



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 28, 2025 – 11:51 PM EDT

PDB ID : 3NRB / pdb_00003nrb
Title : Crystal structure of a formyltetrahydrofolate deformylase (purU, PP_1943)
from PSEUDOMONAS PUTIDA KT2440 at 2.05 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2010-06-30
Resolution : 2.05 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4-5-2 with Phenix2.0rc1
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0rc1
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.006 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.43.1

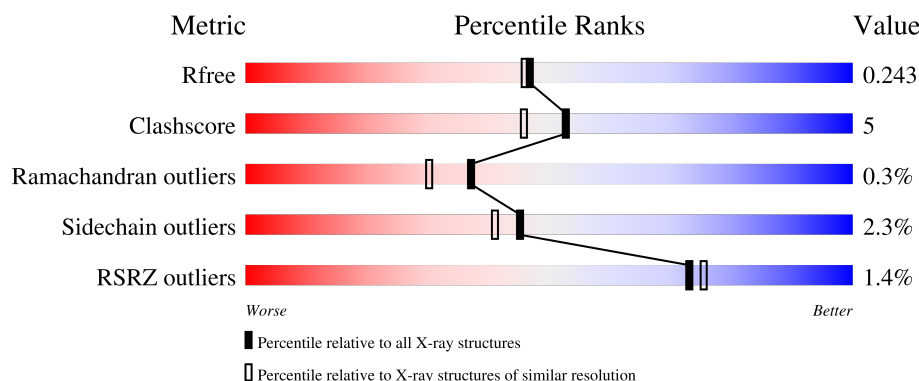
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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}	164625	2096 (2.04-2.04)
Clashscore	180529	2229 (2.04-2.04)
Ramachandran outliers	177936	2217 (2.04-2.04)
Sidechain outliers	177891	2217 (2.04-2.04)
RSRZ outliers	164620	2096 (2.04-2.04)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	287	<div> <div>2%</div> <div>89%</div> <div>9%</div> <div>.</div> </div>
1	B	287	<div> <div>%</div> <div>86%</div> <div>11%</div> <div>..</div> </div>
1	C	287	<div> <div>%</div> <div>87%</div> <div>10%</div> <div>..</div> </div>
1	D	287	<div> <div>%</div> <div>87%</div> <div>11%</div> <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
4	FLC	A	289	-	X	X	-
5	EDO	B	289	-	-	X	-

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 9904 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 Formyltetrahydrofolate deformylase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	281	Total	C	N	O	S	Se	0	8	0
			2253	1432	402	410	3	6			
1	B	280	Total	C	N	O	S	Se	0	8	0
			2261	1438	403	411	3	6			
1	C	282	Total	C	N	O	S	Se	0	4	0
			2241	1421	402	410	3	5			
1	D	283	Total	C	N	O	S	Se	0	7	0
			2269	1444	403	415	3	4			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP Q88LI9
B	0	GLY	-	expression tag	UNP Q88LI9
C	0	GLY	-	expression tag	UNP Q88LI9
D	0	GLY	-	expression tag	UNP Q88LI9

- Molecule 2 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Na	0	0
			1	1		
2	C	1	Total	Na	0	0
			1	1		
2	D	1	Total	Na	0	0
			1	1		

- Molecule 3 is UNKNOWN LIGAND (CCD ID: UNL) (formula:).

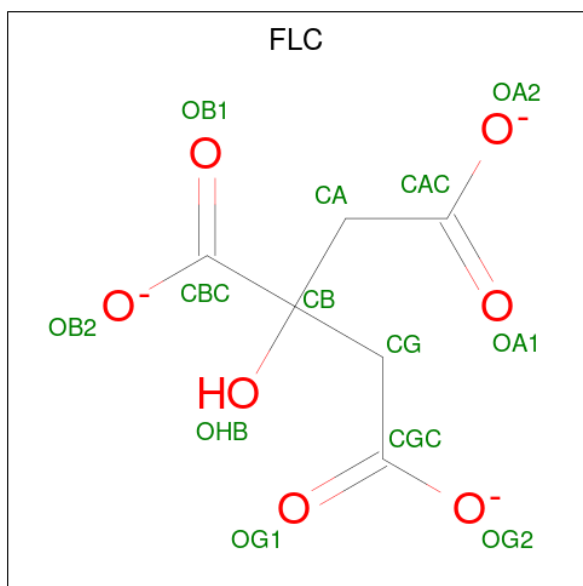
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	O	0	0
			9	9		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	D	1	Total O 9 9	0	0

- Molecule 4 is CITRATE ANION (CCD ID: FLC) (formula: $C_6H_5O_7$).



