



# Full wwPDB X-ray Structure Validation Report ⓘ

Jul 21, 2016 – 09:12 PM EDT

PDB ID : 5EMJ  
Title : Crystal structure of PRMT5:MEP50 with Compound 8 and sinefungin  
Authors : Boriack-Sjodin, P.A.; Jin, L.  
Deposited on : 2015-11-06  
Resolution : 2.27 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  
<http://wwpdb.org/validation/2016/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 : 1.7.1 (RC1), CSD as537be (2016)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20027790  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20027790

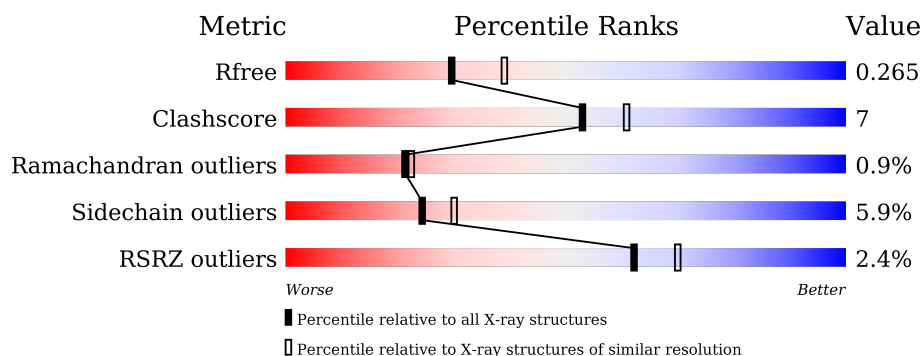
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.27 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))
$R_{free}$	91344	5193 (2.30-2.26)
Clashscore	102246	5929 (2.30-2.26)
Ramachandran outliers	100387	5851 (2.30-2.26)
Sidechain outliers	100360	5850 (2.30-2.26)
RSRZ outliers	91569	5204 (2.30-2.26)

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. 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	645	<div> <div>3%</div> <div>82%</div> <div>14%</div> <div>••</div> </div>
2	B	350	<div> <div>%</div> <div>69%</div> <div>15%</div> <div>•</div> <div>13%</div> </div>

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
5	GOL	A	704	-	-	-	X
5	GOL	A	705	-	-	X	X

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 7774 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 Protein arginine N-methyltransferase 5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	625	Total	C	N	O	S	0	16	0
			5188	3315	896	952	25			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	MET	-	initiating methionine	UNP O14744
A	-6	ASP	-	expression tag	UNP O14744
A	-5	TYR	-	expression tag	UNP O14744
A	-4	LYS	-	expression tag	UNP O14744
A	-3	ASP	-	expression tag	UNP O14744
A	-2	ASP	-	expression tag	UNP O14744
A	-1	ASP	-	expression tag	UNP O14744
A	0	ASP	-	expression tag	UNP O14744
A	1	LYS	-	expression tag	UNP O14744

- Molecule 2 is a protein called Methylosome protein 50.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	303	Total	C	N	O	S	0	2	0
			2301	1442	393	450	16			

There are 9 discrepancies between the modelled and reference sequences:

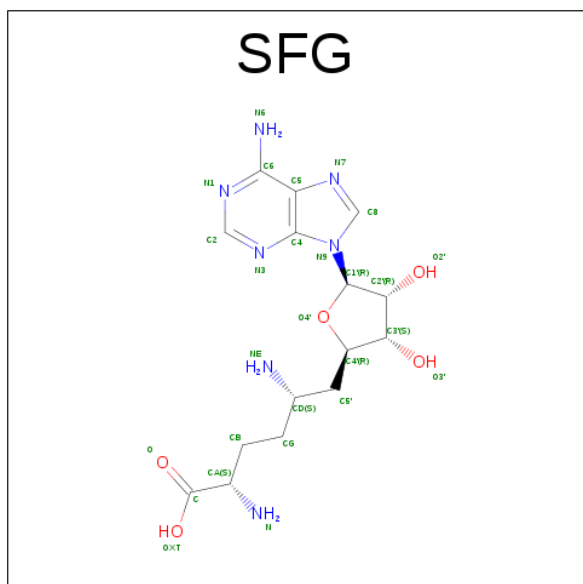
Chain	Residue	Modelled	Actual	Comment	Reference
B	-7	MET	-	initiating methionine	UNP Q9BQA1
B	-6	HIS	-	expression tag	UNP Q9BQA1
B	-5	HIS	-	expression tag	UNP Q9BQA1
B	-4	HIS	-	expression tag	UNP Q9BQA1
B	-3	HIS	-	expression tag	UNP Q9BQA1
B	-2	HIS	-	expression tag	UNP Q9BQA1
B	-1	HIS	-	expression tag	UNP Q9BQA1

