



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 12, 2023 – 03:52 pm GMT

PDB ID : 4AIQ  
Title : The FrpB iron transporter from *Neisseria meningitidis* (F5-1 variant)  
Authors : Saleem, M.; Prince, S.M.; Derrick, J.P.  
Deposited on : 2012-02-11  
Resolution : 2.60 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](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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.4, CSD as541be (2020)  
Xtrriage (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

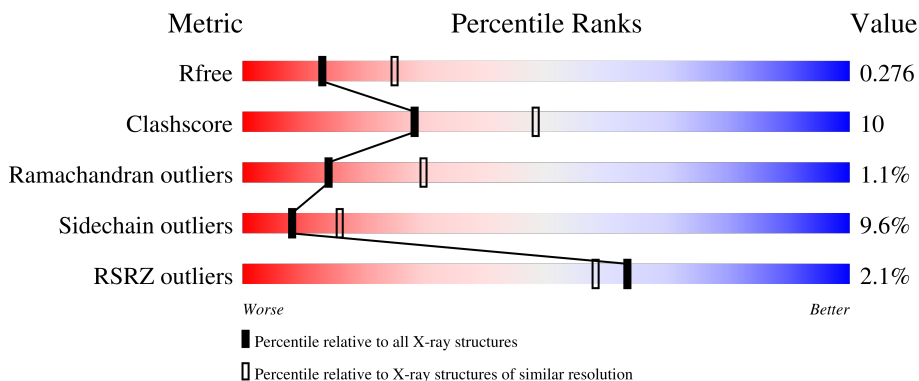
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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	745	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5218 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 FERRIC ENTEROBACTIN RECEPTOR.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	660	5168	3235	938	990	5	0	0	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	expression tag	UNP F0N0E1
A	2	HIS	-	expression tag	UNP F0N0E1
A	3	HIS	-	expression tag	UNP F0N0E1
A	4	HIS	-	expression tag	UNP F0N0E1
A	5	HIS	-	expression tag	UNP F0N0E1
A	6	HIS	-	expression tag	UNP F0N0E1
A	7	HIS	-	expression tag	UNP F0N0E1
A	8	SER	-	expression tag	UNP F0N0E1
A	9	SER	-	expression tag	UNP F0N0E1
A	10	GLY	-	expression tag	UNP F0N0E1
A	11	LEU	-	expression tag	UNP F0N0E1
A	12	VAL	-	expression tag	UNP F0N0E1
A	13	PRO	-	expression tag	UNP F0N0E1
A	14	ARG	-	expression tag	UNP F0N0E1
A	15	GLY	-	expression tag	UNP F0N0E1
A	16	SER	-	expression tag	UNP F0N0E1
A	17	GLY	-	expression tag	UNP F0N0E1
A	18	MET	-	expression tag	UNP F0N0E1
A	19	LYS	-	expression tag	UNP F0N0E1
A	20	GLU	-	expression tag	UNP F0N0E1
A	21	THR	-	expression tag	UNP F0N0E1
A	22	ALA	-	expression tag	UNP F0N0E1
A	23	ALA	-	expression tag	UNP F0N0E1
A	24	ALA	-	expression tag	UNP F0N0E1
A	25	LYS	-	expression tag	UNP F0N0E1
A	26	PHE	-	expression tag	UNP F0N0E1
A	27	GLU	-	expression tag	UNP F0N0E1

