



# wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 11, 2021 – 08:10 AM EDT

PDB ID : 3BMA  
Title : Crystal structure of D-alanyl-lipoteichoic acid synthetase from *Streptococcus pneumoniae* R6  
Authors : Patskovsky, Y.; Sridhar, V.; Bonanno, J.B.; Smith, D.; Rutter, M.; Iizuka, M.; Koss, J.; Bain, K.; Gheyi, T.; Wasserman, S.R.; Sauder, J.M.; Burley, S.K.; Almo, S.C.; New York SGX Research Center for Structural Genomics (NYSGXRC)  
Deposited on : 2007-12-12  
Resolution : 2.24 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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 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 : 2.23.2  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.23.2

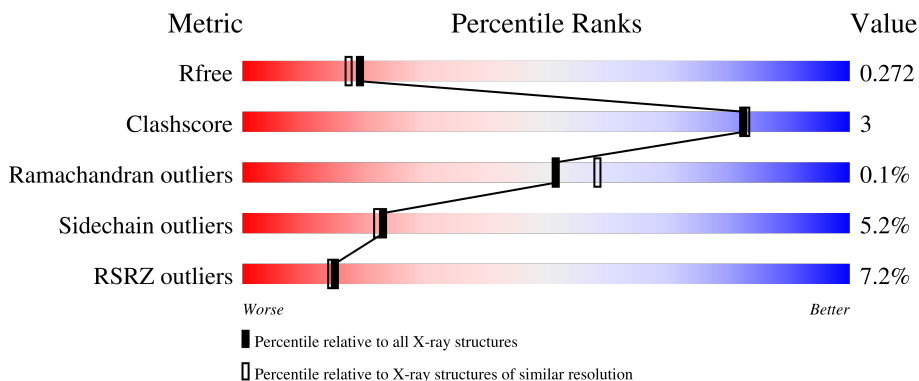
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.24 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	2391 (2.26-2.22)
Clashscore	141614	2539 (2.26-2.22)
Ramachandran outliers	138981	2489 (2.26-2.22)
Sidechain outliers	138945	2490 (2.26-2.22)
RSRZ outliers	127900	2353 (2.26-2.22)

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  $\geq 3$ , 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	407	 5% 86% 10% .
1	B	407	 4% 86% 9% ..
1	C	407	 6% 87% 10% .
1	D	407	 % 88% 8% .
1	E	407	 5% 85% 11% .

Continued on next page...

*Continued from previous page...*

Mol	Chain	Length	Quality of chain
1	F	407	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a red segment on the left labeled '21%', a large green segment labeled '85%', a yellow segment labeled '9%', and a small grey segment on the far right labeled '5%'.</p>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 20324 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 D-alanyl-lipoteichoic acid synthetase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	392	3237	2080	543	604	10	0	6	0
1	B	393	3255	2092	549	604	10	0	6	0
1	C	394	3293	2118	552	613	10	0	13	0
1	D	389	3233	2082	540	600	11	0	9	0
1	E	390	3208	2058	541	599	10	0	3	0
1	F	387	3173	2037	533	593	10	0	2	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	29	MET	-	expression tag	UNP Q8DN13
A	30	SER	-	expression tag	UNP Q8DN13
A	31	LEU	-	expression tag	UNP Q8DN13
A	217	ARG	CYS	engineered mutation	UNP Q8DN13
A	428	GLU	-	expression tag	UNP Q8DN13
A	429	GLY	-	expression tag	UNP Q8DN13
A	430	HIS	-	expression tag	UNP Q8DN13
A	431	HIS	-	expression tag	UNP Q8DN13
A	432	HIS	-	expression tag	UNP Q8DN13
A	433	HIS	-	expression tag	UNP Q8DN13
A	434	HIS	-	expression tag	UNP Q8DN13
A	435	HIS	-	expression tag	UNP Q8DN13
B	29	MET	-	expression tag	UNP Q8DN13
B	30	SER	-	expression tag	UNP Q8DN13
B	31	LEU	-	expression tag	UNP Q8DN13
B	217	ARG	CYS	engineered mutation	UNP Q8DN13
B	428	GLU	-	expression tag	UNP Q8DN13

