Full wwPDB X-ray Structure Validation Report (i)

Jun 7, 2020 – 02:13 am BST

PDB ID	:	6HSR
Title	:	The crystal structure of type II Dehydroquinase from Psychromonas ingrahamii 37, 40% ethanol as cryoprotectant
Authors	:	Lapthorn, A.J.; Roszak, A.W.
Deposited on	:	2018-10-01
Resolution	:	2.00 Å(reported)

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	:	2.11
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)	:	2.11

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 2.00 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.
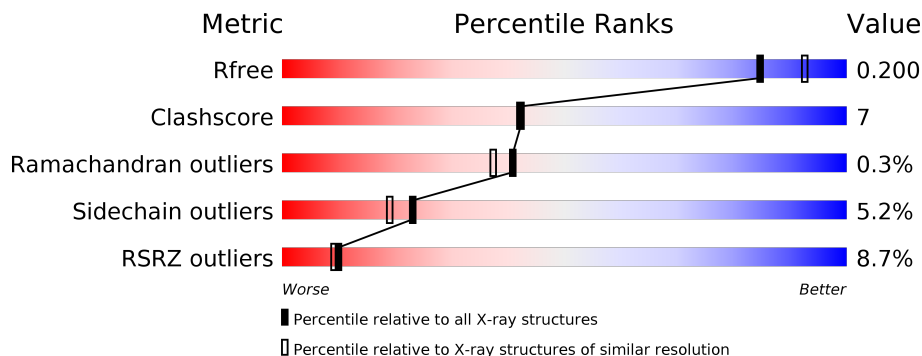
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for >=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	152	3% / 78% / 15% · ·
1	B	152	4% / 71% / 26% ···
1	C	152	21% / 83% / 14% ··
1	D	152	6% / 74% / 20% / 5% ·

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 4906 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-dehydroquinate dehydratase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	148	Total	C	N	O	S	0	1	0
			1164	742	205	216	1			
1	B	151	Total	C	N	O	S	0	1	0
			1179	751	208	219	1			
1	C	149	Total	C	N	O	S	0	0	0
			1158	737	203	217	1			
1	D	152	Total	C	N	O	S	0	1	0
			1189	756	209	222	2			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP A1SZA3
A	-1	SER	-	expression tag	UNP A1SZA3
A	0	HIS	-	expression tag	UNP A1SZA3
B	-2	GLY	-	expression tag	UNP A1SZA3
B	-1	SER	-	expression tag	UNP A1SZA3
B	0	HIS	-	expression tag	UNP A1SZA3
C	-2	GLY	-	expression tag	UNP A1SZA3
C	-1	SER	-	expression tag	UNP A1SZA3
C	0	HIS	-	expression tag	UNP A1SZA3
D	-2	GLY	-	expression tag	UNP A1SZA3
D	-1	SER	-	expression tag	UNP A1SZA3
D	0	HIS	-	expression tag	UNP A1SZA3

- Molecule 2 is ETHANOL (three-letter code: EOH) (formula: C_2H_6O).

EOH
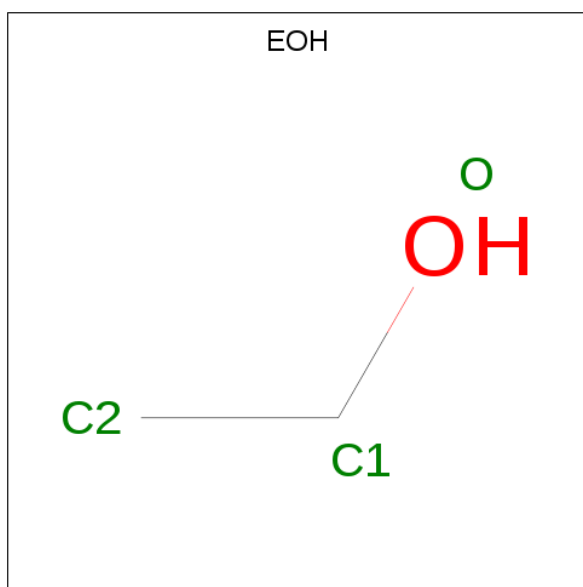
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 3	C 2	O 1	0	0
2	B	1	Total 3	C 2	O 1	0	0
2	C	1	Total 3	C 2	O 1	0	0
2	D	1	Total 3	C 2	O 1	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