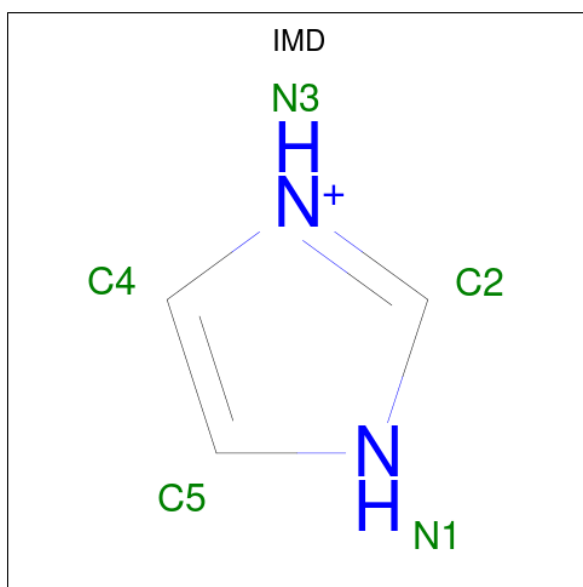
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 13 6 7	0	0
4	D	1	Total C O 13 6 7	0	0

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



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

- Molecule 6 is IMIDAZOLE (CCD ID: IMD) (formula: $C_3H_5N_2$).



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

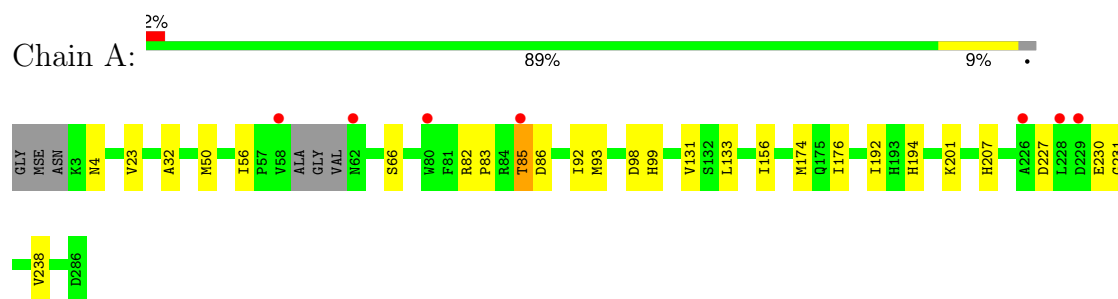
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	193	Total	O	0	0
			193	193		
7	B	197	Total	O	0	0
			197	197		
7	C	197	Total	O	0	0
			197	197		
7	D	198	Total	O	0	0
			198	198		

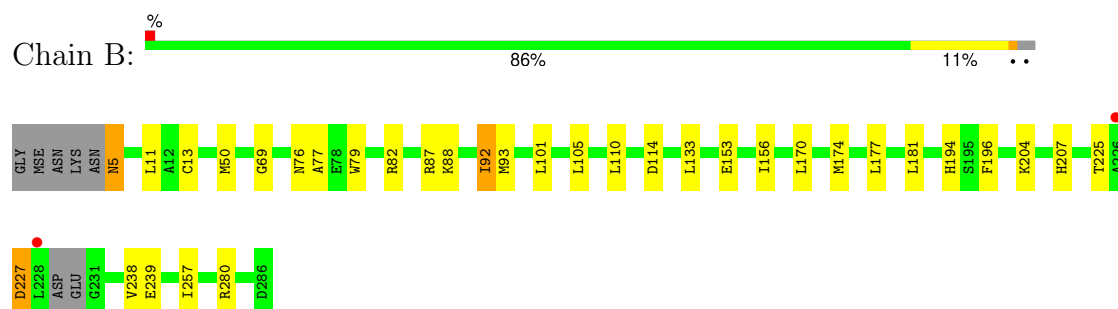
3 Residue-property plots [i](#)

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.

