



# Full wwPDB X-ray Structure Validation Report ⓘ

May 23, 2020 – 08:32 pm BST

PDB ID : 6FWB  
Title : Crystal structure of Mat2A at 1.79 Angstrom resolution  
Authors : Zhou, A.; Wei, Z.; Bai, J.; Wang, H.  
Deposited on : 2018-03-06  
Resolution : 1.79 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  
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

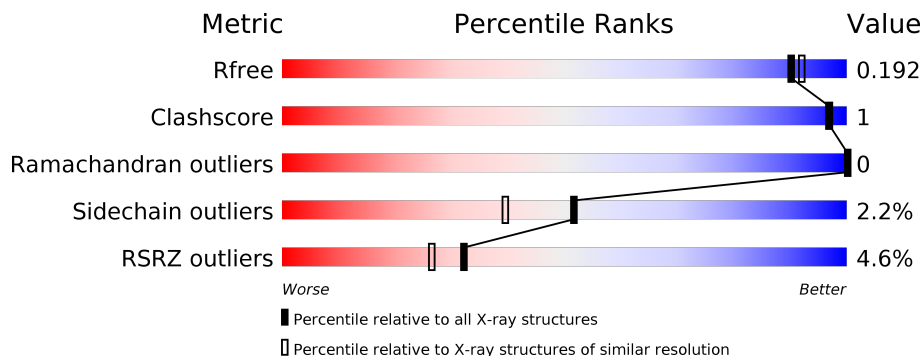
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.79 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	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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	410	 2% 86% 10%
1	B	410	 2% 88% 9%
1	C	410	 10% 86% 11%
1	D	410	 2% 84% 5% 10%

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 crite-

ria:

<b>Mol</b>	<b>Type</b>	<b>Chain</b>	<b>Res</b>	<b>Chirality</b>	<b>Geometry</b>	<b>Clashes</b>	<b>Electron density</b>
2	SO4	A	406	-	-	-	X
2	SO4	D	402	-	-	-	X
2	SO4	D	405	-	-	-	X

## 2 Entry composition i

There are 6 unique types of molecules in this entry. The entry contains 12195 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 S-adenosylmethionine synthase isoform type-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	373	2917	1843	506	555	13	0	4	0
1	A	368	2862	1813	498	539	12	0	2	0
1	C	364	2841	1797	499	534	11	0	2	0
1	D	367	2855	1808	497	539	11	0	1	0

There are 64 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-15	MET	-	initiating methionine	UNP P31153
B	-14	ALA	-	expression tag	UNP P31153
B	-13	HIS	-	expression tag	UNP P31153
B	-12	HIS	-	expression tag	UNP P31153
B	-11	HIS	-	expression tag	UNP P31153
B	-10	HIS	-	expression tag	UNP P31153
B	-9	HIS	-	expression tag	UNP P31153
B	-8	HIS	-	expression tag	UNP P31153
B	-7	GLU	-	expression tag	UNP P31153
B	-6	ASN	-	expression tag	UNP P31153
B	-5	LEU	-	expression tag	UNP P31153
B	-4	TYR	-	expression tag	UNP P31153
B	-3	PHE	-	expression tag	UNP P31153
B	-2	GLN	-	expression tag	UNP P31153
B	-1	GLY	-	expression tag	UNP P31153
B	0	SER	-	expression tag	UNP P31153
A	-15	MET	-	initiating methionine	UNP P31153
A	-14	ALA	-	expression tag	UNP P31153
A	-13	HIS	-	expression tag	UNP P31153
A	-12	HIS	-	expression tag	UNP P31153
A	-11	HIS	-	expression tag	UNP P31153

