44
1:B:680:LEU:HD11	1:B:684:ARG:CZ	2.48	0.44
1:B:631:TYR:O	1:B:634:TYR:HB3	2.17	0.44
1:C:313:LEU:HD12	1:C:313:LEU:N	2.33	0.44
1:C:409:ALA:HB3	1:C:416:TYR:HB2	2.00	0.44
1:D:115:LEU:HD12	1:D:134:ILE:HG12	1.98	0.44
1:A:69:LEU:HD23	1:A:77:LEU:O	2.18	0.44
1:B:388:GLN:HB2	1:B:391:LYS:HG2	2.00	0.44
1:C:654:ALA:HA	1:C:704:HIS:CE1	2.53	0.43
1:A:487:ASN:HD21	1:A:489:LYS:HD3	1.83	0.43
1:B:114:ILE:HG23	1:B:135:TYR:HB3	2.00	0.43
1:B:150:ASN:O	1:B:151:ASN:HB2	2.19	0.43
1:B:765:LEU:HD22	5:B:867:HOH:O	2.17	0.43
1:A:170:ASN:O	1:A:196:ASN:HB2	2.18	0.43
1:B:326:ASP:OD2	1:B:344:GLN:HG2	2.18	0.43
1:C:405:ILE:HG22	1:C:405:ILE:O	2.18	0.43
1:C:674:PRO:O	1:C:680:LEU:HD13	2.17	0.43
1:C:669:ARG:HD2	1:C:670:TYR:CZ	2.53	0.43
1:A:102:ILE:HG21	1:A:116:LEU:HD22	2.00	0.43
1:A:107:ILE:CD1	1:A:114:ILE:HD12	2.48	0.43
1:A:115:LEU:HD21	1:A:155:VAL:CG2	2.48	0.43
1:D:684:ARG:HG3	5:D:825:HOH:O	2.18	0.43
1:A:136:ASP:HB2	1:A:143:ILE:HD11	2.01	0.43
1:A:674:PRO:O	1:A:680:LEU:HD13	2.19	0.43
1:C:155:VAL:HG23	1:C:166:TYR:HB3	2.00	0.43
1:C:387:PHE:CZ	1:C:394:CYS:SG	3.12	0.43
1:D:281:ASN:CG	4:D:2811:NAG:C1	2.83	0.43
1:B:291:ALA:O	1:B:295:ILE:HG23	2.18	0.43
1:C:193:ILE:C	1:C:194:ILE:HD12	2.39	0.43
1:C:415:LEU:HB2	1:C:436:LEU:HD11	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:425:MET:CE	1:D:514:LEU:HD12	2.48	0.43
1:C:58:TYR:CD1	1:C:494:LEU:HD13	2.54	0.43
1:C:415:LEU:C	1:C:415:LEU:HD13	2.39	0.43
1:A:90:LEU:HD21	1:A:114:ILE:HD13	2.01	0.42
1:B:723:LEU:CD2	1:B:728:VAL:HG11	2.48	0.42
1:B:741:GLY:O	1:B:742:ILE:C	2.55	0.42
1:A:190:LYS:HE2	1:A:193:ILE:HD12	2.00	0.42
1:C:761:GLN:NE2	1:D:761:GLN:HE22	2.17	0.42
1:A:251:THR:OG1	1:B:237:GLU:OE2	2.25	0.42
1:D:54:ARG:HB2	1:D:54:ARG:NH1	2.35	0.42
1:D:60:LEU:HD13	1:D:68:TYR:HB2	2.02	0.42
1:A:499:ALA:O	1:A:503:MET:HE3	2.20	0.42
1:C:129:THR:HG23	1:C:151:ASN:HA	2.02	0.42
1:C:413:ASP:OD1	1:C:413:ASP:N	2.52	0.42
1:D:493:VAL:HG11	1:D:496:ASP:HB3	2.01	0.42
1:B:148:ILE:HG23	1:B:149:PRO:HD2	2.02	0.42
1:C:72:GLN:CB	1:C:77:LEU:HD11	2.43	0.42
1:A:513:LYS:O	1:A:527:GLN:HA	2.20	0.42
1:C:236:ILE:HD12	1:D:249:PRO:HD2	2.00	0.42
1:D:415:LEU:HD23	1:D:415:LEU:C	2.40	0.42
1:A:471:ARG:HG3	1:A:480:TYR:CE1	2.55	0.42
1:B:157:TRP:CZ3	1:B:164:LEU:HD13	2.54	0.42
1:B:295:ILE:HD11	1:B:317:ARG:NH1	2.35	0.42
1:C:751:ILE:HG23	1:C:752:TYR:N	2.35	0.42
1:B:213:ALA:HB1	1:B:226:ALA:HB3	2.01	0.42
1:B:73:GLU:C	1:B:75:ASN:H	2.22	0.41
1:B:471:ARG:CG	1:B:480:TYR:CE1	3.02	0.41
1:C:703:ILE:HA	1:C:733:MET:O	2.20	0.41
1:D:90:LEU:HD21	1:D:95:PHE:HE2	1.84	0.41
1:D:134:ILE:HD11	1:D:164:LEU:CD1	2.50	0.41
1:A:236:ILE:HD13	1:A:712:HIS:ND1	2.35	0.41
1:A:438:ASP:OD2	1:A:440:THR:HB	2.20	0.41
1:B:76:ILE:HD12	1:B:90:LEU:CD2	2.50	0.41
1:C:165:ALA:HB2	1:C:216:TRP:CZ2	2.55	0.41
1:C:606:GLN:O	1:C:609:ALA:HB3	2.21	0.41
1:A:72:GLN:O	1:A:74:ASN:N	2.52	0.41
1:D:651:ILE:HD13	1:D:755:MET:HG2	2.00	0.41
1:A:658:ARG:CB	1:A:687:THR:HG22	2.47	0.41
1:B:109:PRO:HG3	1:B:158:SER:O	2.20	0.41
1:C:420:ASN:ND2	1:C:426:PRO:HA	2.35	0.41
1:D:70:TYR:HB3	1:D:79:PHE:CE1	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:65:ASP:OD2	1:B:464:GLU:N	2.47	0.41
1:B:397:ILE:HG22	1:B:439:TYR:CZ	2.56	0.41
1:C:62:TRP:CD2	1:C:462:SER:HA	2.56	0.41
1:B:331:ASP:HB3	1:B:334:SER:HB3	2.03	0.41
1:B:751:ILE:HG12	1:B:755:MET:HE2	2.01	0.41
1:C:305:TRP:CZ2	1:C:311:ILE:HD12	2.55	0.41
1:D:79:PHE:HA	1:D:86:SER:CB	2.50	0.41
1:D:287:ILE:CG2	1:D:339:CYS:SG	3.09	0.41
1:B:215:TRP:HB2	1:B:224:ALA:HB3	2.03	0.41
1:A:208:PHE:O	1:A:209:SER:C	2.59	0.40
1:B:308:GLN:HA	1:B:308:GLN:OE1	2.20	0.40
1:C:407:ILE:CG2	1:C:415:LEU:HD21	2.47	0.40
1:D:115:LEU:HD21	1:D:155:VAL:HG11	2.02	0.40
1:A:490:GLY:O	1:A:491:LEU:C	2.60	0.40
1:B:435:GLN:NE2	1:B:437:SER:OG	2.50	0.40
1:C:454:CYS:HB3	1:C:457:TYR:CZ	2.56	0.40
1:D:303:VAL:HG22	1:D:313:LEU:CD2	2.52	0.40
1:B:669:ARG:HD2	1:B:670:TYR:CZ	2.56	0.40
1:B:708:ASP:OD1	1:B:740:HIS:HA	2.21	0.40
1:A:60:LEU:C	1:A:60:LEU:HD12	2.42	0.40
1:A:389:ILE:HD13	1:A:389:ILE:HA	1.89	0.40
1:A:397:ILE:HG22	1:A:439:TYR:CE2	2.56	0.40
1:B:70:TYR:HB3	1:B:79:PHE:CE1	2.56	0.40
1:B:509:MET:HE3	1:B:510:PRO:HD2	2.02	0.40
1:C:155:VAL:HG22	1:C:164:LEU:HD11	2.04	0.40
1:D:464:GLU:O	1:D:465:ALA:HB3	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	725/740 (98%)	677 (93%)	42 (6%)	6 (1%)	16	36
1	B	731/740 (99%)	691 (94%)	39 (5%)	1 (0%)	48	72
1	C	721/740 (97%)	673 (93%)	39 (5%)	9 (1%)	11	26
1	D	725/740 (98%)	674 (93%)	45 (6%)	6 (1%)	16	36
All	All	2902/2960 (98%)	2715 (94%)	165 (6%)	22 (1%)	16	36

