Full wwPDB X-ray Structure Validation Report (i)

Dec 16, 2023 – 07:15 pm GMT

PDB ID	:	4BXF
Title	:	60S ribosomal protein L27A histidine hydroxylase (MINA53 Y209C) in complex with MN(II), 2-oxoglutarate (2OG) and 60S ribosomal protein L27A (RPL27A G37C) peptide fragment
Authors	:	Chowdhury, R.; Schofield, C.J.
Deposited on	:	2013-07-10
Resolution	:	2.05 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
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:

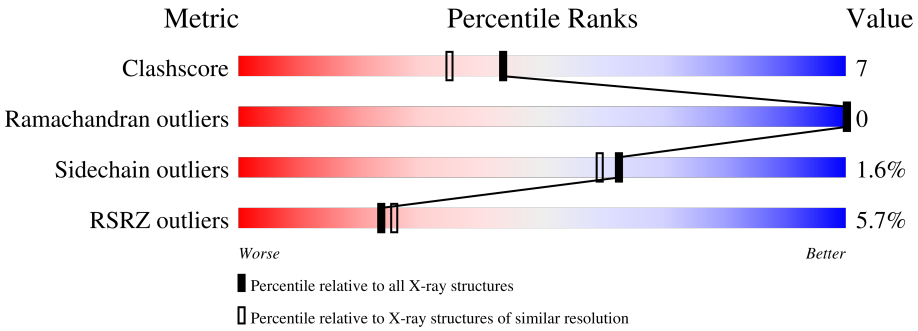
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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))
Clashscore	141614	1773 (2.04-2.04)
Ramachandran outliers	138981	1752 (2.04-2.04)
Sidechain outliers	138945	1752 (2.04-2.04)
RSRZ outliers	127900	1672 (2.04-2.04)

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 >=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 <=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	442	5%, 82%, 14%, ·
1	B	442	5%, 77%, 18%, · 5%
2	C	19	21%, 37%, 11%, 53%
2	D	19	16%, 37%, 5%, 58%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 7077 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 LYSINE-SPECIFIC DEMETHYLASE AND HISTIDYL-HYDROXYLASE MINA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	425	Total	C	N	O	S	0	0	0
			3331	2137	570	611	13			
1	B	422	Total	C	N	O	S	0	0	0
			3256	2086	558	599	13			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	24	SER	-	expression tag	UNP Q8IUF8
A	25	MET	-	expression tag	UNP Q8IUF8
A	209	CYS	TYR	engineered mutation	UNP Q8IUF8
B	24	SER	-	expression tag	UNP Q8IUF8
B	25	MET	-	expression tag	UNP Q8IUF8
B	209	CYS	TYR	engineered mutation	UNP Q8IUF8

- Molecule 2 is a protein called 60S RIBOSOMAL PROTEIN L27A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	9	Total	C	N	O	S	0	0	0
			72	44	18	9	1			
2	D	8	Total	C	N	O	S	0	0	0
			64	38	17	8	1			

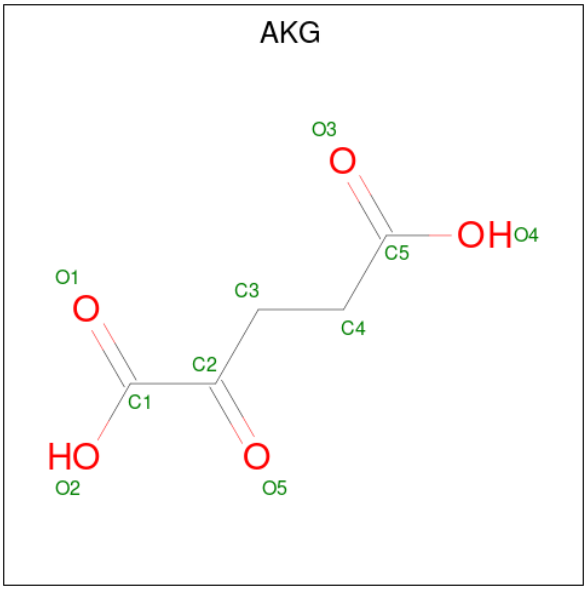
There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	37	CYS	GLY	engineered mutation	UNP P46776
D	37	CYS	GLY	engineered mutation	UNP P46776

