



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 06:08 AM GMT

PDB ID : 2VZE
Title : CRYSTAL STRUCTURE OF HUMAN ACYL-COA SYNTHETASE
MEDIUM-CHAIN FAMILY MEMBER 2A (L64P MUTATION) IN COM-
PLEX WITH AMP
Authors : Yue, W.W.; Kochan, G.T.; Pilka, E.S.; Bhatia, C.; Von Delft, F.; Arrowsmith,
C.H.; Edwards, A.M.; Wikstrom, M.; Bountra, C.; Oppermann, U.
Deposited on : 2008-07-31
Resolution : 2.45 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

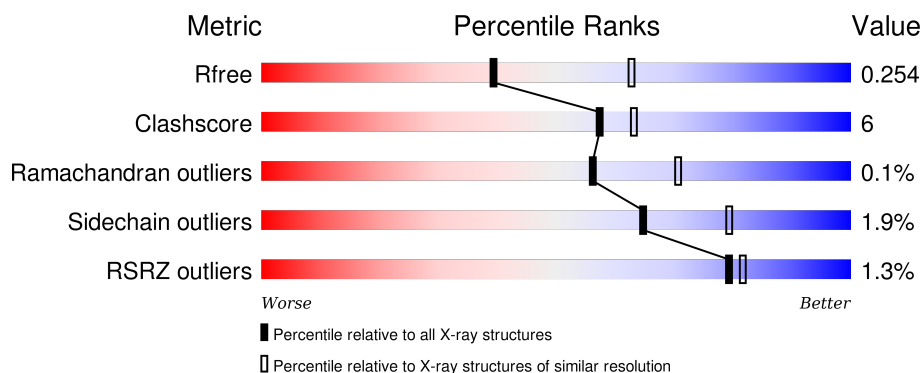
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.45 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}	91344	4776 (2.50-2.42)
Clashscore	102246	1030 (2.48-2.44)
Ramachandran outliers	100387	1024 (2.48-2.44)
Sidechain outliers	100360	1024 (2.48-2.44)
RSRZ outliers	91569	4787 (2.50-2.42)

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. 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	570	<div> <div> <div></div> <div>83%</div> <div>9%</div> <div>6%</div> </div> </div>
1	B	570	<div> <div> <div></div> <div>84%</div> <div>9%</div> <div>6%</div> </div> </div>
1	C	570	<div> <div> <div>2%</div> <div>82%</div> <div>11%</div> <div>6%</div> </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	MG	C	1570	-	-	-	X

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 13191 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 ACYL-COENZYME A SYNTHETASE ACSM2A, MITOCHONDRIAL.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	533	Total	C	N	O	S	0	6	0
			4175	2668	703	776	28			
1	B	533	Total	C	N	O	S	0	2	0
			4120	2636	688	768	28			
1	C	536	Total	C	N	O	S	0	5	0
			4171	2665	700	778	28			

There are 78 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	8	MET	-	EXPRESSION TAG	UNP Q08AH3
A	9	GLY	-	EXPRESSION TAG	UNP Q08AH3
A	10	HIS	-	EXPRESSION TAG	UNP Q08AH3
A	11	HIS	-	EXPRESSION TAG	UNP Q08AH3
A	12	HIS	-	EXPRESSION TAG	UNP Q08AH3
A	13	HIS	-	EXPRESSION TAG	UNP Q08AH3
A	14	HIS	-	EXPRESSION TAG	UNP Q08AH3
A	15	HIS	-	EXPRESSION TAG	UNP Q08AH3
A	16	SER	-	EXPRESSION TAG	UNP Q08AH3
A	17	SER	-	EXPRESSION TAG	UNP Q08AH3
A	18	GLY	-	EXPRESSION TAG	UNP Q08AH3
A	19	VAL	-	EXPRESSION TAG	UNP Q08AH3
A	20	ASP	-	EXPRESSION TAG	UNP Q08AH3
A	21	LEU	-	EXPRESSION TAG	UNP Q08AH3
A	22	GLY	-	EXPRESSION TAG	UNP Q08AH3
A	23	THR	-	EXPRESSION TAG	UNP Q08AH3
A	24	GLU	-	EXPRESSION TAG	UNP Q08AH3
A	25	ASN	-	EXPRESSION TAG	UNP Q08AH3
A	26	LEU	-	EXPRESSION TAG	UNP Q08AH3
A	27	TYR	-	EXPRESSION TAG	UNP Q08AH3
A	28	PHE	-	EXPRESSION TAG	UNP Q08AH3
A	29	GLN	-	EXPRESSION TAG	UNP Q08AH3

Continued on next page...