SO4
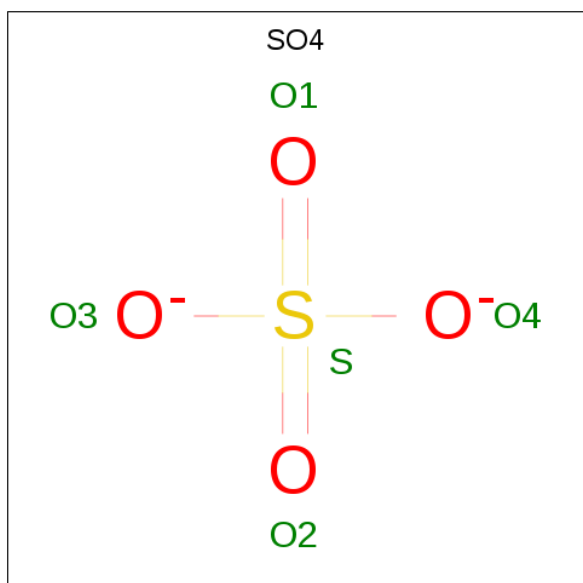
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 5	O 4	S 1	0	0
3	A	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	B	1	Total 5	O 4	S 1	0	0
3	C	1	Total 5	O 4	S 1	0	0
3	C	1	Total 5	O 4	S 1	0	0
3	D	1	Total 5	O 4	S 1	0	0
3	D	1	Total 5	O 4	S 1	0	0
3	D	1	Total 5	O 4	S 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	20	Total 20	O 20	0	0
4	B	42	Total 42	O 42	0	0
4	C	16	Total 16	O 16	0	0
4	D	76	Total 76	O 76	0	0

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of 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-dehydroquinate dehydratase
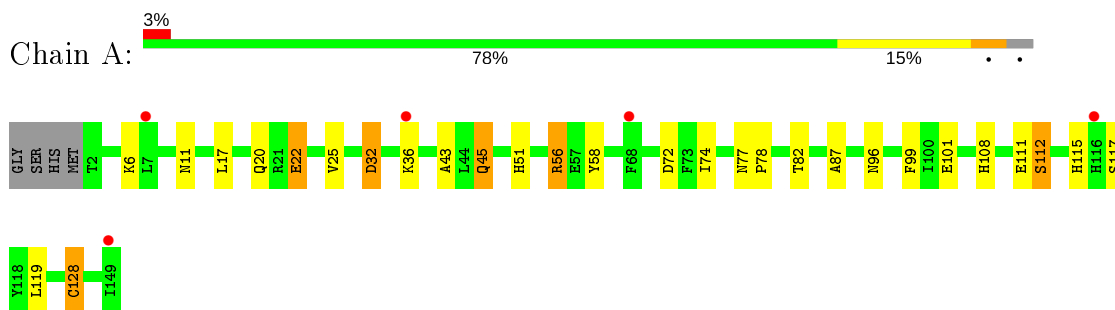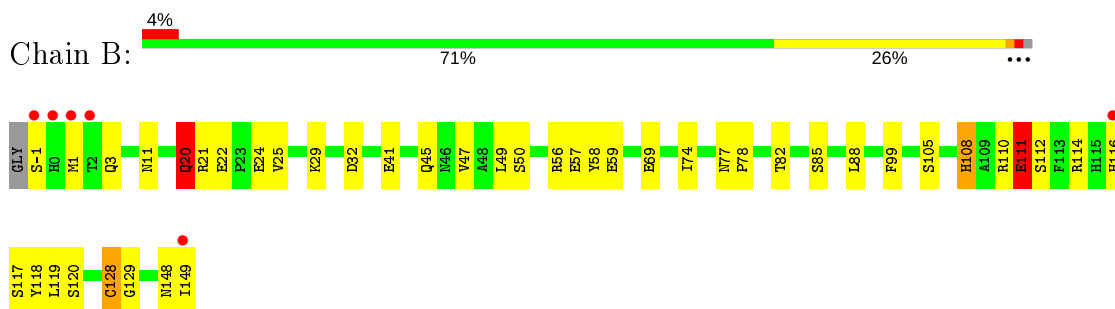
- Molecule 1: 3-dehydroquinate dehydratase

