



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 02:53 PM GMT

PDB ID : 4AQ6  
Title : substrate bound homogentisate 1,2-dioxygenase  
Authors : Jeoung, J.-H.; Lin, T.-Y.; Bommer, M.; Dobbek, H.  
Deposited on : 2012-04-12  
Resolution : 1.98 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (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

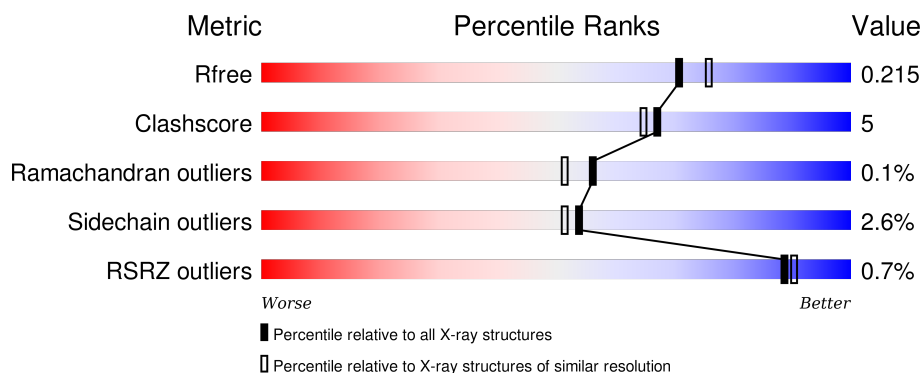
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.98 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	8664 (2.00-1.96)
Clashscore	102246	9905 (2.00-1.96)
Ramachandran outliers	100387	9792 (2.00-1.96)
Sidechain outliers	100360	9791 (2.00-1.96)
RSRZ outliers	91569	8679 (2.00-1.96)

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	433	<div> <div>89%</div> <div>9%</div> <div>.</div> </div>
1	B	433	<div> <div>%</div> <div>88%</div> <div>10%</div> <div>.</div> </div>
1	C	433	<div> <div>87%</div> <div>10%</div> <div>..</div> </div>
1	D	433	<div> <div>87%</div> <div>10%</div> <div>..</div> </div>
1	E	433	<div> <div>%</div> <div>87%</div> <div>11%</div> <div>..</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	433	
1	G	433	
1	H	433	
1	I	433	
1	J	433	
1	K	433	
1	L	433	

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
3	OMD	C	838	-	-	-	X
3	OMD	D	838	-	-	-	X
3	OMD	J	838	-	-	-	X
4	B3P	K	1436	-	-	-	X

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 44389 atoms, of which 28 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 HOMOGENISATE 1,2-DIOXYGENASE.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	425	Total	C	H	N	O	S	0	1	0
			3311	2115	2	580	597	17			
1	B	425	Total	C	N	O	S		0	1	0
			3300	2110	580	593	17				
1	C	425	Total	C	N	O	S		0	0	0
			3298	2109	576	596	17				
1	D	427	Total	C	N	O	S		0	1	0
			3313	2117	579	600	17				
1	E	426	Total	C	N	O	S		0	1	0
			3301	2111	577	596	17				
1	F	425	Total	C	H	N	O	S	0	1	0
			3302	2112	1	578	594	17			
1	G	425	Total	C	H	N	O	S	0	0	0
			3286	2102	2	574	591	17			
1	H	425	Total	C	N	O	S		0	0	0
			3282	2101	578	586	17				
1	I	426	Total	C	N	O	S		0	1	0
			3320	2121	585	597	17				
1	J	425	Total	C	N	O	S		0	1	0
			3298	2111	578	592	17				
1	K	426	Total	C	N	O	S		0	0	0
			3292	2106	576	593	17				
1	L	425	Total	C	H	N	O	S	0	0	0
			3277	2098	1	575	586	17			

- Molecule 2 is FE (III) ION (three-letter code: FE) (formula: Fe).