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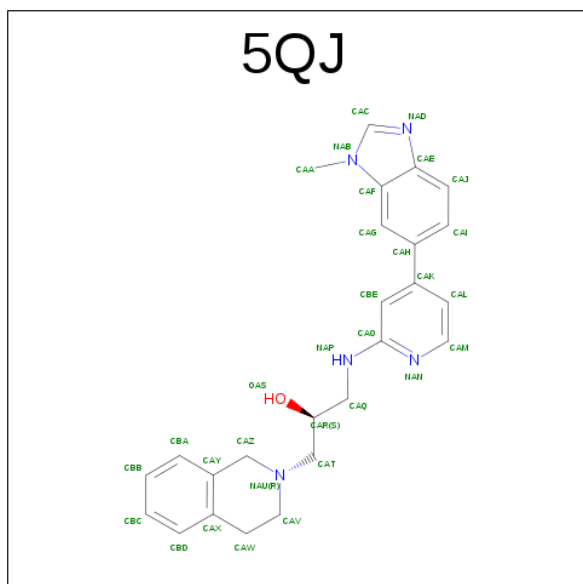
Chain	Residue	Modelled	Actual	Comment	Reference
B	0	HIS	-	expression tag	UNP Q9BQA1
B	1	HIS	-	expression tag	UNP Q9BQA1

- Molecule 3 is SINEFUNGIN (three-letter code: SFG) (formula:  $C_{15}H_{23}N_7O_5$ ).



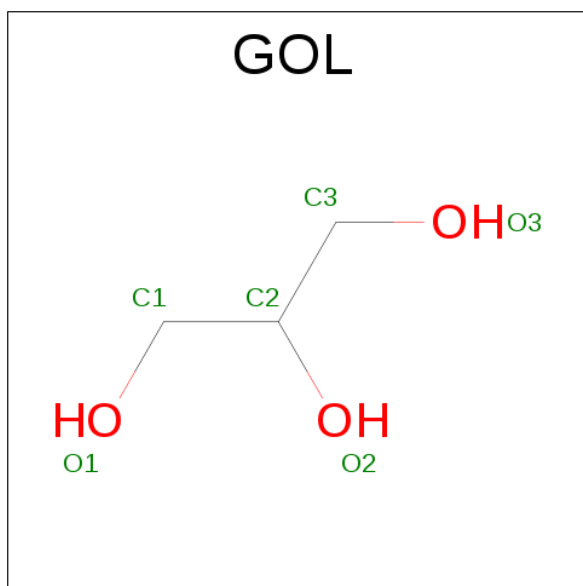
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			27	15	7	5		

- Molecule 4 is (2 {S})-1-(3,4-dihydro-1 {H}-isoquinolin-2-yl)-3-[[4-(3-methylbenzimidazol-5-yl)pyridin-2-yl]amino]propan-2-ol (three-letter code: 5QJ) (formula:  $C_{25}H_{27}N_5O$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			31	25	5	1		

