W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report (i)

Mar 22, 2025 – 09:15 AM EDT

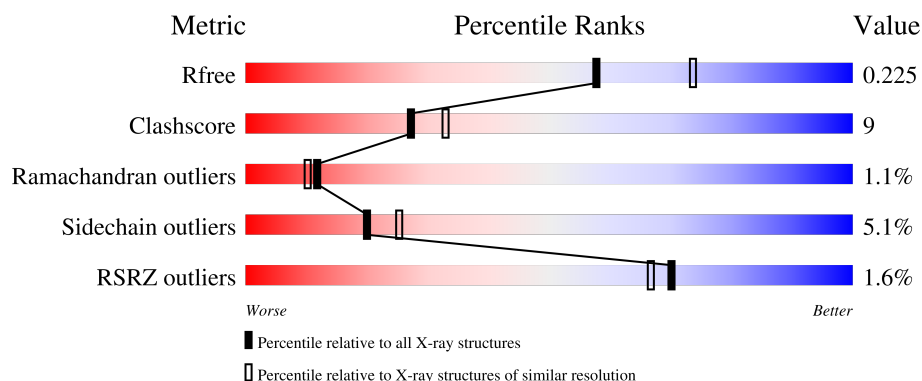|		
PDB ID	:	1AUS
Title	:	ACTIVATED UNLIGANDED SPINACH RUBISCO
Authors	:	Taylor, T.C.; Andersson, I.
Deposited on	:	1995-06-21
Resolution	:	2.20 Å(reported)

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 2.20 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	Percentile Ranks	Value
Rfree		0.225
Clashscore		9
Ramachandran outliers		1.1%
Sidechain outliers		5.1%
RSRZ outliers		1.6%

Worse   *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	5791 (2.20-2.20)
Clashscore	180529	6634 (2.20-2.20)
Ramachandran outliers	177936	6560 (2.20-2.20)
Sidechain outliers	177891	6561 (2.20-2.20)
RSRZ outliers	164620	5791 (2.20-2.20)

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	L	475	75% 15% · 8%
1	M	475	76% 15% · 8%
1	N	475	75% 16% · 8%
1	O	475	75% 15% · 8%
2	S	123	75% 20% 5%

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Mol	Chain	Length	Quality of chain
2	T	123	2% 76% 21% •
2	U	123	2% 75% 22% •
2	V	123	3% 76% 21% •

2   Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 18149 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 RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	439	Total 3440	C 2180	N 608	O 635	S 17	0	0	0
1	M	439	Total 3440	C 2180	N 608	O 635	S 17	0	0	0
1	N	439	Total 3440	C 2180	N 608	O 635	S 17	0	0	0
1	O	439	Total 3440	C 2180	N 608	O 635	S 17	0	0	0

- Molecule 2 is a protein called RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	S	123	Total 1033	C 673	N 167	O 186	S 7	0	0	0
2	T	123	Total 1033	C 673	N 167	O 186	S 7	0	0	0
2	U	123	Total 1033	C 673	N 167	O 186	S 7	0	0	0
2	V	123	Total 1033	C 673	N 167	O 186	S 7	0	0	0

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S	2	GLN	LYS	conflict	UNP Q43832
S	6	ILE	THR	conflict	UNP Q43832
S	7	LEU	GLN	conflict	UNP Q43832
S	9	LEU	MET	conflict	UNP Q43832
S	11	LYS	ARG	conflict	UNP Q43832
S	109	GLU	GLN	conflict	UNP Q43832
S	113	ILE	VAL	conflict	UNP Q43832

