



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 12:08 AM GMT

PDB ID : 1ZUN
Title : Crystal Structure of a GTP-Regulated ATP Sulfurylase Heterodimer from *Pseudomonas syringae*
Authors : Mougous, J.D.; Lee, D.H.; Hubbard, S.C.; Schelle, M.W.; Vocadlo, D.J.; Berger, J.M.; Bertozzi, C.R.
Deposited on : 2005-05-31
Resolution : 2.70 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
<http://wwpdb.org/validation/2016/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 : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
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) : trunk26865

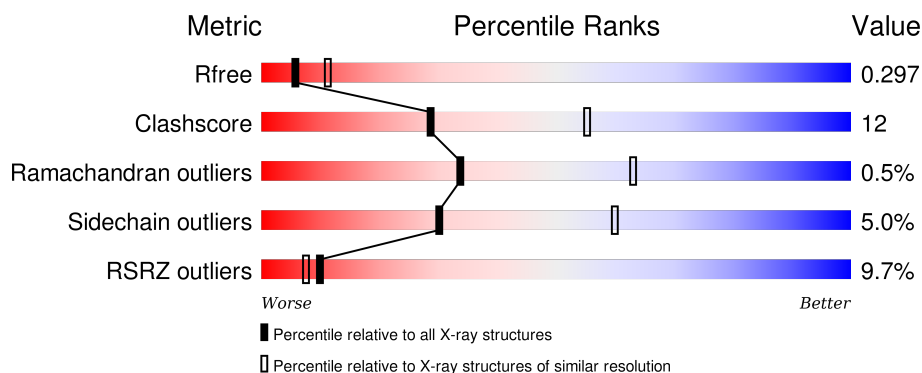
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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	2103 (2.70-2.70)
Clashscore	102246	2422 (2.70-2.70)
Ramachandran outliers	100387	2382 (2.70-2.70)
Sidechain outliers	100360	2382 (2.70-2.70)
RSRZ outliers	91569	2107 (2.70-2.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 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	325	<div> <div>10%</div> <div>51%</div> <div>10%</div> <div>•</div> <div>37%</div> </div>
2	B	434	<div> <div>5%</div> <div>71%</div> <div>17%</div> <div>•</div> <div>9%</div> </div>

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 4836 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 Sulfate adenylyltransferase subunit 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	204	Total	C	N	O	Se	0	0	0
			1661	1065	293	295	8			

There are 27 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	GLY	-	CLONING ARTIFACT	UNP Q87WW0
A	-17	SER	-	CLONING ARTIFACT	UNP Q87WW0
A	-16	SER	-	CLONING ARTIFACT	UNP Q87WW0
A	-15	HIS	-	CLONING ARTIFACT	UNP Q87WW0
A	-14	HIS	-	CLONING ARTIFACT	UNP Q87WW0
A	-13	HIS	-	CLONING ARTIFACT	UNP Q87WW0
A	-12	HIS	-	CLONING ARTIFACT	UNP Q87WW0
A	-11	HIS	-	CLONING ARTIFACT	UNP Q87WW0
A	-10	HIS	-	CLONING ARTIFACT	UNP Q87WW0
A	-9	SER	-	CLONING ARTIFACT	UNP Q87WW0
A	-8	SER	-	CLONING ARTIFACT	UNP Q87WW0
A	-7	GLY	-	CLONING ARTIFACT	UNP Q87WW0
A	-6	LEU	-	CLONING ARTIFACT	UNP Q87WW0
A	-5	VAL	-	CLONING ARTIFACT	UNP Q87WW0
A	-4	PRO	-	CLONING ARTIFACT	UNP Q87WW0
A	-3	ARG	-	CLONING ARTIFACT	UNP Q87WW0
A	-2	GLY	-	CLONING ARTIFACT	UNP Q87WW0
A	-1	SER	-	CLONING ARTIFACT	UNP Q87WW0
A	0	HIS	-	CLONING ARTIFACT	UNP Q87WW0
A	1	MSE	MET	MODIFIED RESIDUE	UNP Q87WW0
A	31	MSE	MET	MODIFIED RESIDUE	UNP Q87WW0
A	42	MSE	MET	MODIFIED RESIDUE	UNP Q87WW0
A	60	MSE	MET	MODIFIED RESIDUE	UNP Q87WW0
A	71	MSE	MET	MODIFIED RESIDUE	UNP Q87WW0
A	78	MSE	MET	MODIFIED RESIDUE	UNP Q87WW0
A	82	MSE	MET	MODIFIED RESIDUE	UNP Q87WW0
A	113	MSE	MET	MODIFIED RESIDUE	UNP Q87WW0

