



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 31, 2016 – 07:49 PM GMT

PDB ID : 1HDZ
Title : THREE-DIMENSIONAL STRUCTURES OF THREE HUMAN ALCOHOL DEHYDROGENASE VARIANTS: CORRELATIONS WITH THEIR FUNCTIONAL DIFFERENCES
Authors : Hurley, T.D.; Amzel, L.M.
Deposited on : 1993-10-15
Resolution : 2.50 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
<http://wwpdb.org/validation/2016/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 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

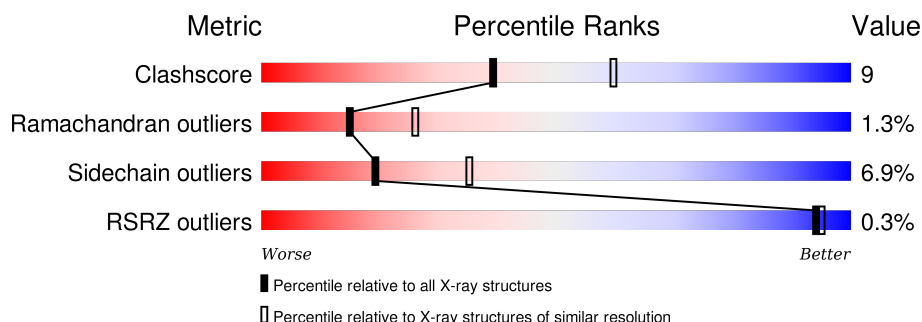
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION



The reported resolution of this entry is 2.50 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))
Clashscore	102246	4242 (2.50-2.50)
Ramachandran outliers	100387	4156 (2.50-2.50)
Sidechain outliers	100360	4158 (2.50-2.50)
RSRZ outliers	91569	3562 (2.50-2.50)

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 $\leq 5\%$. 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	374	 74% 23% •
1	B	374	 73% 23% • •

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 5724 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 ALCOHOL DEHYDROGENASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	374	Total	C	N	O	S	0	0	0
			2774	1766	470	516	22			
1	B	374	Total	C	N	O	S	0	0	0
			2774	1766	470	516	22			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	47	GLY	ARG	CONFLICT	UNP P00325
B	47	GLY	ARG	CONFLICT	UNP P00325

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	Cl	0	0
			1	1		

- Molecule 4 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: C₂₁H₂₇N₇O₁₄P₂).



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

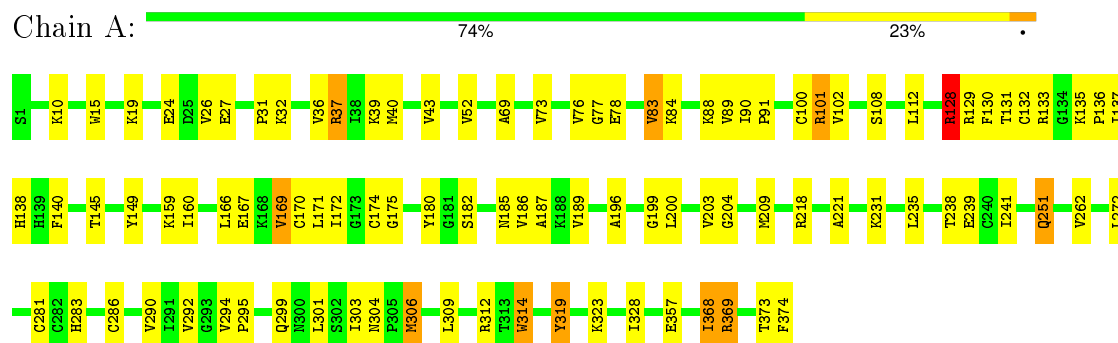
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	45	Total	O	0	0
			45	45		
5	B	38	Total	O	0	0
			38	38		