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Chain	Residue	Modelled	Actual	Comment	Reference
T	2	GLN	LYS	conflict	UNP Q43832
T	6	ILE	THR	conflict	UNP Q43832
T	7	LEU	GLN	conflict	UNP Q43832
T	9	LEU	MET	conflict	UNP Q43832
T	11	LYS	ARG	conflict	UNP Q43832
T	109	GLU	GLN	conflict	UNP Q43832
T	113	ILE	VAL	conflict	UNP Q43832
U	2	GLN	LYS	conflict	UNP Q43832
U	6	ILE	THR	conflict	UNP Q43832
U	7	LEU	GLN	conflict	UNP Q43832
U	9	LEU	MET	conflict	UNP Q43832
U	11	LYS	ARG	conflict	UNP Q43832
U	109	GLU	GLN	conflict	UNP Q43832
U	113	ILE	VAL	conflict	UNP Q43832
V	2	GLN	LYS	conflict	UNP Q43832
V	6	ILE	THR	conflict	UNP Q43832
V	7	LEU	GLN	conflict	UNP Q43832
V	9	LEU	MET	conflict	UNP Q43832
V	11	LYS	ARG	conflict	UNP Q43832
V	109	GLU	GLN	conflict	UNP Q43832
V	113	ILE	VAL	conflict	UNP Q43832

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	L	1	Total 1	Mg 1	0	0
3	M	1	Total 1	Mg 1	0	0
3	N	1	Total 1	Mg 1	0	0
3	O	1	Total 1	Mg 1	0	0

- Molecule 4 is FORMIC ACID (three-letter code: FMT) (formula: CH_2O_2).

FMT
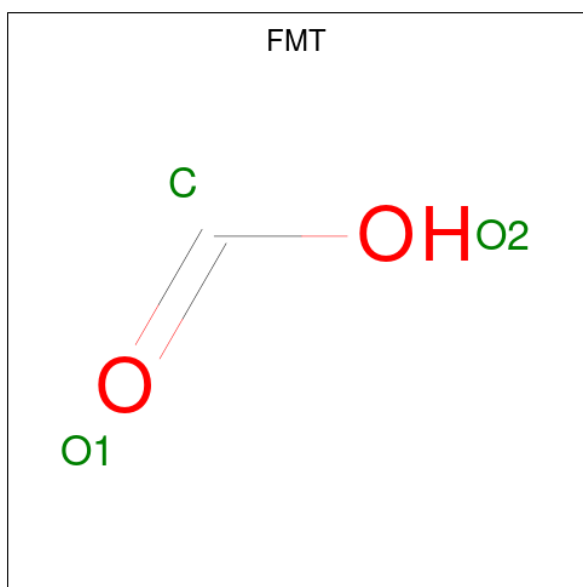
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	L	1	Total 3	C 1	O 2	0	0
4	M	1	Total 3	C 1	O 2	0	0
4	N	1	Total 3	C 1	O 2	0	0
4	O	1	Total 3	C 1	O 2	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	L	187	Total 187	O 187	0	0
5	S	39	Total 39	O 39	0	0
5	M	4	Total 4	O 4	0	0
5	T	1	Total 1	O 1	0	0
5	O	3	Total 3	O 3	0	0
5	V	7	Total 7	O 7	0	0

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: RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE

