



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 9, 2024 – 12:45 pm GMT

PDB ID : 8P3I
Title : Fusion hSlp2-a_Rab27A bound to covalent hit fragment IMP-1721
Authors : De Vita, E.; Brustur, D.; Tersa, M.; Petracca, R.; Morgan, R.M.L.; Lanyon-Hogg, T.; Norman, J.C.; Cota, E.; Tate, E.W.
Deposited on : 2023-05-17
Resolution : 2.00 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
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

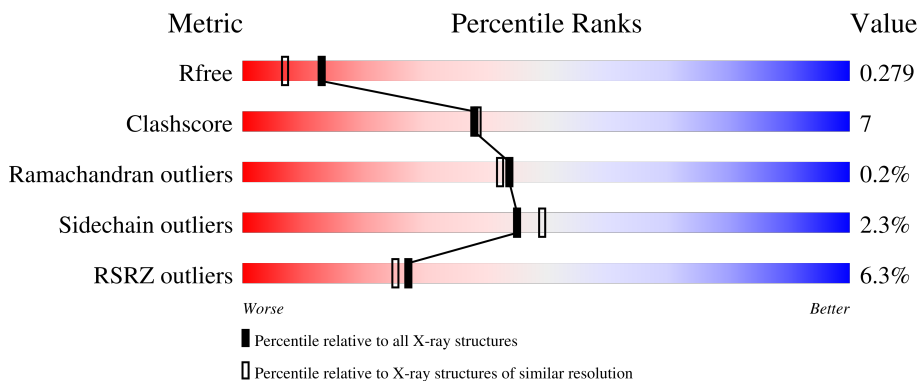
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	9409 (2.00-2.00)
Clashscore	180529	10737 (2.00-2.00)
Ramachandran outliers	177936	10628 (2.00-2.00)
Sidechain outliers	177891	10627 (2.00-2.00)
RSRZ outliers	164620	9409 (2.00-2.00)

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	230	 5% (upper red bar), 82% (green), 10% (yellow), 7% (red), 0% (orange)
1	B	230	 7% (upper red bar), 76% (green), 16% (yellow), 8% (red), 0% (orange)

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	GOL	B	204	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 3586 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.

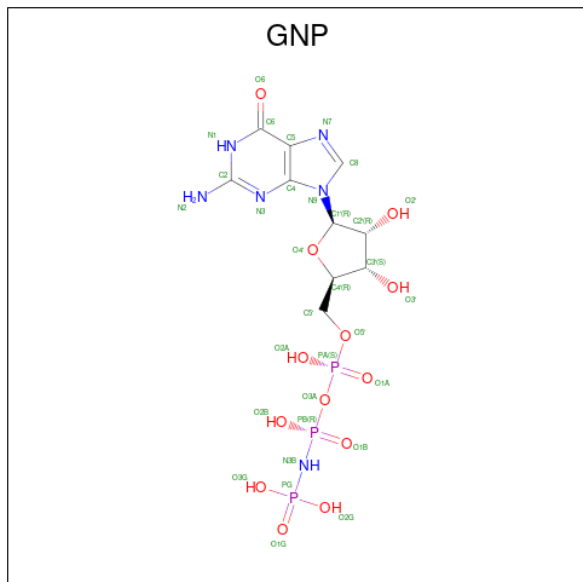
- Molecule 1 is a protein called Synaptotagmin-like protein 2,Ras-related protein Rab-27A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	214	1680	1066	289	316	9	0	0	0
1	B	212	1669	1059	290	312	8	0	0	0

There are 24 discrepancies between the modelled and reference sequences:

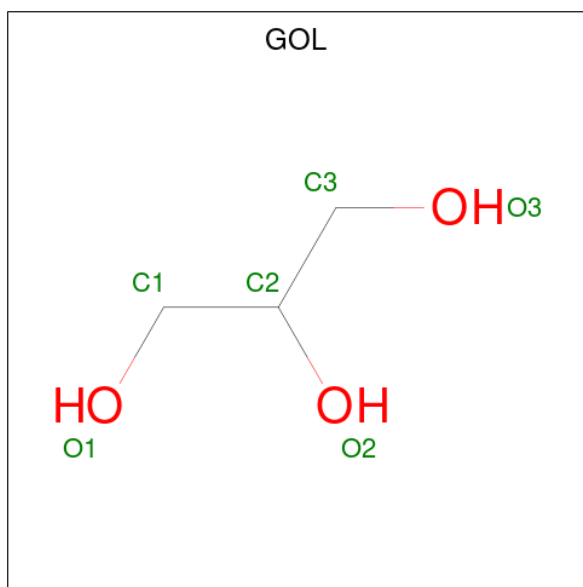
Chain	Residue	Modelled	Actual	Comment	Reference
A	-38	GLY	-	expression tag	UNP Q9HCH5
A	-37	HIS	-	expression tag	UNP Q9HCH5
A	-36	MET	-	expression tag	UNP Q9HCH5
A	-9B	GLY	-	linker	UNP Q9HCH5
A	-9C	SER	-	linker	UNP Q9HCH5
A	-9D	GLY	-	linker	UNP Q9HCH5
A	-9E	SER	-	linker	UNP Q9HCH5
A	-9F	GLY	-	linker	UNP Q9HCH5
A	-9G	SER	-	linker	UNP Q9HCH5
A	-9H	GLY	-	linker	UNP Q9HCH5
A	65	LEU	GLN	engineered mutation	UNP P51159
A	175	SER	CYS	engineered mutation	UNP P51159
B	-38	GLY	-	expression tag	UNP Q9HCH5
B	-37	HIS	-	expression tag	UNP Q9HCH5
B	-36	MET	-	expression tag	UNP Q9HCH5
B	-9B	GLY	-	linker	UNP Q9HCH5
B	-9C	SER	-	linker	UNP Q9HCH5
B	-9D	GLY	-	linker	UNP Q9HCH5
B	-9E	SER	-	linker	UNP Q9HCH5
B	-9F	GLY	-	linker	UNP Q9HCH5
B	-9G	SER	-	linker	UNP Q9HCH5
B	-9H	GLY	-	linker	UNP Q9HCH5
B	64	LEU	GLN	engineered mutation	UNP P51159
B	174	SER	CYS	engineered mutation	UNP P51159

- Molecule 2 is PHOSPHOAMINOPHOSPHONIC ACID-GUANYLATE ESTER (three-letter code: GNP) (formula: $C_{10}H_{17}N_6O_{13}P_3$).



