Full wwPDB X-ray Structure Validation Report (i)

Jun 12, 2024 – 03:00 PM EDT

PDB ID	:	3AY3
Title	:	Crystal structure of glucuronic acid dehydrogeanse from Chromohalobacter salexigens
Authors	:	Ahn, J.-W.; Kim, S.; Kim, K.-J.
Deposited on	:	2011-04-26
Resolution	:	2.10 Å(reported)

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

|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
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)	:	2.36.2

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.10 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.
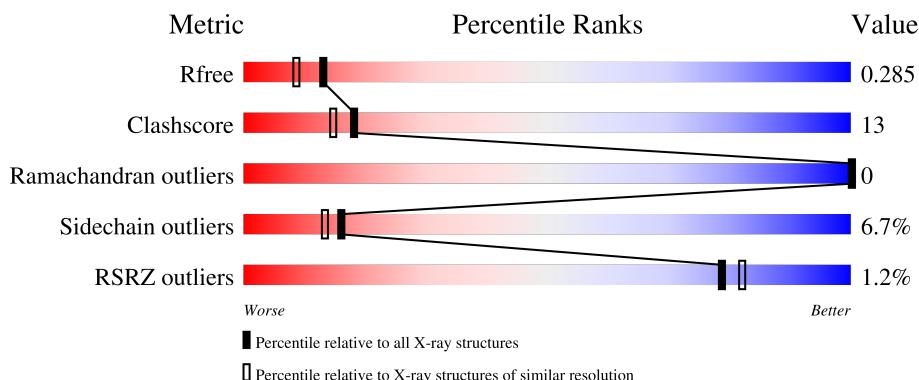
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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	267	74% 24%
1	B	267	78% 17%
1	C	267	74% 22%
1	D	267	72% 22% 5%
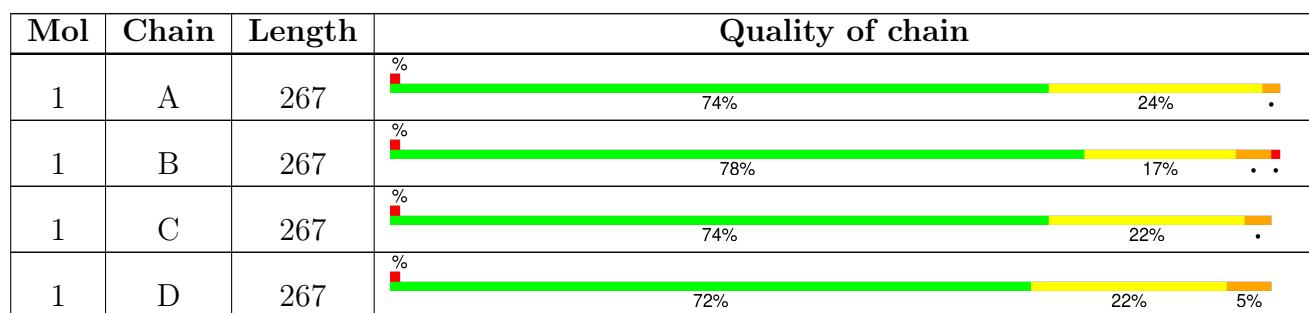
2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 8646 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 NAD-dependent epimerase/dehydratase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	266	Total	C	N	O	S	0	0	0
			2060	1301	358	391	10			
1	B	266	Total	C	N	O	S	0	0	0
			2060	1301	358	391	10			
1	C	266	Total	C	N	O	S	0	0	0
			2060	1301	358	391	10			
1	D	266	Total	C	N	O	S	0	0	0
			2060	1301	358	391	10			

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	112	Total	O	0	0
			112	112		
2	B	99	Total	O	0	0
			99	99		
2	C	112	Total	O	0	0
			112	112		
2	D	83	Total	O	0	0
			83	83		