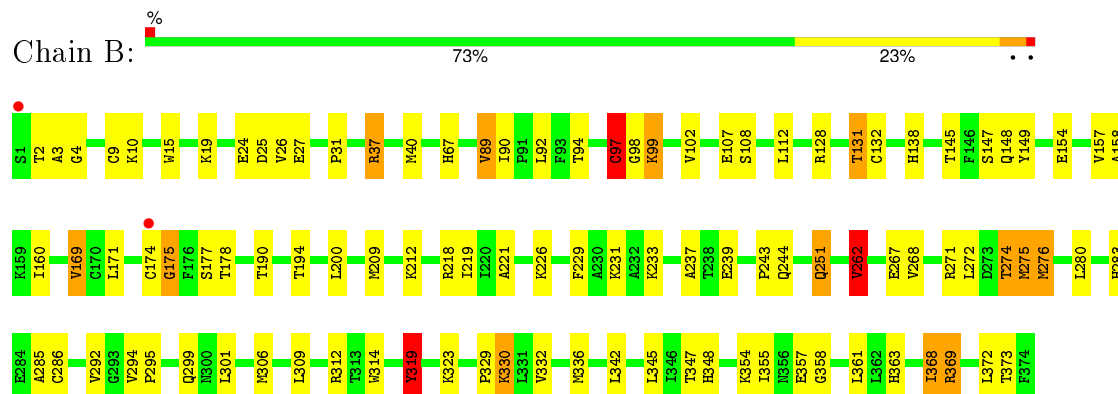
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: ALCOHOL DEHYDROGENASE



• Molecule 1: ALCOHOL DEHYDROGENASE



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	53.56Å 44.26Å 93.01Å 92.36° 103.63° 68.84°	Depositor
Resolution (Å)	7.00 – 2.50 31.20 – 2.39	Depositor EDS
% Data completeness (in resolution range)	(Not available) (7.00-2.50) 77.7 (31.20-2.39)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.02 (at 2.39Å)	Xtriage
Refinement program	X-PLOR	Depositor
R, R_{free}	0.194 , (Not available) 0.171 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	DCC
Wilson B-factor (Å ²)	32.5	Xtriage
Anisotropy	0.795	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 61.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	0 of 23820 reflections	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	5724	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 6.26% 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, 0.375 respectively for untwinned datasets, and 0.333, 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, NAD, CL

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	0.81	0/2826	1.43	21/3824 (0.5%)
1	B	0.77	0/2826	1.43	20/3824 (0.5%)
All	All	0.79	0/5652	1.43	41/7648 (0.5%)

There are no bond length outliers.

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	312	ARG	NE-CZ-NH1	8.66	124.63	120.30
1	B	275	MET	CG-SD-CE	-8.47	86.65	100.20
1	A	314	TRP	CD1-CG-CD2	8.36	112.99	106.30
1	B	37	ARG	NE-CZ-NH2	-8.23	116.18	120.30
1	B	15	TRP	CD1-CG-CD2	7.93	112.65	106.30
1	A	37	ARG	NE-CZ-NH2	-7.92	116.34	120.30
1	A	15	TRP	CE2-CD2-CG	-7.88	101.00	107.30
1	A	319	TYR	CB-CG-CD2	-7.63	116.42	121.00
1	A	15	TRP	CD1-CG-CD2	7.57	112.36	106.30
1	B	15	TRP	CE2-CD2-CG	-7.37	101.40	107.30
1	B	149	TYR	CB-CG-CD1	-7.03	116.78	121.00
1	A	369	ARG	NE-CZ-NH1	7.01	123.81	120.30
1	A	368	ILE	N-CA-C	-6.86	92.47	111.00
1	B	314	TRP	CD1-CG-CD2	6.85	111.78	106.30
1	B	319	TYR	CB-CG-CD2	-6.65	117.01	121.00
1	A	101	ARG	NE-CZ-NH2	-6.42	117.09	120.30
1	B	314	TRP	CE2-CD2-CG	-6.35	102.22	107.30
1	A	314	TRP	CE2-CD2-CG	-6.30	102.26	107.30
1	B	368	ILE	N-CA-C	-6.29	94.01	111.00
1	B	89	VAL	N-CA-CB	-6.17	97.92	111.50
1	A	15	TRP	CG-CD2-CE3	6.09	139.39	133.90
1	A	128	ARG	NE-CZ-NH2	-5.96	117.32	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	262	VAL	N-CA-CB	-5.92	98.47	111.50
1	A	149	TYR	CB-CG-CD2	-5.90	117.46	121.00
1	B	37	ARG	NE-CZ-NH1	5.87	123.24	120.30
1	A	314	TRP	CG-CD1-NE1	-5.87	104.23	110.10
1	A	37	ARG	NE-CZ-NH1	5.73	123.17	120.30
1	B	323	LYS	N-CA-C	-5.73	95.53	111.00
1	A	323	LYS	N-CA-C	-5.52	96.09	111.00
1	B	169	VAL	CG1-CB-CG2	-5.47	102.14	110.90
1	B	218	ARG	NE-CZ-NH1	5.33	122.97	120.30
1	A	185	ASN	CB-CA-C	-5.33	99.74	110.40
1	B	177	SER	CA-CB-OG	-5.30	96.89	111.20
1	A	133	ARG	NE-CZ-NH1	5.22	122.91	120.30
1	A	128	ARG	NE-CZ-NH1	5.21	122.91	120.30
1	A	128	ARG	CG-CD-NE	5.20	122.71	111.80
1	A	180	TYR	CB-CG-CD2	-5.16	117.90	121.00
1	B	312	ARG	CG-CD-NE	5.11	122.53	111.80
1	B	268	VAL	CA-CB-CG1	-5.09	103.26	110.90
1	B	369	ARG	NE-CZ-NH1	5.03	122.81	120.30
1	A	189	VAL	CG1-CB-CG2	-5.02	102.87	110.90