*Continued on next page...*

*Continued from previous page...*

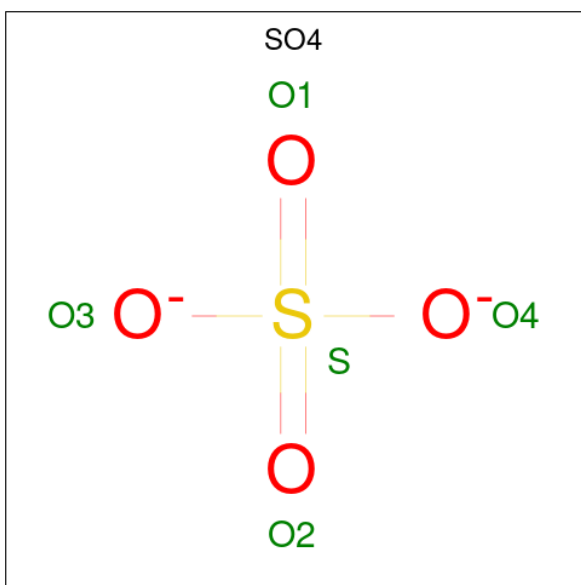
Chain	Residue	Modelled	Actual	Comment	Reference
B	429	GLY	-	expression tag	UNP Q8DN13
B	430	HIS	-	expression tag	UNP Q8DN13
B	431	HIS	-	expression tag	UNP Q8DN13
B	432	HIS	-	expression tag	UNP Q8DN13
B	433	HIS	-	expression tag	UNP Q8DN13
B	434	HIS	-	expression tag	UNP Q8DN13
B	435	HIS	-	expression tag	UNP Q8DN13
C	29	MET	-	expression tag	UNP Q8DN13
C	30	SER	-	expression tag	UNP Q8DN13
C	31	LEU	-	expression tag	UNP Q8DN13
C	217	ARG	CYS	engineered mutation	UNP Q8DN13
C	428	GLU	-	expression tag	UNP Q8DN13
C	429	GLY	-	expression tag	UNP Q8DN13
C	430	HIS	-	expression tag	UNP Q8DN13
C	431	HIS	-	expression tag	UNP Q8DN13
C	432	HIS	-	expression tag	UNP Q8DN13
C	433	HIS	-	expression tag	UNP Q8DN13
C	434	HIS	-	expression tag	UNP Q8DN13
C	435	HIS	-	expression tag	UNP Q8DN13
D	29	MET	-	expression tag	UNP Q8DN13
D	30	SER	-	expression tag	UNP Q8DN13
D	31	LEU	-	expression tag	UNP Q8DN13
D	217	ARG	CYS	engineered mutation	UNP Q8DN13
D	428	GLU	-	expression tag	UNP Q8DN13
D	429	GLY	-	expression tag	UNP Q8DN13
D	430	HIS	-	expression tag	UNP Q8DN13
D	431	HIS	-	expression tag	UNP Q8DN13
D	432	HIS	-	expression tag	UNP Q8DN13
D	433	HIS	-	expression tag	UNP Q8DN13
D	434	HIS	-	expression tag	UNP Q8DN13
D	435	HIS	-	expression tag	UNP Q8DN13
E	29	MET	-	expression tag	UNP Q8DN13
E	30	SER	-	expression tag	UNP Q8DN13
E	31	LEU	-	expression tag	UNP Q8DN13
E	217	ARG	CYS	engineered mutation	UNP Q8DN13
E	428	GLU	-	expression tag	UNP Q8DN13
E	429	GLY	-	expression tag	UNP Q8DN13
E	430	HIS	-	expression tag	UNP Q8DN13
E	431	HIS	-	expression tag	UNP Q8DN13
E	432	HIS	-	expression tag	UNP Q8DN13
E	433	HIS	-	expression tag	UNP Q8DN13
E	434	HIS	-	expression tag	UNP Q8DN13

