



# wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 28, 2023 – 04:54 PM EDT

PDB ID : 3LDB  
Title : Structure of JMJD6 complexd with ALPHA-KETOGLUTARATE and Fab Fragment.  
Authors : Hong, X.; Zang, J.; White, J.; Kappler, J.W.; Wang, C.; Zhang, G.  
Deposited on : 2010-01-12  
Resolution : 2.70 Å(reported)

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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.

The types of validation reports are described at

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

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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 : 2.35  
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) : 2.35

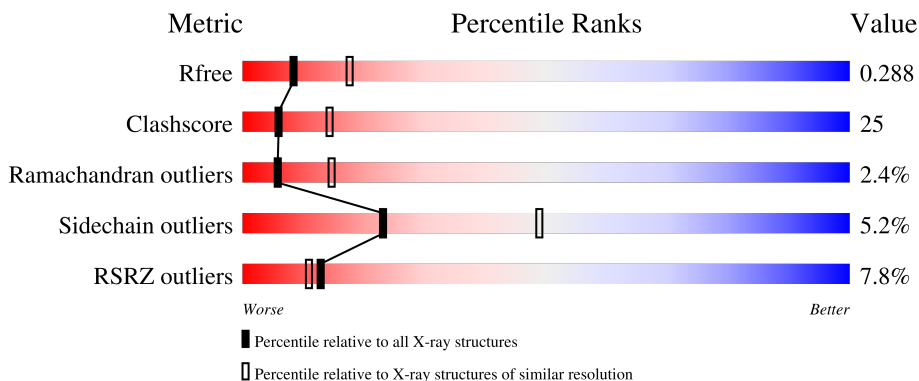
# 1 Overall quality at a glance

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))
$R_{free}$	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (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 of 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	334	
2	B	220	
3	C	221	

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
4	GOL	A	336	-	-	X	-
4	GOL	A	337	-	-	X	-
5	SO4	B	223	-	-	-	X
5	SO4	B	224	-	-	-	X
5	SO4	C	224	-	-	-	X
6	AKG	A	600	-	-	-	X

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 6210 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 Bifunctional arginine demethylase and lysyl-hydroxylase JMJD6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	334	2788	1788	492	501	7	0	0	0

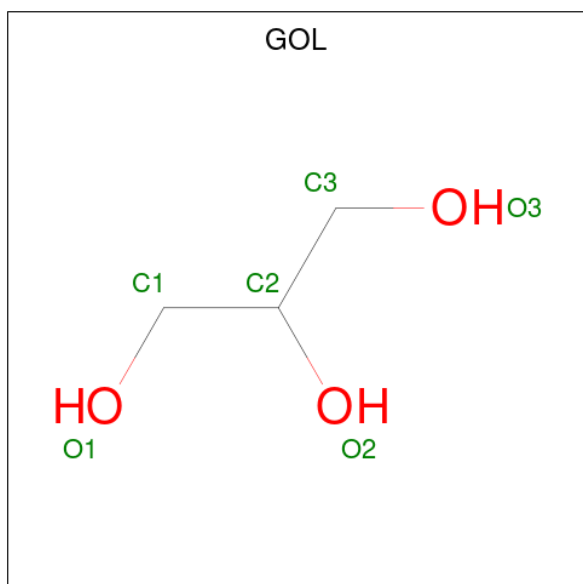
- Molecule 2 is a protein called antibody Fab fragment light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	217	1666	1048	275	336	7	0	0	0

- Molecule 3 is a protein called antibody Fab fragment heavy chain.

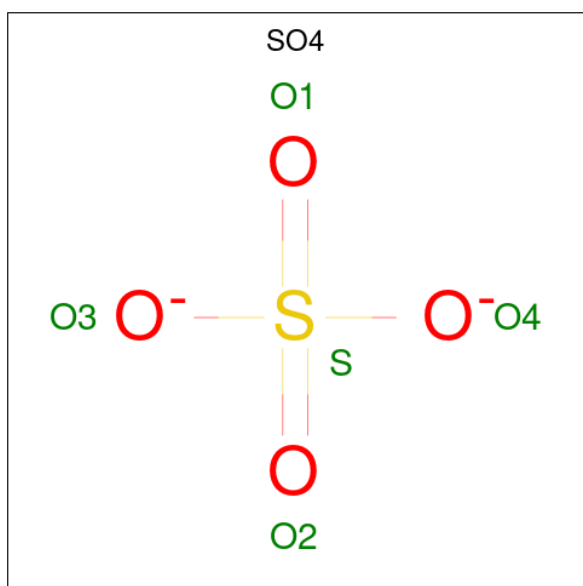
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	210	1618	1029	265	318	6	0	0	0