- Molecule 3 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Mn 1 1	0	0
3	B	1	Total Mn 1 1	0	0

- Molecule 4 is 2-OXOGLUTARIC ACID (three-letter code: AKG) (formula: $C_5H_6O_5$).



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

- Molecule 5 is water.

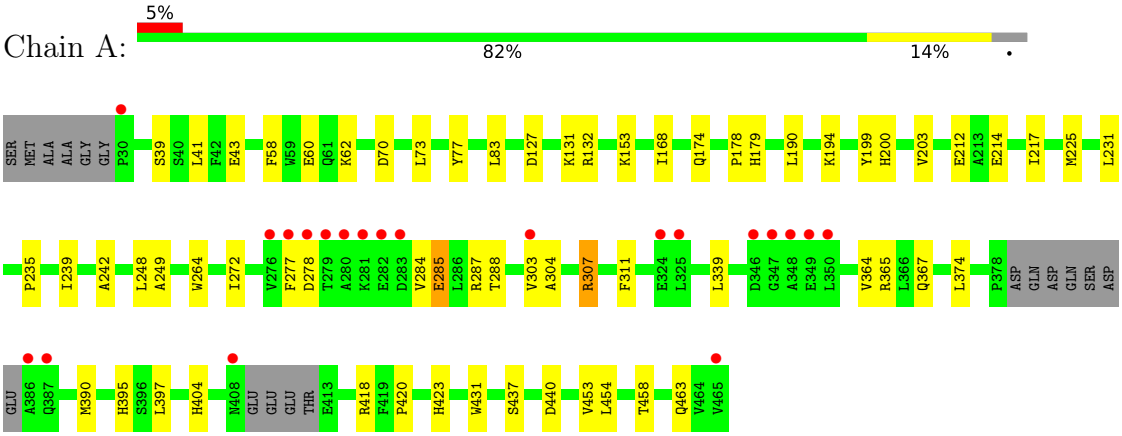
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	229	Total O 229 229	0	0
5	B	101	Total O 101 101	0	0
5	C	1	Total O 1 1	0	0
5	D	1	Total O 1 1	0	0

3 Residue-property plots (i)

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.

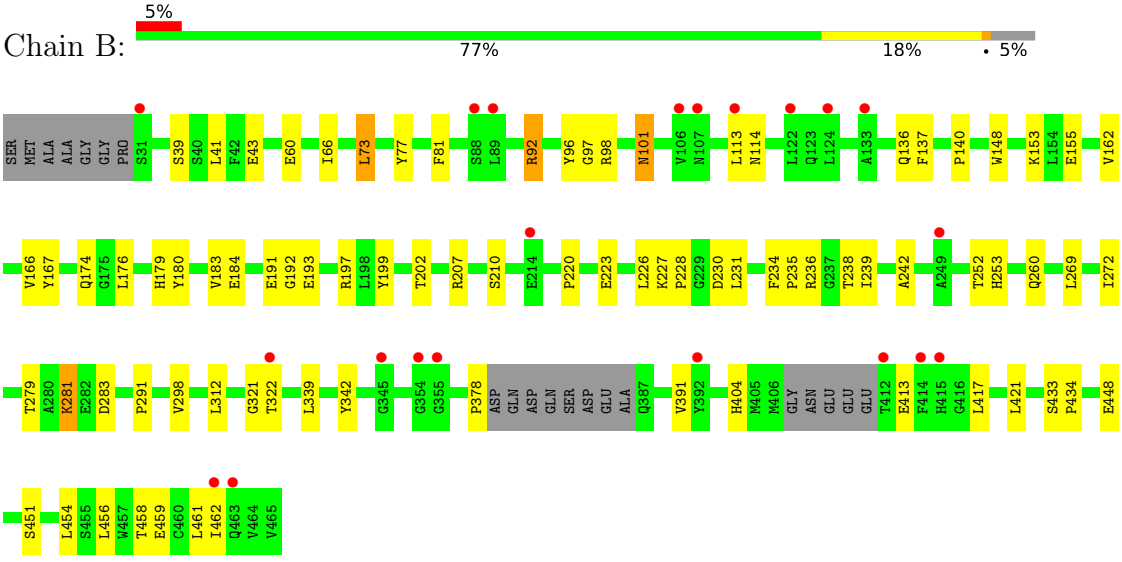
• Molecule 1: BIFUNCTIONAL LYSINE-SPECIFIC DEMETHYLASE AND HISTIDYL-HYDROXYLASE MINA

