Full wwPDB X-ray Structure Validation Report (i)

Nov 2, 2024 – 09:58 pm GMT

PDB ID	:	5NFN
Title	:	JMJD7 IN COMPLEX WITH MN AND 2OG IN THE H32 FORM
Authors	:	Chowdhury, R.; Markolovic, S.; Schofield, C.J.
Deposited on	:	2017-03-14
Resolution	:	2.98 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 (1)) were used in the production of this report:

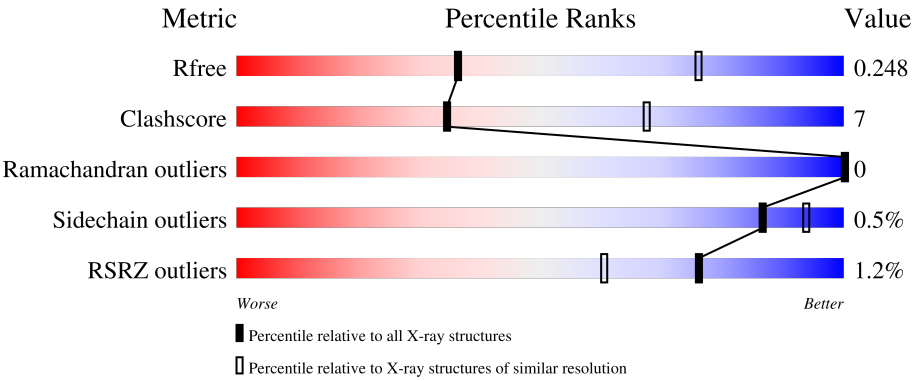
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 2.98 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}	164625	3360 (3.00-2.96)
Clashscore	180529	3751 (3.00-2.96)
Ramachandran outliers	177936	3628 (3.00-2.96)
Sidechain outliers	177891	3631 (3.00-2.96)
RSRZ outliers	164620	3372 (3.00-2.96)

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 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	335	.% 81% 14% 5%
1	B	335	82% 13% 5%
1	C	335	2% 75% 19% 5%
1	D	335	.% 79% 15% 5%

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 10336 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 JmjC domain-containing protein 7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	317	Total	C	N	O	S	0	0	0
			2504	1627	416	447	14			
1	B	318	Total	C	N	O	S	0	0	0
			2518	1634	415	455	14			
1	C	317	Total	C	N	O	S	0	0	0
			2470	1602	406	448	14			
1	D	318	Total	C	N	O	S	0	0	0
			2506	1625	417	450	14			

There are 76 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	GLY	-	expression tag	UNP P0C870
A	-17	SER	-	expression tag	UNP P0C870
A	-16	SER	-	expression tag	UNP P0C870
A	-15	HIS	-	expression tag	UNP P0C870
A	-14	HIS	-	expression tag	UNP P0C870
A	-13	HIS	-	expression tag	UNP P0C870
A	-12	HIS	-	expression tag	UNP P0C870
A	-11	HIS	-	expression tag	UNP P0C870
A	-10	HIS	-	expression tag	UNP P0C870
A	-9	SER	-	expression tag	UNP P0C870
A	-8	SER	-	expression tag	UNP P0C870
A	-7	GLY	-	expression tag	UNP P0C870
A	-6	LEU	-	expression tag	UNP P0C870
A	-5	VAL	-	expression tag	UNP P0C870
A	-4	PRO	-	expression tag	UNP P0C870
A	-3	ARG	-	expression tag	UNP P0C870
A	-2	GLY	-	expression tag	UNP P0C870
A	-1	SER	-	expression tag	UNP P0C870
A	0	HIS	-	expression tag	UNP P0C870
B	-18	GLY	-	expression tag	UNP P0C870
B	-17	SER	-	expression tag	UNP P0C870

