



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2024 – 05:08 PM EDT

PDB ID : 4JBL
Title : Crystal structure of O-Acetyl Serine Sulfhydrylase from *Entamoeba histolytica* in complex with Methionine
Authors : Raj, I.; Gourinath, S.
Deposited on : 2013-02-19
Resolution : 2.00 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 ⓘ 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 ⓘ](#)) 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 : 2.36
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

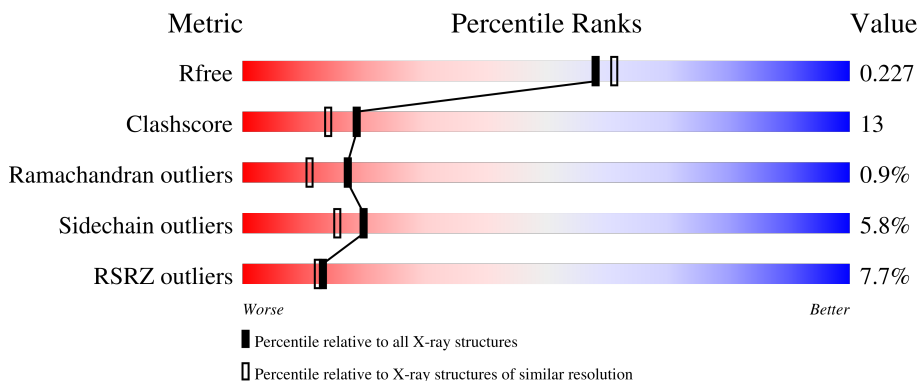
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

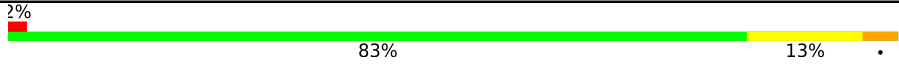
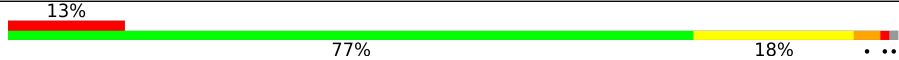
The reported resolution of this entry is 2.00 Å.

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 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 $\leq 5\%$. 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	339	 2% 83% 13% .
1	B	339	 13% 77% 18% ...

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5529 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 Cysteine synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	N	O	P				S
1	A	339	Total 2609	C 1655	N 441	O 497	P 1	S 15	0	0	0
1	B	335	Total 2572	C 1633	N 433	O 491	P 1	S 14	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

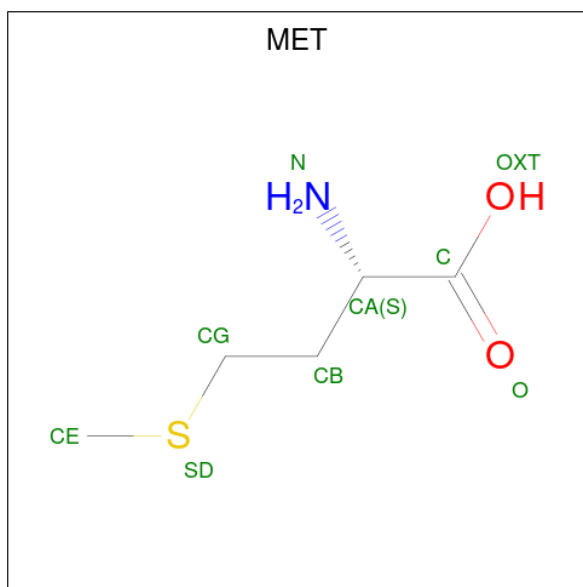
Chain	Residue	Modelled	Actual	Comment	Reference
A	338	HIS	-	expression tag	UNP O15570
A	339	HIS	-	expression tag	UNP O15570
B	338	HIS	-	expression tag	UNP O15570
B	339	HIS	-	expression tag	UNP O15570

- Molecule 2 is SULFATE ION (three-letter code: SO₄) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is METHIONINE (three-letter code: MET) (formula: C₅H₁₁NO₂S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total	C	N	O	S	0	0
			9	5	1	2	1		