All (22) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	72	GLN
1	A	73	GLU
1	C	90	LEU
1	C	93	SER
1	C	465	ALA
1	D	85	ASN
1	A	92	ASN
1	D	503	MET
1	A	491	LEU
1	C	393	ASP
1	D	51	ASN
1	D	72	GLN
1	A	714	GLN
1	B	96	ASP
1	C	73	GLU
1	C	463	LYS
1	D	389	ILE
1	C	82	GLU
1	D	150	ASN
1	C	109	PRO
1	A	88	VAL
1	C	742	ILE

### 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	651/662 (98%)	625 (96%)	26 (4%)	27	53
1	B	658/662 (99%)	631 (96%)	27 (4%)	26	52
1	C	650/662 (98%)	618 (95%)	32 (5%)	21	45
1	D	652/662 (98%)	634 (97%)	18 (3%)	38	66
All	All	2611/2648 (99%)	2508 (96%)	103 (4%)	27	54

All (103) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	66	HIS
1	A	75	ASN
1	A	87	SER
1	A	133	ASP
1	A	138	ASN
1	A	142	LEU
1	A	212	SER
1	A	283	THR
1	A	334	SER
1	A	340	LEU
1	A	360	SER
1	A	385	CYS
1	A	390	ASP
1	A	413	ASP
1	A	433	LYS
1	A	440	THR
1	A	443	THR
1	A	472	CYS
1	A	482	LEU
1	A	488	ASP
1	A	504	LEU
1	A	547	TYR
1	A	566	TYR
1	A	594	ILE
1	A	598	LEU
1	A	677	GLU
1	B	51	ASN
1	B	72	GLN
1	B	80	ASN
1	B	96	ASP
1	B	98	PHE
1	B	141	GLN
1	B	164	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	316	LEU
1	B	354	VAL
1	B	358	ARG
1	B	385	CYS
1	B	436	LEU
1	B	452	GLU
1	B	472	CYS
1	B	482	LEU
1	B	514	LEU
1	B	521	GLU
1	B	547	TYR
1	B	554	LYS
1	B	589	LYS
1	B	594	ILE
1	B	627	TRP
1	B	630	SER
1	B	665	VAL
1	B	677	GLU
1	B	688	VAL
1	B	704	HIS
1	C	67	GLU
1	C	72	GLN
1	C	74	ASN
1	C	77	LEU
1	C	83	TYR
1	C	87	SER
1	C	96	ASP
1	C	129	THR
1	C	145	GLU
1	C	198	ILE
1	C	239	SER
1	C	295	ILE
1	C	316	LEU
1	C	339	CYS
1	C	354	VAL
1	C	370	SER
1	C	385	CYS
1	C	390	ASP
1	C	413	ASP
1	C	415	LEU
1	C	440	THR
1	C	448	GLU

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Mol	Chain	Res	Type
1	C	473	SER
1	C	491	LEU
1	C	547	TYR
1	C	566	TYR
1	C	598	LEU
1	C	622	LYS
1	C	658	ARG
1	C	677	GLU
1	C	688	VAL
1	C	762	CYS
1	D	49	LEU
1	D	71	LYS
1	D	83	TYR
1	D	140	ARG
1	D	142	LEU
1	D	180	LEU
1	D	243	ASP
1	D	326	ASP
1	D	341	VAL
1	D	385	CYS
1	D	389	ILE
1	D	436	LEU
1	D	443	THR
1	D	482	LEU
1	D	501	ASP
1	D	504	LEU
1	D	547	TYR
1	D	685	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	112	GLN
1	A	119	ASN
1	A	281	ASN
1	B	119	ASN
1	B	150	ASN
1	B	169	ASN
1	B	229	ASN
1	B	281	ASN
1	B	314	GLN
1	B	748	HIS

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Mol	Chain	Res	Type
1	C	72	GLN
1	C	74	ASN
1	C	229	ASN
1	C	314	GLN
1	C	344	GLN
1	C	508	GLN
1	C	592	HIS
1	C	612	GLN
1	D	92	ASN
1	D	112	GLN
1	D	229	ASN
1	D	281	ASN
1	D	369	ASN
1	D	748	HIS
1	D	761	GLN

### 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](#)

2 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
2	NAG	E	1	2,1	14,14,15	0.45	0	17,19,21	1.35	2 (11%)
2	NAG	E	2	2	14,14,15	0.58	0	17,19,21	1.43	2 (11%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	E	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	2	NAG	O5-C1-C2	-3.29	106.21	111.29
2	E	1	NAG	C1-C2-N2	3.07	115.27	110.43
2	E	2	NAG	O7-C7-N2	2.35	126.13	121.98
2	E	1	NAG	O4-C4-C3	-2.18	105.25	110.38

There are no chirality outliers.

