



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 10, 2022 – 08:10 PM JST

PDB ID : 7DVB
Title : A complex of a new GH20 enzyme from *Bacteroides thetaiotaomicron*
Authors : Zhang, Z.; He, Y.; Jin, Y.
Deposited on : 2021-01-13
Resolution : 2.05 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The 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 : 2.25
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) : 2.25

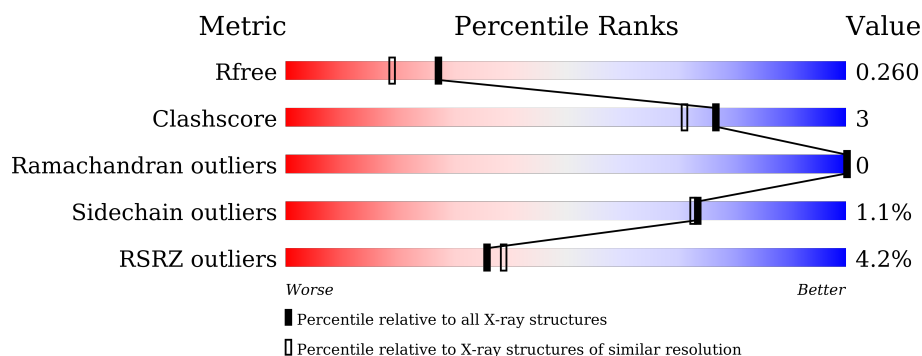
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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	1692 (2.04-2.04)
Clashscore	141614	1773 (2.04-2.04)
Ramachandran outliers	138981	1752 (2.04-2.04)
Sidechain outliers	138945	1752 (2.04-2.04)
RSRZ outliers	127900	1672 (2.04-2.04)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	534	<div> <div>4%</div> <div>89%</div> <div>6%</div> <div>5%</div> </div>
1	B	534	<div> <div>4%</div> <div>87%</div> <div>8%</div> <div>5%</div> </div>
1	C	534	<div> <div>4%</div> <div>90%</div> <div>7%</div> <div>.</div> </div>
1	D	534	<div> <div>4%</div> <div>88%</div> <div>9%</div> <div>.</div> </div>

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 17255 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 Beta-N-acetylhexosaminidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	507	Total	C	N	O	S	0	1	0
			4131	2658	704	753	16			
1	B	508	Total	C	N	O	S	0	0	0
			4131	2658	704	753	16			
1	C	519	Total	C	N	O	S	0	1	0
			4227	2716	721	774	16			
1	D	518	Total	C	N	O	S	0	1	0
			4221	2713	721	771	16			

There are 40 discrepancies between the modelled and reference sequences:

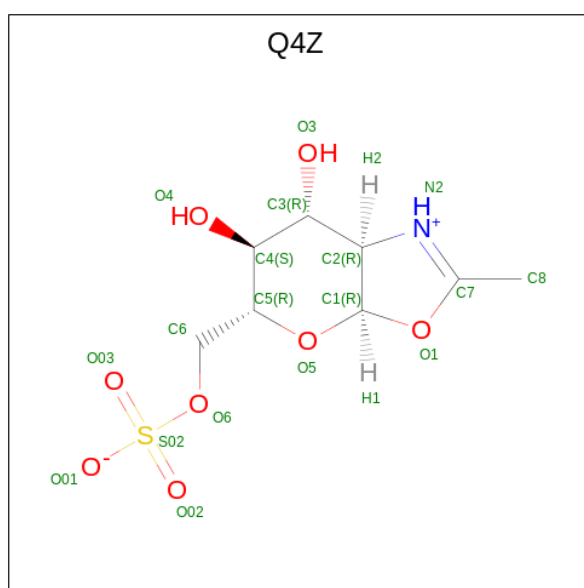
Chain	Residue	Modelled	Actual	Comment	Reference
A	21	MET	-	initiating methionine	UNP A0A0P0FIE8
A	335	ASN	ASP	engineered mutation	UNP A0A0P0FIE8
A	547	LEU	-	expression tag	UNP A0A0P0FIE8
A	548	GLU	-	expression tag	UNP A0A0P0FIE8
A	549	HIS	-	expression tag	UNP A0A0P0FIE8
A	550	HIS	-	expression tag	UNP A0A0P0FIE8
A	551	HIS	-	expression tag	UNP A0A0P0FIE8
A	552	HIS	-	expression tag	UNP A0A0P0FIE8
A	553	HIS	-	expression tag	UNP A0A0P0FIE8
A	554	HIS	-	expression tag	UNP A0A0P0FIE8
B	21	MET	-	initiating methionine	UNP A0A0P0FIE8
B	335	ASN	ASP	engineered mutation	UNP A0A0P0FIE8
B	547	LEU	-	expression tag	UNP A0A0P0FIE8
B	548	GLU	-	expression tag	UNP A0A0P0FIE8
B	549	HIS	-	expression tag	UNP A0A0P0FIE8
B	550	HIS	-	expression tag	UNP A0A0P0FIE8
B	551	HIS	-	expression tag	UNP A0A0P0FIE8
B	552	HIS	-	expression tag	UNP A0A0P0FIE8
B	553	HIS	-	expression tag	UNP A0A0P0FIE8
B	554	HIS	-	expression tag	UNP A0A0P0FIE8
C	21	MET	-	initiating methionine	UNP A0A0P0FIE8

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Chain	Residue	Modelled	Actual	Comment	Reference
C	335	ASN	ASP	engineered mutation	UNP A0A0P0FIE8
C	547	LEU	-	expression tag	UNP A0A0P0FIE8
C	548	GLU	-	expression tag	UNP A0A0P0FIE8
C	549	HIS	-	expression tag	UNP A0A0P0FIE8
C	550	HIS	-	expression tag	UNP A0A0P0FIE8
C	551	HIS	-	expression tag	UNP A0A0P0FIE8
C	552	HIS	-	expression tag	UNP A0A0P0FIE8
C	553	HIS	-	expression tag	UNP A0A0P0FIE8
C	554	HIS	-	expression tag	UNP A0A0P0FIE8
D	21	MET	-	initiating methionine	UNP A0A0P0FIE8
D	335	ASN	ASP	engineered mutation	UNP A0A0P0FIE8
D	547	LEU	-	expression tag	UNP A0A0P0FIE8
D	548	GLU	-	expression tag	UNP A0A0P0FIE8
D	549	HIS	-	expression tag	UNP A0A0P0FIE8
D	550	HIS	-	expression tag	UNP A0A0P0FIE8
D	551	HIS	-	expression tag	UNP A0A0P0FIE8
D	552	HIS	-	expression tag	UNP A0A0P0FIE8
D	553	HIS	-	expression tag	UNP A0A0P0FIE8
D	554	HIS	-	expression tag	UNP A0A0P0FIE8

- Molecule 2 is [(3 {a} {R}),5 {R},6 {S},7 {R},7 {a} {R})-2-methyl-6,7-bis(oxidanyl)-5,6,7,7 {a}-tetrahydro-3 {a} {H}-pyrano[3,2-d][1,3]oxazol-1-ium-5-yl)methyl sulfate (three-letter code: Q4Z) (formula: C₈H₁₃NO₈S) (labeled as "Ligand of Interest" by depositor).