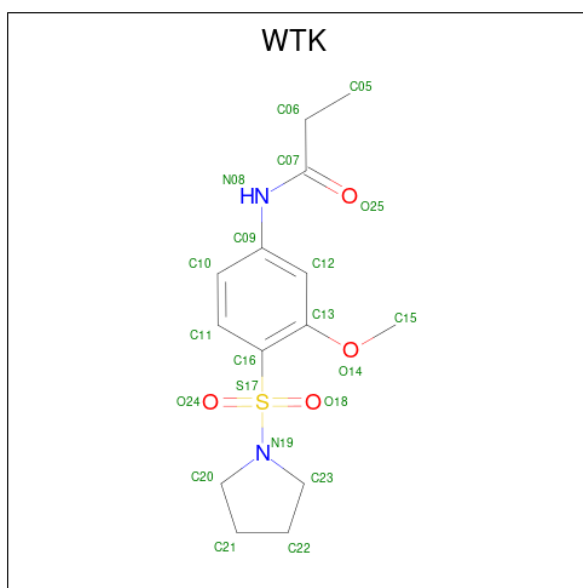
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	P			
2	A	1	Total	32	10	6	13	3	0	0
2	B	1	Total	32	10	6	13	3	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	A	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0

- Molecule 4 is {N}-(3-methoxy-4-pyrrolidin-1-ylsulfonyl-phenyl)propanamide (three-letter code: WTK) (formula: C₁₄H₂₀N₂O₄S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	S	1	0
			21	14	2	4	1		
4	B	1	Total	C	N	O	S	0	0
			21	14	2	4	1		

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Mg	0	0
			1	1		
5	B	1	Total	Mg	0	0
			1	1		

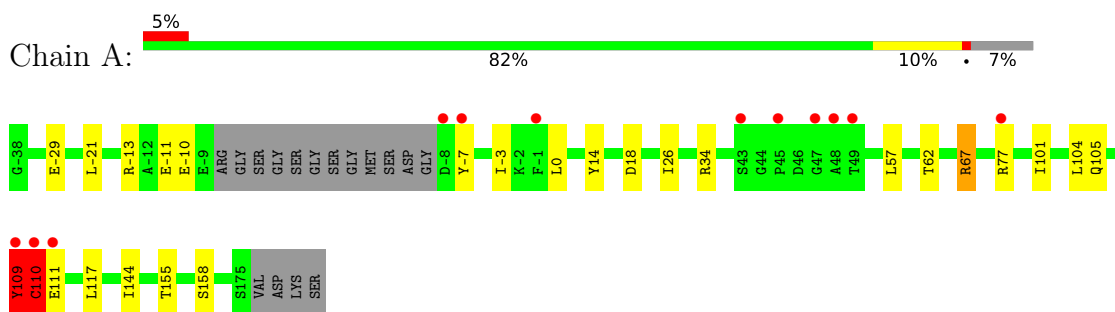
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	28	Total	O	0	0
			28	28		
6	B	29	Total	O	0	0
			29	29		

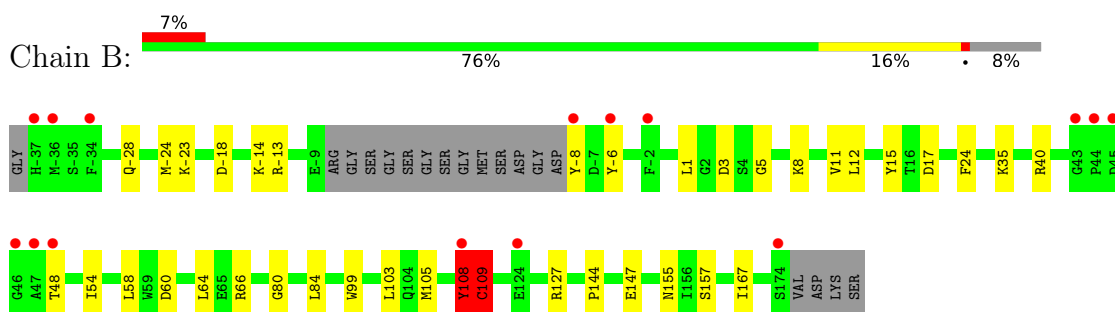
3 Residue-property plots [i](#)

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: Synaptotagmin-like protein 2,Ras-related protein Rab-27A



- Molecule 1: Synaptotagmin-like protein 2,Ras-related protein Rab-27A



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	61.37Å 76.60Å 118.67Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	64.36 – 2.00 64.36 – 2.00	Depositor EDS
% Data completeness (in resolution range)	88.0 (64.36-2.00) 88.1 (64.36-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.93 (at 2.00Å)	Xtrriage
Refinement program	PHENIX (1.17_3644: ???)	Depositor
R, R_{free}	0.229 , 0.280 0.232 , 0.279	Depositor DCC
R_{free} test set	1965 reflections (5.17%)	wwPDB-VP
Wilson B-factor (Å ²)	46.9	Xtrriage
Anisotropy	0.357	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 42.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	3586	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.72% of the height of the origin peak. No significant pseudotranslation is detected.*

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: MG, GOL, GNP, WTK

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	0.46	0/1708	0.98	5/2301 (0.2%)
1	B	0.47	0/1697	0.65	3/2287 (0.1%)
All	All	0.46	0/3405	0.83	8/4588 (0.2%)

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	4
1	B	0	2
All	All	0	6

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	109	TYR	O-C-N	-24.72	83.14	122.70
1	A	109	TYR	C-N-CA	18.00	166.69	121.70
1	A	110	CYS	CA-C-N	-14.68	84.90	117.20
1	A	110	CYS	O-C-N	-11.93	103.61	122.70
1	A	109	TYR	CA-C-N	10.07	139.35	117.20
1	B	108	TYR	O-C-N	9.86	138.48	122.70
1	B	108	TYR	CA-C-N	-9.27	96.80	117.20
1	B	109	CYS	O-C-N	-6.70	111.98	122.70

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	109	TYR	Peptide,Mainchain
1	A	110	CYS	Peptide,Mainchain
1	B	108	TYR	Peptide
1	B	109	CYS	Mainchain

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	1680	0	1641	18	0
1	B	1669	0	1635	27	1
2	A	32	0	13	2	0
2	B	32	0	13	2	0
3	A	36	0	48	7	0
3	B	36	0	48	7	0
4	A	21	0	0	0	0
4	B	21	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
6	A	28	0	0	0	0
6	B	29	0	0	1	0
All	All	3586	0	3398	47	1

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 7.