3 Residue-property plots ⓘ

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

- Molecule 1: NAD-dependent epimerase/dehydratase
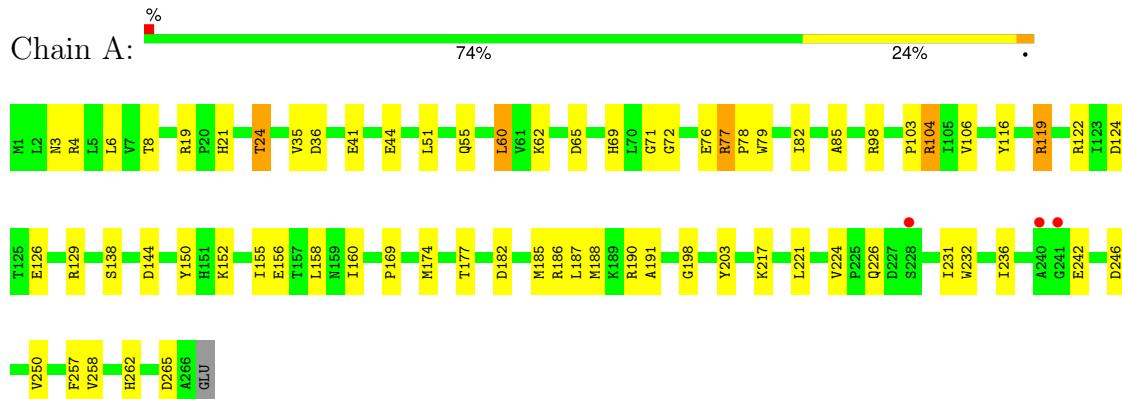
- Molecule 1: NAD-dependent epimerase/dehydratase

- Molecule 1: NAD-dependent epimerase/dehydratase

• Molecule 1: NAD-dependent epimerase/dehydratase

Chain D:
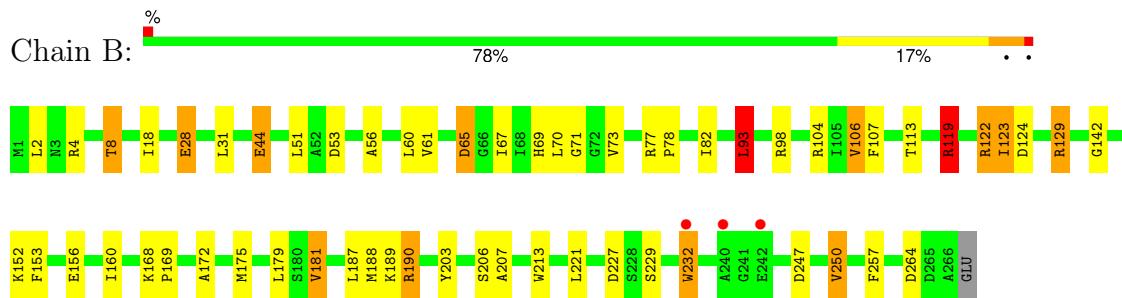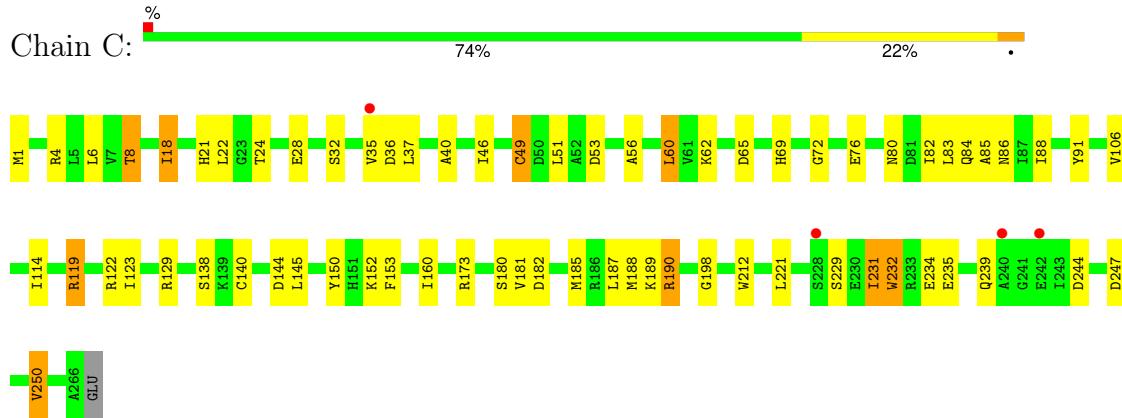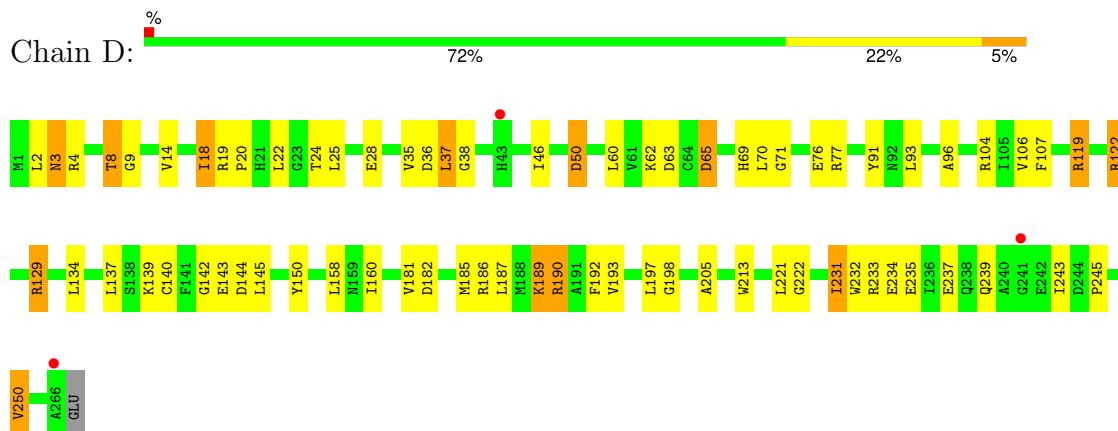
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 63	Depositor
Cell constants a, b, c, α, β, γ	122.76Å 122.76Å 150.48Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 2.10 40.18 – 2.10	Depositor EDS
% Data completeness (in resolution range)	97.8 (50.00-2.10) 97.8 (40.18-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.18 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.5.0110	Depositor
R, R_{free}	0.215 , 0.289 0.215 , 0.285	Depositor DCC
R_{free} test set	3690 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	32.1	Xtriage
Anisotropy	0.556	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 21.0	EDS
L-test for twinning[2]	$< |L| > = 0.43, < L^2 > = 0.26$	Xtriage
Estimated twinning fraction	0.337 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	8646	wwPDB-VP
Average B, all atoms (Å^2)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.08% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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)