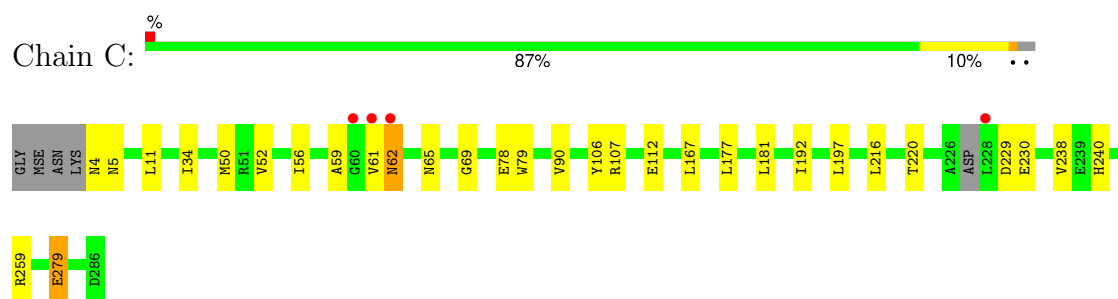
- Molecule 1: Formyltetrahydrofolate deformylase



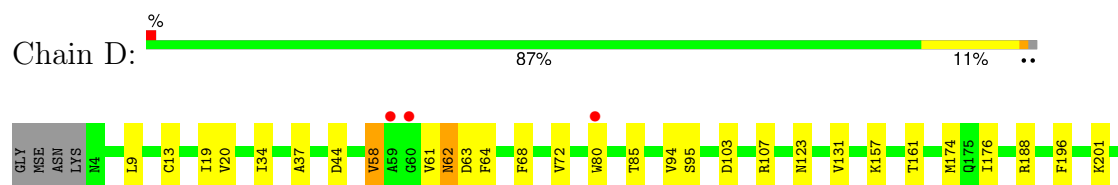
- Molecule 1: Formyltetrahydrofolate deformylase



- Molecule 1: Formyltetrahydrofolate deformylase



- Molecule 1: Formyltetrahydrofolate deformylase





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	82.45Å 118.25Å 129.19Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.96 – 2.05 29.96 – 2.05	Depositor EDS
% Data completeness (in resolution range)	99.7 (29.96-2.05) 99.7 (29.96-2.05)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	0.14	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.85 (at 2.05Å)	Xtriage
Refinement program	REFMAC 5.5.0110, PHENIX	Depositor
R, R_{free}	0.184 , 0.240 0.189 , 0.243	Depositor DCC
R_{free} test set	3987 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	24.4	Xtriage
Anisotropy	0.313	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 44.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	9904	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.90% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FLC, EDO, NA, IMD, UNL

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	1.01	2/2297 (0.1%)	0.97	0/3108
1	B	1.01	2/2303 (0.1%)	0.95	0/3110
1	C	1.01	0/2282	0.97	1/3083 (0.0%)
1	D	0.99	0/2315	0.97	1/3135 (0.0%)
All	All	1.00	4/9197 (0.0%)	0.97	2/12436 (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	D	0	1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	204	LYS	CA-C	5.75	1.57	1.53
1	B	92	ILE	N-CA	5.24	1.52	1.46
1	A	176	ILE	CA-CB	5.22	1.59	1.54
1	A	92	ILE	CA-CB	5.09	1.60	1.54

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	44	ASP	N-CA-C	6.30	118.14	111.28
1	C	62	ASN	N-CA-C	5.01	117.12	111.11

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	62	ASN	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	2253	0	2181	21	0
1	B	2261	0	2228	27	0
1	C	2241	0	2207	24	0
1	D	2269	0	2206	20	0
2	A	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	9	0	0	0	0
3	D	9	0	0	0	0
4	A	13	0	5	4	0
4	D	13	0	5	1	0
5	A	4	0	6	0	0
5	B	12	0	18	6	0
5	C	4	0	6	0	0
5	D	8	0	12	1	0
6	A	5	0	5	0	0
6	B	5	0	5	0	0
6	C	5	0	5	0	0
6	D	5	0	5	2	0
7	A	193	0	0	2	0
7	B	197	0	0	4	0
7	C	197	0	0	2	0
7	D	198	0	0	6	0
All	All	9904	0	8894	89	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 5.