- Molecule 2 is a protein called sulfate adenylyl transferase, subunit 1/adenylylsulfate kinase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	394	Total	C	N	O	S	Se	0	0	0
			3027	1910	522	581	2	12			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	24	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	50	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	121	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	167	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	198	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	203	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	227	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	310	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	338	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	342	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	347	MSE	MET	MODIFIED RESIDUE	GB 28871567
B	431	MSE	MET	MODIFIED RESIDUE	GB 28871567

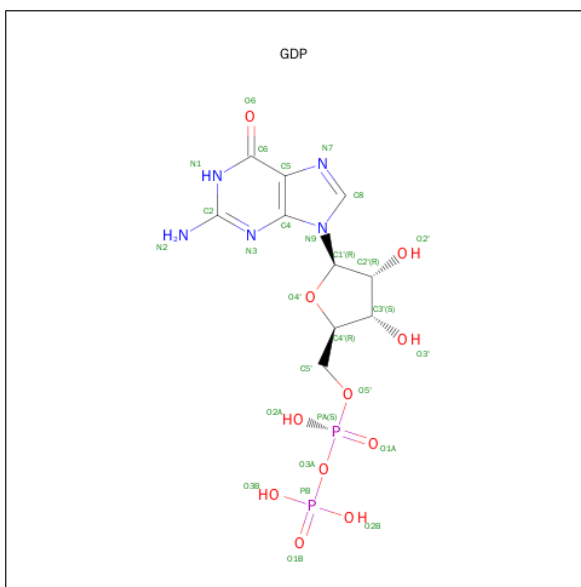
- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Mg	0	0
			1	1		

- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

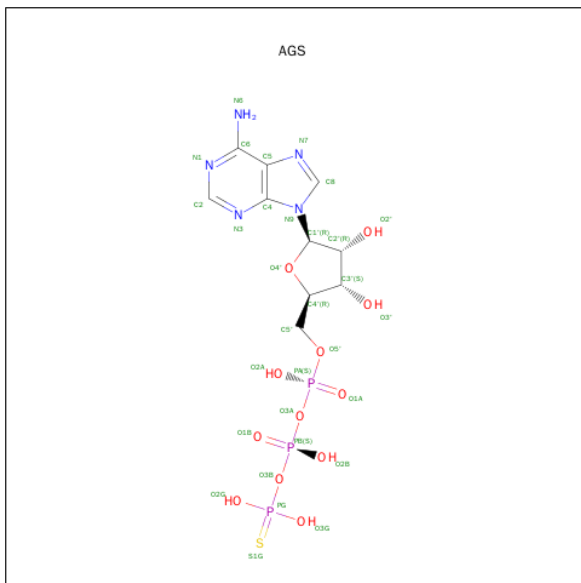
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Na	0	0
			1	1		

- Molecule 5 is GUANOSINE-5'-DIPHOSPHATE (three-letter code: GDP) (formula: C₁₀H₁₅N₅O₁₁P₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	B	1	Total	C	N	O	P	0	0
			28	10	5	11	2		

- Molecule 6 is PHOSPHOTHIOPHOSPHORIC ACID-ADENYLATE ESTER (three-letter code: AGS) (formula: $\text{C}_{10}\text{H}_{16}\text{N}_5\text{O}_{12}\text{P}_3\text{S}$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
6	A	1	Total	C	N	O	P	S	0	0
			31	10	5	12	3	1		

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	29	Total 29	O 29	0	0
7	B	58	Total 58	O 58	0	0

4 Data and refinement statistics

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	110.07Å 110.07Å 171.00Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	20.00 – 2.70 19.80 – 2.70	Depositor EDS
% Data completeness (in resolution range)	100.0 (20.00-2.70) 99.7 (19.80-2.70)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.54 (at 2.71Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.222 , 0.276 0.252 , 0.297	Depositor DCC
R_{free} test set	1091 reflections (5.17%)	DCC
Wilson B-factor (Å ²)	42.3	Xtriage
Anisotropy	0.016	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 48.5	EDS
Estimated twinning fraction	0.034 for h,-h-k,-l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 21111 reflections	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	4836	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.84% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: GDP, NA, MG, AGS

