



# Full wwPDB X-ray Structure Validation Report ⓘ

May 16, 2020 – 10:45 pm BST

PDB ID : 3GGJ  
Title : Human hypoxanthine-guanine phosphoribosyltransferase in complex with 9-(2-phosphonoethoxyethyl)guanine  
Authors : Guddat, L.W.; Keough, D.T.; Jersey, J.  
Deposited on : 2009-02-28  
Resolution : 2.60 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
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) : 2.11

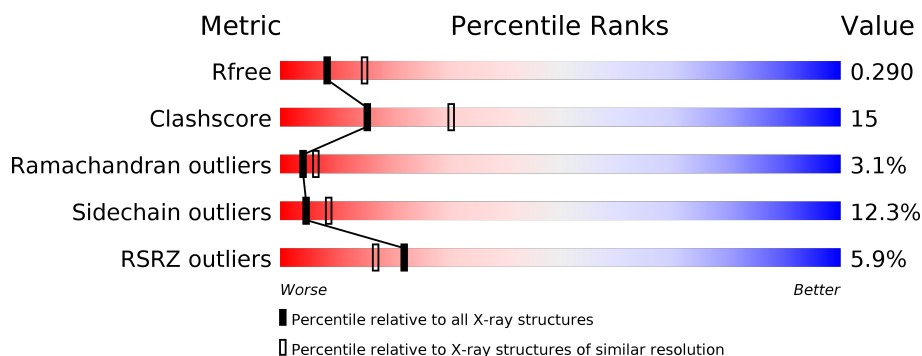
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*



The reported resolution of this entry is 2.60 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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	217	
1	B	217	

## 2 Entry composition [i](#)

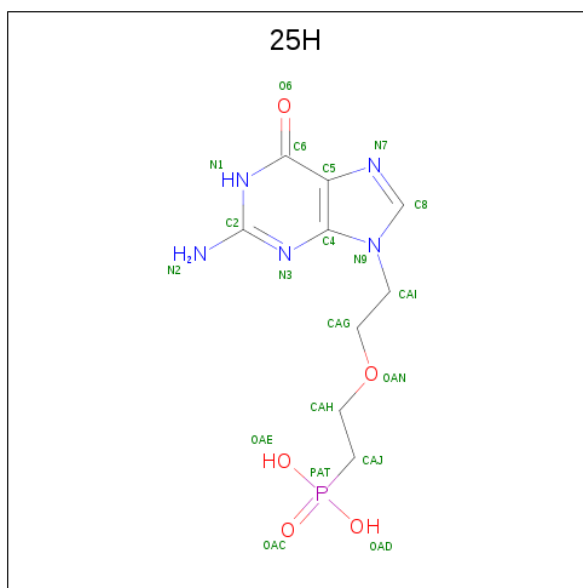
There are 3 unique types of molecules in this entry. The entry contains 3443 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Hypoxanthine-guanine phosphoribosyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	214	Total	C	N	O	S	0	1	0
			1668	1067	283	312	6			
1	B	211	Total	C	N	O	S	0	1	0
			1625	1044	270	305	6			

- Molecule 2 is {2-[2-(2-amino-6-oxo-1,6-dihydro-9H-purin-9-yl)ethoxy]ethyl}phosphonic acid (three-letter code: 25H) (formula: C<sub>9</sub>H<sub>14</sub>N<sub>5</sub>O<sub>5</sub>P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			20	9	5	5	1		
2	B	1	Total	C	N	O	P	0	0
			20	9	5	5	1		

