



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 12:22 AM UTC

PDB ID : 4PML / pdb_00004pml
Title : Crystal Structure of human Tankyrase 2 in complex with 3-amino-benzamide.
Authors : Qiu, W.; Lam, R.; Romanov, V.; Gordon, R.; Gebremeskel, S.; Vodsedalek, J.; Thompson, C.; Beletskaya, I.; Battaile, K.P.; Pai, E.F.; Chirgadze, N.Y.
Deposited on : 2014-05-22
Resolution : 1.87 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 Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

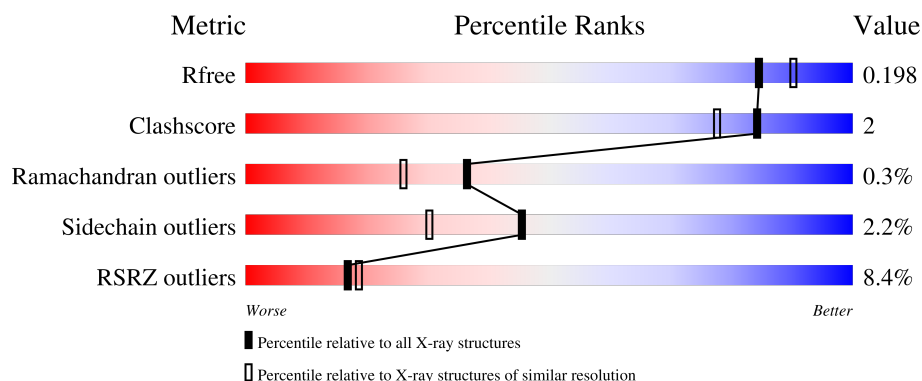
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.87 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}	180053	1220 (1.88-1.88)
Clashscore	190562	1234 (1.88-1.88)
Ramachandran outliers	187476	1222 (1.88-1.88)
Sidechain outliers	187428	1222 (1.88-1.88)
RSRZ outliers	180081	1220 (1.88-1.88)

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	227	<div> <div>4%</div> <div>81%</div> <div>7%</div> <div>13%</div> </div>
1	B	227	<div> <div>7%</div> <div>85%</div> <div>5%</div> <div>10%</div> </div>
1	C	227	<div> <div>5%</div> <div>81%</div> <div>11%</div> <div>8%</div> </div>
1	D	227	<div> <div>14%</div> <div>79%</div> <div>8%</div> <div>13%</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
6	DMS	C	1204	-	-	-	X

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 7313 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 Tankyrase-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	198	Total	C	N	O	S	0	0	0
			1598	1008	295	284	11			
1	B	205	Total	C	N	O	S	0	0	0
			1662	1049	304	298	11			
1	C	208	Total	C	N	O	S	0	0	0
			1678	1058	308	301	11			
1	D	198	Total	C	N	O	S	0	1	0
			1590	1002	293	283	12			

There are 84 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	938	MET	-	initiating methionine	UNP Q9H2K2
A	939	GLY	-	expression tag	UNP Q9H2K2
A	940	SER	-	expression tag	UNP Q9H2K2
A	941	SER	-	expression tag	UNP Q9H2K2
A	942	HIS	-	expression tag	UNP Q9H2K2
A	943	HIS	-	expression tag	UNP Q9H2K2
A	944	HIS	-	expression tag	UNP Q9H2K2
A	945	HIS	-	expression tag	UNP Q9H2K2
A	946	HIS	-	expression tag	UNP Q9H2K2
A	947	HIS	-	expression tag	UNP Q9H2K2
A	948	SER	-	expression tag	UNP Q9H2K2
A	949	SER	-	expression tag	UNP Q9H2K2
A	950	GLY	-	expression tag	UNP Q9H2K2
A	951	ARG	-	expression tag	UNP Q9H2K2
A	952	GLU	-	expression tag	UNP Q9H2K2
A	953	ASN	-	expression tag	UNP Q9H2K2
A	954	LEU	-	expression tag	UNP Q9H2K2
A	955	TYR	-	expression tag	UNP Q9H2K2
A	956	PHE	-	expression tag	UNP Q9H2K2
A	957	GLN	-	expression tag	UNP Q9H2K2
A	958	GLY	-	expression tag	UNP Q9H2K2