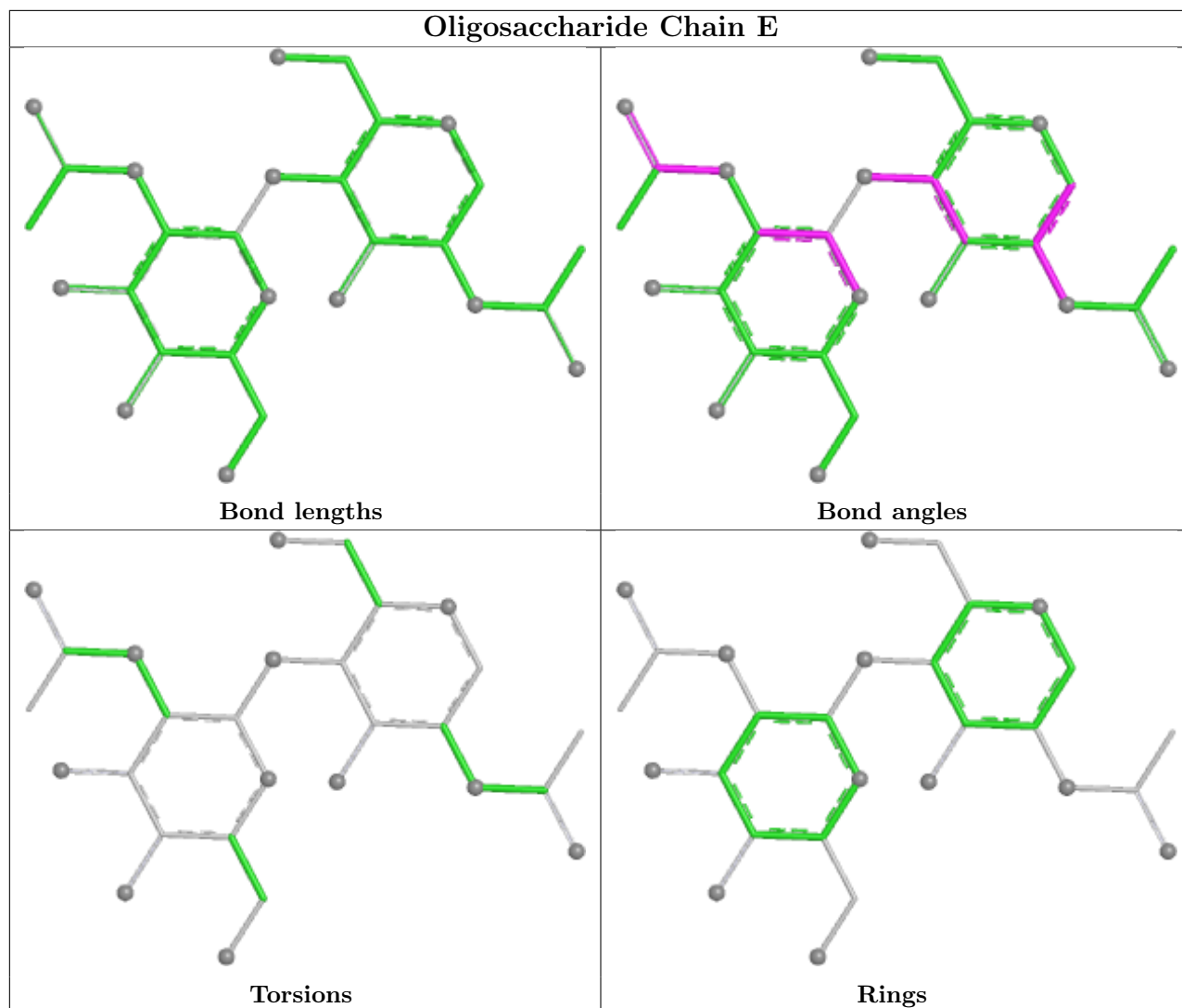
There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	1	NAG	5	0
2	E	2	NAG	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 oligosaccharide.



## 5.6 Ligand geometry [i](#)

19 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	2191	1	14,14,15	0.67	0	17,19,21	0.94	1 (5%)
3	LUI	B	800	-	29,30,30	0.84	1 (3%)	38,42,42	1.41	3 (7%)
4	NAG	B	2811	1	14,14,15	0.51	0	17,19,21	0.88	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	D	2291	1	14,14,15	0.51	0	17,19,21	2.53	6 (35%)
3	LUI	D	800	-	29,30,30	0.84	1 (3%)	38,42,42	1.47	4 (10%)
4	NAG	B	1501	1	14,14,15	0.59	0	17,19,21	1.25	1 (5%)
4	NAG	A	3211	1	14,14,15	0.59	0	17,19,21	0.85	0
4	NAG	D	1501	1	14,14,15	0.88	0	17,19,21	1.65	3 (17%)
4	NAG	A	2811	1	14,14,15	0.89	0	17,19,21	1.39	5 (29%)
4	NAG	A	2291	1	14,14,15	0.66	0	17,19,21	1.32	2 (11%)
4	NAG	B	2291	1	14,14,15	0.51	0	17,19,21	1.09	1 (5%)
3	LUI	C	800	-	29,30,30	0.85	1 (3%)	38,42,42	1.33	3 (7%)
3	LUI	A	800	-	29,30,30	0.86	2 (6%)	38,42,42	1.36	4 (10%)
4	NAG	D	2811	1	14,14,15	0.87	0	17,19,21	1.98	4 (23%)
4	NAG	B	3211	1	14,14,15	0.72	0	17,19,21	1.32	1 (5%)
4	NAG	A	2292	-	14,14,15	0.66	0	17,19,21	1.22	2 (11%)
4	NAG	D	2191	1	14,14,15	0.61	0	17,19,21	1.06	1 (5%)
4	NAG	A	1501	1	14,14,15	0.68	0	17,19,21	2.04	5 (29%)
4	NAG	B	901	1	14,14,15	0.79	0	17,19,21	2.14	4 (23%)

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	2191	1	-	0/6/23/26	0/1/1/1
3	LUI	B	800	-	-	1/13/15/15	0/3/3/3
4	NAG	B	2811	1	-	2/6/23/26	0/1/1/1
4	NAG	D	2291	1	-	2/6/23/26	0/1/1/1
3	LUI	D	800	-	-	3/13/15/15	0/3/3/3
4	NAG	B	1501	1	-	2/6/23/26	0/1/1/1
4	NAG	A	3211	1	-	0/6/23/26	0/1/1/1
4	NAG	D	1501	1	-	3/6/23/26	0/1/1/1
4	NAG	A	2811	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2291	1	-	1/6/23/26	0/1/1/1
4	NAG	B	2291	1	-	0/6/23/26	0/1/1/1
3	LUI	C	800	-	-	2/13/15/15	0/3/3/3
3	LUI	A	800	-	-	4/13/15/15	0/3/3/3
4	NAG	D	2811	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	B	3211	1	-	2/6/23/26	0/1/1/1
4	NAG	A	2292	-	-	2/6/23/26	0/1/1/1
4	NAG	D	2191	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1501	1	-	3/6/23/26	0/1/1/1
4	NAG	B	901	1	-	1/6/23/26	0/1/1/1

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	800	LUI	C7-N8	-2.54	1.34	1.40
3	B	800	LUI	C7-N8	-2.28	1.35	1.40
3	A	800	LUI	C9-N8	-2.23	1.35	1.39
3	C	800	LUI	C7-N8	-2.21	1.35	1.40
3	D	800	LUI	C7-N8	-2.15	1.35	1.40

All (50) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	2291	NAG	C1-O5-C5	7.19	121.82	112.19
3	B	800	LUI	C2-C7-N8	5.02	122.62	115.26
3	D	800	LUI	C2-C7-N8	5.01	122.60	115.26
3	A	800	LUI	C2-C7-N8	4.86	122.38	115.26
3	C	800	LUI	C2-C7-N8	4.74	122.20	115.26
4	B	901	NAG	C4-C3-C2	4.71	117.92	111.02
4	D	2291	NAG	O5-C1-C2	4.63	118.45	111.29
4	D	2811	NAG	O5-C1-C2	4.51	118.27	111.29
3	C	800	LUI	C25-O24-C5	4.46	125.62	117.63
4	B	901	NAG	C1-O5-C5	4.43	118.13	112.19
4	A	1501	NAG	C1-C2-N2	4.35	117.29	110.43
4	D	2811	NAG	C1-C2-N2	-4.16	103.89	110.43
4	B	3211	NAG	C4-C3-C2	4.14	117.08	111.02
4	A	1501	NAG	O5-C1-C2	-3.78	105.44	111.29
4	A	2291	NAG	C3-C4-C5	3.60	116.75	110.23
4	A	1501	NAG	C2-N2-C7	3.41	127.47	122.90
4	B	1501	NAG	C1-O5-C5	3.39	116.73	112.19
4	D	2291	NAG	C1-C2-N2	-3.38	105.11	110.43
4	D	1501	NAG	C2-N2-C7	3.37	127.41	122.90
3	D	800	LUI	C12-C11-C10	-3.33	115.18	120.91
4	D	2811	NAG	C4-C3-C2	3.23	115.75	111.02
4	B	901	NAG	O5-C1-C2	3.19	116.23	111.29
3	B	800	LUI	C12-C11-C10	-3.16	115.47	120.91