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	SER	-	expression tag	UNP P0C870
B	-15	HIS	-	expression tag	UNP P0C870
B	-14	HIS	-	expression tag	UNP P0C870
B	-13	HIS	-	expression tag	UNP P0C870
B	-12	HIS	-	expression tag	UNP P0C870
B	-11	HIS	-	expression tag	UNP P0C870
B	-10	HIS	-	expression tag	UNP P0C870
B	-9	SER	-	expression tag	UNP P0C870
B	-8	SER	-	expression tag	UNP P0C870
B	-7	GLY	-	expression tag	UNP P0C870
B	-6	LEU	-	expression tag	UNP P0C870
B	-5	VAL	-	expression tag	UNP P0C870
B	-4	PRO	-	expression tag	UNP P0C870
B	-3	ARG	-	expression tag	UNP P0C870
B	-2	GLY	-	expression tag	UNP P0C870
B	-1	SER	-	expression tag	UNP P0C870
B	0	HIS	-	expression tag	UNP P0C870
C	-18	GLY	-	expression tag	UNP P0C870
C	-17	SER	-	expression tag	UNP P0C870
C	-16	SER	-	expression tag	UNP P0C870
C	-15	HIS	-	expression tag	UNP P0C870
C	-14	HIS	-	expression tag	UNP P0C870
C	-13	HIS	-	expression tag	UNP P0C870
C	-12	HIS	-	expression tag	UNP P0C870
C	-11	HIS	-	expression tag	UNP P0C870
C	-10	HIS	-	expression tag	UNP P0C870
C	-9	SER	-	expression tag	UNP P0C870
C	-8	SER	-	expression tag	UNP P0C870
C	-7	GLY	-	expression tag	UNP P0C870
C	-6	LEU	-	expression tag	UNP P0C870
C	-5	VAL	-	expression tag	UNP P0C870
C	-4	PRO	-	expression tag	UNP P0C870
C	-3	ARG	-	expression tag	UNP P0C870
C	-2	GLY	-	expression tag	UNP P0C870
C	-1	SER	-	expression tag	UNP P0C870
C	0	HIS	-	expression tag	UNP P0C870
D	-18	GLY	-	expression tag	UNP P0C870
D	-17	SER	-	expression tag	UNP P0C870
D	-16	SER	-	expression tag	UNP P0C870
D	-15	HIS	-	expression tag	UNP P0C870
D	-14	HIS	-	expression tag	UNP P0C870
D	-13	HIS	-	expression tag	UNP P0C870

Continued on next page...

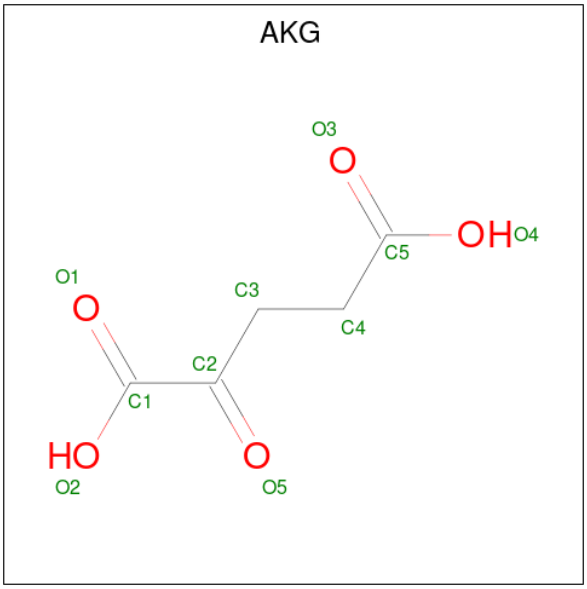
Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
D	-12	HIS	-	expression tag	UNP P0C870
D	-11	HIS	-	expression tag	UNP P0C870
D	-10	HIS	-	expression tag	UNP P0C870
D	-9	SER	-	expression tag	UNP P0C870
D	-8	SER	-	expression tag	UNP P0C870
D	-7	GLY	-	expression tag	UNP P0C870
D	-6	LEU	-	expression tag	UNP P0C870
D	-5	VAL	-	expression tag	UNP P0C870
D	-4	PRO	-	expression tag	UNP P0C870
D	-3	ARG	-	expression tag	UNP P0C870
D	-2	GLY	-	expression tag	UNP P0C870
D	-1	SER	-	expression tag	UNP P0C870
D	0	HIS	-	expression tag	UNP P0C870

- Molecule 2 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

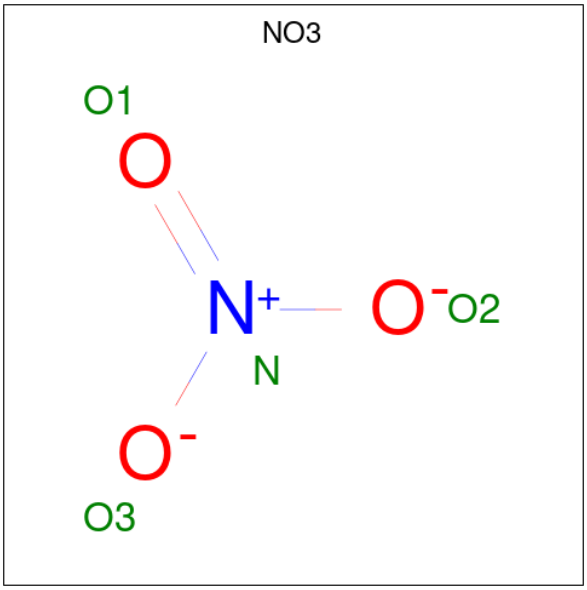
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Mn 1 1	0	0
2	B	1	Total Mn 1 1	0	0
2	C	1	Total Mn 1 1	0	0
2	D	1	Total Mn 1 1	0	0

- Molecule 3 is 2-OXOGLUTARIC ACID (three-letter code: AKG) (formula: $C_5H_6O_5$).



