Full wwPDB X-ray Structure Validation Report (i)

Sep 16, 2023 – 05:08 PM EDT

PDB ID	:	4PN3
Title	:	Crystal structure of 3-hydroxyacyl-CoA-dehydrogenase from Brucella melitensis
Authors	:	Lukacs, C.M.; Abendroth, J.; Edwards, T.E.; Lorimer, D.; Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on	:	2014-05-22
Resolution	:	2.15 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:

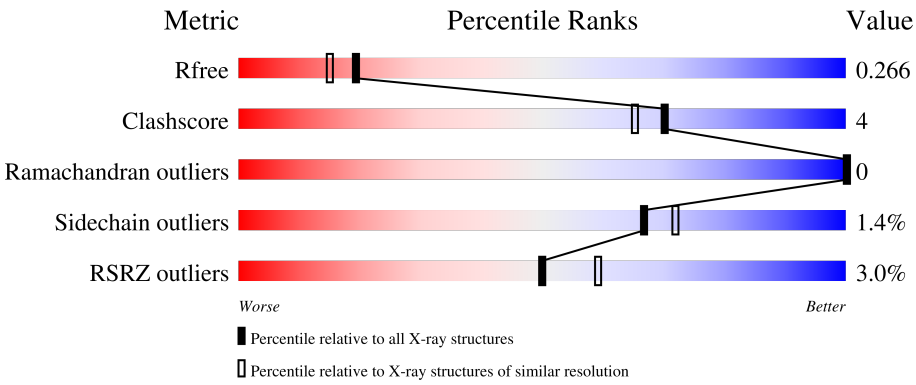
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 2.15 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	1479 (2.16-2.16)
Clashscore	141614	1585 (2.16-2.16)
Ramachandran outliers	138981	1560 (2.16-2.16)
Sidechain outliers	138945	1559 (2.16-2.16)
RSRZ outliers	127900	1456 (2.16-2.16)

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	263	%, 90%, 8% • •
1	B	263	3%, 91%, 6% • •
1	C	263	8%, 92%, 6% •
1	D	263	3%, 87%, 6% • 5%
1	E	263	%, 92%, 5% • •

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Mol	Chain	Length	Quality of chain
1	F	263	3% 90% 6%
1	G	263	4% 92% 5%
1	H	263	2% 88% 6% 6%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 14988 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 3-hydroxyacyl-CoA dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	260	1867	1164	342	348	13	0	2	0
1	B	260	1845	1149	338	347	11	0	0	0
1	C	259	1811	1131	328	342	10	0	0	0
1	D	249	1759	1098	322	330	9	0	0	0
1	E	257	1829	1141	332	345	11	0	0	0
1	F	254	1803	1124	332	338	9	0	0	0
1	G	256	1795	1120	324	342	9	0	0	0
1	H	248	1750	1091	321	329	9	0	0	0

There are 64 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	MET	-	initiating methionine	UNP N7K0F6
A	-6	ALA	-	expression tag	UNP N7K0F6
A	-5	HIS	-	expression tag	UNP N7K0F6
A	-4	HIS	-	expression tag	UNP N7K0F6
A	-3	HIS	-	expression tag	UNP N7K0F6
A	-2	HIS	-	expression tag	UNP N7K0F6
A	-1	HIS	-	expression tag	UNP N7K0F6
A	0	HIS	-	expression tag	UNP N7K0F6
B	-7	MET	-	initiating methionine	UNP N7K0F6
B	-6	ALA	-	expression tag	UNP N7K0F6
B	-5	HIS	-	expression tag	UNP N7K0F6
B	-4	HIS	-	expression tag	UNP N7K0F6
B	-3	HIS	-	expression tag	UNP N7K0F6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-2	HIS	-	expression tag	UNP N7K0F6
B	-1	HIS	-	expression tag	UNP N7K0F6
B	0	HIS	-	expression tag	UNP N7K0F6
C	-7	MET	-	initiating methionine	UNP N7K0F6
C	-6	ALA	-	expression tag	UNP N7K0F6
C	-5	HIS	-	expression tag	UNP N7K0F6
C	-4	HIS	-	expression tag	UNP N7K0F6
C	-3	HIS	-	expression tag	UNP N7K0F6
C	-2	HIS	-	expression tag	UNP N7K0F6
C	-1	HIS	-	expression tag	UNP N7K0F6
C	0	HIS	-	expression tag	UNP N7K0F6
D	-7	MET	-	initiating methionine	UNP N7K0F6
D	-6	ALA	-	expression tag	UNP N7K0F6
D	-5	HIS	-	expression tag	UNP N7K0F6
D	-4	HIS	-	expression tag	UNP N7K0F6
D	-3	HIS	-	expression tag	UNP N7K0F6
D	-2	HIS	-	expression tag	UNP N7K0F6
D	-1	HIS	-	expression tag	UNP N7K0F6
D	0	HIS	-	expression tag	UNP N7K0F6
E	-7	MET	-	initiating methionine	UNP N7K0F6
E	-6	ALA	-	expression tag	UNP N7K0F6
E	-5	HIS	-	expression tag	UNP N7K0F6
E	-4	HIS	-	expression tag	UNP N7K0F6
E	-3	HIS	-	expression tag	UNP N7K0F6
E	-2	HIS	-	expression tag	UNP N7K0F6
E	-1	HIS	-	expression tag	UNP N7K0F6
E	0	HIS	-	expression tag	UNP N7K0F6
F	-7	MET	-	initiating methionine	UNP N7K0F6
F	-6	ALA	-	expression tag	UNP N7K0F6
F	-5	HIS	-	expression tag	UNP N7K0F6
F	-4	HIS	-	expression tag	UNP N7K0F6
F	-3	HIS	-	expression tag	UNP N7K0F6
F	-2	HIS	-	expression tag	UNP N7K0F6
F	-1	HIS	-	expression tag	UNP N7K0F6
F	0	HIS	-	expression tag	UNP N7K0F6
G	-7	MET	-	initiating methionine	UNP N7K0F6
G	-6	ALA	-	expression tag	UNP N7K0F6
G	-5	HIS	-	expression tag	UNP N7K0F6
G	-4	HIS	-	expression tag	UNP N7K0F6
G	-3	HIS	-	expression tag	UNP N7K0F6
G	-2	HIS	-	expression tag	UNP N7K0F6
G	-1	HIS	-	expression tag	UNP N7K0F6