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	0.96	1/2109 (0.0%)	0.88	2/2868 (0.1%)
1	B	0.99	1/2109 (0.0%)	0.92	6/2868 (0.2%)
1	C	0.96	0/2109	0.89	3/2868 (0.1%)
1	D	1.01	0/2109	0.93	9/2868 (0.3%)
All	All	0.98	2/8436 (0.0%)	0.91	20/11472 (0.2%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	203	TYR	CD2-CE2	5.54	1.47	1.39
1	B	203	TYR	CD1-CE1	-5.51	1.31	1.39

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	190	ARG	NE-CZ-NH2	-10.81	114.90	120.30
1	B	190	ARG	NE-CZ-NH1	7.19	123.89	120.30
1	D	129	ARG	NE-CZ-NH2	-7.08	116.76	120.30
1	D	129	ARG	NE-CZ-NH1	6.91	123.76	120.30
1	D	104	ARG	NE-CZ-NH1	6.55	123.58	120.30
1	C	190	ARG	NE-CZ-NH2	-6.09	117.26	120.30
1	D	190	ARG	NE-CZ-NH2	-6.00	117.30	120.30
1	C	239	GLN	N-CA-C	-5.96	94.90	111.00
1	D	119	ARG	NE-CZ-NH2	-5.90	117.35	120.30
1	B	129	ARG	NE-CZ-NH2	-5.77	117.42	120.30
1	D	158	LEU	CB-CG-CD2	-5.58	101.50	111.00
1	A	124	ASP	CB-CG-OD2	5.58	123.32	118.30
1	A	77	ARG	NE-CZ-NH2	-5.50	117.55	120.30
1	C	231	ILE	CB-CA-C	-5.48	100.64	111.60
1	D	104	ARG	NE-CZ-NH2	-5.46	117.57	120.30
1	D	93	LEU	CA-CB-CG	5.42	127.76	115.30
1	B	179	LEU	CA-CB-CG	5.32	127.54	115.30
1	B	93	LEU	CA-CB-CG	5.25	127.38	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	197	LEU	CB-CG-CD2	-5.11	102.31	111.00
1	B	119	ARG	NE-CZ-NH2	-5.02	117.79	120.30

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	2060	0	1999	50	0
1	B	2060	0	1999	56	0
1	C	2060	0	1999	52	0
1	D	2060	0	1999	67	0
2	A	112	0	0	2	0
2	B	99	0	0	4	0
2	C	112	0	0	0	0
2	D	83	0	0	1	0
All	All	8646	0	7996	217	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 13.