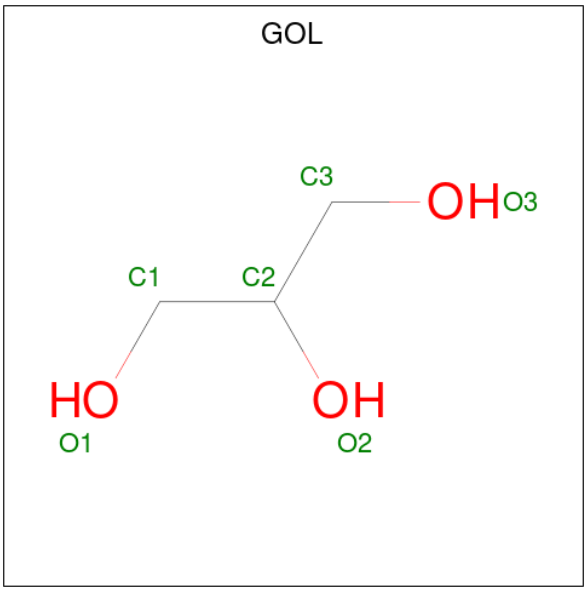
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 10 5 5	0	0
3	B	1	Total C O 10 5 5	0	0
3	D	1	Total C O 10 5 5	0	0

- Molecule 4 is NITRATE ION (three-letter code: NO3) (formula: NO_3).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total N O 4 1 3	0	0
4	A	1	Total N O 4 1 3	0	0
4	C	1	Total N O 4 1 3	0	0
4	D	1	Total N O 4 1 3	0	0
4	D	1	Total N O 4 1 3	0	0
4	D	1	Total N O 4 1 3	0	0
4	D	1	Total N O 4 1 3	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 6 is water.

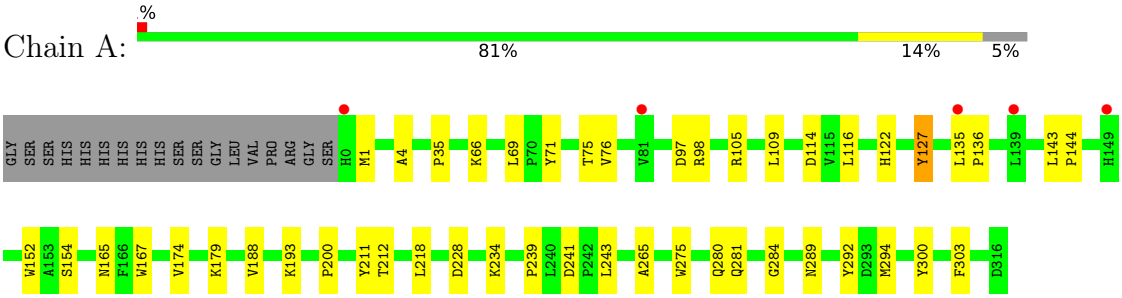
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	79	Total O 79 79	0	0
6	B	64	Total O 64 64	0	0
6	C	56	Total O 56 56	0	0
6	D	53	Total O 53 53	0	0

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.

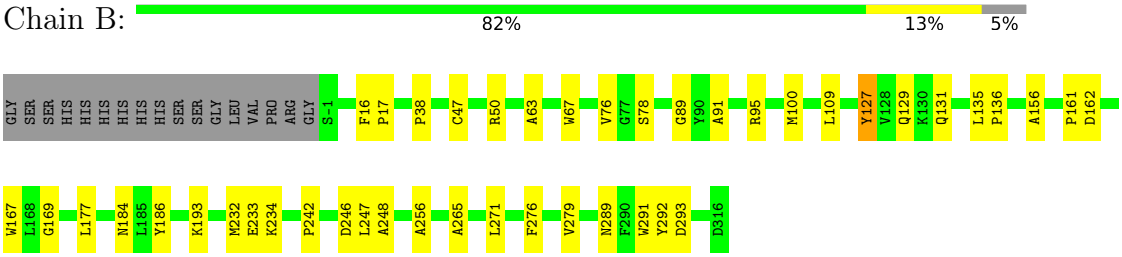
• Molecule 1: JmjC domain-containing protein 7

Chain A:



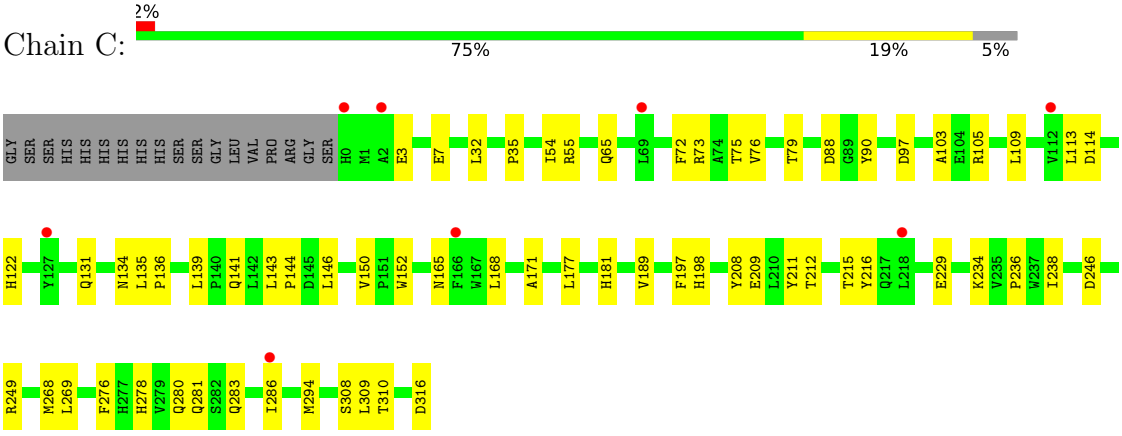
• Molecule 1: JmjC domain-containing protein 7

Chain B:



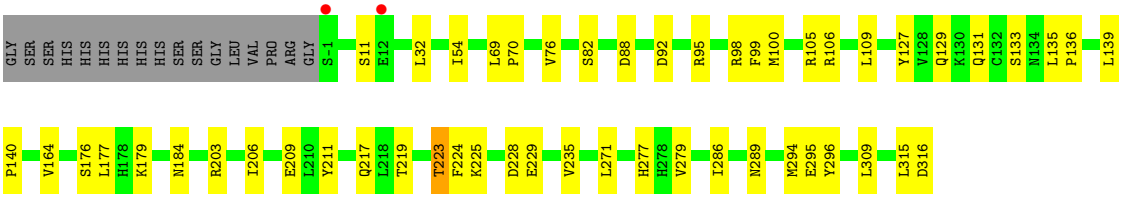
• Molecule 1: JmjC domain-containing protein 7

Chain C:



• Molecule 1: JmjC domain-containing protein 7

Chain D:


GLY SER SER HIS HIS HIS HIS HIS HIS SER SER GLY LEU VAL PRO ARG GLY S-1 S11 E12 L32 I54 L69 P70 V76 S82 D88 D92 R95 R98 F99 M100 R105 R106 L109 Y127 V128 Q129 K130 Q131 C132 S133 N134 L135 P136 L139
P140 V164 S176 L177 H178 K179 N184 R203 I206 E209 L210 Y211 Q217 L218 T219 T223 F224 K225 D228 E229 V235 L271 H277 H278 V279 I286 N289 M294 E295 Y296 L309 L315 D316

4 Data and refinement statistics (i)

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, α, β, γ	207.22Å 207.22Å 211.79Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.46 – 2.98 48.46 – 2.98	Depositor EDS
% Data completeness (in resolution range)	99.3 (48.46-2.98) 99.7 (48.46-2.98)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.21 (at 2.96Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.249 , 0.251 0.250 , 0.248	Depositor DCC
R_{free} test set	1738 reflections (4.86%)	wwPDB-VP
Wilson B-factor (Å^2)	75.1	Xtriage
Anisotropy	0.704	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 77.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	10336	wwPDB-VP
Average B, all atoms (Å^2)	110.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.55% 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, NO3, GOL

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	0.37	0/2589	0.69	0/3547
1	B	0.38	0/2603	0.65	0/3566
1	C	0.36	0/2554	0.72	0/3504
1	D	0.37	0/2591	0.65	0/3552
All	All	0.37	0/10337	0.68	0/14169