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	0.28	0/1696	0.47	0/2276
2	B	0.28	0/3063	0.53	0/4123
All	All	0.28	0/4759	0.51	0/6399

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
2	B	0	4

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	278	VAL	Mainchain,Peptide
2	B	279	LEU	Mainchain,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	1661	0	1630	29	0
2	B	3027	0	3039	85	0
3	A	1	0	0	0	0
4	A	1	0	0	0	0
5	B	28	0	12	1	0
6	A	31	0	12	1	0
7	A	29	0	0	1	0
7	B	58	0	0	1	0
All	All	4836	0	4693	109	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 12.

All (109) 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)
2:B:278:VAL:HG12	2:B:322:LEU:CD2	1.61	1.29
2:B:125:ALA:HB3	2:B:155:LEU:CD1	1.73	1.18
1:A:168:ASN:HB2	7:A:729:HOH:O	1.41	1.17
1:A:166:LEU:HD12	2:B:417:ILE:CG2	1.76	1.15
2:B:278:VAL:HG12	2:B:322:LEU:HD23	1.28	1.15
2:B:279:LEU:N	2:B:280:PRO:HD2	1.33	1.13
2:B:125:ALA:CB	2:B:155:LEU:HD12	1.80	1.10
1:A:166:LEU:CD1	2:B:417:ILE:HG22	1.82	1.10
1:A:166:LEU:HD12	2:B:417:ILE:HG22	1.04	1.00
2:B:279:LEU:N	2:B:280:PRO:CD	2.25	0.99
2:B:125:ALA:HB3	2:B:155:LEU:HD12	1.01	0.99
2:B:278:VAL:CG1	2:B:322:LEU:CD2	2.41	0.99
2:B:279:LEU:H	2:B:280:PRO:CD	1.76	0.98
2:B:165:ASN:HD21	2:B:205:ALA:H	1.14	0.95
1:A:155:HIS:CE1	1:A:181:ARG:HH22	1.86	0.94
2:B:240:ASN:CB	2:B:267:SER:HB2	2.02	0.90
1:A:155:HIS:HE1	1:A:181:ARG:HH22	1.19	0.89
2:B:122:ALA:HA	2:B:155:LEU:HD11	1.54	0.89
2:B:278:VAL:HG12	2:B:322:LEU:HD22	1.59	0.83
2:B:279:LEU:H	2:B:280:PRO:HD2	0.86	0.82
2:B:255:ASN:HD22	2:B:257:ASN:H	1.32	0.77
2:B:279:LEU:HD21	2:B:323:VAL:HG11	1.73	0.71
2:B:279:LEU:HD11	2:B:323:VAL:HB	1.72	0.70
2:B:357:ARG:NH2	2:B:403:ALA:O	2.25	0.70
2:B:278:VAL:CG1	2:B:322:LEU:HD22	2.19	0.69
1:A:35:ILE:HB	1:A:71:MSE:HE2	1.76	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:279:LEU:HD11	2:B:323:VAL:CB	2.22	0.68
2:B:240:ASN:CB	2:B:267:SER:CB	2.71	0.66
2:B:347:MSE:HE1	2:B:366:ILE:HB	1.76	0.65
1:A:60:MSE:HE1	1:A:89:HIS:HB2	1.80	0.64
2:B:97:ARG:HB2	2:B:108:ILE:HB	1.82	0.61
2:B:40:LEU:HD22	2:B:203:MSE:HE1	1.82	0.61
2:B:347:MSE:HE3	2:B:366:ILE:HD13	1.83	0.60
2:B:321:LEU:HD12	2:B:403:ALA:HB3	1.83	0.60
1:A:64:THR:HG22	1:A:65:ARG:H	1.65	0.60
2:B:347:MSE:CE	2:B:366:ILE:HB	2.33	0.59
1:A:34:SER:OG	6:A:600:AGS:H2'	2.03	0.59
1:A:135:ARG:HD3	1:A:193:ILE:HD13	1.86	0.58
2:B:279:LEU:HD21	2:B:323:VAL:CG1	2.35	0.56
2:B:119:ARG:H	2:B:389:ASN:ND2	2.03	0.56
2:B:323:VAL:HG22	7:B:615:HOH:O	2.05	0.56
1:A:60:MSE:HG2	1:A:87:ILE:HB	1.86	0.56
1:A:149:SER:HB3	1:A:181:ARG:HB2	1.88	0.56
2:B:357:ARG:HH11	2:B:357:ARG:HB3	1.71	0.55
2:B:341:TRP:CE3	2:B:428:ALA:HB2	2.41	0.55
2:B:28:LEU:HD12	2:B:109:ALA:O	2.06	0.55
2:B:226:LEU:O	2:B:227:MSE:HB3	2.07	0.54
2:B:165:ASN:ND2	2:B:205:ALA:H	1.96	0.54
2:B:339:LEU:O	2:B:391:ILE:HA	2.08	0.53
2:B:280:PRO:HG3	2:B:320:ASP:CG	2.29	0.53