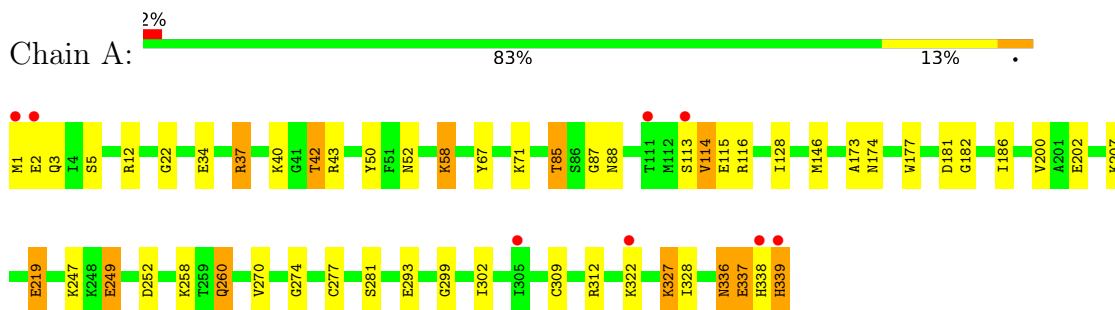
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	174	Total	O	0	0
			174	174		
4	B	155	Total	O	0	0
			155	155		

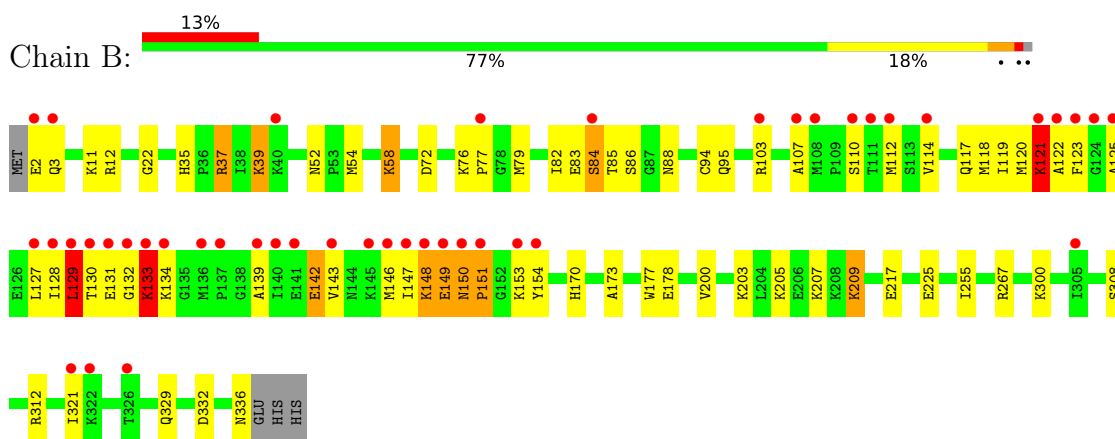
3 Residue-property plots [i](#)

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: Cysteine synthase



- Molecule 1: Cysteine synthase



4 Data and refinement statistics

Property	Value	Source
Space group	P 41	Depositor
Cell constants a, b, c, α , β , γ	80.42Å 80.42Å 112.23Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	28.43 – 2.00 28.43 – 2.00	Depositor EDS
% Data completeness (in resolution range)	97.5 (28.43-2.00) 97.6 (28.43-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.15 (at 2.00Å)	Xtrriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.178 , 0.225 0.185 , 0.227	Depositor DCC
R_{free} test set	2334 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	23.0	Xtrriage
Anisotropy	0.120	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 49.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.024 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	5529	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.54% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: LLP, 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	1.03	1/2628 (0.0%)	1.00	7/3539 (0.2%)
1	B	1.09	1/2589 (0.0%)	1.04	10/3487 (0.3%)
All	All	1.06	2/5217 (0.0%)	1.02	17/7026 (0.2%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	337	GLU	CD-OE2	-7.46	1.17	1.25
1	B	308	SER	C-N	5.04	1.45	1.34