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

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	2504	0	2406	29	0
1	B	2518	0	2413	38	0
1	C	2470	0	2332	48	0
1	D	2506	0	2389	38	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
3	A	10	0	4	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	10	0	4	2	0
3	D	10	0	4	2	0
4	A	8	0	0	0	0
4	C	4	0	0	0	0
4	D	16	0	0	0	0
5	B	18	0	24	4	0
5	D	6	0	8	3	0
6	A	79	0	0	2	0
6	B	64	0	0	7	0
6	C	56	0	0	4	0
6	D	53	0	0	3	0
All	All	10336	0	9584	145	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 (145) 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:A:1:MET:HE1	6:D:621:HOH:O	1.53	1.06
1:D:129:GLN:O	1:D:131:GLN:HG3	1.89	0.72
1:D:179:LYS:NZ	6:D:603:HOH:O	2.26	0.68
1:B:233:GLU:HG2	6:B:654:HOH:O	1.93	0.68
1:B:177:LEU:HD21	1:B:276:PHE:HB3	1.75	0.68
1:D:184:ASN:ND2	3:D:502:AKG:O1	2.26	0.68
1:B:129:GLN:O	1:B:131:GLN:HG3	1.95	0.67
1:C:109:LEU:O	1:C:113:LEU:HG	1.96	0.66
1:A:98:ARG:NH2	1:A:228:ASP:OD1	2.30	0.65
6:A:614:HOH:O	1:B:47:CYS:SG	2.54	0.65
1:C:79:THR:OG1	1:C:141:GLN:NE2	2.31	0.64
1:B:279:VAL:HG21	3:B:502:AKG:H41	1.79	0.64
1:B:232:MET:HA	5:B:504:GOL:O1	2.01	0.60
1:B:91:ALA:HB3	1:B:129:GLN:HE22	1.66	0.59
1:D:135:LEU:HB3	1:D:136:PRO:HD3	1.84	0.59
1:C:73:ARG:NH2	1:C:114:ASP:OD1	2.35	0.59
1:B:78:SER:N	6:B:609:HOH:O	2.35	0.58
1:B:135:LEU:HB3	1:B:136:PRO:HD3	1.84	0.58
1:D:294:MET:HA	5:D:503:GOL:O1	2.03	0.57
1:B:127:TYR:OH	1:B:193:LYS:NZ	2.38	0.57
1:B:233:GLU:N	5:B:504:GOL:O1	2.35	0.57
1:C:135:LEU:HB3	1:C:136:PRO:CD	2.35	0.57