- Molecule 4 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
4	A	1	Total C O 6 3 3	0	0
4	A	1	Total C O 6 3 3	0	0
4	A	1	Total C O 6 3 3	0	0
4	A	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0

- Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



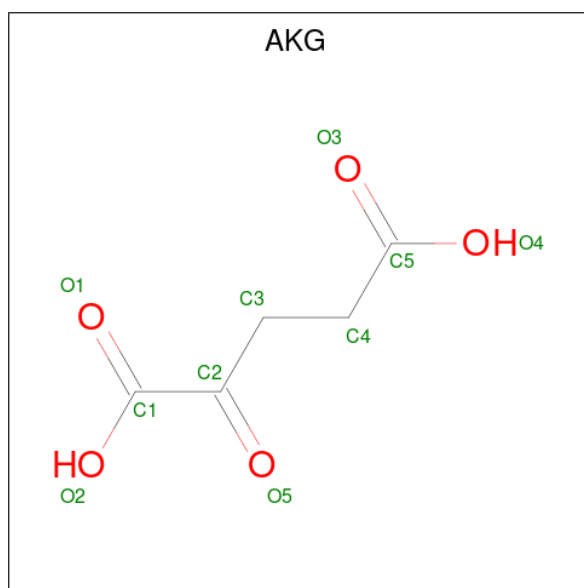
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total O S 5 4 1	0	0
5	A	1	Total O S 5 4 1	0	0
5	A	1	Total O S 5 4 1	0	0
5	A	1	Total O S 5 4 1	0	0
5	A	1	Total O S 5 4 1	0	0
5	A	1	Total O S 5 4 1	0	0
5	A	1	Total O S 5 4 1	0	0

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

- Molecule 6 is 2-OXOGLUTARIC ACID (three-letter code: AKG) (formula: C<sub>5</sub>H<sub>6</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf		
6	A	1	Total	C	O	0	0
			10	5	5		

- Molecule 7 is FE (III) ION (three-letter code: FE) (formula: Fe).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	
7	A	1	Total	Fe	0	0
			1	1		

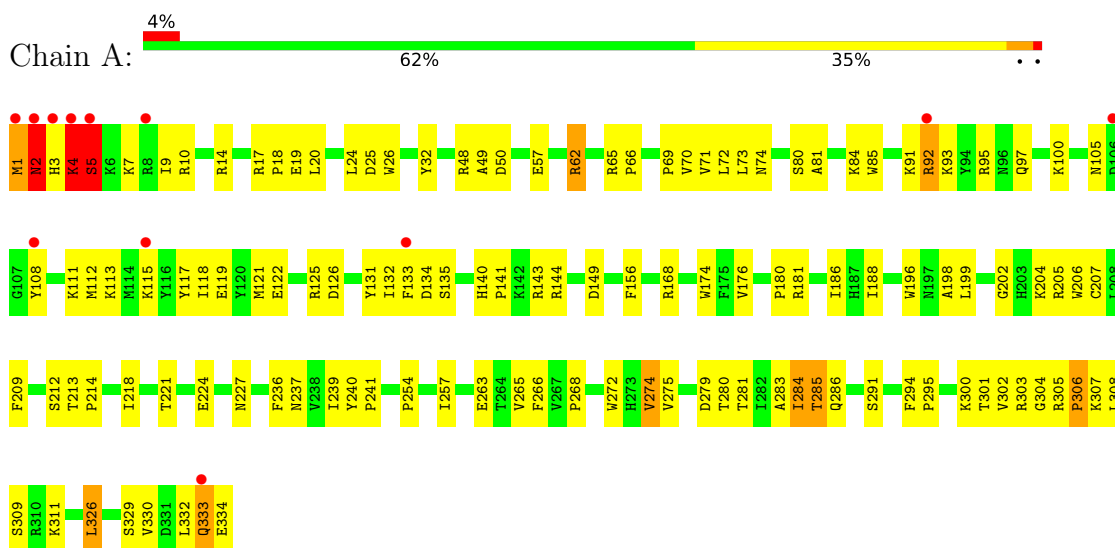
- Molecule 8 is MERCURY (II) ION (three-letter code: HG) (formula: Hg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	
8	A	2	Total	Hg	0	0
			2	2		