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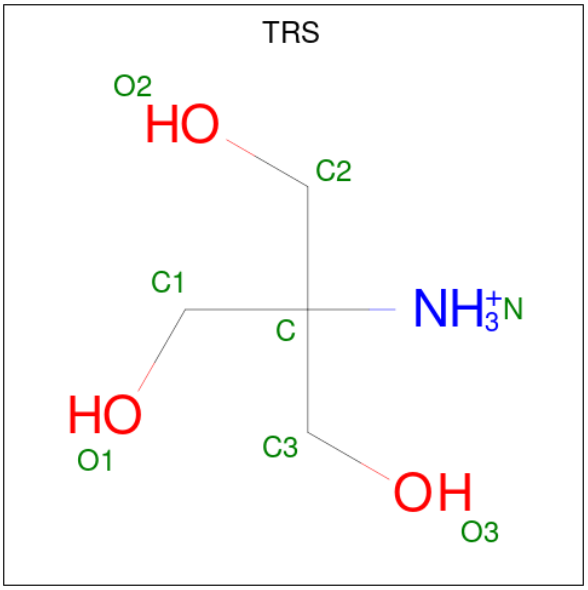
Chain	Residue	Modelled	Actual	Comment	Reference
G	0	HIS	-	expression tag	UNP N7K0F6
H	-7	MET	-	initiating methionine	UNP N7K0F6
H	-6	ALA	-	expression tag	UNP N7K0F6
H	-5	HIS	-	expression tag	UNP N7K0F6
H	-4	HIS	-	expression tag	UNP N7K0F6
H	-3	HIS	-	expression tag	UNP N7K0F6
H	-2	HIS	-	expression tag	UNP N7K0F6
H	-1	HIS	-	expression tag	UNP N7K0F6
H	0	HIS	-	expression tag	UNP N7K0F6

- Molecule 2 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: $C_4H_{12}NO_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	B	1	8	4	1	3	0	0
2	D	1	8	4	1	3	0	0
2	F	1	8	4	1	3	0	0
2	G	1	8	4	1	3	0	0

- Molecule 3 is water.

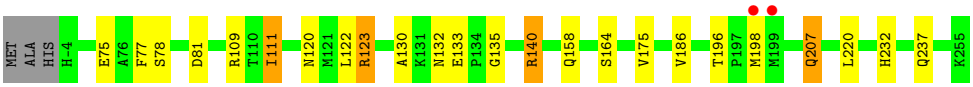
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	75	75	75	0	0
			Total	O		
3	B	56	56	56	0	0
			Total	O		
3	C	49	49	49	0	0
			Total	O		
3	D	71	71	71	0	0
			Total	O		
3	E	83	83	83	0	0
			Total	O		
3	F	64	64	64	0	0
			Total	O		
3	G	38	38	38	0	0
			Total	O		
3	H	61	61	61	0	0

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.