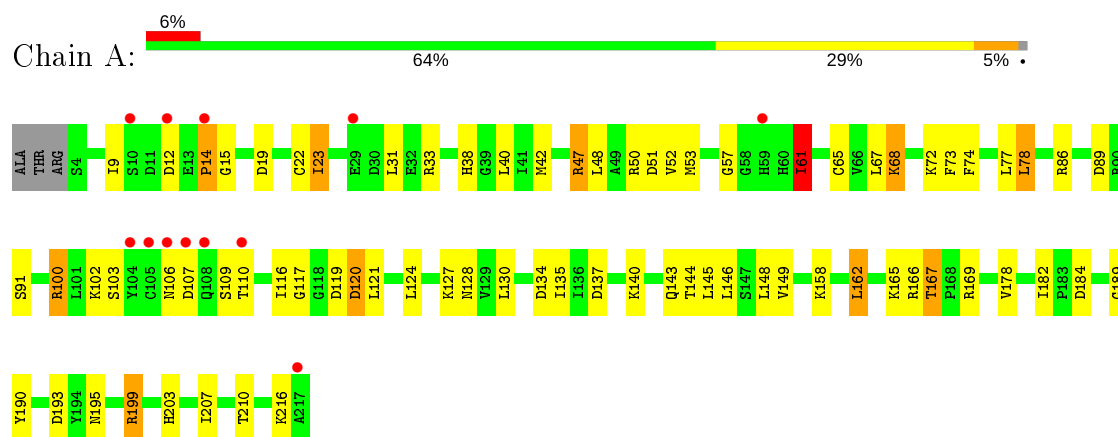
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	62	Total 62	O 62	0	0
3	B	48	Total 48	O 48	0	0

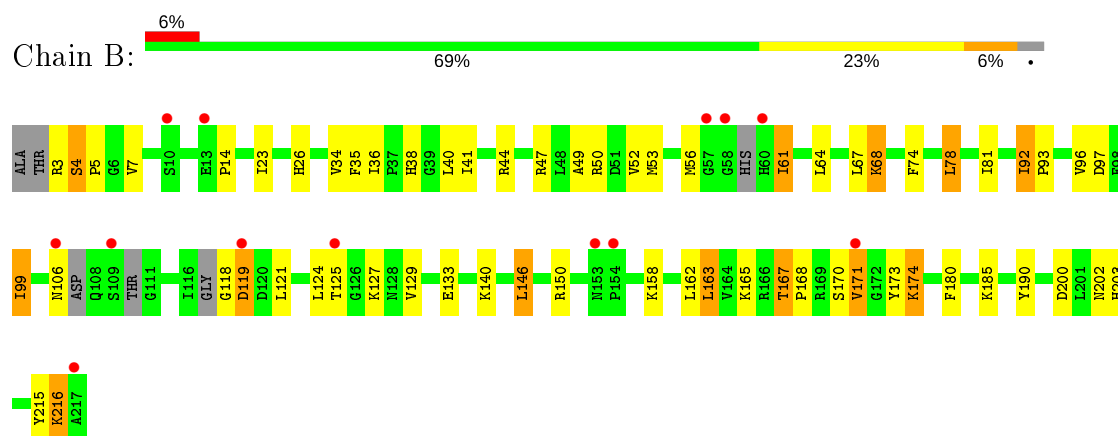
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Hypoxanthine-guanine phosphoribosyltransferase



- Molecule 1: Hypoxanthine-guanine phosphoribosyltransferase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	111.19 Å 72.75 Å 51.39 Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	27.78 – 2.60 27.78 – 2.60	Depositor EDS
% Data completeness (in resolution range)	98.7 (27.78-2.60) 98.7 (27.78-2.60)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.57 (at 2.61 Å)	Xtriage
Refinement program	REFMAC 5.5.0066	Depositor
R, $R_{free}$	0.236 , 0.295 0.235 , 0.290	Depositor DCC
$R_{free}$ test set	656 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	38.8	Xtriage
Anisotropy	0.126	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 45.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	3443	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	27.0	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 24.54 % 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 3.7617e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 25H

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	0.42	0/1706	0.60	1/2307 (0.0%)
1	B	0.47	1/1657 (0.1%)	0.59	0/2238
All	All	0.45	1/3363 (0.0%)	0.59	1/4545 (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

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	133	GLU	CD-OE2	7.38	1.33	1.25

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	78	LEU	CA-CB-CG	-5.38	102.94	115.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	67	LEU	Peptide

## 5.2 Too-close contacts ⓘ

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	1668	0	1663	50	0
1	B	1625	0	1598	48	0
2	A	20	0	12	3	0
2	B	20	0	12	0	0
3	A	62	0	0	8	0
3	B	48	0	0	5	0
All	All	3443	0	3285	98	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 15.