All (89) 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:225:THR:HG22	7:B:754:HOH:O	1.59	1.02
1:C:11:LEU:HD22	1:C:50[B]:MSE:HE2	1.44	0.99
1:C:11:LEU:HD22	1:C:50[B]:MSE:CE	2.05	0.86
1:A:194:HIS:HE2	4:A:289:FLC:HA2	1.44	0.82
1:C:5:ASN:HB3	7:C:710:HOH:O	1.80	0.81
1:B:82:ARG:HD2	5:B:289:EDO:H21	1.69	0.75
1:C:11:LEU:HD13	1:C:50[B]:MSE:HE3	1.71	0.72
1:A:207[B]:HIS:ND1	4:A:289:FLC:OB2	2.22	0.71
1:A:174[A]:MSE:HA	1:A:174[A]:MSE:HE2	1.71	0.71
1:D:161[A]:THR:HG22	7:D:498:HOH:O	1.92	0.70
1:D:20:VAL:HG23	7:D:642:HOH:O	1.92	0.70
1:C:229:ASP:CB	7:C:800:HOH:O	2.44	0.65
1:A:32:ALA:HB2	1:A:56:ILE:HD12	1.79	0.65
1:D:157:LYS:O	1:D:161[A]:THR:HG23	1.97	0.65
1:C:177:LEU:HD22	1:C:181:LEU:HD23	1.81	0.62
1:A:194:HIS:NE2	4:A:289:FLC:HA2	2.14	0.62
1:A:131[A]:VAL:HG12	1:A:133:LEU:H	1.64	0.62
1:C:65:ASN:HD22	1:C:79:TRP:HE1	1.48	0.61
1:A:194:HIS:HE2	4:A:289:FLC:CA	2.12	0.60
1:C:11:LEU:HD13	1:C:50[B]:MSE:CE	2.32	0.60
1:C:65:ASN:ND2	1:C:79:TRP:HE1	2.00	0.59
1:D:207[B]:HIS:ND1	4:D:289:FLC:OG2	2.26	0.59
1:A:238:VAL:HG21	1:B:238:VAL:HG21	1.85	0.59
1:D:58:VAL:HG22	7:D:790:HOH:O	2.02	0.59
1:A:98:ASP:CG	1:A:131[B]:VAL:HG13	2.27	0.58
1:B:93:MSE:HE1	1:B:156:ILE:HD13	1.85	0.58
1:B:174[B]:MSE:HA	1:B:174[B]:MSE:HE2	1.86	0.58
1:B:225:THR:CG2	7:B:754:HOH:O	2.33	0.58
1:A:231:GLY:N	7:A:802:HOH:O	2.32	0.57
1:A:83:PRO:HB2	1:A:85:THR:HB	1.87	0.57
1:B:5:ASN:ND2	7:B:593:HOH:O	2.36	0.57
1:B:170:LEU:HD11	1:B:177:LEU:HD11	1.86	0.56
1:B:207:HIS:HB3	7:B:521:HOH:O	2.05	0.56
1:A:98:ASP:CG	1:A:131[A]:VAL:HG23	2.30	0.56
1:B:239:GLU:HB2	1:B:257:ILE:HD11	1.88	0.56
1:D:174:MSE:HA	1:D:174:MSE:HE2	1.89	0.54
1:B:88:LYS:HZ2	5:B:289:EDO:H22	1.72	0.54
1:B:88:LYS:NZ	5:B:289:EDO:H22	2.23	0.54
1:A:23:VAL:HG11	1:A:50[A]:MSE:HE1	1.91	0.53
1:C:59:ALA:HA	1:C:62:ASN:HD22	1.74	0.53
1:C:216:LEU:HD21	1:C:240:HIS:CE1	2.45	0.51
1:C:238:VAL:HG21	1:D:238:VAL:HG21	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:34:ILE:HD12	1:C:52:VAL:CG1	2.41	0.51
1:B:88:LYS:HZ2	5:B:289:EDO:C2	2.25	0.50
1:A:98:ASP:OD2	1:A:131[A]:VAL:HG23	2.11	0.50
1:A:98:ASP:OD2	1:A:131[B]:VAL:HG13	2.13	0.49
1:A:93:MSE:HE1	1:A:156:ILE:HD13	1.95	0.49