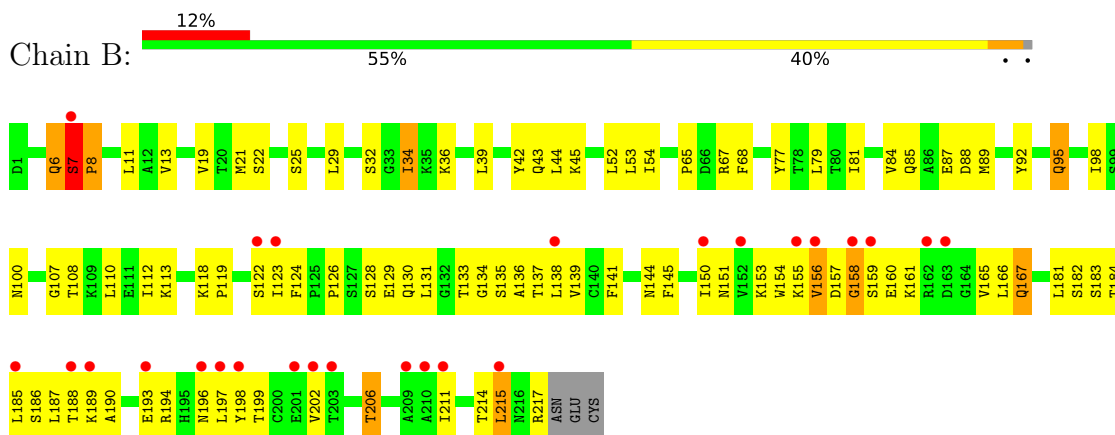
### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

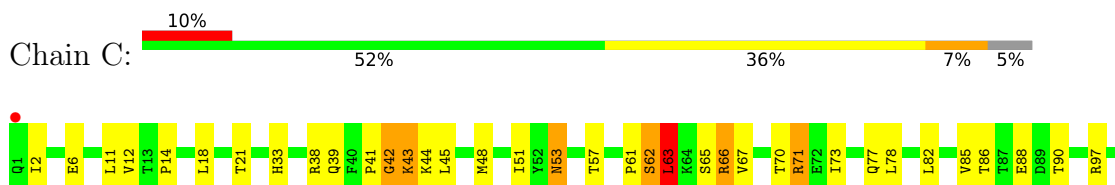
- Molecule 1: Bifunctional arginine demethylase and lysyl-hydroxylase JMJD6



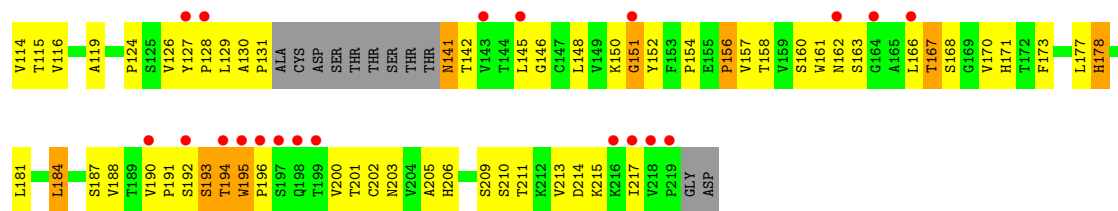
- Molecule 2: antibody Fab fragment light chain



- Molecule 3: antibody Fab fragment heavy chain







## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	138.38Å 138.38Å 183.62Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.28 – 2.70 47.28 – 2.70	Depositor EDS
% Data completeness (in resolution range)	81.7 (47.28-2.70) 81.8 (47.28-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.21 (at 2.69Å)	Xtrriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.250 , 0.285 0.249 , 0.288	Depositor DCC
$R_{free}$ test set	2024 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	63.1	Xtrriage
Anisotropy	0.437	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 61.6	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	0.92	EDS
Total number of atoms	6210	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	83.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.40% 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: AKG, GOL, SO4, FE, HG

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	0.47	4/2873 (0.1%)	0.68	2/3896 (0.1%)
2	B	0.39	0/1699	0.70	4/2304 (0.2%)
3	C	0.46	0/1664	0.77	3/2282 (0.1%)
All	All	0.45	4/6236 (0.1%)	0.71	9/8482 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
2	B	0	3
All	All	0	5

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	5	SER	CB-OG	6.66	1.50	1.42
1	A	5	SER	CA-CB	6.07	1.62	1.52
1	A	4	LYS	CE-NZ	5.32	1.62	1.49
1	A	4	LYS	CD-CE	5.16	1.64	1.51