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Full wwPDB X-ray Structure Validation Report

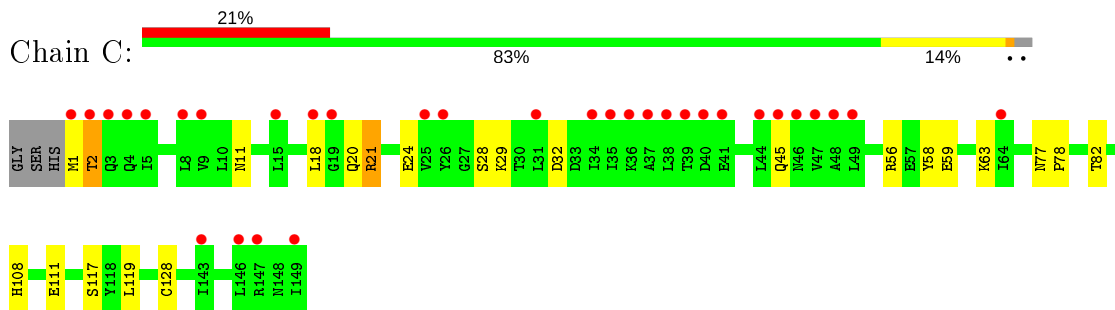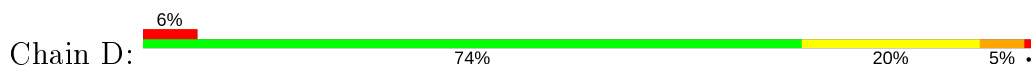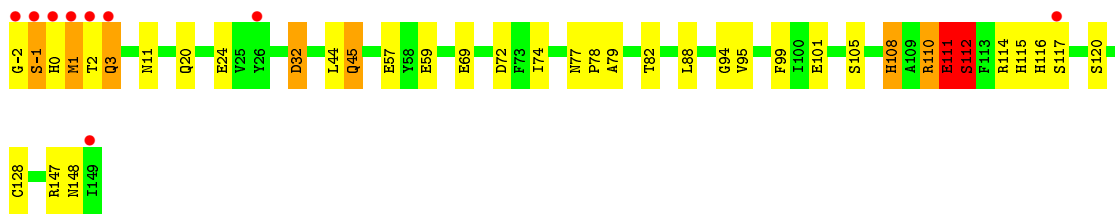# 4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 3	Depositor
Cell constants a, b, c, α, β, γ	138.83Å 138.83Å 138.83Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	69.51 – 2.00 69.41 – 2.00	Depositor EDS
% Data completeness (in resolution range)	94.5 (69.51-2.00) 94.5 (69.41-2.00)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	1.77 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.8.0232	Depositor
R, R_{free}	0.173 , 0.194 0.181 , 0.200	Depositor DCC
R_{free} test set	2836 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	54.9	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 66.2	EDS
L-test for twinning[2]	$<|L|> = 0.48, <L^2> = 0.31$	Xtriage
Estimated twinning fraction	0.036 for l,-k,h	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	4906	wwPDB-VP
Average B, all atoms (Å^2)	86.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.57% 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)