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



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

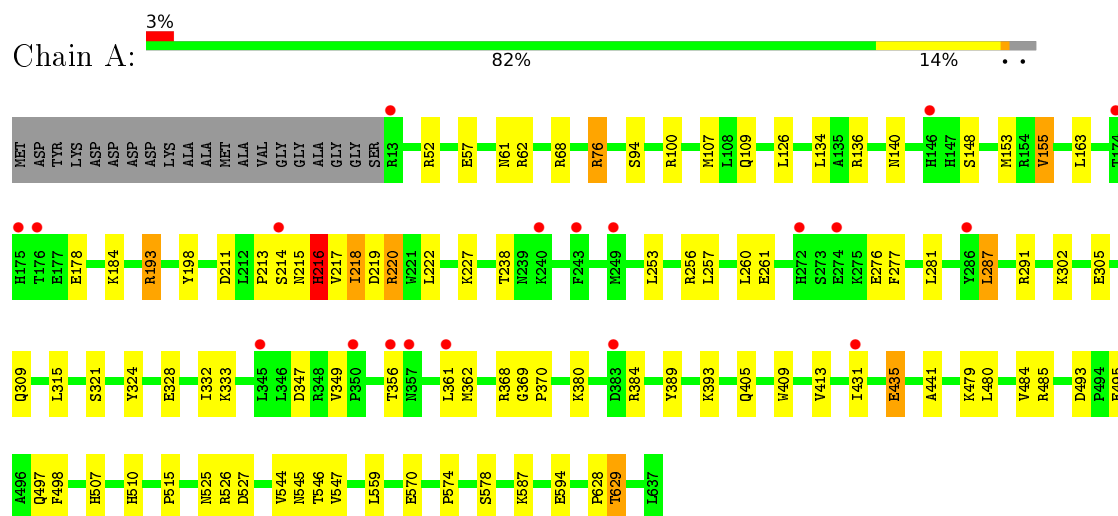
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	163	Total	O	0	0
			163	163		
6	B	40	Total	O	0	0
			40	40		

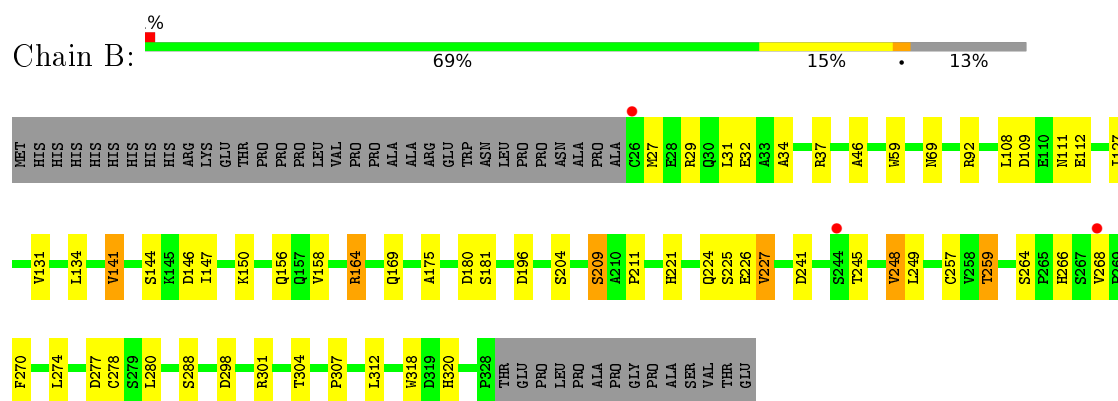
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: Protein arginine N-methyltransferase 5



- Molecule 2: Methylosome protein 50



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	104.24Å 138.83Å 179.34Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	61.05 – 2.27 54.91 – 2.27	Depositor EDS
% Data completeness (in resolution range)	98.7 (61.05-2.27) 98.7 (54.91-2.27)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.05	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.45 (at 2.27Å)	Xtriage
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.209 , 0.266 0.208 , 0.265	Depositor DCC
$R_{free}$ test set	2996 reflections (5.33%)	DCC
Wilson B-factor (Å <sup>2</sup> )	48.7	Xtriage
Anisotropy	0.233	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 44.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	7774	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.09% 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: GOL, 5QJ, SFG

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	0.55	0/5335	0.72	2/7258 (0.0%)
2	B	0.46	0/2358	0.66	0/3219
All	All	0.52	0/7693	0.70	2/10477 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	155	VAL	CB-CA-C	-5.26	101.41	111.40
1	A	493	ASP	CB-CG-OD1	5.18	122.96	118.30

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	5188	0	5064	70	0
2	B	2301	0	2217	30	0
3	A	27	0	22	0	0
4	A	31	0	0	0	0
5	A	18	0	24	4	0
5	B	6	0	8	1	0
6	A	163	0	0	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	40	0	0	5	0
All	All	7774	0	7335	99	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 7.