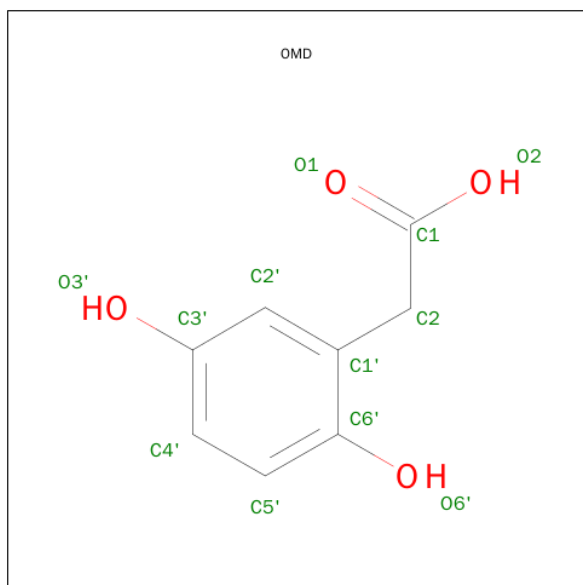
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	G	1	Total	Fe	0	0
			1	1		
2	J	1	Total	Fe	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	D	1	Total	Fe	0	0
			1	1		
2	K	1	Total	Fe	0	0
			1	1		
2	E	1	Total	Fe	0	0
			1	1		
2	H	1	Total	Fe	0	0
			1	1		
2	B	1	Total	Fe	0	0
			1	1		
2	I	1	Total	Fe	0	0
			1	1		
2	C	1	Total	Fe	0	0
			1	1		
2	A	1	Total	Fe	0	0
			1	1		
2	L	1	Total	Fe	0	0
			1	1		
2	F	1	Total	Fe	0	0
			1	1		

- Molecule 3 is 2-(3,6-DIHYDROXYPHENYL)ACETIC ACID (three-letter code: OMD) (formula: C<sub>8</sub>H<sub>8</sub>O<sub>4</sub>).



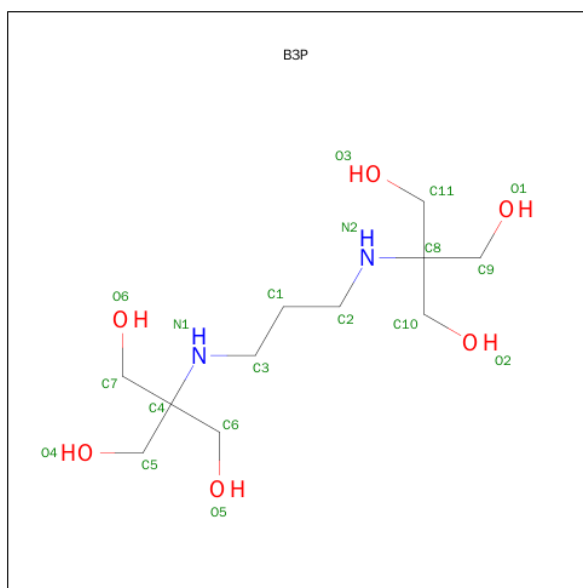
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			12	8	4		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	C	O	0	0
			12	8	4		
3	C	1	Total	C	O	0	0
			12	8	4		
3	D	1	Total	C	O	0	0
			12	8	4		
3	E	1	Total	C	O	0	0
			12	8	4		
3	F	1	Total	C	O	0	0
			12	8	4		
3	G	1	Total	C	O	0	0
			12	8	4		
3	H	1	Total	C	O	0	0
			12	8	4		
3	I	1	Total	C	O	0	0
			12	8	4		
3	J	1	Total	C	O	0	0
			12	8	4		
3	K	1	Total	C	O	0	0
			12	8	4		
3	L	1	Total	C	O	0	0
			12	8	4		

- Molecule 4 is 2-[3-(2-HYDROXY-1,1-DIHYDROXYMETHYL-ETHYLAMINO)-PROPYL AMINO]-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: B3P) (formula:  $C_{11}H_{26}N_2O_6$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	K	1	Total	C	H	N	O	0	0
			41	11	22	2	6		