All (47) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:155:THR:HG21	3:A:203:GOL:H31	1.72	0.72
1:B:15:TYR:O	1:B:35:LYS:NZ	2.25	0.69
1:B:66:ARG:HH21	3:B:204:GOL:H12	1.61	0.64
1:B:80:GLY:HA3	1:B:167:ILE:HD11	1.82	0.62
1:B:5:GLY:H	2:B:201:GNP:HNB3	1.46	0.62
1:B:66:ARG:NH2	3:B:204:GOL:H12	2.22	0.54
1:A:-10:GLU:HG2	1:A:-10:GLU:O	2.08	0.53
1:B:12:LEU:HD22	1:B:58:LEU:HD23	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:-13:ARG:HH22	1:B:105:MET:C	2.13	0.52
1:A:-10:GLU:OE2	1:B:108:TYR:O	2.28	0.51
1:B:147:GLU:O	1:B:155:ASN:ND2	2.34	0.50
1:A:111:GLU:HG3	1:B:-13:ARG:HG2	1.94	0.50
1:B:-28:GLN:O	1:B:-24:MET:HG2	2.11	0.49
3:B:204:GOL:O3	3:B:204:GOL:O1	2.26	0.49
1:A:77:ARG:HA	1:A:109:TYR:CD1	2.47	0.49
2:A:201:GNP:N3	3:A:205:GOL:H11	2.28	0.49
1:B:24:PHE:CD1	2:B:201:GNP:H5'1	2.47	0.48
1:A:34:ARG:HA	3:A:207:GOL:H2	1.96	0.48
3:A:203:GOL:O3	3:A:203:GOL:O1	2.28	0.48
1:A:-7:TYR:CD2	1:A:-7:TYR:C	2.87	0.47
1:B:12:LEU:HD12	1:B:60:ASP:HB2	1.96	0.47
1:B:144:PRO:HB3	3:B:207:GOL:H2	1.95	0.47
1:B:-18:ASP:OD1	1:B:-14:LYS:NZ	2.48	0.47
1:B:99:TRP:CE2	3:B:205:GOL:H32	2.49	0.46
1:B:127:ARG:HH22	1:B:147:GLU:CD	2.19	0.46
1:A:-3:ILE:HB	1:A:57:LEU:HD23	1.98	0.46
1:B:40:ARG:HG2	1:B:40:ARG:HH11	1.81	0.46
2:A:201:GNP:H1'	3:A:205:GOL:H11	1.98	0.45
1:A:-7:TYR:CD2	1:A:-7:TYR:O	2.70	0.45
1:B:66:ARG:HE	3:B:204:GOL:H12	1.82	0.45
1:B:-6:TYR:HB2	1:B:54:ILE:HD13	2.00	0.44
1:B:64:LEU:HD23	1:B:64:LEU:HA	1.89	0.44
1:B:127:ARG:NH2	1:B:147:GLU:OE1	2.47	0.43
1:A:101:ILE:O	1:A:105:GLN:HG2	2.18	0.43
1:B:1:LEU:HD12	1:B:99:TRP:CE3	2.54	0.43
1:A:14:TYR:CZ	3:A:206:GOL:H12	2.54	0.43
1:B:11:VAL:HG21	1:B:84:LEU:HD21	2.01	0.42
1:A:26:ILE:HD12	3:A:202:GOL:O2	2.18	0.42
1:A:117:LEU:HB2	1:A:144:ILE:HD12	2.02	0.42
1:A:0:LEU:HD21	1:A:62:THR:HG21	2.02	0.41
1:B:40:ARG:HG2	1:B:40:ARG:NH1	2.35	0.41
1:B:103:LEU:HD23	1:B:103:LEU:HA	1.76	0.41
1:B:3:ASP:O	1:B:8:LYS:NZ	2.54	0.41
1:A:-21:LEU:HD23	1:A:-21:LEU:HA	1.83	0.40
1:A:-29:GLU:OE1	1:A:67:ARG:NH2	2.52	0.40
1:A:104:LEU:HD23	1:A:104:LEU:HA	1.85	0.40
3:B:202:GOL:H31	6:B:311:HOH:O	2.22	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:-23:LYS:NZ	1:B:48:THR:O[3_545]	2.17	0.03

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	210/230 (91%)	203 (97%)	6 (3%)	1 (0%)	25	21
1	B	208/230 (90%)	198 (95%)	10 (5%)	0	100	100
All	All	418/460 (91%)	401 (96%)	16 (4%)	1 (0%)	44	42

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	110	CYS

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	173/193 (90%)	169 (98%)	4 (2%)	45	49
1	B	172/193 (89%)	168 (98%)	4 (2%)	45	49
All	All	345/386 (89%)	337 (98%)	8 (2%)	45	49

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	-11	GLU
1	A	18	ASP
1	A	67	ARG
1	A	158	SER
1	B	-8	TYR
1	B	17	ASP
1	B	109	CYS
1	B	157	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 2 are monoatomic - leaving 16 for Mogul analysis.

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	GOL	B	205	-	5,5,5	0.65	0	5,5,5	1.06	0
3	GOL	A	203	-	5,5,5	0.67	0	5,5,5	1.47	1 (20%)
3	GOL	B	204	-	5,5,5	1.05	0	5,5,5	1.22	1 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	B	206	-	5,5,5	0.88	0	5,5,5	0.97	0
3	GOL	A	206	-	5,5,5	1.09	0	5,5,5	0.74	0
3	GOL	A	204	-	5,5,5	0.90	0	5,5,5	0.99	0
3	GOL	B	203	-	5,5,5	1.06	0	5,5,5	0.84	0
2	GNP	B	201	5	29,34,34	1.66	7 (24%)	33,54,54	2.21	5 (15%)
4	WTK	B	208	1	22,22,22	3.63	12 (54%)	30,31,31	2.88	9 (30%)
3	GOL	B	202	-	5,5,5	0.71	0	5,5,5	0.99	0
4	WTK	A	208	1	22,22,22	3.45	11 (50%)	30,31,31	2.58	6 (20%)
2	GNP	A	201	5	29,34,34	1.68	7 (24%)	33,54,54	2.22	7 (21%)
3	GOL	A	202	-	5,5,5	0.82	0	5,5,5	0.93	0
3	GOL	A	207	-	5,5,5	0.88	0	5,5,5	1.03	0
3	GOL	B	207	-	5,5,5	0.80	0	5,5,5	0.92	0
3	GOL	A	205	-	5,5,5	1.06	1 (20%)	5,5,5	0.93	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	B	205	-	-	1/4/4/4	-
3	GOL	A	203	-	-	0/4/4/4	-
3	GOL	B	204	-	-	2/4/4/4	-
3	GOL	B	206	-	-	2/4/4/4	-
3	GOL	A	206	-	-	4/4/4/4	-
3	GOL	A	204	-	-	3/4/4/4	-
3	GOL	B	203	-	-	0/4/4/4	-
2	GNP	B	201	5	-	2/14/38/38	0/3/3/3
4	WTK	B	208	1	-	7/20/27/27	0/2/2/2
3	GOL	B	202	-	-	2/4/4/4	-
4	WTK	A	208	1	-	4/20/27/27	0/2/2/2
2	GNP	A	201	5	-	7/14/38/38	0/3/3/3
3	GOL	A	202	-	-	2/4/4/4	-
3	GOL	A	207	-	-	1/4/4/4	-
3	GOL	B	207	-	-	2/4/4/4	-
3	GOL	A	205	-	-	4/4/4/4	-