*Continued on next page...*

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
E	435	HIS	-	expression tag	UNP Q8DN13
F	29	MET	-	expression tag	UNP Q8DN13
F	30	SER	-	expression tag	UNP Q8DN13
F	31	LEU	-	expression tag	UNP Q8DN13
F	217	ARG	CYS	engineered mutation	UNP Q8DN13
F	428	GLU	-	expression tag	UNP Q8DN13
F	429	GLY	-	expression tag	UNP Q8DN13
F	430	HIS	-	expression tag	UNP Q8DN13
F	431	HIS	-	expression tag	UNP Q8DN13
F	432	HIS	-	expression tag	UNP Q8DN13
F	433	HIS	-	expression tag	UNP Q8DN13
F	434	HIS	-	expression tag	UNP Q8DN13
F	435	HIS	-	expression tag	UNP Q8DN13

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



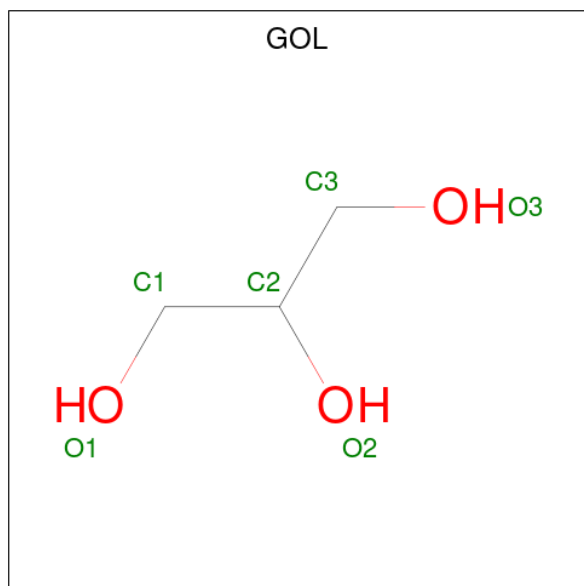
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	E	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		

Continued on next page...

*Continued from previous page...*

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 6	C 3	O 3	0	0
3	A	1	Total 6	C 3	O 3	0	0
3	A	1	Total 6	C 3	O 3	0	0
3	C	1	Total 6	C 3	O 3	0	0
3	C	1	Total 6	C 3	O 3	0	0
3	C	1	Total 6	C 3	O 3	0	0
3	C	1	Total 6	C 3	O 3	0	0
3	E	1	Total 6	C 3	O 3	0	0

- Molecule 4 is water.

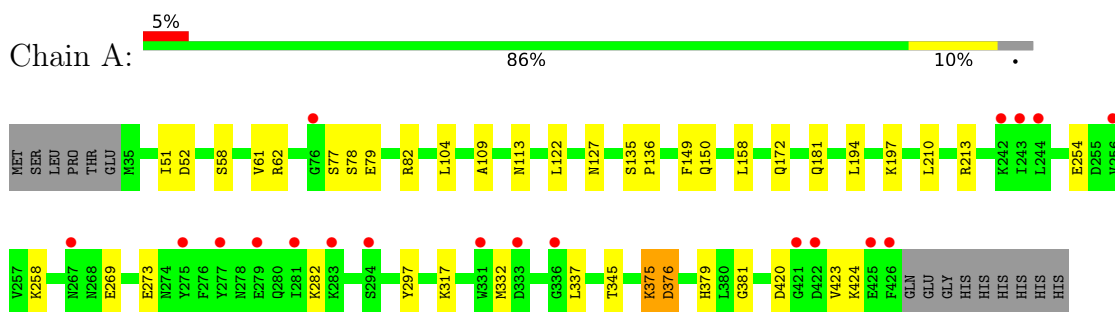
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	159	Total 159	O 159	0	0
4	B	176	Total 176	O 176	0	0
4	C	141	Total 141	O 141	0	0
4	D	175	Total 175	O 175	0	0
4	E	102	Total 102	O 102	0	0
4	F	42	Total 42	O 42	0	0



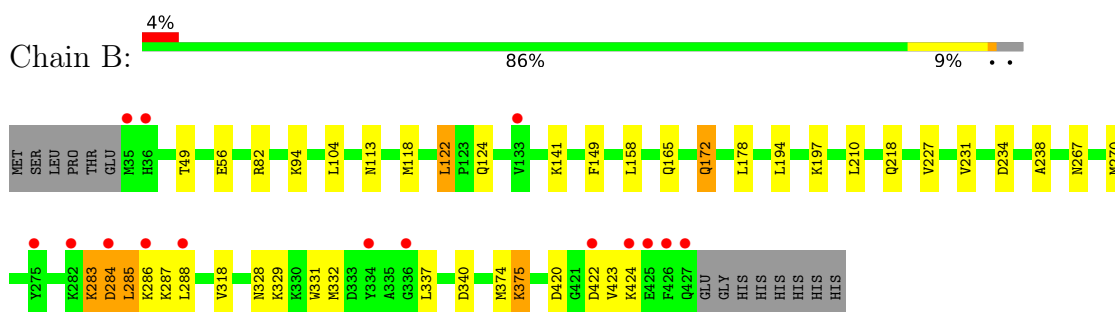
### 3 Residue-property plots [i](#)

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.