All (98) 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:195:ASN:HB3	3:A:278:HOH:O	1.21	1.28
1:B:61:ILE:H	1:B:61:ILE:HD13	1.21	1.02
1:B:64:LEU:HD21	1:B:99:ILE:HD11	1.46	0.98
1:B:167:THR:HG22	1:B:168:PRO:HD2	1.44	0.97
1:A:100:ARG:HH11	1:A:100:ARG:HG3	1.33	0.93
1:B:38:HIS:H	1:B:203:HIS:HD2	1.15	0.93
1:A:38:HIS:H	1:A:203:HIS:HD2	1.16	0.89
1:B:4:SER:HA	3:B:259:HOH:O	1.78	0.83
1:A:167:THR:HG21	1:A:169:ARG:NH1	1.96	0.80
1:A:102:LYS:HB2	1:A:116:ILE:HD11	1.66	0.76
1:B:38:HIS:H	1:B:203:HIS:CD2	2.01	0.76
1:B:52:VAL:HG12	1:B:53:MET:HE3	1.70	0.74
1:A:100:ARG:HH11	1:A:100:ARG:CG	1.99	0.74
1:B:216:LYS:HA	3:B:260:HOH:O	1.87	0.73
1:B:99:ILE:HG22	1:B:118:GLY:CA	2.19	0.72
1:A:38:HIS:H	1:A:203:HIS:CD2	2.05	0.70
1:B:5:PRO:HD2	3:B:259:HOH:O	1.91	0.70
1:A:167:THR:HG23	1:A:184:ASP:OD2	1.92	0.69
1:B:64:LEU:HD21	1:B:99:ILE:CD1	2.22	0.69
1:A:140:LYS:O	1:A:144:THR:HG23	1.93	0.68
1:A:102:LYS:HB2	1:A:116:ILE:CD1	2.24	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:7:VAL:HG23	1:B:44:ARG:HD3	1.77	0.66
1:A:9:ILE:O	1:A:166:ARG:NH2	2.28	0.66
1:B:167:THR:HG22	1:B:168:PRO:CD	2.24	0.66
1:B:61:ILE:CD1	1:B:61:ILE:H	1.96	0.66
1:B:3:ARG:O	1:B:4:SER:CB	2.44	0.66
1:A:68:LYS:HE3	3:A:279:HOH:O	1.95	0.65
1:B:99:ILE:HG22	1:B:118:GLY:HA2	1.79	0.65
1:B:50:ARG:HD2	3:B:263:HOH:O	1.96	0.64
1:A:48:LEU:O	1:A:52:VAL:HG23	1.97	0.64
1:A:9:ILE:HD12	1:A:182:ILE:HG22	1.82	0.61
1:A:53:MET:HE1	1:A:57:GLY:HA2	1.83	0.60
1:B:56:MET:CE	1:B:158:LYS:HB2	2.32	0.59
1:A:167:THR:HG23	1:A:184:ASP:CG	2.23	0.57
1:A:73:PHE:CD1	1:A:162:LEU:HG	2.40	0.57
1:B:162:LEU:HG	1:B:163:LEU:HD13	1.86	0.57
1:B:61:ILE:HD13	1:B:61:ILE:N	2.05	0.56
1:A:119:ASP:O	1:A:120:ASP:C	2.44	0.56
1:A:137:ASP:OD2	1:A:169:ARG:NH2	2.39	0.56
1:B:124:LEU:HD22	1:B:129:VAL:HG21	1.88	0.55
1:B:118:GLY:C	1:B:119:ASP:CG	2.65	0.54
1:B:56:MET:HE3	1:B:158:LYS:HB2	1.89	0.54
1:B:99:ILE:HG22	1:B:118:GLY:HA3	1.90	0.53
1:A:100:ARG:NH1	1:A:100:ARG:CG	2.64	0.52
1:B:38:HIS:HB2	1:B:202:ASN:HB3	1.90	0.52
1:A:47:ARG:NH2	3:A:252:HOH:O	2.42	0.52
1:A:23:ILE:HD12	1:A:31:LEU:CD1	2.40	0.51
1:A:23:ILE:HD12	1:A:31:LEU:HD12	1.93	0.51
1:A:61:ILE:HA	1:A:128:ASN:O	2.10	0.51
1:B:121:LEU:HB3	1:B:124:LEU:CD1	2.41	0.51