Bond lengths and bond angles in the following residue types are not validated in this section: EOH, SO4

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	1.15	10/1188 (0.8%)	1.17	6/1608 (0.4%)
1	B	1.34	12/1203 (1.0%)	1.37	12/1629 (0.7%)
1	C	1.07	2/1178 (0.2%)	1.10	0/1596
1	D	1.61	14/1213 (1.2%)	1.42	12/1641 (0.7%)
All	All	1.31	38/4782 (0.8%)	1.27	30/6474 (0.5%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	D	0	4
All	All	0	6

All (38) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	111	GLU	CD-OE2	-18.59	1.05	1.25
1	D	117	SER	CA-CB	-13.48	1.32	1.52
1	D	112	SER	CA-CB	10.65	1.69	1.52
1	D	105	SER	CB-OG	10.21	1.55	1.42
1	A	111	GLU	CD-OE2	8.66	1.35	1.25
1	B	57	GLU	CD-OE2	8.03	1.34	1.25
1	D	108	HIS	CE1-NE2	7.80	1.50	1.32
1	B	69	GLU	CD-OE1	7.59	1.33	1.25
1	C	117	SER	CA-CB	-7.29	1.42	1.52
1	B	108	HIS	CE1-NE2	6.89	1.48	1.32
1	A	111	GLU	CD-OE1	6.78	1.33	1.25

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	50	SER	CA-CB	-6.41	1.43	1.52
1	A	117	SER	CA-CB	-6.40	1.43	1.52
1	B	111	GLU	CD-OE2	-6.34	1.18	1.25
1	D	59	GLU	CD-OE1	6.33	1.32	1.25
1	B	41	GLU	C-O	-6.32	1.11	1.23
1	A	101	GLU	CD-OE2	6.30	1.32	1.25
1	B	105	SER	CB-OG	6.30	1.50	1.42
1	B	57	GLU	CD-OE1	-6.17	1.18	1.25
1	D	120	SER	CB-OG	-5.93	1.34	1.42
1	D	95	VAL	C-O	-5.82	1.12	1.23
1	D	101	GLU	CG-CD	5.78	1.60	1.51
1	A	115	HIS	C-O	-5.78	1.12	1.23
1	A	112	SER	CB-OG	-5.76	1.34	1.42
1	D	111	GLU	CD-OE1	5.73	1.31	1.25
1	B	85	SER	CA-CB	-5.52	1.44	1.52
1	D	69	GLU	CD-OE1	5.49	1.31	1.25
1	D	94	GLY	C-O	-5.29	1.15	1.23
1	D	115	HIS	C-O	-5.28	1.13	1.23
1	A	87	ALA	C-O	5.21	1.33	1.23
1	D	57	GLU	CG-CD	5.13	1.59	1.51
1	A	43	ALA	C-O	5.12	1.33	1.23
1	B	117	SER	CA-CB	-5.09	1.45	1.52
1	B	117	SER	CB-OG	5.09	1.48	1.42
1	C	111	GLU	CD-OE2	5.08	1.31	1.25
1	A	51	HIS	C-O	5.06	1.32	1.23
1	B	129	GLY	C-O	-5.06	1.15	1.23
1	A	56	ARG	C-O	5.02	1.32	1.23