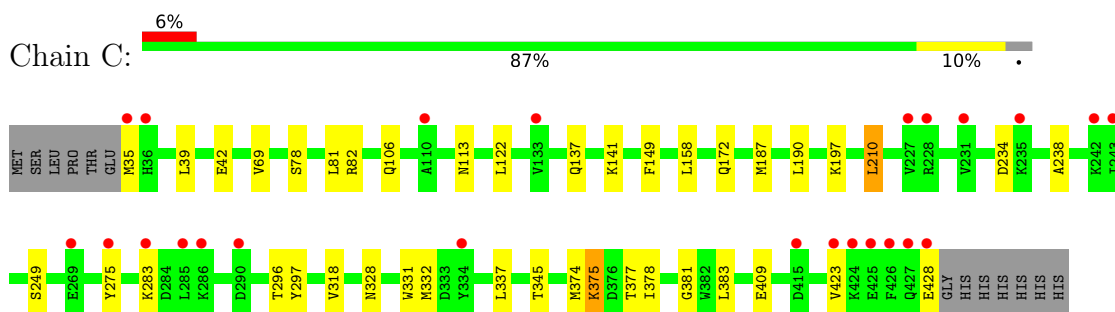
- Molecule 1: D-alanyl-lipoteichoic acid synthetase



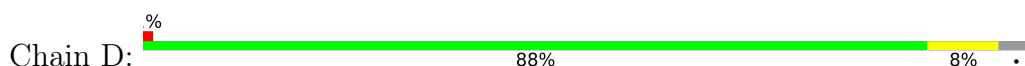
- Molecule 1: D-alanyl-lipoteichoic acid synthetase

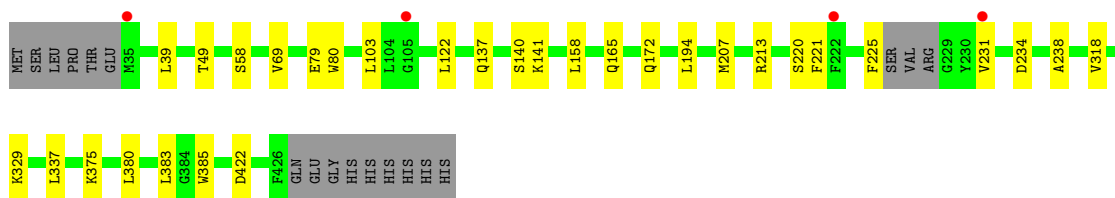


- Molecule 1: D-alanyl-lipoteichoic acid synthetase

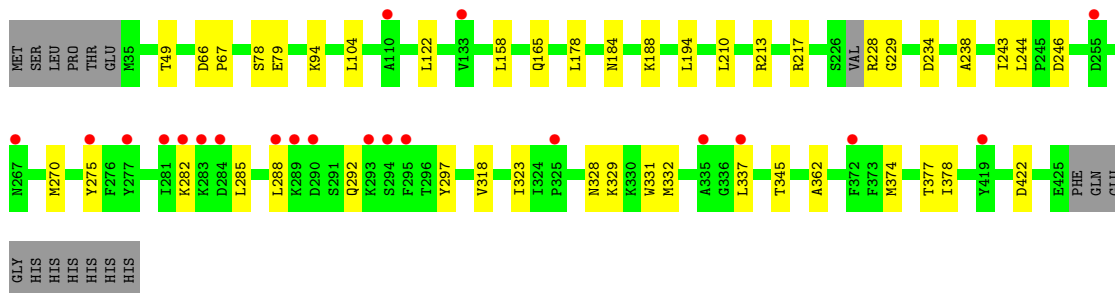
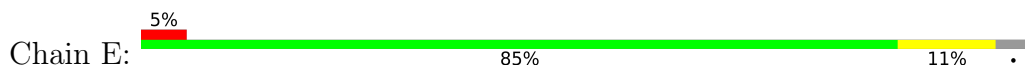


