



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 24, 2024 – 07:19 pm BST

PDB ID : 8PUT
Title : IF5A in complex with Deoxyhypusine synthase
Authors : Ennifar, E.; D'agostino, M.
Deposited on : 2023-07-17
Resolution : 2.00 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 : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.37.1
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

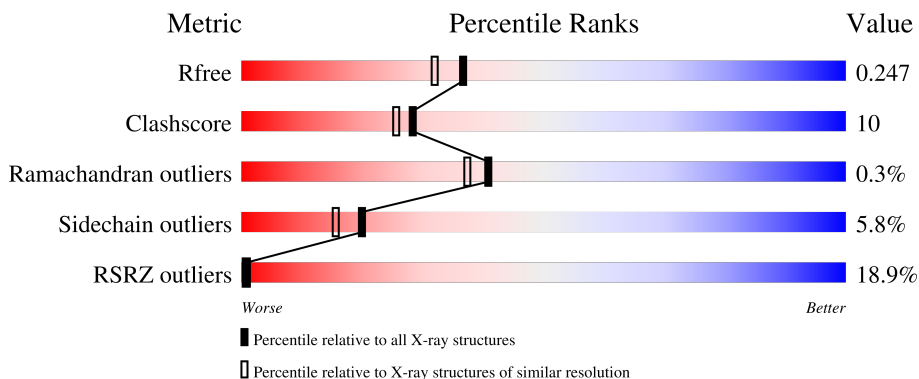
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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	312	 8% 84% 16%
1	B	312	 9% 86% 13% .
1	C	312	 13% 74% 22% .
1	D	312	 13% 70% 28% ..
2	E	131	 28% 63% 34% ..

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Mol	Chain	Length	Quality of chain
2	F	131	
2	G	131	
2	H	131	

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
3	NAD	C	402	-	-	-	X

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 14257 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 Probable deoxyhypusine synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	312	2476	1605	411	455	5	0	0	0
1	B	312	2476	1605	411	455	5	0	0	0
1	C	312	2476	1605	411	455	5	0	0	0
1	D	312	2476	1605	411	455	5	0	0	0

- Molecule 2 is a protein called Translation initiation factor 5A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	E	129	1000	637	167	191	5	0	0	0
2	F	130	1006	640	168	193	5	0	0	0
2	G	129	1000	637	167	191	5	0	0	0
2	H	129	1000	637	167	191	5	0	0	0

- Molecule 3 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: C₂₁H₂₇N₇O₁₄P₂) (labeled as "Ligand of Interest" by depositor).

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

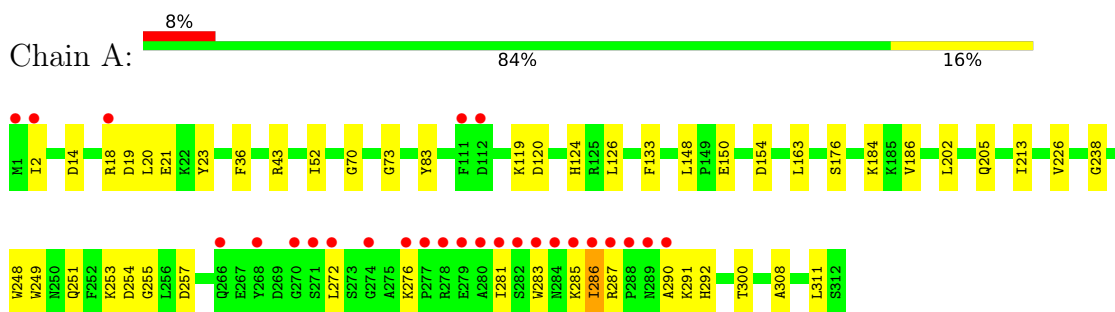
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	82	Total O 82 82	0	0
5	B	48	Total O 48 48	0	0
5	C	5	Total O 5 5	0	0
5	D	9	Total O 9 9	0	0
5	E	1	Total O 1 1	0	0
5	F	5	Total O 5 5	0	0