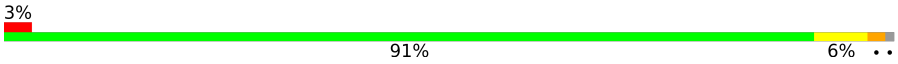
• Molecule 1: 3-hydroxyacyl-CoA dehydrogenase

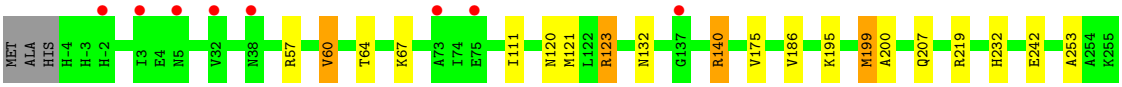
Chain A:



• Molecule 1: 3-hydroxyacyl-CoA dehydrogenase

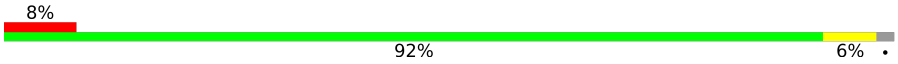
Chain B:

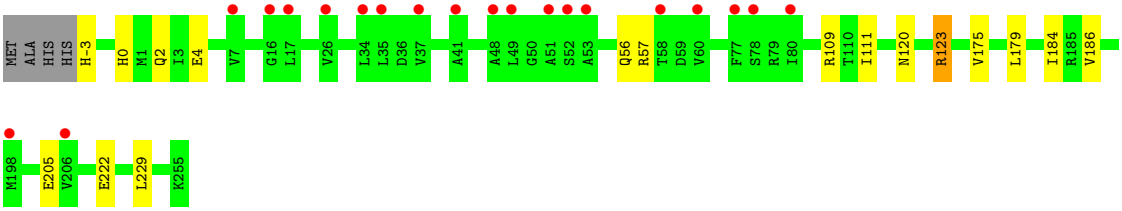




• Molecule 1: 3-hydroxyacyl-CoA dehydrogenase

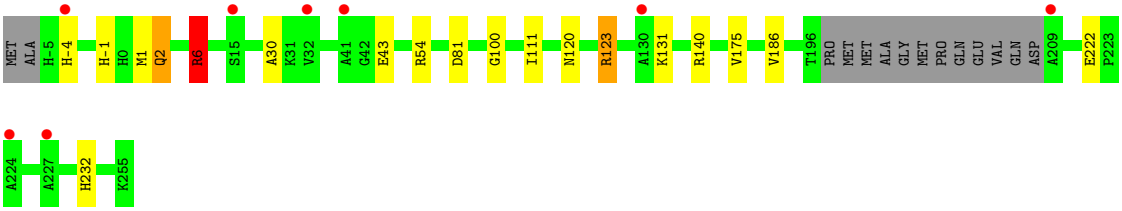
Chain C:





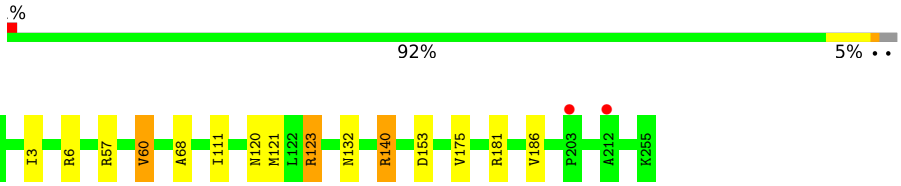
• Molecule 1: 3-hydroxyacyl-CoA dehydrogenase

Chain D:



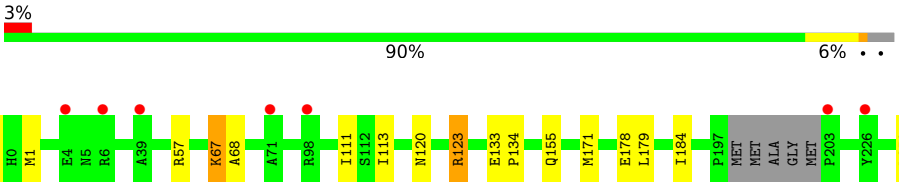
• Molecule 1: 3-hydroxyacyl-CoA dehydrogenase

Chain E:



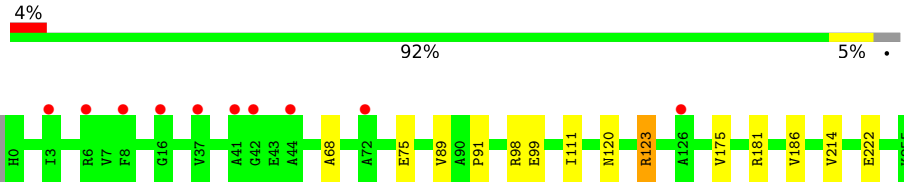
• Molecule 1: 3-hydroxyacyl-CoA dehydrogenase

Chain F:



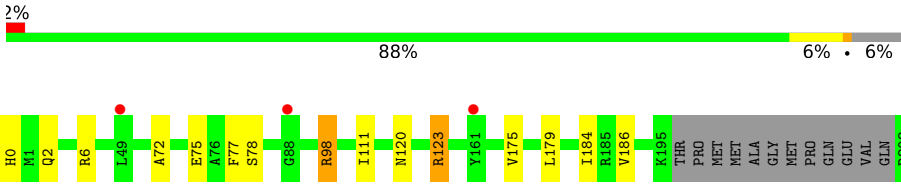
• Molecule 1: 3-hydroxyacyl-CoA dehydrogenase

Chain G:



• Molecule 1: 3-hydroxyacyl-CoA dehydrogenase

Chain H:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 43	Depositor
Cell constants a, b, c, α, β, γ	72.84Å 72.84Å 350.41Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.13 – 2.15 47.13 – 2.15	Depositor EDS
% Data completeness (in resolution range)	97.8 (47.13-2.15) 97.8 (47.13-2.15)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	6.74 (at 2.16Å)	Xtriage
Refinement program	REFMAC 5.8.0049	Depositor
R, R_{free}	0.236 , 0.264 0.240 , 0.266	Depositor DCC
R_{free} test set	1885 reflections (1.96%)	wwPDB-VP
Wilson B-factor (Å^2)	17.1	Xtriage
Anisotropy	0.428	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 17.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.42$, $< L^2 > = 0.25$	Xtriage
Estimated twinning fraction	0.458 for h,-k,-l	Xtriage
Reported twinning fraction	0.547 for H, K, L 0.453 for K, H, -L	Depositor
Outliers	1 of 96205 reflections (0.001%)	Xtriage
F_o,F_c correlation	0.86	EDS
Total number of atoms	14988	wwPDB-VP
Average B, all atoms (Å^2)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.14% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: TRS

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	0.70	1/1893 (0.1%)	0.89	8/2561 (0.3%)
1	B	0.63	0/1871	0.85	10/2533 (0.4%)
1	C	0.59	0/1837	0.79	4/2495 (0.2%)
1	D	0.65	0/1783	0.88	7/2415 (0.3%)
1	E	0.66	0/1853	0.83	4/2508 (0.2%)
1	F	0.62	0/1827	0.81	5/2474 (0.2%)
1	G	0.62	0/1818	0.76	2/2467 (0.1%)
1	H	0.64	0/1773	0.80	3/2400 (0.1%)
All	All	0.64	1/14655 (0.0%)	0.83	43/19853 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	81	ASP	CB-CG	5.35	1.62	1.51

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	F	123	ARG	NE-CZ-NH1	11.10	125.85	120.30
1	A	81	ASP	CB-CG-OD2	10.50	127.75	118.30
1	F	123	ARG	NE-CZ-NH2	-10.18	115.21	120.30
1	A	123	ARG	NE-CZ-NH2	-10.06	115.27	120.30
1	E	123	ARG	NE-CZ-NH2	-9.90	115.35	120.30
1	H	123	ARG	NE-CZ-NH1	9.76	125.18	120.30
1	A	123	ARG	NE-CZ-NH1	9.60	125.10	120.30
1	D	123	ARG	NE-CZ-NH1	9.56	125.08	120.30
1	C	123	ARG	NE-CZ-NH1	9.51	125.05	120.30
1	A	140	ARG	NE-CZ-NH2	-9.46	115.57	120.30
1	E	123	ARG	NE-CZ-NH1	9.22	124.91	120.30
1	G	123	ARG	NE-CZ-NH1	9.12	124.86	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	G	123	ARG	NE-CZ-NH2	-9.08	115.76	120.30
1	D	123	ARG	NE-CZ-NH2	-9.01	115.79	120.30
1	H	123	ARG	NE-CZ-NH2	-8.71	115.94	120.30
1	C	123	ARG	NE-CZ-NH2	-8.48	116.06	120.30
1	D	140	ARG	NE-CZ-NH2	8.29	124.44	120.30
1	B	123	ARG	NE-CZ-NH2	-8.24	116.18	120.30
1	F	57	ARG	NE-CZ-NH1	7.28	123.94	120.30
1	D	54	ARG	NE-CZ-NH2	-7.20	116.70	120.30
1	B	199	MET	CG-SD-CE	7.02	111.43	100.20
1	D	140	ARG	NE-CZ-NH1	-6.83	116.89	120.30
1	A	140	ARG	NE-CZ-NH1	6.64	123.62	120.30
1	H	98	ARG	NE-CZ-NH1	6.61	123.60	120.30
1	B	123	ARG	CD-NE-CZ	-6.58	114.38	123.60
1	B	123	ARG	NE-CZ-NH1	6.42	123.51	120.30
1	C	57	ARG	NE-CZ-NH1	6.39	123.49	120.30
1	B	140	ARG	NE-CZ-NH2	-6.37	117.11	120.30
1	E	60	VAL	CA-CB-CG2	6.27	120.30	110.90
1	F	57	ARG	NE-CZ-NH2	-6.19	117.20	120.30
1	B	140	ARG	NE-CZ-NH1	6.09	123.35	120.30
1	B	57	ARG	NE-CZ-NH1	6.07	123.33	120.30
1	E	140	ARG	NE-CZ-NH2	-5.92	117.34	120.30
1	A	109	ARG	NE-CZ-NH2	-5.81	117.40	120.30
1	D	222	GLU	CG-CD-OE2	5.57	129.43	118.30
1	B	60	VAL	CA-CB-CG2	5.57	119.25	110.90
1	B	123	ARG	CG-CD-NE	-5.41	100.44	111.80
1	D	6	ARG	CA-CB-CG	5.31	125.07	113.40
1	B	67	LYS	CB-CA-C	-5.28	99.85	110.40
1	A	122	LEU	CA-CB-CG	5.24	127.36	115.30
1	A	81	ASP	OD1-CG-OD2	-5.24	113.34	123.30
1	C	109	ARG	NE-CZ-NH2	-5.11	117.75	120.30
1	F	171	MET	CB-CA-C	-5.05	100.30	110.40