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	114	ARG	NE-CZ-NH2	-10.85	114.87	120.30
1	B	114	ARG	NE-CZ-NH1	9.15	124.88	120.30
1	B	110	ARG	NE-CZ-NH2	-9.00	115.80	120.30
1	D	45	GLN	CB-CG-CD	-8.65	89.11	111.60
1	B	110	ARG	NE-CZ-NH1	8.09	124.34	120.30
1	D	88	LEU	CB-CG-CD1	-7.21	98.73	111.00
1	A	111	GLU	OE1-CD-OE2	-6.89	115.03	123.30
1	A	32	ASP	CB-CG-OD1	-6.58	112.38	118.30
1	D	112	SER	N-CA-CB	-6.55	100.67	110.50
1	D	114	ARG	NE-CZ-NH2	-6.52	117.04	120.30
1	B	20	GLN	CB-CA-C	-6.50	97.40	110.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	72	ASP	CB-CG-OD1	-5.88	113.01	118.30
1	B	149	ILE	CA-C-O	-5.80	107.91	120.10
1	B	128	CYS	CA-CB-SG	-5.75	103.66	114.00
1	D	32	ASP	CB-CG-OD2	-5.74	113.13	118.30
1	D	32	ASP	CB-CG-OD1	-5.58	113.28	118.30
1	B	32	ASP	CB-CG-OD1	-5.48	113.37	118.30
1	D	111	GLU	CG-CD-OE1	5.47	129.24	118.30
1	D	3	GLN	N-CA-CB	5.44	120.39	110.60
1	B	21	ARG	CG-CD-NE	-5.42	100.41	111.80
1	B	120	SER	CA-CB-OG	-5.37	96.71	111.20
1	A	111	GLU	CG-CD-OE2	5.36	129.02	118.30
1	D	112	SER	CB-CA-C	5.33	120.22	110.10
1	B	41	GLU	CB-CA-C	5.29	120.98	110.40
1	D	147	ARG	CG-CD-NE	-5.28	100.72	111.80
1	D	110	ARG	NE-CZ-NH1	5.21	122.90	120.30
1	A	45	GLN	CB-CG-CD	-5.15	98.20	111.60
1	A	72	ASP	CB-CG-OD1	-5.14	113.68	118.30
1	A	128	CYS	CA-CB-SG	-5.08	104.86	114.00
1	B	88	LEU	CB-CG-CD1	-5.04	102.43	111.00

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	112	SER	Mainchain
1	B	111	GLU	Mainchain
1	D	110	ARG	Mainchain
1	D	111	GLU	Mainchain
1	D	112	SER	Mainchain
1	D	116	HIS	Mainchain