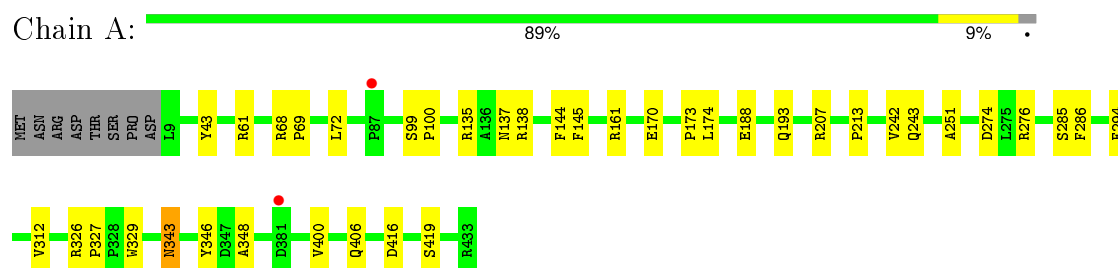
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	482	Total	O	0	6
			488	488		
5	B	424	Total	O	0	1
			425	425		
5	C	377	Total	O	0	7
			384	384		
5	D	439	Total	O	0	2
			441	441		
5	E	398	Total	O	0	3
			401	401		
5	F	333	Total	O	0	3
			336	336		
5	G	378	Total	O	0	1
			379	379		
5	H	365	Total	O	0	4
			369	369		
5	I	338	Total	O	0	2
			340	340		
5	J	350	Total	O	0	2
			352	352		
5	K	368	Total	O	0	0
			368	368		
5	L	328	Total	O	0	1
			329	329		

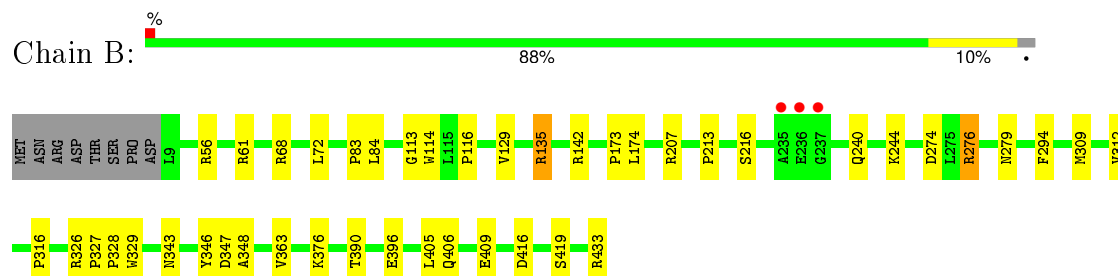
### 3 Residue-property plots

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.

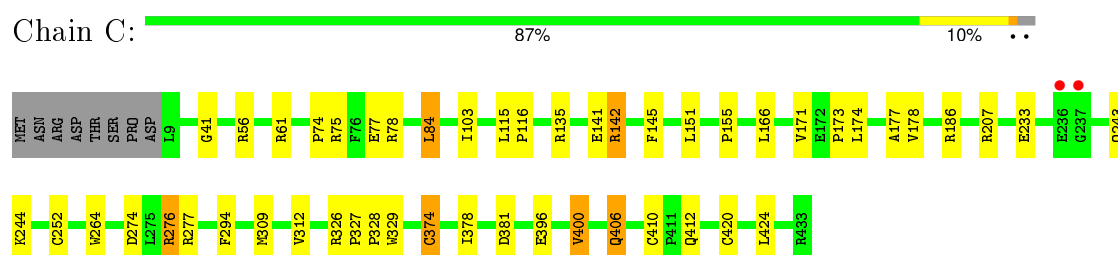
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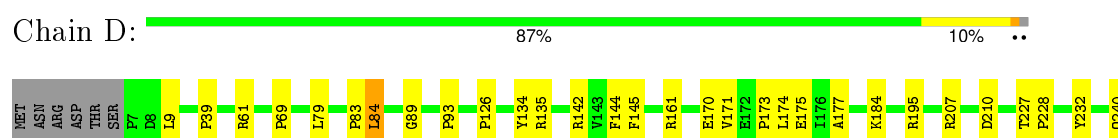
#### • Molecule 1: HOMOGENTISATE 1,2-DIOXYGENASE