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	37	ARG	NE-CZ-NH2	-8.48	116.06	120.30
1	B	12	ARG	NE-CZ-NH1	7.69	124.14	120.30
1	A	12	ARG	NE-CZ-NH1	7.54	124.07	120.30
1	B	72	ASP	CB-CG-OD1	-7.40	111.64	118.30
1	B	72	ASP	CB-CG-OD2	7.28	124.85	118.30
1	B	129	LEU	CA-CB-CG	6.79	130.91	115.30
1	B	267	ARG	NE-CZ-NH2	-6.61	116.99	120.30
1	B	84	SER	O-C-N	6.42	132.97	122.70
1	A	252	ASP	CB-CG-OD1	-5.85	113.03	118.30
1	A	327	LYS	CD-CE-NZ	-5.77	98.44	111.70
1	B	84	SER	CA-C-N	-5.70	104.65	117.20
1	A	37	ARG	NE-CZ-NH1	5.54	123.07	120.30
1	A	87	GLY	N-CA-C	5.28	126.29	113.10
1	B	178	GLU	OE1-CD-OE2	5.26	129.61	123.30
1	B	133	LYS	N-CA-C	-5.24	96.86	111.00
1	B	300	LYS	CD-CE-NZ	-5.03	100.13	111.70
1	A	181	ASP	CB-CG-OD1	5.00	122.80	118.30