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	1501	NAG	C1-C2-N2	3.07	115.27	110.43
3	D	800	LUI	C7-N8-C9	-3.03	120.43	123.68
3	A	800	LUI	C12-C11-C10	-3.01	115.72	120.91
4	A	2292	NAG	O5-C1-C2	-2.77	107.00	111.29
4	B	2291	NAG	C1-C2-N2	2.72	114.71	110.43
4	A	1501	NAG	C4-C3-C2	-2.69	107.07	111.02
4	B	901	NAG	O7-C7-C8	-2.69	117.27	122.05
4	A	2811	NAG	C3-C4-C5	2.66	115.05	110.23
3	B	800	LUI	C7-N8-C9	-2.60	120.89	123.68
4	A	1501	NAG	C1-O5-C5	2.53	115.58	112.19
3	A	800	LUI	C7-N8-C9	-2.46	121.05	123.68
4	A	2811	NAG	C1-C2-N2	-2.43	106.61	110.43
4	A	2811	NAG	C4-C3-C2	2.41	114.56	111.02
4	D	2291	NAG	C3-C4-C5	2.40	114.59	110.23
4	D	2811	NAG	C2-N2-C7	2.32	126.01	122.90
3	D	800	LUI	C16-C11-C10	2.30	124.86	120.91
4	A	2811	NAG	C1-O5-C5	2.25	115.21	112.19
4	A	2811	NAG	O5-C1-C2	2.24	114.75	111.29
4	D	2191	NAG	C2-N2-C7	2.22	125.88	122.90
4	D	1501	NAG	O4-C4-C5	2.21	114.77	109.32
4	A	2292	NAG	O7-C7-N2	2.17	125.81	121.98
4	A	2191	NAG	O5-C1-C2	-2.10	108.05	111.29
4	D	2291	NAG	O7-C7-N2	2.07	125.64	121.98
4	D	2291	NAG	O5-C5-C4	2.06	115.83	110.83
4	A	2291	NAG	C1-C2-N2	-2.05	107.20	110.43
3	C	800	LUI	C20-C19-N8	-2.05	109.40	112.38
3	A	800	LUI	C9-C17-N18	-2.03	108.62	113.12

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	800	LUI	O24-C25-C26-N27
4	A	1501	NAG	C3-C2-N2-C7
4	D	1501	NAG	C1-C2-N2-C7
4	B	2811	NAG	O5-C5-C6-O6
4	B	1501	NAG	O5-C5-C6-O6
4	D	1501	NAG	O5-C5-C6-O6
4	B	2811	NAG	C4-C5-C6-O6
4	B	1501	NAG	C4-C5-C6-O6
4	D	1501	NAG	C4-C5-C6-O6
4	A	2292	NAG	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
4	A	2292	NAG	O5-C5-C6-O6
4	D	2291	NAG	C4-C5-C6-O6
4	A	1501	NAG	C4-C5-C6-O6
4	A	2811	NAG	C4-C5-C6-O6
4	A	1501	NAG	O5-C5-C6-O6
3	A	800	LUI	N8-C19-C20-C21
4	A	2811	NAG	O5-C5-C6-O6
4	B	901	NAG	O5-C5-C6-O6
3	D	800	LUI	N8-C19-C20-C21
4	B	3211	NAG	O5-C5-C6-O6
3	A	800	LUI	N8-C19-C20-C22
4	D	2291	NAG	O5-C5-C6-O6
3	B	800	LUI	O24-C25-C26-O28
4	A	2291	NAG	C4-C5-C6-O6
3	D	800	LUI	N8-C19-C20-C22
3	C	800	LUI	O24-C25-C26-O28
4	B	3211	NAG	C4-C5-C6-O6
3	D	800	LUI	O24-C25-C26-O28
3	A	800	LUI	O24-C25-C26-O28
3	A	800	LUI	C4-C5-O24-C25

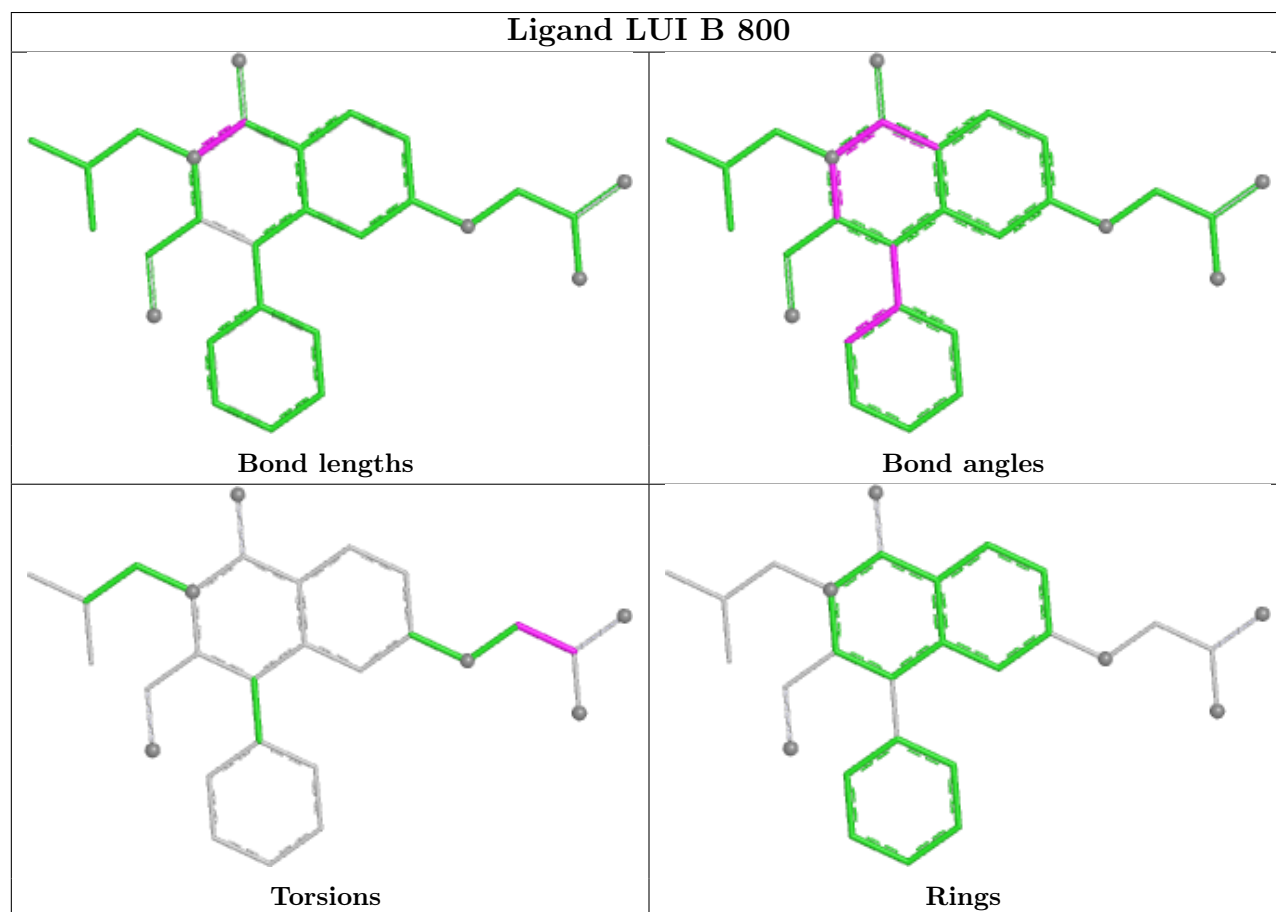
There are no ring outliers.