All (38) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	208	WTK	S17-N19	8.90	1.76	1.63
4	A	208	WTK	S17-N19	8.42	1.75	1.63
4	A	208	WTK	O24-S17	6.32	1.50	1.43
4	B	208	WTK	O24-S17	6.04	1.50	1.43
4	B	208	WTK	C07-N08	5.45	1.47	1.35
4	B	208	WTK	C21-C20	-5.00	1.34	1.51
2	A	201	GNP	PB-O3A	4.97	1.65	1.59
4	A	208	WTK	C21-C20	-4.92	1.34	1.51
2	B	201	GNP	PB-O3A	4.84	1.65	1.59
4	B	208	WTK	C20-N19	4.79	1.57	1.48
4	A	208	WTK	C07-N08	4.77	1.46	1.35
4	A	208	WTK	C20-N19	4.77	1.57	1.48
4	A	208	WTK	C22-C23	-4.64	1.35	1.51
4	B	208	WTK	C22-C23	-4.53	1.36	1.51
4	B	208	WTK	C23-N19	4.36	1.56	1.48
4	A	208	WTK	C23-N19	4.18	1.56	1.48
4	B	208	WTK	C09-N08	4.12	1.50	1.41
4	B	208	WTK	C16-S17	3.70	1.83	1.78
4	A	208	WTK	C09-N08	3.62	1.49	1.41
2	B	201	GNP	PB-O1B	3.45	1.51	1.46
2	B	201	GNP	C6-N1	3.21	1.38	1.33
2	A	201	GNP	C6-N1	3.12	1.38	1.33
2	A	201	GNP	PB-O1B	2.92	1.50	1.46
2	A	201	GNP	PG-O1G	2.82	1.50	1.46
2	B	201	GNP	PG-O1G	2.81	1.50	1.46
2	A	201	GNP	PG-N3B	2.79	1.70	1.63
2	B	201	GNP	PG-N3B	2.70	1.70	1.63
2	A	201	GNP	PB-O2B	-2.32	1.50	1.56
4	B	208	WTK	O14-C13	2.31	1.40	1.37
4	B	208	WTK	O18-S17	2.27	1.46	1.43
4	A	208	WTK	C16-S17	2.27	1.81	1.78
4	A	208	WTK	O14-C13	2.23	1.40	1.37
2	A	201	GNP	C5-C6	2.19	1.45	1.41
2	B	201	GNP	C5-C6	2.12	1.45	1.41
3	A	205	GOL	C3-C2	2.06	1.60	1.51
4	A	208	WTK	C22-C21	2.05	1.62	1.48
4	B	208	WTK	C22-C21	2.04	1.62	1.48
2	B	201	GNP	PB-O2B	-2.02	1.51	1.56

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	208	WTK	O24-S17-O18	-11.57	100.77	119.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	208	WTK	O24-S17-O18	-8.56	105.64	119.52
2	B	201	GNP	C5-C6-N1	-8.27	112.11	123.43
2	A	201	GNP	C5-C6-N1	-8.15	112.28	123.43
4	A	208	WTK	O18-S17-N19	5.73	111.92	106.69
2	A	201	GNP	C2-N1-C6	5.64	124.90	115.93
2	B	201	GNP	C2-N1-C6	5.56	124.77	115.93
2	B	201	GNP	O1G-PG-N3B	-5.47	103.72	111.77
4	B	208	WTK	O18-S17-N19	4.96	111.22	106.69
4	B	208	WTK	O24-S17-N19	4.85	111.11	106.69
4	A	208	WTK	C23-N19-S17	4.43	126.94	119.97
4	A	208	WTK	O24-S17-N19	4.35	110.65	106.69
2	A	201	GNP	O5'-PA-O1A	-3.98	93.51	109.07
4	A	208	WTK	C20-N19-S17	3.84	126.00	119.97
4	A	208	WTK	O14-C13-C16	3.52	119.23	116.50
4	B	208	WTK	C20-N19-S17	3.45	125.39	119.97
4	B	208	WTK	C23-N19-S17	3.34	125.22	119.97
2	A	201	GNP	O2A-PA-O5'	3.20	122.61	107.75
4	B	208	WTK	C16-S17-N19	3.10	112.54	106.81
4	B	208	WTK	O14-C13-C16	2.99	118.82	116.50
2	A	201	GNP	N3-C2-N1	-2.86	123.41	127.22
2	B	201	GNP	N3-C2-N1	-2.68	123.65	127.22
2	A	201	GNP	C4-C5-C6	-2.55	118.36	120.80
2	B	201	GNP	C4-C5-C6	-2.47	118.44	120.80
2	A	201	GNP	O1G-PG-N3B	-2.33	108.34	111.77
3	A	203	GOL	C3-C2-C1	-2.31	102.72	111.70
4	B	208	WTK	C11-C16-S17	2.19	120.46	117.42
3	B	204	GOL	C3-C2-C1	-2.08	103.62	111.70
4	B	208	WTK	C22-C23-N19	2.05	106.44	103.43

There are no chirality outliers.

All (43) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	201	GNP	PG-N3B-PB-O1B
2	A	201	GNP	C5'-O5'-PA-O3A
2	A	201	GNP	C5'-O5'-PA-O2A
2	A	201	GNP	O4'-C4'-C5'-O5'
2	B	201	GNP	PA-O3A-PB-O1B
2	B	201	GNP	PA-O3A-PB-O2B
3	A	202	GOL	C1-C2-C3-O3
3	A	205	GOL	O1-C1-C2-C3
3	A	205	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
3	A	205	GOL	O2-C2-C3-O3
3	B	206	GOL	O1-C1-C2-C3
3	B	207	GOL	O1-C1-C2-C3
4	B	208	WTK	C13-C16-S17-O24
4	A	208	WTK	C12-C13-O14-C15
4	A	208	WTK	C16-C13-O14-C15
3	B	202	GOL	O2-C2-C3-O3
3	B	207	GOL	O1-C1-C2-O2
2	A	201	GNP	C3'-C4'-C5'-O5'
4	A	208	WTK	C20-N19-S17-O18
4	B	208	WTK	C23-N19-S17-O24
3	A	204	GOL	O1-C1-C2-C3
3	A	204	GOL	C1-C2-C3-O3
3	A	206	GOL	O1-C1-C2-C3
3	A	207	GOL	O1-C1-C2-C3
3	B	202	GOL	C1-C2-C3-O3
3	A	202	GOL	O2-C2-C3-O3
3	A	204	GOL	O1-C1-C2-O2
3	B	206	GOL	O1-C1-C2-O2
3	B	204	GOL	O1-C1-C2-C3
4	B	208	WTK	C16-C13-O14-C15
3	A	206	GOL	C1-C2-C3-O3
2	A	201	GNP	C5'-O5'-PA-O1A
3	A	205	GOL	O1-C1-C2-O2
4	B	208	WTK	C12-C13-O14-C15
4	B	208	WTK	C05-C06-C07-N08
2	A	201	GNP	PA-O3A-PB-O2B
3	B	204	GOL	C1-C2-C3-O3
3	A	206	GOL	O1-C1-C2-O2
3	A	206	GOL	O2-C2-C3-O3
4	B	208	WTK	C05-C06-C07-O25
3	B	205	GOL	O2-C2-C3-O3
4	A	208	WTK	C20-N19-S17-C16
4	B	208	WTK	C13-C16-S17-O18

There are no ring outliers.