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:79:THR:O	1:C:109:LEU:HB2	2.05	0.57
1:B:256:ALA:O	5:B:505:GOL:O2	2.22	0.56
1:D:279:VAL:HG21	3:D:502:AKG:H41	1.86	0.56
1:D:289:ASN:O	1:D:289:ASN:OD1	2.24	0.56
1:B:177:LEU:HD12	1:B:242:PRO:HG3	1.88	0.55
1:C:212:THR:HG22	1:C:234:LYS:HE3	1.88	0.55
1:D:217:GLN:HB3	1:D:225:LYS:HB2	1.89	0.54
1:B:246:ASP:N	6:B:603:HOH:O	2.29	0.54
1:C:88:ASP:OD2	1:C:90:TYR:HD2	1.90	0.54
1:B:293:ASP:OD2	5:B:503:GOL:O2	2.23	0.54
1:B:91:ALA:CB	1:B:129:GLN:HE22	2.20	0.54
1:B:76:VAL:HG23	1:B:109:LEU:HD23	1.89	0.54
1:A:211:TYR:OH	1:A:239:PRO:HB3	2.08	0.54
1:C:79:THR:HG21	1:C:139:LEU:HD23	1.91	0.53
1:B:289:ASN:OD1	1:B:289:ASN:O	2.26	0.53
1:A:212:THR:HG22	1:A:234:LYS:HE3	1.91	0.52
1:C:150:VAL:HG21	1:C:268:MET:HE1	1.91	0.52
1:A:97:ASP:O	1:A:98:ARG:HD3	2.10	0.52
1:C:35:PRO:HB3	1:C:152:TRP:NE1	2.25	0.52
1:B:234:LYS:HG3	1:C:7:GLU:OE2	2.10	0.52
1:C:3:GLU:O	1:C:7:GLU:HG2	2.10	0.51
1:A:105:ARG:NH2	1:A:122:HIS:NE2	2.59	0.51
1:D:69:LEU:HD12	1:D:286:ILE:HD11	1.92	0.51
1:C:103:ALA:HB2	1:C:216:TYR:O	2.10	0.51
1:B:100:MET:HE3	1:B:100:MET:HA	1.92	0.51
1:B:247:LEU:HB3	1:C:97:ASP:HB3	1.93	0.51
1:C:209:GLU:O	1:C:236:PRO:HA	2.10	0.51
1:D:95:ARG:HB2	1:D:100:MET:HG2	1.93	0.50
1:D:105:ARG:NH2	1:D:106:ARG:H	2.08	0.50
1:D:133:SER:HA	1:D:164:VAL:O	2.12	0.49
1:D:92:ASP:O	1:D:176:SER:OG	2.30	0.49
1:A:127:TYR:HH	1:A:167:TRP:HE3	1.59	0.49
1:B:265:ALA:O	6:B:601:HOH:O	2.20	0.49
1:C:168:LEU:HD13	1:C:286:ILE:HG12	1.94	0.49
1:C:65:GLN:N	1:C:65:GLN:OE1	2.46	0.49
1:D:82:SER:OG	1:D:106:ARG:NH1	2.45	0.49
1:B:186:TYR:OH	1:B:193:LYS:HE3	2.13	0.48
1:D:99:PHE:CD2	1:D:235:VAL:HG11	2.48	0.48
1:A:66:LYS:HE2	1:A:71:TYR:CE1	2.49	0.48
1:A:174:VAL:HG22	1:A:280:GLN:HG2	1.95	0.48
1:B:246:ASP:OD2	1:C:249:ARG:NE	2.47	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:32:LEU:O	1:C:55:ARG:HG2	2.14	0.47
1:C:131:GLN:HA	1:C:165:ASN:CG	2.34	0.47
1:A:1:MET:HG3	1:C:308:SER:OG	2.15	0.47
1:A:75:THR:HG22	1:A:76:VAL:HG13	1.96	0.47
1:A:143:LEU:N	1:A:144:PRO:HD2	2.29	0.47
1:D:76:VAL:HG23	1:D:109:LEU:HD23	1.96	0.47
1:B:95:ARG:HB2	1:B:100:MET:HG2	1.95	0.47
1:C:76:VAL:O	1:C:109:LEU:HD23	2.14	0.47
1:C:54:ILE:N	1:C:268:MET:O	2.40	0.46
1:C:246:ASP:HB2	6:C:620:HOH:O	2.15	0.46
1:C:35:PRO:HB3	1:C:152:TRP:CE2	2.50	0.46
1:C:197:PHE:HZ	1:C:269:LEU:HD21	1.80	0.46
1:C:198:HIS:HB2	1:C:276:PHE:HB2	1.98	0.46
1:D:219:THR:OG1	1:D:223:THR:OG1	2.20	0.46
1:A:4:ALA:O	1:D:11:SER:OG	2.26	0.46
1:A:69:LEU:HG	6:A:655:HOH:O	2.15	0.46
1:A:35:PRO:HB3	1:A:152:TRP:CE2	2.51	0.45
1:C:32:LEU:HD12	1:C:54:ILE:HG13	1.97	0.45
1:D:184:ASN:HB3	1:D:271:LEU:HB3	1.98	0.45
1:A:105:ARG:HD2	1:A:218:LEU:HD23	1.98	0.45
1:B:50:ARG:NH2	6:B:613:HOH:O	2.40	0.45
1:C:280:GLN:HG2	1:C:281:GLN:N	2.31	0.45
1:D:129:GLN:O	1:D:129:GLN:HG3	2.17	0.45
1:A:165:ASN:HB2	1:A:289:ASN:OD1	2.17	0.45
1:B:16:PHE:HB3	1:B:17:PRO:HD3	1.99	0.45
1:C:189:VAL:O	1:C:189:VAL:HG12	2.16	0.45
1:C:215:THR:OG1	1:C:229:GLU:OE2	2.21	0.44