13 monomers are involved in 31 short contacts:

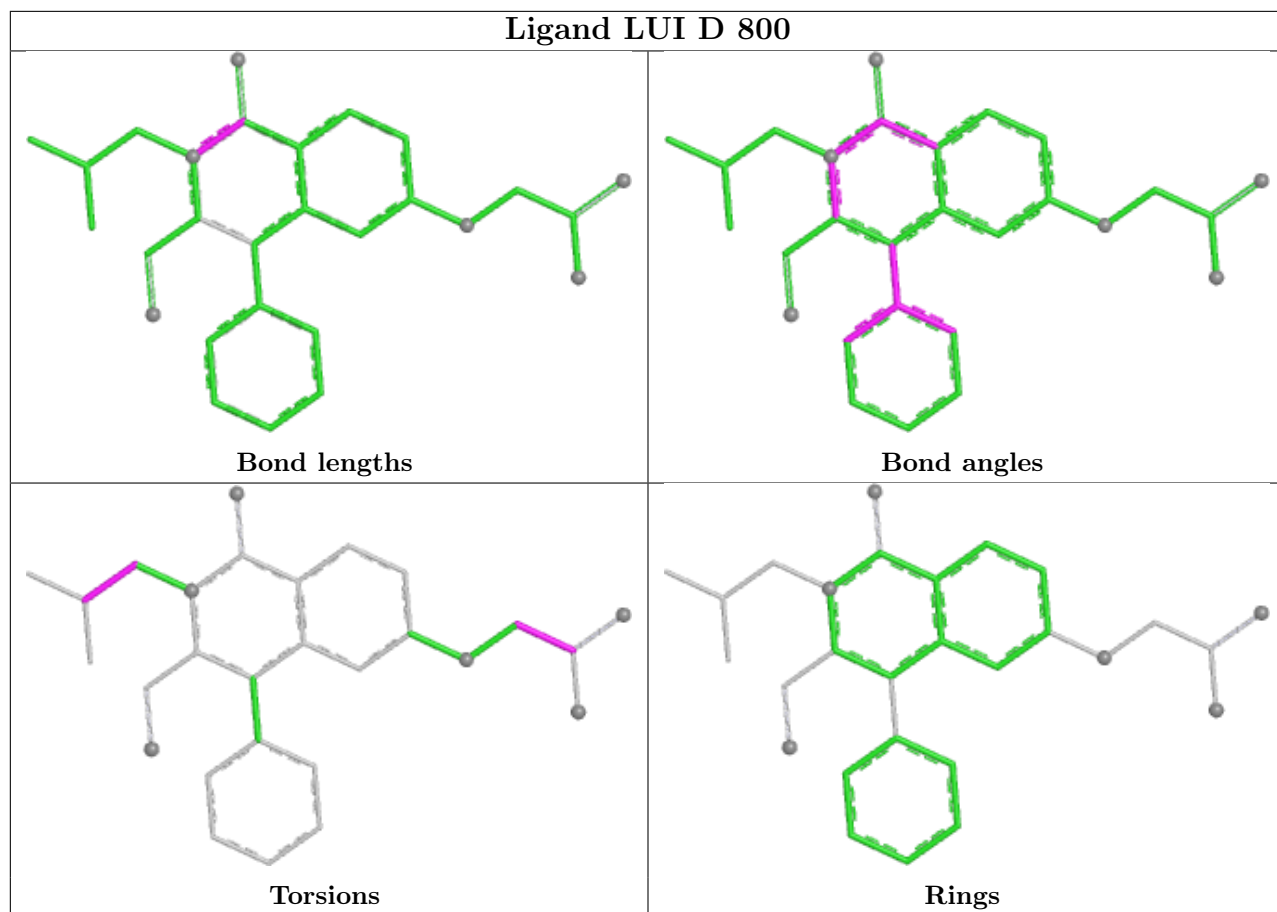
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	2811	NAG	2	0
4	D	2291	NAG	3	0
4	B	1501	NAG	4	0
4	A	3211	NAG	2	0
4	D	1501	NAG	1	0
4	A	2811	NAG	3	0
4	A	2291	NAG	4	0
4	B	2291	NAG	2	0
3	C	800	LUI	3	0
4	D	2811	NAG	3	0
4	A	2292	NAG	3	0
4	D	2191	NAG	2	0
4	B	901	NAG	2	0

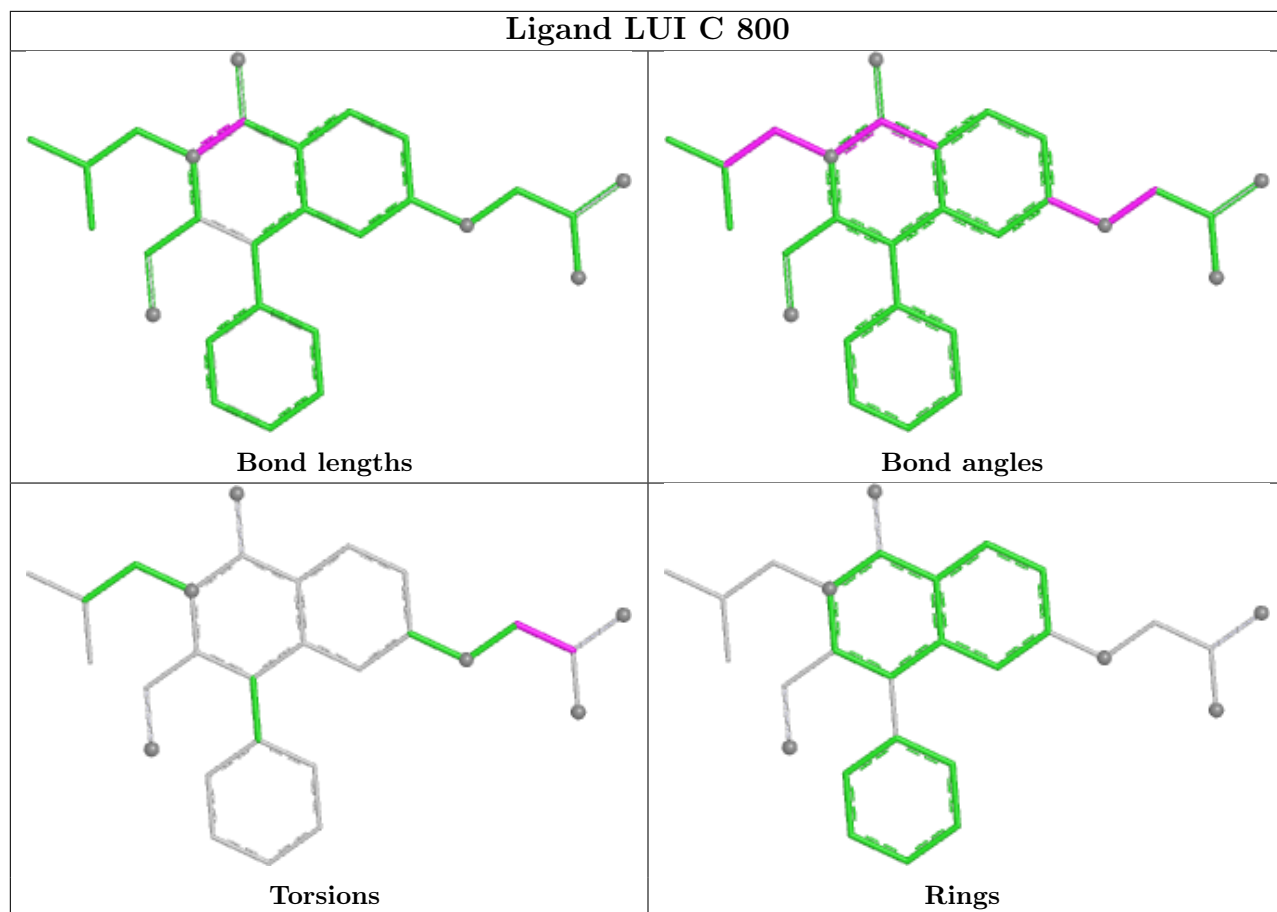
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