- Molecule 1: D-alanyl-lipoteichoic acid synthetase

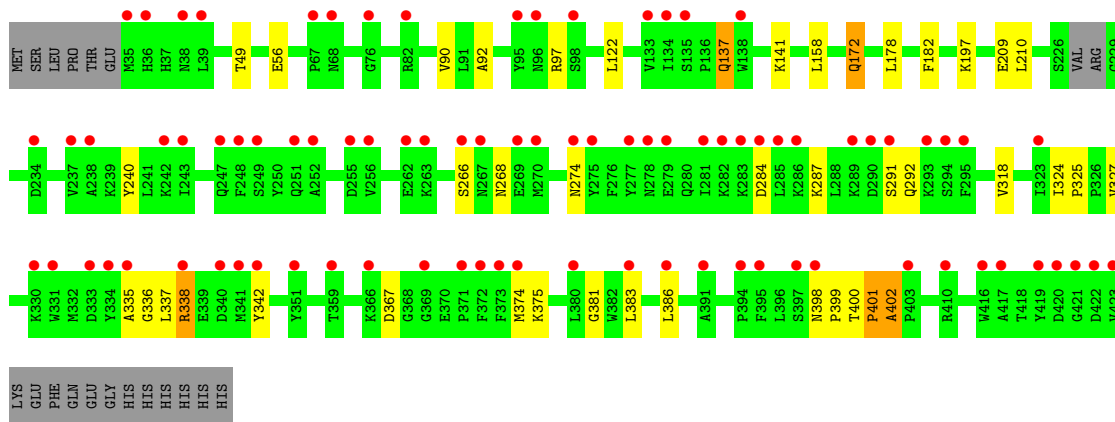
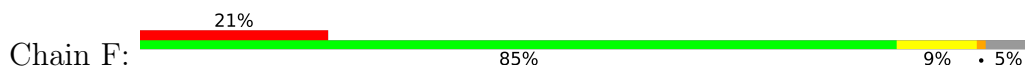




• Molecule 1: D-alanyl-lipoteichoic acid synthetase



• Molecule 1: D-alanyl-lipoteichoic acid synthetase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	92.96Å 148.06Å 208.15Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.24 34.24 – 2.24	Depositor EDS
% Data completeness (in resolution range)	99.3 (20.00-2.24) 99.3 (34.24-2.24)	Depositor EDS
$R_{merge}$	0.20	Depositor
$R_{sym}$	0.13	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.62 (at 2.24Å)	Xtrriage
Refinement program	REFMAC 5.3.0034	Depositor
R, $R_{free}$	0.214 , 0.271 0.215 , 0.272	Depositor DCC
$R_{free}$ test set	4146 reflections (3.02%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	34.6	Xtrriage
Anisotropy	0.222	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 51.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	20324	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	49.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.02% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: GOL, 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	0.37	0/3341	0.55	0/4511
1	B	0.38	0/3362	0.55	0/4537
1	C	0.36	0/3418	0.53	0/4612
1	D	0.37	0/3345	0.56	0/4512
1	E	0.36	0/3301	0.55	1/4456 (0.0%)
1	F	0.37	0/3263	0.51	0/4407
All	All	0.37	0/20030	0.54	1/27035 (0.0%)

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	F	0	4

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	210	LEU	CA-CB-CG	5.22	127.30	115.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	F	335	ALA	Peptide
1	F	336	GLY	Peptide
1	F	400	THR	Peptide

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Group
1	F	401	PRO	Peptide

## 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	3237	0	3145	17	0
1	B	3255	0	3175	23	0
1	C	3293	0	3226	20	0
1	D	3233	0	3154	7	0
1	E	3208	0	3107	16	0
1	F	3173	0	3067	18	0
2	A	15	0	0	0	0
2	B	25	0	0	1	0
2	D	20	0	0	0	0
2	E	5	0	0	0	0
2	F	5	0	0	1	0
3	A	30	0	40	2	0
3	C	24	0	32	2	0
3	E	6	0	8	1	0
4	A	159	0	0	0	0
4	B	176	0	0	1	0
4	C	141	0	0	3	0
4	D	175	0	0	0	0
4	E	102	0	0	1	0
4	F	42	0	0	1	0
All	All	20324	0	18954	97	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 3.