All (99) 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:215[B]:ASN:O	1:A:217[B]:VAL:N	1.64	1.28
1:A:220[B]:ARG:HB3	1:A:220[B]:ARG:NH1	1.88	0.88
1:A:218[B]:ILE:HG22	1:A:256:ARG:HH21	1.38	0.87
1:A:220[B]:ARG:HB3	1:A:220[B]:ARG:HH11	1.43	0.80
1:A:222[A]:LEU:HB3	1:A:510:HIS:HB2	1.66	0.78
1:A:215[A]:ASN:O	1:A:216[A]:HIS:HB3	1.82	0.77
1:A:215[B]:ASN:O	1:A:217[B]:VAL:HG22	1.84	0.77
1:A:215[B]:ASN:C	1:A:217[B]:VAL:N	2.39	0.74
2:B:69:ASN:HB2	6:B:535:HOH:O	1.88	0.74
1:A:546:THR:OG1	1:A:547:VAL:N	2.24	0.71
1:A:109:GLN:HE22	5:A:705:GOL:C3	2.03	0.70
1:A:218[B]:ILE:CG2	1:A:256:ARG:HH21	2.04	0.70
1:A:215[B]:ASN:C	1:A:217[B]:VAL:H	1.93	0.69
1:A:52:ARG:HD2	5:A:705:GOL:O3	1.93	0.69
1:A:215[B]:ASN:O	1:A:218[B]:ILE:N	2.26	0.68
1:A:362:MET:HG2	1:A:389:TYR:HB2	1.77	0.66
1:A:215[B]:ASN:O	1:A:217[B]:VAL:CG2	2.44	0.66
2:B:32:GLU:OE2	2:B:301:ARG:HD3	1.96	0.65
1:A:485:ARG:HG3	1:A:498:PHE:HZ	1.62	0.64
1:A:324:TYR:CB	1:A:368:ARG:HD2	2.27	0.64
1:A:215[B]:ASN:O	1:A:217[B]:VAL:CA	2.45	0.64
1:A:525:ASN:HD21	1:A:527:ASP:HB2	1.63	0.64
1:A:109:GLN:HE22	5:A:705:GOL:H31	1.64	0.63
1:A:218[B]:ILE:HG22	1:A:256:ARG:NH2	2.10	0.63
1:A:215[B]:ASN:O	1:A:216[B]:HIS:C	2.36	0.62
1:A:349:VAL:HG23	1:A:384:ARG:HE	1.64	0.61
1:A:220[B]:ARG:HG2	6:A:801:HOH:O	1.99	0.61
1:A:215[B]:ASN:OD1	1:A:216[B]:HIS:N	2.33	0.61
1:A:479:LYS:NZ	6:A:804:HOH:O	2.32	0.61
1:A:219[A]:ASP:O	1:A:222[A]:LEU:HB2	2.01	0.61
1:A:544:VAL:HG22	1:A:545:ASN:O	2.01	0.60
1:A:215[A]:ASN:O	1:A:216[A]:HIS:CB	2.50	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:628:PRO:O	1:A:629:THR:HB	2.00	0.59
2:B:156:GLN:HB3	2:B:158:VAL:HG22	1.83	0.59
2:B:259:THR:HG21	2:B:301:ARG:NH2	2.18	0.58
1:A:193:ARG:HG3	1:A:193:ARG:HH21	1.70	0.57
2:B:144:SER:HB3	2:B:146:ASP:OD1	2.04	0.57
1:A:525:ASN:ND2	1:A:527:ASP:HB2	2.20	0.56
1:A:305:GLU:HG2	1:A:507:HIS:CG	2.41	0.56
2:B:111:ASN:HA	6:B:521:HOH:O	2.06	0.56
2:B:277:ASP:O	2:B:278:CYS:HB2	2.09	0.53
1:A:57:GLU:HG2	1:A:61:ASN:ND2	2.25	0.52
2:B:27:MET:HG3	2:B:59:TRP:NE1	2.24	0.52
2:B:181:SER:O	2:B:196:ASP:HA	2.11	0.51
1:A:324:TYR:HB2	1:A:368:ARG:HD2	1.92	0.51
1:A:332:ILE:HG13	1:A:574:PRO:O	2.12	0.50
1:A:140:ASN:ND2	6:A:807:HOH:O	2.44	0.50
1:A:333:LYS:HE3	1:A:435:GLU:HG2	1.92	0.50
2:B:29:ARG:HG3	2:B:320:HIS:HB2	1.93	0.50
1:A:215[A]:ASN:HA	1:A:218[A]:ILE:HG23	1.94	0.50