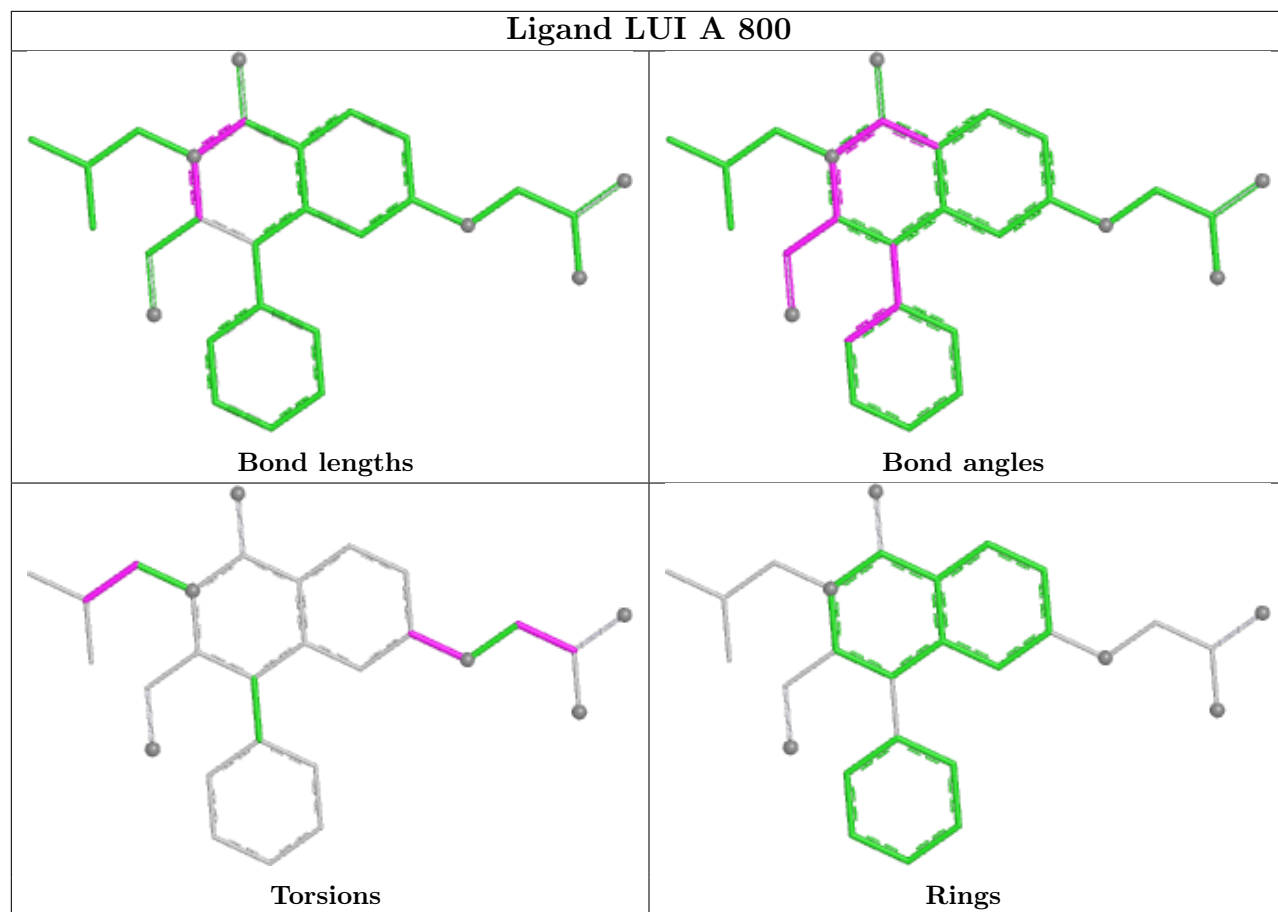
also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted 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	727/740 (98%)	-0.37	6 (0%) 82 82	21, 42, 79, 100	0
1	B	733/740 (99%)	-0.35	6 (0%) 82 82	24, 46, 69, 85	0
1	C	725/740 (97%)	0.01	16 (2%) 62 61	25, 61, 101, 122	0
1	D	727/740 (98%)	-0.26	4 (0%) 85 85	24, 47, 91, 117	0
All	All	2912/2960 (98%)	-0.24	32 (1%) 77 77	21, 48, 91, 122	0

All (32) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	95	PHE	3.7
1	C	83	TYR	3.3
1	C	348	MET	3.2
1	C	486	VAL	3.2
1	B	70	TYR	3.0
1	A	81	ALA	2.8
1	D	102	ILE	2.8
1	C	88	VAL	2.8
1	D	81	ALA	2.8
1	A	40	ARG	2.8
1	C	89	PHE	2.6
1	C	59	SER	2.4
1	B	338	ASN	2.4
1	C	105	TYR	2.4
1	A	74	ASN	2.4
1	A	85	ASN	2.3
1	C	279	VAL	2.3
1	B	83	TYR	2.2
1	C	135	TYR	2.2
1	B	486	VAL	2.2
1	D	89	PHE	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	90	LEU	2.2
1	C	176	ILE	2.1
1	B	81	ALA	2.1
1	A	73	GLU	2.1
1	C	73	GLU	2.1
1	B	95	PHE	2.1
1	D	72	GLN	2.1
1	C	330	TYR	2.1
1	C	140	ARG	2.1
1	A	93	SER	2.1
1	C	100	HIS	2.0