1:A:53:MET:CE	1:A:57:GLY:HA2	2.40	0.51
1:B:173:TYR:O	1:B:174:LYS:O	2.29	0.50
1:B:49:ALA:HB1	1:B:81:ILE:HG13	1.93	0.50
1:B:125:THR:O	1:B:127:LYS:HG2	2.11	0.50
1:B:56:MET:HB3	1:B:61:ILE:CG2	2.43	0.49
1:A:65:CYS:HB2	1:A:74:PHE:CD1	2.48	0.49
1:B:53:MET:CE	1:B:53:MET:HA	2.42	0.49
1:B:121:LEU:HB3	1:B:124:LEU:HD11	1.94	0.49
1:A:165:LYS:NZ	2:A:218:25H:O6	2.42	0.49
1:B:74:PHE:CE2	1:B:96:VAL:HG13	2.48	0.48
1:A:100:ARG:HB3	1:A:117:GLY:H	1.79	0.48
1:B:170:SER:O	1:B:171:VAL:O	2.32	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:38:HIS:N	1:A:203:HIS:HD2	1.96	0.48
1:A:52:VAL:HG11	1:A:130:LEU:HD22	1.96	0.48
1:A:14:PRO:HD2	3:A:245:HOH:O	2.14	0.47
1:B:173:TYR:O	1:B:174:LYS:C	2.52	0.47
1:A:189:GLY:HA3	1:A:203:HIS:O	2.16	0.46
1:B:215:TYR:O	1:B:216:LYS:O	2.32	0.46
1:A:124:LEU:HD23	1:A:149:VAL:HG13	1.97	0.46
1:B:36:ILE:HG22	1:B:41:ILE:HG13	1.97	0.46
1:A:134:ASP:OD1	1:A:135:ILE:N	2.48	0.46
1:B:23:ILE:HD11	1:B:34:VAL:HG21	1.97	0.45
1:A:167:THR:CG2	1:A:169:ARG:NH1	2.74	0.45
1:B:106:ASN:HB2	3:B:229:HOH:O	2.16	0.45
1:B:165:LYS:HE2	1:B:185:LYS:O	2.16	0.45
1:B:14:PRO:HB2	1:B:35:PHE:CE1	2.52	0.44
1:B:38:HIS:N	1:B:203:HIS:HD2	1.98	0.44
1:B:26:HIS:HE1	1:B:200:ASP:OD2	2.01	0.44
1:A:38:HIS:HE1	3:A:280:HOH:O	2.01	0.44
1:A:199:ARG:HB2	3:A:273:HOH:O	2.18	0.44
1:B:92:ILE:HA	1:B:93:PRO:HD3	1.91	0.44
1:B:7:VAL:CG2	1:B:44:ARG:HD3	2.46	0.44
1:A:42:MET:HA	1:A:42:MET:HE2	2.01	0.43
1:B:23:ILE:HD11	1:B:34:VAL:CG2	2.49	0.43
1:A:119:ASP:O	1:A:121:LEU:N	2.52	0.43
1:A:137:ASP:HB3	2:A:218:25H:OAD	2.18	0.43
1:A:23:ILE:CD1	1:A:31:LEU:HD12	2.49	0.43
1:A:14:PRO:HB2	1:A:33:ARG:HD2	2.00	0.42
1:A:22:CYS:O	1:A:203:HIS:HE1	2.03	0.41
1:A:47:ARG:NH1	1:A:51:ASP:OD1	2.53	0.41
1:A:107:ASP:OD2	2:A:218:25H:HAI	2.21	0.41
1:B:7:VAL:HB	1:B:180:PHE:CD2	2.56	0.41
1:A:109:SER:HA	3:A:268:HOH:O	2.20	0.41
1:A:14:PRO:HB2	1:A:15:GLY:H	1.67	0.41
1:A:42:MET:HA	1:A:42:MET:CE	2.51	0.41
1:A:127:LYS:HG2	3:A:243:HOH:O	2.21	0.40
1:B:78:LEU:HA	1:B:78:LEU:HD22	1.87	0.40
1:A:207:ILE:O	1:A:207:ILE:HG23	2.20	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	213/217 (98%)	192 (90%)	15 (7%)	6 (3%)	5	7
1	B	202/217 (93%)	179 (89%)	16 (8%)	7 (4%)	3	5
All	All	415/434 (96%)	371 (89%)	31 (8%)	13 (3%)	4	6