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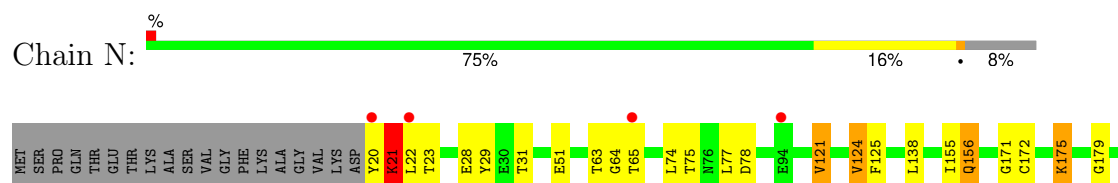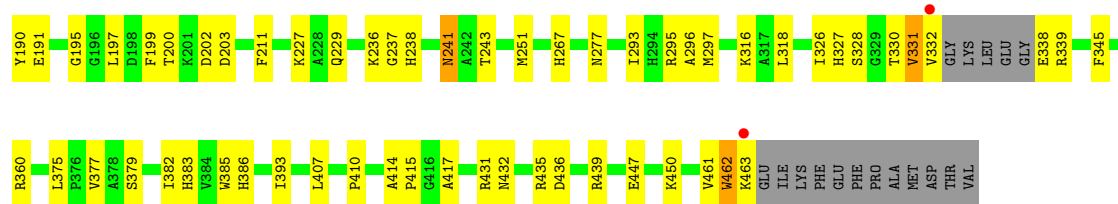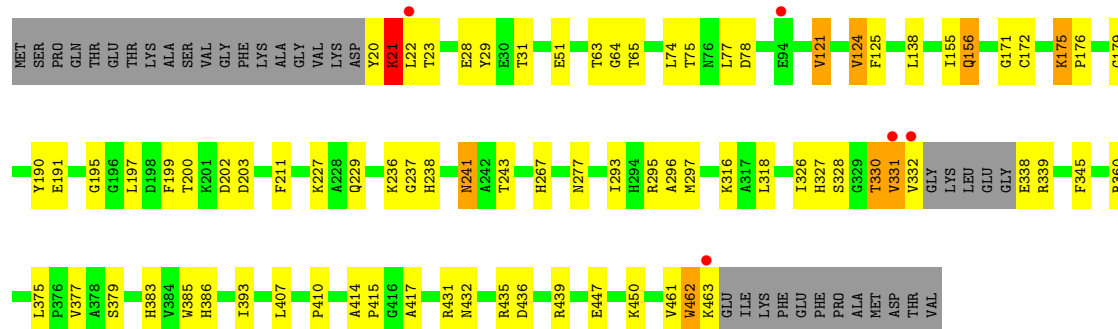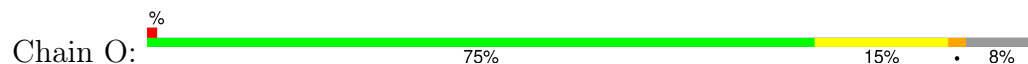Y190 E191 G195 G196 L197 D198 F199 T200 K201 D202 D203 F211 K227 A228 Q229 K236 G237 H238 N241 A242 T243 M251 H267 N277 I293 H294 R295 A296 M297 K316 A317 L318 I326 H327 S328 G329 T330 V331 V332 GLY LYS LEU GLU GLY E338 R339 F345

R360 L375 P376 V377 A378 S379 I382 H383 V384 W385 H386 I393 L407 P410 A414 P415 G416 A417 R431 N432 R435 D436 R439 E447 K450 V461 W462 K463 GLU ILE LYS PHE GLU PHE PRO ALA MET ASP THR VAL

● Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE

Chain O:

Chain O: 75% 15% · 8%

MET SER PRO GLN THR GLU THR LYS ALA SER VAL GLY PHE LYS ALA GLY VAL LYS ASP Y20 K21 L22 T23 E28 Y29 E30 T31 E51 T63 G64 T65 L74 T75 N76 L77 D78 E94 V121 V124 F125 L138 I155 Q156 G171 C172 K175 P176 G179

Y190 E191 G195 G196 L197 D198 F199 T200 K201 D202 D203 F211 K227 A228 Q229 K236 G237 H238 N241 A242 T243 H267 N277 I293 H294 R295 A296 M297 K316 A317 L318 I326 H327 S328 G329 T330 V331 V332 GLY LYS LEU GLU GLY E338 R339 F345 R360

L375 P376 V377 A378 S379 H383 V384 W385 H386 I393 L407 P410 A414 P415 G416 A417 R431 N432 R435 D436 R439 E447 K450 V461 W462 K463 GLU ILE LYS PHE GLU PHE PRO ALA MET ASP THR VAL

● Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE

Chain S:

Chain S: 3% 75% 20% 5%

M1 P5 I6 L7 N8 L9 K10 T22 T23 D24 Q25 L26 A27 R28 D31 K37 W38 V39 F44 D47 H48 T68 M69 W70 D79 P80 A81 E88 E89 K92 N96 A97 F98 G103 R108 E109 I116 A121 G122 Y123

● Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE

Chain T:

Chain T: 2% 76% 21% ·

M1 Q2 P5 I6 L7 N8 L9 T22 T23 D24 Q25 L26 A27 R28 D31 K37 W38 V39 P40 F44 D47 H48 T68 M69 W70 D79 P80 A81 E88 E89 K92 N96 A97 F98 G103 R108 E109 A121 G122 Y123

● Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE

Chain U:

Chain U: 2% 75% 22% ·

M1 P5 I6 L7 N8 L9 T22 T23 D24 Q25 L26 A27 R28 D31 V39 F44 D47 H48 H56 N57 S58 T68 M69 W70 D79 P80 A81 E88 E89 K92 N96 A97 F98 G103 R108 E109 A121 G122 Y123

● Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE/OXYGENASE

Chain V:

Chain V: 3% 76% 21% ·

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	157.40Å 158.70Å 203.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	7.00 – 2.20 7.00 – 2.20	Depositor EDS
% Data completeness (in resolution range)	94.8 (7.00-2.20) 93.0 (7.00-2.20)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.68 (at 2.09Å)	Xtriage
Refinement program	X-PLOR	Depositor
R, R_{free}	0.217 , 0.239 0.220 , 0.225	Depositor DCC
R_{free} test set	6039 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	17.7	Xtriage
Anisotropy	0.102	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.46 , 57.1	EDS
L-test for twinning[2]	$< |L| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.016 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	18149	wwPDB-VP
Average B, all atoms (Å^2)	15.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 48.57 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 8.4383e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: FMT, 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	L	0.67	0/3525	0.81	2/4785 (0.0%)
1	M	0.67	0/3525	0.81	2/4785 (0.0%)
1	N	0.67	0/3525	0.81	2/4785 (0.0%)
1	O	0.67	0/3525	0.81	2/4785 (0.0%)
2	S	0.74	0/1068	0.81	0/1453
2	T	0.74	0/1068	0.81	0/1453
2	U	0.74	0/1068	0.81	0/1453
2	V	0.74	0/1068	0.81	0/1453
All	All	0.69	0/18372	0.81	8/24952 (0.0%)

There are no bond length outliers.

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	O	462	TRP	N-CA-C	6.94	129.73	111.00
1	L	462	TRP	N-CA-C	6.94	129.73	111.00
1	M	462	TRP	N-CA-C	6.94	129.73	111.00
1	N	462	TRP	N-CA-C	6.93	129.72	111.00
1	N	124	VAL	CB-CA-C	-5.86	100.27	111.40

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.

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	L	3440	0	3353	65	2
1	M	3440	0	3353	58	3
1	N	3440	0	3353	63	2
1	O	3440	0	3353	63	2
2	S	1033	0	990	28	2
2	T	1033	0	990	25	2
2	U	1033	0	990	26	2
2	V	1033	0	990	26	2
3	L	1	0	0	0	0
3	M	1	0	0	0	0
3	N	1	0	0	0	0
3	O	1	0	0	0	0
4	L	3	0	0	1	0
4	M	3	0	0	1	0
4	N	3	0	0	1	0
4	O	3	0	0	1	0
5	L	187	0	0	5	0
5	M	4	0	0	0	0
5	O	3	0	0	0	0
5	S	39	0	0	1	0
5	T	1	0	0	0	0
5	V	7	0	0	0	0
All	All	18149	0	17372	313	9

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 9.

The worst 5 of 313 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:L:179:GLY:O	2:V:109:GLU:HG2	1.76	0.85
1:N:267:HIS:HD2	1:N:277:ASN:HD22	1.25	0.85
1:O:267:HIS:HD2	1:O:277:ASN:HD22	1.25	0.84
1:M:267:HIS:HD2	1:M:277:ASN:HD22	1.25	0.83
1:L:267:HIS:HD2	1:L:277:ASN:HD22	1.25	0.82

The worst 5 of 9 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)
1:L:74:LEU:O	2:T:109:GLU:OE1[3_555]	1.37	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:S:109:GLU:OE1	1:M:74:LEU:O[3_555]	1.37	0.83
1:N:74:LEU:O	2:V:109:GLU:OE1[3_555]	1.40	0.80
2:U:109:GLU:OE1	1:O:74:LEU:O[3_555]	1.40	0.80
2:S:109:GLU:OE1	1:M:74:LEU:C[3_555]	1.86	0.34