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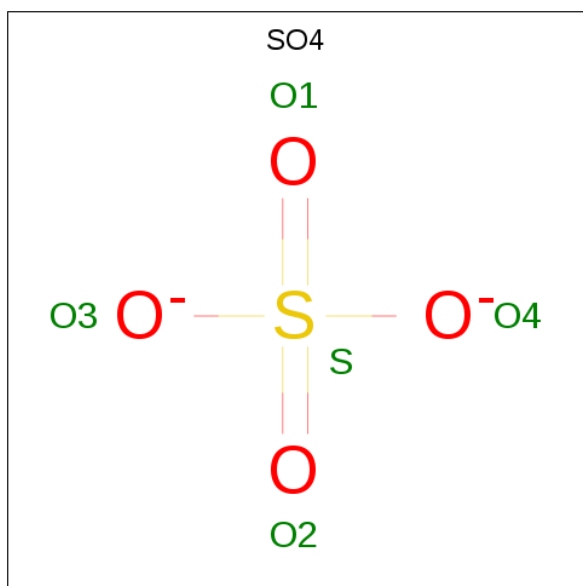
Chain	Residue	Modelled	Actual	Comment	Reference
A	-10	HIS	-	expression tag	UNP P31153
A	-9	HIS	-	expression tag	UNP P31153
A	-8	HIS	-	expression tag	UNP P31153
A	-7	GLU	-	expression tag	UNP P31153
A	-6	ASN	-	expression tag	UNP P31153
A	-5	LEU	-	expression tag	UNP P31153
A	-4	TYR	-	expression tag	UNP P31153
A	-3	PHE	-	expression tag	UNP P31153
A	-2	GLN	-	expression tag	UNP P31153
A	-1	GLY	-	expression tag	UNP P31153
A	0	SER	-	expression tag	UNP P31153
C	-15	MET	-	initiating methionine	UNP P31153
C	-14	ALA	-	expression tag	UNP P31153
C	-13	HIS	-	expression tag	UNP P31153
C	-12	HIS	-	expression tag	UNP P31153
C	-11	HIS	-	expression tag	UNP P31153
C	-10	HIS	-	expression tag	UNP P31153
C	-9	HIS	-	expression tag	UNP P31153
C	-8	HIS	-	expression tag	UNP P31153
C	-7	GLU	-	expression tag	UNP P31153
C	-6	ASN	-	expression tag	UNP P31153
C	-5	LEU	-	expression tag	UNP P31153
C	-4	TYR	-	expression tag	UNP P31153
C	-3	PHE	-	expression tag	UNP P31153
C	-2	GLN	-	expression tag	UNP P31153
C	-1	GLY	-	expression tag	UNP P31153
C	0	SER	-	expression tag	UNP P31153
D	-15	MET	-	initiating methionine	UNP P31153
D	-14	ALA	-	expression tag	UNP P31153
D	-13	HIS	-	expression tag	UNP P31153
D	-12	HIS	-	expression tag	UNP P31153
D	-11	HIS	-	expression tag	UNP P31153
D	-10	HIS	-	expression tag	UNP P31153
D	-9	HIS	-	expression tag	UNP P31153
D	-8	HIS	-	expression tag	UNP P31153
D	-7	GLU	-	expression tag	UNP P31153
D	-6	ASN	-	expression tag	UNP P31153
D	-5	LEU	-	expression tag	UNP P31153
D	-4	TYR	-	expression tag	UNP P31153
D	-3	PHE	-	expression tag	UNP P31153
D	-2	GLN	-	expression tag	UNP P31153
D	-1	GLY	-	expression tag	UNP P31153

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Chain	Residue	Modelled	Actual	Comment	Reference
D	0	SER	-	expression tag	UNP P31153

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



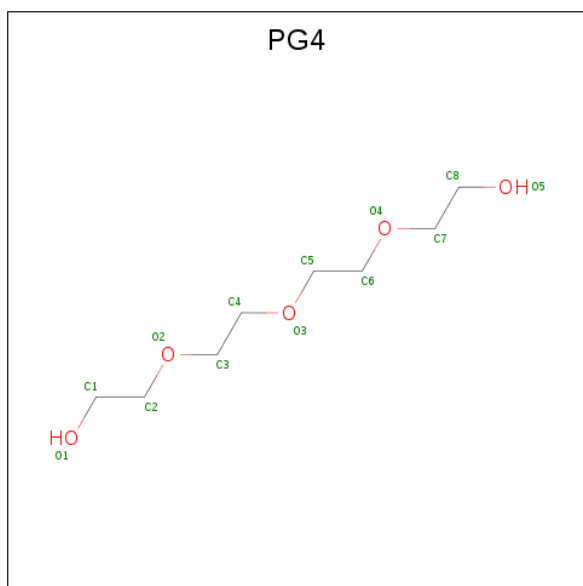
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: C<sub>8</sub>H<sub>18</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	C	O	0	0
			13	8	5		
3	B	1	Total	C	O	0	0
			13	8	5		
3	A	1	Total	C	O	0	0
			13	8	5		