All (217) 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:106:VAL:HG11	1:B:188:MET:CE	1.52	1.37
1:D:119:ARG:HD3	1:D:250:VAL:O	1.35	1.21
1:B:106:VAL:CG1	1:B:188:MET:HE1	1.73	1.18
1:A:8:THR:HG21	1:A:69:HIS:CD2	1.79	1.17
1:B:8:THR:HG21	1:B:69:HIS:CD2	1.79	1.16
1:B:122:ARG:HG2	1:B:122:ARG:HH11	1.05	1.12
1:C:160:ILE:HD12	1:C:187:LEU:HD23	1.29	1.12
1:D:122:ARG:HH11	1:D:122:ARG:HG2	1.05	1.07
1:D:8:THR:HG21	1:D:69:HIS:CD2	1.91	1.05
1:B:8:THR:HG21	1:B:69:HIS:HD2	1.10	1.02

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:122:ARG:HH11	1:D:122:ARG:CG	1.72	1.02
1:B:106:VAL:HG11	1:B:188:MET:HE1	1.02	1.01
1:A:8:THR:HG21	1:A:69:HIS:HD2	1.20	0.99
1:D:8:THR:CG2	1:D:71:GLY:H	1.79	0.96
1:D:8:THR:HG22	1:D:71:GLY:H	1.31	0.96
1:B:106:VAL:HG11	1:B:188:MET:HE3	1.48	0.92
1:D:18:ILE:HG13	1:D:185:MET:CE	2.00	0.90
1:B:122:ARG:HG2	1:B:122:ARG:NH1	1.85	0.89
1:D:119:ARG:CD	1:D:250:VAL:O	2.20	0.88
1:A:55:GLN:HB2	2:A:310:HOH:O	1.75	0.87
1:A:8:THR:HG23	1:A:71:GLY:N	1.91	0.86
1:B:160:ILE:HD12	1:B:187:LEU:HD23	1.58	0.85
1:A:8:THR:HG23	1:A:71:GLY:H	1.39	0.85
1:B:122:ARG:HH11	1:B:122:ARG:CG	1.90	0.84
1:C:53:ASP:OD2	1:C:56:ALA:HB2	1.79	0.82
1:D:122:ARG:HG2	1:D:122:ARG:NH1	1.87	0.80
1:C:247:ASP:HB3	1:C:250:VAL:HG13	1.62	0.80
1:C:160:ILE:HD12	1:C:187:LEU:CD2	2.12	0.79
1:D:18:ILE:HG13	1:D:185:MET:HE3	1.65	0.76
1:D:18:ILE:HG13	1:D:185:MET:HE1	1.69	0.75
1:A:19:ARG:NH1	1:A:44:GLU:OE2	2.20	0.74
1:C:129:ARG:HH21	1:D:129:ARG:NH2	1.87	0.73
1:B:190:ARG:HD3	1:B:221:LEU:O	1.88	0.73
1:D:8:THR:HG21	1:D:69:HIS:HD2	1.48	0.73
1:A:8:THR:CG2	1:A:71:GLY:H	2.01	0.72
1:C:35:VAL:HG12	1:C:36:ASP:H	1.53	0.72
1:A:119:ARG:HD3	1:A:250:VAL:O	1.91	0.71
1:C:18:ILE:HD12	1:C:181:VAL:HG23	1.73	0.71
1:D:8:THR:HG22	1:D:71:GLY:N	2.06	0.70
1:C:49:CYS:SG	1:C:60:LEU:HG	2.31	0.70
1:C:190:ARG:HD3	1:C:221:LEU:O	1.91	0.70
1:B:67:ILE:HG21	1:B:93:LEU:HD11	1.73	0.69
1:A:8:THR:CG2	1:A:69:HIS:CD2	2.70	0.69
1:C:119:ARG:HD3	1:C:250:VAL:O	1.93	0.69
1:D:8:THR:CG2	1:D:71:GLY:N	2.54	0.68
1:C:129:ARG:NH2	1:D:129:ARG:HH21	1.93	0.67
1:C:129:ARG:HH21	1:D:129:ARG:HH21	1.42	0.67
1:D:235:GLU:O	1:D:239:GLN:HG3	1.94	0.67
1:B:8:THR:HG23	1:B:71:GLY:H	1.59	0.67
1:D:107:PHE:CZ	1:D:142:GLY:HA3	2.30	0.67
1:B:8:THR:CG2	1:B:71:GLY:H	2.09	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:190:ARG:HD3	1:A:221:LEU:O	1.97	0.65