Chain A:



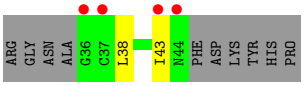
• Molecule 1: BIFUNCTIONAL LYSINE-SPECIFIC DEMETHYLASE AND HISTIDYL-HYDROXYLASE MINA

Chain B:

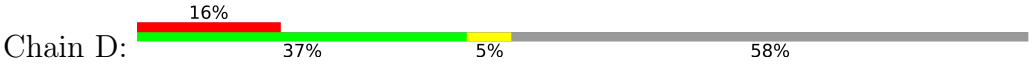


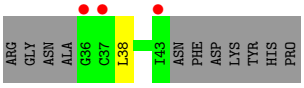
• Molecule 2: 60S RIBOSOMAL PROTEIN L27A

Chain C:



• Molecule 2: 60S RIBOSOMAL PROTEIN L27A





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	70.34Å 88.39Å 167.18Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	64.83 – 2.05 64.83 – 2.05	Depositor EDS
% Data completeness (in resolution range)	98.2 (64.83-2.05) 92.4 (64.83-2.05)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.29 (at 2.05Å)	Xtriage
Refinement program	CNS 1.3	Depositor
R, R_{free}	0.220 , 0.221 0.216 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å^2)	27.3	Xtriage
Anisotropy	0.429	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 62.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	7077	wwPDB-VP
Average B, all atoms (Å^2)	49.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.97% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 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: MN, AKG

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	0.44	0/3411	0.59	0/4630
1	B	0.35	0/3335	0.54	2/4535 (0.0%)
2	C	0.43	0/74	0.60	0/98
2	D	0.38	0/66	0.52	0/87
All	All	0.40	0/6886	0.57	2/9350 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	321	GLY	N-CA-C	5.73	127.42	113.10
1	B	378	PRO	N-CA-CB	5.47	109.87	103.30

There are no chirality outliers.

There are no planarity outliers.

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	3331	0	3246	45	0
1	B	3256	0	3091	50	0
2	C	72	0	64	2	0
2	D	64	0	53	2	0
3	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
4	A	10	0	4	0	0
4	B	10	0	4	1	0
5	A	229	0	0	2	0
5	B	101	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
All	All	7077	0	6462	89	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