Continued from previous page...

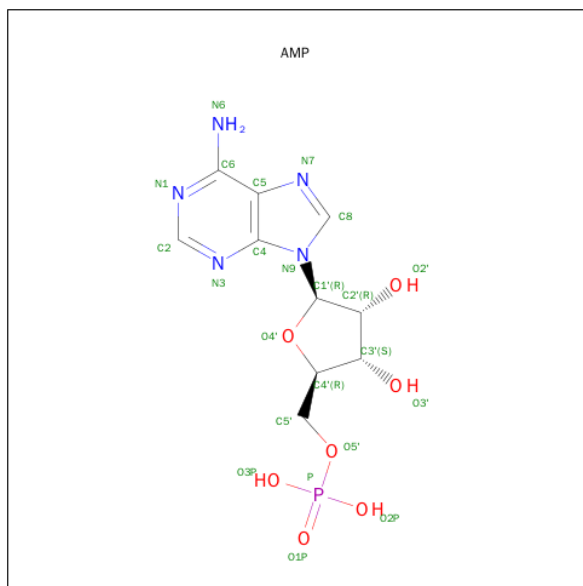
Chain	Residue	Modelled	Actual	Comment	Reference
A	30	SER	-	EXPRESSION TAG	UNP Q08AH3
A	31	MET	-	EXPRESSION TAG	UNP Q08AH3
A	64	PRO	LEU	ENGINEERED MUTATION	UNP Q08AH3
A	463	ASP	ASN	CONFLICT	UNP Q08AH3
B	8	MET	-	EXPRESSION TAG	UNP Q08AH3
B	9	GLY	-	EXPRESSION TAG	UNP Q08AH3
B	10	HIS	-	EXPRESSION TAG	UNP Q08AH3
B	11	HIS	-	EXPRESSION TAG	UNP Q08AH3
B	12	HIS	-	EXPRESSION TAG	UNP Q08AH3
B	13	HIS	-	EXPRESSION TAG	UNP Q08AH3
B	14	HIS	-	EXPRESSION TAG	UNP Q08AH3
B	15	HIS	-	EXPRESSION TAG	UNP Q08AH3
B	16	SER	-	EXPRESSION TAG	UNP Q08AH3
B	17	SER	-	EXPRESSION TAG	UNP Q08AH3
B	18	GLY	-	EXPRESSION TAG	UNP Q08AH3
B	19	VAL	-	EXPRESSION TAG	UNP Q08AH3
B	20	ASP	-	EXPRESSION TAG	UNP Q08AH3
B	21	LEU	-	EXPRESSION TAG	UNP Q08AH3
B	22	GLY	-	EXPRESSION TAG	UNP Q08AH3
B	23	THR	-	EXPRESSION TAG	UNP Q08AH3
B	24	GLU	-	EXPRESSION TAG	UNP Q08AH3
B	25	ASN	-	EXPRESSION TAG	UNP Q08AH3
B	26	LEU	-	EXPRESSION TAG	UNP Q08AH3
B	27	TYR	-	EXPRESSION TAG	UNP Q08AH3
B	28	PHE	-	EXPRESSION TAG	UNP Q08AH3
B	29	GLN	-	EXPRESSION TAG	UNP Q08AH3
B	30	SER	-	EXPRESSION TAG	UNP Q08AH3
B	31	MET	-	EXPRESSION TAG	UNP Q08AH3
B	64	PRO	LEU	ENGINEERED MUTATION	UNP Q08AH3
B	463	ASP	ASN	CONFLICT	UNP Q08AH3
C	8	MET	-	EXPRESSION TAG	UNP Q08AH3
C	9	GLY	-	EXPRESSION TAG	UNP Q08AH3
C	10	HIS	-	EXPRESSION TAG	UNP Q08AH3
C	11	HIS	-	EXPRESSION TAG	UNP Q08AH3
C	12	HIS	-	EXPRESSION TAG	UNP Q08AH3
C	13	HIS	-	EXPRESSION TAG	UNP Q08AH3
C	14	HIS	-	EXPRESSION TAG	UNP Q08AH3
C	15	HIS	-	EXPRESSION TAG	UNP Q08AH3
C	16	SER	-	EXPRESSION TAG	UNP Q08AH3
C	17	SER	-	EXPRESSION TAG	UNP Q08AH3
C	18	GLY	-	EXPRESSION TAG	UNP Q08AH3
C	19	VAL	-	EXPRESSION TAG	UNP Q08AH3