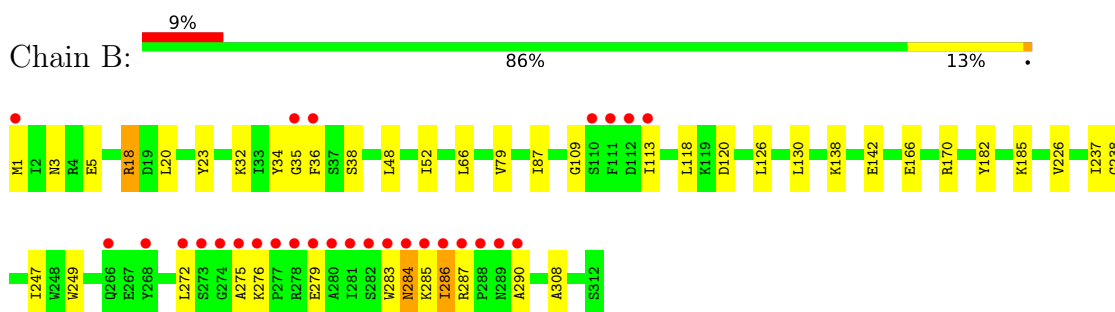
3 Residue-property plots [i](#)

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.

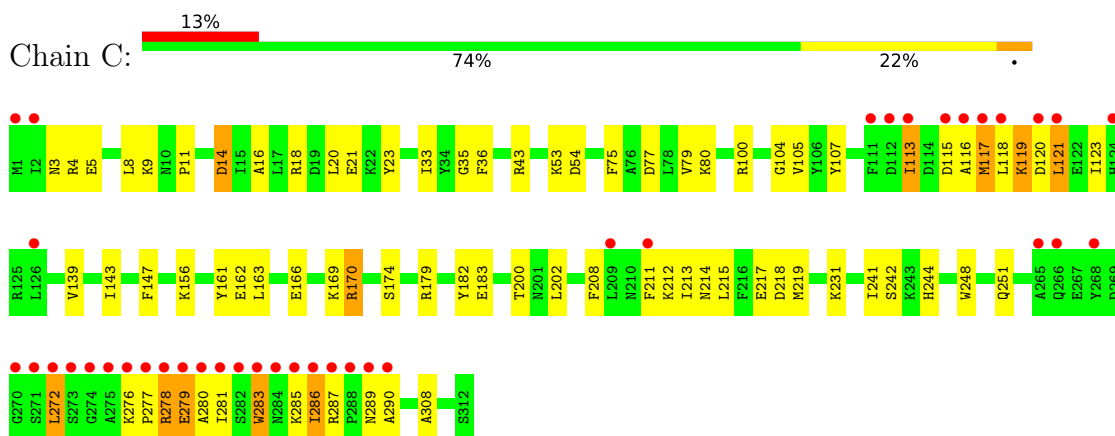
- Molecule 1: Probable deoxyhypusine synthase



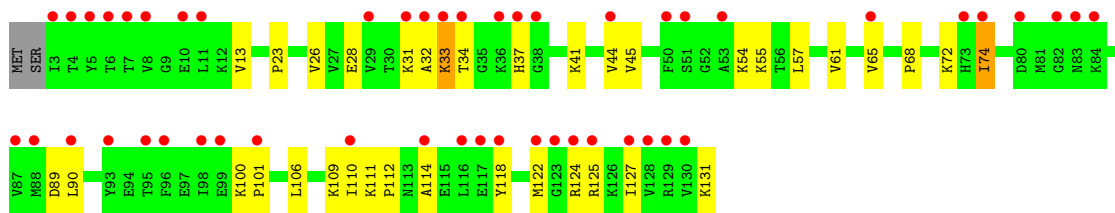
- Molecule 1: Probable deoxyhypusine synthase



- Molecule 1: Probable deoxyhypusine synthase



- Molecule 1: Probable deoxyhypusine synthase



4 Data and refinement statistics i

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	115.37Å 136.76Å 144.02Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.83 – 2.00 99.17 – 1.87	Depositor EDS
% Data completeness (in resolution range)	57.3 (29.83-2.00) 44.5 (99.17-1.87)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.06 (at 1.87Å)	Xtrriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.190 , 0.247 0.189 , 0.247	Depositor DCC
R_{free} test set	4493 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	31.4	Xtrriage
Anisotropy	0.180	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 68.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.010 for -h,l,k	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	14257	wwPDB-VP
Average B, all atoms (Å ²)	79.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 20.07 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 9.4175e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: PEG, NAD