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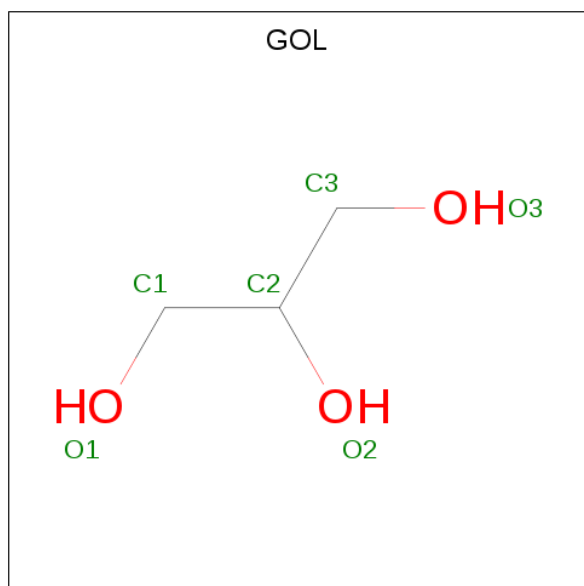
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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			13	8	5		
3	C	1	Total	C	O	0	0
			13	8	5		
3	D	1	Total	C	O	0	0
			13	8	5		
3	D	1	Total	C	O	0	0
			13	8	5		

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

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

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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

- Molecule 6 is water.

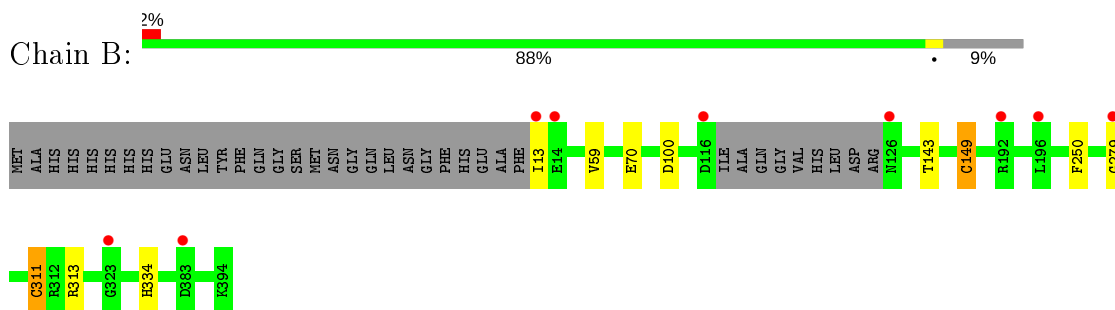


<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
6	B	168	Total 168	O 168	0	0
6	A	168	Total 168	O 168	0	0
6	C	75	Total 75	O 75	0	0
6	D	110	Total 110	O 110	0	0

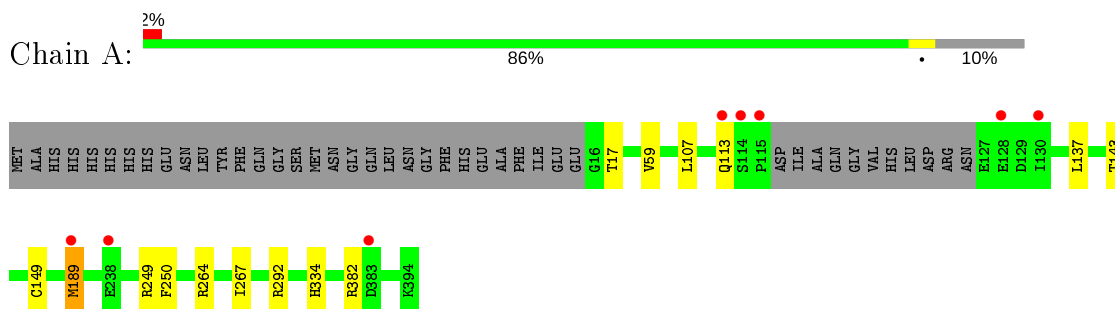
### 3 Residue-property plots [i](#)