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
C	20	ASP	-	EXPRESSION TAG	UNP Q08AH3
C	21	LEU	-	EXPRESSION TAG	UNP Q08AH3
C	22	GLY	-	EXPRESSION TAG	UNP Q08AH3
C	23	THR	-	EXPRESSION TAG	UNP Q08AH3
C	24	GLU	-	EXPRESSION TAG	UNP Q08AH3
C	25	ASN	-	EXPRESSION TAG	UNP Q08AH3
C	26	LEU	-	EXPRESSION TAG	UNP Q08AH3
C	27	TYR	-	EXPRESSION TAG	UNP Q08AH3
C	28	PHE	-	EXPRESSION TAG	UNP Q08AH3
C	29	GLN	-	EXPRESSION TAG	UNP Q08AH3
C	30	SER	-	EXPRESSION TAG	UNP Q08AH3
C	31	MET	-	EXPRESSION TAG	UNP Q08AH3
C	64	PRO	LEU	ENGINEERED MUTATION	UNP Q08AH3
C	463	ASP	ASN	CONFLICT	UNP Q08AH3

- Molecule 2 is ADENOSINE MONOPHOSPHATE (three-letter code: AMP) (formula: $C_{10}H_{14}N_5O_7P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			23	10	5	7	1		
2	B	1	Total	C	N	O	P	0	0
			23	10	5	7	1		
2	C	1	Total	C	N	O	P	0	0
			23	10	5	7	1		

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	1	Total 1	Mg 1	0	0

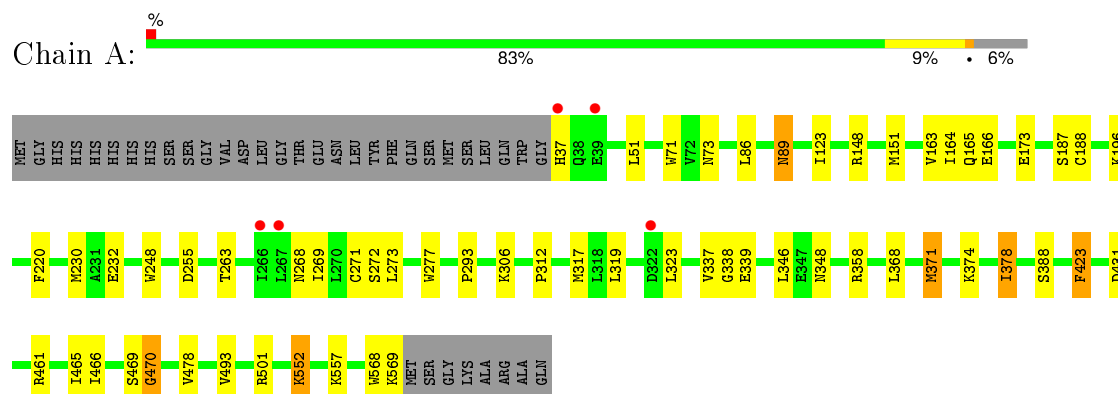
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	256	Total 256	O 256	0	0
4	B	234	Total 234	O 234	0	0
4	C	165	Total 165	O 165	0	0

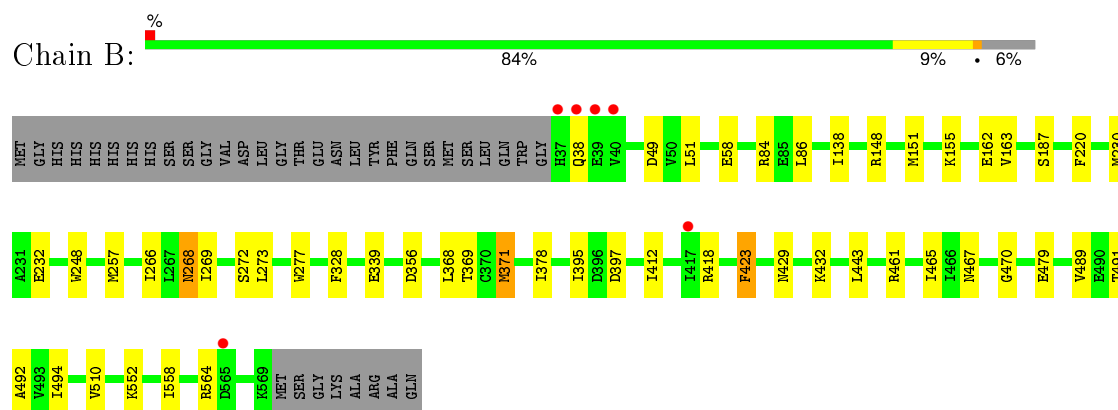
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