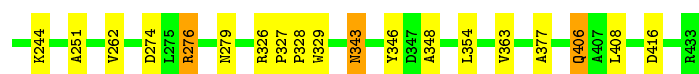
#### • Molecule 1: HOMOGENTISATE 1,2-DIOXYGENASE



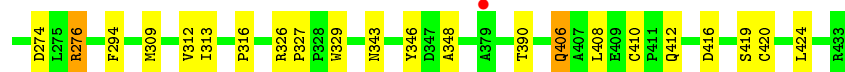
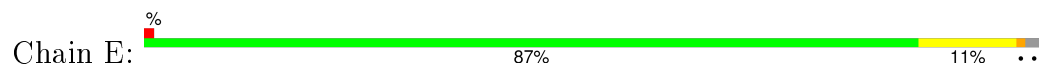
#### • Molecule 1: HOMOGENTISATE 1,2-DIOXYGENASE



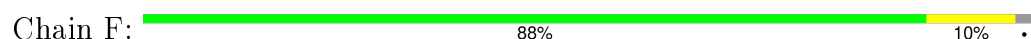




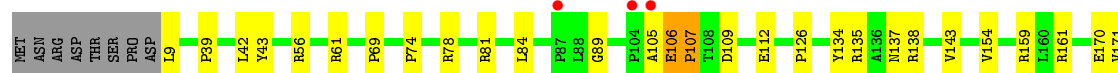
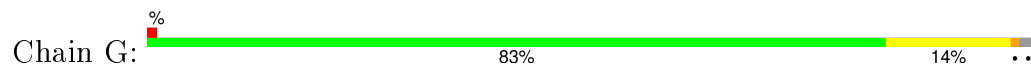
• Molecule 1: HOMOGENITISATE 1,2-DIOXYGENASE



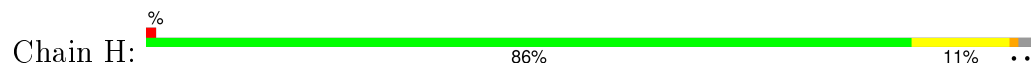
• Molecule 1: HOMOGENITISATE 1,2-DIOXYGENASE



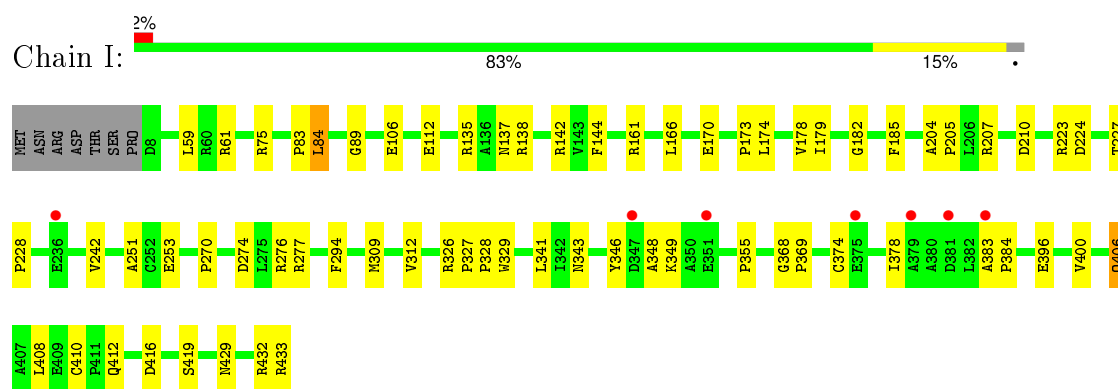
• Molecule 1: HOMOGENITISATE 1,2-DIOXYGENASE