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	0.26	0/2527	0.49	0/3409
1	B	0.27	0/2527	0.50	0/3409
1	C	0.26	0/2527	0.51	0/3409
1	D	0.27	0/2527	0.53	1/3409 (0.0%)
2	E	0.28	0/1014	0.55	0/1367
2	F	0.26	0/1020	0.54	0/1375
2	G	0.27	0/1014	0.59	0/1367
2	H	0.30	0/1014	0.55	0/1367
All	All	0.27	0/14170	0.52	1/19112 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	279	GLU	N-CA-C	-5.62	95.83	111.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2476	0	2521	31	0
1	B	2476	0	2521	28	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	2476	0	2521	59	0
1	D	2476	0	2521	68	0
2	E	1000	0	1039	32	0
2	F	1006	0	1044	13	0
2	G	1000	0	1039	50	0
2	H	1000	0	1039	25	0
3	A	44	0	25	2	0
3	B	44	0	25	2	0
3	C	88	0	50	2	0
4	A	7	0	10	0	0
4	B	14	0	20	0	0
5	A	82	0	0	0	0
5	B	48	0	0	0	0
5	C	5	0	0	0	0
5	D	9	0	0	0	0
5	E	1	0	0	0	0
5	F	5	0	0	0	0
All	All	14257	0	14375	280	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 10.