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.

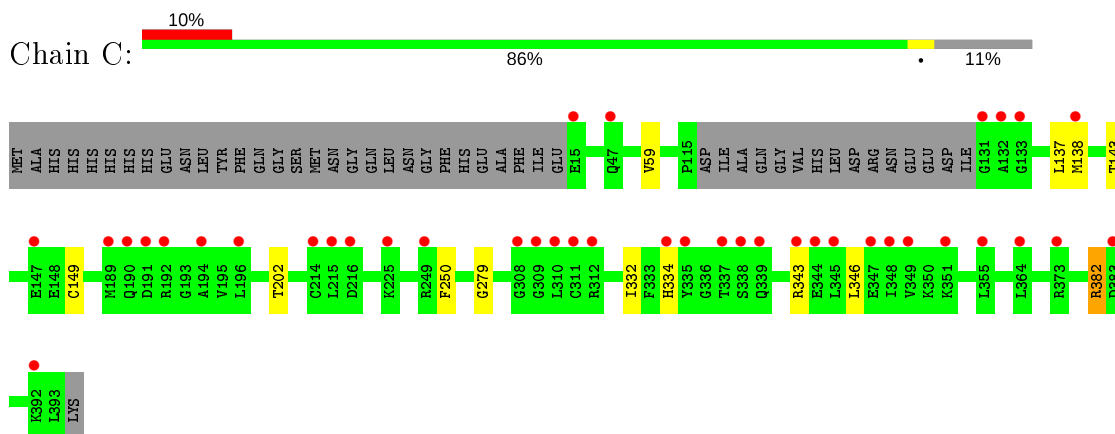
- Molecule 1: S-adenosylmethionine synthase isoform type-2



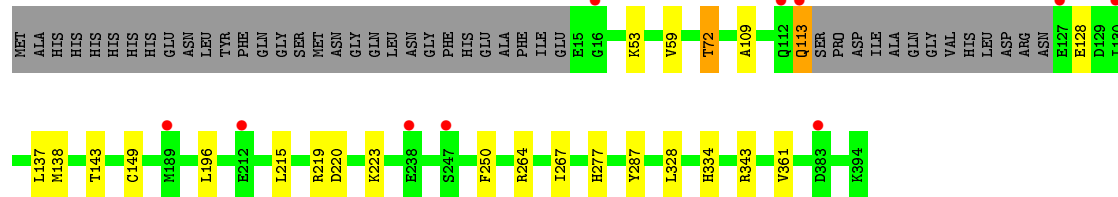
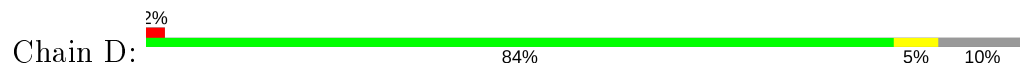
- Molecule 1: S-adenosylmethionine synthase isoform type-2



- Molecule 1: S-adenosylmethionine synthase isoform type-2



- Molecule 1: S-adenosylmethionine synthase isoform type-2



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	68.43Å 103.03Å 114.47Å 90.00° 93.36° 90.00°	Depositor
Resolution (Å)	57.13 – 1.79 57.13 – 1.79	Depositor EDS
% Data completeness (in resolution range)	98.4 (57.13-1.79) 98.4 (57.13-1.79)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.66 (at 1.80Å)	Xtrriage
Refinement program	REFMAC 5.8.0189	Depositor
R, $R_{free}$	0.172 , 0.183 0.182 , 0.192	Depositor DCC
$R_{free}$ test set	7223 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	26.8	Xtrriage
Anisotropy	0.099	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 43.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	12195	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	34.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.92% 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, PG4, SO4, NA