1:B:293:ASP:HB2	6:B:631:HOH:O	2.17	0.44
1:D:95:ARG:HB2	1:D:100:MET:CG	2.46	0.44
1:D:295:GLU:HB2	5:D:503:GOL:H12	2.00	0.44
1:A:135:LEU:HB3	1:A:136:PRO:CD	2.48	0.44
1:A:193:LYS:HD3	1:A:281:GLN:HB3	2.00	0.44
1:B:89:GLY:O	6:B:602:HOH:O	2.20	0.44
1:D:315:LEU:O	6:D:601:HOH:O	2.21	0.44
1:A:294:MET:HE1	1:A:300:TYR:HB2	2.00	0.43
1:C:278:HIS:HE1	6:C:645:HOH:O	2.00	0.43
1:B:167:TRP:CH2	3:B:502:AKG:H31	2.54	0.43
1:A:154:SER:HG	1:A:292:TYR:HH	1.66	0.43
1:C:283:GLN:O	6:C:601:HOH:O	2.21	0.43
1:D:229:GLU:HA	1:D:229:GLU:OE1	2.18	0.43
1:D:295:GLU:N	5:D:503:GOL:O2	2.50	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:98:ARG:CD	1:A:212:THR:OG1	2.67	0.43
1:A:116:LEU:HD13	1:A:284:GLY:HA2	2.00	0.43
1:C:181:HIS:HB2	1:C:294:MET:SD	2.59	0.43
1:B:161:PRO:HG3	1:B:292:TYR:CZ	2.54	0.42
1:C:310:THR:HG22	1:C:316:ASP:HB2	2.00	0.42
1:B:63:ALA:O	1:B:67:TRP:HB2	2.19	0.42
1:C:105:ARG:NH2	1:C:122:HIS:NE2	2.67	0.42
1:A:76:VAL:HG23	1:A:109:LEU:HD23	2.00	0.42
1:B:127:TYR:CD1	1:B:169:GLY:HA3	2.55	0.42
1:A:188:VAL:HG12	1:A:265:ALA:HA	2.01	0.42
1:D:203:ARG:NH1	1:D:206:ILE:O	2.52	0.42
1:A:179:LYS:HE2	1:A:303:PHE:CZ	2.53	0.42
1:C:135:LEU:HD21	1:C:146:LEU:HD11	1.99	0.42
1:B:184:ASN:HB3	1:B:271:LEU:HB3	2.02	0.42
1:C:309:LEU:HD13	1:D:309:LEU:HD13	2.02	0.42
1:A:200:PRO:HD3	1:A:275:TRP:CD1	2.55	0.42
1:C:278:HIS:CE1	6:C:645:HOH:O	2.73	0.42
1:C:208:TYR:OH	1:C:238:ILE:HD11	2.19	0.41
1:D:209:GLU:HB3	1:D:211:TYR:CE2	2.54	0.41
1:C:143:LEU:N	1:C:144:PRO:HD2	2.36	0.41
1:D:217:GLN:O	1:D:224:PHE:HA	2.20	0.41
1:D:139:LEU:N	1:D:140:PRO:CD	2.84	0.41
1:D:88:ASP:N	1:D:88:ASP:OD1	2.53	0.41
1:B:162:ASP:N	1:B:291:TRP:O	2.46	0.41
1:D:98:ARG:HE	1:D:228:ASP:CG	2.24	0.41
1:D:296:TYR:CD1	1:D:296:TYR:N	2.89	0.41
1:B:247:LEU:CB	1:C:97:ASP:HB3	2.49	0.41
1:A:241:ASP:OD1	1:A:243:LEU:HB2	2.21	0.41
1:B:38:PRO:HA	1:B:156:ALA:HB2	2.02	0.41
1:B:248:ALA:O	1:C:211:TYR:HE1	2.03	0.41
1:C:72:PHE:HE2	1:C:286:ILE:HD13	1.84	0.41
1:C:134:ASN:OD1	1:C:165:ASN:HA	2.21	0.41
1:C:171:ALA:HB2	1:C:283:GLN:CA	2.50	0.41
1:C:177:LEU:O	1:C:238:ILE:HD13	2.21	0.41
1:D:69:LEU:HB2	1:D:70:PRO:HD3	2.02	0.41
1:D:203:ARG:NH2	1:D:316:ASP:OD2	2.46	0.41
1:D:32:LEU:HD12	1:D:54:ILE:HG13	2.03	0.41
1:A:98:ARG:HD2	1:A:212:THR:OG1	2.20	0.40
1:D:177:LEU:HD23	1:D:277:HIS:C	2.41	0.40
1:C:75:THR:HG22	1:C:76:VAL:HG13	2.03	0.40
1:D:184:ASN:HD21	1:D:289:ASN:HD22	1.68	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	315/335 (94%)	306 (97%)	9 (3%)	0	100	100
1	B	316/335 (94%)	307 (97%)	9 (3%)	0	100	100
1	C	315/335 (94%)	304 (96%)	11 (4%)	0	100	100
1	D	316/335 (94%)	308 (98%)	8 (2%)	0	100	100
All	All	1262/1340 (94%)	1225 (97%)	37 (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	261/288 (91%)	259 (99%)	2 (1%)	79	90
1	B	264/288 (92%)	263 (100%)	1 (0%)	89	95
1	C	254/288 (88%)	254 (100%)	0	100	100
1	D	260/288 (90%)	258 (99%)	2 (1%)	79	90
All	All	1039/1152 (90%)	1034 (100%)	5 (0%)	86	94