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	1867	0	1871	15	0
1	B	1845	0	1834	16	0
1	C	1811	0	1780	11	0
1	D	1759	0	1745	14	0
1	E	1829	0	1840	12	0
1	F	1803	0	1794	15	0
1	G	1795	0	1782	10	0
1	H	1750	0	1733	17	0
2	B	8	0	12	1	0
2	D	8	0	12	1	0
2	F	8	0	12	0	0
2	G	8	0	12	1	0
3	A	75	0	0	7	0
3	B	56	0	0	5	0
3	C	49	0	0	2	0
3	D	71	0	0	6	0
3	E	83	0	0	5	0
3	F	64	0	0	6	0
3	G	38	0	0	2	0
3	H	61	0	0	4	0
All	All	14988	0	14427	105	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 4.

All (105) 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:G:301:TRS:O1	2:G:301:TRS:O2	1.77	0.98
1:F:133:GLU:OE2	1:F:134:PRO:HD2	1.61	0.98
1:A:207:GLN:HG2	1:A:220:LEU:HD11	1.48	0.95
1:B:120:ASN:OD1	1:B:123:ARG:NH2	2.02	0.92
1:C:2:GLN:NE2	1:C:4:GLU:OE1	2.08	0.85
1:G:222:GLU:HG3	1:H:-1:HIS:CD2	2.17	0.79
1:A:75:GLU:HG2	3:A:346:HOH:O	1.83	0.78
1:A:130:ALA:O	3:A:338:HOH:O	2.03	0.75
1:F:133:GLU:OE2	1:F:133:GLU:HA	1.87	0.73
1:B:200:ALA:HB3	3:B:449:HOH:O	1.89	0.72
1:B:64:THR:HG23	3:B:401:HOH:O	1.88	0.72
1:A:237:GLN:OE1	1:H:98:ARG:NH2	2.27	0.67
1:F:113:ILE:O	3:F:445:HOH:O	2.13	0.66
1:C:56:GLN:NE2	3:C:328:HOH:O	2.29	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:1:MET:HE3	3:D:455:HOH:O	1.98	0.64
1:F:133:GLU:OE2	1:F:134:PRO:CD	2.41	0.64
1:G:214:VAL:O	3:G:420:HOH:O	2.13	0.64
1:G:68:ALA:HB3	3:G:426:HOH:O	1.97	0.64
1:E:153:ASP:OD2	3:E:311:HOH:O	2.15	0.63
1:D:1:MET:CE	3:D:455:HOH:O	2.48	0.61
1:G:89:VAL:HG12	1:G:91:PRO:HD3	1.82	0.60
1:E:68:ALA:HA	3:E:304:HOH:O	2.01	0.58
1:F:178:GLU:HB2	3:F:454:HOH:O	2.04	0.57
1:A:158:GLN:HG2	3:A:333:HOH:O	2.04	0.57
1:A:232:HIS:HB2	3:B:443:HOH:O	2.06	0.56
3:A:362:HOH:O	1:D:100:GLY:HA2	2.06	0.56
1:C:-3:HIS:ND1	1:C:0:HIS:HB2	2.21	0.56
1:G:120:ASN:O	1:G:123:ARG:HG2	2.06	0.56
1:H:2:GLN:O	1:H:6:ARG:HD2	2.05	0.56
1:A:77:PHE:O	1:A:78:SER:OG	2.18	0.55
1:F:250:LEU:HD12	3:F:453:HOH:O	2.05	0.55
1:A:120:ASN:O	1:A:123:ARG:HG2	2.06	0.55
1:E:120:ASN:O	1:E:123:ARG:HG2	2.07	0.55
1:D:131:LYS:HG3	3:D:451:HOH:O	2.06	0.55
1:H:120:ASN:O	1:H:123:ARG:HG2	2.07	0.54
1:B:120:ASN:O	1:B:123:ARG:HG2	2.07	0.54
1:F:67:LYS:O	3:F:457:HOH:O	2.18	0.54
1:F:120:ASN:O	1:F:123:ARG:HG2	2.07	0.54
1:D:120:ASN:O	1:D:123:ARG:HG2	2.07	0.54
1:C:120:ASN:O	1:C:123:ARG:HG2	2.07	0.54
1:B:120:ASN:HA	1:B:123:ARG:HD3	1.89	0.54
1:B:242:GLU:OE1	2:B:301:TRS:O2	2.24	0.53
1:D:120:ASN:HA	1:D:123:ARG:HD3	1.91	0.53
1:B:232:HIS:ND1	3:B:443:HOH:O	2.34	0.52
1:C:120:ASN:HA	1:C:123:ARG:HD3	1.92	0.52
1:F:120:ASN:HA	1:F:123:ARG:HD3	1.92	0.52
1:H:75:GLU:HB2	3:H:301:HOH:O	2.10	0.51
1:E:120:ASN:HA	1:E:123:ARG:HD3	1.93	0.51
1:H:120:ASN:HA	1:H:123:ARG:HD3	1.92	0.51
1:C:205:GLU:OE2	3:C:301:HOH:O	2.19	0.51
1:F:68:ALA:HB1	3:F:417:HOH:O	2.10	0.51
1:A:120:ASN:HA	1:A:123:ARG:HD3	1.92	0.51
1:G:120:ASN:HA	1:G:123:ARG:HD3	1.92	0.51
1:F:-1:HIS:O	1:F:1:MET:CE	2.59	0.50
1:D:6:ARG:HG3	1:D:81:ASP:CB	2.41	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:301:TRS:O3	2:D:301:TRS:O1	2.24	0.50