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	0.60	0/2924	0.82	3/3955 (0.1%)
1	B	0.61	0/2979	0.87	4/4028 (0.1%)
1	C	0.55	0/2897	0.79	1/3919 (0.0%)
1	D	0.59	0/2913	0.84	3/3939 (0.1%)
All	All	0.59	0/11713	0.83	11/15841 (0.1%)

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	311[A]	CYS	CA-CB-SG	10.35	132.63	114.00
1	B	311[B]	CYS	CA-CB-SG	10.35	132.63	114.00
1	D	220	ASP	CB-CG-OD1	8.55	126.00	118.30
1	D	220	ASP	CB-CG-OD2	-6.81	112.17	118.30
1	B	313	ARG	NE-CZ-NH2	-6.75	116.92	120.30
1	A	264	ARG	NE-CZ-NH1	5.67	123.14	120.30
1	D	264	ARG	NE-CZ-NH1	5.61	123.11	120.30
1	B	100	ASP	CB-CG-OD2	-5.44	113.41	118.30
1	A	382	ARG	NE-CZ-NH1	5.31	122.95	120.30
1	A	292	ARG	NE-CZ-NH2	-5.00	117.80	120.30
1	C	382	ARG	NE-CZ-NH2	-5.00	117.80	120.30

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	2862	0	2873	7	0
1	B	2917	0	2914	5	0
1	C	2841	0	2845	6	0
1	D	2855	0	2862	9	0
2	A	40	0	0	1	0
2	B	35	0	0	0	0
2	D	20	0	0	1	0
3	A	26	0	36	0	0
3	B	26	0	36	0	0
3	C	13	0	18	0	0
3	D	26	0	36	0	0
4	B	1	0	0	0	0
5	A	6	0	8	0	0
5	D	6	0	8	0	0
6	A	168	0	0	0	0
6	B	168	0	0	0	0
6	C	75	0	0	0	0
6	D	110	0	0	0	0
All	All	12195	0	11636	20	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 1.

All (20) 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:B:59:VAL:HG21	1:A:59:VAL:HG21	1.73	0.70
1:C:59:VAL:HG21	1:D:59:VAL:HG21	1.73	0.70
1:A:17:THR:HG22	1:A:189:MET:HG2	1.78	0.65
1:D:53:LYS:HB2	1:D:72:THR:HG23	1.82	0.59
1:B:279:GLY:HA2	1:A:267:ILE:HG13	1.89	0.54
1:D:277:HIS:CE1	2:D:405:SO4:O3	2.61	0.53
1:D:72:THR:HB	1:D:113:GLN:O	2.12	0.49
1:D:287:TYR:CD2	1:D:361:VAL:HB	2.49	0.48
1:C:279:GLY:HA2	1:D:267:ILE:HG13	1.99	0.45
1:C:137:LEU:O	1:C:138:MET:SD	2.75	0.43
1:C:332:ILE:HD12	1:C:346:LEU:HA	2.00	0.43
1:C:202:THR:HG21	1:D:328:LEU:HD13	1.99	0.42
1:A:249:ARG:NH2	2:A:408:SO4:O3	2.52	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:279:GLY:HA2	1:A:267:ILE:CG1	2.49	0.42
1:D:143:THR:O	1:D:149:CYS:HA	2.19	0.42
1:A:143:THR:O	1:A:149:CYS:HA	2.19	0.42
1:C:143:THR:O	1:C:149:CYS:HA	2.20	0.41
1:B:143:THR:O	1:B:149[B]:CYS:HA	2.20	0.41
1:B:143:THR:O	1:B:149[A]:CYS:HA	2.20	0.41
1:A:107:LEU:HD23	1:D:109:ALA:HB2	2.03	0.41