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	2774	0	2846	52	0
1	B	2774	0	2846	52	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	B	1	0	0	0	0
4	A	44	0	26	2	0
4	B	44	0	26	3	0
5	A	45	0	0	0	0
5	B	38	0	0	0	0
All	All	5724	0	5744	101	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 9.

All (101) 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:187:ALA:HB2	1:A:290:VAL:HG21	1.62	0.81
1:B:348:HIS:HD2	1:B:361:LEU:HD13	1.47	0.80
1:A:73:VAL:HG21	1:A:83:VAL:HG11	1.65	0.78
1:B:178:THR:HG21	4:B:377:NAD:C4N	2.14	0.77
1:A:171:LEU:HD21	1:A:369:ARG:HG3	1.68	0.76
1:B:26:VAL:HG12	1:B:132:CYS:HB2	1.67	0.76
1:B:97:CYS:SG	1:B:99:LYS:HE3	2.25	0.75
1:B:90:ILE:HD12	1:B:160:ILE:HG21	1.71	0.73
1:B:251:GLN:HG2	1:B:280:LEU:HB2	1.75	0.69
1:A:36:VAL:HG22	1:A:76:VAL:HG12	1.75	0.67
1:A:272:LEU:HD11	1:A:299:GLN:HB3	1.82	0.61
1:B:347:THR:HG21	1:B:368:ILE:H	1.66	0.61
1:B:94:THR:HB	1:B:319:TYR:CD2	2.37	0.60
1:A:174:CYS:SG	4:A:377:NAD:H5N	2.41	0.60
1:B:94:THR:HB	1:B:319:TYR:HD2	1.66	0.60
1:A:283:HIS:CD2	1:A:286:CYS:SG	2.95	0.59
1:B:347:THR:HG22	1:B:369:ARG:O	2.02	0.59
1:B:306:MET:SD	1:B:309:LEU:HD23	2.43	0.59
1:A:108:SER:OG	1:B:286:CYS:HB3	2.03	0.58
1:A:69:ALA:O	1:A:91:PRO:HD2	2.04	0.57
1:B:10:LYS:HA	1:B:24:GLU:O	2.05	0.57
1:A:73:VAL:HG21	1:A:83:VAL:CG1	2.35	0.56
1:B:102:VAL:HG13	1:B:108:SER:HB2	1.87	0.56
1:A:26:VAL:HG12	1:A:132:CYS:HB2	1.87	0.55
1:B:272:LEU:HD11	1:B:299:GLN:HB3	1.87	0.55
1:A:102:VAL:HG13	1:A:108:SER:HB3	1.90	0.54
1:A:32:LYS:O	1:A:77:GLY:HA3	2.08	0.54
1:A:306:MET:HE3	1:A:309:LEU:HB3	1.90	0.54
1:A:171:LEU:CD2	1:A:369:ARG:HG3	2.36	0.53
1:B:174:CYS:SG	1:B:175:GLY:N	2.81	0.53
1:B:348:HIS:NE2	1:B:361:LEU:HD22	2.24	0.53
1:A:304:ASN:OD1	1:A:306:MET:HB2	2.09	0.53
1:A:43:VAL:HG22	1:A:69:ALA:HB2	1.90	0.53
1:A:90:ILE:HD11	1:A:169:VAL:HG13	1.91	0.52
1:B:271:ARG:HB2	1:B:274:THR:OG1	2.10	0.52
1:A:251:GLN:H	1:A:251:GLN:NE2	2.09	0.51
1:B:355:ILE:HG13	1:B:372:LEU:HD11	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:27:GLU:HB2	1:B:131:THR:OG1	2.10	0.50
1:A:272:LEU:HD22	1:A:301:LEU:HG	1.92	0.50
1:B:283:HIS:HD2	1:B:285:ALA:H	1.59	0.50
1:B:251:GLN:HG2	1:B:280:LEU:CB	2.41	0.50
1:B:219:ILE:HB	1:B:237:ALA:HA	1.94	0.50
1:A:175:GLY:HA2	1:A:203:VAL:HG22	1.94	0.50
1:A:90:ILE:HG13	1:A:160:ILE:HD13	1.95	0.49
1:B:194:THR:HG22	1:B:262:VAL:HG22	1.94	0.49
1:A:128:ARG:HD3	1:A:138:HIS:HA	1.93	0.49
1:A:199:GLY:O	1:A:204:GLY:HA3	2.13	0.49
1:B:160:ILE:HB	1:B:332:VAL:HG11	1.94	0.48
