



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2018 – 05:29 pm GMT

PDB ID : 1VM6
Title : Crystal structure of Dihydrodipicolinate reductase (TM1520) from *Thermotoga maritima* at 2.27 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2004-09-03
Resolution : 2.27 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.7.3 (157068), CSD as539be (2018)
Xtriage (Phenix) : 1.13
EDS : trunk30967
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Refmac : 5.8.0158
CCP4 : 7.0 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30967

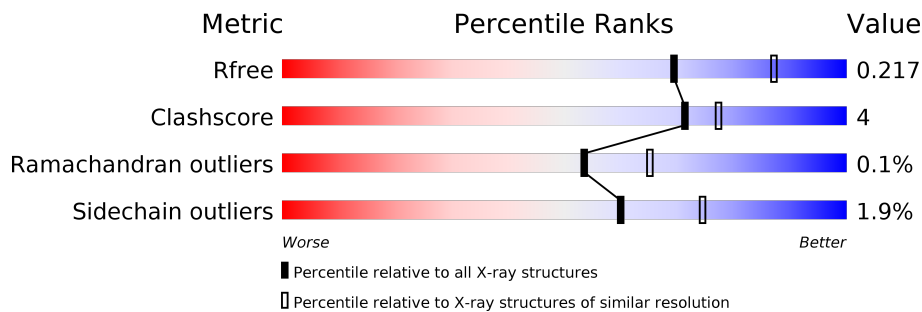
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.27 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}	111664	6121 (2.30-2.26)
Clashscore	122126	6842 (2.30-2.26)
Ramachandran outliers	120053	6755 (2.30-2.26)
Sidechain outliers	120020	6755 (2.30-2.26)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	228	86% 8% 6%
1	B	228	86% 10% •
1	C	228	85% 10% 6%
1	D	228	83% 11% • 5%

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
2	ACT	A	218	-	-	X	-
2	ACT	B	218	-	-	X	-
2	ACT	B	221	-	-	X	-

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 7538 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 Dihydrodipicolinate reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	215	Total 1667	C 1073	N 280	O 309	S 5	0	0	0
1	B	218	Total 1705	C 1096	N 292	O 312	S 5	0	0	0
1	C	215	Total 1663	C 1070	N 279	O 309	S 5	0	0	0
1	D	217	Total 1699	C 1092	N 289	O 313	S 5	0	1	0

There are 48 discrepancies between the modelled and reference sequences:

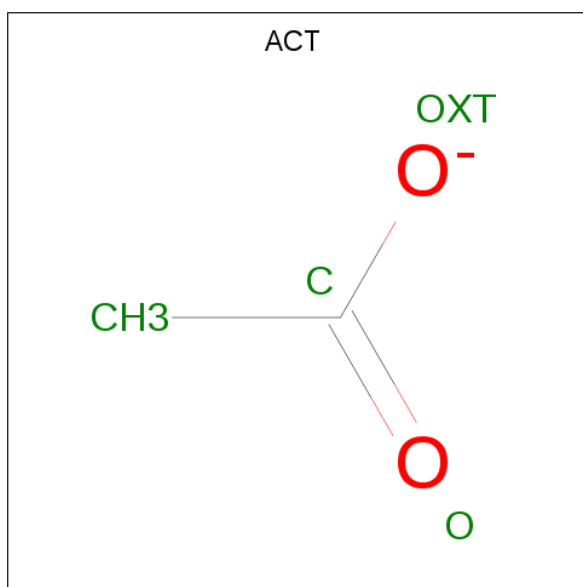
Chain	Residue	Modelled	Actual	Comment	Reference
A	-11	MET	-	LEADER SEQUENCE	UNP Q9X1K8
A	-10	GLY	-	LEADER SEQUENCE	UNP Q9X1K8
A	-9	SER	-	LEADER SEQUENCE	UNP Q9X1K8
A	-8	ASP	-	LEADER SEQUENCE	UNP Q9X1K8
A	-7	LYS	-	LEADER SEQUENCE	UNP Q9X1K8
A	-6	ILE	-	LEADER SEQUENCE	UNP Q9X1K8
A	-5	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
A	-4	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
A	-3	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
A	-2	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
A	-1	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
A	0	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
B	-11	MET	-	LEADER SEQUENCE	UNP Q9X1K8
B	-10	GLY	-	LEADER SEQUENCE	UNP Q9X1K8
B	-9	SER	-	LEADER SEQUENCE	UNP Q9X1K8
B	-8	ASP	-	LEADER SEQUENCE	UNP Q9X1K8
B	-7	LYS	-	LEADER SEQUENCE	UNP Q9X1K8
B	-6	ILE	-	LEADER SEQUENCE	UNP Q9X1K8
B	-5	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
B	-4	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
B	-3	HIS	-	LEADER SEQUENCE	UNP Q9X1K8