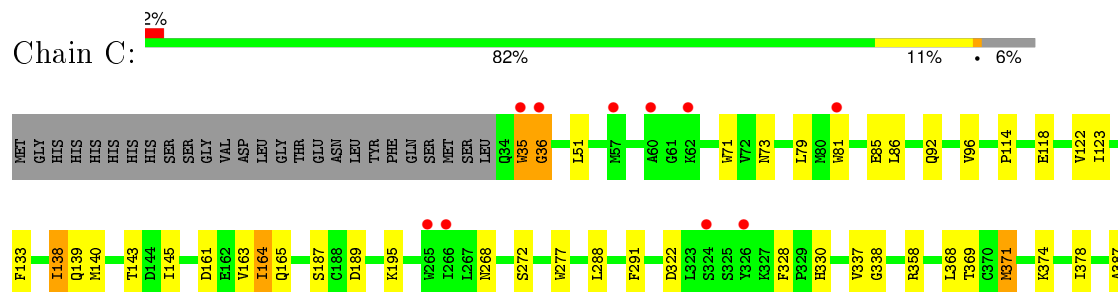
- Molecule 1: ACYL-COENZYME A SYNTHETASE ACSM2A, MITOCHONDRIAL



- Molecule 1: ACYL-COENZYME A SYNTHETASE ACSM2A, MITOCHONDRIAL



- Molecule 1: ACYL-COENZYME A SYNTHETASE ACSM2A, MITOCHONDRIAL





4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	97.73 Å 97.73 Å 384.60 Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.16 – 2.45 38.00 – 2.45	Depositor EDS
% Data completeness (in resolution range)	100.0 (39.16-2.45) 98.8 (38.00-2.45)	Depositor EDS
R_{merge}	0.01	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.30 (at 2.45 Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.193 , 0.243 0.208 , 0.254	Depositor DCC
R_{free} test set	3451 reflections (5.27%)	DCC
Wilson B-factor (Å ²)	25.9	Xtriage
Anisotropy	0.111	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 22.0	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.27$	Xtriage
Outliers	0 of 69065 reflections	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	13191	wwPDB-VP
Average B, all atoms (Å ²)	2.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.70% 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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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

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	0.66	1/4287 (0.0%)	0.70	0/5817
1	B	0.60	0/4222	0.67	0/5735
1	C	0.60	2/4281 (0.0%)	0.65	0/5817
All	All	0.62	3/12790 (0.0%)	0.67	0/17369

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

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	471	TYR	CD1-CE1	-5.67	1.30	1.39
1	A	271	CYS	CB-SG	-5.37	1.73	1.81
1	C	484	GLU	CG-CD	5.30	1.59	1.51

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	470	GLY	Peptide

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	4175	0	4171	53	0
1	B	4120	0	4085	45	0
1	C	4171	0	4127	51	0
2	A	23	0	12	0	0
2	B	23	0	12	0	0
2	C	23	0	12	0	0
3	C	1	0	0	0	0
4	A	256	0	0	13	1
4	B	234	0	0	12	1
4	C	165	0	0	6	0
All	All	13191	0	12419	149	1

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 6.

All (149) 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:173:GLU:HG2	4:A:2067:HOH:O	1.43	1.14
1:C:371:MET:HE3	1:C:387:ALA:HB2	1.40	1.03
1:A:368:LEU:HD23	1:A:371:MET:HE1	1.44	0.99
1:A:151[B]:MET:HE2	1:A:230:MET:HG3	1.48	0.91
1:C:368:LEU:HD21	1:C:371:MET:HE2	1.55	0.89
1:B:395:ILE:HD11	1:B:443:LEU:HD21	1.58	0.84
1:B:397:ASP:HB3	4:B:2164:HOH:O	1.77	0.84
1:A:346:LEU:HD12	4:A:2151:HOH:O	1.77	0.83
1:A:368:LEU:HD12	4:A:2160:HOH:O	1.78	0.83
1:A:368:LEU:CD2	1:A:371:MET:HE1	2.09	0.82
1:C:395:ILE:HD11	1:C:443:LEU:HD21	1.61	0.82
1:A:368:LEU:CD2	1:A:371:MET:CE	2.58	0.81
1:B:339:GLU:OE1	4:B:2127:HOH:O	1.98	0.81
1:C:371:MET:CE	1:C:387:ALA:HB2	2.10	0.80
1:C:368:LEU:HD21	1:C:371:MET:CE	2.11	0.79
1:B:49:ASP:CG	4:B:2004:HOH:O	2.25	0.74
1:C:371:MET:CE	1:C:387:ALA:CB	2.66	0.73