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Chain	Residue	Modelled	Actual	Comment	Reference
B	938	MET	-	initiating methionine	UNP Q9H2K2
B	939	GLY	-	expression tag	UNP Q9H2K2
B	940	SER	-	expression tag	UNP Q9H2K2
B	941	SER	-	expression tag	UNP Q9H2K2
B	942	HIS	-	expression tag	UNP Q9H2K2
B	943	HIS	-	expression tag	UNP Q9H2K2
B	944	HIS	-	expression tag	UNP Q9H2K2
B	945	HIS	-	expression tag	UNP Q9H2K2
B	946	HIS	-	expression tag	UNP Q9H2K2
B	947	HIS	-	expression tag	UNP Q9H2K2
B	948	SER	-	expression tag	UNP Q9H2K2
B	949	SER	-	expression tag	UNP Q9H2K2
B	950	GLY	-	expression tag	UNP Q9H2K2
B	951	ARG	-	expression tag	UNP Q9H2K2
B	952	GLU	-	expression tag	UNP Q9H2K2
B	953	ASN	-	expression tag	UNP Q9H2K2
B	954	LEU	-	expression tag	UNP Q9H2K2
B	955	TYR	-	expression tag	UNP Q9H2K2
B	956	PHE	-	expression tag	UNP Q9H2K2
B	957	GLN	-	expression tag	UNP Q9H2K2
B	958	GLY	-	expression tag	UNP Q9H2K2
C	938	MET	-	initiating methionine	UNP Q9H2K2
C	939	GLY	-	expression tag	UNP Q9H2K2
C	940	SER	-	expression tag	UNP Q9H2K2
C	941	SER	-	expression tag	UNP Q9H2K2
C	942	HIS	-	expression tag	UNP Q9H2K2
C	943	HIS	-	expression tag	UNP Q9H2K2
C	944	HIS	-	expression tag	UNP Q9H2K2
C	945	HIS	-	expression tag	UNP Q9H2K2
C	946	HIS	-	expression tag	UNP Q9H2K2
C	947	HIS	-	expression tag	UNP Q9H2K2
C	948	SER	-	expression tag	UNP Q9H2K2
C	949	SER	-	expression tag	UNP Q9H2K2
C	950	GLY	-	expression tag	UNP Q9H2K2
C	951	ARG	-	expression tag	UNP Q9H2K2
C	952	GLU	-	expression tag	UNP Q9H2K2
C	953	ASN	-	expression tag	UNP Q9H2K2
C	954	LEU	-	expression tag	UNP Q9H2K2
C	955	TYR	-	expression tag	UNP Q9H2K2
C	956	PHE	-	expression tag	UNP Q9H2K2
C	957	GLN	-	expression tag	UNP Q9H2K2
C	958	GLY	-	expression tag	UNP Q9H2K2

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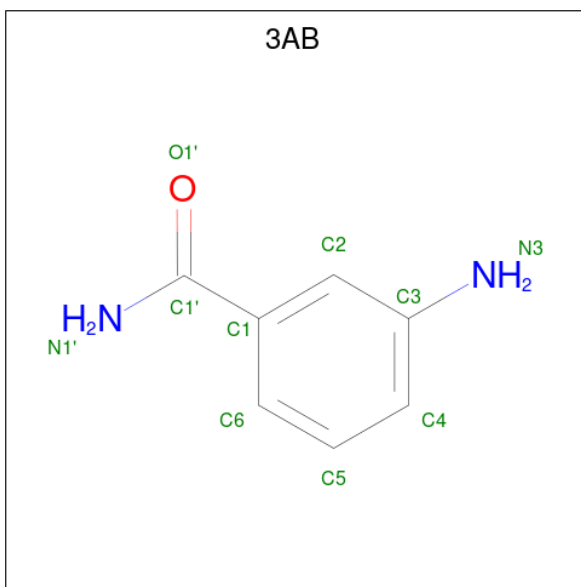
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Chain	Residue	Modelled	Actual	Comment	Reference
D	938	MET	-	initiating methionine	UNP Q9H2K2
D	939	GLY	-	expression tag	UNP Q9H2K2
D	940	SER	-	expression tag	UNP Q9H2K2
D	941	SER	-	expression tag	UNP Q9H2K2
D	942	HIS	-	expression tag	UNP Q9H2K2
D	943	HIS	-	expression tag	UNP Q9H2K2
D	944	HIS	-	expression tag	UNP Q9H2K2
D	945	HIS	-	expression tag	UNP Q9H2K2
D	946	HIS	-	expression tag	UNP Q9H2K2
D	947	HIS	-	expression tag	UNP Q9H2K2
D	948	SER	-	expression tag	UNP Q9H2K2
D	949	SER	-	expression tag	UNP Q9H2K2
D	950	GLY	-	expression tag	UNP Q9H2K2
D	951	ARG	-	expression tag	UNP Q9H2K2
D	952	GLU	-	expression tag	UNP Q9H2K2
D	953	ASN	-	expression tag	UNP Q9H2K2
D	954	LEU	-	expression tag	UNP Q9H2K2
D	955	TYR	-	expression tag	UNP Q9H2K2
D	956	PHE	-	expression tag	UNP Q9H2K2
D	957	GLN	-	expression tag	UNP Q9H2K2
D	958	GLY	-	expression tag	UNP Q9H2K2