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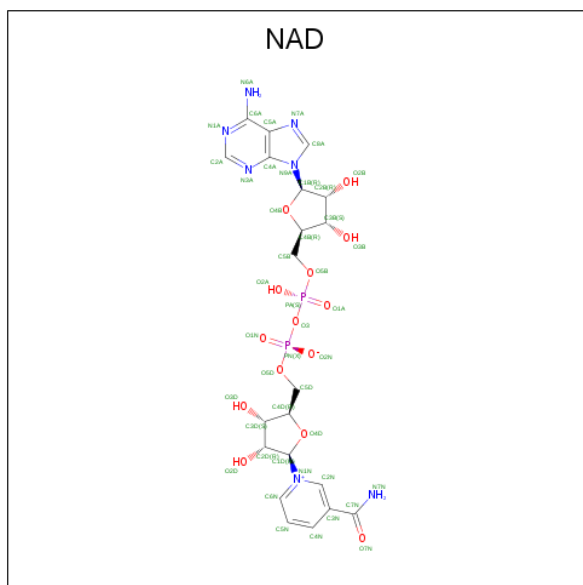
Chain	Residue	Modelled	Actual	Comment	Reference
B	-2	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
B	-1	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
B	0	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
C	-11	MET	-	LEADER SEQUENCE	UNP Q9X1K8
C	-10	GLY	-	LEADER SEQUENCE	UNP Q9X1K8
C	-9	SER	-	LEADER SEQUENCE	UNP Q9X1K8
C	-8	ASP	-	LEADER SEQUENCE	UNP Q9X1K8
C	-7	LYS	-	LEADER SEQUENCE	UNP Q9X1K8
C	-6	ILE	-	LEADER SEQUENCE	UNP Q9X1K8
C	-5	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
C	-4	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
C	-3	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
C	-2	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
C	-1	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
C	0	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
D	-11	MET	-	LEADER SEQUENCE	UNP Q9X1K8
D	-10	GLY	-	LEADER SEQUENCE	UNP Q9X1K8
D	-9	SER	-	LEADER SEQUENCE	UNP Q9X1K8
D	-8	ASP	-	LEADER SEQUENCE	UNP Q9X1K8
D	-7	LYS	-	LEADER SEQUENCE	UNP Q9X1K8
D	-6	ILE	-	LEADER SEQUENCE	UNP Q9X1K8
D	-5	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
D	-4	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
D	-3	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
D	-2	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
D	-1	HIS	-	LEADER SEQUENCE	UNP Q9X1K8
D	0	HIS	-	LEADER SEQUENCE	UNP Q9X1K8

- Molecule 2 is ACETATE ION (three-letter code: ACT) (formula: C₂H₃O₂).



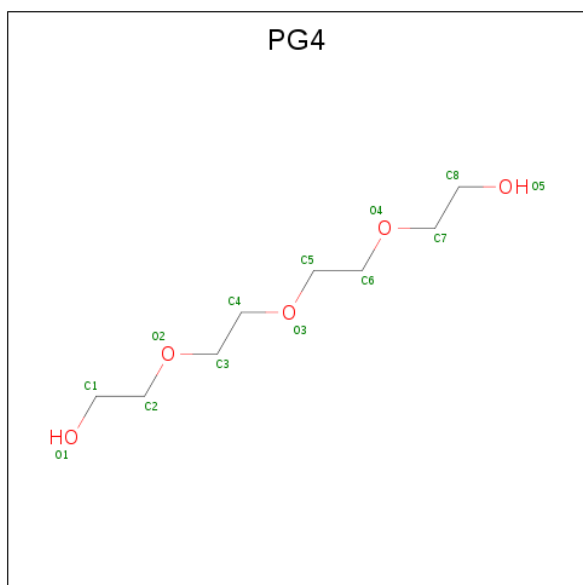
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	C	1	Total C O 4 2 2	0	0
2	C	1	Total C O 4 2 2	0	0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

- Molecule 3 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: C₂₁H₂₇N₇O₁₄P₂).