1:B:190:ARG:CD	1:B:221:LEU:O	2.46	0.63
1:A:119:ARG:CD	1:A:250:VAL:O	2.47	0.62
1:A:76:GLU:HA	1:A:76:GLU:OE1	1.98	0.62
1:C:185:MET:HE1	1:C:188:MET:HG3	1.81	0.62
1:B:8:THR:HG22	1:B:69:HIS:HA	1.81	0.62
1:D:35:VAL:HG22	1:D:36:ASP:N	2.15	0.62
1:A:6:LEU:HD11	1:A:60:LEU:CD2	2.30	0.62
1:A:160:ILE:HD12	1:A:187:LEU:HD23	1.82	0.61
1:B:122:ARG:NH1	1:B:122:ARG:CG	2.56	0.61
1:B:160:ILE:HD12	1:B:187:LEU:CD2	2.30	0.61
1:C:18:ILE:HG13	1:C:185:MET:CE	2.31	0.61
1:D:8:THR:HG23	1:D:71:GLY:HA3	1.82	0.60
1:D:37:LEU:HD23	1:D:46:ILE:HG23	1.83	0.60
1:A:8:THR:CG2	1:A:69:HIS:HD2	2.05	0.60
1:A:104:ARG:NH1	1:A:156:GLU:OE1	2.34	0.60
1:C:32:SER:OG	1:C:49:CYS:SG	2.60	0.60
1:D:50:ASP:OD1	1:D:50:ASP:C	2.39	0.60
1:B:78:PRO:HB3	1:B:264:ASP:OD1	2.03	0.59
1:B:53:ASP:HB3	1:B:56:ALA:HB3	1.85	0.59
1:A:8:THR:HG22	1:A:69:HIS:HA	1.84	0.58
1:C:37:LEU:HD12	1:C:46:ILE:HG23	1.84	0.58
1:C:190:ARG:CD	1:C:221:LEU:O	2.52	0.58
1:C:18:ILE:HG23	1:C:22:LEU:HD21	1.85	0.58
1:C:18:ILE:CG1	1:C:185:MET:CE	2.81	0.58
1:A:129:ARG:HH22	1:A:144:ASP:CG	2.07	0.58
1:C:53:ASP:OD2	1:C:56:ALA:CB	2.51	0.58
1:A:82:ILE:CG2	1:A:138:SER:HB3	2.35	0.57
1:A:21:HIS:O	1:A:24:THR:HB	2.04	0.57
1:B:106:VAL:CG1	1:B:188:MET:CE	2.45	0.57
1:B:247:ASP:HB3	1:B:250:VAL:HG13	1.86	0.57
1:A:77:ARG:O	1:A:82:ILE:HD12	2.04	0.56
1:B:188:MET:CE	1:B:188:MET:HA	2.36	0.56
1:C:18:ILE:CG1	1:C:185:MET:HE2	2.36	0.56
1:A:257:PHE:O	1:B:152:LYS:NZ	2.37	0.56
1:C:140:CYS:HB3	1:D:144:ASP:OD2	2.04	0.56
1:B:119:ARG:NH2	2:B:309:HOH:O	2.37	0.56
1:B:8:THR:CG2	1:B:69:HIS:CD2	2.73	0.55
1:C:86:ASN:HB3	1:C:138:SER:HB2	1.89	0.55
1:B:107:PHE:CZ	1:B:142:GLY:HA3	2.41	0.55
1:D:76:GLU:OE1	1:D:134:LEU:HB2	2.06	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:6:LEU:HD11	1:A:60:LEU:HD21	1.89	0.55
1:D:18:ILE:HG23	1:D:22:LEU:HD21	1.89	0.55
1:D:122:ARG:CG	1:D:122:ARG:NH1	2.45	0.55
1:D:18:ILE:CG1	1:D:185:MET:HE3	2.36	0.55
1:D:233:ARG:O	1:D:237:GLU:HG3	2.07	0.54
1:A:8:THR:HG23	1:A:71:GLY:CA	2.38	0.54
1:A:122:ARG:HG3	1:A:122:ARG:HH11	1.73	0.54
1:B:8:THR:HG23	1:B:71:GLY:N	2.23	0.53
1:B:124:ASP:HB2	2:B:296:HOH:O	2.08	0.53
1:D:35:VAL:CG2	1:D:36:ASP:H	2.20	0.53
1:A:126:GLU:OE2	1:A:217:LYS:HD3	2.09	0.53
1:D:35:VAL:HG22	1:D:36:ASP:H	1.73	0.53
1:A:182:ASP:O	1:A:186:ARG:HG3	2.09	0.53
1:D:35:VAL:CG2	1:D:36:ASP:N	2.73	0.52
1:B:123:ILE:HD11	1:B:213:TRP:HD1	1.74	0.52