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Chain	Residue	Modelled	Actual	Comment	Reference
A	28	ARG	-	expression tag	UNP F0N0E1
A	29	GLN	-	expression tag	UNP F0N0E1
A	30	HIS	-	expression tag	UNP F0N0E1
A	31	MET	-	expression tag	UNP F0N0E1
A	32	ASP	-	expression tag	UNP F0N0E1
A	33	SER	-	expression tag	UNP F0N0E1
A	34	PRO	-	expression tag	UNP F0N0E1
A	35	ASP	-	expression tag	UNP F0N0E1
A	36	LEU	-	expression tag	UNP F0N0E1
A	37	GLY	-	expression tag	UNP F0N0E1
A	38	THR	-	expression tag	UNP F0N0E1
A	39	ASP	-	expression tag	UNP F0N0E1
A	40	ASP	-	expression tag	UNP F0N0E1
A	41	ASP	-	expression tag	UNP F0N0E1
A	42	ASP	-	expression tag	UNP F0N0E1
A	43	LYS	-	expression tag	UNP F0N0E1
A	44	MET	-	expression tag	UNP F0N0E1
A	272	GLU	LYS	variant	UNP F0N0E1
A	302	PRO	SER	variant	UNP F0N0E1
A	455	LEU	ILE	variant	UNP F0N0E1
A	638	ALA	THR	variant	UNP F0N0E1

- Molecule 2 is FE (III) ION (three-letter code: FE) (formula: Fe).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Fe 1 1	0	0

- Molecule 3 is IMIDAZOLE (three-letter code: IMD) (formula: C<sub>3</sub>H<sub>5</sub>N<sub>2</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N 5 3 2	0	0

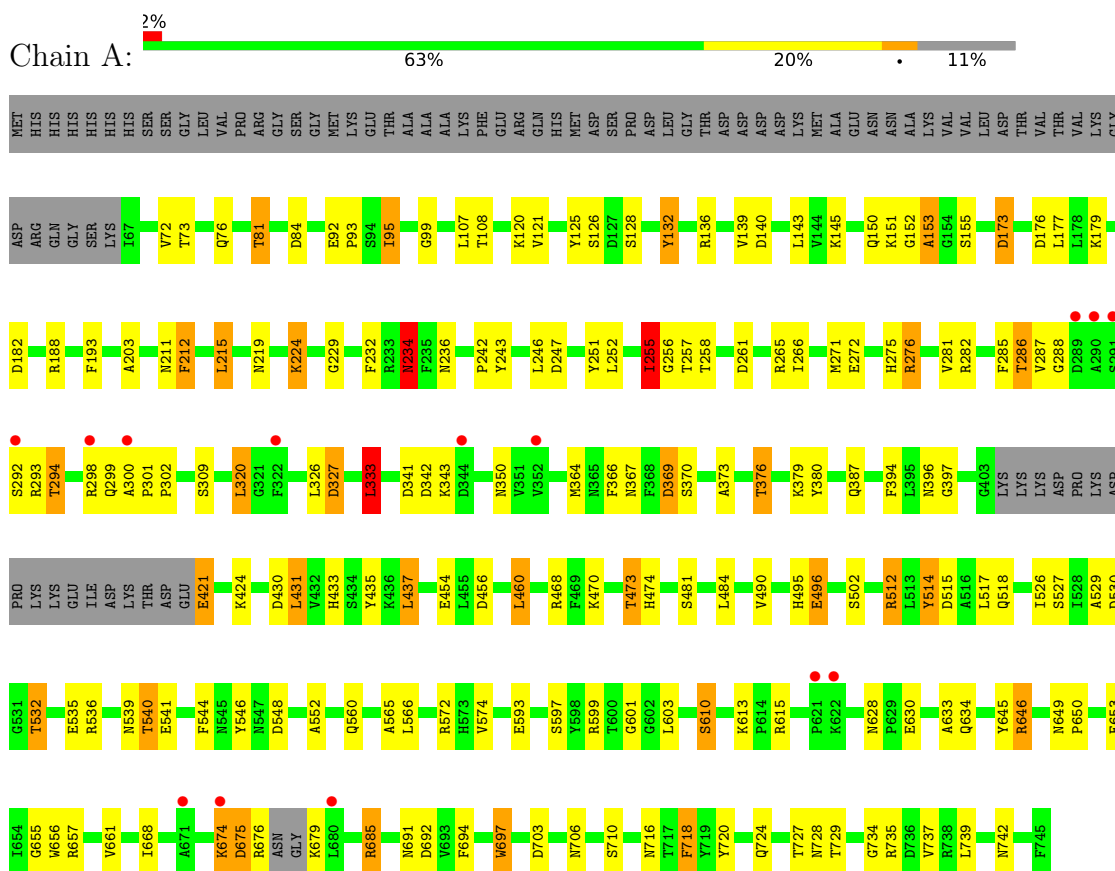
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	44	Total O 44 44	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: FERRIC ENTEROBACTIN RECEPTOR