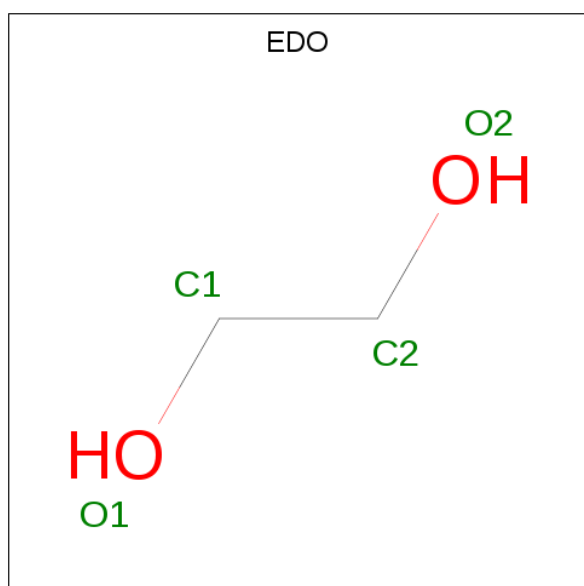
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
3	A	1	44	21	7	14	2	0	0
3	B	1	44	21	7	14	2	0	0
3	C	1	44	21	7	14	2	0	0
3	D	1	44	21	7	14	2	0	0

- Molecule 4 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	O	0	0
			13	8	5		
4	B	1	Total	C	O	0	0
			13	8	5		
4	B	1	Total	C	O	0	0
			8	5	3		
4	C	1	Total	C	O	0	0
			13	8	5		

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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


- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	93	Total	O	0	0
			93	93		
6	B	190	Total	O	0	0
			190	190		
6	C	106	Total	O	0	0
			106	106		
6	D	140	Total	O	0	0
			140	140		

3 Residue-property plots [i](#)


These plots are drawn for all protein, RNA and DNA 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. 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. 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: Dihydrodipicolinate reductase

Chain A: 




- Molecule 1: Dihydrodipicolinate reductase

Chain B: 




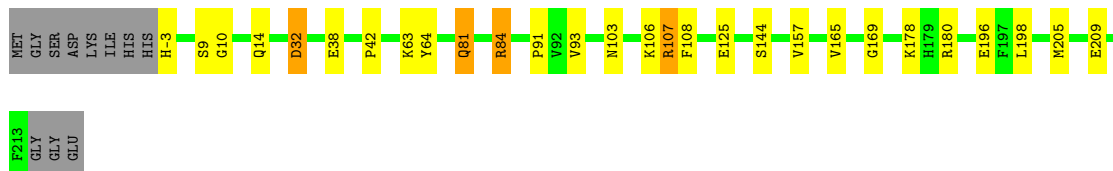
- Molecule 1: Dihydrodipicolinate reductase

Chain C: 



- Molecule 1: Dihydrodipicolinate reductase

Chain D: 



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	133.08Å 109.22Å 112.60Å 90.00° 119.23° 90.00°	Depositor
Resolution (Å)	29.03 – 2.27 29.03 – 2.27	Depositor EDS
% Data completeness (in resolution range)	95.5 (29.03-2.27) 95.5 (29.03-2.27)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.75 (at 2.26Å)	Xtrriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.171 , 0.213 0.176 , 0.217	Depositor DCC
R_{free} test set	3151 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å ²)	34.4	Xtrriage
Anisotropy	0.379	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 46.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7538	wwPDB-VP
Average B, all atoms (Å ²)	47.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.92% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PG4, EDO, NAD, ACT

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	0.59	0/1699	0.73	2/2294 (0.1%)
1	B	0.74	1/1741 (0.1%)	0.80	2/2351 (0.1%)
1	C	0.62	0/1694	0.75	2/2286 (0.1%)
1	D	0.65	0/1738	0.78	2/2347 (0.1%)
All	All	0.65	1/6872 (0.0%)	0.77	8/9278 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	209	GLU	CG-CD	5.16	1.59	1.51

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	180	ARG	NE-CZ-NH1	8.73	124.67	120.30
1	D	180	ARG	NE-CZ-NH1	6.95	123.78	120.30
1	B	202	ASP	CB-CG-OD2	-6.57	112.38	118.30
1	C	180	ARG	NE-CZ-NH2	-6.22	117.19	120.30
1	B	202	ASP	CB-CG-OD1	5.86	123.57	118.30
1	C	180	ARG	NE-CZ-NH1	5.33	122.96	120.30
1	A	180	ARG	NE-CZ-NH2	-5.07	117.77	120.30
1	D	180	ARG	NE-CZ-NH2	-5.06	117.77	120.30