All (280) 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:251:GLN:HE22	2:G:36:LYS:HB2	1.27	0.96
1:D:284:ASN:HD21	2:H:34:THR:HB	1.35	0.92
1:D:251:GLN:HB3	1:D:285:LYS:HG2	1.58	0.86
1:D:171:ILE:HB	1:D:179:ARG:HG2	1.64	0.80
1:A:287:ARG:HB2	1:A:290:ALA:HB2	1.61	0.80
2:H:111:LYS:HG2	2:H:114:ALA:HB2	1.67	0.76
1:D:276:LYS:O	1:D:279:GLU:HG3	1.85	0.76
1:B:247:ILE:HG22	1:B:285:LYS:HD3	1.68	0.75
2:G:87:VAL:HG12	2:G:88:MET:H	1.51	0.75
1:B:275:ALA:HB1	1:B:279:GLU:HG2	1.69	0.75
2:G:78:ILE:H	2:G:87:VAL:HG21	1.53	0.74
2:E:36:LYS:H	2:E:36:LYS:HD2	1.54	0.73
2:E:23:PRO:HB3	2:E:68:PRO:HG3	1.71	0.73
2:H:37:HIS:HD1	2:H:41:LYS:HE3	1.54	0.73
2:F:4:THR:HG23	2:F:67:VAL:HB	1.72	0.72
1:A:285:LYS:HZ3	2:F:36:LYS:HD3	1.55	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:116:LEU:HD23	2:G:127:ILE:HG23	1.70	0.71
2:G:29:VAL:HG22	2:G:44:VAL:HG12	1.73	0.70
2:G:116:LEU:HA	2:G:130:VAL:HA	1.72	0.70
1:B:138:LYS:NZ	1:B:142:GLU:OE2	2.26	0.69
2:F:80:ASP:O	2:F:82:GLY:N	2.26	0.69
2:E:77:ILE:HD13	2:E:85:ILE:HG23	1.75	0.69
1:B:35:GLY:HA3	1:D:300:THR:HG21	1.75	0.68
2:E:115:GLU:HG3	2:E:131:LYS:HB2	1.76	0.68
1:D:105:VAL:HG23	1:D:107:TYR:HE1	1.59	0.67
1:D:287:ARG:HB2	1:D:290:ALA:HB2	1.77	0.67
2:F:78:ILE:HD11	2:F:88:MET:HB2	1.75	0.67
2:G:104:ASP:O	2:G:105:GLU:HG3	1.94	0.67
1:B:287:ARG:HB2	1:B:290:ALA:HB2	1.78	0.66
1:D:119:LYS:O	1:D:120:ASP:HB2	1.94	0.66
1:A:21:GLU:HG3	1:A:311:LEU:HD13	1.77	0.66
1:A:238:GLY:HA2	3:A:401:NAD:H1B	1.77	0.66
1:D:122:GLU:HG2	1:D:133:PHE:HE2	1.61	0.66
1:D:124:HIS:NE2	1:D:133:PHE:HD1	1.94	0.65
2:E:85:ILE:HD13	2:E:100:LYS:HG3	1.79	0.65
1:B:66:LEU:HD21	1:B:237:ILE:HG21	1.79	0.64
1:C:113:ILE:HG23	1:C:115:ASP:H	1.62	0.64
1:C:244:HIS:HB2	1:C:272:LEU:HD21	1.79	0.64
1:D:4:ARG:NH2	1:D:122:GLU:O	2.31	0.64
2:G:83:ASN:OD1	2:G:84:LYS:N	2.30	0.63
1:C:287:ARG:HB2	1:C:290:ALA:HB2	1.80	0.63
1:A:43:ARG:NH2	1:A:292:HIS:O	2.32	0.63
2:H:34:THR:OG1	2:H:37:HIS:NE2	2.32	0.62
1:C:169:LYS:HG2	1:C:182:TYR:CZ	2.35	0.62
2:G:101:PRO:HG2	2:G:106:LEU:HD13	1.81	0.61
1:C:117:MET:SD	1:C:117:MET:N	2.71	0.61
1:D:122:GLU:HA	1:D:133:PHE:CE2	2.35	0.61
2:F:103:GLU:O	2:F:104:ASP:HB2	2.01	0.61
1:B:284:ASN:HB2	2:E:36:LYS:CE	2.31	0.61
1:B:3:ASN:ND2	1:B:5:GLU:OE1	2.35	0.60
2:H:101:PRO:HD2	2:H:110:ILE:HD11	1.84	0.59
2:G:103:GLU:H	2:G:106:LEU:HD11	1.68	0.59
1:A:300:THR:HG21	1:C:35:GLY:HA3	1.84	0.59
1:D:124:HIS:HE2	1:D:133:PHE:HD1	1.50	0.59
2:E:116:LEU:HD22	2:E:127:ILE:HD13	1.84	0.59
2:G:63:GLN:OE1	2:G:64:GLN:NE2	2.35	0.59
2:G:98:ILE:HD12	2:G:125:ARG:HG3	1.85	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:248:TRP:HA	1:A:285:LYS:HE3	1.84	0.59
1:C:14:ASP:OD1	1:C:100:ARG:NH2	2.36	0.59
1:C:166:GLU:O	1:C:170:ARG:HD2	2.02	0.59
1:D:124:HIS:CE1	1:D:133:PHE:HA	2.38	0.58
1:C:278:ARG:HD2	1:D:115:ASP:HB2	1.86	0.58
1:D:205:GLN:HB3	1:D:209:LEU:HD22	1.84	0.58
1:D:283:TRP:HE3	1:D:285:LYS:H	1.52	0.58
1:D:8:LEU:HD21	1:D:123:ILE:HD11	1.86	0.57
1:D:251:GLN:CB	1:D:285:LYS:HG2	2.32	0.57
2:G:101:PRO:HG3	2:G:127:ILE:HB	1.86	0.57
2:F:104:ASP:O	2:F:108:SER:OG	2.22	0.57
1:C:105:VAL:HG13	1:C:107:TYR:HE1	1.68	0.57
1:D:102:PHE:CD2	1:D:143:ILE:HG12	2.40	0.57
2:G:126:LYS:HD3	2:G:127:ILE:H	1.68	0.56