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	366/410 (89%)	359 (98%)	7 (2%)	0	100	100
1	B	373/410 (91%)	367 (98%)	6 (2%)	0	100	100
1	C	362/410 (88%)	355 (98%)	7 (2%)	0	100	100
1	D	364/410 (89%)	356 (98%)	8 (2%)	0	100	100
All	All	1465/1640 (89%)	1437 (98%)	28 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 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	307/340 (90%)	302 (98%)	5 (2%)	62	54
1	B	314/340 (92%)	306 (98%)	8 (2%)	47	34
1	C	303/340 (89%)	299 (99%)	4 (1%)	69	62
1	D	305/340 (90%)	293 (96%)	12 (4%)	32	17
All	All	1229/1360 (90%)	1200 (98%)	29 (2%)	52	36

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	13	ILE
1	B	70	GLU
1	B	149[A]	CYS
1	B	149[B]	CYS
1	B	250	PHE
1	B	311[A]	CYS
1	B	311[B]	CYS
1	B	334	HIS
1	A	113	GLN
1	A	137	LEU
1	A	189	MET
1	A	250	PHE
1	A	334	HIS
1	C	250	PHE
1	C	334	HIS
1	C	343	ARG
1	C	382	ARG
1	D	72	THR
1	D	113	GLN
1	D	128	GLU
1	D	137	LEU
1	D	138	MET
1	D	196	LEU
1	D	215	LEU
1	D	219	ARG
1	D	223	LYS
1	D	250	PHE
1	D	334	HIS
1	D	343	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:



Mol	Chain	Res	Type
1	D	183	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

Of 29 ligands modelled in this entry, 1 is monoatomic - leaving 28 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	$\# Z  > 2$
2	SO4	A	408	-	4,4,4	0.38	0	6,6,6	0.16	0
5	GOL	A	401	-	5,5,5	0.55	0	5,5,5	0.65	0
2	SO4	A	407	-	4,4,4	0.34	0	6,6,6	0.07	0
2	SO4	D	404	-	4,4,4	0.25	0	6,6,6	0.15	0
3	PG4	D	407	-	12,12,12	0.50	0	11,11,11	0.32	0
2	SO4	A	402	-	4,4,4	0.37	0	6,6,6	0.34	0
2	SO4	A	409	-	4,4,4	0.28	0	6,6,6	0.28	0
3	PG4	B	408	-	12,12,12	0.48	0	11,11,11	0.34	0
2	SO4	B	403	-	4,4,4	0.34	0	6,6,6	0.08	0
2	SO4	A	406	-	4,4,4	0.36	0	6,6,6	0.10	0
2	SO4	D	405	-	4,4,4	0.42	0	6,6,6	0.42	0
2	SO4	B	402	-	4,4,4	0.32	0	6,6,6	0.10	0
2	SO4	B	406	-	4,4,4	0.37	0	6,6,6	0.41	0
3	PG4	A	410	-	12,12,12	0.36	0	11,11,11	0.48	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	SO4	A	404	-	4,4,4	0.33	0	6,6,6	0.08	0
2	SO4	D	403	-	4,4,4	0.31	0	6,6,6	0.09	0
2	SO4	A	403	-	4,4,4	0.34	0	6,6,6	0.13	0
2	SO4	B	407	-	4,4,4	0.35	0	6,6,6	0.25	0
3	PG4	C	401	-	12,12,12	0.50	0	11,11,11	0.24	0
2	SO4	B	404	-	4,4,4	0.34	0	6,6,6	0.18	0
2	SO4	A	405	-	4,4,4	0.33	0	6,6,6	0.14	0
3	PG4	B	409	-	12,12,12	0.51	0	11,11,11	0.34	0
2	SO4	D	402	-	4,4,4	0.32	0	6,6,6	0.08	0
5	GOL	D	401	-	5,5,5	0.45	0	5,5,5	0.68	0
2	SO4	B	401	-	4,4,4	0.33	0	6,6,6	0.15	0
2	SO4	B	405	-	4,4,4	0.39	0	6,6,6	0.11	0
3	PG4	D	406	-	12,12,12	0.57	0	11,11,11	0.36	0
3	PG4	A	411	-	12,12,12	0.51	0	11,11,11	0.25	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
5	GOL	D	401	-	-	0/4/4/4	-
5	GOL	A	401	-	-	0/4/4/4	-
3	PG4	A	410	-	-	3/10/10/10	-
3	PG4	C	401	-	-	5/10/10/10	-
3	PG4	D	407	-	-	7/10/10/10	-
3	PG4	B	409	-	-	6/10/10/10	-
3	PG4	D	406	-	-	6/10/10/10	-
3	PG4	A	411	-	-	5/10/10/10	-
3	PG4	B	408	-	-	7/10/10/10	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	408	PG4	O2-C3-C4-O3
3	D	407	PG4	O3-C5-C6-O4