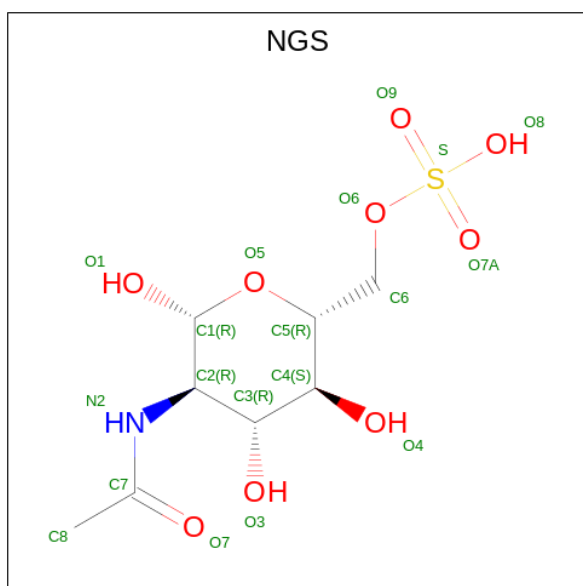
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			18	8	1	8	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	N	O	S	0	0
			18	8	1	8	1		
2	C	1	Total	C	N	O	S	0	0
			18	8	1	8	1		
2	D	1	Total	C	N	O	S	0	0
			18	8	1	8	1		

- Molecule 3 is 2-acetamido-2-deoxy-6-O-sulfo-beta-D-glucopyranose (three-letter code: NGS) (formula: $C_8H_{15}NO_9S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	D	1	Total	C	N	O	S	0	0
			19	8	1	9	1		

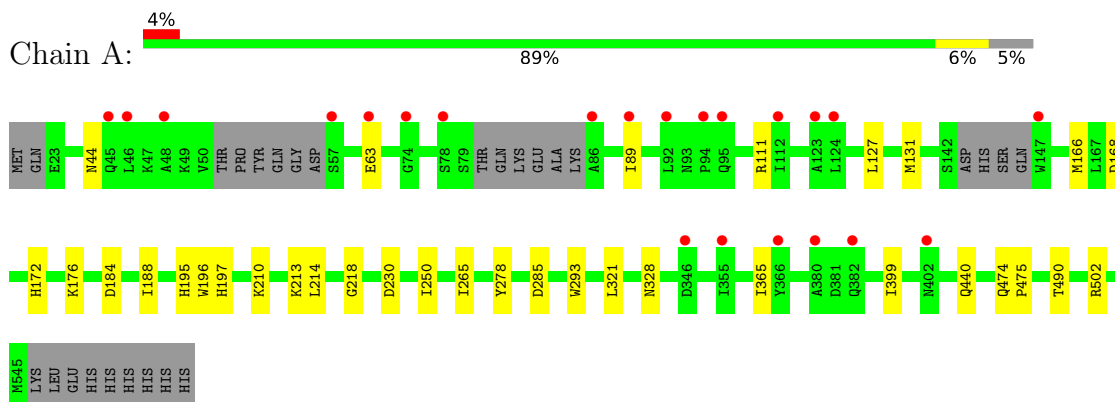
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	130	Total	O	0	0
			130	130		
4	B	125	Total	O	0	0
			125	125		
4	C	116	Total	O	0	0
			116	116		
4	D	83	Total	O	0	0
			83	83		

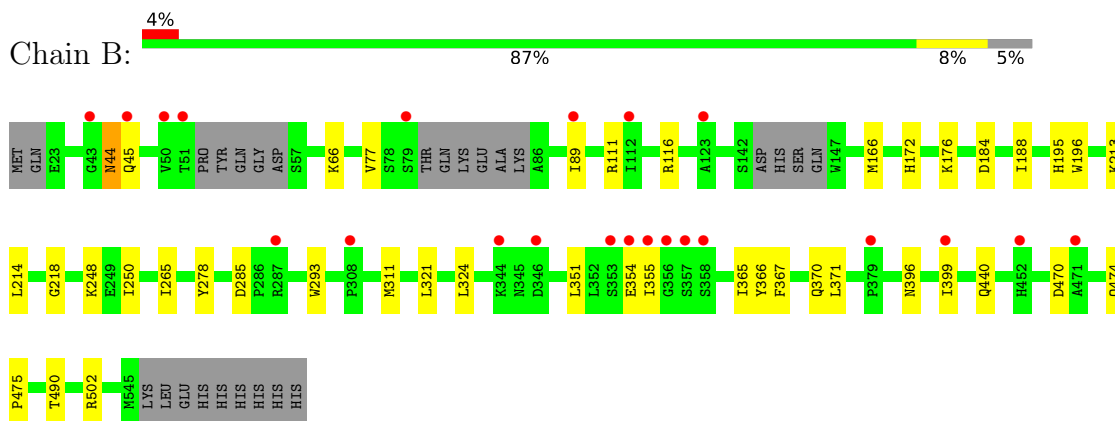
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

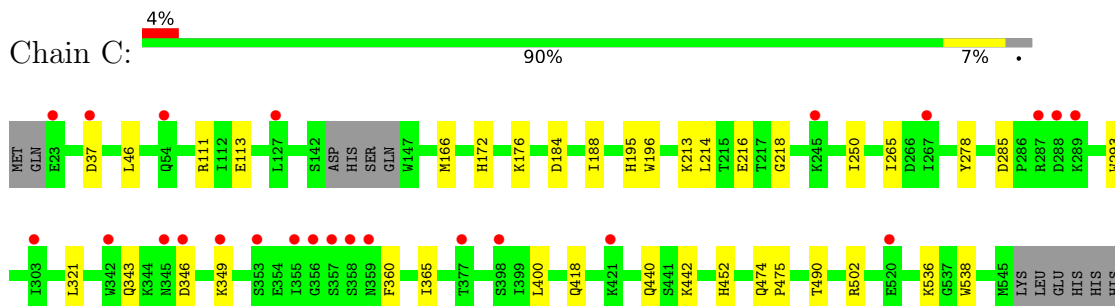
- Molecule 1: Beta-N-acetylhexosaminidase



- Molecule 1: Beta-N-acetylhexosaminidase

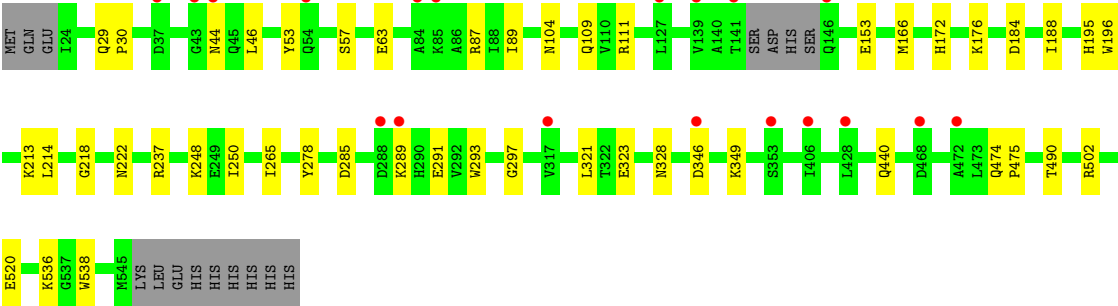
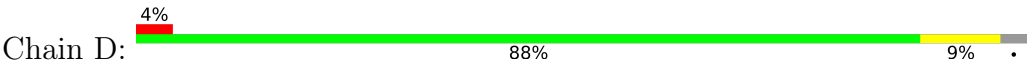