1:B:354:LYS:HA	1:B:354:LYS:HE2	1.96	0.47
1:B:229:PHE:O	1:B:233:LYS:HG3	2.13	0.47
1:B:292:VAL:O	4:B:377:NAD:H2N	2.14	0.47
1:B:209:MET:HE3	1:B:345:LEU:HD11	1.95	0.47
1:A:88:LYS:HD3	1:A:166:LEU:HD21	1.96	0.47
1:B:200:LEU:HD11	1:B:221:ALA:HB1	1.97	0.47
1:B:174:CYS:SG	4:B:377:NAD:H5N	2.55	0.47
1:B:348:HIS:CD2	1:B:361:LEU:HD13	2.38	0.46
1:B:294:VAL:HA	1:B:295:PRO:HD3	1.78	0.46
1:A:69:ALA:HA	1:A:170:CYS:HB2	1.98	0.46
1:B:171:LEU:HD12	1:B:342:LEU:HB3	1.98	0.46
1:B:9:CYS:HB2	1:B:148:GLN:OE1	2.15	0.46
1:B:9:CYS:O	1:B:25:ASP:HA	2.16	0.45
1:A:172:ILE:HG22	1:A:328:ILE:HG23	1.98	0.45
1:B:271:ARG:O	1:B:275:MET:HG3	2.16	0.45
1:A:10:LYS:HA	1:A:24:GLU:O	2.17	0.45
1:A:292:VAL:O	4:A:377:NAD:H2N	2.17	0.45
1:B:128:ARG:HG2	1:B:138:HIS:HA	1.99	0.45
1:A:129:ARG:NH1	1:A:129:ARG:HG2	2.32	0.44
1:B:31:PRO:HD3	1:B:37:ARG:HB2	2.00	0.44
1:B:40:MET:HG3	1:B:147:SER:O	2.17	0.44
1:A:312:ARG:HH11	1:A:312:ARG:HD2	1.70	0.43
1:A:89:VAL:HG12	1:A:159:LYS:HA	2.00	0.43
1:A:43:VAL:HG23	1:A:374:PHE:HE1	1.83	0.43
1:A:100:CYS:HB2	1:A:112:LEU:HD12	1.99	0.43
1:A:128:ARG:O	1:A:129:ARG:NH1	2.51	0.43
1:A:303:ILE:HG21	1:A:314:TRP:CH2	2.53	0.43
1:A:294:VAL:HA	1:A:295:PRO:HD3	1.73	0.43
1:B:330:LYS:HB3	1:B:330:LYS:HE3	1.89	0.43
1:B:92:LEU:HA	1:B:319:TYR:OH	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:196:ALA:HB2	1:A:262:VAL:HG11	2.00	0.43
1:B:158:ALA:HB1	1:B:329:PRO:HD3	2.00	0.43
1:A:31:PRO:HD3	1:A:37:ARG:HB2	2.01	0.43
1:A:171:LEU:HA	1:A:171:LEU:HD23	1.83	0.42
1:A:52:VAL:HG21	1:A:140:PHE:CE1	2.54	0.42
1:A:209:MET:HE2	1:A:235:LEU:HD22	2.02	0.42
1:A:182:SER:O	1:A:186:VAL:HB	2.19	0.42
1:A:241:ILE:HD13	1:A:241:ILE:HG21	1.86	0.42
1:A:309:LEU:HD21	1:B:294:VAL:HG22	2.01	0.41
1:A:101:ARG:HD3	1:B:283:HIS:CE1	2.56	0.41
1:B:154:GLU:O	1:B:157:VAL:HG12	2.21	0.41
1:B:272:LEU:HD22	1:B:301:LEU:HG	2.02	0.41
1:B:231:LYS:HA	1:B:231:LYS:HD3	1.85	0.41
1:A:200:LEU:HD21	1:A:221:ALA:HB1	2.03	0.41
1:B:358:GLY:HA2	1:B:361:LEU:HD12	2.03	0.41
1:A:130:PHE:HB2	1:A:137:ILE:HB	2.02	0.41
1:B:276:MET:CE	1:B:276:MET:HA	2.51	0.41
1:A:135:LYS:HA	1:A:136:PRO:HD3	1.98	0.40
1:A:40:MET:HB3	1:A:374:PHE:CE1	2.56	0.40
1:A:218:ARG:HA	1:A:238:THR:HG21	2.03	0.40
1:B:347:THR:HG21	1:B:368:ILE:N	2.33	0.40
1:B:94:THR:H	1:B:319:TYR:HE2	1.68	0.40
1:A:69:ALA:HB3	1:A:145:THR:HG21	2.03	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	372/374 (100%)	339 (91%)	32 (9%)	1 (0%)	46 68
1	B	372/374 (100%)	332 (89%)	31 (8%)	9 (2%)	7 11