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

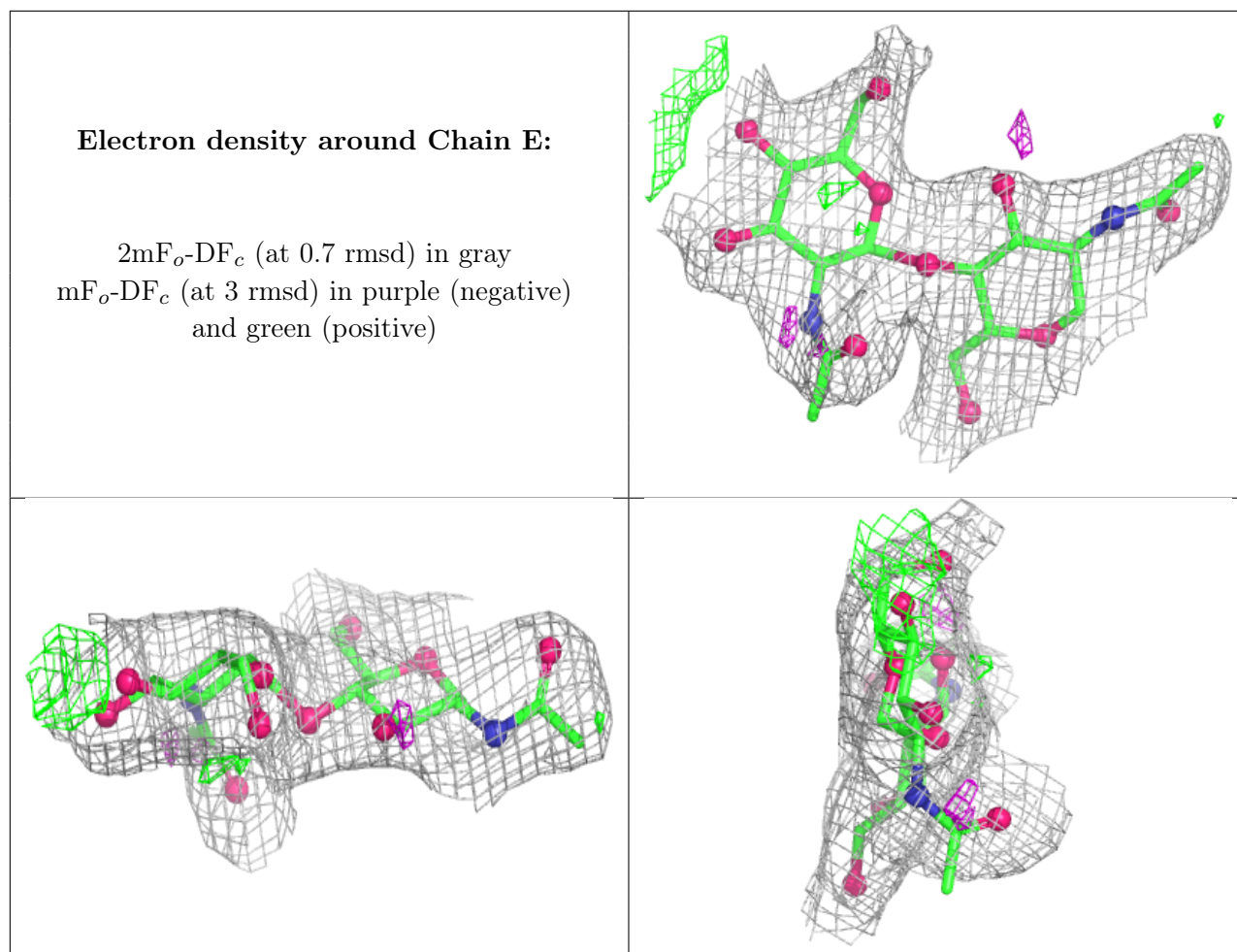
There are no non-standard protein/DNA/RNA residues in this entry.

## 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
2	NAG	E	2	14/15	0.79	0.12	55,55,56,56	0
2	NAG	E	1	14/15	0.90	0.08	42,44,46,46	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.



## 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.

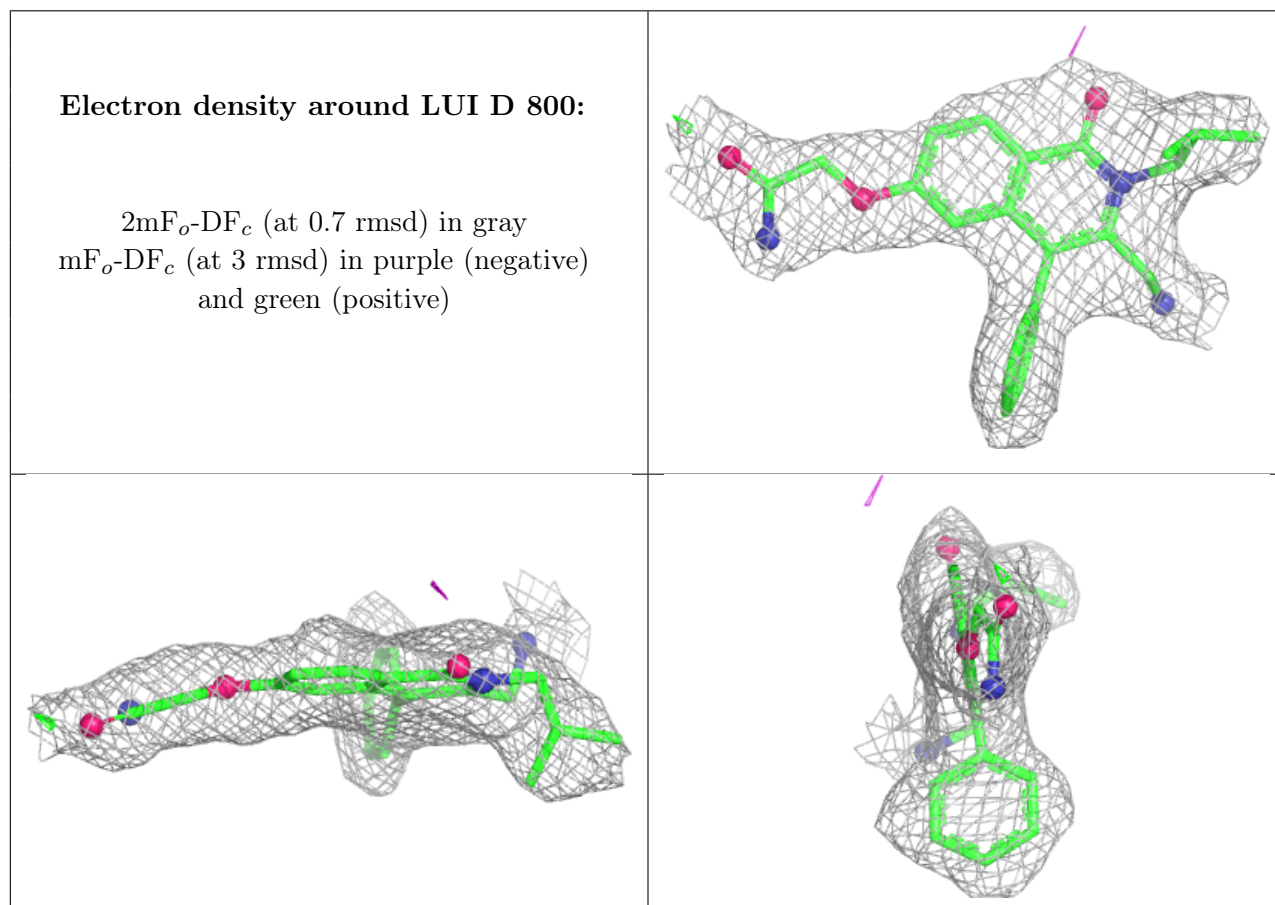
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	NAG	D	1501	14/15	0.68	0.13	51,53,54,54	0
4	NAG	A	2811	14/15	0.69	0.15	48,51,54,54	0
4	NAG	A	1501	14/15	0.70	0.13	53,55,57,59	0
4	NAG	B	901	14/15	0.73	0.12	53,54,55,55	0
4	NAG	B	3211	14/15	0.75	0.13	55,57,57,58	0
4	NAG	A	2191	14/15	0.77	0.12	53,56,59,60	0
4	NAG	D	2191	14/15	0.78	0.11	51,53,57,58	0
4	NAG	D	2811	14/15	0.78	0.12	52,53,54,54	0
4	NAG	B	1501	14/15	0.82	0.10	50,51,52,52	0
4	NAG	B	2811	14/15	0.82	0.11	51,52,55,55	0
4	NAG	A	2292	14/15	0.84	0.09	50,51,52,52	0