All (89) 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:92:ARG:HH11	1:B:92:ARG:HG2	1.39	0.86
1:A:374:LEU:HD13	1:B:298:VAL:HG12	1.65	0.79
1:B:92:ARG:HG2	1:B:92:ARG:NH1	1.97	0.78
1:A:285:GLU:OE2	1:A:307:ARG:NH1	2.20	0.74
1:A:272:ILE:HD13	1:B:272:ILE:HD13	1.72	0.70
1:A:390:MET:HG3	1:A:418:ARG:HD3	1.73	0.70
1:B:97:GLY:HA2	1:B:101:ASN:HD21	1.58	0.69
1:A:203:VAL:HG22	1:B:281:LYS:HD2	1.74	0.68
1:B:456:LEU:HB3	1:B:462:ILE:HD13	1.78	0.66
1:A:390:MET:HE3	1:A:418:ARG:HG2	1.77	0.65
1:B:41:LEU:HD22	1:B:153:LYS:HB2	1.79	0.65
1:A:41:LEU:HD22	1:A:153:LYS:HB2	1.79	0.64
1:A:41:LEU:HD22	1:A:153:LYS:CB	2.35	0.57
1:B:448:GLU:HA	1:B:451:SER:HB3	1.86	0.57
1:B:41:LEU:HD22	1:B:153:LYS:CB	2.35	0.57
1:B:179:HIS:CG	2:D:38:LEU:HD12	2.40	0.57
1:A:214:GLU:HG3	1:A:217:ILE:HD11	1.88	0.56
1:B:191:GLU:HB2	1:B:252:THR:HB	1.86	0.55
1:A:284:VAL:HG12	1:A:287:ARG:NH2	2.22	0.55
1:A:272:ILE:HD11	1:B:312:LEU:HD21	1.88	0.55
1:A:199:TYR:HB2	1:A:239:ILE:HB	1.88	0.54
1:A:454:LEU:O	1:A:458:THR:HG23	2.07	0.54
1:A:284:VAL:O	1:A:288:THR:HG23	2.08	0.53
1:B:92:ARG:HH11	1:B:92:ARG:CG	2.14	0.52
1:B:461:LEU:O	1:B:462:ILE:HD12	2.10	0.51
1:A:374:LEU:HD11	1:A:431:TRP:CZ2	2.45	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:417:LEU:HD11	1:B:459:GLU:HG3	1.93	0.50
1:B:202:THR:HG23	1:B:239:ILE:HD11	1.93	0.50
1:B:391:VAL:HG23	1:B:421:LEU:HA	1.94	0.49
1:B:96:TYR:HB3	1:B:114:ASN:HD22	1.78	0.49
1:B:456:LEU:CB	1:B:462:ILE:HD13	2.43	0.49
1:A:437:SER:HB2	1:A:440:ASP:OD2	2.12	0.49
1:B:39:SER:O	1:B:43:GLU:HG3	2.13	0.48
1:A:420:PRO:HG2	1:A:423:HIS:ND1	2.28	0.48
2:C:43:ILE:HD12	2:C:43:ILE:N	2.29	0.48
1:B:199:TYR:CE2	1:B:220:PRO:HG3	2.48	0.48
1:A:178:PRO:HG2	1:A:212:GLU:O	2.15	0.47
1:B:137:PHE:HE2	1:B:140:PRO:HA	1.79	0.47
1:B:73:LEU:HD22	1:B:77:TYR:CE1	2.49	0.47
1:A:339:LEU:HG	1:A:404:HIS:CE1	2.49	0.47
1:B:454:LEU:O	1:B:458:THR:HG23	2.15	0.47
1:B:81:PHE:CD1	1:B:166:VAL:HG11	2.51	0.46
1:A:364:VAL:HG11	1:A:453:VAL:HG11	1.98	0.46
1:B:179:HIS:CD2	2:D:38:LEU:HD12	2.50	0.46
1:B:167:TYR:HB2	1:B:253:HIS:CE1	2.51	0.46
1:B:433:SER:HA	1:B:434:PRO:HD3	1.81	0.45
1:A:365:ARG:NH1	1:A:367:GLN:HG2	2.32	0.45
1:B:155:GLU:HG2	1:B:162:VAL:HG23	1.97	0.45
1:B:279:THR:CG2	1:B:283:ASP:HB3	2.46	0.45
1:A:70:ASP:HB3	1:A:73:LEU:HB2	1.99	0.45