1:A:158:LEU:HD22	1:A:191:ALA:HB2	1.91	0.52
1:B:123:ILE:HD11	1:B:213:TRP:CD1	2.45	0.52
1:B:229:SER:O	1:B:232:TRP:HD1	1.92	0.52
1:C:129:ARG:HH22	1:C:144:ASP:CG	2.14	0.51
1:D:18:ILE:CG1	1:D:185:MET:CE	2.83	0.51
1:C:144:ASP:OD2	1:D:140:CYS:HB3	2.10	0.51
1:C:129:ARG:NH2	1:D:129:ARG:NH2	2.55	0.51
1:B:2:LEU:HD22	1:B:65:ASP:HB3	1.93	0.51
1:B:129:ARG:NH1	2:B:313:HOH:O	2.43	0.51
1:A:4:ARG:H	1:A:65:ASP:HB2	1.75	0.51
1:A:3:ASN:N	1:A:65:ASP:OD2	2.30	0.51
1:B:106:VAL:HG13	1:B:188:MET:HE1	1.83	0.51
1:A:232:TRP:O	1:A:236:ILE:HG12	2.11	0.50
1:B:18:ILE:HD11	1:B:70:LEU:HD11	1.93	0.50
1:C:150:TYR:CE1	1:C:198:GLY:HA2	2.46	0.50
1:A:6:LEU:CD1	1:A:60:LEU:HD22	2.41	0.50
1:C:80:ASN:O	1:C:84:GLN:HG2	2.11	0.50
1:C:21:HIS:O	1:C:24:THR:HB	2.11	0.50
1:D:182:ASP:O	1:D:186:ARG:HG3	2.12	0.50
1:D:190:ARG:HD3	1:D:221:LEU:O	2.12	0.50
1:A:6:LEU:HD11	1:A:60:LEU:HD22	1.94	0.49
1:C:91:TYR:HA	1:C:145:LEU:HD21	1.95	0.49
1:A:174:MET:HA	1:A:177:THR:OG1	2.13	0.49
1:C:122:ARG:HG2	1:C:122:ARG:HH11	1.77	0.49
1:D:243:ILE:O	1:D:245:PRO:HD3	2.13	0.49
1:B:206:SER:HB3	1:B:227:ASP:O	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:8:THR:HG23	1:D:71:GLY:CA	2.43	0.48
1:C:18:ILE:HG12	1:C:185:MET:CE	2.43	0.48
1:D:205:ALA:HB2	1:D:213:TRP:CZ3	2.49	0.48
1:C:119:ARG:CD	1:C:250:VAL:O	2.61	0.48
1:C:114:ILE:HD13	1:C:123:ILE:HD11	1.96	0.47
1:D:4:ARG:H	1:D:65:ASP:HB2	1.79	0.47
1:C:6:LEU:HD21	1:C:60:LEU:HD13	1.96	0.47
1:C:173:ARG:HG3	1:C:212:TRP:HH2	1.79	0.47
1:D:150:TYR:CE1	1:D:198:GLY:HA2	2.49	0.47
1:A:224:VAL:O	1:A:226:GLN:NE2	2.45	0.47
1:B:8:THR:HG22	1:B:70:LEU:N	2.30	0.47
1:C:72:GLY:HA2	1:C:85:ALA:HB1	1.96	0.47
1:C:229:SER:O	1:C:232:TRP:HD1	1.97	0.47
1:B:119:ARG:HD2	1:B:250:VAL:O	2.15	0.46
1:D:19:ARG:HB3	1:D:20:PRO:HD3	1.98	0.46
1:D:14:VAL:O	1:D:18:ILE:HB	2.16	0.46
1:A:122:ARG:HG3	1:A:122:ARG:NH1	2.30	0.46
1:D:91:TYR:HA	1:D:145:LEU:HD21	1.98	0.46
1:C:185:MET:HE1	1:C:188:MET:CG	2.46	0.45
1:B:8:THR:CG2	1:B:69:HIS:HA	2.44	0.45
1:C:83:LEU:O	1:C:88:ILE:HG13	2.17	0.45
1:D:9:GLY:HA3	1:D:71:GLY:HA2	1.99	0.45
1:D:96:ALA:HA	2:D:312:HOH:O	2.16	0.45
1:B:172:ALA:O	1:B:175:MET:HB2	2.17	0.45
1:C:18:ILE:HG12	1:C:185:MET:HE2	1.98	0.45
1:A:150:TYR:CE1	1:A:198:GLY:HA2	2.52	0.45
1:C:244:ASP:HB3	1:C:247:ASP:HB2	1.99	0.45
1:B:181:VAL:HG12	2:B:292:HOH:O	2.16	0.45
1:D:129:ARG:HH22	1:D:144:ASP:CG	2.19	0.44
1:A:119:ARG:NH2	2:A:311:HOH:O	2.49	0.44