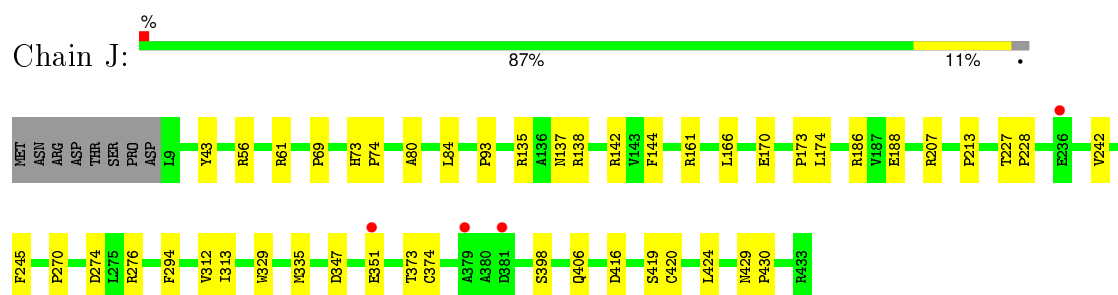
• Molecule 1: HOMOGENITISATE 1,2-DIOXYGENASE



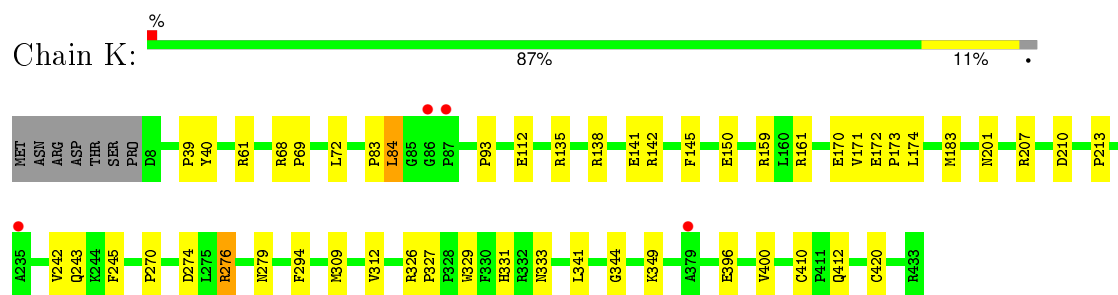
• Molecule 1: HOMOGENITISATE 1,2-DIOXYGENASE



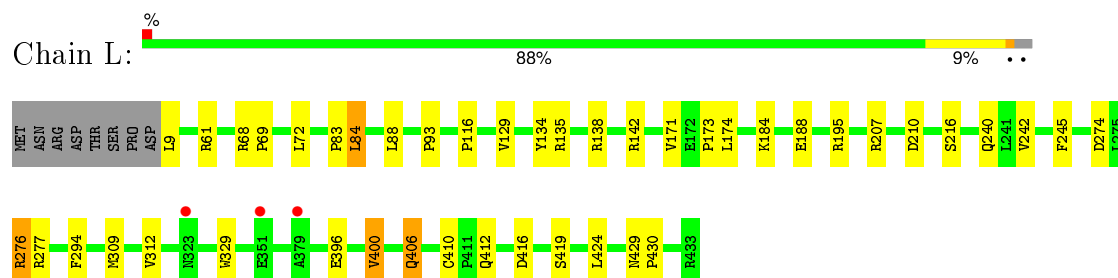
• Molecule 1: HOMOGENITISATE 1,2-DIOXYGENASE



• Molecule 1: HOMOGENITISATE 1,2-DIOXYGENASE



• Molecule 1: HOMOGENITISATE 1,2-DIOXYGENASE



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	93.39Å 93.71Å 162.98Å 87.69° 80.42° 68.39°	Depositor
Resolution (Å)	34.17 – 1.98 34.17 – 1.98	Depositor EDS
% Data completeness (in resolution range)	95.6 (34.17-1.98) 94.9 (34.17-1.98)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.20 (at 1.98Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE: 1.7.3_928)	Depositor
R, $R_{free}$	0.161 , 0.216 0.161 , 0.215	Depositor DCC
$R_{free}$ test set	16870 reflections (5.26%)	DCC
Wilson B-factor (Å <sup>2</sup> )	18.3	Xtriage
Anisotropy	0.366	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 53.5	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.44$ , $\langle L^2 \rangle = 0.27$	Xtriage
Outliers	0 of 337386 reflections	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	44389	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.27% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: B3P, FE, OMD