11 monomers are involved in 16 short contacts:

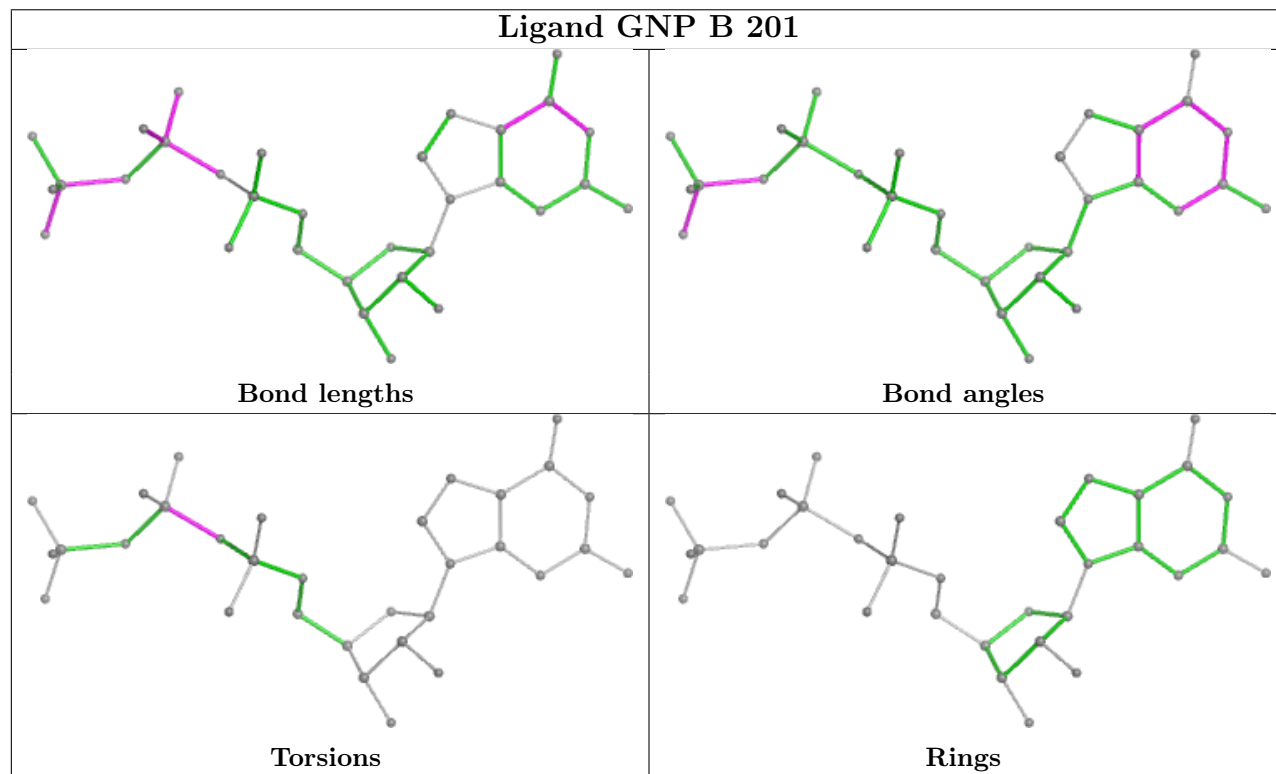
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	205	GOL	1	0
3	A	203	GOL	2	0
3	B	204	GOL	4	0