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	42	GLY	N-CA-C	-10.67	86.44	113.10
2	B	144	ASN	N-CA-C	7.98	132.54	111.00
1	A	2	ASN	N-CA-C	7.45	131.11	111.00
1	A	2	ASN	CB-CA-C	-7.20	96.01	110.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	7	SER	CB-CA-C	-6.72	97.34	110.10

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1	MET	Peptide
1	A	2	ASN	Peptide
2	B	156	VAL	Peptide
2	B	6	GLN	Peptide
2	B	7	SER	Peptide

## 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	2788	0	2739	113	0
2	B	1666	0	1644	111	0
3	C	1618	0	1568	96	0
4	A	24	0	28	10	0
4	B	6	0	7	0	0
5	A	65	0	0	2	0
5	B	15	0	0	0	0
5	C	15	0	0	0	0
6	A	10	0	4	0	0
7	A	1	0	0	0	0
8	A	2	0	0	0	0
All	All	6210	0	5990	305	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 25.

The worst 5 of 305 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:7:SER:HB2	2:B:8:PRO:CD	1.64	1.27

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:167:GLN:HB3	2:B:183:SER:HA	1.38	1.06
2:B:7:SER:HB2	2:B:8:PRO:HD2	1.43	1.00
2:B:7:SER:HB2	2:B:8:PRO:HD3	1.42	0.98
2:B:7:SER:CB	2:B:8:PRO:CD	2.42	0.98

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	332/334 (99%)	305 (92%)	24 (7%)	3 (1%)	17	40
2	B	215/220 (98%)	181 (84%)	31 (14%)	3 (1%)	11	28
3	C	206/221 (93%)	175 (85%)	19 (9%)	12 (6%)	1	2
All	All	753/775 (97%)	661 (88%)	74 (10%)	18 (2%)	6	15

5 of 18 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	206	THR
3	C	62	SER
3	C	193	SER
3	C	194	THR
1	A	333	GLN

### 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	301/301 (100%)	288 (96%)	13 (4%)	29	57
2	B	190/193 (98%)	180 (95%)	10 (5%)	22	48
3	C	187/196 (95%)	175 (94%)	12 (6%)	17	39
All	All	678/690 (98%)	643 (95%)	35 (5%)	23	49

5 of 35 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	70	THR
3	C	71	ARG
3	C	141	ASN
1	A	326	LEU
1	A	285	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
3	C	77	GLN
3	C	171	HIS
3	C	206	HIS
3	C	141	ASN
2	B	143	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 28 ligands modelled in this entry, 3 are monoatomic - leaving 25 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
5	SO4	C	222	-	4,4,4	0.28	0	6,6,6	0.10	0
5	SO4	B	223	-	4,4,4	0.30	0	6,6,6	0.15	0
5	SO4	A	351	-	4,4,4	0.25	0	6,6,6	0.06	0
6	AKG	A	600	-	9,9,9	1.37	2 (22%)	11,11,11	1.37	2 (18%)
4	GOL	B	221	-	5,5,5	2.16	1 (20%)	5,5,5	0.25	0
4	GOL	A	335	-	5,5,5	2.16	1 (20%)	5,5,5	0.37	0
5	SO4	B	224	-	4,4,4	0.23	0	6,6,6	0.18	0
5	SO4	C	223	-	4,4,4	0.24	0	6,6,6	0.07	0
5	SO4	A	346	-	4,4,4	0.27	0	6,6,6	0.08	0
5	SO4	A	339	-	4,4,4	0.26	0	6,6,6	0.15	0
5	SO4	A	349	-	4,4,4	0.25	0	6,6,6	0.07	0
5	SO4	A	350	-	4,4,4	0.25	0	6,6,6	0.21	0
5	SO4	A	342	-	4,4,4	0.29	0	6,6,6	0.04	0
5	SO4	C	224	-	4,4,4	0.27	0	6,6,6	0.07	0
5	SO4	A	348	-	4,4,4	0.28	0	6,6,6	0.05	0
4	GOL	A	336	-	5,5,5	2.26	1 (20%)	5,5,5	0.43	0
5	SO4	B	222	-	4,4,4	0.28	0	6,6,6	0.07	0
4	GOL	A	338	-	5,5,5	2.17	1 (20%)	5,5,5	0.33	0
5	SO4	A	344	-	4,4,4	0.26	0	6,6,6	0.07	0
4	GOL	A	337	-	5,5,5	2.14	1 (20%)	5,5,5	0.31	0
5	SO4	A	343	-	4,4,4	0.26	0	6,6,6	0.05	0
5	SO4	A	347	-	4,4,4	0.25	0	6,6,6	0.07	0
5	SO4	A	340	-	4,4,4	0.26	0	6,6,6	0.08	0
5	SO4	A	341	-	4,4,4	0.26	0	6,6,6	0.10	0
5	SO4	A	345	-	4,4,4	0.25	0	6,6,6	0.13	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
4	GOL	A	337	-	-	0/4/4/4	-
4	GOL	A	335	-	-	0/4/4/4	-
4	GOL	A	336	-	-	0/4/4/4	-
6	AKG	A	600	-	-	0/9/9/9	-
4	GOL	B	221	-	-	0/4/4/4	-
4	GOL	A	338	-	-	0/4/4/4	-