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	114	ASP
1	A	127	TYR
1	B	127	TYR
1	D	127	TYR
1	D	223	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	129	GLN
1	B	304	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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 18 ligands modelled in this entry, 4 are monoatomic - leaving 14 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	NO3	D	505	-	1,3,3	0.62	0	0,3,3	-	-
4	NO3	D	506	-	1,3,3	0.58	0	0,3,3	-	-
4	NO3	D	507	-	1,3,3	0.60	0	0,3,3	-	-

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
5	GOL	B	503	-	5,5,5	0.47	0	5,5,5	0.30	0
3	AKG	B	502	2	9,9,9	2.36	1 (11%)	11,11,11	1.19	0
4	NO3	C	502	-	1,3,3	0.60	0	0,3,3	-	-
4	NO3	D	504	-	1,3,3	0.63	0	0,3,3	-	-
5	GOL	B	504	-	5,5,5	0.44	0	5,5,5	0.24	0
4	NO3	A	504	-	1,3,3	0.64	0	0,3,3	-	-
4	NO3	A	503	-	1,3,3	0.63	0	0,3,3	-	-
3	AKG	A	502	2	9,9,9	2.42	1 (11%)	11,11,11	1.87	3 (27%)
5	GOL	D	503	-	5,5,5	0.35	0	5,5,5	0.29	0
3	AKG	D	502	2	9,9,9	2.05	1 (11%)	11,11,11	1.62	2 (18%)
5	GOL	B	505	-	5,5,5	0.39	0	5,5,5	0.24	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	B	503	-	-	0/4/4/4	-
3	AKG	B	502	2	-	0/9/9/9	-
5	GOL	B	504	-	-	1/4/4/4	-
3	AKG	A	502	2	-	0/9/9/9	-
5	GOL	D	503	-	-	0/4/4/4	-
3	AKG	D	502	2	-	2/9/9/9	-
5	GOL	B	505	-	-	0/4/4/4	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	502	AKG	C2-C1	-6.52	1.44	1.53
3	A	502	AKG	C2-C1	-6.41	1.45	1.53
3	D	502	AKG	C2-C1	-5.43	1.46	1.53

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	502	AKG	O1-C1-C2	-3.37	117.22	121.72
3	A	502	AKG	O2-C1-C2	3.02	122.24	113.97
3	D	502	AKG	O1-C1-C2	-2.60	118.25	121.72
3	A	502	AKG	C3-C2-C1	2.46	120.53	115.97
3	D	502	AKG	O2-C1-C2	2.36	120.42	113.97

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	504	GOL	O1-C1-C2-C3
3	D	502	AKG	C3-C4-C5-O3
3	D	502	AKG	C3-C4-C5-O4

There are no ring outliers.

6 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	503	GOL	1	0
3	B	502	AKG	2	0
5	B	504	GOL	2	0
5	D	503	GOL	3	0
3	D	502	AKG	2	0
5	B	505	GOL	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	317/335 (94%)	-0.30	5 (1%) 70 53	79, 96, 120, 134	0
1	B	318/335 (94%)	-0.34	0 100 100	81, 98, 123, 144	0
1	C	317/335 (94%)	-0.15	8 (2%) 58 41	91, 132, 177, 180	0
1	D	318/335 (94%)	-0.33	2 (0%) 85 75	85, 104, 139, 154	0
All	All	1270/1340 (94%)	-0.28	15 (1%) 76 60	79, 104, 167, 180	0

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	112	VAL	4.1
1	D	-1	SER	3.3
1	C	166	PHE	2.6
1	C	69	LEU	2.5
1	C	286	ILE	2.4
1	A	0	HIS	2.4
1	A	135	LEU	2.3
1	C	0	HIS	2.3
1	C	2	ALA	2.3
1	D	12	GLU	2.3
1	C	127	TYR	2.2
1	C	218	LEU	2.2
1	A	139	LEU	2.1
1	A	149	HIS	2.1
1	A	81	VAL	2.0

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

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

6.3 Carbohydrates (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	NO3	D	505	4/4	0.43	0.07	152,154,154,155	0
5	GOL	B	504	6/6	0.54	0.09	120,121,122,123	0
4	NO3	D	506	4/4	0.63	0.09	144,145,145,145	0
4	NO3	C	502	4/4	0.63	0.09	125,125,126,126	0
4	NO3	A	503	4/4	0.64	0.09	118,122,122,127	0
4	NO3	D	504	4/4	0.65	0.10	111,112,116,117	0
5	GOL	B	505	6/6	0.70	0.08	113,119,127,128	0
5	GOL	B	503	6/6	0.79	0.11	98,105,106,107	0
2	MN	C	501	1/1	0.80	0.09	123,123,123,123	0
5	GOL	D	503	6/6	0.83	0.23	118,118,118,119	0
4	NO3	A	504	4/4	0.91	0.09	99,103,103,107	0
3	AKG	D	502	10/10	0.93	0.08	97,101,102,104	0
4	NO3	D	507	4/4	0.93	0.09	101,101,101,101	0
3	AKG	B	502	10/10	0.95	0.07	90,94,99,101	0
3	AKG	A	502	10/10	0.96	0.08	90,94,95,96	0
2	MN	D	501	1/1	0.99	0.03	70,70,70,70	0
2	MN	A	501	1/1	1.00	0.04	72,72,72,72	0
2	MN	B	501	1/1	1.00	0.03	68,68,68,68	0

6.5 Other polymers (i)

There are no such residues in this entry.