1:B:104:ARG:HD3	1:B:156:GLU:OE1	2.17	0.44
1:D:24:THR:HG22	1:D:25:LEU:HD23	1.98	0.44
1:A:185:MET:HE2	1:A:188:MET:HG3	1.98	0.44
1:B:77:ARG:O	1:B:82:ILE:HD12	2.18	0.44
1:D:62:LYS:HG2	1:D:63:ASP:OD2	2.17	0.44
1:C:4:ARG:H	1:C:65:ASP:HB2	1.82	0.44
1:C:76:GLU:HA	1:C:76:GLU:OE1	2.17	0.44
1:B:8:THR:HG22	1:B:70:LEU:H	1.82	0.44
1:B:104:ARG:HD2	1:B:156:GLU:HB2	1.98	0.44
1:B:4:ARG:HA	1:B:28:GLU:O	2.18	0.43
1:D:62:LYS:HB2	1:D:62:LYS:HE3	1.87	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:73:VAL:HG21	1:B:82:ILE:HG13	1.99	0.43
1:D:36:ASP:OD1	1:D:38:GLY:N	2.51	0.43
1:D:8:THR:HG23	1:D:71:GLY:N	2.33	0.43
1:A:6:LEU:CD1	1:A:60:LEU:CD2	2.96	0.43
1:B:61:VAL:HG13	1:B:67:ILE:HD11	2.01	0.43
1:D:160:ILE:HD12	1:D:187:LEU:HD23	1.99	0.43
1:D:8:THR:HG22	1:D:70:LEU:N	2.34	0.42
1:C:8:THR:OG1	1:C:69:HIS:HD2	2.02	0.42
1:C:18:ILE:CG1	1:C:185:MET:HE3	2.49	0.42
1:D:231:ILE:HD13	1:D:232:TRP:N	2.35	0.42
1:D:205:ALA:HB2	1:D:213:TRP:HZ3	1.84	0.42
1:A:262:HIS:O	1:A:265:ASP:HB2	2.20	0.42
1:B:98:ARG:HD2	1:B:153:PHE:CD1	2.54	0.42
1:D:3:ASN:N	1:D:65:ASP:OD2	2.35	0.42
1:D:4:ARG:O	1:D:65:ASP:N	2.47	0.42
1:D:139:LYS:O	1:D:143:GLU:HG3	2.20	0.42
1:B:31:LEU:CD1	1:B:44:GLU:HG3	2.50	0.42
1:A:98:ARG:HA	1:A:155:ILE:HD11	2.01	0.42
1:B:31:LEU:HD12	1:B:44:GLU:HG3	2.00	0.42
1:A:65:ASP:O	1:A:103:PRO:CB	2.68	0.41
1:B:113:THR:HB	1:B:129:ARG:HD2	2.02	0.41
1:A:169:PRO:HD2	1:A:232:TRP:CD1	2.56	0.41
1:C:181:VAL:HG13	1:C:182:ASP:N	2.35	0.41
1:D:189:LYS:HD2	1:D:193:VAL:HG11	2.02	0.41
1:C:40:ALA:HB2	1:C:46:ILE:HD12	2.02	0.41
1:A:82:ILE:HG21	1:A:138:SER:HB3	2.02	0.41
1:A:116:TYR:CE1	1:A:258:VAL:HG13	2.56	0.41
1:B:169:PRO:HD2	1:B:232:TRP:CD1	2.55	0.41
1:C:152:LYS:HG2	1:C:153:PHE:CE1	2.55	0.41
1:D:76:GLU:O	1:D:77:ARG:HG2	2.20	0.41
1:A:78:PRO:O	1:A:79:TRP:C	2.56	0.41
1:D:137:LEU:O	1:D:140:CYS:HB2	2.21	0.41
1:D:190:ARG:HD2	1:D:222:GLY:O	2.20	0.41
1:A:119:ARG:HD2	1:A:250:VAL:O	2.21	0.41
1:A:152:LYS:NZ	1:B:257:PHE:O	2.50	0.41
1:C:18:ILE:HG13	1:C:185:MET:HE2	2.00	0.41
1:C:82:ILE:HG23	1:C:138:SER:HB3	2.02	0.41
1:C:234:GLU:HG3	1:C:235:GLU:N	2.35	0.41
1:D:2:LEU:HD11	1:D:192:PHE:CG	2.56	0.41
1:A:72:GLY:HA2	1:A:85:ALA:HB1	2.04	0.40
1:B:207:ALA:N	1:B:227:ASP:O	2.52	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:234:GLU:O	1:D:235:GLU:C	2.57	0.40
1:D:243:ILE:O	1:D:245:PRO:CD	2.70	0.40