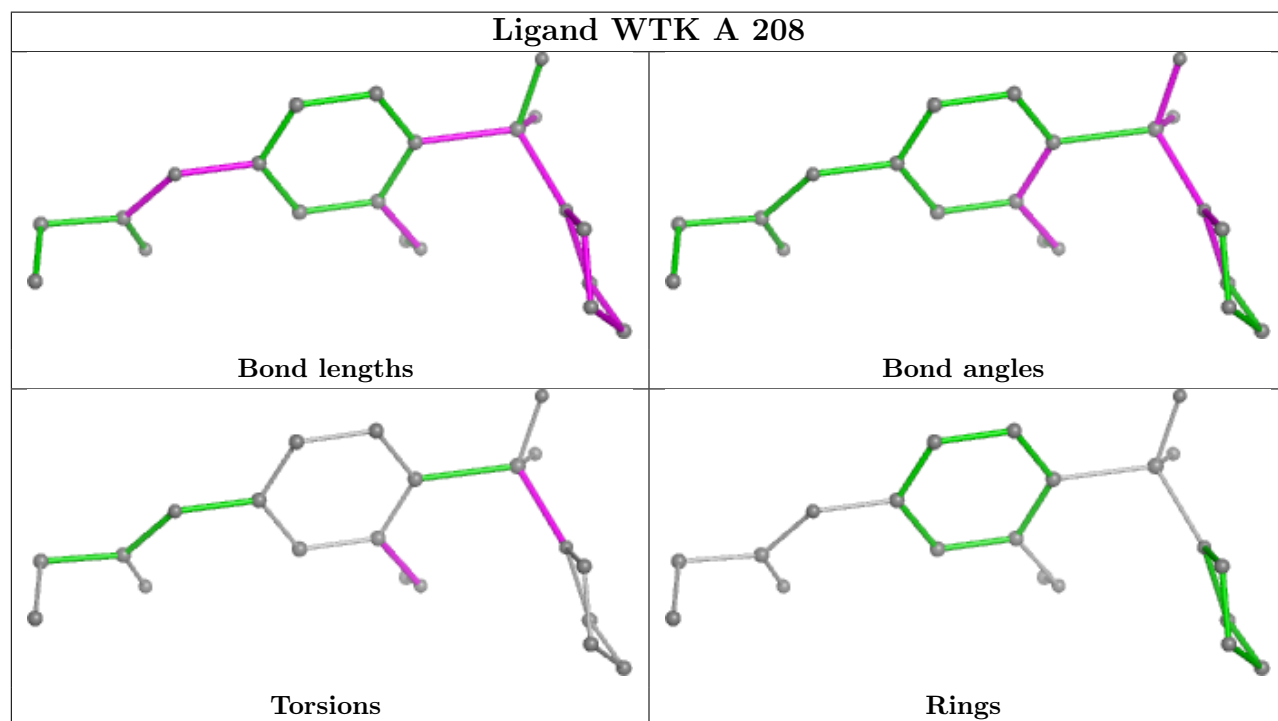
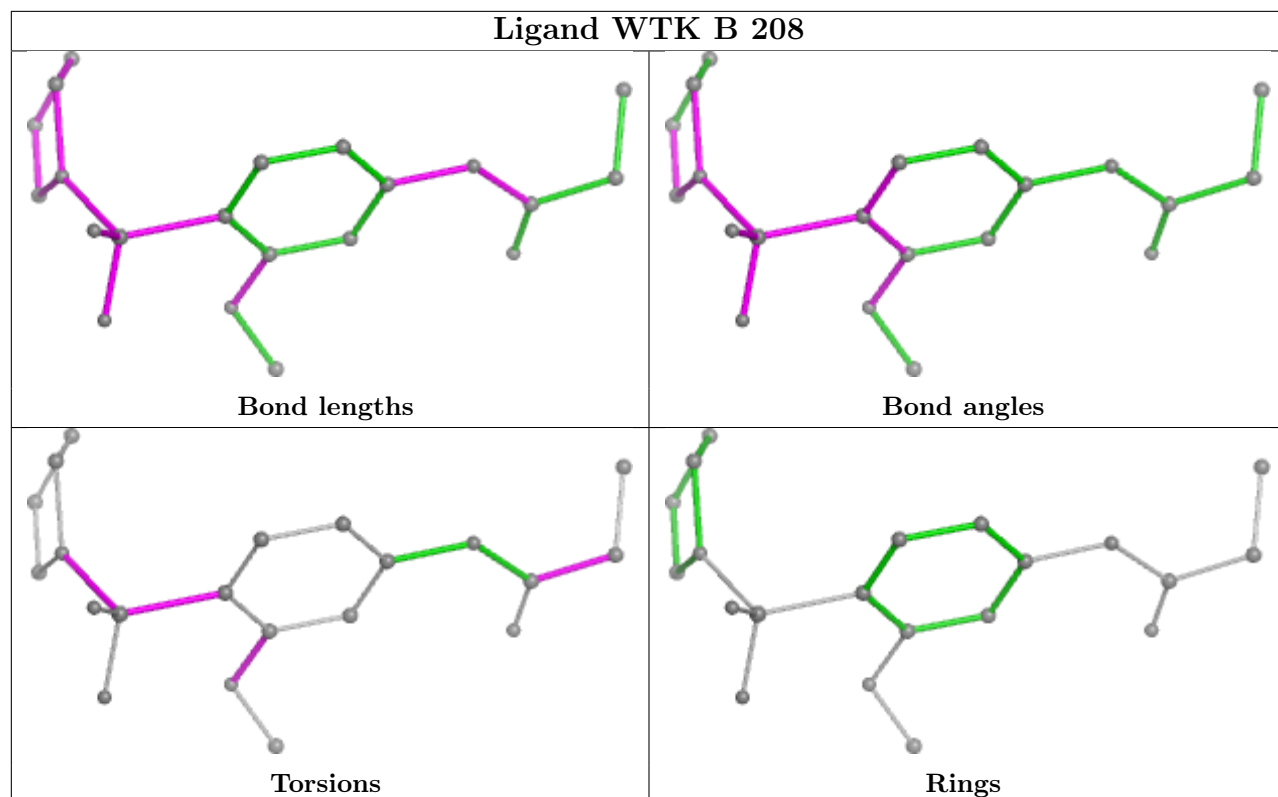
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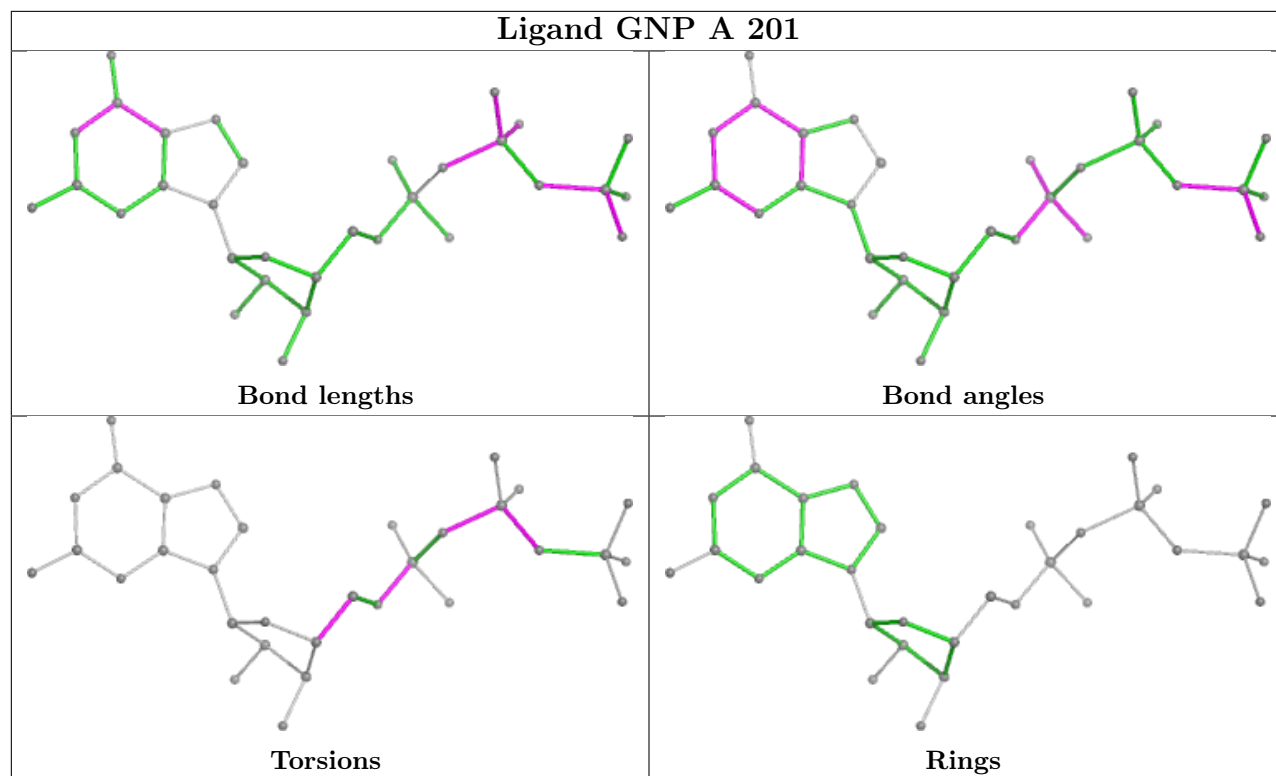
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	206	GOL	1	0
2	B	201	GNP	2	0
3	B	202	GOL	1	0
2	A	201	GNP	2	0
3	A	202	GOL	1	0
3	A	207	GOL	1	0
3	B	207	GOL	1	0
3	A	205	GOL	2	0