- Molecule 1: Beta-N-acetylhexosaminidase



HIS
HIS
HIS

● Molecule 1: Beta-N-acetylhexosaminidase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	82.03Å 67.00Å 192.80Å 90.00° 94.67° 90.00°	Depositor
Resolution (Å)	19.72 – 2.05 19.71 – 2.05	Depositor EDS
% Data completeness (in resolution range)	99.2 (19.72-2.05) 99.3 (19.71-2.05)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.94 (at 2.06Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.229 , 0.259 0.229 , 0.260	Depositor DCC
R_{free} test set	6601 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	34.6	Xtriage
Anisotropy	0.215	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 37.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	17255	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 42.26 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.0940e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical 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: Q4Z, NGS

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	0.27	0/4235	0.55	0/5727
1	B	0.27	0/4235	0.55	0/5727
1	C	0.27	0/4335	0.55	0/5865
1	D	0.27	0/4329	0.55	0/5857
All	All	0.27	0/17134	0.55	0/23176

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4131	0	4098	18	0
1	B	4131	0	4099	31	0
1	C	4227	0	4189	24	0
1	D	4221	0	4186	33	0
2	A	18	0	0	0	0
2	B	18	0	0	0	0
2	C	18	0	0	0	0
2	D	18	0	0	0	0
3	D	19	0	9	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	130	0	0	0	0
4	B	125	0	0	0	0
4	C	116	0	0	0	0
4	D	83	0	0	1	0
All	All	17255	0	16581	100	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 3.

All (100) 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:C:111:ARG:NH1	1:C:113:GLU:OE2	2.23	0.71
1:D:104[B]:ASN:OD1	1:D:153:GLU:HG3	1.90	0.70
1:C:265:ILE:CG1	1:C:321:LEU:HD11	2.27	0.64
1:D:265:ILE:CG1	1:D:321:LEU:HD11	2.26	0.64
1:B:367:PHE:HA	1:B:370:GLN:OE1	1.97	0.64
1:D:265:ILE:HG12	1:D:321:LEU:HD11	1.80	0.63
1:B:265:ILE:CG1	1:B:321:LEU:HD11	2.28	0.63
1:A:265:ILE:CG1	1:A:321:LEU:HD11	2.28	0.63
1:D:89:ILE:HD12	1:D:111:ARG:HH22	1.63	0.63
1:C:265:ILE:HG12	1:C:321:LEU:HD11	1.82	0.62
1:C:365:ILE:HG22	1:C:400:LEU:HD13	1.83	0.61
1:B:89:ILE:CG2	1:B:111:ARG:HG2	2.32	0.59
1:B:396:ASN:O	1:B:399:ILE:HG22	2.03	0.59
1:B:265:ILE:HG12	1:B:321:LEU:HD11	1.85	0.58
1:A:265:ILE:HG12	1:A:321:LEU:HD11	1.85	0.58
1:B:44:ASN:HB3	1:D:248:LYS:HD3	1.89	0.54
1:B:45:GLN:HB3	1:D:323:GLU:HG2	1.88	0.54
1:D:46:LEU:HD11	1:D:87:ARG:HH11	1.72	0.54
1:D:109:GLN:HE22	1:D:111:ARG:NH2	2.08	0.52
1:D:176:LYS:HG3	1:D:250:ILE:HD11	1.91	0.52
1:C:418:GLN:NE2	1:C:418:GLN:HA	2.24	0.51
1:D:346:ASP:HA	1:D:349:LYS:HE3	1.93	0.50
1:A:176:LYS:HG3	1:A:250:ILE:HD11	1.93	0.50
1:C:176:LYS:HG3	1:C:250:ILE:HD11	1.93	0.50
1:C:265:ILE:HG13	1:C:321:LEU:HD11	1.93	0.50
1:C:213:LYS:HA	1:C:216:GLU:HB2	1.94	0.49
1:B:265:ILE:HG13	1:B:321:LEU:HD11	1.94	0.49
1:D:297:GLY:HA2	3:D:602:NGS:O3	2.12	0.49
1:B:176:LYS:HG3	1:B:250:ILE:HD11	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:265:ILE:HG13	1:D:321:LEU:HD11	1.94	0.48
1:D:536:LYS:HE2	1:D:538:TRP:CZ2	2.49	0.48
1:A:265:ILE:HG13	1:A:321:LEU:HD11	1.94	0.47
1:D:29:GLN:OE1	1:D:30:PRO:HD2	2.14	0.47
1:B:351:LEU:HA	1:B:354:GLU:HG2	1.97	0.47
1:C:365:ILE:CG2	1:C:400:LEU:HD13	2.45	0.47
1:D:46:LEU:HD11	1:D:87:ARG:HD3	1.97	0.46
1:C:346:ASP:HA	1:C:349:LYS:HE3	1.97	0.46
1:B:365:ILE:HG22	1:B:399:ILE:CG2	2.45	0.46
1:B:470:ASP:HA	1:C:452:HIS:HD2	1.80	0.46
1:D:184:ASP:O	1:D:188:ILE:HG12	2.16	0.46
1:A:285:ASP:OD1	1:A:285:ASP:N	2.49	0.45
1:D:89:ILE:HD12	1:D:111:ARG:NH2	2.31	0.45
1:A:172:HIS:CE1	1:A:490[B]:THR:HG22	2.51	0.45
1:D:289:LYS:HD2	1:D:291:GLU:OE2	2.16	0.45
1:B:285:ASP:OD1	1:B:285:ASP:N	2.49	0.45
1:B:172:HIS:CE1	1:B:490:THR:HG22	2.52	0.45
1:D:172:HIS:CE1	1:D:490:THR:HG22	2.51	0.45
1:C:172:HIS:CE1	1:C:490:THR:HG22	2.52	0.45
1:C:184:ASP:O	1:C:188:ILE:HG12	2.17	0.45
1:C:285:ASP:N	1:C:285:ASP:OD1	2.48	0.44
1:A:184:ASP:O	1:A:188:ILE:HG12	2.17	0.44
1:D:109:GLN:HE22	1:D:111:ARG:HH21	1.65	0.44
1:B:470:ASP:HA	1:C:452:HIS:CD2	2.52	0.44
1:D:109:GLN:NE2	1:D:111:ARG:HH21	2.14	0.44
1:A:127:LEU:HD23	1:A:131:MET:HE2	1.98	0.44
1:B:366:TYR:HD1	1:B:399:ILE:HD11	1.83	0.44
1:B:45:GLN:CB	1:D:323:GLU:HG2	2.48	0.43
1:C:214:LEU:O	1:C:218:GLY:HA3	2.18	0.43
1:B:311:MET:HE3	1:B:371:LEU:CD2	2.48	0.43
1:D:166:MET:HG3	1:D:195:HIS:CG	2.54	0.43
1:D:53:TYR:CD2	1:D:57:SER:OG	2.72	0.43
1:B:166:MET:HG3	1:B:195:HIS:CG	2.54	0.43
1:C:343:GLN:HA	1:C:360:PHE:CE1	2.53	0.43
1:C:440:GLN:HB3	1:C:502:ARG:CZ	2.49	0.43
1:B:184:ASP:O	1:B:188:ILE:HG12	2.17	0.43
1:A:89:ILE:HG23	1:A:111:ARG:HG3	2.01	0.43
1:B:214:LEU:O	1:B:218:GLY:HA3	2.19	0.43
1:C:166:MET:HG3	1:C:195:HIS:CG	2.54	0.43
1:B:311:MET:CE	1:B:371:LEU:CD2	2.96	0.43
1:D:440:GLN:HB3	1:D:502:ARG:CZ	2.49	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:166:MET:HG3	1:A:195:HIS:CG	2.53	0.42
1:B:474:GLN:N	1:B:475:PRO:CD	2.82	0.42
1:D:285:ASP:N	1:D:285:ASP:OD1	2.49	0.42
1:A:365:ILE:HG22	1:A:399:ILE:CG1	2.50	0.42
1:B:355:ILE:HG22	1:B:355:ILE:O	2.19	0.42
1:D:213:LYS:HB2	1:D:278:TYR:CZ	2.54	0.42
1:D:474:GLN:N	1:D:475:PRO:CD	2.82	0.42
1:A:440:GLN:HB3	1:A:502:ARG:CZ	2.49	0.42
1:C:474:GLN:N	1:C:475:PRO:CD	2.83	0.42
1:D:214:LEU:O	1:D:218:GLY:HA3	2.19	0.42
1:A:213:LYS:HB2	1:A:278:TYR:CZ	2.54	0.42
1:B:66:LYS:HE3	1:B:77:VAL:O	2.20	0.42
1:D:520:GLU:HG2	4:D:774:HOH:O	2.19	0.42
1:A:214:LEU:O	1:A:218:GLY:HA3	2.20	0.42
1:B:213:LYS:HB2	1:B:278:TYR:CZ	2.55	0.42
1:B:248:LYS:HE3	1:B:324:LEU:HD23	2.01	0.42
1:B:440:GLN:HB3	1:B:502:ARG:CZ	2.50	0.42
1:C:213:LYS:HB2	1:C:278:TYR:CZ	2.54	0.42
1:B:311:MET:HE3	1:B:371:LEU:HD21	2.02	0.41
1:D:46:LEU:CD1	1:D:87:ARG:HH11	2.32	0.41
1:A:474:GLN:N	1:A:475:PRO:CD	2.83	0.41
1:D:166:MET:HA	1:D:195:HIS:O	2.21	0.41
1:A:230:ASP:OD2	1:C:442:LYS:HE3	2.21	0.41
1:C:166:MET:HA	1:C:195:HIS:O	2.21	0.41
1:B:365:ILE:HG22	1:B:399:ILE:HG23	2.01	0.41
1:B:166:MET:HA	1:B:195:HIS:O	2.20	0.41
1:C:536:LYS:HE2	1:C:538:TRP:CZ2	2.56	0.41
1:D:222:ASN:ND2	1:D:237:ARG:HD3	2.36	0.41
1:A:166:MET:HA	1:A:195:HIS:O	2.21	0.40
1:A:168:ASP:HA	1:A:197:HIS:HB3	2.04	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	500/534 (94%)	494 (99%)	6 (1%)	0	100	100
1	B	500/534 (94%)	494 (99%)	6 (1%)	0	100	100
1	C	516/534 (97%)	508 (98%)	8 (2%)	0	100	100
1	D	515/534 (96%)	507 (98%)	8 (2%)	0	100	100
All	All	2031/2136 (95%)	2003 (99%)	28 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	435/459 (95%)	429 (99%)	6 (1%)	67	65
1	B	435/459 (95%)	431 (99%)	4 (1%)	78	79
1	C	445/459 (97%)	441 (99%)	4 (1%)	78	79
1	D	444/459 (97%)	439 (99%)	5 (1%)	73	73
All	All	1759/1836 (96%)	1740 (99%)	19 (1%)	73	73