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	175.98Å 78.69Å 73.43Å 90.00° 97.22° 90.00°	Depositor
Resolution (Å)	36.42 – 2.60 36.42 – 2.60	Depositor EDS
% Data completeness (in resolution range)	97.2 (36.42-2.60) 97.2 (36.42-2.60)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.16 (at 2.61Å)	Xtrriage
Refinement program	REFMAC 5.5.0109	Depositor
R, $R_{free}$	0.227 , 0.277 0.223 , 0.276	Depositor DCC
$R_{free}$ test set	1508 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	53.8	Xtrriage
Anisotropy	0.099	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 33.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	5218	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	48.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.51% 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: IMD, FE

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	1.16	6/5279 (0.1%)	1.10	22/7128 (0.3%)

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	421	GLU	CB-CG	6.40	1.64	1.52
1	A	718	PHE	CE1-CZ	5.53	1.47	1.37
1	A	261	ASP	CB-CG	5.49	1.63	1.51
1	A	132	TYR	CD1-CE1	5.25	1.47	1.39
1	A	421	GLU	CD-OE1	5.18	1.31	1.25
1	A	193	PHE	CB-CG	5.13	1.60	1.51

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	657	ARG	NE-CZ-NH2	-10.69	114.96	120.30
1	A	657	ARG	NE-CZ-NH1	9.29	124.94	120.30
1	A	215	LEU	CB-CG-CD1	-8.37	96.77	111.00
1	A	685	ARG	NE-CZ-NH1	8.03	124.31	120.30
1	A	468	ARG	NE-CZ-NH1	7.45	124.02	120.30
1	A	234	ASN	CB-CA-C	-6.60	97.20	110.40
1	A	685	ARG	NE-CZ-NH2	-6.38	117.11	120.30
1	A	646	ARG	NE-CZ-NH1	6.29	123.44	120.30
1	A	697	TRP	CA-CB-CG	6.27	125.62	113.70
1	A	572	ARG	NE-CZ-NH2	-6.03	117.29	120.30
1	A	536	ARG	NE-CZ-NH1	-5.85	117.38	120.30
1	A	703	ASP	CB-CG-OD1	5.78	123.50	118.30
1	A	327	ASP	CB-CG-OD1	5.64	123.37	118.30
1	A	566	LEU	CA-CB-CG	-5.63	102.34	115.30
1	A	84	ASP	CB-CG-OD1	5.61	123.35	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	369	ASP	CB-CG-OD1	5.53	123.28	118.30
1	A	255	ILE	CG1-CB-CG2	-5.52	99.25	111.40
1	A	572	ARG	NE-CZ-NH1	5.39	123.00	120.30
1	A	692	ASP	CB-CG-OD1	5.23	123.01	118.30
1	A	333	LEU	CA-CB-CG	5.12	127.09	115.30
1	A	540	THR	CB-CA-C	5.07	125.28	111.60
1	A	646	ARG	NE-CZ-NH2	-5.04	117.78	120.30

There are no chirality outliers.

There are no planarity outliers.

## 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	5168	0	5002	100	0
2	A	1	0	0	0	0
3	A	5	0	4	0	0
4	A	44	0	0	0	0
All	All	5218	0	5006	100	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 10.