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

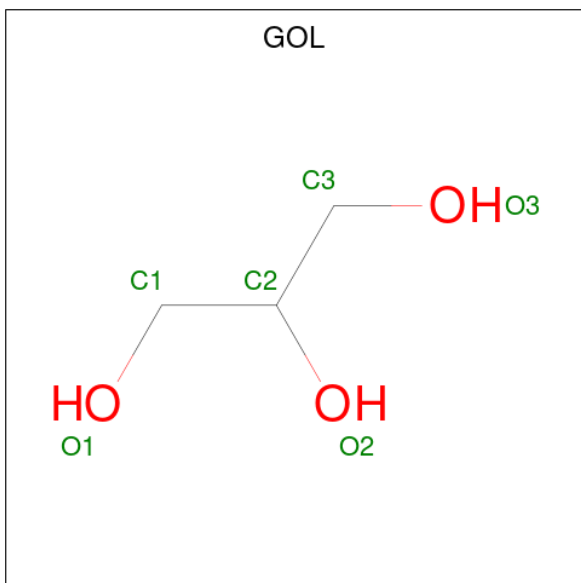
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Zn 1 1	0	0
2	B	1	Total Zn 1 1	0	0
2	C	1	Total Zn 1 1	0	0
2	D	1	Total Zn 1 1	0	0

- Molecule 3 is 3-aminobenzamide (CCD ID: 3AB) (formula: C₇H₈N₂O).



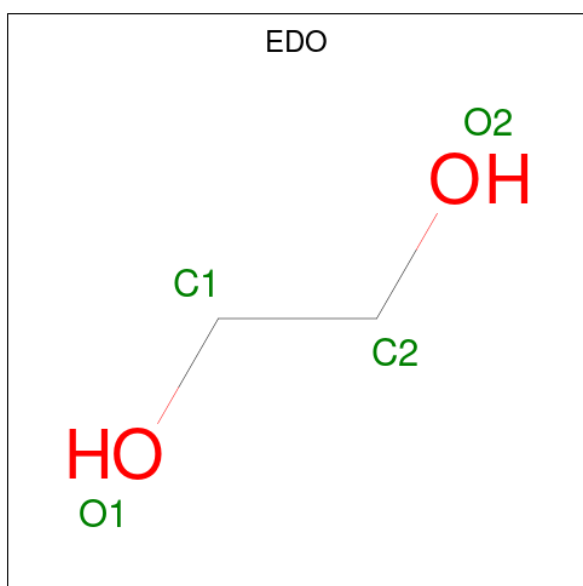
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			10	7	2	1		
3	B	1	Total	C	N	O	0	0
			10	7	2	1		
3	C	1	Total	C	N	O	0	0
			10	7	2	1		
3	D	1	Total	C	N	O	0	0
			10	7	2	1		

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



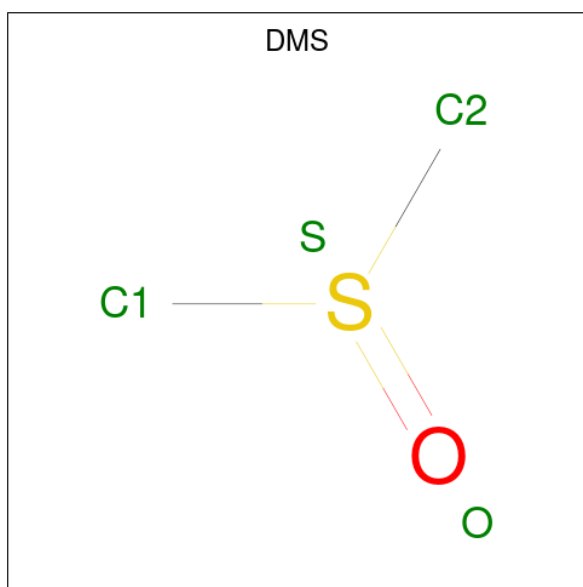
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	D	1	Total	C	O	0	0
			6	3	3		