1:H:72:ALA:HB2	3:H:319:HOH:O	2.11	0.50
1:E:60:VAL:HG23	1:E:121:MET:HG2	1.95	0.49
1:F:-1:HIS:O	1:F:1:MET:HE3	2.12	0.49
1:G:222:GLU:HG3	1:H:-1:HIS:NE2	2.27	0.49
1:H:6:ARG:NH2	3:H:302:HOH:O	2.46	0.49
1:B:199:MET:CE	1:B:207:GLN:HA	2.43	0.49
1:D:6:ARG:HG3	1:D:81:ASP:HB3	1.96	0.48
1:G:98:ARG:NH1	1:G:99:GLU:OE2	2.47	0.48
3:A:338:HOH:O	1:E:140:ARG:NH1	2.48	0.47
1:B:219:ARG:HE	1:H:98:ARG:NH2	2.12	0.47
1:A:198[B]:MET:HG2	3:A:341:HOH:O	2.15	0.47
1:F:133:GLU:OE2	1:F:133:GLU:CA	2.56	0.47
1:H:6:ARG:HH11	1:H:6:ARG:HG3	1.80	0.46
1:F:155:GLN:NE2	3:F:464:HOH:O	2.46	0.46
1:A:135:GLY:HA2	3:A:372:HOH:O	2.15	0.46
1:A:132:ASN:O	1:A:140:ARG:HD3	2.15	0.46
1:E:3:ILE:O	1:E:6:ARG:HG2	2.15	0.45
1:E:6:ARG:NH1	3:E:329:HOH:O	2.48	0.45
1:A:175:VAL:HG12	1:A:186:VAL:HG21	1.98	0.45
1:B:219:ARG:HE	1:H:98:ARG:CZ	2.30	0.45
1:D:30:ALA:N	3:D:401:HOH:O	2.48	0.45
1:B:199:MET:HE2	1:B:207:GLN:HA	1.99	0.45
1:D:2:GLN:HG2	3:D:450:HOH:O	2.17	0.45
1:B:132:ASN:O	1:B:140:ARG:HD3	2.18	0.44
1:H:75:GLU:HG2	3:H:306:HOH:O	2.17	0.44
1:E:132:ASN:O	1:E:140:ARG:HD3	2.17	0.43
1:G:175:VAL:HG12	1:G:186:VAL:HG21	2.00	0.43
1:C:222:GLU:HG3	1:D:-1:HIS:ND1	2.33	0.43
1:E:175:VAL:HG12	1:E:186:VAL:HG21	2.00	0.43
1:E:140:ARG:NH2	3:E:374:HOH:O	2.51	0.43
1:C:175:VAL:HG12	1:C:186:VAL:HG21	2.01	0.43
1:H:175:VAL:HG12	1:H:186:VAL:HG21	2.01	0.43
1:B:60:VAL:HG23	1:B:121:MET:HG2	2.00	0.43
1:B:123:ARG:HD3	1:B:123:ARG:HH21	1.38	0.43
1:G:89:VAL:HG12	1:G:91:PRO:CD	2.49	0.43
1:H:179:LEU:HB3	1:H:184:ILE:HB	2.00	0.42
1:H:77:PHE:O	1:H:78:SER:HB3	2.19	0.41
1:B:175:VAL:HG12	1:B:186:VAL:HG21	2.02	0.41
1:C:-3:HIS:ND1	1:C:0:HIS:N	2.68	0.41
1:D:175:VAL:HG12	1:D:186:VAL:HG21	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:-3:HIS:CD2	1:H:0:HIS:HB2	2.56	0.41
1:F:179:LEU:HB3	1:F:184:ILE:HB	2.02	0.41
1:C:229:LEU:HA	1:D:232:HIS:CE1	2.55	0.41
1:C:179:LEU:HB3	1:C:184:ILE:HB	2.03	0.41
1:D:1:MET:HE2	3:D:455:HOH:O	2.19	0.41
1:A:196:THR:OG1	1:A:198[B]:MET:HG2	2.21	0.40
1:A:111:ILE:HD12	1:A:164:SER:HB3	2.03	0.40
1:B:253:ALA:HB2	3:B:451:HOH:O	2.21	0.40
1:E:57:ARG:NE	3:E:362:HOH:O	2.55	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	260/263 (99%)	252 (97%)	8 (3%)	0	100	100
1	B	258/263 (98%)	252 (98%)	6 (2%)	0	100	100
1	C	257/263 (98%)	248 (96%)	9 (4%)	0	100	100
1	D	245/263 (93%)	240 (98%)	5 (2%)	0	100	100
1	E	255/263 (97%)	249 (98%)	6 (2%)	0	100	100
1	F	250/263 (95%)	244 (98%)	6 (2%)	0	100	100
1	G	254/263 (97%)	248 (98%)	6 (2%)	0	100	100
1	H	244/263 (93%)	238 (98%)	6 (2%)	0	100	100
All	All	2023/2104 (96%)	1971 (97%)	52 (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	177/186 (95%)	173 (98%)	4 (2%)	50	53
1	B	173/186 (93%)	171 (99%)	2 (1%)	71	76
1	C	167/186 (90%)	166 (99%)	1 (1%)	86	90
1	D	164/186 (88%)	159 (97%)	5 (3%)	41	40
1	E	174/186 (94%)	172 (99%)	2 (1%)	73	78
1	F	169/186 (91%)	167 (99%)	2 (1%)	71	76
1	G	167/186 (90%)	164 (98%)	3 (2%)	59	63
1	H	162/186 (87%)	161 (99%)	1 (1%)	86	90
All	All	1353/1488 (91%)	1333 (98%)	20 (2%)	67	69