All (100) 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:615:ARG:HH12	1:A:634:GLN:HE21	1.13	0.97
1:A:706:ASN:HD22	1:A:742:ASN:HD21	1.03	0.96
1:A:535:GLU:HG2	1:A:565:ALA:HA	1.57	0.85
1:A:656:TRP:HE1	1:A:691:ASN:HD22	1.26	0.83
1:A:145:LYS:HD3	1:A:176:ASP:OD2	1.79	0.82
1:A:300:ALA:O	1:A:302:PRO:HD3	1.79	0.82
1:A:685:ARG:NH2	1:A:724:GLN:O	2.16	0.77
1:A:706:ASN:HD22	1:A:742:ASN:ND2	1.80	0.76
1:A:706:ASN:ND2	1:A:742:ASN:HD21	1.83	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:373:ALA:HB3	1:A:376:THR:HG23	1.69	0.74
1:A:288:GLY:N	1:A:294:THR:HG22	2.03	0.74
1:A:281:VAL:HG12	1:A:282:ARG:HG3	1.71	0.72
1:A:364:MET:HG2	1:A:366:PHE:CE1	2.28	0.68
1:A:288:GLY:H	1:A:294:THR:HG22	1.58	0.68
1:A:656:TRP:HE1	1:A:691:ASN:ND2	1.92	0.67
1:A:495:HIS:ND1	1:A:496:GLU:N	2.42	0.67
1:A:93:PRO:HB2	1:A:610:SER:HB3	1.78	0.66
1:A:151:LYS:HZ3	1:A:593:GLU:HG3	1.61	0.65
1:A:242:PRO:O	1:A:286:THR:HG22	1.96	0.65
1:A:460:LEU:HD23	1:A:490:VAL:HG12	1.78	0.65
1:A:373:ALA:HB3	1:A:376:THR:CG2	2.26	0.65
1:A:615:ARG:HH12	1:A:634:GLN:NE2	1.89	0.64
1:A:529:ALA:O	1:A:532:THR:HG23	1.98	0.64
1:A:615:ARG:NH1	1:A:634:GLN:HE21	1.91	0.63
1:A:242:PRO:HD2	1:A:286:THR:HG21	1.81	0.62
1:A:675:ASP:OD1	1:A:679:LYS:HB3	1.99	0.62
1:A:73:THR:HG22	1:A:76:GLN:OE1	2.00	0.61
1:A:369:ASP:OD1	1:A:379:LYS:HG2	2.01	0.61
1:A:539:ASN:ND2	1:A:560:GLN:HG3	2.18	0.59
1:A:674:LYS:HA	1:A:679:LYS:O	2.02	0.59
1:A:107:LEU:C	1:A:107:LEU:HD23	2.22	0.59
1:A:152:GLY:O	1:A:153:ALA:HB2	2.03	0.58
1:A:92:GLU:HG3	1:A:95:ILE:HG12	1.86	0.58
1:A:99:GLY:H	1:A:724:GLN:NE2	2.01	0.58
1:A:431:LEU:HD22	1:A:435:TYR:CE2	2.40	0.57
1:A:246:LEU:HD22	1:A:275:HIS:HB3	1.88	0.56
1:A:81:THR:HG21	1:A:710:SER:OG	2.06	0.55
1:A:396:ASN:OD1	1:A:396:ASN:N	2.40	0.55
1:A:613:LYS:HA	1:A:634:GLN:HE22	1.73	0.54
1:A:309:SER:O	1:A:333:LEU:HD23	2.07	0.54
1:A:343:LYS:O	1:A:350:ASN:HB3	2.08	0.54
1:A:232:PHE:HB2	1:A:718:PHE:CE1	2.43	0.54
1:A:173:ASP:HB2	1:A:176:ASP:OD2	2.07	0.54
1:A:132:TYR:HD2	1:A:628:ASN:ND2	2.07	0.53
1:A:517:LEU:HG	1:A:517:LEU:O	2.09	0.53
1:A:720:TYR:CZ	1:A:728:ASN:HB3	2.44	0.53
1:A:99:GLY:H	1:A:724:GLN:HE22	1.55	0.53
1:A:247:ASP:HB3	1:A:276:ARG:HG2	1.91	0.52
1:A:326:LEU:HD12	1:A:367:ASN:O	2.09	0.52