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



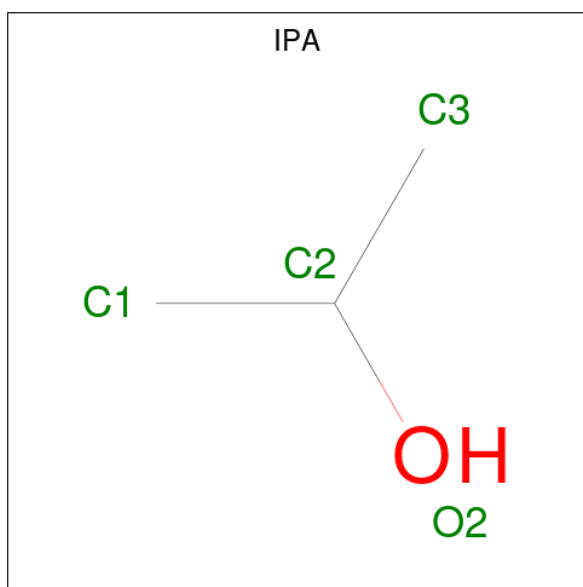
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	B	1	Total	C	O	0	0
			4	2	2		
5	D	1	Total	C	O	0	0
			4	2	2		

- Molecule 6 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C_2H_6OS).



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

- Molecule 7 is ISOPROPYL ALCOHOL (CCD ID: IPA) (formula: C_3H_8O).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	B	1	Total	C	O		
			4	3	1	0	0

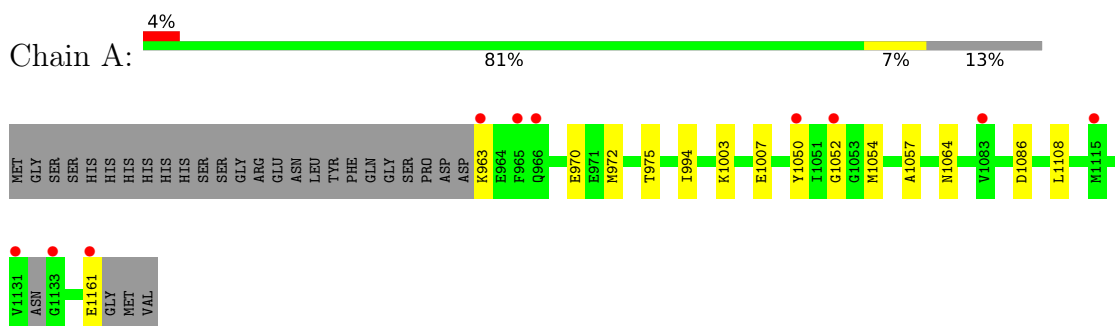
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	191	Total 191	O 191	0	0
8	B	167	Total 167	O 167	0	0
8	C	192	Total 192	O 192	0	0
8	D	135	Total 135	O 135	0	0

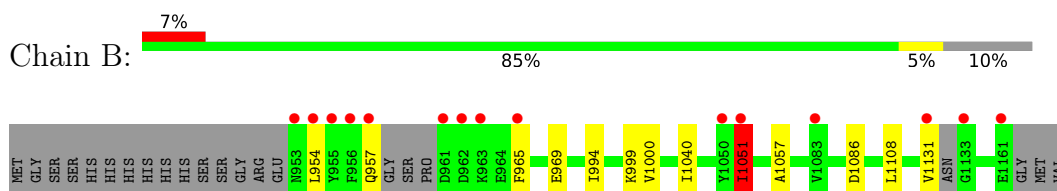
3 Residue-property plots [i](#)

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.