1:A:328:GLU:OE2	1:A:368:ARG:HB2	2.13	0.49
1:A:328:GLU:OE2	1:A:368:ARG:HD3	2.13	0.48
2:B:221:HIS:HB2	2:B:227:VAL:HG22	1.95	0.48
2:B:301:ARG:HD2	2:B:318:TRP:NE1	2.28	0.48
1:A:222[B]:LEU:HD11	1:A:256:ARG:HB3	1.95	0.48
2:B:221:HIS:HB2	2:B:227:VAL:CG2	2.44	0.48
2:B:34:ALA:O	2:B:304:THR:HB	2.15	0.47
1:A:220[B]:ARG:HG3	6:A:806:HOH:O	2.15	0.46
1:A:495:GLU:HB3	1:A:587:LYS:HE2	1.97	0.46
1:A:52:ARG:HB3	5:A:705:GOL:O3	2.16	0.45
1:A:480:LEU:O	1:A:484:VAL:HG23	2.15	0.45
2:B:164:ARG:NH2	6:B:501:HOH:O	2.27	0.45
1:A:544:VAL:HG22	1:A:545:ASN:N	2.32	0.45
2:B:141:VAL:HA	2:B:150:LYS:O	2.17	0.45
2:B:92:ARG:O	2:B:108:LEU:HB2	2.17	0.45
1:A:62:ARG:HD3	2:B:298:ASP:OD2	2.16	0.44
2:B:248:VAL:HG12	2:B:249:LEU:HD13	1.99	0.44
1:A:193:ARG:HG3	1:A:193:ARG:NH2	2.29	0.44
1:A:260:LEU:O	1:A:261:GLU:HB2	2.17	0.44
1:A:107:MET:SD	1:A:134:LEU:HD12	2.58	0.44
2:B:169:GLN:HG2	6:B:528:HOH:O	2.17	0.44
1:A:349:VAL:O	1:A:349:VAL:HG23	2.18	0.43
1:A:515:PRO:HD2	1:A:570:GLU:OE1	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:109:ASP:HB3	2:B:112:GLU:H	1.84	0.43
1:A:281:LEU:HD12	1:A:281:LEU:HA	1.84	0.43
1:A:361:LEU:HD23	1:A:431:ILE:HB	2.00	0.43
2:B:37:ARG:O	2:B:307:PRO:HG3	2.19	0.43
2:B:92:ARG:HD3	6:B:532:HOH:O	2.18	0.43
1:A:409:TRP:HB3	1:A:413:VAL:CG2	2.49	0.42
2:B:134:LEU:HA	2:B:175:ALA:HB1	2.00	0.42
1:A:253:LEU:HG	1:A:257:LEU:HD12	2.00	0.42
1:A:276:GLU:HG2	1:A:277:PHE:H	1.84	0.42
2:B:31:LEU:HD23	2:B:46:ALA:HB2	2.01	0.42
1:A:222[B]:LEU:CD1	1:A:256:ARG:HB3	2.49	0.42
1:A:211:ASP:HB2	6:A:813:HOH:O	2.20	0.42
2:B:221:HIS:CB	2:B:227:VAL:HG22	2.50	0.42
1:A:193:ARG:HD3	1:A:198:TYR:CE2	2.55	0.42
1:A:222[A]:LEU:HD13	1:A:510:HIS:CD2	2.54	0.41
2:B:264:SER:OG	2:B:270:PHE:N	2.53	0.41
1:A:76:ARG:HH11	1:A:76:ARG:HB2	1.85	0.41
1:A:94:SER:O	1:A:100:ARG:NH1	2.49	0.41
2:B:224:GLN:C	2:B:226:GLU:H	2.24	0.41
1:A:126:LEU:HD21	1:A:153:MET:HE2	2.01	0.41
1:A:510:HIS:ND1	6:A:806:HOH:O	2.37	0.41
2:B:264:SER:HB2	2:B:266:HIS:HD2	1.86	0.41
1:A:287:LEU:HD12	1:A:287:LEU:HA	1.96	0.40
1:A:369:GLY:N	1:A:370:PRO:HD2	2.36	0.40
2:B:211:PRO:HA	5:B:401:GOL:H31	2.03	0.40
1:A:227:LYS:HA	1:A:227:LYS:HD3	1.85	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	639/645 (99%)	601 (94%)	32 (5%)	6 (1%)	21	22
2	B	303/350 (87%)	286 (94%)	13 (4%)	4 (1%)	15	14
All	All	942/995 (95%)	887 (94%)	45 (5%)	10 (1%)	21	17