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:371:MET:HE1	1:C:387:ALA:HB1	1.70	0.73
1:C:164:ILE:CD1	1:C:165:GLN:H	2.03	0.72
1:A:164:ILE:HD11	1:A:188:CYS:SG	2.30	0.71
1:A:89:ASN:HB2	4:A:2018:HOH:O	1.90	0.71
1:C:189:ASP:CB	4:C:2041:HOH:O	2.39	0.70
1:C:395:ILE:HD11	1:C:443:LEU:CD2	2.21	0.70
1:A:51:LEU:HD11	1:A:86:LEU:HD23	1.73	0.70
1:A:368:LEU:HD21	1:A:371:MET:CE	2.23	0.69
1:B:368:LEU:HD23	1:B:371:MET:HE1	1.75	0.69
1:C:118:GLU:OE2	1:C:195:LYS:NZ	2.22	0.68
1:A:151[B]:MET:HG2	1:A:230:MET:HE2	1.77	0.67
1:C:164:ILE:HD12	1:C:165:GLN:H	1.59	0.67
1:A:431:ASP:HB2	4:A:2190:HOH:O	1.95	0.66
1:B:368:LEU:CD2	1:B:371:MET:CE	2.75	0.65
1:B:369:THR:HG23	1:B:412:ILE:HD11	1.79	0.64
1:A:368:LEU:HD21	1:A:371:MET:HE2	1.80	0.63
1:B:429:ASN:OD1	1:B:432:LYS:HD2	1.99	0.63
1:C:368:LEU:CD2	1:C:371:MET:HE2	2.27	0.63
1:C:371:MET:HE1	1:C:387:ALA:CB	2.27	0.62
1:C:368:LEU:CD2	1:C:371:MET:CE	2.79	0.61
1:C:371:MET:HE3	1:C:387:ALA:CB	2.21	0.61
1:B:368:LEU:CD2	1:B:371:MET:HE1	2.30	0.61
1:A:368:LEU:CD2	1:A:371:MET:HE2	2.31	0.61
1:A:164:ILE:HG23	1:A:165:GLN:N	2.16	0.61
1:C:288:LEU:HD22	1:C:291:PHE:HA	1.83	0.61
1:B:467:ASN:HB2	4:B:2233:HOH:O	2.00	0.61
1:B:151[A]:MET:HG2	1:B:230:MET:CE	2.31	0.60
1:A:469:SER:OG	1:A:501[B]:ARG:NH2	2.35	0.60
1:A:374:LYS:HE3	4:A:2146:HOH:O	2.02	0.59
1:A:461:ARG:NH2	1:A:465:ILE:HD12	2.17	0.58
1:A:148[B]:ARG:HG2	1:A:220:PHE:CE2	2.39	0.58
1:B:138:ILE:HB	1:B:162[B]:GLU:HG2	1.88	0.56
1:C:51:LEU:HD11	1:C:86:LEU:HD23	1.87	0.56
1:C:114:PRO:HB3	1:C:138:ILE:HD13	1.87	0.56
1:A:478:VAL:HB	1:A:493:VAL:HG21	1.88	0.55
1:B:84:ARG:HB2	4:B:2009:HOH:O	2.06	0.55
1:C:374:LYS:HE3	4:C:2092:HOH:O	2.06	0.55
1:A:196:LYS:CG	4:A:2084:HOH:O	2.55	0.54
1:B:38:GLN:HE21	1:B:418:ARG:HG2	1.73	0.53
1:B:266:ILE:O	1:B:269:ILE:HG22	2.08	0.53
1:B:494:ILE:HD12	1:B:564:ARG:HA	1.90	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:35:TRP:O	1:C:36:GLY:O	2.26	0.53
1:A:166:GLU:HG3	4:A:2047:HOH:O	2.08	0.52
1:B:368:LEU:HG	1:B:371:MET:HE2	1.91	0.52