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	2609	0	2664	36	0
1	B	2572	0	2632	103	0
2	A	5	0	0	0	0
2	B	5	0	0	0	0
3	B	9	0	8	1	0
4	A	174	0	0	1	0
4	B	155	0	0	3	0
All	All	5529	0	5304	138	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 (138) 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:258:LYS:HB3	1:A:260:GLN:NE2	1.51	1.24
1:B:110:SER:HA	1:B:129:LEU:CD1	1.69	1.22
1:B:121:LYS:HE2	1:B:122:ALA:HB2	1.24	1.11
1:A:258:LYS:HB3	1:A:260:GLN:HE21	1.01	1.06
1:B:110:SER:HA	1:B:129:LEU:HD12	1.37	1.02
1:B:121:LYS:HE2	1:B:122:ALA:CB	1.91	1.00
1:B:121:LYS:CD	1:B:122:ALA:H	1.73	1.00
1:B:110:SER:HA	1:B:129:LEU:HD11	1.44	0.99
1:B:86:SER:HB2	1:B:112:MET:CE	1.94	0.97
1:B:120:MET:O	1:B:121:LYS:CD	2.14	0.96
1:B:127:LEU:O	1:B:128:ILE:HG13	1.65	0.96
1:B:121:LYS:CE	1:B:122:ALA:HB2	1.99	0.93
1:B:121:LYS:HD3	1:B:122:ALA:H	1.33	0.91
1:B:142:GLU:HA	1:B:142:GLU:OE1	1.74	0.87
1:A:258:LYS:CB	1:A:260:GLN:HE21	1.87	0.87
1:B:83:GLU:HG3	1:B:84:SER:N	1.89	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:35:HIS:HE1	1:B:37:ARG:HD3	1.40	0.86
1:B:120:MET:C	1:B:121:LYS:HD3	1.96	0.85
1:B:132:GLY:O	1:B:133:LYS:CB	2.25	0.85
1:B:120:MET:O	1:B:121:LYS:HD2	1.77	0.84
1:B:86:SER:HB2	1:B:112:MET:HE3	1.60	0.82
1:B:86:SER:HB2	1:B:112:MET:HE2	1.60	0.82
1:A:338:HIS:O	1:A:339:HIS:HB2	1.80	0.81
1:B:110:SER:CA	1:B:129:LEU:CD1	2.58	0.81
1:B:120:MET:O	1:B:121:LYS:HB3	1.79	0.79
1:B:120:MET:O	1:B:121:LYS:CB	2.32	0.78
1:B:114:VAL:O	1:B:118:MET:HG3	1.83	0.78
1:B:121:LYS:CE	1:B:122:ALA:H	1.96	0.78
1:B:35:HIS:ND1	1:B:37:ARG:HG2	1.99	0.77
1:A:260:GLN:H	1:A:260:GLN:CD	1.88	0.75
1:B:35:HIS:CE1	1:B:37:ARG:HG2	2.21	0.75
1:B:110:SER:CA	1:B:129:LEU:HD11	2.15	0.75
1:B:121:LYS:CD	1:B:122:ALA:N	2.48	0.74
1:B:132:GLY:O	1:B:133:LYS:HB2	1.86	0.74
1:B:255:ILE:CD1	4:B:611:HOH:O	2.36	0.72
1:B:209:LYS:O	1:B:209:LYS:HE3	1.88	0.72
1:B:118:MET:O	1:B:121:LYS:NZ	2.23	0.72
1:B:120:MET:C	1:B:121:LYS:CD	2.58	0.70
1:B:147:ILE:O	1:B:148:LYS:C	2.30	0.70
1:B:255:ILE:HD13	4:B:611:HOH:O	1.89	0.69
1:B:121:LYS:HD3	1:B:122:ALA:N	2.07	0.68
1:B:117:GLN:NE2	4:B:608:HOH:O	2.24	0.68
1:B:121:LYS:CE	1:B:122:ALA:CB	2.67	0.66
1:B:35:HIS:CE1	1:B:37:ARG:HD3	2.29	0.65
1:A:22:GLY:H	1:A:52:ASN:HD21	1.46	0.64
1:B:121:LYS:HE2	1:B:122:ALA:N	2.14	0.62
1:B:22:GLY:H	1:B:52:ASN:ND2	1.97	0.62
1:B:130:THR:CG2	1:B:142:GLU:HG2	2.30	0.61
1:B:84:SER:HA	1:B:107:ALA:O	2.01	0.61
1:B:121:LYS:HE2	1:B:122:ALA:CA	2.30	0.60
1:B:121:LYS:HD3	1:B:121:LYS:N	2.16	0.60
1:B:39:LYS:HA	1:B:39:LYS:HE3	1.82	0.60
1:B:121:LYS:HE2	1:B:122:ALA:H	1.68	0.59
1:B:154:TYR:CD2	1:B:154:TYR:N	2.69	0.58
1:A:42:THR:HG22	1:A:299:GLY:H	1.68	0.58
1:A:128:ILE:HD13	1:A:146:MET:SD	2.44	0.58
1:B:83:GLU:HG3	1:B:84:SER:H	1.64	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:110:SER:HB3	1:B:129:LEU:HG	1.85	0.57
1:B:121:LYS:CG	1:B:122:ALA:N	2.68	0.57
1:B:121:LYS:CE	1:B:122:ALA:N	2.68	0.57
1:B:119:ILE:O	1:B:121:LYS:NZ	2.34	0.56
1:B:118:MET:O	1:B:121:LYS:CE	2.54	0.56
1:A:58:LLP:H4'1	1:A:58:LLP:OP2	2.05	0.56
1:B:84:SER:HB3	1:B:143:VAL:CG2	2.36	0.55
1:B:120:MET:O	1:B:121:LYS:CG	2.54	0.55
1:B:84:SER:HB3	1:B:143:VAL:HG21	1.89	0.55
1:B:83:GLU:CG	1:B:84:SER:N	2.64	0.55