2:B:122:ALA:CA	2:B:155:LEU:HD11	2.34	0.52
1:A:136:ARG:HG3	1:A:186:SER:HB2	1.91	0.52
2:B:243:ASP:OD2	2:B:243:ASP:N	2.42	0.52
1:A:31:MSE:HA	1:A:131:PHE:HB2	1.91	0.52
1:A:166:LEU:O	2:B:126:SER:OG	2.21	0.51
2:B:235:ILE:C	2:B:237:SER:H	2.13	0.51
2:B:166:LYS:HG2	5:B:599:GDP:C6	2.45	0.51
2:B:22:LYS:HB3	2:B:104:ARG:HA	1.93	0.50
1:A:155:HIS:HE1	1:A:181:ARG:NH2	2.00	0.50
2:B:255:ASN:ND2	2:B:257:ASN:H	2.07	0.50
2:B:229:ILE:O	2:B:233:VAL:HG22	2.11	0.49
1:A:31:MSE:HG3	1:A:42:MSE:HE3	1.94	0.48
1:A:136:ARG:HA	1:A:142:ARG:HB3	1.95	0.47
1:A:156:ARG:HG3	1:A:157:TRP:N	2.28	0.47
2:B:111:THR:HG21	2:B:121:MSE:HA	1.97	0.47
2:B:261:PHE:CE2	2:B:316:ILE:HB	2.50	0.47
2:B:122:ALA:O	2:B:155:LEU:HD13	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:274:ASP:OD1	2:B:324:HIS:HE1	1.99	0.46
2:B:95:ALA:HB3	2:B:110:ASP:HB3	1.97	0.46
2:B:125:ALA:CB	2:B:155:LEU:CD1	2.62	0.46
2:B:165:ASN:HD22	2:B:203:MSE:HG3	1.80	0.46
1:A:135:ARG:HB2	1:A:138:GLU:HG3	1.98	0.46
2:B:226:LEU:O	2:B:227:MSE:CB	2.64	0.46
2:B:158:LYS:HD3	2:B:237:SER:HB3	1.97	0.45
2:B:27:PHE:CZ	2:B:108:ILE:HG12	2.51	0.45
2:B:191:ILE:HB	2:B:193:PHE:HB2	1.99	0.45
2:B:278:VAL:CG1	2:B:322:LEU:HD21	2.41	0.45
1:A:34:SER:O	1:A:35:ILE:HD13	2.17	0.45
2:B:279:LEU:HD11	2:B:323:VAL:CG2	2.47	0.44
2:B:352:LYS:HB3	2:B:421:ARG:HD2	1.99	0.44
2:B:278:VAL:HG11	2:B:316:ILE:HG12	1.97	0.44
1:A:197:ILE:HA	1:A:202:ILE:HD12	2.00	0.44
1:A:32:LEU:HB2	1:A:131:PHE:O	2.18	0.44
1:A:121:ALA:O	1:A:125:HIS:HD2	2.01	0.44
2:B:119:ARG:HG2	2:B:389:ASN:HD21	1.83	0.43
2:B:286:ARG:HB3	2:B:311:GLU:HG3	2.01	0.43
2:B:43:ARG:NH2	2:B:206:LEU:O	2.52	0.43
2:B:279:LEU:CD2	2:B:328:VAL:HG13	2.49	0.42
2:B:345:GLU:HA	2:B:346:PRO:HD3	1.91	0.42
2:B:280:PRO:HG3	2:B:320:ASP:OD2	2.18	0.42
2:B:283:LYS:HE3	2:B:314:ILE:HG13	2.01	0.42
2:B:104:ARG:HD2	2:B:230:LEU:O	2.20	0.42
2:B:279:LEU:HD22	2:B:328:VAL:HG13	2.01	0.42
1:A:142:ARG:O	1:A:145:GLU:HB2	2.19	0.42
2:B:279:LEU:HB3	2:B:403:ALA:HB2	2.02	0.42
2:B:44:LEU:HD22	2:B:227:MSE:HE2	2.01	0.42
2:B:130:LEU:HA	2:B:159:HIS:O	2.20	0.41
2:B:343:ALA:C	2:B:388:LEU:HD13	2.39	0.41
2:B:214:LYS:HE3	2:B:224:GLN:HA	2.01	0.41
1:A:174:VAL:HG22	1:A:178:GLU:HB2	2.02	0.41
1:A:-3:ARG:NH1	2:B:269:ILE:O	2.52	0.41
2:B:279:LEU:CD1	2:B:323:VAL:HB	2.46	0.41
2:B:279:LEU:HD11	2:B:323:VAL:HG21	2.03	0.41
2:B:237:SER:O	2:B:239:ARG:N	2.48	0.41
2:B:104:ARG:HG3	2:B:106:PHE:CZ	2.56	0.40
1:A:64:THR:HG21	1:A:109:HIS:NE2	2.35	0.40
2:B:122:ALA:O	2:B:155:LEU:CD1	2.69	0.40
2:B:245:ARG:NH1	2:B:405:ASP:OD1	2.55	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:407:TYR:CG	2:B:431:MSE:HB2	2.56	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	200/325 (62%)	187 (94%)	12 (6%)	1 (0%)	34	63
2	B	386/434 (89%)	364 (94%)	20 (5%)	2 (0%)	34	63
All	All	586/759 (77%)	551 (94%)	32 (6%)	3 (0%)	34	63