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	1164	0	1178	14	0
1	B	1179	0	1187	22	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	1158	0	1165	21	0
1	D	1189	0	1205	15	0
2	A	3	0	6	0	0
2	B	3	0	6	1	0
2	C	3	0	6	0	0
2	D	3	0	6	1	0
3	A	10	0	0	0	0
3	B	15	0	0	2	0
3	C	10	0	0	0	0
3	D	15	0	0	0	0
4	A	20	0	0	2	0
4	B	42	0	0	5	0
4	C	16	0	0	4	0
4	D	76	0	0	4	0
All	All	4906	0	4759	66	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 (66) 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:20:GLN:CA	1:B:20:GLN:HE21	1.36	1.22
1:B:20:GLN:N	1:B:20:GLN:HE21	1.52	1.06
1:B:20:GLN:HA	1:B:20:GLN:HE21	1.10	1.06
1:B:20:GLN:CA	1:B:20:GLN:NE2	2.14	1.03
1:D:128:CYS:SG	4:D:302:HOH:O	2.14	1.00
1:B:20:GLN:HA	1:B:20:GLN:NE2	1.68	0.99
1:C:21:ARG:NH2	1:C:21:ARG:HG2	1.93	0.81
1:B:111:GLU:OE2	4:B:301:HOH:O	2.01	0.78
1:B:20:GLN:N	1:B:20:GLN:NE2	2.29	0.77
1:C:108:HIS:NE2	4:C:301:HOH:O	2.20	0.75
1:C:128:CYS:SG	4:C:301:HOH:O	2.36	0.75
1:A:128:CYS:SG	4:A:301:HOH:O	2.37	0.72
1:D:111:GLU:OE2	4:D:301:HOH:O	2.07	0.71
1:B:108:HIS:NE2	4:B:304:HOH:O	2.24	0.70
1:B:128:CYS:SG	4:B:304:HOH:O	2.23	0.69
1:C:21:ARG:HH21	1:C:21:ARG:HG2	1.56	0.69
1:D:-2:GLY:O	1:D:0:HIS:N	2.26	0.68
1:D:108:HIS:NE2	4:D:302:HOH:O	2.29	0.65
2:B:201:EOH:H21	3:B:202:SO4:O3	2.02	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:11:ASN:HD22	1:C:77:ASN:HB3	1.68	0.59
1:C:21:ARG:HH21	1:C:21:ARG:CG	2.16	0.58
1:D:1:MET:CE	1:D:2:THR:O	2.56	0.54
1:B:29:LYS:CE	3:B:203:SO4:O1	2.56	0.54
1:D:1:MET:HE3	1:D:2:THR:O	2.07	0.53
1:A:17:LEU:O	1:A:20:GLN:HG2	2.09	0.52
1:C:32:ASP:HB2	4:C:302:HOH:O	2.09	0.52
1:B:-1:SER:C	1:B:1:MET:H	2.13	0.52
1:A:11:ASN:HD22	1:A:77:ASN:HB3	1.76	0.51
1:B:11:ASN:HD22	1:B:77:ASN:HB3	1.75	0.50
1:C:24:GLU:N	1:C:24:GLU:OE2	2.37	0.50
1:A:56:ARG:HG2	1:B:58:TYR:HB2	1.93	0.50
1:D:-1:SER:O	1:D:0:HIS:ND1	2.45	0.49
1:C:24:GLU:H	1:C:24:GLU:CD	2.16	0.49
1:B:56:ARG:HG2	1:C:58:TYR:HB2	1.95	0.47
1:B:22:GLU:HB3	1:B:25:VAL:HB	1.95	0.47
1:A:108:HIS:NE2	4:A:301:HOH:O	2.36	0.47
1:C:78:PRO:HG3	1:C:119:LEU:HD12	1.96	0.46
1:A:22:GLU:HB3	1:A:25:VAL:HB	1.97	0.46
1:A:78:PRO:HG3	1:A:119:LEU:HD12	1.98	0.46
1:C:11:ASN:ND2	1:C:77:ASN:HB3	2.31	0.45
1:D:11:ASN:HD22	1:D:77:ASN:HB3	1.81	0.45
1:B:59:GLU:OE1	4:B:302:HOH:O	2.21	0.45
1:D:79:ALA:HA	2:D:201:EOH:H21	2.00	0.44
1:D:1:MET:HE1	4:D:372:HOH:O	2.17	0.44
1:A:58:TYR:HB2	1:C:56:ARG:HG2	1.99	0.44
1:A:11:ASN:ND2	1:A:77:ASN:HB3	2.33	0.44
1:B:78:PRO:HG2	1:B:82:THR:OG1	2.18	0.44
1:A:96:ASN:HB2	1:C:21:ARG:NH1	2.33	0.43
1:D:11:ASN:ND2	1:D:77:ASN:HB3	2.34	0.43
1:D:78:PRO:HG2	1:D:82[B]:THR:HB	1.99	0.43
1:C:78:PRO:HG2	1:C:82:THR:OG1	2.19	0.43
1:B:116[A]:HIS:HE1	1:B:118:TYR:CE2	2.36	0.43
1:D:78:PRO:HG2	1:D:82[A]:THR:OG1	2.20	0.42
1:D:74:ILE:O	1:D:99:PHE:HA	2.19	0.42
1:B:47:VAL:O	4:B:303:HOH:O	2.22	0.42
1:C:58:TYR:CE1	1:C:59:GLU:HG3	2.54	0.42
1:A:78:PRO:HG2	1:A:82:THR:OG1	2.20	0.42
1:A:74:ILE:O	1:A:99:PHE:HA	2.19	0.41
1:A:96:ASN:HB2	1:C:21:ARG:HH11	1.85	0.41
1:A:96:ASN:HB2	1:C:21:ARG:HE	1.86	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:78:PRO:HG3	1:B:119:LEU:HD12	2.03	0.41
1:B:74:ILE:O	1:B:99:PHE:HA	2.21	0.41
1:D:44:LEU:HA	1:D:44:LEU:HD23	1.79	0.41
1:B:56:ARG:HG2	1:C:58:TYR:CB	2.50	0.40
1:C:18:LEU:HB2	4:C:303:HOH:O	2.20	0.40
1:C:1:MET:C	1:C:2:THR:O	2.59	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	147/152 (97%)	143 (97%)	4 (3%)	0	100	100
1	B	150/152 (99%)	145 (97%)	5 (3%)	0	100	100
1	C	147/152 (97%)	142 (97%)	4 (3%)	1 (1%)	22	16
1	D	151/152 (99%)	146 (97%)	4 (3%)	1 (1%)	22	16
All	All	595/608 (98%)	576 (97%)	17 (3%)	2 (0%)	41	37