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	12	ASP
1	A	14	PRO
1	A	120	ASP
1	B	171	VAL
1	B	174	LYS
1	B	216	LYS
1	A	61	ILE
1	A	190	TYR
1	B	4	SER
1	B	190	TYR
1	A	106	ASN
1	B	68	LYS
1	B	146	LEU

### 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	181/191 (95%)	151 (83%)	30 (17%)	2	3

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	172/191 (90%)	158 (92%)	14 (8%)	11	23
All	All	353/382 (92%)	309 (88%)	44 (12%)	4	8

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	19	ASP
1	A	23	ILE
1	A	40	LEU
1	A	47	ARG
1	A	50	ARG
1	A	61	ILE
1	A	67	LEU
1	A	68	LYS
1	A	72	LYS
1	A	77	LEU
1	A	78	LEU
1	A	86	ARG
1	A	89[A]	ASP
1	A	89[B]	ASP
1	A	91	SER
1	A	100	ARG
1	A	103	SER
1	A	110	THR
1	A	143	GLN
1	A	145	LEU
1	A	146	LEU
1	A	148	LEU
1	A	158	LYS
1	A	162	LEU
1	A	167	THR
1	A	178	VAL
1	A	193	ASP
1	A	199	ARG
1	A	210	THR
1	A	216	LYS
1	B	40	LEU
1	B	47	ARG
1	B	61	ILE
1	B	68	LYS
1	B	78	LEU
1	B	92	ILE

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Mol	Chain	Res	Type
1	B	97	ASP
1	B	99	ILE
1	B	119	ASP
1	B	140	LYS
1	B	146	LEU
1	B	150	ARG
1	B	163	LEU
1	B	167	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	26	HIS
1	A	38	HIS
1	A	85	ASN
1	A	203	HIS
1	B	26	HIS
1	B	195	ASN
1	B	203	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

2 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	25H	B	218	-	17,21,21	1.34	2 (11%)	19,30,30	2.21	7 (36%)
2	25H	A	218	-	17,21,21	1.35	3 (17%)	19,30,30	2.03	5 (26%)

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	25H	B	218	-	-	0/9/9/9	0/2/2/2
2	25H	A	218	-	-	4/9/9/9	0/2/2/2

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	218	25H	PAT-CAJ	3.13	1.82	1.78
2	B	218	25H	O6-C6	3.06	1.32	1.24
2	A	218	25H	O6-C6	2.97	1.32	1.24
2	A	218	25H	PAT-CAJ	2.56	1.81	1.78
2	A	218	25H	C6-N1	2.19	1.36	1.33

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	218	25H	N3-C2-N1	-4.85	120.75	127.22
2	B	218	25H	C2-N3-C4	4.53	120.54	115.36
2	A	218	25H	C2-N3-C4	4.25	120.21	115.36
2	A	218	25H	N3-C2-N1	-4.20	121.62	127.22
2	A	218	25H	OAC-PAT-CAJ	-3.67	104.61	111.40
2	B	218	25H	OAC-PAT-CAJ	-3.24	105.40	111.40
2	B	218	25H	C6-N1-C2	3.09	120.84	115.93
2	B	218	25H	C5-C6-N1	-3.06	119.24	123.43
2	A	218	25H	C5-C6-N1	-2.81	119.59	123.43
2	B	218	25H	OAE-PAT-OAD	2.53	115.48	108.08
2	A	218	25H	C6-N1-C2	2.42	119.78	115.93
2	B	218	25H	C6-C5-C4	-2.00	118.89	120.80

There are no chirality outliers.

All (4) torsion outliers are listed below:

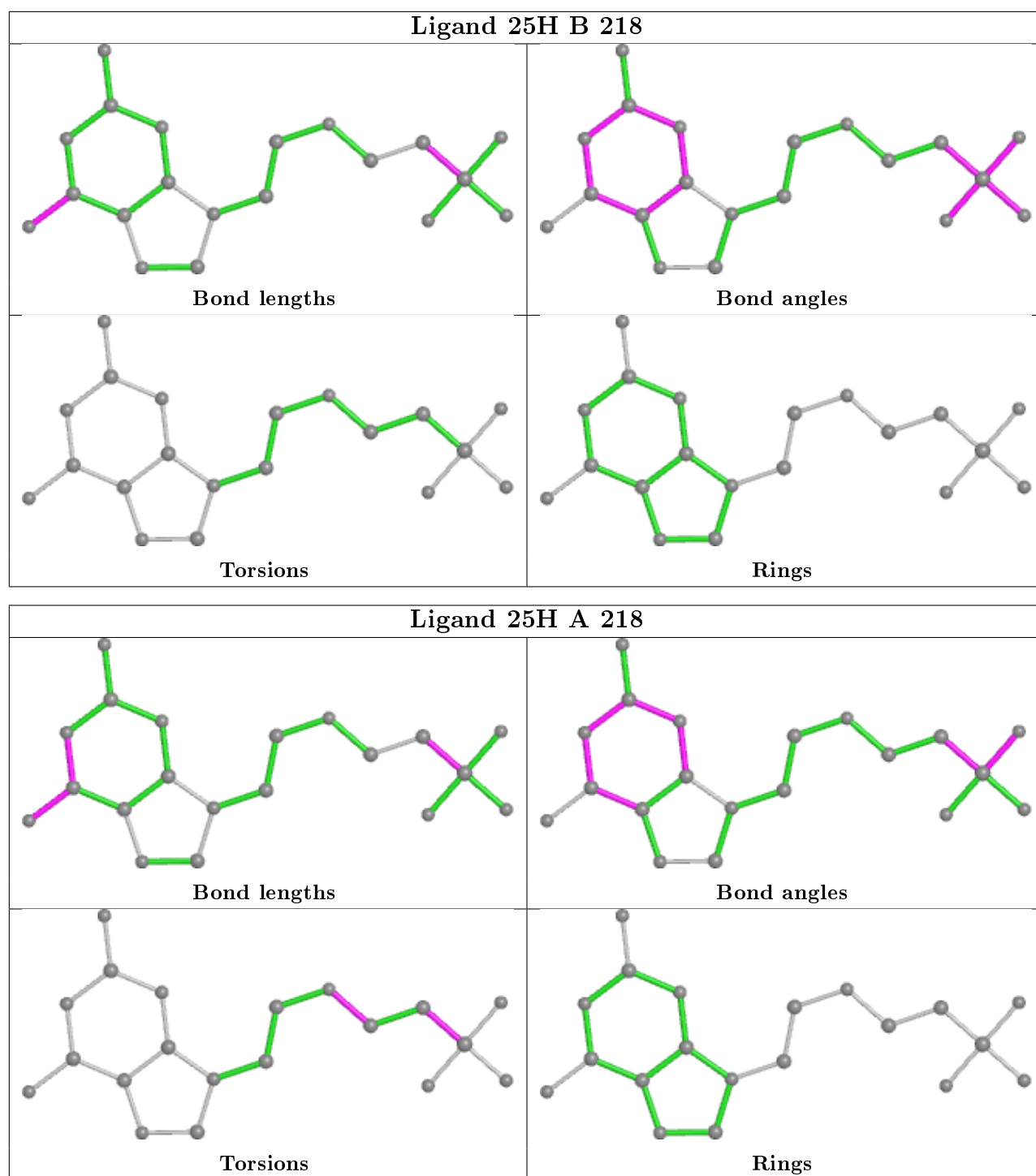
Mol	Chain	Res	Type	Atoms
2	A	218	25H	CAH-CAJ-PAT-OAD
2	A	218	25H	CAH-CAJ-PAT-OAE
2	A	218	25H	CAH-CAJ-PAT-OAC
2	A	218	25H	CAJ-CAH-OAN-CAG

There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	218	25H	3	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	214/217 (98%)	0.20	12 (5%)	24 19	6, 24, 53, 70	1 (0%)
1	B	211/217 (97%)	0.19	13 (6%)	20 15	8, 26, 50, 79	0
All	All	425/434 (97%)	0.20	25 (5%)	22 17	6, 25, 51, 79	1 (0%)

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	104	TYR	5.5
1	A	14	PRO	4.7
1	A	59	HIS	4.5
1	B	58	GLY	4.3
1	B	217	ALA	3.9
1	A	107	ASP	3.9
1	A	108	GLN	3.8
1	B	125	THR	3.7
1	B	106	ASN	3.7
1	A	105	CYS	3.7
1	A	106	ASN	3.7
1	B	154	PRO	3.4
1	A	110	THR	3.1
1	A	12	ASP	2.7
1	B	60	HIS	2.7
1	B	13	GLU	2.7
1	A	10	SER	2.6
1	B	153	ASN	2.6
1	B	171	VAL	2.6
1	B	57	GLY	2.5
1	B	10	SER	2.5
1	A	217	ALA	2.4
1	A	29	GLU	2.3
1	B	119	ASP	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	109	SER	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 carbohydrates in this entry.