1:B:87:ARG:HD3	1:B:114:ASP:OD1	2.12	0.49
1:C:197:LEU:HD12	1:C:220:THR:HG21	1.95	0.48
1:D:58:VAL:CG2	7:D:790:HOH:O	2.61	0.48
1:D:13:CYS:SG	1:D:19:ILE:HD13	2.54	0.47
1:B:11:LEU:HB3	1:B:50[B]:MSE:HG3	1.96	0.47
1:D:34:ILE:HG21	1:D:37:ALA:HB2	1.96	0.47
1:C:107:ARG:HD3	1:C:112:GLU:OE1	2.14	0.47
1:B:196[A]:PHE:C	1:B:196[A]:PHE:CD1	2.93	0.47
1:D:103:ASP:O	1:D:107:ARG:HG3	2.15	0.47
1:D:123:ASN:HD21	6:D:292:IMD:H2	1.80	0.46
1:B:13:CYS:HB3	1:B:77:ALA:HA	1.97	0.45
1:B:227:ASP:OD1	1:B:227:ASP:N	2.48	0.45
1:C:59:ALA:HA	1:C:62:ASN:ND2	2.31	0.45
1:D:123:ASN:HD21	6:D:292:IMD:C2	2.30	0.45
1:C:192:ILE:O	1:C:192:ILE:HG23	2.17	0.45
1:C:90:VAL:HG22	1:C:167:LEU:HB3	1.99	0.44
1:B:93:MSE:HE1	1:B:156:ILE:CD1	2.47	0.44
1:D:61:VAL:HA	1:D:64:PHE:HB2	1.99	0.44
1:D:201:LYS:NZ	5:D:291:EDO:O1	2.48	0.44
1:C:69:GLY:HA2	1:C:79:TRP:CH2	2.53	0.44
1:A:99:HIS:HA	1:C:106:TYR:OH	2.17	0.43
1:A:174[A]:MSE:HG3	7:A:311:HOH:O	2.17	0.43
1:B:88:LYS:NZ	5:B:289:EDO:C2	2.81	0.43
1:A:85:THR:HG22	1:A:86:ASP:N	2.33	0.43
1:D:196[A]:PHE:CD1	1:D:196[A]:PHE:C	2.97	0.43
1:A:192:ILE:HG23	1:A:192:ILE:O	2.19	0.42
1:C:279[B]:GLU:O	1:C:279[B]:GLU:HG3	2.20	0.42
1:B:92:ILE:HG21	1:B:101:LEU:HD13	2.02	0.42
1:B:153:GLU:HG2	1:B:181:LEU:HD22	2.02	0.42
1:C:56:ILE:HG23	1:C:61:VAL:CG2	2.50	0.42
1:A:201:LYS:NZ	1:A:230[A]:GLU:OE2	2.46	0.42
1:B:82:ARG:HD2	5:B:289:EDO:C2	2.44	0.41
1:C:230:GLU:HG3	7:D:366:HOH:O	2.20	0.41
1:B:69:GLY:HA2	1:B:79:TRP:CH2	2.54	0.41
1:B:239:GLU:CG	1:B:257:ILE:HD11	2.50	0.41
1:D:94:VAL:HG22	1:D:95:SER:N	2.35	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:11:LEU:CD1	1:C:50[B]:MSE:HE3	2.46	0.41
1:B:105:LEU:HD13	1:B:133:LEU:O	2.20	0.41
1:D:9:LEU:HD12	1:D:80[B]:TRP:O	2.21	0.41
1:D:68:PHE:O	1:D:72:VAL:HG22	2.21	0.41
1:D:229:ASP:HB3	7:D:492:HOH:O	2.21	0.41
1:B:50[A]:MSE:HE2	1:B:50[A]:MSE:HB3	1.98	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	285/287 (99%)	278 (98%)	6 (2%)	1 (0%)	30	23
1	B	284/287 (99%)	278 (98%)	6 (2%)	0	100	100
1	C	282/287 (98%)	270 (96%)	12 (4%)	0	100	100
1	D	288/287 (100%)	282 (98%)	4 (1%)	2 (1%)	19	11
All	All	1139/1148 (99%)	1108 (97%)	28 (2%)	3 (0%)	37	30