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	2	THR
1	D	-1	SER

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	126/128 (98%)	121 (96%)	5 (4%)	31	29
1	B	126/128 (98%)	119 (94%)	7 (6%)	21	17
1	C	124/128 (97%)	118 (95%)	6 (5%)	25	22
1	D	129/128 (101%)	121 (94%)	8 (6%)	18	13
All	All	505/512 (99%)	479 (95%)	26 (5%)	23	19

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	LYS
1	A	22	GLU
1	A	32	ASP
1	A	36	LYS
1	A	45	GLN
1	B	3	GLN
1	B	20	GLN
1	B	24	GLU
1	B	45	GLN
1	B	49	LEU
1	B	112	SER
1	B	148	ASN
1	C	20	GLN
1	C	21	ARG
1	C	28	SER
1	C	29	LYS
1	C	45	GLN
1	C	63	LYS
1	D	1	MET
1	D	3	GLN
1	D	20	GLN
1	D	24	GLU
1	D	32	ASP
1	D	45	GLN
1	D	112	SER
1	D	148	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

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Mol	Chain	Res	Type
1	A	11	ASN
1	A	115	HIS
1	B	11	ASN
1	B	20	GLN
1	C	11	ASN
1	C	115	HIS
1	D	3	GLN
1	D	11	ASN
1	D	115	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 carbohydrates in this entry.

5.6 Ligand geometry (i)

14 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	$\#|Z| > 2$
3	SO4	A	203	-	4,4,4	0.38	0	6,6,6	0.08	0
2	EOH	B	201	-	2,2,2	0.64	0	1,1,1	0.12	0
3	SO4	D	204	-	4,4,4	0.97	0	6,6,6	0.65	0
2	EOH	D	201	-	2,2,2	0.06	0	1,1,1	0.74	0
3	SO4	D	202	-	4,4,4	1.40	0	6,6,6	1.54	1 (16%)
3	SO4	C	202	-	4,4,4	0.39	0	6,6,6	0.62	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	SO4	B	204	-	4,4,4	0.43	0	6,6,6	0.27	0
3	SO4	B	203	-	4,4,4	0.34	0	6,6,6	0.52	0
3	SO4	A	202	-	4,4,4	0.54	0	6,6,6	0.67	0
3	SO4	B	202	-	4,4,4	0.41	0	6,6,6	0.78	0
2	EOH	C	201	-	2,2,2	0.21	0	1,1,1	0.40	0
2	EOH	A	201	-	2,2,2	0.47	0	1,1,1	0.14	0
3	SO4	C	203	-	4,4,4	0.32	0	6,6,6	0.05	0
3	SO4	D	203	-	4,4,4	0.77	0	6,6,6	0.27	0

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	202	SO4	O4-S-O2	3.21	126.08	109.31