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	111	ILE
1	A	133[A]	GLU
1	A	133[B]	GLU
1	A	207	GLN
1	B	111	ILE
1	B	195	LYS
1	C	111	ILE
1	D	-4	HIS
1	D	2	GLN
1	D	6	ARG
1	D	43	GLU
1	D	111	ILE
1	E	111	ILE
1	E	181	ARG
1	F	67	LYS
1	F	111	ILE
1	G	75	GLU
1	G	111	ILE
1	G	181	ARG

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Mol	Chain	Res	Type
1	H	111	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	-1	HIS
1	C	56	GLN
1	D	2	GLN
1	D	232	HIS
1	F	155	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

4 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	TRS	D	301	-	7,7,7	0.52	0	9,9,9	0.85	0
2	TRS	G	301	-	7,7,7	1.02	0	9,9,9	2.78	5 (55%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	TRS	F	301	-	7,7,7	0.47	0	9,9,9	1.15	1 (11%)
2	TRS	B	301	-	7,7,7	1.05	0	9,9,9	1.87	2 (22%)

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
2	TRS	D	301	-	-	9/9/9/9	-
2	TRS	G	301	-	-	3/9/9/9	-
2	TRS	F	301	-	-	8/9/9/9	-
2	TRS	B	301	-	-	6/9/9/9	-

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	301	TRS	O1-C1-C	-4.38	97.12	111.00
2	B	301	TRS	C2-C-C1	-3.90	98.73	110.81
2	G	301	TRS	C3-C-C2	-3.43	100.18	110.81
2	G	301	TRS	C3-C-C1	3.27	120.94	110.81
2	G	301	TRS	C3-C-N	3.26	117.72	107.98
2	G	301	TRS	C2-C-C1	-2.60	102.75	110.81
2	F	301	TRS	C3-C-N	2.55	115.58	107.98
2	B	301	TRS	C3-C-C2	2.25	117.78	110.81