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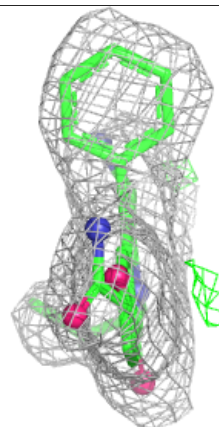
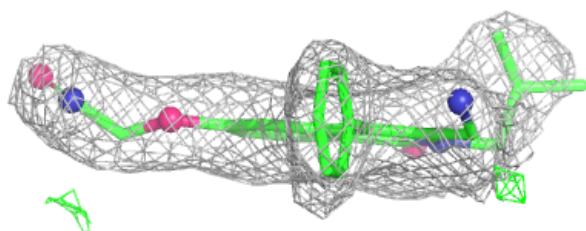
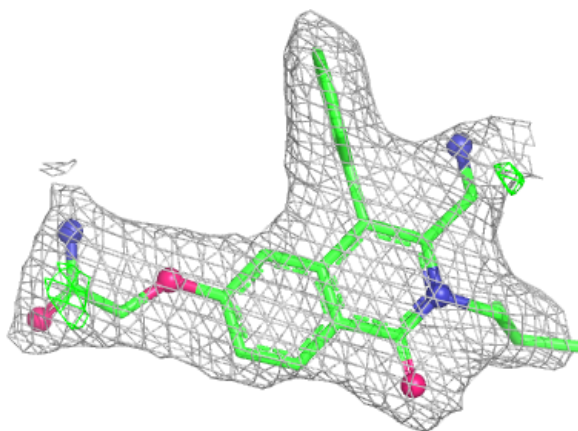
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	NAG	D	2291	14/15	0.86	0.10	50,51,53,54	0
4	NAG	B	2291	14/15	0.86	0.10	45,48,49,49	0
4	NAG	A	3211	14/15	0.87	0.11	49,52,54,55	0
4	NAG	A	2291	14/15	0.89	0.11	45,48,50,51	0
3	LUI	D	800	28/28	0.94	0.09	35,38,42,43	0
3	LUI	C	800	28/28	0.94	0.08	39,41,46,47	0
3	LUI	B	800	28/28	0.95	0.08	37,39,40,40	0
3	LUI	A	800	28/28	0.95	0.09	36,40,47,50	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.

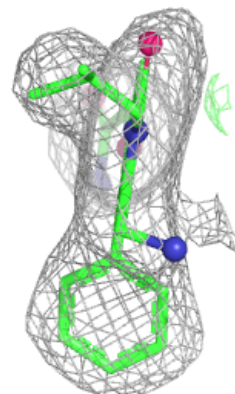
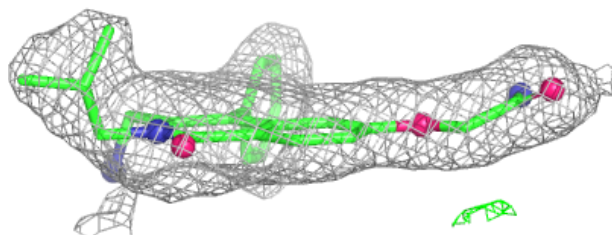
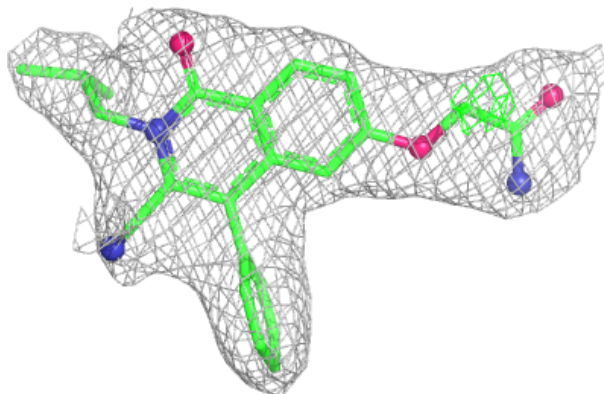


**Electron density around LUI C 800:**

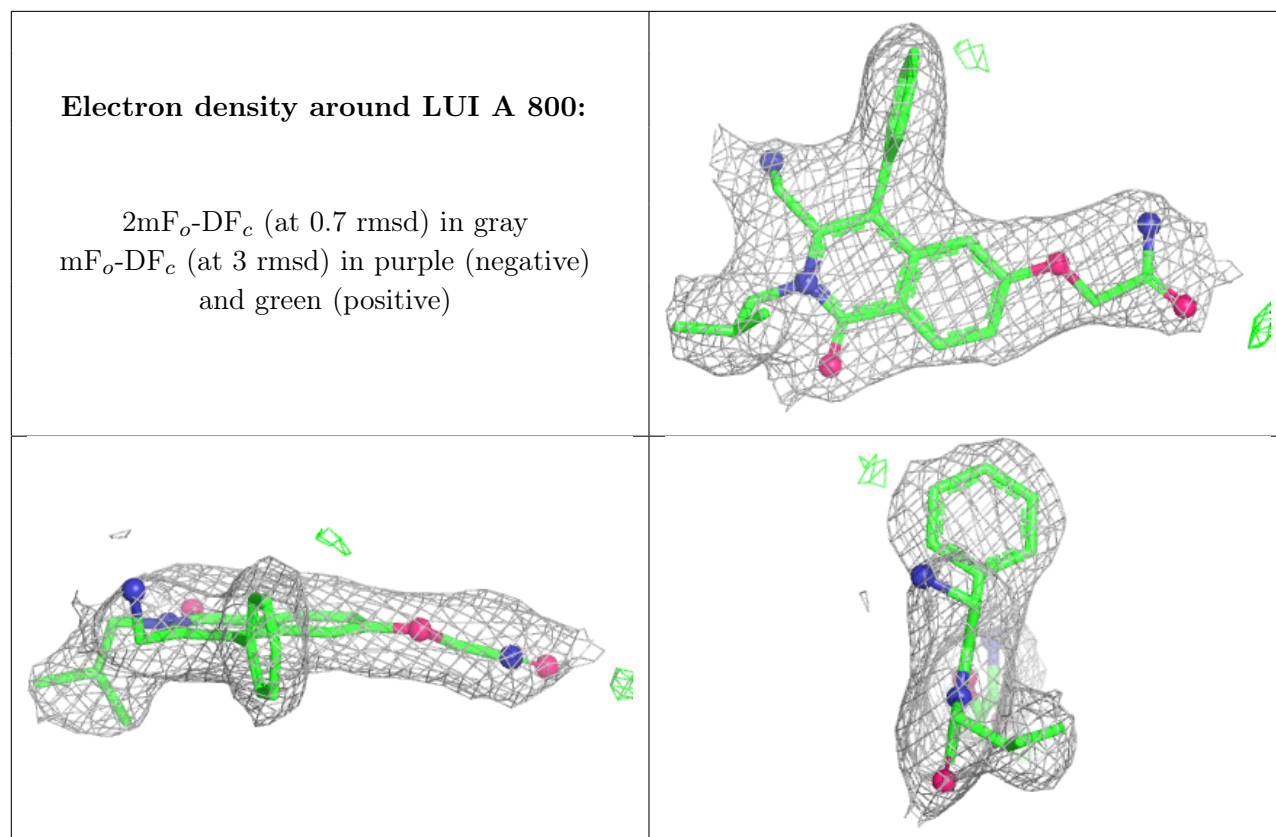
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around LUI B 800:**

$2mF_o-DF_c$  (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.