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	201	EOH	1	0
2	D	201	EOH	1	0
3	B	203	SO4	1	0
3	B	202	SO4	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(Å²)	Q<0.9
1	A	148/152 (97%)	0.52	5 (3%)	45	44	64, 94, 147, 176	2 (1%)
1	B	151/152 (99%)	0.50	6 (3%)	38	37	50, 75, 130, 168	3 (1%)
1	C	149/152 (98%)	1.08	32 (21%)	0	0	63, 92, 152, 178	3 (2%)
1	D	152/152 (100%)	0.64	9 (5%)	22	21	38, 56, 118, 174	1 (0%)
All	All	600/608 (98%)	0.68	52 (8%)	10	9	38, 82, 145, 178	9 (1%)

All (52) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	-2	GLY	9.9
1	C	149	ILE	9.4
1	A	149	ILE	9.1
1	D	-1	SER	8.8
1	B	0	HIS	8.8
1	D	0	HIS	7.5
1	B	-1	SER	6.8
1	C	5	ILE	6.8
1	B	1	MET	6.4
1	C	44	LEU	5.7
1	C	38	LEU	5.7
1	C	8	LEU	5.5
1	C	1	MET	5.3
1	D	1	MET	4.9
1	C	49	LEU	4.0
1	C	146	LEU	3.7
1	A	116[A]	HIS	3.5
1	C	26	TYR	3.4
1	C	45	GLN	3.4
1	C	48	ALA	3.3
1	B	149	ILE	3.2

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Mol	Chain	Res	Type	RSRZ
1	C	3	GLN	3.2
1	C	47	VAL	3.2
1	C	35	ILE	3.1
1	B	116[A]	HIS	3.1
1	C	41	GLU	3.0
1	C	9	VAL	2.9
1	C	34	ILE	2.9
1	C	40	ASP	2.7
1	C	19	GLY	2.7
1	D	149	ILE	2.7
1	C	2	THR	2.7
1	C	36	LYS	2.6
1	D	26	TYR	2.5
1	C	31	LEU	2.5
1	D	2	THR	2.5
1	C	143	ILE	2.5
1	C	18	LEU	2.4
1	C	37	ALA	2.4
1	A	68	PHE	2.4
1	A	7	LEU	2.4
1	C	147	ARG	2.4
1	C	15	LEU	2.3
1	C	64	ILE	2.3
1	A	36	LYS	2.2
1	C	25	VAL	2.2
1	C	46	ASN	2.2
1	C	39	THR	2.1
1	D	117	SER	2.1
1	B	2	THR	2.1
1	C	4	GLN	2.1
1	D	3	GLN	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 carbohydrates in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. 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	EOH	C	201	3/3	0.86	0.29	77,77,93,101	0
3	SO4	D	204	5/5	0.89	0.28	73,75,95,96	0
3	SO4	B	203	5/5	0.90	0.10	86,98,107,134	0
3	SO4	A	203	5/5	0.90	0.12	138,147,158,176	0
3	SO4	D	203	5/5	0.91	0.14	88,100,109,141	0
3	SO4	B	204	5/5	0.93	0.15	87,91,107,108	0
3	SO4	C	202	5/5	0.94	0.12	76,88,97,109	0
2	EOH	A	201	3/3	0.94	0.20	68,68,68,86	0
3	SO4	C	203	5/5	0.94	0.21	141,159,163,182	0
3	SO4	A	202	5/5	0.94	0.15	68,72,87,89	0
2	EOH	B	201	3/3	0.95	0.24	58,58,69,81	0
2	EOH	D	201	3/3	0.96	0.21	43,43,46,59	0
3	SO4	D	202	5/5	0.98	0.20	47,48,56,61	0
3	SO4	B	202	5/5	0.98	0.14	58,68,75,77	0

6.5 Other polymers (i)

There are no such residues in this entry.