1:A:269:ILE:HD12	1:A:273:LEU:HD13	1.90	0.52
1:C:164:ILE:CD1	1:C:165:GLN:N	2.72	0.51
1:C:123:ILE:HD12	1:C:133:PHE:CD1	2.46	0.51
1:A:248:TRP:CE3	1:A:371:MET:HG3	2.43	0.51
1:C:330:HIS:HD2	4:C:2078:HOH:O	1.91	0.51
1:C:358:ARG:HD3	4:C:2100:HOH:O	2.10	0.51
1:C:461:ARG:NH2	1:C:465:ILE:HD12	2.25	0.51
1:B:461:ARG:NH2	1:B:465:ILE:HD12	2.26	0.51
1:B:151[A]:MET:HG2	1:B:230:MET:HE1	1.93	0.51
1:B:273:LEU:HG	1:B:277:TRP:CZ3	2.46	0.51
1:C:369:THR:HG23	1:C:412:ILE:HD11	1.91	0.50
1:A:358:ARG:HG2	1:A:378:ILE:HD11	1.94	0.50
1:C:337:VAL:HG22	1:C:338:GLY:N	2.27	0.50
1:C:139[A]:GLN:HB3	1:C:537:PRO:HD2	1.94	0.49
1:C:508:PHE:CD2	1:C:563:LEU:HD13	2.47	0.49
1:C:143:THR:HG23	4:C:2011:HOH:O	2.12	0.49
1:B:248:TRP:CE3	1:B:371:MET:HG3	2.47	0.49
1:B:151[A]:MET:HE1	4:B:2060:HOH:O	2.11	0.49
1:B:38:GLN:NE2	1:B:418:ARG:HG2	2.28	0.49
1:B:148:ARG:HG2	1:B:220:PHE:CE2	2.48	0.49
1:C:268:ASN:O	1:C:272:SER:HB3	2.13	0.49
1:A:268:ASN:O	1:A:272:SER:HB3	2.14	0.48
1:C:92:GLN:O	1:C:96:VAL:HG23	2.14	0.47
1:A:371:MET:HB3	1:A:371:MET:HE2	1.66	0.47
1:A:337:VAL:HG22	1:A:338:GLY:N	2.28	0.47
1:B:368:LEU:HG	1:B:371:MET:CE	2.45	0.47
1:B:429:ASN:HB3	1:B:432:LYS:HB2	1.97	0.47
1:C:164:ILE:HD13	1:C:165:GLN:H	1.80	0.47
1:B:432:LYS:HG2	4:B:2089:HOH:O	2.15	0.47
1:C:449:ILE:HG22	1:C:450:LYS:N	2.30	0.46
1:C:368:LEU:CD2	1:C:371:MET:HE1	2.46	0.46
1:A:466:ILE:HD11	1:A:493:VAL:HG12	1.98	0.46
1:A:151[B]:MET:CG	1:A:230:MET:HE2	2.45	0.45
1:B:58:GLU:HB3	4:B:2009:HOH:O	2.16	0.45
1:A:123:ILE:HG21	1:A:269:ILE:HD13	1.97	0.45
1:C:497:PRO:HG3	1:C:568:TRP:CD2	2.52	0.45
1:B:368:LEU:CD2	1:B:371:MET:HE2	2.46	0.45
1:C:139[A]:GLN:HB3	1:C:537:PRO:CD	2.47	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:79:LEU:HD13	1:C:81:TRP:HH2	1.82	0.45
1:C:81:TRP:HD1	1:C:85:GLU:HB3	1.83	0.44
1:C:71:TRP:CH2	1:C:73:ASN:HB3	2.53	0.44
1:C:358:ARG:HG2	1:C:378:ILE:HD11	1.99	0.44
1:B:369:THR:CG2	1:B:412:ILE:HD11	2.45	0.44
1:A:263:THR:HG23	4:A:2125:HOH:O	2.17	0.44
1:A:164:ILE:CG2	1:A:165:GLN:N	2.81	0.44