1:B:35:HIS:HE1	1:B:37:ARG:CD	2.18	0.54
1:A:113:SER:HB3	1:A:116:ARG:HB2	1.89	0.54
1:B:22:GLY:H	1:B:52:ASN:HD21	1.55	0.54
1:B:35:HIS:CE1	1:B:37:ARG:CG	2.89	0.54
1:B:205:LYS:HD2	1:B:209:LYS:NZ	2.23	0.54
1:A:22:GLY:H	1:A:52:ASN:ND2	2.06	0.53
1:B:132:GLY:O	1:B:133:LYS:HB3	2.07	0.53
1:A:336:ASN:C	1:A:336:ASN:HD22	2.11	0.53
1:B:114:VAL:HA	1:B:117:GLN:HG3	1.90	0.52
1:B:58:LLP:OP2	1:B:58:LLP:H4'1	2.10	0.52
1:B:209:LYS:O	1:B:209:LYS:CE	2.57	0.52
1:B:153:LYS:HB3	1:B:154:TYR:CD2	2.45	0.52
1:B:153:LYS:HB3	1:B:154:TYR:CE2	2.46	0.51
1:A:219:GLU:HG2	1:A:258:LYS:HG2	1.92	0.51
1:B:118:MET:O	1:B:121:LYS:HD2	2.11	0.51
1:B:217:GLU:OE2	1:B:225:GLU:HG3	2.10	0.50
1:A:336:ASN:HD22	1:A:337:GLU:N	2.09	0.50
1:A:34:GLU:OE1	1:A:327:LYS:NZ	2.44	0.50
1:B:146:MET:O	1:B:150:ASN:OD1	2.29	0.50
1:B:173:ALA:HB2	1:B:200:VAL:HA	1.92	0.50
1:A:173:ALA:HB2	1:A:200:VAL:HA	1.95	0.49
1:B:149:GLU:HG3	1:B:150:ASN:OD1	2.13	0.49
1:B:76:LYS:HG2	1:B:79:MET:SD	2.52	0.49
1:B:94:CYS:SG	1:B:125:ALA:HB2	2.53	0.49
1:A:88:ASN:ND2	1:A:312:ARG:HH11	2.10	0.49
1:B:153:LYS:HD2	1:B:154:TYR:CE2	2.48	0.48
1:A:339:HIS:HB2	4:A:666:HOH:O	2.14	0.47
1:B:110:SER:CB	1:B:129:LEU:HD11	2.44	0.47
1:B:121:LYS:NZ	1:B:122:ALA:CB	2.78	0.47
1:A:258:LYS:HB3	1:A:260:GLN:HE22	1.67	0.47
1:B:130:THR:HG22	1:B:142:GLU:HG2	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:332:ASP:O	1:B:336:ASN:ND2	2.49	0.46
1:A:58:LLP:NZ	1:A:58:LLP:O3	2.49	0.46
1:B:88:ASN:ND2	1:B:312:ARG:HH11	2.14	0.45
1:A:186:ILE:HD12	1:A:302:ILE:HG12	1.98	0.45
1:A:50:TYR:CG	1:A:309:CYS:HB3	2.52	0.45
1:A:177:TRP:CD1	1:A:207:LYS:HD2	2.52	0.45
1:B:84:SER:HB2	1:B:139:ALA:HB1	1.98	0.45
1:B:205:LYS:HD2	1:B:209:LYS:HZ2	1.81	0.45
1:B:150:ASN:HA	1:B:151:PRO:HD3	1.69	0.45
1:B:149:GLU:HG3	1:B:150:ASN:CG	2.38	0.44
1:B:133:LYS:NZ	1:B:134:LYS:HE2	2.33	0.43
1:B:35:HIS:CE1	1:B:37:ARG:CD	2.98	0.43
1:B:121:LYS:NZ	1:B:122:ALA:HB2	2.32	0.43
1:B:82:ILE:HG12	1:B:83:GLU:N	2.33	0.43
1:B:127:LEU:C	1:B:128:ILE:HG13	2.25	0.43
1:A:328:ILE:HD12	1:A:328:ILE:HA	1.81	0.43
1:B:177:TRP:CG	1:B:207:LYS:HD2	2.53	0.43
1:A:37:ARG:HD2	1:A:293:GLU:OE1	2.19	0.42
1:A:202:GLU:OE2	1:A:247:LYS:NZ	2.51	0.42
1:A:270:VAL:HG22	1:B:123:PHE:CD1	2.55	0.42
1:A:85:THR:O	1:A:85:THR:HG23	2.20	0.42
1:B:154:TYR:N	1:B:154:TYR:HD2	2.17	0.42
1:B:83:GLU:CG	1:B:84:SER:H	2.26	0.42
1:A:249:GLU:CD	1:A:249:GLU:H	2.24	0.42
1:A:338:HIS:O	1:A:339:HIS:CB	2.53	0.41
1:B:142:GLU:O	1:B:146:MET:HG3	2.19	0.41
1:B:86:SER:HG	3:B:401:MET:N	2.18	0.41
1:B:119:ILE:HA	1:B:121:LYS:HZ2	1.84	0.41
1:A:67:TYR:CZ	1:A:71:LYS:HD2	2.55	0.41
1:B:54:MET:HG2	1:B:95:GLN:NE2	2.36	0.41
1:A:114:VAL:H	1:A:114:VAL:HG12	1.47	0.41
1:A:177:TRP:CE3	1:A:182:GLY:HA2	2.56	0.41
1:B:76:LYS:O	1:B:77:PRO:C	2.57	0.41
1:A:270:VAL:O	1:A:274:GLY:HA2	2.21	0.41
1:A:336:ASN:C	1:A:336:ASN:ND2	2.73	0.41
1:B:58:LLP:H4'1	1:B:58:LLP:OP4	2.20	0.41
1:B:119:ILE:HA	1:B:121:LYS:NZ	2.36	0.41
1:A:277:CYS:HB2	1:A:281:SER:CB	2.51	0.40
1:B:149:GLU:HB2	1:B:150:ASN:H	1.32	0.40
1:B:170:HIS:HB3	1:B:203:LYS:HE3	2.04	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	336/339 (99%)	329 (98%)	7 (2%)	0	100	100
1	B	332/339 (98%)	310 (93%)	16 (5%)	6 (2%)	8	3
All	All	668/678 (98%)	639 (96%)	23 (3%)	6 (1%)	17	11