1:A:243:TYR:CZ	1:A:301:PRO:HG3	2.45	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:151:LYS:NZ	1:A:593:GLU:HG3	2.25	0.51
1:A:107:LEU:HD23	1:A:108:THR:N	2.26	0.51
1:A:512:ARG:HH22	1:A:535:GLU:CD	2.15	0.50
1:A:380:TYR:CD1	1:A:380:TYR:N	2.80	0.49
1:A:552:ALA:HB3	1:A:597:SER:OG	2.13	0.49
1:A:514:TYR:CG	1:A:526:ILE:HG21	2.47	0.49
1:A:341:ASP:OD2	1:A:343:LYS:HE3	2.12	0.49
1:A:265:ARG:HH11	1:A:265:ARG:HG3	1.78	0.48
1:A:548:ASP:OD1	1:A:548:ASP:C	2.52	0.48
1:A:212:PHE:HE2	1:A:255:ILE:HG22	1.79	0.48
1:A:473:THR:HG21	1:A:527:SER:HA	1.94	0.47
1:A:431:LEU:HD22	1:A:435:TYR:HE2	1.77	0.47
1:A:234:ASN:HB3	1:A:236:ASN:H	1.80	0.47
1:A:120:LYS:HA	1:A:125:TYR:HB3	1.94	0.47
1:A:734:GLY:O	1:A:735:ARG:C	2.52	0.47
1:A:152:GLY:O	1:A:153:ALA:CB	2.62	0.47
1:A:286:THR:HB	1:A:287:VAL:H	1.28	0.47
1:A:320:LEU:HD23	1:A:320:LEU:O	2.14	0.47
1:A:546:TYR:OH	1:A:548:ASP:OD2	2.25	0.46
1:A:364:MET:HG2	1:A:366:PHE:HE1	1.78	0.46
1:A:128:SER:OG	1:A:387:GLN:NE2	2.49	0.46
1:A:394:PHE:CD2	1:A:437:LEU:HB3	2.51	0.46
1:A:437:LEU:HD12	1:A:437:LEU:HA	1.76	0.45
1:A:177:LEU:HD12	1:A:215:LEU:CD1	2.46	0.45
1:A:211:ASN:HB2	1:A:258:THR:O	2.17	0.45
1:A:650:PRO:HB2	1:A:697:TRP:CZ3	2.52	0.45
1:A:599:ARG:HA	1:A:603:LEU:O	2.17	0.44
1:A:143:LEU:HD13	1:A:271:MET:SD	2.58	0.44
1:A:229:GLY:HA2	1:A:716:ASN:OD1	2.17	0.44
1:A:139:VAL:HG22	1:A:140:ASP:N	2.33	0.44
1:A:188:ARG:O	1:A:203:ALA:HA	2.17	0.44
1:A:151:LYS:NZ	1:A:593:GLU:CG	2.80	0.44
1:A:544:PHE:C	1:A:544:PHE:CD1	2.91	0.44
1:A:136:ARG:NH1	1:A:630:GLU:HG3	2.33	0.43
1:A:252:LEU:HD13	1:A:271:MET:HB2	1.99	0.43
1:A:177:LEU:HD12	1:A:215:LEU:HD11	2.00	0.43
1:A:285:PHE:HB2	1:A:299:GLN:NE2	2.34	0.43
1:A:292:SER:C	1:A:294:THR:H	2.21	0.43
1:A:502:SER:HA	1:A:541:GLU:O	2.19	0.43
1:A:655:GLY:HA3	1:A:694:PHE:CZ	2.53	0.42
1:A:242:PRO:O	1:A:286:THR:CG2	2.67	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:251:TYR:CE2	1:A:272:GLU:HG3	2.55	0.42
1:A:727:THR:O	1:A:729:THR:HG23	2.20	0.42
1:A:256:GLY:HA2	1:A:266:ILE:O	2.20	0.42
1:A:224:LYS:HA	1:A:224:LYS:HD2	1.68	0.42
1:A:645:TYR:O	1:A:653:GLU:HA	2.20	0.42
1:A:342:ASP:O	1:A:350:ASN:HA	2.19	0.41
1:A:397:GLY:O	1:A:433:HIS:CD2	2.73	0.41
1:A:633:ALA:HA	1:A:668:ILE:CG2	2.51	0.41
1:A:139:VAL:CG2	1:A:140:ASP:N	2.85	0.41