1:A:148[B]:ARG:HG2	1:A:220:PHE:CD2	2.53	0.44
1:C:118:GLU:O	1:C:122:VAL:HG23	2.18	0.44
1:C:489:VAL:HG22	1:C:510:VAL:O	2.18	0.43
1:B:257:MET:HG2	4:B:2100:HOH:O	2.17	0.43
1:A:151[B]:MET:HG2	1:A:230:MET:CE	2.46	0.43
1:B:148:ARG:HG2	1:B:220:PHE:CD2	2.53	0.43
1:A:163:VAL:HG22	4:A:2062:HOH:O	2.18	0.43
1:B:356:ASP:HB3	1:B:378:ILE:CD1	2.49	0.43
1:B:38:GLN:HE21	1:B:418:ARG:CG	2.30	0.43
1:A:71:TRP:CH2	1:A:73:ASN:HB3	2.54	0.43
1:A:319:LEU:HD22	1:A:348:ASN:CG	2.39	0.43
1:B:268:ASN:O	1:B:272:SER:HB3	2.18	0.43
1:C:86:LEU:HD21	1:C:277:TRP:CH2	2.54	0.42
1:C:490:GLU:OE2	1:C:552:LYS:HE2	2.18	0.42
1:A:568:TRP:O	1:A:569:LYS:C	2.56	0.42
1:B:163:VAL:HG22	4:B:2066:HOH:O	2.19	0.42
1:A:470:GLY:C	4:A:2216:HOH:O	2.57	0.42
1:C:490:GLU:HG2	1:C:550:LEU:HD12	2.02	0.42
1:B:368:LEU:HD21	1:B:371:MET:CE	2.48	0.42
1:A:269:ILE:CD1	1:A:273:LEU:HD13	2.50	0.42
1:A:346:LEU:CD1	4:A:2151:HOH:O	2.52	0.42
1:A:323:LEU:HA	1:A:323:LEU:HD23	1.75	0.42
1:A:293:PRO:HD3	1:A:317:MET:CE	2.50	0.41
1:A:164:ILE:HG23	1:A:165:GLN:H	1.82	0.41
1:B:479:GLU:HG2	1:B:491:THR:HG23	2.02	0.41
1:A:339[A]:GLU:HG3	4:A:2147:HOH:O	2.18	0.41
1:B:148:ARG:NE	4:B:2062:HOH:O	2.37	0.41
1:B:492:ALA:HB2	1:B:558:ILE:HG21	2.02	0.41
1:B:470:GLY:N	4:B:2207:HOH:O	2.40	0.41
1:B:232:GLU:O	1:B:423:PHE:HB2	2.20	0.41
1:C:140:MET:HE3	1:C:145:ILE:HG12	2.02	0.41
1:C:330:HIS:CD2	4:C:2078:HOH:O	2.70	0.41
1:A:312:PRO:HD2	1:A:339[B]:GLU:HG3	2.02	0.41
1:C:161:ASP:O	1:C:164:ILE:HG13	2.20	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:371:MET:HB3	1:B:371:MET:HE2	1.85	0.41
1:A:293:PRO:HD3	1:A:317:MET:HE3	2.03	0.41
1:A:255:ASP:OD1	1:A:306[A]:LYS:HD2	2.21	0.41
1:A:552:LYS:HA	1:A:557:LYS:O	2.21	0.41
1:B:489:VAL:HG22	1:B:510:VAL:O	2.21	0.41
1:A:273:LEU:HG	1:A:277:TRP:CZ3	2.56	0.40
1:C:394:ILE:CD1	1:C:410:ILE:HG12	2.51	0.40
1:A:232:GLU:O	1:A:423:PHE:HB2	2.21	0.40
1:B:51:LEU:HD11	1:B:86:LEU:HD23	2.04	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:2144:HOH:O	4:B:2166:HOH:O[7_555]	2.19	0.01