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	44	ASN
1	A	63	GLU
1	A	196	TRP
1	A	210	LYS
1	A	293	TRP
1	A	328	ASN
1	B	44	ASN
1	B	116	ARG
1	B	196	TRP
1	B	293	TRP

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Mol	Chain	Res	Type
1	C	37	ASP
1	C	46	LEU
1	C	196	TRP
1	C	293	TRP
1	D	44	ASN
1	D	63	GLU
1	D	196	TRP
1	D	293	TRP
1	D	328	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	29	GLN
1	A	440	GLN
1	B	418	GLN
1	C	29	GLN
1	C	70	GLN
1	C	385	GLN
1	C	418	GLN
1	C	422	GLN
1	C	452	HIS
1	D	109	GLN
1	D	222	ASN
1	D	312	GLN
1	D	382	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](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry

5 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	Q4Z	D	601	-	19,19,19	0.62	0	20,29,29	1.90	3 (15%)
2	Q4Z	C	601	-	19,19,19	0.64	1 (5%)	20,29,29	1.97	4 (20%)
2	Q4Z	A	601	-	19,19,19	0.49	0	20,29,29	1.99	3 (15%)
3	NGS	D	602	-	19,19,19	0.39	0	26,28,28	0.72	0
2	Q4Z	B	601	-	19,19,19	0.53	0	20,29,29	1.67	3 (15%)

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	Q4Z	D	601	-	-	0/6/34/34	0/2/2/2
2	Q4Z	C	601	-	-	1/6/34/34	0/2/2/2
2	Q4Z	A	601	-	-	1/6/34/34	0/2/2/2
3	NGS	D	602	-	-	0/10/30/30	0/1/1/1
2	Q4Z	B	601	-	-	0/6/34/34	0/2/2/2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	601	Q4Z	O6-S02	2.01	1.62	1.56

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	601	Q4Z	C2-N2-C7	5.63	110.27	106.46
2	A	601	Q4Z	C2-N2-C7	5.56	110.22	106.46
2	A	601	Q4Z	O1-C7-C8	5.27	119.73	114.90
2	D	601	Q4Z	C2-N2-C7	5.20	109.99	106.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	601	Q4Z	O1-C7-C8	4.96	119.44	114.90
2	D	601	Q4Z	O1-C7-C8	4.77	119.28	114.90
2	B	601	Q4Z	O1-C7-C8	4.44	118.97	114.90
2	B	601	Q4Z	C2-N2-C7	4.16	109.28	106.46
2	D	601	Q4Z	C1-O5-C5	3.24	120.05	113.69
2	C	601	Q4Z	C1-O5-C5	2.97	119.51	113.69
2	A	601	Q4Z	C1-O5-C5	2.80	119.18	113.69
2	B	601	Q4Z	C1-O5-C5	2.77	119.13	113.69
2	C	601	Q4Z	O6-C6-C5	2.04	111.42	107.62

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	Q4Z	O5-C5-C6-O6
2	C	601	Q4Z	O5-C5-C6-O6

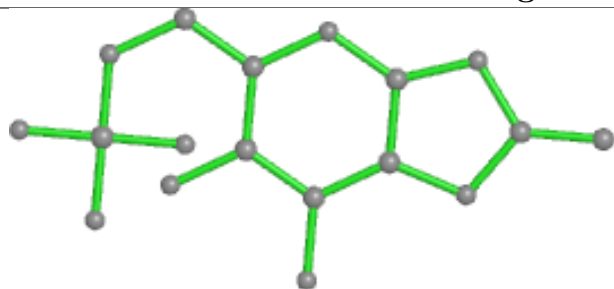
There are no ring outliers.