There are no symmetry-related clashes.

5.3　Torsion angles ⓘ

5.3.1　Protein backbone ⓘ

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	264/267 (99%)	256 (97%)	8 (3%)	0	100	100
1	B	264/267 (99%)	257 (97%)	7 (3%)	0	100	100
1	C	264/267 (99%)	254 (96%)	10 (4%)	0	100	100
1	D	264/267 (99%)	255 (97%)	9 (3%)	0	100	100
All	All	1056/1068 (99%)	1022 (97%)	34 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	215/216 (100%)	202 (94%)	13 (6%)	19	16
1	B	215/216 (100%)	199 (93%)	16 (7%)	13	10
1	C	215/216 (100%)	200 (93%)	15 (7%)	15	12

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	215/216 (100%)	201 (94%)	14 (6%)	17	14
All	All	860/864 (100%)	802 (93%)	58 (7%)	16	13

All (58) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	24	THR
1	A	35	VAL
1	A	36	ASP
1	A	41	GLU
1	A	51	LEU
1	A	60	LEU
1	A	62	LYS
1	A	104	ARG
1	A	106	VAL
1	A	119	ARG
1	A	231	ILE
1	A	242	GLU
1	A	246	ASP
1	B	8	THR
1	B	28	GLU
1	B	44	GLU
1	B	51	LEU
1	B	60	LEU
1	B	65	ASP
1	B	93	LEU
1	B	106	VAL
1	B	119	ARG
1	B	122	ARG
1	B	123	ILE
1	B	168	LYS
1	B	181	VAL
1	B	189	LYS
1	B	232	TRP
1	B	250	VAL
1	C	1	MET
1	C	8	THR
1	C	18	ILE
1	C	28	GLU
1	C	49	CYS
1	C	51	LEU
1	C	60	LEU

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Mol	Chain	Res	Type
1	C	62	LYS
1	C	106	VAL
1	C	119	ARG
1	C	180	SER
1	C	189	LYS
1	C	231	ILE
1	C	232	TRP
1	C	250	VAL
1	D	3	ASN
1	D	8	THR
1	D	18	ILE
1	D	28	GLU
1	D	37	LEU
1	D	50	ASP
1	D	60	LEU
1	D	65	ASP
1	D	106	VAL
1	D	122	ARG
1	D	181	VAL
1	D	189	LYS
1	D	231	ILE
1	D	250	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	69	HIS
1	A	159	ASN
1	B	69	HIS
1	C	69	HIS
1	C	80	ASN
1	C	159	ASN
1	D	69	HIS
1	D	159	ASN

5.3.3 RNA (i)

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 ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

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 ⓘ

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, 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	266/267 (99%)	-0.25	3 (1%)	80	84	21, 32, 51, 60	0
1	B	266/267 (99%)	-0.17	3 (1%)	80	84	22, 34, 55, 64	0
1	C	266/267 (99%)	-0.22	4 (1%)	73	77	21, 33, 55, 62	0
1	D	266/267 (99%)	-0.17	3 (1%)	80	84	21, 34, 60, 69	0
All	All	1064/1068 (99%)	-0.20	13 (1%)	79	82	21, 33, 56, 69	0

All (13) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	240	ALA	9.1
1	B	240	ALA	4.8
1	D	241	GLY	4.4
1	A	240	ALA	3.8
1	D	266	ALA	3.3
1	A	241	GLY	2.7
1	C	35	VAL	2.6
1	C	228	SER	2.6
1	C	242	GLU	2.6
1	D	43	HIS	2.2
1	A	228	SER	2.2
1	B	242	GLU	2.1
1	B	232	TRP	2.1

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 ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.