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	1667	0	1701	11	0
1	B	1705	0	1733	17	0
1	C	1663	0	1704	14	0
1	D	1699	0	1726	17	0
2	A	8	0	6	2	0
2	B	24	0	18	4	0
2	C	8	0	6	0	0
2	D	8	0	6	0	0
3	A	44	0	26	1	0
3	B	44	0	26	0	0
3	C	44	0	26	1	0
3	D	44	0	26	0	0
4	B	34	0	45	1	0
4	C	13	0	18	0	0
5	C	4	0	6	0	0
6	A	93	0	0	0	0
6	B	190	0	0	3	0
6	C	106	0	0	0	0
6	D	140	0	0	1	0
All	All	7538	0	7073	54	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 4.

All (54) 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:93:VAL:HG23	1:B:198:LEU:HD21	1.61	0.83
1:D:196:GLU:OE2	6:D:411:HOH:O	2.13	0.66
1:A:93:VAL:HG23	1:A:198:LEU:HD21	1.75	0.66
1:C:91:PRO:HB2	1:C:198:LEU:HD22	1.78	0.65
1:B:210:GLU:OE1	6:B:491:HOH:O	2.14	0.64
1:A:91:PRO:HB2	1:A:198:LEU:HD22	1.80	0.64
1:C:93:VAL:HG23	1:C:198:LEU:HD21	1.83	0.61
1:B:193:LYS:NZ	2:B:221:ACT:H1	2.15	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:9:SER:OG	1:D:32:ASP:OD1	2.16	0.57
1:B:91:PRO:HB2	1:B:198:LEU:HD22	1.85	0.57
1:C:23:LYS:HG3	1:C:192:LEU:HD21	1.87	0.56
2:A:217:ACT:H1	2:A:218:ACT:H2	1.87	0.55
1:D:106:LYS:HE2	1:D:209:GLU:OE2	2.06	0.55
1:B:193:LYS:HZ3	2:B:221:ACT:H1	1.71	0.55
1:D:103:ASN:O	1:D:107:ARG:HD3	2.08	0.54
1:D:-3:HIS:HA	1:D:196:GLU:OE1	2.09	0.53
1:B:169:GLY:HA3	1:D:157:VAL:HG13	1.89	0.53
1:B:106:LYS:HG2	1:B:145:ALA:HB2	1.92	0.51
1:C:16:ILE:HD13	1:C:46:ILE:HG21	1.93	0.50
2:B:218:ACT:H2	2:B:222:ACT:H3	1.93	0.50
1:C:16:ILE:HD13	1:C:46:ILE:CG2	2.41	0.49
1:A:73:THR:HG21	2:A:218:ACT:H3	1.93	0.49
1:B:106:LYS:HD2	6:B:376:HOH:O	2.13	0.48
1:A:71:GLY:O	3:A:300:NAD:H2N	2.13	0.48
1:B:80:LEU:HD21	4:B:302:PG4:H52	1.96	0.48
1:C:183:SER:O	1:C:186:VAL:HG12	2.13	0.47
1:A:165:VAL:HG22	1:A:178:LYS:HG3	1.97	0.47
1:D:165:VAL:HG22	1:D:178:LYS:HG3	1.96	0.46
1:A:107:ARG:CZ	1:A:209:GLU:OE2	2.64	0.46
1:D:38:GLU:OE2	1:D:63:LYS:NZ	2.40	0.46
1:A:23:LYS:HG3	1:A:192:LEU:HD21	1.99	0.45
1:A:157:VAL:CG1	1:C:169:GLY:HA3	2.46	0.45
1:A:108:PHE:HB3	1:D:108:PHE:CE2	2.52	0.45
1:B:132:LYS:NZ	6:B:361:HOH:O	2.49	0.44
1:B:73:THR:HA	1:B:96:TYR:CE1	2.53	0.44
1:D:91:PRO:HB2	1:D:198:LEU:HD22	1.98	0.44
1:D:42:PRO:HD2	1:D:64:TYR:CG	2.53	0.44
1:B:121:VAL:HA	1:B:167:VAL:O	2.18	0.43
1:D:10:GLY:O	1:D:14:GLN:HG3	2.18	0.43
1:B:178:LYS:HZ2	1:C:178:LYS:HE2	1.84	0.43
1:B:165:VAL:HG22	1:B:178:LYS:HG2	2.01	0.42
1:B:169:GLY:HA3	1:D:157:VAL:CG1	2.49	0.42
1:C:121:VAL:HA	1:C:167:VAL:O	2.19	0.42
1:B:127:HIS:CD2	2:B:218:ACT:H3	2.55	0.42
1:D:93:VAL:HG23	1:D:198:LEU:HD21	2.02	0.42
1:A:121:VAL:O	1:A:150:VAL:HG13	2.20	0.41
1:A:157:VAL:HG13	1:C:169:GLY:HA3	2.02	0.41
1:C:104:VAL:HG22	1:C:212:ILE:HG21	2.02	0.41
1:D:84:ARG:HH12	1:D:205:MET:HG3	1.84	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:42:PRO:HD2	1:C:64:TYR:CG	2.56	0.41
1:B:157:VAL:HG13	1:D:169:GLY:HA3	2.02	0.41
1:C:104:VAL:CG2	1:C:212:ILE:HG21	2.52	0.40
1:C:71:GLY:O	3:C:300:NAD:H2N	2.22	0.40
1:D:81:GLN:OE1	1:D:81:GLN:HA	2.21	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	213/228 (93%)	208 (98%)	4 (2%)	1 (0%)	31	36
1	B	216/228 (95%)	214 (99%)	2 (1%)	0	100	100
1	C	213/228 (93%)	208 (98%)	5 (2%)	0	100	100
1	D	216/228 (95%)	212 (98%)	4 (2%)	0	100	100
All	All	858/912 (94%)	842 (98%)	15 (2%)	1 (0%)	53	65