1 monomer is involved in 1 short contact:

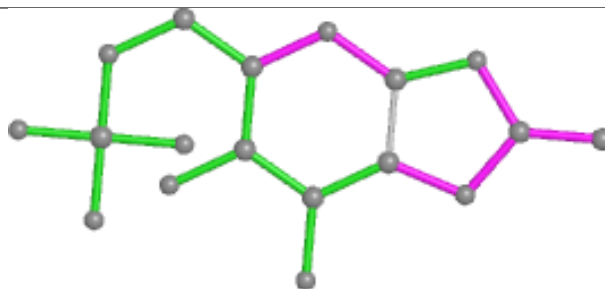
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	602	NGS	1	0

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

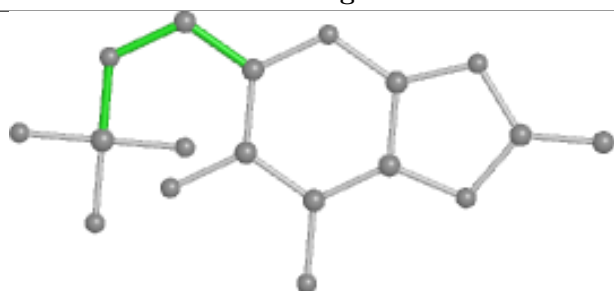
Ligand Q4Z D 601



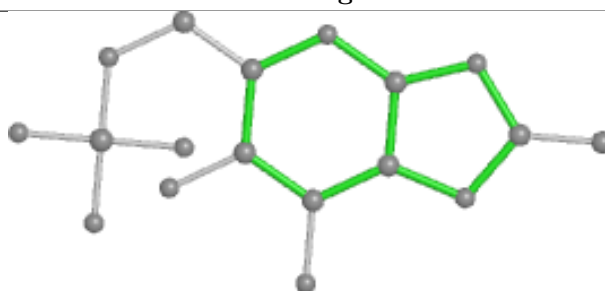
Bond lengths



Bond angles

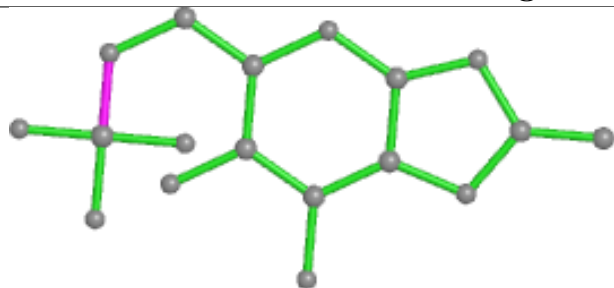


Torsions

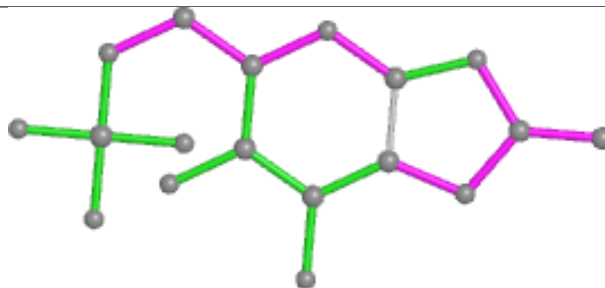


Rings

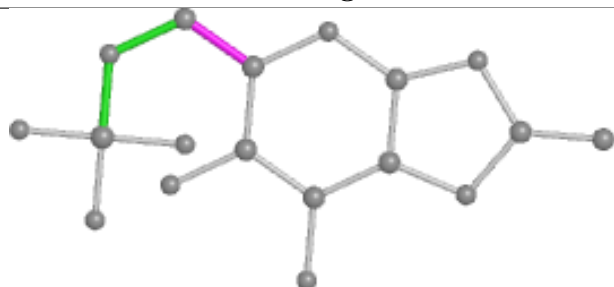
Ligand Q4Z C 601



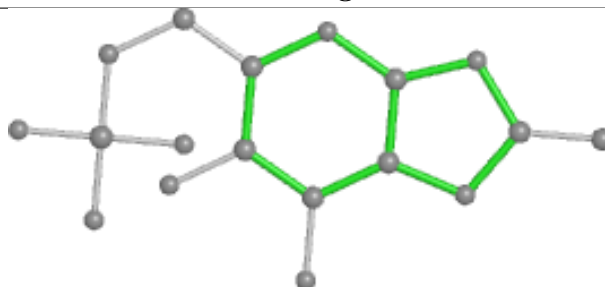
Bond lengths



Bond angles