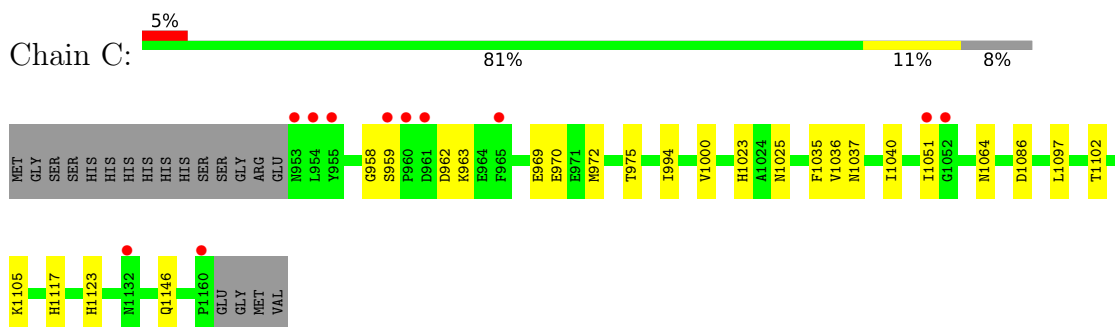
• Molecule 1: Tankyrase-2



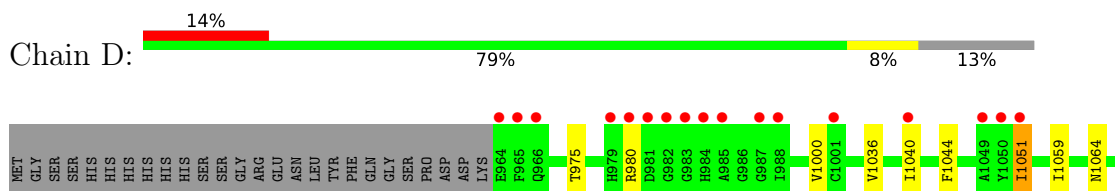
• Molecule 1: Tankyrase-2

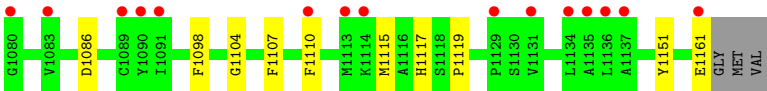


• Molecule 1: Tankyrase-2



• Molecule 1: Tankyrase-2





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	74.02Å 79.80Å 153.82Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	44.34 – 1.87 44.34 – 1.87	Depositor EDS
% Data completeness (in resolution range)	95.8 (44.34-1.87) 95.7 (44.34-1.87)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.79 (at 1.87Å)	Xtriage
Refinement program	BUSTER 2.10.0	Depositor
R, R_{free}	0.201 , 0.223 (Not available) , 0.198	Depositor DCC
R_{free} test set	1074 reflections (1.48%)	wwPDB-VP
Wilson B-factor (Å ²)	22.2	Xtriage
Anisotropy	0.443	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 52.7	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	7313	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 16.28% 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: ZN, 3AB, GOL, DMS, IPA, EDO

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	0.68	0/1640	1.13	3/2202 (0.1%)
1	B	0.68	0/1705	1.17	1/2289 (0.0%)
1	C	0.68	0/1724	1.18	5/2319 (0.2%)
1	D	0.69	0/1636	1.16	2/2202 (0.1%)
All	All	0.68	0/6705	1.16	11/9012 (0.1%)

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	1086	ASP	CA-CB-CG	6.08	118.68	112.60
1	C	963	LYS	CA-C-N	5.61	127.73	120.44
1	C	963	LYS	C-N-CA	5.61	127.73	120.44
1	A	1086	ASP	CA-CB-CG	5.59	118.19	112.60
1	C	1086	ASP	CA-CB-CG	5.45	118.05	112.60
1	A	963	LYS	CA-C-N	5.39	127.45	120.44
1	A	963	LYS	C-N-CA	5.39	127.45	120.44
1	D	1110	PHE	CA-CB-CG	5.31	119.11	113.80
1	B	1086	ASP	CA-CB-CG	5.15	117.75	112.60
1	C	1035	PHE	CA-C-N	5.12	127.75	120.53
1	C	1035	PHE	C-N-CA	5.12	127.75	120.53