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	213	PHE

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	182/194 (94%)	180 (99%)	2 (1%)	76	86
1	B	187/194 (96%)	184 (98%)	3 (2%)	65	79
1	C	182/194 (94%)	179 (98%)	3 (2%)	65	79
1	D	187/194 (96%)	181 (97%)	6 (3%)	42	56
All	All	738/776 (95%)	724 (98%)	14 (2%)	60	74

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	SER
1	A	125	GLU
1	B	-4	HIS
1	B	56	LYS
1	B	125	GLU
1	C	50	SER
1	C	141	LEU
1	C	144	SER
1	D	32	ASP
1	D	81	GLN
1	D	84	ARG
1	D	107	ARG
1	D	125	GLU
1	D	144	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 carbohydrates in this entry.

5.6 Ligand geometry

21 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	ACT	A	217	-	1,3,3	1.81	0	0,3,3	0.00	-
2	ACT	A	218	-	1,3,3	0.45	0	0,3,3	0.00	-
3	NAD	A	300	-	40,48,48	1.52	3 (7%)	44,73,73	1.95	2 (4%)
2	ACT	B	217	-	1,3,3	2.91	1 (100%)	0,3,3	0.00	-
2	ACT	B	218	-	1,3,3	2.19	1 (100%)	0,3,3	0.00	-
2	ACT	B	219	-	1,3,3	1.48	0	0,3,3	0.00	-
2	ACT	B	220	-	1,3,3	2.47	1 (100%)	0,3,3	0.00	-
2	ACT	B	221	-	1,3,3	1.65	0	0,3,3	0.00	-
2	ACT	B	222	-	1,3,3	0.12	0	0,3,3	0.00	-
3	NAD	B	300	-	40,48,48	1.59	3 (7%)	44,73,73	1.77	4 (9%)
4	PG4	B	301	-	12,12,12	0.60	0	11,11,11	0.27	0
4	PG4	B	302	-	12,12,12	0.48	0	11,11,11	0.52	0
4	PG4	B	303	-	7,7,12	0.50	0	6,6,11	0.45	0
2	ACT	C	217	-	1,3,3	0.59	0	0,3,3	0.00	-
2	ACT	C	218	-	1,3,3	1.98	0	0,3,3	0.00	-
3	NAD	C	300	-	40,48,48	1.69	3 (7%)	44,73,73	1.67	2 (4%)
5	EDO	C	301	-	3,3,3	0.61	0	2,2,2	0.22	0
4	PG4	C	302	-	12,12,12	0.66	0	11,11,11	0.46	0
2	ACT	D	217	-	1,3,3	0.91	0	0,3,3	0.00	-
2	ACT	D	218	-	1,3,3	0.48	0	0,3,3	0.00	-
3	NAD	D	300	-	40,48,48	1.63	3 (7%)	44,73,73	1.99	6 (13%)