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	34	SER
2	B	280	PRO
2	B	279	LEU

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	175/276 (63%)	166 (95%)	9 (5%)	29	59
2	B	327/352 (93%)	311 (95%)	16 (5%)	31	61

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	502/628 (80%)	477 (95%)	25 (5%)	30	60

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	VAL
1	A	37	LYS
1	A	45	LEU
1	A	60	MSE
1	A	75	ARG
1	A	142	ARG
1	A	144	LYS
1	A	174	VAL
1	A	193	ILE
2	B	78	LEU
2	B	97	ARG
2	B	158	LYS
2	B	161	VAL
2	B	183	ASP
2	B	233	VAL
2	B	235	ILE
2	B	243	ASP
2	B	255	ASN
2	B	310	MSE
2	B	323	VAL
2	B	347	MSE
2	B	357	ARG
2	B	379	GLU
2	B	380	GLU
2	B	431	MSE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	17	HIS
1	A	44	HIS
1	A	125	HIS
1	A	155	HIS
1	A	161	ASN
2	B	32	ASN
2	B	120	ASN

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Mol	Chain	Res	Type
2	B	148	HIS
2	B	165	ASN
2	B	249	GLN
2	B	255	ASN
2	B	299	GLN
2	B	324	HIS
2	B	371	HIS
2	B	389	ASN

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](#)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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	$\# Z > 2$
6	AGS	A	600	3,4	24,33,33	2.47	5 (20%)	28,52,52	2.41	7 (25%)
5	GDP	B	599	-	23,30,30	1.23	2 (8%)	30,47,47	1.89	6 (20%)

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
6	AGS	A	600	3,4	-	0/15/38/38	0/3/3/3
5	GDP	B	599	-	-	0/12/32/32	0/3/3/3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	600	AGS	PB-O1B	2.25	1.59	1.51
6	A	600	AGS	PA-O1A	2.26	1.59	1.51
6	A	600	AGS	C5-C4	2.71	1.46	1.40
5	B	599	GDP	C5-C4	3.28	1.47	1.40
5	B	599	GDP	C6-C5	3.87	1.49	1.41
6	A	600	AGS	C4-N3	6.17	1.44	1.35
6	A	600	AGS	PG-S1G	8.65	2.07	1.90