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	336	GOL	O1-C1	-4.97	1.21	1.42
4	A	338	GOL	O1-C1	-4.78	1.22	1.42
4	B	221	GOL	O1-C1	-4.77	1.22	1.42
4	A	337	GOL	O1-C1	-4.75	1.22	1.42
4	A	335	GOL	O1-C1	-4.74	1.22	1.42

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	600	AKG	C3-C2-C1	2.23	120.11	115.97
6	A	600	AKG	O2-C1-C2	2.20	120.00	113.97

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	336	GOL	5	0
5	A	344	SO4	1	0
4	A	337	GOL	5	0
5	A	347	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	334/334 (100%)	0.28	12 (3%) 42 42	23, 69, 104, 129	3 (0%)
2	B	217/220 (98%)	0.70	26 (11%) 4 3	34, 77, 148, 159	0
3	C	210/221 (95%)	0.60	21 (10%) 7 5	33, 84, 136, 141	0
All	All	761/775 (98%)	0.49	59 (7%) 13 11	23, 74, 141, 159	3 (0%)

The worst 5 of 59 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1	MET	6.5
2	B	158	GLY	6.4
3	C	145	LEU	6.2
3	C	190	VAL	6.2
1	A	2	ASN	5.7

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

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

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
6	AKG	A	600	10/10	0.57	0.54	125,131,133,133	0
5	SO4	C	224	5/5	0.65	0.41	178,178,179,179	0
7	FE	A	601	1/1	0.67	0.19	142,142,142,142	0
5	SO4	B	224	5/5	0.69	0.46	143,143,143,144	0
4	GOL	A	335	6/6	0.72	0.37	101,102,104,106	0
4	GOL	A	338	6/6	0.72	0.31	110,112,112,113	0
5	SO4	A	344	5/5	0.75	0.30	155,156,156,156	0
5	SO4	A	346	5/5	0.76	0.22	158,158,159,159	0
4	GOL	B	221	6/6	0.78	0.15	125,127,127,127	0
5	SO4	A	343	5/5	0.80	0.23	154,154,155,155	0
5	SO4	B	223	5/5	0.80	0.48	34,35,36,37	5
4	GOL	A	336	6/6	0.80	0.20	77,79,83,85	0
5	SO4	A	351	5/5	0.81	0.33	96,96,96,97	5
5	SO4	A	340	5/5	0.84	0.18	145,145,145,145	0
5	SO4	A	348	5/5	0.84	0.26	155,155,156,156	0
5	SO4	C	222	5/5	0.86	0.26	78,78,80,80	5
5	SO4	A	347	5/5	0.86	0.27	75,75,76,76	5
5	SO4	C	223	5/5	0.88	0.43	71,71,71,71	5
5	SO4	A	341	5/5	0.88	0.15	137,138,139,139	0
4	GOL	A	337	6/6	0.89	0.38	102,105,106,107	0
5	SO4	A	342	5/5	0.90	0.18	140,140,141,141	0
5	SO4	A	339	5/5	0.90	0.36	61,62,63,64	5
5	SO4	A	345	5/5	0.91	0.15	136,137,138,138	0
5	SO4	A	349	5/5	0.91	0.17	147,148,148,148	0
5	SO4	B	222	5/5	0.93	0.22	76,76,77,78	5
5	SO4	A	350	5/5	0.94	0.14	97,99,99,101	0
8	HG	A	352	1/1	0.96	0.18	98,98,98,98	1
8	HG	A	353	1/1	0.97	0.14	122,122,122,122	1

## 6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.