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
2	ACT	A	217	-	-	0/0/0/0	0/0/0/0
2	ACT	A	218	-	-	0/0/0/0	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAD	A	300	-	-	0/22/62/62	0/5/5/5
2	ACT	B	217	-	-	0/0/0/0	0/0/0/0
2	ACT	B	218	-	-	0/0/0/0	0/0/0/0
2	ACT	B	219	-	-	0/0/0/0	0/0/0/0
2	ACT	B	220	-	-	0/0/0/0	0/0/0/0
2	ACT	B	221	-	-	0/0/0/0	0/0/0/0
2	ACT	B	222	-	-	0/0/0/0	0/0/0/0
3	NAD	B	300	-	-	0/22/62/62	0/5/5/5
4	PG4	B	301	-	-	0/10/10/10	0/0/0/0
4	PG4	B	302	-	-	0/10/10/10	0/0/0/0
4	PG4	B	303	-	-	0/5/5/10	0/0/0/0
2	ACT	C	217	-	-	0/0/0/0	0/0/0/0
2	ACT	C	218	-	-	0/0/0/0	0/0/0/0
3	NAD	C	300	-	-	0/22/62/62	0/5/5/5
5	EDO	C	301	-	-	0/1/1/1	0/0/0/0
4	PG4	C	302	-	-	0/10/10/10	0/0/0/0
2	ACT	D	217	-	-	0/0/0/0	0/0/0/0
2	ACT	D	218	-	-	0/0/0/0	0/0/0/0
3	NAD	D	300	-	-	0/22/62/62	0/5/5/5

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	218	ACT	CH3-C	2.19	1.51	1.48
3	D	300	NAD	C2A-N1A	2.23	1.38	1.33
2	B	220	ACT	CH3-C	2.47	1.51	1.48
3	A	300	NAD	C2A-N1A	2.72	1.39	1.33
3	C	300	NAD	C2A-N1A	2.90	1.39	1.33
2	B	217	ACT	CH3-C	2.91	1.52	1.48
3	B	300	NAD	C2A-N1A	3.30	1.40	1.33
3	D	300	NAD	C2A-N3A	4.05	1.38	1.32
3	A	300	NAD	C2A-N3A	4.15	1.38	1.32
3	B	300	NAD	C2A-N3A	4.19	1.39	1.32
3	C	300	NAD	C2A-N3A	4.28	1.39	1.32
3	A	300	NAD	O7N-C7N	6.80	1.37	1.24
3	B	300	NAD	O7N-C7N	7.24	1.38	1.24
3	D	300	NAD	O7N-C7N	8.18	1.40	1.24
3	C	300	NAD	O7N-C7N	8.27	1.40	1.24

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	300	NAD	N3A-C2A-N1A	-10.89	119.54	128.86
3	D	300	NAD	N3A-C2A-N1A	-10.73	119.68	128.86
3	C	300	NAD	N3A-C2A-N1A	-9.32	120.89	128.86
3	B	300	NAD	N3A-C2A-N1A	-8.99	121.17	128.86
3	B	300	NAD	C4D-O4D-C1D	-3.66	106.02	109.83
3	D	300	NAD	C5N-C4N-C3N	-2.72	117.15	120.35
3	C	300	NAD	C1B-N9A-C4A	-2.15	122.92	126.64
3	D	300	NAD	C4D-O4D-C1D	-2.08	107.66	109.83
3	D	300	NAD	C1B-N9A-C4A	-2.05	123.10	126.64
3	D	300	NAD	C4B-O4B-C1B	-2.04	107.70	109.83
3	B	300	NAD	C2N-C3N-C4N	2.08	120.65	118.26
3	B	300	NAD	C3N-C7N-N7N	2.44	120.59	117.76
3	D	300	NAD	C2N-C3N-C4N	2.69	121.36	118.26
3	A	300	NAD	C3N-C7N-N7N	3.45	121.77	117.76

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

8 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	217	ACT	1	0
2	A	218	ACT	2	0
3	A	300	NAD	1	0
2	B	218	ACT	2	0
2	B	221	ACT	2	0
2	B	222	ACT	1	0
4	B	302	PG4	1	0
3	C	300	NAD	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

6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.