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	214[A]	SER
1	A	214[B]	SER
1	A	216[A]	HIS
1	A	216[B]	HIS
2	B	147	ILE
2	B	209	SER
2	B	127	ILE
1	A	441	ALA
2	B	248	VAL
1	A	213	PRO

### 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	572/570 (100%)	537 (94%)	35 (6%)	23	29
2	B	260/298 (87%)	243 (94%)	17 (6%)	21	26
All	All	832/868 (96%)	780 (94%)	52 (6%)	24	27

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	68	ARG
1	A	76	ARG
1	A	136	ARG
1	A	148[A]	SER
1	A	148[B]	SER
1	A	155	VAL

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Mol	Chain	Res	Type
1	A	163	LEU
1	A	178	GLU
1	A	184	LYS
1	A	193	ARG
1	A	216[A]	HIS
1	A	216[B]	HIS
1	A	218[A]	ILE
1	A	218[B]	ILE
1	A	220[A]	ARG
1	A	220[B]	ARG
1	A	238	THR
1	A	287	LEU
1	A	291	ARG
1	A	302	LYS
1	A	309	GLN
1	A	315	LEU
1	A	321	SER
1	A	347	ASP
1	A	356	THR
1	A	380	LYS
1	A	393	LYS
1	A	405	GLN
1	A	435	GLU
1	A	497	GLN
1	A	526	ARG
1	A	559	LEU
1	A	578	SER
1	A	594	GLU
1	A	629	THR
2	B	131	VAL
2	B	141	VAL
2	B	164	ARG
2	B	180	ASP
2	B	204	SER
2	B	209	SER
2	B	225	SER
2	B	227	VAL
2	B	241	ASP
2	B	245	THR
2	B	257	CYS
2	B	259	THR
2	B	268	VAL

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Mol	Chain	Res	Type
2	B	274	LEU
2	B	280	LEU
2	B	288	SER
2	B	312	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	ASN
1	A	79	ASN
1	A	511	GLN
1	A	525	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