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	600	AGS	N3-C2-N1	-7.42	123.21	128.89
6	A	600	AGS	C2'-C1'-N9	-6.69	104.06	114.29
6	A	600	AGS	C4-C5-N7	-4.41	105.42	109.48
5	B	599	GDP	C5-C6-N1	-4.40	117.57	123.59
5	B	599	GDP	C6-C5-C4	-3.40	116.83	120.90
5	B	599	GDP	C4-C5-N7	-3.33	106.41	109.48
5	B	599	GDP	PA-O3A-PB	-3.28	121.66	132.67
6	A	600	AGS	PA-O3A-PB	-3.16	123.86	132.73
5	B	599	GDP	N3-C2-N1	-3.09	122.73	127.44
6	A	600	AGS	PB-O3B-PG	-2.60	123.97	132.67
6	A	600	AGS	C4'-O4'-C1'	2.10	112.03	109.72
6	A	600	AGS	C2-N1-C6	2.55	123.32	118.77
5	B	599	GDP	C6-N1-C2	5.00	122.88	115.94

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	600	AGS	1	0
5	B	599	GDP	1	0

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

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	196/325 (60%)	0.94	34 (17%) 2 1	41, 49, 68, 71	0
2	B	382/434 (88%)	0.27	22 (5%) 26 25	25, 36, 48, 84	0
All	All	578/759 (76%)	0.50	56 (9%) 10 7	25, 40, 62, 84	0

All (56) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	64	THR	6.1
1	A	106	SER	6.0
2	B	90	ILE	5.5
2	B	16	LEU	5.2
1	A	110	THR	4.9
2	B	239	ARG	4.7
1	A	73	ARG	4.7
1	A	204	ILE	4.6
2	B	279	LEU	4.3
2	B	17	GLY	4.2
2	B	192	ALA	4.0
2	B	222	ALA	3.9
2	B	422	LEU	3.8
2	B	21	ARG	3.8
1	A	209	PHE	3.7
1	A	109	HIS	3.7
1	A	81	GLU	3.6
1	A	65	ARG	3.5
1	A	108	LYS	3.5
1	A	153	SER	3.4
1	A	206	PRO	3.4
1	A	69	GLN	3.3
2	B	18	GLN	3.2
2	B	49	LYS	3.0

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Mol	Chain	Res	Type	RSRZ
2	B	186	LYS	3.0
1	A	107	ALA	2.9
1	A	76	ASP	2.8
2	B	194	LYS	2.8
1	A	70	GLU	2.8
1	A	90	ILE	2.7
1	A	80	GLU	2.7
1	A	66	TRP	2.7
2	B	51	ILE	2.7
1	A	208	TYR	2.6
1	A	68	PHE	2.5
1	A	155	HIS	2.5
2	B	280	PRO	2.5
1	A	91	ASN	2.4
2	B	34	ASP	2.4
1	A	120	GLN	2.3
1	A	176	LYS	2.3
1	A	154	LYS	2.3
1	A	152	ASP	2.2
1	A	160	LYS	2.2
2	B	114	HIS	2.2
1	A	63	ASP	2.2
2	B	216	GLU	2.2
1	A	156	ARG	2.2
1	A	124	LYS	2.1
1	A	-4	PRO	2.1
1	A	168	ASN	2.1
2	B	313	GLU	2.1
2	B	434	ALA	2.1
2	B	327	ASN	2.1
1	A	77	GLN	2.1
2	B	193	PHE	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

6.3 Carbohydrates ⓘ

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, 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	LLDF	B-factors(Å ²)	Q<0.9
5	GDP	B	599	28/28	0.96	0.12	-1.60	26,27,32,33	0
6	AGS	A	600	31/31	0.92	0.16	-1.82	57,61,64,64	0
4	NA	A	700	1/1	0.88	0.15	-	66,66,66,66	0
3	MG	A	598	1/1	0.89	0.10	-	37,37,37,37	0

6.5 Other polymers [i](#)

There are no such residues in this entry.