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	0.39	0/3411	0.55	0/4653
1	B	0.38	0/3401	0.53	0/4640
1	C	0.38	0/3399	0.54	0/4637
1	D	0.39	0/3416	0.55	0/4662
1	E	0.39	0/3403	0.55	0/4645
1	F	0.39	0/3403	0.54	0/4643
1	G	0.34	0/3385	0.51	0/4620
1	H	0.35	0/3384	0.51	0/4619
1	I	0.35	0/3422	0.51	0/4667
1	J	0.34	0/3400	0.51	0/4639
1	K	0.36	0/3394	0.53	0/4633
1	L	0.37	0/3378	0.53	0/4612
All	All	0.37	0/40796	0.53	0/55670

There are no bond length outliers.

There are no bond angle outliers.

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	3309	2	3196	24	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	3300	0	3182	30	0
1	C	3298	0	3180	32	0
1	D	3313	0	3187	32	0
1	E	3301	0	3174	34	0
1	F	3301	1	3187	23	0
1	G	3284	2	3159	49	0
1	H	3282	0	3168	33	0
1	I	3320	0	3211	48	0
1	J	3298	0	3185	26	0
1	K	3292	0	3169	28	0
1	L	3276	1	3157	34	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
2	G	1	0	0	0	0
2	H	1	0	0	0	0
2	I	1	0	0	0	0
2	J	1	0	0	0	0
2	K	1	0	0	0	0
2	L	1	0	0	0	0
3	A	12	0	6	0	0
3	B	12	0	6	0	0
3	C	12	0	6	1	0
3	D	12	0	6	1	0
3	E	12	0	6	0	0
3	F	12	0	6	0	0
3	G	12	0	6	0	0
3	H	12	0	6	1	0
3	I	12	0	6	0	0
3	J	12	0	6	0	0
3	K	12	0	6	0	0
3	L	12	0	6	0	0
4	K	19	22	25	1	0
5	A	488	0	0	2	0
5	B	425	0	0	9	2
5	C	384	0	0	5	1
5	D	441	0	0	9	0
5	E	401	0	0	6	0
5	F	336	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	G	379	0	0	7	0
5	H	369	0	0	7	0
5	I	340	0	0	8	0
5	J	352	0	0	5	1
5	K	368	0	0	2	0
5	L	329	0	0	4	0
All	All	44361	28	38252	372	2

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 5.

The worst 5 of 372 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:C:56:ARG:CB	1:C:56:ARG:CD	2.48	0.91
1:B:56:ARG:CB	1:B:56:ARG:CD	2.50	0.90
1:G:56:ARG:CB	1:G:56:ARG:CD	2.51	0.88
1:G:106:GLU:HB3	1:G:107:PRO:HD3	1.55	0.87
1:G:106:GLU:CB	1:G:107:PRO:HD3	2.05	0.85

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:2385:HOH:O	5:C:2379:HOH:O[1_565]	2.15	0.05
5:B:2401:HOH:O	5:J:2101:HOH:O[1_466]	2.16	0.04

## 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	424/433 (98%)	410 (97%)	14 (3%)	0	100	100
1	B	424/433 (98%)	411 (97%)	12 (3%)	1 (0%)	52	47
1	C	423/433 (98%)	408 (96%)	14 (3%)	1 (0%)	52	47
1	D	426/433 (98%)	414 (97%)	11 (3%)	1 (0%)	52	47
1	E	425/433 (98%)	414 (97%)	11 (3%)	0	100	100
1	F	424/433 (98%)	409 (96%)	14 (3%)	1 (0%)	52	47
1	G	423/433 (98%)	402 (95%)	19 (4%)	2 (0%)	34	25
1	H	423/433 (98%)	405 (96%)	18 (4%)	0	100	100
1	I	425/433 (98%)	410 (96%)	15 (4%)	0	100	100
1	J	424/433 (98%)	412 (97%)	12 (3%)	0	100	100
1	K	424/433 (98%)	412 (97%)	12 (3%)	0	100	100
1	L	423/433 (98%)	408 (96%)	15 (4%)	0	100	100
All	All	5088/5196 (98%)	4915 (97%)	167 (3%)	6 (0%)	56	51