6 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
3	SFG	A	701	-	23,29,29	1.21	3 (13%)	20,42,42	2.08	3 (15%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	5QJ	A	702	-	33,35,35	2.02	9 (27%)	41,49,49	1.50	5 (12%)
5	GOL	A	703	-	5,5,5	0.31	0	5,5,5	0.27	0
5	GOL	A	704	-	5,5,5	0.30	0	5,5,5	0.34	0
5	GOL	A	705	-	5,5,5	0.25	0	5,5,5	0.73	0
5	GOL	B	401	-	5,5,5	0.22	0	5,5,5	0.54	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	SFG	A	701	-	-	0/9/33/33	0/3/3/3
4	5QJ	A	702	-	-	0/13/22/22	0/5/5/5
5	GOL	A	703	-	-	0/4/4/4	0/0/0/0
5	GOL	A	704	-	-	0/4/4/4	0/0/0/0
5	GOL	A	705	-	-	0/4/4/4	0/0/0/0
5	GOL	B	401	-	-	0/4/4/4	0/0/0/0

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	702	5QJ	CAZ-CAY	-5.40	1.39	1.51
4	A	702	5QJ	CAW-CAX	-5.01	1.42	1.51
4	A	702	5QJ	CAJ-CAE	-4.26	1.34	1.41
4	A	702	5QJ	CAH-CAK	-2.70	1.42	1.49
4	A	702	5QJ	CAG-CAF	-2.55	1.35	1.40
3	A	701	SFG	C2'-C1'	-2.53	1.49	1.53
4	A	702	5QJ	CAF-CAE	-2.36	1.35	1.40
4	A	702	5QJ	CAO-NAP	-2.07	1.33	1.36
4	A	702	5QJ	CAJ-CAI	2.11	1.41	1.36
3	A	701	SFG	O4'-C1'	2.39	1.44	1.41
3	A	701	SFG	C5-C4	3.41	1.48	1.40
4	A	702	5QJ	CAM-NAN	3.68	1.42	1.34

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	701	SFG	N3-C2-N1	-7.89	122.68	128.87
4	A	702	5QJ	CAL-CAM-NAN	-3.98	119.22	123.88
4	A	702	5QJ	CBE-CAO-NAP	-2.84	116.64	120.71
3	A	701	SFG	O4'-C4'-C5'	-2.16	106.02	109.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	701	SFG	C2-N1-C6	2.02	122.37	118.77
4	A	702	5QJ	CAK-CBE-CAO	3.21	121.42	118.39
4	A	702	5QJ	NAP-CAO-NAN	3.27	122.30	117.05
4	A	702	5QJ	CAZ-NAU-CAV	4.34	115.08	110.00

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
5	A	705	GOL	4	0
5	B	401	GOL	1	0

## 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	625/645 (96%)	0.07	19 (3%) 54 62	19, 48, 84, 144	0
2	B	303/350 (86%)	-0.06	3 (0%) 84 87	40, 60, 93, 130	0
All	All	928/995 (93%)	0.03	22 (2%) 62 70	19, 52, 88, 144	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	175	HIS	5.5
1	A	176	THR	4.9
1	A	431	ILE	3.5
2	B	268	VAL	3.5
1	A	146[A]	HIS	3.1
1	A	272	HIS	2.8
1	A	286	TYR	2.7
1	A	274	GLU	2.7
1	A	243	PHE	2.5
1	A	383	ASP	2.4
1	A	345	LEU	2.4
1	A	356	THR	2.3
1	A	361	LEU	2.3
1	A	357	ASN	2.2
2	B	26	CYS	2.2
1	A	350	PRO	2.1
1	A	13	ARG	2.1
1	A	249	MET	2.1
1	A	174	THR	2.1
2	B	244	SER	2.1
1	A	240	LYS	2.0
1	A	214[A]	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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
5	GOL	A	704	6/6	0.91	0.17	4.11	47,53,60,64	0
5	GOL	A	705	6/6	0.87	0.23	4.09	57,63,65,73	0
5	GOL	A	703	6/6	0.91	0.14	1.22	66,68,71,76	0
4	5QJ	A	702	31/31	0.95	0.13	-0.01	37,56,74,78	0
5	GOL	B	401	6/6	0.93	0.13	-0.31	63,68,70,78	0
3	SFG	A	701	27/27	0.98	0.12	-0.52	32,35,42,43	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.