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, 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	214/230 (93%)	0.45	12 (5%) 31 29	39, 52, 77, 115	0
1	B	212/230 (92%)	0.72	15 (7%) 23 21	43, 56, 95, 112	0
All	All	426/460 (92%)	0.58	27 (6%) 27 25	39, 54, 90, 115	0

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	111	GLU	5.0
1	B	47	ALA	4.6
1	B	46	GLY	4.0
1	B	-34	PHE	3.7
1	B	45	ASP	3.7
1	A	47	GLY	3.5
1	B	-8	TYR	3.4
1	B	44	PRO	3.2
1	B	-37	HIS	3.0
1	A	-7	TYR	2.9
1	A	49	THR	2.9
1	B	-36	MET	2.9
1	A	-8	ASP	2.9
1	A	45	PRO	2.7
1	B	174	SER	2.6
1	B	43	GLY	2.5
1	B	-2	PHE	2.5
1	A	-1	PHE	2.4
1	B	108	TYR	2.4
1	A	109	TYR	2.3
1	B	-6	TYR	2.3
1	B	124	GLU	2.2
1	A	77	ARG	2.2
1	B	48	THR	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	43	SER	2.0
1	A	48	ALA	2.0
1	A	110	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](#)

There are no monosaccharides in this entry.

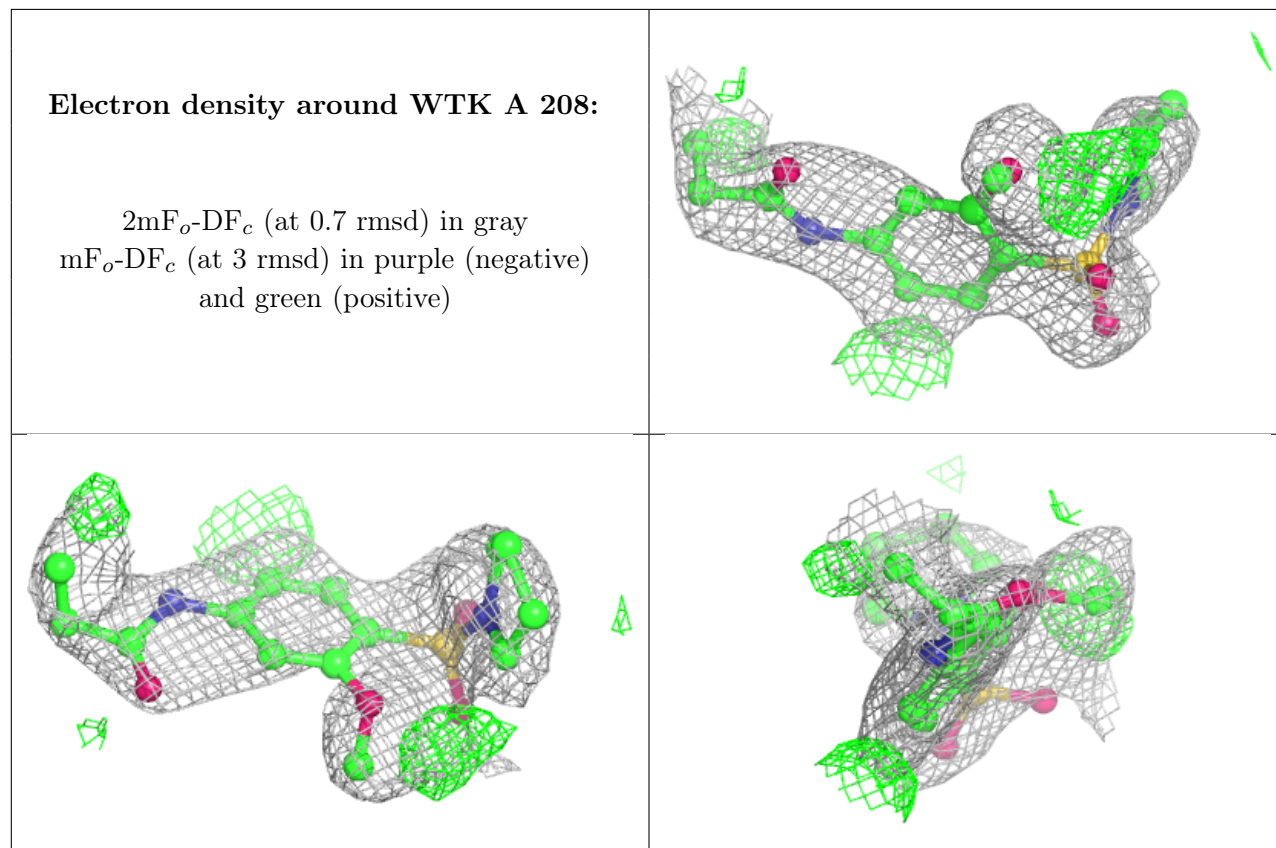
6.4 Ligands [i](#)

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(Å ²)	Q<0.9
4	WTK	A	208	21/21	0.72	0.19	56,62,71,74	9
3	GOL	B	203	6/6	0.74	0.16	66,73,76,76	0
3	GOL	B	207	6/6	0.76	0.13	63,65,67,69	0
3	GOL	B	206	6/6	0.77	0.15	61,66,69,75	0
3	GOL	A	207	6/6	0.82	0.12	55,60,60,64	0
4	WTK	B	208	21/21	0.82	0.15	62,68,73,78	7
3	GOL	A	205	6/6	0.85	0.12	47,50,58,66	0
3	GOL	B	204	6/6	0.85	0.12	58,63,66,71	0
3	GOL	A	206	6/6	0.86	0.10	59,62,65,71	0
3	GOL	B	205	6/6	0.86	0.11	53,61,62,64	0
3	GOL	A	202	6/6	0.90	0.11	46,52,57,59	0
3	GOL	A	203	6/6	0.91	0.11	52,62,64,67	0
3	GOL	B	202	6/6	0.92	0.09	47,50,54,56	0
3	GOL	A	204	6/6	0.92	0.10	52,62,64,66	0
2	GNP	A	201	32/32	0.97	0.06	37,43,47,50	0
2	GNP	B	201	32/32	0.97	0.06	39,45,50,53	0
5	MG	A	209	1/1	0.99	0.03	44,44,44,44	0
5	MG	B	209	1/1	1.00	0.03	45,45,45,45	0