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.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1598	0	1536	6	0
1	B	1662	0	1586	6	0
1	C	1678	0	1603	11	0
1	D	1590	0	1513	10	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	10	0	8	0	0
3	B	10	0	8	0	0
3	C	10	0	8	0	0
3	D	10	0	8	0	0
4	A	6	0	8	1	0
4	B	6	0	8	0	0
4	C	6	0	8	0	0
4	D	6	0	8	1	0
5	A	4	0	6	0	0
5	B	8	0	12	0	0
5	D	4	0	6	1	0
6	A	4	0	6	0	0
6	B	4	0	6	2	0
6	C	4	0	6	1	0
7	B	4	0	8	0	0
8	A	191	0	0	0	0
8	B	167	0	0	0	0
8	C	192	0	0	0	0
8	D	135	0	0	0	0
All	All	7313	0	6352	30	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 2.

All (30) 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:C:1105:LYS:H	1:C:1123:HIS:HD2	1.36	0.73
1:B:1000:VAL:HG21	1:B:1040:ILE:HD12	1.73	0.70
1:C:958:GLY:HA3	6:C:1204:DMS:H12	1.77	0.66
1:C:1000:VAL:HG21	1:C:1040:ILE:HD12	1.82	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:999:LYS:HB2	6:B:1205:DMS:H13	1.81	0.62
1:C:1040:ILE:HD11	1:C:1097:LEU:HD21	1.85	0.59
1:D:1115[A]:MET:HE1	1:D:1119:PRO:HG3	1.85	0.58
1:C:959:SER:HB2	1:C:962:ASP:HB2	1.84	0.58
1:A:1057:ALA:O	1:C:1117:HIS:HE1	1.87	0.57
1:C:972:MET:HG2	1:C:994:ILE:HD11	1.85	0.57
1:B:1057:ALA:O	1:D:1117:HIS:HE1	1.91	0.53
1:C:1023:HIS:HD2	1:C:1025:ASN:H	1.59	0.51
1:B:965:PHE:HB2	6:B:1205:DMS:H22	1.93	0.49
1:A:1054:MET:HB2	4:A:1203:GOL:H32	1.95	0.48
1:D:1044:PHE:HB3	1:D:1059:ILE:HD13	1.95	0.48
1:D:1107:PHE:CG	1:D:1119:PRO:HG2	2.50	0.46
1:A:975:THR:HB	1:A:1064:ASN:HA	1.98	0.46
1:B:969:GLU:HG3	1:B:994:ILE:HG13	1.97	0.46
1:D:1104:GLY:O	5:D:1204:EDO:H12	2.15	0.46
1:C:969:GLU:HG3	1:C:994:ILE:HG13	1.97	0.45
1:C:1102:THR:HB	1:C:1146:GLN:HG2	2.00	0.44
1:A:972:MET:HG2	1:A:994:ILE:HD11	1.99	0.43
1:B:1051:ILE:HD13	1:D:1051:ILE:HD13	2.00	0.43
1:D:1098:PHE:HB3	1:D:1151:TYR:HB2	1.99	0.43
1:A:1003:LYS:O	1:A:1007:GLU:HG2	2.19	0.43
1:D:975:THR:HB	1:D:1064:ASN:HA	2.01	0.42
1:A:1050:TYR:CZ	1:A:1052:GLY:HA3	2.55	0.42
1:D:1059:ILE:HG12	4:D:1203:GOL:H31	2.01	0.41
1:C:975:THR:HB	1:C:1064:ASN:HA	2.02	0.41
1:D:1000:VAL:HG21	1:D:1040:ILE:HG12	2.01	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	194/227 (86%)	189 (97%)	5 (3%)	0	100	100
1	B	199/227 (88%)	196 (98%)	2 (1%)	1 (0%)	24	13
1	C	206/227 (91%)	204 (99%)	2 (1%)	0	100	100
1	D	197/227 (87%)	191 (97%)	5 (2%)	1 (0%)	24	13
All	All	796/908 (88%)	780 (98%)	14 (2%)	2 (0%)	36	26

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	1051	ILE
1	B	1051	ILE

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	167/192 (87%)	164 (98%)	3 (2%)	51	38
1	B	174/192 (91%)	169 (97%)	5 (3%)	37	20
1	C	176/192 (92%)	172 (98%)	4 (2%)	44	29
1	D	165/192 (86%)	162 (98%)	3 (2%)	51	38
All	All	682/768 (89%)	667 (98%)	15 (2%)	45	30