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	301	TRS	C1-C-C2-O2
2	B	301	TRS	C3-C-C2-O2
2	B	301	TRS	N-C-C2-O2
2	B	301	TRS	N-C-C3-O3
2	D	301	TRS	C3-C-C2-O2
2	D	301	TRS	C1-C-C3-O3
2	D	301	TRS	N-C-C3-O3
2	F	301	TRS	N-C-C2-O2
2	F	301	TRS	N-C-C3-O3

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Mol	Chain	Res	Type	Atoms
2	G	301	TRS	N-C-C1-O1
2	D	301	TRS	C3-C-C1-O1
2	D	301	TRS	C1-C-C2-O2
2	F	301	TRS	C2-C-C1-O1
2	F	301	TRS	C1-C-C2-O2
2	F	301	TRS	C1-C-C3-O3
2	G	301	TRS	C2-C-C1-O1
2	B	301	TRS	C1-C-C3-O3
2	D	301	TRS	C2-C-C1-O1
2	D	301	TRS	N-C-C1-O1
2	D	301	TRS	N-C-C2-O2
2	D	301	TRS	C2-C-C3-O3
2	F	301	TRS	N-C-C1-O1
2	G	301	TRS	C3-C-C1-O1
2	B	301	TRS	C2-C-C3-O3
2	F	301	TRS	C3-C-C2-O2
2	F	301	TRS	C2-C-C3-O3

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	301	TRS	1	0
2	G	301	TRS	1	0
2	B	301	TRS	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, 95th 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	260/263 (98%)	0.29	2 (0%)	86	89	18, 25, 49, 68	0
1	B	260/263 (98%)	0.49	8 (3%)	49	58	18, 31, 50, 63	0
1	C	259/263 (98%)	0.70	20 (7%)	13	18	21, 35, 61, 67	0
1	D	249/263 (94%)	0.47	8 (3%)	47	56	18, 29, 43, 54	0
1	E	257/263 (97%)	0.29	2 (0%)	86	89	18, 27, 43, 59	0
1	F	254/263 (96%)	0.49	7 (2%)	53	62	21, 30, 48, 63	0
1	G	256/263 (97%)	0.60	10 (3%)	39	48	20, 35, 56, 82	0
1	H	248/263 (94%)	0.46	4 (1%)	72	77	18, 29, 49, 72	0
All	All	2043/2104 (97%)	0.48	61 (2%)	50	59	18, 30, 51, 82	0

All (61) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	41	ALA	6.2
1	G	37	VAL	4.9
1	H	210	LEU	4.4
1	C	41	ALA	3.6
1	C	78	SER	3.3
1	C	48	ALA	3.2
1	C	58	THR	3.2
1	F	203	PRO	3.2
1	F	39	ALA	3.1
1	B	32	VAL	3.0
1	D	130	ALA	2.9
1	C	26	VAL	2.9
1	H	88	GLY	2.8
1	G	16	GLY	2.7
1	C	37	VAL	2.7
1	F	71	ALA	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	38	ASN	2.6
1	C	16	GLY	2.5
1	C	52	SER	2.4
1	B	137	GLY	2.4
1	C	60	VAL	2.4
1	A	198[A]	MET	2.3
1	F	6	ARG	2.3
1	D	209	ALA	2.3
1	G	42	GLY	2.3
1	A	199	MET	2.3
1	G	72	ALA	2.3
1	G	126	ALA	2.3
1	H	161	TYR	2.3
1	D	15	SER	2.3
1	G	3	ILE	2.3
1	D	32	VAL	2.2
1	C	80	ILE	2.2
1	C	34	LEU	2.2
1	C	35	LEU	2.2
1	D	227	ALA	2.2
1	F	226	TYR	2.2
1	C	51	ALA	2.2
1	B	3	ILE	2.2
1	C	206	VAL	2.2
1	G	6	ARG	2.2
1	G	44	ALA	2.2
1	D	224	ALA	2.1
1	F	4	GLU	2.1
1	C	7	VAL	2.1
1	C	77	PHE	2.1
1	D	-4	HIS	2.1
1	F	98	ARG	2.1
1	C	49	LEU	2.1
1	C	53	ALA	2.1
1	E	203	PRO	2.1
1	B	-2	HIS	2.1
1	H	49	LEU	2.0
1	B	73	ALA	2.0
1	D	41	ALA	2.0
1	E	212	ALA	2.0
1	G	8	PHE	2.0
1	B	5	ASN	2.0

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Mol	Chain	Res	Type	RSRZ
1	C	198	MET	2.0
1	B	75	GLU	2.0
1	C	17	LEU	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, 95th 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
2	TRS	B	301	8/8	0.79	0.15	18,19,20,22	0
2	TRS	D	301	8/8	0.84	0.15	29,37,44,49	0
2	TRS	F	301	8/8	0.85	0.16	23,25,26,29	0
2	TRS	G	301	8/8	0.86	0.14	15,16,19,22	0

6.5 Other polymers (i)

There are no such residues in this entry.