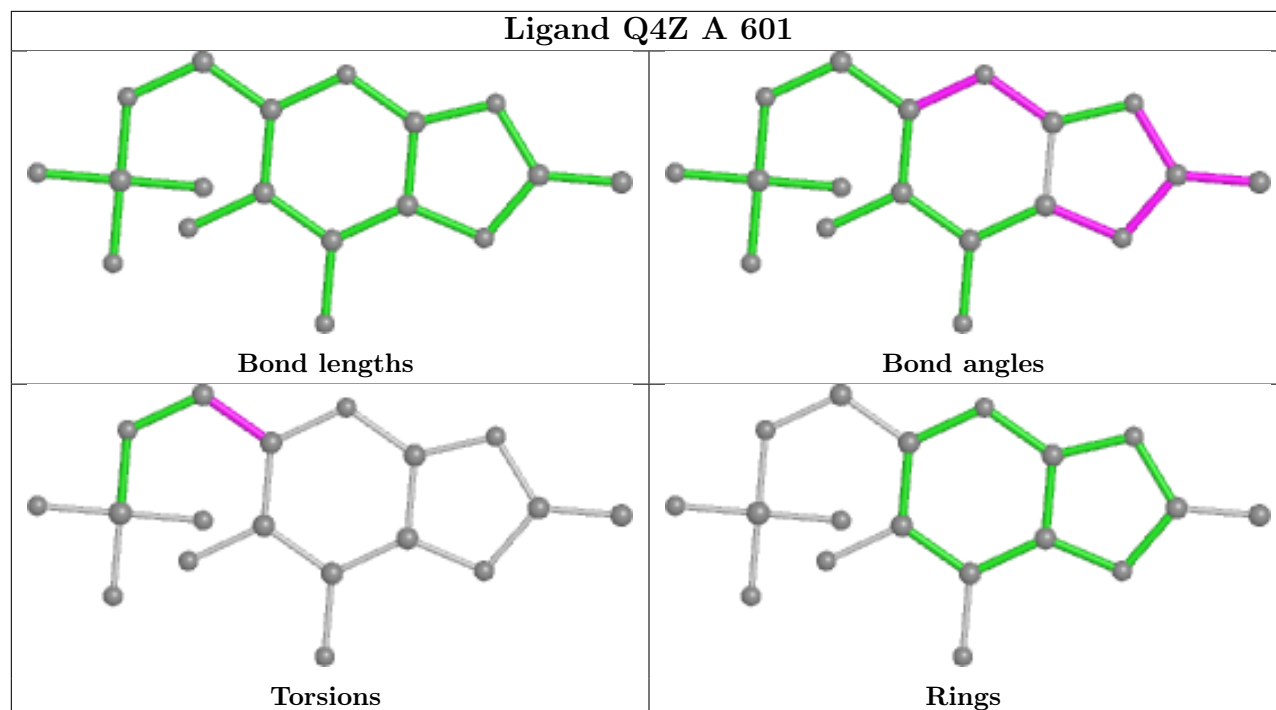


Torsions

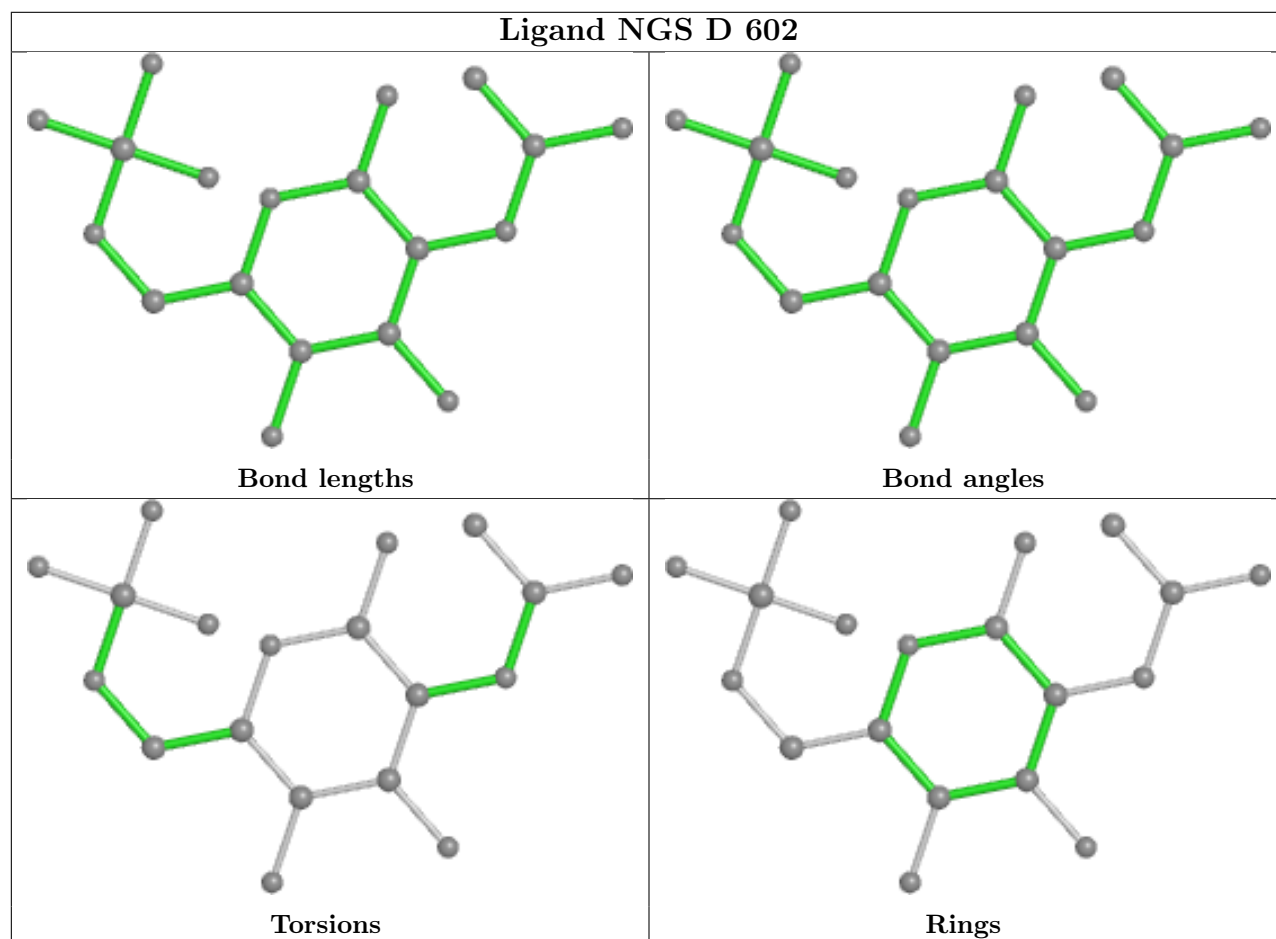


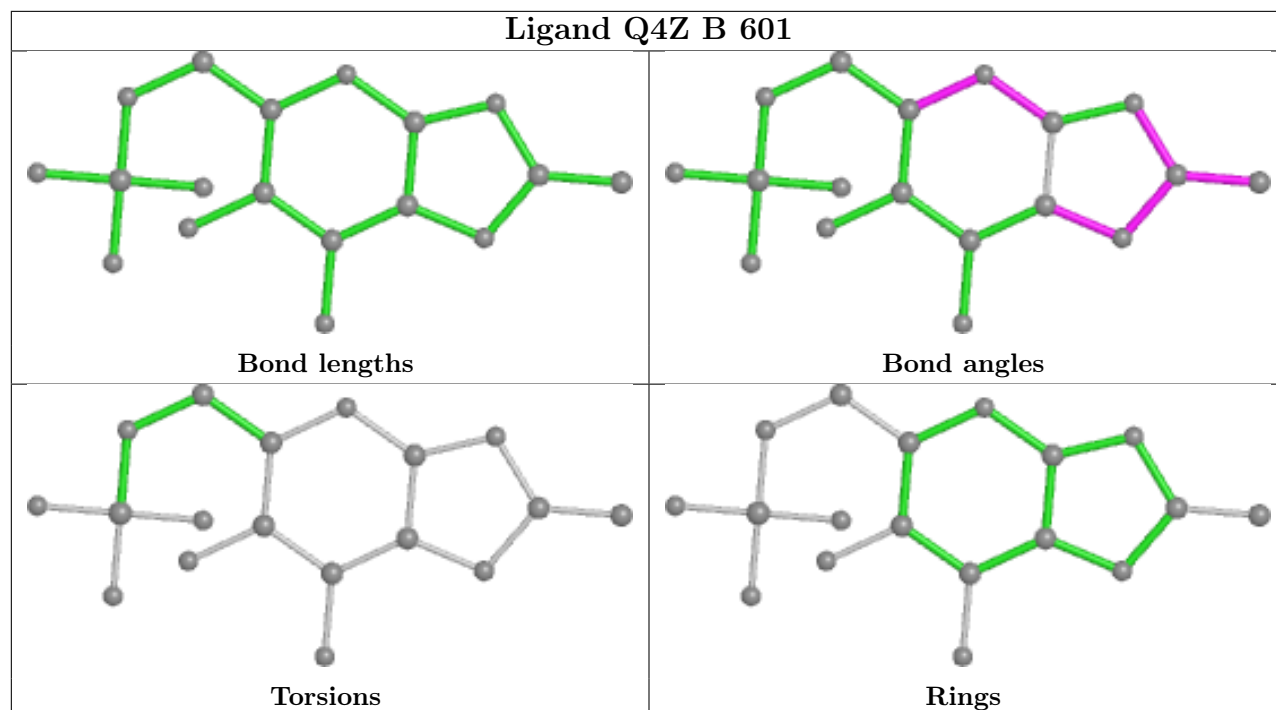
Rings

Ligand Q4Z A 601



Ligand NGS D 602





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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	507/534 (94%)	0.28	22 (4%) 35 38	20, 33, 59, 72	33 (6%)
1	B	508/534 (95%)	0.28	22 (4%) 35 38	20, 34, 58, 72	25 (4%)
1	C	519/534 (97%)	0.36	24 (4%) 32 35	22, 37, 60, 91	30 (5%)
1	D	518/534 (97%)	0.32	19 (3%) 41 45	23, 37, 58, 70	28 (5%)
All	All	2052/2136 (96%)	0.31	87 (4%) 36 39	20, 35, 58, 91	116 (5%)