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	970	GLU
1	A	1108	LEU
1	A	1161	GLU
1	B	954	LEU
1	B	957	GLN
1	B	1051	ILE
1	B	1108	LEU
1	B	1131	VAL
1	C	970	GLU

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Mol	Chain	Res	Type
1	C	1036	VAL
1	C	1037	ASN
1	C	1051	ILE
1	D	980	ARG
1	D	1036	VAL
1	D	1161	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	998	GLN
1	A	1095	GLN
1	B	957	GLN
1	B	998	GLN
1	B	1011	HIS
1	B	1021	HIS
1	B	1025	ASN
1	B	1109	GLN
1	C	1011	HIS
1	C	1023	HIS
1	C	1025	ASN
1	C	1037	ASN
1	C	1109	GLN
1	C	1117	HIS
1	C	1123	HIS
1	D	998	GLN
1	D	1011	HIS
1	D	1095	GLN
1	D	1117	HIS

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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 20 ligands modelled in this entry, 4 are monoatomic - leaving 16 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	3AB	B	1202	-	10,10,10	1.06	1 (10%)	13,13,13	0.66	0
5	EDO	B	1207	-	3,3,3	0.42	0	2,2,2	0.57	0
4	GOL	D	1203	-	5,5,5	0.09	0	5,5,5	0.25	0
4	GOL	A	1203	-	5,5,5	0.08	0	5,5,5	0.20	0
3	3AB	A	1202	-	10,10,10	1.14	1 (10%)	13,13,13	0.73	0
4	GOL	C	1203	-	5,5,5	0.06	0	5,5,5	0.11	0
4	GOL	B	1203	-	5,5,5	0.06	0	5,5,5	0.18	0
6	DMS	A	1205	-	3,3,3	0.33	0	3,3,3	0.34	0
6	DMS	C	1204	-	3,3,3	0.31	0	3,3,3	0.29	0
5	EDO	A	1204	-	3,3,3	0.50	0	2,2,2	0.39	0
3	3AB	D	1202	-	10,10,10	1.13	1 (10%)	13,13,13	0.66	0
7	IPA	B	1204	-	3,3,3	0.64	0	3,3,3	0.52	0
6	DMS	B	1205	-	3,3,3	0.30	0	3,3,3	0.62	0
5	EDO	B	1206	-	3,3,3	0.50	0	2,2,2	0.37	0
3	3AB	C	1201	-	10,10,10	1.26	1 (10%)	13,13,13	0.72	0
5	EDO	D	1204	-	3,3,3	0.50	0	2,2,2	0.23	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	3AB	B	1202	-	-	0/4/4/4	0/1/1/1
5	EDO	B	1207	-	-	1/1/1/1	-
4	GOL	D	1203	-	-	0/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	A	1203	-	-	0/4/4/4	-
3	3AB	A	1202	-	-	0/4/4/4	0/1/1/1
4	GOL	C	1203	-	-	0/4/4/4	-
4	GOL	B	1203	-	-	0/4/4/4	-
5	EDO	A	1204	-	-	0/1/1/1	-
3	3AB	D	1202	-	-	0/4/4/4	0/1/1/1
5	EDO	B	1206	-	-	0/1/1/1	-
3	3AB	C	1201	-	-	0/4/4/4	0/1/1/1
5	EDO	D	1204	-	-	0/1/1/1	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	1201	3AB	C1-C1'	3.18	1.55	1.50
3	A	1202	3AB	C1-C1'	2.78	1.54	1.50
3	D	1202	3AB	C1-C1'	2.65	1.54	1.50
3	B	1202	3AB	C1-C1'	2.51	1.54	1.50

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	1207	EDO	O1-C1-C2-O2

There are no ring outliers.

5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	1203	GOL	1	0
4	A	1203	GOL	1	0
6	C	1204	DMS	1	0
6	B	1205	DMS	2	0
5	D	1204	EDO	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(Å ²)	Q<0.9
1	A	198/227 (87%)	0.29	10 (5%) 33 35	15, 26, 45, 74	0
1	B	205/227 (90%)	0.40	15 (7%) 21 24	15, 27, 53, 81	0
1	C	208/227 (91%)	0.25	11 (5%) 32 34	13, 25, 46, 61	0
1	D	198/227 (87%)	0.85	32 (16%) 4 5	17, 33, 54, 81	1 (0%)
All	All	809/908 (89%)	0.45	68 (8%) 17 19	13, 27, 51, 81	1 (0%)