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Mol	Chain	Res	Type	Atoms
3	C	401	PG4	O2-C3-C4-O3
3	C	401	PG4	O3-C5-C6-O4
3	A	411	PG4	O3-C5-C6-O4
3	B	409	PG4	O2-C3-C4-O3
3	B	409	PG4	O3-C5-C6-O4
3	D	407	PG4	O1-C1-C2-O2
3	B	408	PG4	O1-C1-C2-O2
3	B	409	PG4	O1-C1-C2-O2
3	A	411	PG4	O1-C1-C2-O2
3	B	408	PG4	O4-C7-C8-O5
3	D	406	PG4	O4-C7-C8-O5
3	D	406	PG4	O3-C5-C6-O4
3	B	408	PG4	O3-C5-C6-O4
3	D	407	PG4	O4-C7-C8-O5
3	A	410	PG4	O2-C3-C4-O3
3	C	401	PG4	O1-C1-C2-O2
3	C	401	PG4	O4-C7-C8-O5
3	A	410	PG4	O1-C1-C2-O2
3	D	406	PG4	O1-C1-C2-O2
3	B	409	PG4	O4-C7-C8-O5
3	D	407	PG4	C4-C3-O2-C2
3	A	411	PG4	C5-C6-O4-C7
3	B	408	PG4	C4-C3-O2-C2
3	D	406	PG4	C6-C5-O3-C4
3	C	401	PG4	C5-C6-O4-C7
3	D	407	PG4	C8-C7-O4-C6
3	B	409	PG4	C6-C5-O3-C4
3	A	411	PG4	O4-C7-C8-O5
3	A	410	PG4	O4-C7-C8-O5
3	D	406	PG4	O2-C3-C4-O3
3	B	408	PG4	C6-C5-O3-C4
3	B	409	PG4	C1-C2-O2-C3
3	A	411	PG4	C6-C5-O3-C4
3	D	406	PG4	C5-C6-O4-C7
3	D	407	PG4	O2-C3-C4-O3
3	B	408	PG4	C3-C4-O3-C5
3	D	407	PG4	C6-C5-O3-C4

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	408	SO4	1	0
2	D	405	SO4	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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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	368/410 (89%)	-0.05	8 (2%) 62 57	17, 26, 43, 69	0
1	B	373/410 (90%)	0.04	9 (2%) 59 54	18, 27, 45, 67	0
1	C	364/410 (88%)	0.54	40 (10%) 5 4	22, 43, 68, 92	0
1	D	367/410 (89%)	0.10	10 (2%) 54 49	21, 32, 51, 76	0
All	All	1472/1640 (89%)	0.16	67 (4%) 32 26	17, 30, 60, 92	0

All (67) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	16	GLY	8.2
1	B	116	ASP	7.7
1	A	114	SER	6.1
1	C	349	VAL	5.2
1	C	339	GLN	5.0
1	C	192	ARG	4.6
1	C	132	ALA	4.6
1	C	131	GLY	4.4
1	C	343	ARG	4.3
1	A	115	PRO	4.2
1	C	15	GLU	4.1
1	C	191	ASP	4.0
1	C	309	GLY	4.0
1	C	351	LYS	3.9
1	C	214	CYS	3.8
1	C	133	GLY	3.7
1	C	147	GLU	3.6
1	C	347	GLU	3.5
1	C	196	LEU	3.5
1	C	308	GLY	3.4
1	D	130	ILE	3.4