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	121	LYS
1	B	149	GLU
1	B	133	LYS
1	B	148	LYS
1	B	150	ASN
1	B	151	PRO

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	278/278 (100%)	261 (94%)	17 (6%)	18	14
1	B	274/278 (99%)	259 (94%)	15 (6%)	21	17
All	All	552/556 (99%)	520 (94%)	32 (6%)	20	15

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	2	GLU
1	A	3	GLN
1	A	5	SER
1	A	40	LYS
1	A	42	THR
1	A	43	ARG
1	A	85	THR
1	A	114	VAL
1	A	115	GLU
1	A	174	ASN
1	A	219	GLU
1	A	249	GLU
1	A	260	GLN
1	A	322	LYS
1	A	336	ASN
1	A	339	HIS
1	B	2	GLU
1	B	3	GLN
1	B	11	LYS
1	B	37	ARG
1	B	39	LYS
1	B	85	THR
1	B	103	ARG
1	B	121	LYS
1	B	129	LEU
1	B	131	GLU
1	B	133	LYS
1	B	142	GLU
1	B	209	LYS
1	B	321	ILE
1	B	329	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3	GLN
1	A	15	HIS
1	A	52	ASN
1	A	88	ASN
1	A	144	ASN
1	A	260	GLN
1	A	336	ASN

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Mol	Chain	Res	Type
1	B	3	GLN
1	B	52	ASN
1	B	88	ASN
1	B	95	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](#)

2 non-standard protein/DNA/RNA residues 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
1	LLP	B	58	1	23,24,25	2.44	7 (30%)	25,32,34	1.82	9 (36%)
1	LLP	A	58	1	23,24,25	2.67	5 (21%)	25,32,34	1.55	5 (20%)

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
1	LLP	B	58	1	-	1/16/17/19	0/1/1/1
1	LLP	A	58	1	-	0/16/17/19	0/1/1/1

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	58	LLP	C3-C2	8.30	1.49	1.40
1	B	58	LLP	C3-C2	7.60	1.48	1.40
1	A	58	LLP	C4-C3	5.44	1.49	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	58	LLP	C4'-NZ	4.86	1.43	1.27
1	B	58	LLP	C4-C3	4.50	1.47	1.40
1	A	58	LLP	C4-C5	4.37	1.47	1.42
1	B	58	LLP	C4-C5	3.90	1.46	1.42
1	B	58	LLP	C4'-NZ	3.65	1.39	1.27
1	B	58	LLP	O3-C3	-2.88	1.30	1.37
1	B	58	LLP	C2'-C2	2.46	1.54	1.50
1	A	58	LLP	C2-N1	2.15	1.37	1.33
1	B	58	LLP	C4-C4'	2.01	1.50	1.46