All (68) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1131	VAL	6.3
1	D	1131	VAL	6.1
1	B	1131	VAL	5.8
1	B	957	GLN	3.8
1	D	1110	PHE	3.7
1	A	963	LYS	3.7
1	B	956	PHE	3.6
1	C	1051	ILE	3.5
1	A	1050	TYR	3.4
1	B	965	PHE	3.4
1	B	954	LEU	3.4
1	C	1132	ASN	3.3
1	D	1135	ALA	3.1
1	B	1050	TYR	3.1
1	B	1161	GLU	3.0
1	C	960	PRO	3.0
1	D	1136	LEU	3.0
1	B	1051	ILE	2.9
1	D	1113	MET	2.9
1	D	1080	GLY	2.9
1	C	959	SER	2.8

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Mol	Chain	Res	Type	RSRZ
1	C	965	PHE	2.8
1	A	965	PHE	2.8
1	D	980	ARG	2.8
1	D	1161	GLU	2.8
1	B	953	ASN	2.7
1	B	955	TYR	2.7
1	D	1129	PRO	2.7
1	A	1083	VAL	2.6
1	C	1052	GLY	2.6
1	D	979	HIS	2.6
1	D	1051	ILE	2.6
1	D	1083	VAL	2.6
1	D	983	GLY	2.5
1	D	1137	ALA	2.5
1	D	1050	TYR	2.4
1	D	985	ALA	2.4
1	D	1090	TYR	2.4
1	D	981	ASP	2.4
1	B	963	LYS	2.4
1	D	1134	LEU	2.3
1	B	1133	GLY	2.3
1	D	1089	CYS	2.3
1	D	1091	ILE	2.3
1	A	1133	GLY	2.3
1	A	1161	GLU	2.3
1	C	955	TYR	2.3
1	C	1160	PRO	2.3
1	D	1049	ALA	2.3
1	C	953	ASN	2.3
1	D	1001	CYS	2.3
1	A	1115	MET	2.3
1	C	954	LEU	2.3
1	B	961	ASP	2.2
1	D	982	GLY	2.2
1	B	962	ASP	2.2
1	D	1114	LYS	2.2
1	C	961	ASP	2.2
1	D	965	PHE	2.1
1	D	966	GLN	2.1
1	B	1083	VAL	2.1
1	D	988	ILE	2.1
1	D	984	HIS	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	1040	ILE	2.0
1	A	966	GLN	2.0
1	D	964	GLU	2.0
1	A	1052	GLY	2.0
1	D	987	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 oligosaccharides 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
6	DMS	A	1205	4/4	0.56	0.36	97,97,97,97	0
6	DMS	C	1204	4/4	0.60	0.44	97,98,98,98	0
4	GOL	B	1203	6/6	0.71	0.18	53,53,54,55	0
6	DMS	B	1205	4/4	0.77	0.26	86,86,86,86	0
7	IPA	B	1204	4/4	0.77	0.22	50,50,50,51	0
4	GOL	D	1203	6/6	0.79	0.16	36,38,39,40	0
4	GOL	A	1203	6/6	0.82	0.16	39,42,42,44	0
5	EDO	A	1204	4/4	0.83	0.14	50,50,50,51	0
5	EDO	B	1206	4/4	0.84	0.15	34,36,36,37	0
5	EDO	B	1207	4/4	0.85	0.21	42,43,43,44	0
4	GOL	C	1203	6/6	0.88	0.11	30,31,35,37	0
3	3AB	D	1202	10/10	0.90	0.08	28,28,28,29	0
5	EDO	D	1204	4/4	0.93	0.10	29,30,30,33	0
3	3AB	B	1202	10/10	0.96	0.05	17,18,19,20	0
3	3AB	C	1201	10/10	0.96	0.05	14,16,19,20	0
2	ZN	D	1201	1/1	0.96	0.05	41,41,41,41	0
3	3AB	A	1202	10/10	0.97	0.05	13,14,17,20	0
2	ZN	B	1201	1/1	0.97	0.05	38,38,38,38	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	ZN	C	1202	1/1	0.98	0.04	34,34,34,34	0
2	ZN	A	1201	1/1	0.98	0.04	32,32,32,32	0

6.5 Other polymers [i](#)

There are no such residues in this entry.