## 6.4 Ligands [i](#)

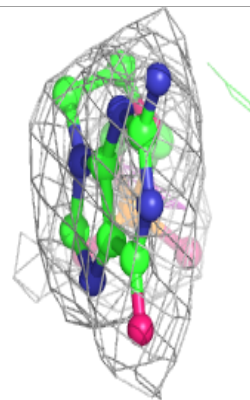
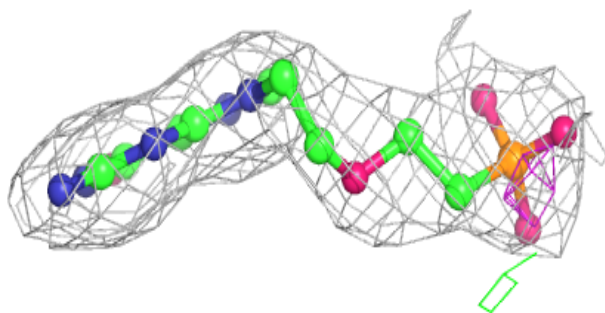
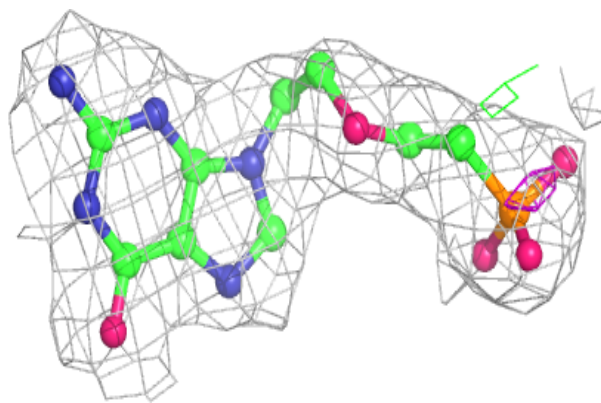
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	25H	A	218	20/20	0.93	0.15	21,24,32,34	0
2	25H	B	218	20/20	0.97	0.10	20,21,26,27	0

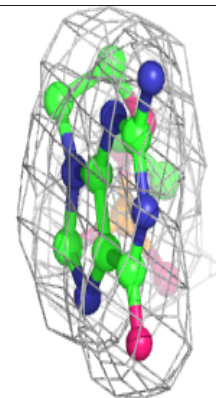
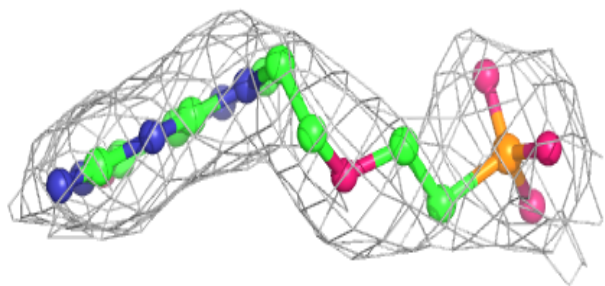
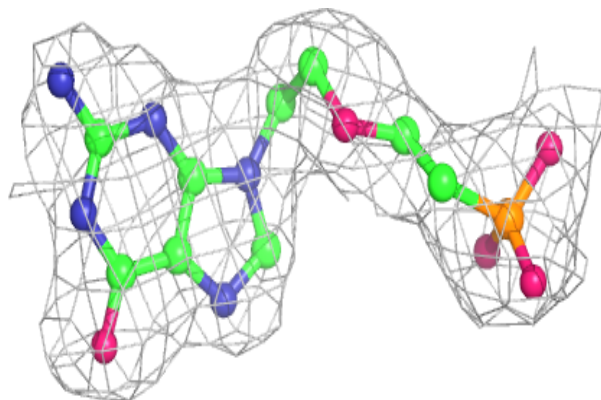
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around 25H A 218:**

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

**Electron density around 25H B 218:**

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



## 6.5 Other polymers

There are no such residues in this entry.