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	744/748 (100%)	671 (90%)	63 (8%)	10 (1%)	15	26

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	3	ALA
1	B	169	VAL
1	B	175	GLY
1	B	363	HIS
1	B	97	CYS
1	B	145	THR
1	B	67	HIS
1	A	368	ILE
1	B	4	GLY
1	B	98	GLY

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	304/304 (100%)	286 (94%)	18 (6%)	24	44
1	B	304/304 (100%)	280 (92%)	24 (8%)	15	28
All	All	608/608 (100%)	566 (93%)	42 (7%)	19	35

All (42) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	19	LYS
1	A	27	GLU
1	A	39	LYS
1	A	78	GLU
1	A	83	VAL
1	A	84	LYS
1	A	128	ARG
1	A	131	THR

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Mol	Chain	Res	Type
1	A	167	GLU
1	A	169	VAL
1	A	231	LYS
1	A	239	GLU
1	A	251	GLN
1	A	281	CYS
1	A	306	MET
1	A	319	TYR
1	A	357	GLU
1	A	373	THR
1	B	2	THR
1	B	19	LYS
1	B	89	VAL
1	B	97	CYS
1	B	99	LYS
1	B	107	GLU
1	B	112	LEU
1	B	131	THR
1	B	190	THR
1	B	212	LYS
1	B	226	LYS
1	B	239	GLU
1	B	243	PRO
1	B	244	GLN
1	B	251	GLN
1	B	262	VAL
1	B	267	GLU
1	B	274	THR
1	B	276	MET
1	B	319	TYR
1	B	330	LYS
1	B	336	MET
1	B	357	GLU
1	B	373	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	251	GLN
1	A	283	HIS
1	A	299	GLN
1	A	300	ASN

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Mol	Chain	Res	Type
1	A	348	HIS
1	B	244	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 carbohydrates in this entry.