The worst 5 of 97 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:284:ASP:OD2	1:B:287:LYS:HE3	1.68	0.93
1:B:285:LEU:HD12	1:B:285:LEU:N	2.03	0.74

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:137[A]:GLN:NE2	2:F:14:SO4:O1	2.21	0.73
1:F:337:LEU:O	1:F:338:ARG:HB2	1.96	0.66
1:D:221:PHE:HZ	1:F:182:PHE:HB3	1.63	0.63

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	396/407 (97%)	381 (96%)	15 (4%)	0	100	100
1	B	398/407 (98%)	385 (97%)	12 (3%)	1 (0%)	41	44
1	C	405/407 (100%)	393 (97%)	12 (3%)	0	100	100
1	D	393/407 (97%)	380 (97%)	13 (3%)	0	100	100
1	E	389/407 (96%)	371 (95%)	18 (5%)	0	100	100
1	F	385/407 (95%)	362 (94%)	21 (6%)	2 (0%)	29	28
All	All	2366/2442 (97%)	2272 (96%)	91 (4%)	3 (0%)	51	58

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	F	402	ALA
1	B	284	ASP
1	F	338	ARG

### 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	349/357 (98%)	333 (95%)	16 (5%)	27	28
1	B	351/357 (98%)	328 (93%)	23 (7%)	16	14
1	C	358/357 (100%)	338 (94%)	20 (6%)	21	19
1	D	349/357 (98%)	328 (94%)	21 (6%)	19	17
1	E	344/357 (96%)	327 (95%)	17 (5%)	25	25
1	F	340/357 (95%)	324 (95%)	16 (5%)	26	27
All	All	2091/2142 (98%)	1978 (95%)	113 (5%)	23	20

5 of 113 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	423	VAL
1	F	327	VAL
1	D	231	VAL
1	F	318	VAL
1	F	137[A]	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 40 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	150	GLN
1	F	124	GLN
1	E	192	GLN
1	E	408	ASN
1	F	274	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

24 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	15	-	4,4,4	0.14	0	6,6,6	0.11	0
2	SO4	B	2	-	4,4,4	0.14	0	6,6,6	0.10	0
2	SO4	E	13	-	4,4,4	0.13	0	6,6,6	0.07	0
3	GOL	C	1	-	5,5,5	0.33	0	5,5,5	0.24	0
2	SO4	D	11	-	4,4,4	0.13	0	6,6,6	0.10	0
3	GOL	E	1	-	5,5,5	0.39	0	5,5,5	0.34	0
3	GOL	A	437	-	5,5,5	0.34	0	5,5,5	0.43	0
2	SO4	F	14	-	4,4,4	0.14	0	6,6,6	0.10	0
2	SO4	B	5	-	4,4,4	0.16	0	6,6,6	0.07	0
3	GOL	C	436	-	5,5,5	0.37	0	5,5,5	0.29	0
3	GOL	A	438	-	5,5,5	0.38	0	5,5,5	0.21	0
2	SO4	B	6	-	4,4,4	0.13	0	6,6,6	0.09	0
2	SO4	B	4	-	4,4,4	0.16	0	6,6,6	0.12	0
2	SO4	A	3	-	4,4,4	0.14	0	6,6,6	0.07	0
3	GOL	A	439	-	5,5,5	0.36	0	5,5,5	0.21	0
2	SO4	A	1	-	4,4,4	0.15	0	6,6,6	0.06	0
2	SO4	D	8	-	4,4,4	0.13	0	6,6,6	0.13	0
2	SO4	D	7	-	4,4,4	0.15	0	6,6,6	0.09	0
2	SO4	B	10	-	4,4,4	0.15	0	6,6,6	0.08	0
3	GOL	C	438	-	5,5,5	0.36	0	5,5,5	0.28	0
3	GOL	A	440	-	5,5,5	0.38	0	5,5,5	0.23	0
2	SO4	D	9	-	4,4,4	0.14	0	6,6,6	0.08	0
3	GOL	C	437	-	5,5,5	0.45	0	5,5,5	0.33	0
3	GOL	A	436	-	5,5,5	0.39	0	5,5,5	0.30	0