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	106	GLU
1	C	142	ARG
1	G	107	PRO
1	B	363	VAL
1	D	363	VAL

### 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	342/355 (96%)	336 (98%)	6 (2%)	66	67
1	B	339/355 (96%)	333 (98%)	6 (2%)	66	67
1	C	340/355 (96%)	329 (97%)	11 (3%)	46	41
1	D	342/355 (96%)	331 (97%)	11 (3%)	46	41

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	339/355 (96%)	330 (97%)	9 (3%)	52	50
1	F	340/355 (96%)	333 (98%)	7 (2%)	61	61
1	G	336/355 (95%)	323 (96%)	13 (4%)	39	32
1	H	336/355 (95%)	326 (97%)	10 (3%)	48	44
1	I	343/355 (97%)	334 (97%)	9 (3%)	54	51
1	J	339/355 (96%)	330 (97%)	9 (3%)	52	50
1	K	338/355 (95%)	328 (97%)	10 (3%)	48	44
1	L	335/355 (94%)	326 (97%)	9 (3%)	52	50
All	All	4069/4260 (96%)	3959 (97%)	110 (3%)	54	50

5 of 110 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	374	CYS
1	G	400	VAL
1	L	61	ARG
1	G	84	LEU
1	G	276	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	343	ASN
1	G	101	GLN
1	J	101	GLN
1	D	343	ASN
1	I	429	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 [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 25 ligands modelled in this entry, 12 are monoatomic - leaving 13 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	$\# Z  > 2$
3	OMD	A	838	2	9,12,12	0.77	0	13,16,16	1.06	1 (7%)
3	OMD	B	838	2	9,12,12	0.42	0	13,16,16	0.73	0
3	OMD	C	838	2	9,12,12	0.61	0	13,16,16	0.98	1 (7%)
3	OMD	D	838	2	9,12,12	0.63	0	13,16,16	0.79	0
3	OMD	E	838	2	9,12,12	0.68	0	13,16,16	0.91	1 (7%)
3	OMD	F	838	2	9,12,12	0.65	0	13,16,16	0.87	1 (7%)
3	OMD	G	838	2	9,12,12	0.52	0	13,16,16	0.53	0
3	OMD	H	838	2	9,12,12	0.64	0	13,16,16	0.81	0
3	OMD	I	838	2	9,12,12	0.44	0	13,16,16	0.39	0
3	OMD	J	838	2	9,12,12	0.62	0	13,16,16	0.72	0
4	B3P	K	1436	-	18,18,18	1.21	3 (16%)	23,23,23	0.92	0
3	OMD	K	838	2	9,12,12	0.47	0	13,16,16	0.70	0
3	OMD	L	838	2	9,12,12	0.67	0	13,16,16	0.94	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	OMD	A	838	2	-	0/2/4/4	0/1/1/1
3	OMD	B	838	2	-	0/2/4/4	0/1/1/1
3	OMD	C	838	2	-	0/2/4/4	0/1/1/1
3	OMD	D	838	2	-	0/2/4/4	0/1/1/1
3	OMD	E	838	2	-	0/2/4/4	0/1/1/1
3	OMD	F	838	2	-	0/2/4/4	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	OMD	G	838	2	-	0/2/4/4	0/1/1/1
3	OMD	H	838	2	-	0/2/4/4	0/1/1/1
3	OMD	I	838	2	-	0/2/4/4	0/1/1/1
3	OMD	J	838	2	-	0/2/4/4	0/1/1/1
4	B3P	K	1436	-	-	0/28/28/28	0/0/0/0
3	OMD	K	838	2	-	0/2/4/4	0/1/1/1
3	OMD	L	838	2	-	0/2/4/4	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	K	1436	B3P	O3-C11	-2.05	1.35	1.42
4	K	1436	B3P	C2-N2	2.28	1.50	1.46
4	K	1436	B3P	C7-C4	2.71	1.56	1.53

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	838	OMD	C2-C1'-C6'	-2.17	118.28	121.70
3	C	838	OMD	C2-C1'-C6'	-2.08	118.41	121.70
3	F	838	OMD	C2'-C1'-C6'	2.11	120.28	118.33
3	A	838	OMD	C2'-C1'-C6'	2.45	120.59	118.33