1:B:66:ILE:HD12	1:B:231:LEU:HD22	1.98	0.45
1:B:180:TYR:CZ	1:B:210:SER:HB3	2.52	0.44
1:B:339:LEU:HG	1:B:404:HIS:CD2	2.52	0.44
1:B:192:GLY:O	1:B:228:PRO:HD3	2.18	0.43
1:A:285:GLU:HG2	1:A:311:PHE:HE1	1.83	0.43
1:B:60:GLU:HA	1:B:235:PRO:HB3	2.01	0.43
1:A:127:ASP:OD1	1:A:131:LYS:HD2	2.18	0.43
1:A:395:HIS:ND1	1:A:397:LEU:HB2	2.34	0.43
1:B:174:GLN:HG3	1:B:242:ALA:O	2.18	0.43
1:A:194:LYS:N	1:A:225:MET:HE3	2.34	0.43
1:A:307:ARG:CG	1:A:307:ARG:HH11	2.32	0.43
1:A:174:GLN:HG3	1:A:242:ALA:O	2.19	0.43
1:B:176:LEU:HD12	4:B:901:AKG:H42	2.00	0.43
1:B:136:GLN:HA	1:B:166:VAL:O	2.19	0.42
1:A:58:PHE:CE1	1:A:62:LYS:HE3	2.55	0.42
1:A:132:ARG:HD3	5:A:2101:HOH:O	2.19	0.42
1:B:148:TRP:CZ2	1:B:342:TYR:HA	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:77:TYR:O	1:A:190:LEU:HD22	2.19	0.42
1:A:200:HIS:HE1	5:A:2124:HOH:O	2.01	0.42
1:B:227:LYS:HG2	1:B:230:ASP:OD2	2.20	0.42
1:B:183:VAL:HG12	1:B:260:GLN:HB2	2.02	0.42
1:A:179:HIS:CG	2:C:38:LEU:HD12	2.55	0.42
1:A:231:LEU:C	1:A:231:LEU:HD23	2.41	0.42
1:A:367:GLN:CD	1:A:463:GLN:HB2	2.40	0.42
1:A:83:LEU:HD13	1:A:168:ILE:HG21	2.01	0.41
1:A:339:LEU:HG	1:A:404:HIS:CD2	2.54	0.41
1:A:39:SER:O	1:A:43:GLU:HG3	2.20	0.41
1:B:234:PHE:CD1	1:B:238:THR:HB	2.55	0.41
1:A:272:ILE:CD1	1:B:272:ILE:HD13	2.45	0.41
1:A:277:PHE:CE2	1:B:269:LEU:HD12	2.56	0.41
1:B:197:ARG:HG2	1:B:223:GLU:HG3	2.02	0.41
1:A:248:LEU:HD12	1:A:249:ALA:N	2.36	0.41
1:A:303:VAL:HG13	1:A:304:ALA:N	2.36	0.41
1:B:184:GLU:OE2	1:B:236:ARG:HG2	2.21	0.41
1:A:60:GLU:HA	1:A:235:PRO:HB3	2.03	0.41
1:A:367:GLN:NE2	1:A:463:GLN:HB2	2.35	0.41
1:B:193:GLU:HA	1:B:226:LEU:O	2.20	0.41
1:B:113:LEU:N	1:B:113:LEU:HD12	2.36	0.41
1:A:264:TRP:CZ2	1:B:291:PRO:HD3	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	419/442 (95%)	405 (97%)	14 (3%)	0	100	100
1	B	416/442 (94%)	407 (98%)	9 (2%)	0	100	100
2	C	7/19 (37%)	7 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
2	D	6/19 (32%)	6 (100%)	0	0	100 100
All	All	848/922 (92%)	825 (97%)	23 (3%)	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	356/394 (90%)	353 (99%)	3 (1%)	81 82
1	B	336/394 (85%)	328 (98%)	8 (2%)	49 42
2	C	7/16 (44%)	7 (100%)	0	100 100
2	D	6/16 (38%)	6 (100%)	0	100 100
All	All	705/820 (86%)	694 (98%)	11 (2%)	62 59