5.6 Ligand geometry ⓘ

Of 7 ligands modelled in this entry, 5 are monoatomic - leaving 2 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	NAD	A	377	-	38,48,48	2.04	5 (13%)	47,73,73	2.00	11 (23%)
4	NAD	B	377	-	38,48,48	2.04	6 (15%)	47,73,73	2.04	13 (27%)

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	NAD	A	377	-	-	0/22/62/62	0/5/5/5
4	NAD	B	377	-	-	0/22/62/62	0/5/5/5

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	377	NAD	C3N-C7N	-9.90	1.34	1.50
4	A	377	NAD	C3N-C7N	-9.74	1.35	1.50
4	A	377	NAD	C2N-C3N	-3.33	1.33	1.39
4	B	377	NAD	C4N-C3N	-2.79	1.34	1.39
4	B	377	NAD	C2N-C3N	-2.68	1.34	1.39
4	B	377	NAD	C5N-C4N	-2.64	1.33	1.38
4	A	377	NAD	C5A-N7A	-2.60	1.30	1.39
4	B	377	NAD	C5A-N7A	-2.48	1.31	1.39
4	A	377	NAD	C5N-C4N	-2.33	1.34	1.38
4	A	377	NAD	C5A-C4A	-2.22	1.35	1.40
4	B	377	NAD	C3D-C4D	-2.05	1.47	1.53

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	377	NAD	N3A-C2A-N1A	-7.23	123.36	128.89
4	B	377	NAD	N3A-C2A-N1A	-6.41	123.98	128.89
4	B	377	NAD	O7N-C7N-N7N	-4.82	115.81	122.59
4	A	377	NAD	O7N-C7N-N7N	-4.80	115.84	122.59
4	B	377	NAD	C5D-C4D-C3D	-3.45	101.52	115.21
4	B	377	NAD	C4B-O4B-C1B	-3.36	106.02	109.72
4	A	377	NAD	C2B-C1B-N9A	-3.13	109.51	114.29
4	B	377	NAD	O2D-C2D-C3D	-2.99	102.09	111.83
4	A	377	NAD	O2D-C2D-C3D	-2.81	102.67	111.83
4	A	377	NAD	C5D-C4D-C3D	-2.65	104.71	115.21
4	A	377	NAD	O3D-C3D-C4D	-2.41	103.82	111.05
4	A	377	NAD	C4B-O4B-C1B	-2.26	107.24	109.72
4	B	377	NAD	O3D-C3D-C4D	-2.10	104.75	111.05
4	B	377	NAD	C4A-C5A-N7A	2.05	111.36	109.48
4	B	377	NAD	C1B-N9A-C4A	2.23	130.30	126.94
4	A	377	NAD	C2N-C3N-C4N	2.31	120.86	118.29
4	B	377	NAD	O3-PN-O5D	2.31	109.06	102.94
4	A	377	NAD	O3-PA-O5B	2.33	109.11	102.94
4	B	377	NAD	O4D-C4D-C5D	2.42	117.96	109.32
4	B	377	NAD	O2N-PN-O3	2.85	118.02	105.09
4	A	377	NAD	O2N-PN-O3	3.19	119.57	105.09
4	B	377	NAD	O3-PA-O5B	3.39	111.94	102.94
4	A	377	NAD	C3N-C7N-N7N	3.68	121.84	117.82
4	B	377	NAD	C3N-C7N-N7N	4.56	122.80	117.82

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	377	NAD	2	0
4	B	377	NAD	3	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	374/374 (100%)	-0.59	0 100 100	5, 24, 42, 62	0
1	B	374/374 (100%)	-0.44	2 (0%) 91 92	6, 31, 52, 59	0
All	All	748/748 (100%)	-0.51	2 (0%) 94 95	5, 27, 48, 62	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	1	SER	2.4
1	B	174	CYS	2.1

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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
4	NAD	A	377	44/44	0.97	0.13	-0.47	2,17,23,32	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
4	NAD	B	377	44/44	0.97	0.13	-0.58	8,26,38,42	0
2	ZN	A	375	1/1	0.99	0.05	-1.62	35,35,35,35	0
2	ZN	B	375	1/1	0.99	0.02	-1.88	29,29,29,29	0
2	ZN	B	376	1/1	0.99	0.12	-2.18	34,34,34,34	1
2	ZN	A	376	1/1	0.98	0.06	-3.06	26,26,26,26	1
3	CL	B	601	1/1	0.97	0.14	-	42,42,42,42	0

6.5 Other polymers [i](#)

There are no such residues in this entry.