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	654/745 (88%)	615 (94%)	32 (5%)	7 (1%)	<b>14</b> <b>30</b>

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	153	ALA
1	A	574	VAL
1	A	601	GLY
1	A	234	ASN
1	A	675	ASP
1	A	293	ARG
1	A	514	TYR

### 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	540/615 (88%)	488 (90%)	52 (10%)	<b>8</b> <b>16</b>

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	72	VAL
1	A	81	THR
1	A	95	ILE
1	A	121	VAL
1	A	126	SER
1	A	150	GLN
1	A	155	SER
1	A	173	ASP
1	A	179	LYS
1	A	182	ASP
1	A	212	PHE
1	A	219	ASN
1	A	224	LYS
1	A	255	ILE
1	A	257	THR
1	A	276	ARG
1	A	286	THR
1	A	294	THR
1	A	298	ARG
1	A	320	LEU
1	A	327	ASP
1	A	333	LEU
1	A	370	SER
1	A	376	THR
1	A	421	GLU
1	A	424	LYS
1	A	430	ASP
1	A	431	LEU
1	A	437	LEU
1	A	454	GLU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	456	ASP
1	A	460	LEU
1	A	470	LYS
1	A	473	THR
1	A	474	HIS
1	A	481	SER
1	A	484	LEU
1	A	496	GLU
1	A	512	ARG
1	A	515	ASP
1	A	518	GLN
1	A	530	ASP
1	A	532	THR
1	A	540	THR
1	A	610	SER
1	A	646	ARG
1	A	649	ASN
1	A	661	VAL
1	A	674	LYS
1	A	676	ARG
1	A	737	VAL
1	A	739	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	164	ASN
1	A	175	GLN
1	A	211	ASN
1	A	221	ASN
1	A	264	HIS
1	A	375	GLN
1	A	387	GLN
1	A	392	GLN
1	A	485	ASN
1	A	539	ASN
1	A	560	GLN
1	A	570	GLN
1	A	634	GLN
1	A	691	ASN
1	A	724	GLN
1	A	728	ASN

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Mol	Chain	Res	Type
1	A	742	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](#)

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 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	$\# Z  > 2$
3	IMD	A	1747	2	3,5,5	0.53	0	4,5,5	0.79	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	IMD	A	1747	2	-	-	0/1/1/1

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.

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 [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	660/745 (88%)	-0.09	14 (2%) 63 58	31, 47, 69, 92	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	300	ALA	4.1
1	A	291	SER	3.8
1	A	622	LYS	3.4
1	A	352	VAL	3.2
1	A	289	ASP	3.1
1	A	298	ARG	2.7
1	A	680	LEU	2.5
1	A	671	ALA	2.4
1	A	621	PRO	2.4
1	A	290	ALA	2.4
1	A	322	PHE	2.4
1	A	292	SER	2.4
1	A	344	ASP	2.3
1	A	674	LYS	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 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( $\text{\AA}^2$ )	Q<0.9
3	IMD	A	1747	5/5	0.95	0.16	61,61,64,65	0
2	FE	A	1746	1/1	0.98	0.10	49,49,49,49	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.