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	285	ALA
1	A	4	ASN
1	D	63	ASP

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	237/242 (98%)	233 (98%)	4 (2%)	56	55
1	B	242/242 (100%)	235 (97%)	7 (3%)	37	32
1	C	240/242 (99%)	234 (98%)	6 (2%)	42	38
1	D	240/242 (99%)	233 (97%)	7 (3%)	37	32
All	All	959/968 (99%)	935 (98%)	24 (2%)	45	38

All (24) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	66	SER
1	A	82	ARG
1	A	85	THR
1	A	227	ASP
1	B	5	ASN
1	B	76	ASN
1	B	110	LEU
1	B	194	HIS
1	B	227	ASP
1	B	280[A]	ARG
1	B	280[B]	ARG
1	C	4	ASN
1	C	78	GLU
1	C	259[A]	ARG
1	C	259[B]	ARG
1	C	279[A]	GLU
1	C	279[B]	GLU
1	D	58	VAL
1	D	62	ASN
1	D	85	THR
1	D	131	VAL
1	D	176	ILE
1	D	188	ARG
1	D	286	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	5	ASN

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Mol	Chain	Res	Type
1	A	175	GLN
1	A	277	ASN
1	B	5	ASN
1	B	39	GLN
1	B	41	ASN
1	B	158	ASN
1	B	162	GLN
1	C	62	ASN
1	C	65	ASN
1	C	76	ASN
1	C	158	ASN
1	C	175	GLN
1	D	4	ASN
1	D	108	HIS
1	D	208	GLN

5.3.3 RNA ⓘ

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 18 ligands modelled in this entry, 3 are monoatomic and 2 are unknown - leaving 13 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	FLC	D	289	-	12,12,12	1.02	0	17,17,17	1.84	3 (17%)
5	EDO	D	290	-	3,3,3	0.38	0	2,2,2	0.29	0
6	IMD	C	289	-	3,5,5	0.37	0	4,5,5	0.62	0
5	EDO	B	289	-	3,3,3	0.75	0	2,2,2	0.49	0
5	EDO	B	288	-	3,3,3	0.57	0	2,2,2	0.33	0
5	EDO	D	291	-	3,3,3	0.68	0	2,2,2	0.08	0
6	IMD	D	292	-	3,5,5	0.31	0	4,5,5	0.98	0
6	IMD	A	291	-	3,5,5	0.29	0	4,5,5	0.98	0
6	IMD	B	290	-	3,5,5	0.24	0	4,5,5	0.96	0
4	FLC	A	289	-	12,12,12	2.12	1 (8%)	17,17,17	4.07	8 (47%)
5	EDO	C	288	-	3,3,3	0.53	0	2,2,2	0.37	0
5	EDO	B	287	-	3,3,3	0.83	0	2,2,2	0.36	0
5	EDO	A	290	-	3,3,3	0.45	0	2,2,2	0.33	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
4	FLC	D	289	-	-	9/16/16/16	-
5	EDO	D	290	-	-	1/1/1/1	-
6	IMD	C	289	-	-	-	0/1/1/1
5	EDO	B	289	-	-	1/1/1/1	-
5	EDO	B	288	-	-	0/1/1/1	-
5	EDO	D	291	-	-	1/1/1/1	-
6	IMD	D	292	-	-	-	0/1/1/1
6	IMD	A	291	-	-	-	0/1/1/1
6	IMD	B	290	-	-	-	0/1/1/1
4	FLC	A	289	-	-	10/16/16/16	-
5	EDO	C	288	-	-	1/1/1/1	-
5	EDO	B	287	-	-	0/1/1/1	-
5	EDO	A	290	-	-	1/1/1/1	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	289	FLC	CB-CBC	6.35	1.60	1.53

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	289	FLC	OB2-CBC-CB	11.86	135.90	113.14
4	A	289	FLC	CG-CB-CBC	7.44	126.49	110.03
4	A	289	FLC	OHB-CB-CA	-4.92	98.15	109.38
4	A	289	FLC	OB2-CBC-OB1	-4.91	108.16	123.86
4	D	289	FLC	OB2-CBC-CB	4.81	122.38	113.14
4	A	289	FLC	OB1-CBC-CB	-3.18	115.92	122.09
4	D	289	FLC	OHB-CB-CG	-2.76	103.08	109.38
4	A	289	FLC	CB-CG-CGC	2.54	120.86	113.92
4	A	289	FLC	OA1-CAC-CA	-2.51	115.84	122.95
4	D	289	FLC	OB1-CBC-CB	-2.46	117.32	122.09
4	A	289	FLC	OG2-CGC-OG1	-2.09	117.97	123.33

There are no chirality outliers.