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	278	ASP
1	A	285	GLU
1	A	307	ARG
1	B	73	LEU
1	B	92	ARG
1	B	98	ARG
1	B	101	ASN
1	B	207	ARG
1	B	281	LYS
1	B	322	THR
1	B	413	GLU

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

Mol	Chain	Res	Type
1	A	200	HIS
1	B	101	ASN
1	B	136	GLN
1	B	200	HIS

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 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	$\#\|Z\| > 2$
4	AKG	A	901	3	9,9,9	1.19	0	11,11,11	1.53	2 (18%)
4	AKG	B	901	3	9,9,9	1.22	0	11,11,11	1.54	2 (18%)

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	AKG	A	901	3	-	0/9/9/9	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	AKG	B	901	3	-	1/9/9/9	-

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	901	AKG	O1-C1-C2	-2.99	117.72	121.72
4	A	901	AKG	O1-C1-C2	-2.74	118.06	121.72
4	A	901	AKG	C3-C2-C1	2.32	120.28	115.97
4	B	901	AKG	C3-C2-C1	2.26	120.16	115.97

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	901	AKG	C3-C4-C5-O4

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	901	AKG	1	0

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} 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	425/442 (96%)	0.33	21 (4%)	29	31	20, 37, 92, 100	6 (1%)
1	B	422/442 (95%)	0.49	21 (4%)	28	31	21, 53, 100, 100	6 (1%)
2	C	9/19 (47%)	1.42	4 (44%)	0	0	27, 38, 61, 63	0
2	D	8/19 (42%)	1.51	3 (37%)	0	0	48, 62, 87, 87	0
All	All	864/922 (93%)	0.43	49 (5%)	23	25	20, 47, 98, 100	12 (1%)

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	44	ASN	5.8
1	A	281	LYS	4.7
1	B	412	THR	4.6
1	A	279	THR	4.5
1	A	278	ASP	4.1
2	D	37	CYS	3.8
1	B	249	ALA	3.6
1	A	280	ALA	3.5
1	A	324	GLU	3.4
1	A	349	GLU	3.4
1	B	355	GLY	3.3
1	B	106	VAL	3.2
1	B	354	GLY	3.1
1	B	462	ILE	3.0
1	B	124	LEU	3.0
1	A	348	ALA	3.0
1	B	133	ALA	3.0
1	B	322	THR	2.9
1	A	350	LEU	2.8
1	A	283	ASP	2.8
1	B	113	LEU	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	277	PHE	2.6
1	B	414	PHE	2.6
1	A	386	ALA	2.5
1	B	415	HIS	2.5
1	B	345	GLY	2.5
1	B	31	SER	2.5
1	A	325	LEU	2.5
1	A	387	GLN	2.5
1	A	347	GLY	2.5
2	D	36	GLY	2.4
1	A	282	GLU	2.4
1	B	122	LEU	2.4
1	A	30	PRO	2.4
1	A	346	ASP	2.3
2	C	43	ILE	2.3
2	C	36	GLY	2.2
1	B	89	LEU	2.2
1	B	214	GLU	2.2
2	D	43	ILE	2.2
1	A	303	VAL	2.2
1	B	463	GLN	2.2
1	A	408	ASN	2.2
2	C	37	CYS	2.1
1	B	107	ASN	2.1
1	B	88	SER	2.0
1	B	392	TYR	2.0
1	A	276	VAL	2.0
1	A	465	VAL	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 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^{th} 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^2)	Q<0.9
4	AKG	B	901	10/10	0.92	0.22	48,52,58,58	0
3	MN	B	601	1/1	0.96	0.08	45,45,45,45	0
4	AKG	A	901	10/10	0.97	0.10	27,32,38,40	0
3	MN	A	601	1/1	1.00	0.10	28,28,28,28	0

6.5 Other polymers (i)

There are no such residues in this entry.