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	58	LLP	C4-C3-C2	-3.87	117.80	120.19
1	B	58	LLP	C6-N1-C2	3.68	125.99	119.17
1	A	58	LLP	C6-N1-C2	2.82	124.39	119.17
1	B	58	LLP	C4-C3-C2	-2.75	118.48	120.19
1	B	58	LLP	OP4-C5'-C5	2.74	114.57	109.35
1	B	58	LLP	O3-C3-C2	2.65	123.27	117.49
1	A	58	LLP	O3-C3-C2	2.51	122.96	117.49
1	B	58	LLP	C2'-C2-C3	2.49	123.96	120.89
1	B	58	LLP	C3-C4-C4'	2.46	125.00	120.41
1	B	58	LLP	C3-C2-N1	-2.44	117.62	120.77
1	B	58	LLP	C3-C4-C5	-2.34	116.47	118.26
1	A	58	LLP	C4-C4'-NZ	-2.33	113.61	124.31
1	A	58	LLP	C3-C2-N1	-2.27	117.83	120.77
1	B	58	LLP	C5-C6-N1	-2.05	120.41	123.82

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	58	LLP	CG-CD-CE-NZ

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	58	LLP	2	0
1	A	58	LLP	2	0

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

3 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	SO4	A	401	-	4,4,4	0.49	0	6,6,6	0.44	0
2	SO4	B	402	-	4,4,4	0.39	0	6,6,6	0.32	0
3	MET	B	401	-	7,8,8	0.98	0	7,9,9	1.53	1 (14%)

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
3	MET	B	401	-	-	2/8/8/8	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	401	MET	OXT-C-O	-2.95	117.39	124.09

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	401	MET	OXT-C-CA-CB
3	B	401	MET	O-C-CA-CB

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	401	MET	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, 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	338/339 (99%)	-0.01	8 (2%) 59 57	12, 21, 42, 68	0
1	B	334/339 (98%)	0.47	44 (13%) 3 2	10, 22, 64, 111	0
All	All	672/678 (99%)	0.23	52 (7%) 13 12	10, 22, 55, 111	0

All (52) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	127	LEU	7.0
1	B	141	GLU	6.3
1	B	123	PHE	5.6
1	B	133	LYS	5.4
1	B	143	VAL	5.3
1	B	136	MET	5.1
1	B	146	MET	5.1
1	B	132	GLY	4.9
1	B	148	LYS	4.7
1	B	111	THR	4.7
1	A	1	MET	4.6
1	B	40	LYS	4.5
1	B	321	ILE	4.4
1	B	151	PRO	4.4
1	B	84	SER	4.2
1	B	149	GLU	4.1
1	B	137	PRO	3.8
1	B	134	LYS	3.6
1	B	125	ALA	3.6
1	B	2	GLU	3.5
1	B	139	ALA	3.5
1	A	339	HIS	3.5
1	A	338	HIS	3.2
1	B	103	ARG	3.1

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Mol	Chain	Res	Type	RSRZ
1	B	147	ILE	3.0
1	A	322	LYS	2.9
1	B	110	SER	2.9
1	B	114	VAL	2.8
1	B	130	THR	2.8
1	A	113	SER	2.8
1	B	3	GLN	2.7
1	B	145	LYS	2.6
1	B	154	TYR	2.5
1	B	153	LYS	2.5
1	B	122	ALA	2.4
1	B	124	GLY	2.4
1	B	131	GLU	2.3
1	B	121	LYS	2.3
1	B	128	ILE	2.3
1	B	112	MET	2.3
1	A	2	GLU	2.3
1	B	107	ALA	2.3
1	B	108	MET	2.3
1	B	322	LYS	2.3
1	B	326	THR	2.2
1	B	305	ILE	2.2
1	A	111	THR	2.2
1	B	129	LEU	2.1
1	B	150	ASN	2.1
1	B	140	ILE	2.1
1	B	77	PRO	2.0
1	A	305	ILE	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	LLP	A	58	24/25	0.98	0.14	12,14,16,16	0
1	LLP	B	58	24/25	0.99	0.17	11,14,15,16	0

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	SO4	B	402	5/5	0.93	0.18	63,65,72,73	0
3	MET	B	401	9/9	0.95	0.14	26,28,32,35	0
2	SO4	A	401	5/5	0.97	0.16	47,50,52,61	0

6.5 Other polymers [i](#)

There are no such residues in this entry.