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	13	ILE	3.3
1	B	126	ASN	3.2
1	B	196	LEU	3.2
1	C	355	LEU	3.2
1	C	194	ALA	3.1
1	C	216	ASP	3.1
1	B	14	GLU	3.0
1	B	383	ASP	3.0
1	D	112	GLN	3.0
1	A	113	GLN	2.9
1	B	192	ARG	2.8
1	C	373	ARG	2.8
1	C	337	THR	2.8
1	C	335	TYR	2.7
1	C	249	ARG	2.7
1	C	344	GLU	2.7
1	C	311	CYS	2.6
1	A	189	MET	2.6
1	C	345	LEU	2.6
1	C	334	HIS	2.6
1	C	364	LEU	2.5
1	D	383	ASP	2.5
1	C	138	MET	2.4
1	D	189	MET	2.4
1	C	383	ASP	2.4
1	A	128	GLU	2.4
1	B	279	GLY	2.3
1	D	113	GLN	2.3
1	C	312	ARG	2.2
1	C	215	LEU	2.2
1	C	392	LYS	2.2
1	B	323	GLY	2.2
1	A	130	ILE	2.2
1	A	238	GLU	2.2
1	C	338	SER	2.2
1	D	212	GLU	2.2
1	C	190	GLN	2.2
1	C	310	LEU	2.2
1	C	348	ILE	2.2
1	D	127	GLU	2.2
1	D	247	SER	2.1
1	C	189	MET	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	47	GLN	2.1
1	D	238	GLU	2.1
1	C	225	LYS	2.0
1	A	383	ASP	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(Å <sup>2</sup> )	Q<0.9
2	SO4	B	405	5/5	0.48	0.28	80,84,91,93	0
3	PG4	D	406	13/13	0.61	0.28	58,68,75,75	0
3	PG4	D	407	13/13	0.71	0.24	68,76,78,78	0
2	SO4	A	409	5/5	0.72	0.34	62,71,72,74	0
2	SO4	D	405	5/5	0.73	0.48	59,66,77,79	0
3	PG4	B	409	13/13	0.74	0.32	52,62,81,83	0
3	PG4	B	408	13/13	0.76	0.16	63,66,70,70	0
2	SO4	A	406	5/5	0.76	0.41	97,99,100,101	0
2	SO4	B	406	5/5	0.77	0.34	61,65,69,71	0
2	SO4	D	402	5/5	0.77	0.40	95,96,98,99	0
3	PG4	A	411	13/13	0.78	0.19	64,69,74,76	0
2	SO4	B	403	5/5	0.79	0.40	87,88,91,95	0
2	SO4	A	405	5/5	0.81	0.24	87,90,92,93	0
3	PG4	A	410	13/13	0.82	0.26	52,60,63,66	0
2	SO4	A	403	5/5	0.83	0.30	88,91,93,95	0
2	SO4	B	407	5/5	0.84	0.24	79,83,85,87	0
3	PG4	C	401	13/13	0.84	0.20	68,71,79,82	0
2	SO4	B	401	5/5	0.86	0.26	81,83,84,85	0
2	SO4	B	402	5/5	0.86	0.32	90,92,92,94	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	GOL	A	401	6/6	0.88	0.13	25,26,26,26	0
2	SO4	A	407	5/5	0.91	0.27	86,86,88,89	0
4	NA	B	410	1/1	0.92	0.07	33,33,33,33	0
5	GOL	D	401	6/6	0.92	0.14	31,34,34,35	0
2	SO4	B	404	5/5	0.92	0.23	56,57,59,62	0
2	SO4	D	403	5/5	0.93	0.26	88,89,90,91	0
2	SO4	A	408	5/5	0.94	0.14	60,61,64,68	0
2	SO4	A	404	5/5	0.95	0.15	74,75,77,77	0
2	SO4	D	404	5/5	0.97	0.15	39,43,46,46	0
2	SO4	A	402	5/5	0.99	0.10	30,32,36,37	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.