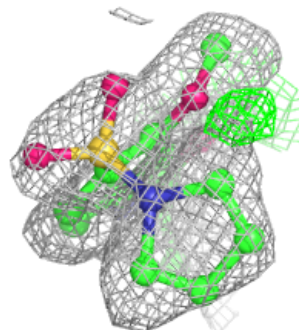
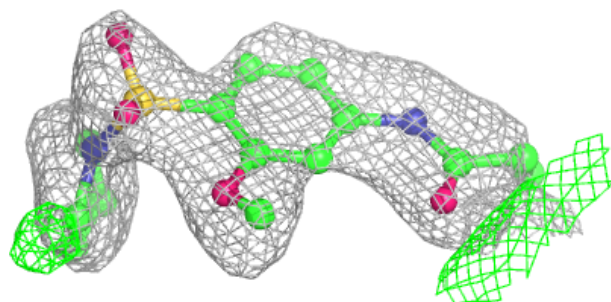
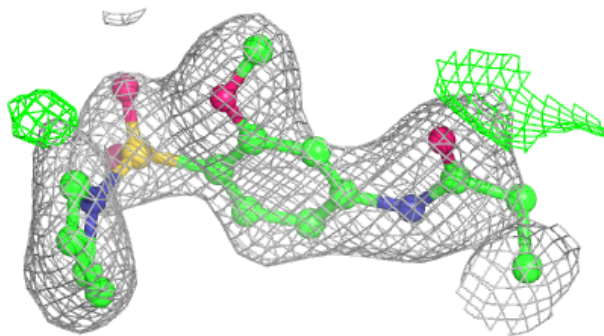
The following is a graphical depiction of the model fit to experimental electron density of all

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.

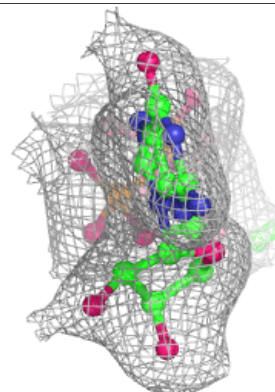
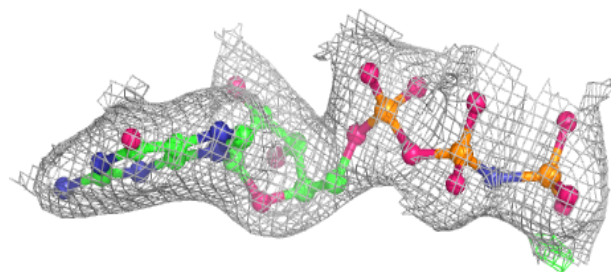
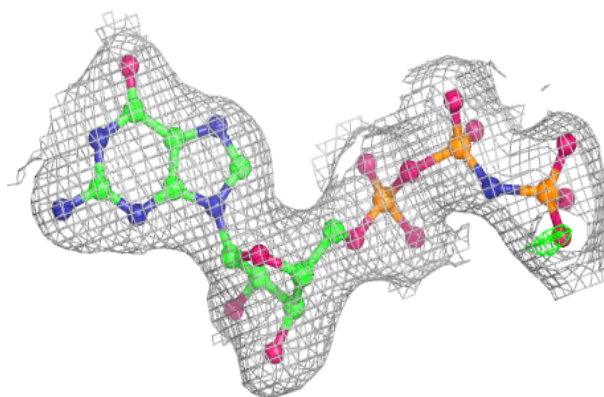


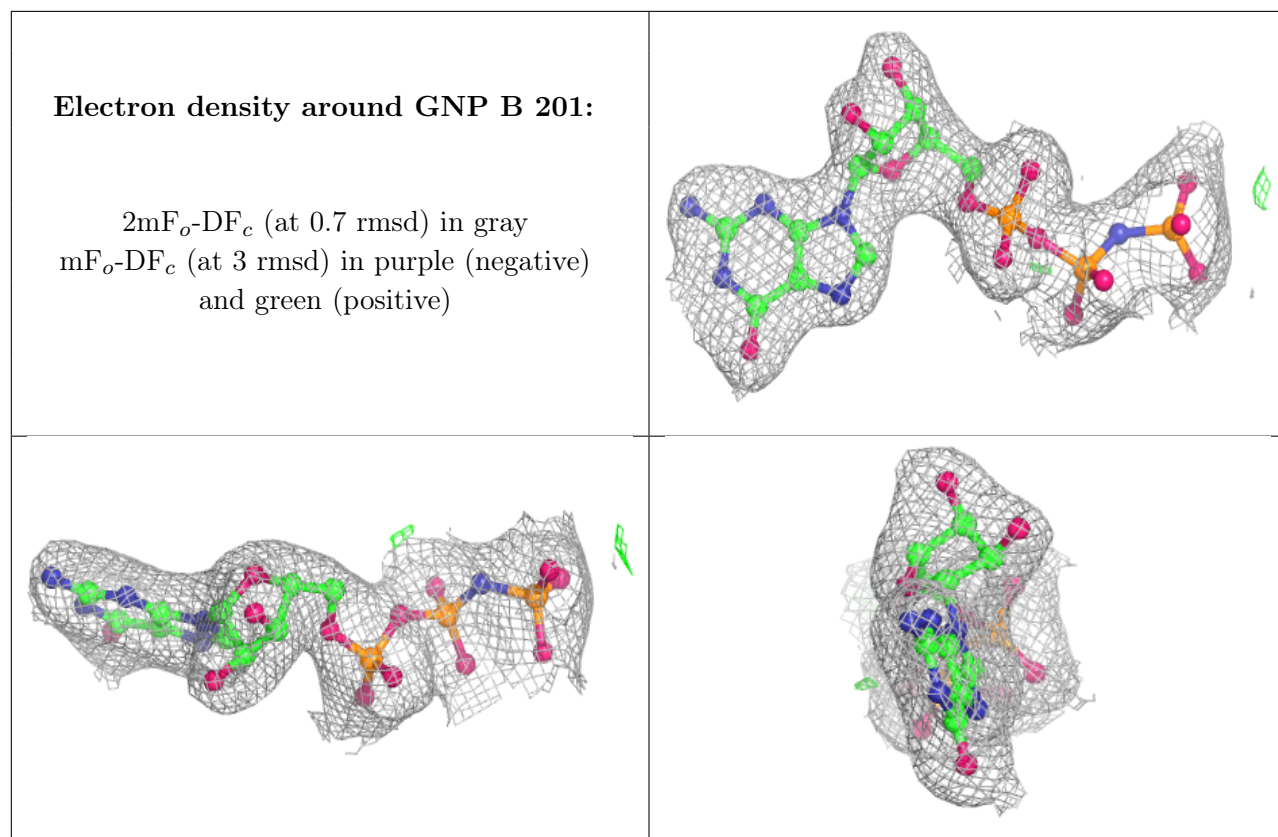
Electron density around WTK B 208:

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

**Electron density around GNP A 201:**

$2mF_o-DF_c$ (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.