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	537/570 (94%)	524 (98%)	13 (2%)	0	100	100
1	B	533/570 (94%)	518 (97%)	15 (3%)	0	100	100
1	C	539/570 (95%)	522 (97%)	16 (3%)	1 (0%)	52	64
All	All	1609/1710 (94%)	1564 (97%)	44 (3%)	1 (0%)	56	71

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	36	GLY

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	453/485 (93%)	445 (98%)	8 (2%)	66	81
1	B	441/485 (91%)	434 (98%)	7 (2%)	70	83
1	C	448/485 (92%)	438 (98%)	10 (2%)	60	75
All	All	1342/1455 (92%)	1317 (98%)	25 (2%)	65	79

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	37	HIS
1	A	89	ASN
1	A	187	SER
1	A	371	MET
1	A	378	ILE
1	A	388	SER
1	A	423	PHE
1	A	552	LYS
1	B	155	LYS
1	B	187	SER
1	B	268	ASN
1	B	328	PHE
1	B	371	MET
1	B	423	PHE
1	B	552	LYS
1	C	35	TRP
1	C	138	ILE
1	C	163	VAL
1	C	164	ILE
1	C	187	SER
1	C	322	ASP
1	C	328	PHE
1	C	371	MET
1	C	423	PHE
1	C	429	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	165	GLN
1	A	206	HIS
1	A	213	GLN
1	A	268	ASN
1	B	38	GLN
1	B	89	ASN
1	B	213	GLN
1	B	268	ASN
1	B	332	GLN
1	C	268	ASN
1	C	330	HIS
1	C	400	ASN

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](#)

Of 4 ligands modelled in this entry, 1 is monoatomic - leaving 3 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	AMP	A	1570	-	20,25,25	1.13	1 (5%)	22,38,38	2.14	4 (18%)
2	AMP	B	1570	-	20,25,25	1.06	1 (5%)	22,38,38	2.26	4 (18%)
2	AMP	C	1571	-	20,25,25	1.01	1 (5%)	22,38,38	1.99	5 (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	AMP	A	1570	-	-	0/6/26/26	0/3/3/3
2	AMP	B	1570	-	-	0/6/26/26	0/3/3/3
2	AMP	C	1571	-	-	0/6/26/26	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1571	AMP	C5-C4	2.30	1.45	1.40
2	B	1570	AMP	C5-C4	3.03	1.47	1.40
2	A	1570	AMP	C5-C4	3.13	1.47	1.40

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1570	AMP	N3-C2-N1	-8.65	122.27	128.89
2	A	1570	AMP	N3-C2-N1	-6.82	123.68	128.89
2	C	1571	AMP	N3-C2-N1	-6.69	123.78	128.89
2	A	1570	AMP	C4-C5-N7	-4.16	105.65	109.48
2	A	1570	AMP	C2'-C1'-N9	-3.42	109.07	114.29
2	C	1571	AMP	C2'-C1'-N9	-3.15	109.48	114.29
2	C	1571	AMP	C4-C5-N7	-2.79	106.91	109.48
2	C	1571	AMP	O5'-P-O1P	-2.72	100.22	107.14
2	B	1570	AMP	C2'-C1'-N9	-2.40	110.63	114.29
2	A	1570	AMP	C1'-N9-C4	-2.36	123.38	126.94
2	C	1571	AMP	C1'-N9-C4	-2.00	123.92	126.94
2	B	1570	AMP	O3'-C3'-C4'	2.12	117.42	111.05
2	B	1570	AMP	O3P-P-O2P	2.47	116.77	107.38

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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	533/570 (93%)	-0.38	5 (0%) 85 87	2, 2, 4, 11	0
1	B	533/570 (93%)	-0.29	6 (1%) 82 84	2, 2, 4, 9	0
1	C	536/570 (94%)	-0.10	10 (1%) 70 72	2, 2, 4, 17	0
All	All	1602/1710 (93%)	-0.26	21 (1%) 79 81	2, 2, 4, 17	0

All (21) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	39	GLU	5.5
1	B	37	HIS	4.6
1	C	81	TRP	4.0
1	B	38	GLN	3.9
1	B	40	VAL	3.3
1	A	37	HIS	3.3
1	C	324	SER	3.1
1	C	35	TRP	3.0
1	A	39	GLU	2.8
1	C	60	ALA	2.8
1	B	565	ASP	2.5
1	C	57	MET	2.4
1	A	267	LEU	2.3
1	C	265	TRP	2.3
1	A	266	ILE	2.3
1	C	266	ILE	2.3
1	C	326	TYR	2.3
1	C	62	LYS	2.1
1	B	417	ILE	2.1
1	A	322	ASP	2.0
1	C	36	GLY	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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
3	MG	C	1570	1/1	0.93	0.26	2.86	13,13,13,13	0
2	AMP	B	1570	23/23	0.98	0.11	-0.92	2,2,7,14	0
2	AMP	A	1570	23/23	0.98	0.11	-0.93	2,2,3,10	0
2	AMP	C	1571	23/23	0.98	0.09	-1.28	2,3,7,11	0

6.5 Other polymers [i](#)

There are no such residues in this entry.