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	L	435/475 (92%)	416 (96%)	15 (3%)	4 (1%)	14	14
1	M	435/475 (92%)	416 (96%)	15 (3%)	4 (1%)	14	14
1	N	435/475 (92%)	416 (96%)	15 (3%)	4 (1%)	14	14
1	O	435/475 (92%)	416 (96%)	15 (3%)	4 (1%)	14	14
2	S	121/123 (98%)	112 (93%)	7 (6%)	2 (2%)	7	5
2	T	121/123 (98%)	112 (93%)	7 (6%)	2 (2%)	7	5
2	U	121/123 (98%)	112 (93%)	7 (6%)	2 (2%)	7	5
2	V	121/123 (98%)	112 (93%)	7 (6%)	2 (2%)	7	5
All	All	2224/2392 (93%)	2112 (95%)	88 (4%)	24 (1%)	12	10

5 of 24 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	L	63	THR
1	L	331	VAL
2	S	47	ASP
1	M	63	THR
1	M	331	VAL

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	L	357/386 (92%)	340 (95%)	17 (5%)	21	28
1	M	357/386 (92%)	340 (95%)	17 (5%)	21	28
1	N	357/386 (92%)	341 (96%)	16 (4%)	23	30
1	O	357/386 (92%)	340 (95%)	17 (5%)	21	28
2	S	112/112 (100%)	105 (94%)	7 (6%)	15	17
2	T	112/112 (100%)	105 (94%)	7 (6%)	15	17
2	U	112/112 (100%)	105 (94%)	7 (6%)	15	17
2	V	112/112 (100%)	105 (94%)	7 (6%)	15	17
All	All	1876/1992 (94%)	1781 (95%)	95 (5%)	20	25

5 of 95 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	N	172	CYS
1	O	21	LYS
1	N	241	ASN
2	U	26	LEU
1	O	77	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 65 such sidechains are listed below:

Mol	Chain	Res	Type
1	O	267	HIS
1	O	304	GLN
1	M	241	ASN
1	M	238	HIS
1	O	386	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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	#$|Z| > 2$
4	FMT	M	477	1,3	2,2,2	0.94	0	1,1,1	0.88	0
4	FMT	L	477	1,3	2,2,2	0.95	0	1,1,1	0.89	0
4	FMT	N	477	1,3	2,2,2	0.95	0	1,1,1	0.89	0
4	FMT	O	477	1,3	2,2,2	0.96	0	1,1,1	0.88	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	M	477	FMT	1	0
4	L	477	FMT	1	0
4	N	477	FMT	1	0
4	O	477	FMT	1	0

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(Å²)	Q<0.9
1	L	439/475 (92%)	-0.47	6 (1%)	73	70	4, 11, 30, 39	0
1	M	439/475 (92%)	-0.36	6 (1%)	73	70	4, 11, 30, 39	0
1	N	439/475 (92%)	-0.43	6 (1%)	73	70	4, 11, 30, 39	0
1	O	439/475 (92%)	-0.42	5 (1%)	77	75	4, 11, 30, 39	0
2	S	123/123 (100%)	-0.05	4 (3%)	49	46	6, 20, 32, 38	0
2	T	123/123 (100%)	0.07	3 (2%)	59	56	6, 20, 32, 38	0
2	U	123/123 (100%)	-0.05	2 (1%)	70	67	6, 20, 32, 38	0
2	V	123/123 (100%)	-0.09	4 (3%)	49	46	6, 20, 32, 38	0
All	All	2248/2392 (93%)	-0.34	36 (1%)	70	67	4, 14, 31, 39	0

The worst 5 of 36 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	U	121	ALA	4.6
1	M	22	LEU	4.4
1	N	22	LEU	4.4
1	L	332	VAL	4.2
1	N	332	VAL	3.8

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.

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6.4   Ligands ⓘ

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
3	MG	M	476	1/1	0.64	0.08	17,17,17,17	0
3	MG	L	476	1/1	0.72	0.07	17,17,17,17	0
3	MG	O	476	1/1	0.81	0.05	17,17,17,17	0
3	MG	N	476	1/1	0.84	0.06	17,17,17,17	0
4	FMT	L	477	3/3	0.90	0.07	15,15,15,16	0
4	FMT	M	477	3/3	0.90	0.10	15,15,15,16	0
4	FMT	N	477	3/3	0.95	0.08	15,15,15,16	0
4	FMT	O	477	3/3	0.97	0.05	15,15,15,16	0

6.5   Other polymers ⓘ

There are no such residues in this entry.