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	289	FLC	CG-CB-CBC-OB1
4	A	289	FLC	CG-CB-CBC-OB2
4	A	289	FLC	OHB-CB-CBC-OB1
4	A	289	FLC	OHB-CB-CBC-OB2
4	D	289	FLC	CAC-CA-CB-CG
4	D	289	FLC	OHB-CB-CBC-OB1
4	A	289	FLC	CA-CB-CG-CGC
4	A	289	FLC	CBC-CB-CG-CGC
4	D	289	FLC	CAC-CA-CB-CBC
5	B	289	EDO	O1-C1-C2-O2
4	D	289	FLC	OHB-CB-CBC-OB2
4	A	289	FLC	CA-CB-CBC-OB1
4	A	289	FLC	CA-CB-CBC-OB2
4	D	289	FLC	CA-CB-CBC-OB1
4	D	289	FLC	CA-CB-CBC-OB2
4	D	289	FLC	CG-CB-CBC-OB1
4	D	289	FLC	CAC-CA-CB-OHB
4	A	289	FLC	CAC-CA-CB-OHB
4	D	289	FLC	CG-CB-CBC-OB2
4	A	289	FLC	OHB-CB-CG-CGC
5	A	290	EDO	O1-C1-C2-O2
5	D	290	EDO	O1-C1-C2-O2
5	C	288	EDO	O1-C1-C2-O2
5	D	291	EDO	O1-C1-C2-O2

There are no ring outliers.

5 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	289	FLC	1	0
5	B	289	EDO	6	0
5	D	291	EDO	1	0
6	D	292	IMD	2	0
4	A	289	FLC	4	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, 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	277/287 (96%)	-0.38	7 (2%) 58 60	10, 25, 47, 65	6 (2%)
1	B	276/287 (96%)	-0.55	2 (0%) 84 86	10, 23, 45, 64	6 (2%)
1	C	278/287 (96%)	-0.39	4 (1%) 73 75	10, 26, 47, 67	3 (1%)
1	D	279/287 (97%)	-0.35	3 (1%) 77 80	10, 26, 50, 67	7 (2%)
All	All	1110/1148 (96%)	-0.42	16 (1%) 73 75	10, 25, 47, 67	22 (1%)

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	228	LEU	3.5
1	C	228	LEU	3.5
1	D	59	ALA	3.3
1	D	80[A]	TRP	2.9
1	C	62	ASN	2.7
1	A	226	ALA	2.6
1	A	80[A]	TRP	2.5
1	B	226	ALA	2.4
1	C	61	VAL	2.4
1	A	229	ASP	2.4
1	A	228	LEU	2.3
1	A	58	VAL	2.2
1	A	62	ASN	2.1
1	C	60	GLY	2.0
1	A	85	THR	2.0
1	D	60	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 monosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	EDO	B	288	4/4	0.72	0.18	48,54,56,56	0
5	EDO	D	291	4/4	0.77	0.17	43,45,46,48	0
6	IMD	D	292	5/5	0.82	0.14	22,42,48,49	0
5	EDO	B	289	4/4	0.84	0.17	40,46,48,49	0
6	IMD	C	289	5/5	0.86	0.15	36,48,59,62	0
5	EDO	C	288	4/4	0.86	0.14	35,49,49,49	0
6	IMD	B	290	5/5	0.87	0.14	16,30,45,45	0
4	FLC	A	289	13/13	0.88	0.10	20,38,48,49	0
5	EDO	B	287	4/4	0.88	0.12	27,31,33,36	0
6	IMD	A	291	5/5	0.88	0.13	25,26,47,53	0
5	EDO	D	290	4/4	0.90	0.11	39,39,47,49	0
5	EDO	A	290	4/4	0.90	0.10	41,43,43,45	0
2	NA	C	287	1/1	0.93	0.07	49,49,49,49	0
3	UNL	A	288	9/-	0.93	0.07	26,28,42,50	0
4	FLC	D	289	13/13	0.94	0.07	29,32,39,44	0
3	UNL	D	288	9/-	0.95	0.11	25,31,34,40	0
2	NA	A	287	1/1	0.97	0.05	30,30,30,30	0
2	NA	D	287	1/1	0.98	0.12	23,23,23,23	0

6.5 Other polymers [i](#)

There are no such residues in this entry.