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	GOL	A	440	-	-	2/4/4/4	-
3	GOL	C	436	-	-	2/4/4/4	-
3	GOL	A	438	-	-	3/4/4/4	-
3	GOL	A	439	-	-	2/4/4/4	-
3	GOL	C	438	-	-	2/4/4/4	-
3	GOL	C	1	-	-	4/4/4/4	-
3	GOL	E	1	-	-	2/4/4/4	-
3	GOL	A	437	-	-	4/4/4/4	-
3	GOL	C	437	-	-	4/4/4/4	-
3	GOL	A	436	-	-	4/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 29 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	436	GOL	O1-C1-C2-C3
3	A	436	GOL	C1-C2-C3-O3
3	A	437	GOL	O1-C1-C2-O2
3	A	437	GOL	O1-C1-C2-C3
3	A	437	GOL	C1-C2-C3-O3

There are no ring outliers.

7 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1	GOL	1	0
3	E	1	GOL	1	0
2	F	14	SO4	1	0
3	A	438	GOL	1	0
2	B	4	SO4	1	0
3	C	437	GOL	1	0
3	A	436	GOL	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	392/407 (96%)	0.08	19 (4%) 30 30	15, 38, 80, 110	0
1	B	393/407 (96%)	-0.00	15 (3%) 40 40	13, 39, 79, 108	0
1	C	394/407 (96%)	0.14	24 (6%) 21 20	19, 43, 83, 122	0
1	D	389/407 (95%)	-0.21	4 (1%) 82 83	17, 34, 63, 103	0
1	E	390/407 (95%)	0.16	21 (5%) 25 25	18, 46, 95, 111	0
1	F	387/407 (95%)	1.03	85 (21%) 0 0	22, 73, 114, 126	0
All	All	2345/2442 (96%)	0.20	168 (7%) 15 14	13, 43, 96, 126	0

The worst 5 of 168 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	421	GLY	8.2
1	F	372	PHE	8.0
1	F	36	HIS	7.3
1	F	35	MET	7.2
1	E	283	LYS	6.4

### 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 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
3	GOL	C	1	6/6	0.67	0.32	69,72,77,77	0
3	GOL	C	436	6/6	0.73	0.40	49,65,72,74	0
3	GOL	C	438	6/6	0.76	0.32	81,85,88,89	0
2	SO4	A	1	5/5	0.81	0.23	44,46,54,56	5
3	GOL	E	1	6/6	0.82	0.24	51,67,73,79	0
3	GOL	A	439	6/6	0.87	0.25	68,70,72,74	0
3	GOL	C	437	6/6	0.88	0.29	51,55,60,63	0
2	SO4	D	8	5/5	0.88	0.28	26,39,41,50	5
3	GOL	A	440	6/6	0.88	0.22	72,79,82,83	0
3	GOL	A	437	6/6	0.90	0.17	28,51,60,66	0
2	SO4	B	10	5/5	0.91	0.16	46,47,50,56	5
3	GOL	A	436	6/6	0.92	0.15	37,42,56,62	0
2	SO4	A	15	5/5	0.92	0.19	39,39,49,49	5
2	SO4	D	11	5/5	0.92	0.12	35,40,46,48	5
2	SO4	D	9	5/5	0.93	0.15	21,25,35,40	5
2	SO4	E	13	5/5	0.93	0.14	103,106,108,108	0
2	SO4	F	14	5/5	0.93	0.36	59,60,62,62	5
2	SO4	B	4	5/5	0.94	0.16	34,38,41,43	5
2	SO4	B	5	5/5	0.95	0.28	26,30,38,40	5
2	SO4	B	6	5/5	0.96	0.14	34,41,49,50	5
3	GOL	A	438	6/6	0.96	0.13	27,43,49,61	0
2	SO4	A	3	5/5	0.96	0.33	40,47,52,54	5
2	SO4	D	7	5/5	0.97	0.34	38,40,45,50	5
2	SO4	B	2	5/5	0.97	0.10	72,77,79,82	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.