All (87) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	358	SER	5.1
1	C	353	SER	5.1
1	B	355	ILE	4.9
1	C	54	GLN	4.8
1	B	356	GLY	4.3
1	D	43	GLY	3.7
1	A	89	ILE	3.7
1	C	288	ASP	3.6
1	C	37	ASP	3.6
1	C	357	SER	3.6
1	A	380	ALA	3.4
1	D	44	ASN	3.4
1	A	74	GLY	3.4
1	B	43	GLY	3.3
1	C	287	ARG	3.2
1	D	54	GLN	3.2
1	B	50	VAL	3.2
1	A	63	GLU	3.2
1	D	289	LYS	3.2
1	D	353	SER	3.1
1	A	366	TYR	3.1

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Mol	Chain	Res	Type	RSRZ
1	C	345	ASN	3.1
1	B	354	GLU	3.1
1	D	85	LYS	3.0
1	B	452	HIS	3.0
1	B	123	ALA	3.0
1	B	353	SER	3.0
1	C	289	LYS	3.0
1	A	147	TRP	2.8
1	A	124	LEU	2.8
1	B	51	THR	2.8
1	D	84	ALA	2.8
1	D	346	ASP	2.7
1	C	349	LYS	2.7
1	B	112	ILE	2.7
1	D	288	ASP	2.7
1	D	127	LEU	2.6
1	C	355	ILE	2.6
1	A	46	LEU	2.6
1	B	89	ILE	2.6
1	B	358	SER	2.6
1	A	92	LEU	2.6
1	A	382	GLN	2.6
1	B	346	ASP	2.6
1	B	399	ILE	2.6
1	C	127	LEU	2.6
1	B	357	SER	2.5
1	D	472	ALA	2.5
1	C	356	GLY	2.5
1	A	94	PRO	2.5
1	C	342	TRP	2.5
1	D	139	VAL	2.5
1	B	308	PRO	2.5
1	A	112	ILE	2.5
1	D	468	ASP	2.4
1	B	79	SER	2.4
1	C	23	GLU	2.4
1	A	355	ILE	2.4
1	C	303	ILE	2.4
1	C	359	ASN	2.4
1	C	245	LYS	2.3
1	A	95	GLN	2.3
1	A	86	ALA	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	45	GLN	2.3
1	C	398	SER	2.3
1	B	287	ARG	2.3
1	A	346	ASP	2.3
1	D	406	ILE	2.3
1	A	57	SER	2.2
1	A	48	ALA	2.2
1	A	123	ALA	2.2
1	C	346	ASP	2.2
1	D	37	ASP	2.2
1	D	317	VAL	2.2
1	A	402	ASN	2.1
1	C	421	LYS	2.1
1	B	471	ALA	2.1
1	C	520	GLU	2.1
1	D	141	THR	2.1
1	D	428	LEU	2.1
1	B	379	PRO	2.1
1	C	377	THR	2.1
1	D	146	GLN	2.1
1	B	344	LYS	2.1
1	A	45	GLN	2.0
1	A	78	SER	2.0
1	C	267	ILE	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](#)

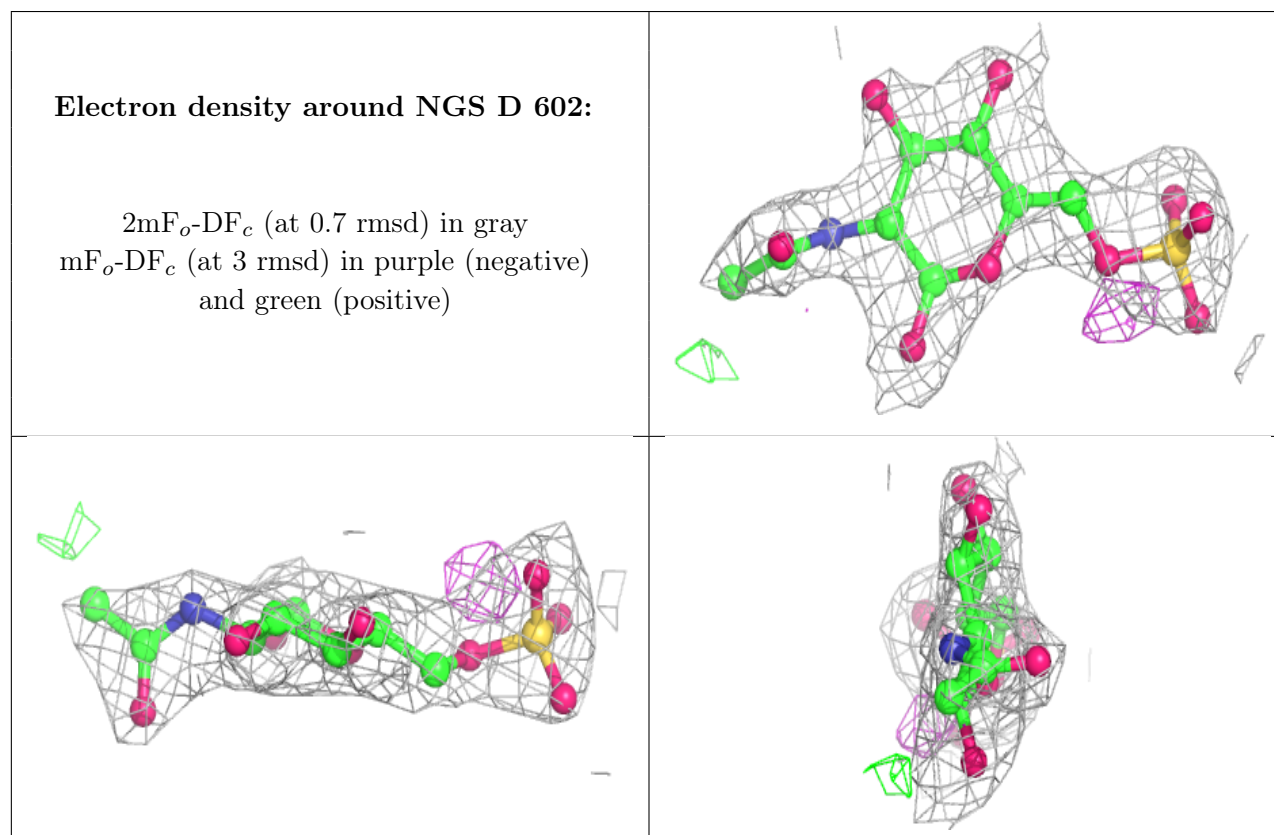
There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