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	838	OMD	1	0
3	D	838	OMD	1	0
3	H	838	OMD	1	0
4	K	1436	B3P	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 [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	425/433 (98%)	-0.43	2 (0%) 91 93	9, 16, 30, 41	0
1	B	425/433 (98%)	-0.41	3 (0%) 89 90	11, 18, 31, 52	0
1	C	425/433 (98%)	-0.40	2 (0%) 91 93	10, 17, 30, 52	5 (1%)
1	D	427/433 (98%)	-0.42	0 100 100	10, 17, 29, 48	0
1	E	426/433 (98%)	-0.40	3 (0%) 89 90	11, 17, 31, 51	1 (0%)
1	F	425/433 (98%)	-0.38	0 100 100	10, 18, 30, 57	0
1	G	425/433 (98%)	-0.13	6 (1%) 78 80	15, 24, 38, 63	2 (0%)
1	H	425/433 (98%)	-0.21	4 (0%) 85 87	14, 22, 37, 53	0
1	I	426/433 (98%)	-0.19	7 (1%) 74 77	14, 23, 37, 56	0
1	J	425/433 (98%)	-0.27	4 (0%) 85 87	14, 23, 38, 60	0
1	K	426/433 (98%)	-0.32	4 (0%) 85 87	11, 19, 33, 55	0
1	L	425/433 (98%)	-0.30	3 (0%) 89 90	13, 20, 35, 53	0
All	All	5105/5196 (98%)	-0.32	38 (0%) 89 90	9, 19, 35, 63	8 (0%)

The worst 5 of 38 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	105	ALA	5.1
1	K	86	GLY	4.4
1	H	379	ALA	4.2
1	K	235	ALA	4.0
1	G	235	ALA	4.0

### 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( $\text{\AA}^2$ )	Q<0.9
3	OMD	J	838	12/12	0.96	0.16	2.86	18,23,25,26	12
4	B3P	K	1436	19/19	0.94	0.13	2.35	18,26,33,39	0
3	OMD	C	838	12/12	0.96	0.12	2.33	9,14,16,17	12
3	OMD	D	838	12/12	0.96	0.14	2.28	12,17,19,22	0
3	OMD	F	838	12/12	0.96	0.12	1.36	13,17,18,20	0
3	OMD	A	838	12/12	0.96	0.12	1.19	8,12,15,16	0
3	OMD	L	838	12/12	0.95	0.13	0.97	18,23,24,30	0
3	OMD	G	838	12/12	0.96	0.12	0.80	17,19,23,24	0
3	OMD	K	838	12/12	0.98	0.12	0.66	15,17,20,20	0
3	OMD	B	838	12/12	0.98	0.10	0.16	13,16,18,18	0
3	OMD	H	838	12/12	0.97	0.12	0.03	18,21,24,26	0
3	OMD	I	838	12/12	0.97	0.11	-0.40	20,24,26,28	0
3	OMD	E	838	12/12	0.97	0.09	-1.08	11,13,15,18	0
2	FE	G	837	1/1	1.00	0.07	-	16,16,16,16	0
2	FE	F	837	1/1	0.99	0.09	-	13,13,13,13	0
2	FE	D	837	1/1	1.00	0.07	-	11,11,11,11	0
2	FE	I	837	1/1	1.00	0.07	-	18,18,18,18	0
2	FE	B	837	1/1	1.00	0.07	-	12,12,12,12	0
2	FE	C	837	1/1	1.00	0.08	-	11,11,11,11	0
2	FE	J	837	1/1	1.00	0.06	-	16,16,16,16	0
2	FE	E	837	1/1	1.00	0.07	-	13,13,13,13	0
2	FE	H	837	1/1	1.00	0.07	-	17,17,17,17	0
2	FE	L	837	1/1	1.00	0.07	-	14,14,14,14	0
2	FE	A	837	1/1	1.00	0.08	-	11,11,11,11	0
2	FE	K	837	1/1	1.00	0.08	-	15,15,15,15	0

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

There are no such residues in this entry.