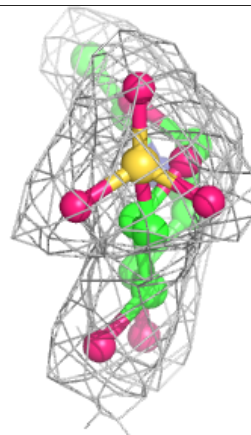
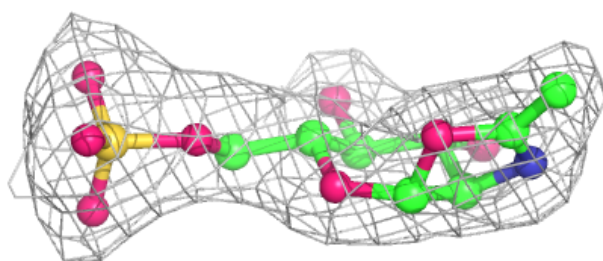
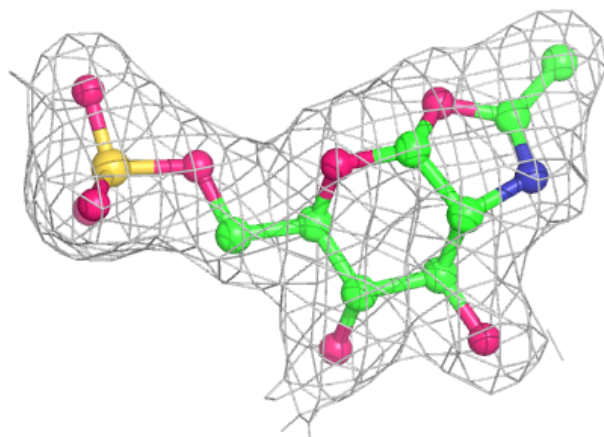
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	NGS	D	602	19/19	0.88	0.17	49,55,64,65	0
2	Q4Z	B	601	18/18	0.97	0.08	24,27,30,30	0
2	Q4Z	A	601	18/18	0.97	0.09	21,22,27,28	0
2	Q4Z	D	601	18/18	0.98	0.08	26,27,28,29	0
2	Q4Z	C	601	18/18	0.98	0.09	26,27,28,29	0

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.

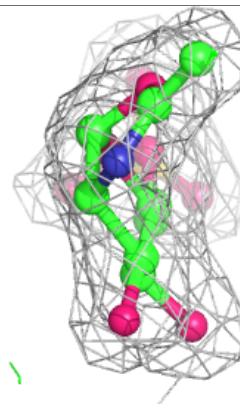
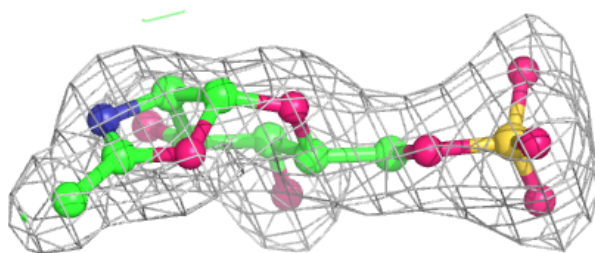
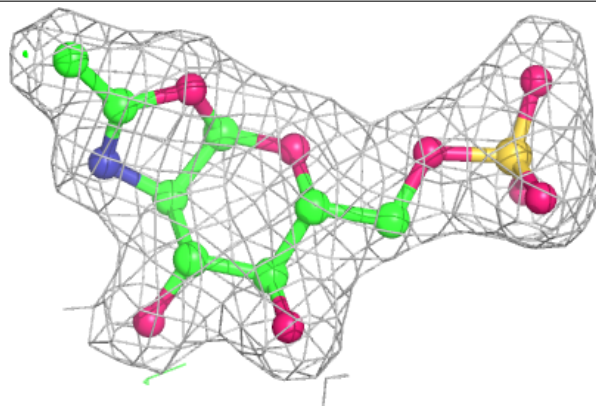


Electron density around Q4Z B 601:

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

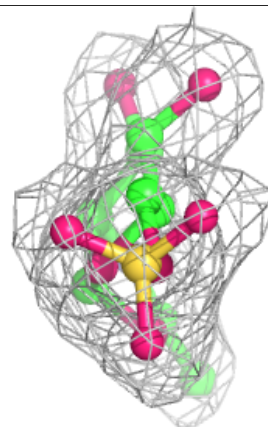
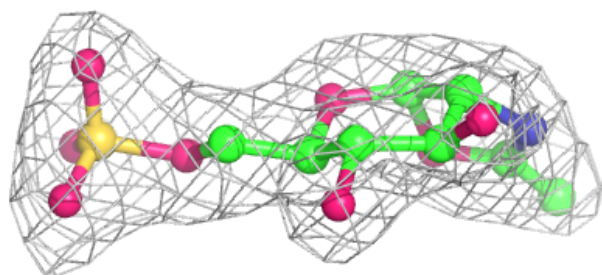
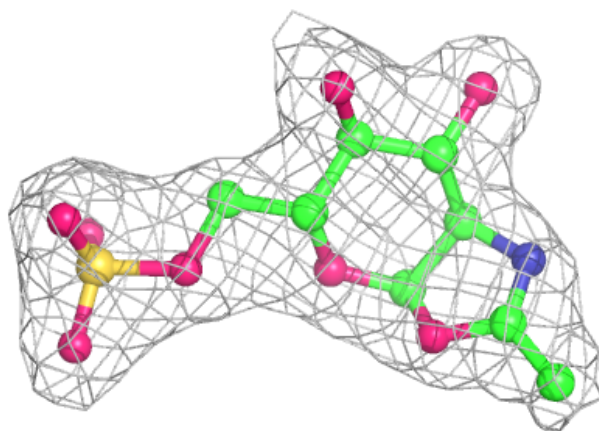
**Electron density around Q4Z A 601:**

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



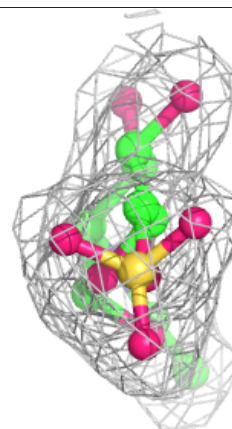
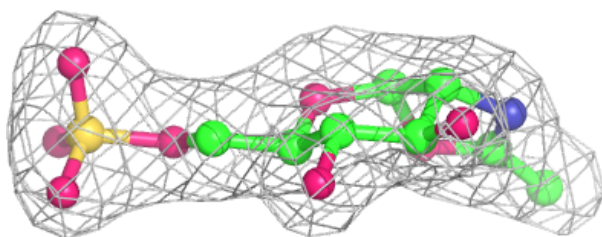
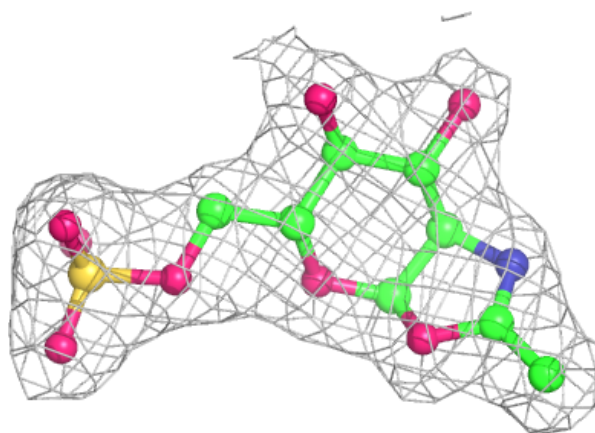
Electron density around Q4Z D 601:

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



Electron density around Q4Z C 601:

$2mF_o - DF_c$ (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.