1:C:113:ILE:HD12	1:C:118:LEU:HG	1.86	0.56
1:B:238:GLY:HA2	3:B:401:NAD:H1B	1.86	0.56
2:H:28:GLU:HB3	2:H:45:VAL:HB	1.88	0.56
2:E:16:TYR:CE1	2:E:25:ARG:HG3	2.41	0.56
1:A:283:TRP:HB3	1:A:285:LYS:HD2	1.86	0.56
2:E:4:THR:HG23	2:E:67:VAL:HB	1.87	0.56
3:C:402:NAD:H8A	1:D:271:SER:HB3	1.86	0.56
2:G:119:TRP:HZ3	2:G:128:VAL:HB	1.71	0.55
1:C:161:TYR:CE1	1:C:162:GLU:HG3	2.41	0.55
2:H:23:PRO:HB3	2:H:68:PRO:HG3	1.87	0.55
1:C:147:PHE:HD2	1:C:170:ARG:HE	1.53	0.55
1:D:124:HIS:CD2	2:G:36:LYS:HG2	2.41	0.55
1:D:166:GLU:O	1:D:170:ARG:HD2	2.07	0.55
1:D:181:ALA:HA	1:D:186:VAL:HG22	1.89	0.55
2:G:100:LYS:HE3	2:G:110:ILE:HG13	1.88	0.55
2:H:106:LEU:HD13	2:H:127:ILE:HG22	1.87	0.55
2:H:32:ALA:O	2:H:33:LYS:HG2	2.07	0.55
1:C:8:LEU:HD21	1:C:123:ILE:HD11	1.88	0.54
1:C:251:GLN:NE2	2:G:35:GLY:O	2.40	0.54
1:D:147:PHE:HD2	1:D:170:ARG:HE	1.54	0.54
2:F:70:ILE:HD13	2:F:70:ILE:H	1.73	0.54
2:G:81:MET:HE2	2:G:83:ASN:H	1.73	0.53
2:H:74:ILE:HG23	2:H:90:LEU:HB2	1.90	0.53
1:C:251:GLN:HB2	1:C:285:LYS:HG3	1.90	0.53
1:D:110:SER:OG	1:D:112:ASP:OD1	2.25	0.53
1:D:54:ASP:OD2	1:D:258:TYR:OH	2.27	0.53
2:F:3:ILE:HG13	2:F:66:GLU:HB3	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:77:ILE:HA	2:G:87:VAL:HB	1.90	0.53
1:A:18:ARG:HG3	1:A:19:ASP:H	1.75	0.52
1:A:126:LEU:HD11	3:A:401:NAD:N7N	2.24	0.52
1:D:163:LEU:HD21	1:D:202:LEU:HD21	1.90	0.52
1:D:147:PHE:O	1:D:151:ILE:HG13	2.08	0.52
1:D:253:LYS:NZ	1:D:255:GLY:O	2.43	0.52
2:G:88:MET:HA	2:G:94:GLU:O	2.09	0.52
1:D:214:ASN:HD21	1:D:216:PHE:HD2	1.58	0.52
1:D:4:ARG:HH21	1:D:122:GLU:HB3	1.75	0.52
1:B:283:TRP:O	2:E:36:LYS:HE2	2.10	0.52
2:E:77:ILE:HD12	2:E:86:GLN:O	2.10	0.52
1:B:18:ARG:HD2	1:B:18:ARG:N	2.26	0.51
1:C:100:ARG:HA	1:C:104:GLY:O	2.10	0.51
1:C:163:LEU:HD21	1:C:202:LEU:HD11	1.92	0.51
2:E:6:THR:OG1	2:E:7:THR:N	2.43	0.51
1:D:114:ASP:OD1	1:D:117:MET:HG2	2.10	0.51
1:D:122:GLU:HG2	1:D:133:PHE:CE2	2.42	0.51
1:A:281:ILE:HD13	1:A:286:ILE:HG12	1.92	0.51
2:G:72:LYS:HG3	2:G:119:TRP:NE1	2.26	0.51
1:B:109:GLY:HA3	1:B:130:LEU:HD13	1.92	0.50
2:E:84:LYS:HG2	2:E:99:GLU:OE2	2.12	0.50
1:C:117:MET:O	1:C:121:LEU:HD12	2.11	0.50
1:A:18:ARG:HG3	1:A:19:ASP:N	2.26	0.50
2:G:78:ILE:HG12	2:G:87:VAL:HG21	1.92	0.50
1:D:141:GLU:HG3	1:D:201:ASN:OD1	2.11	0.49
1:D:141:GLU:OE1	2:G:38:GLY:HA3	2.12	0.49
2:G:78:ILE:HG23	2:G:87:VAL:HG11	1.93	0.49
1:A:23:TYR:HD1	1:C:23:TYR:HD1	1.60	0.49
1:C:276:LYS:HD2	1:C:277:PRO:HD2	1.94	0.49
1:B:113:ILE:HD11	1:B:118:LEU:HD11	1.93	0.49
1:C:139:VAL:O	1:C:143:ILE:HD13	2.12	0.49
1:D:101:SER:HB3	1:D:171:ILE:HG23	1.94	0.49
2:E:84:LYS:O	2:E:85:ILE:HD12	2.13	0.49
1:C:116:ALA:O	1:C:119:LYS:HG3	2.13	0.49
2:G:77:ILE:O	2:G:113:ASN:N	2.41	0.49
1:C:119:LYS:HD2	1:C:120:ASP:N	2.28	0.48
1:C:166:GLU:OE1	1:C:170:ARG:NH1	2.46	0.48
2:E:45:VAL:HG11	2:E:54:LYS:HE2	1.95	0.48
2:G:87:VAL:HG12	2:G:88:MET:N	2.24	0.48
1:A:52:ILE:HD12	1:A:83:TYR:HD1	1.78	0.48
2:H:34:THR:HG1	2:H:37:HIS:CE1	2.29	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:20:LEU:HB3	1:A:308:ALA:HB2	1.95	0.48
1:B:32:LYS:HE2	1:D:15:ILE:HG22	1.95	0.48
1:C:200:THR:HG1	1:D:248:TRP:HE1	1.63	0.47
1:D:100:ARG:HA	1:D:104:GLY:O	2.14	0.47
1:D:151:ILE:HD13	1:D:166:GLU:HB3	1.96	0.47
1:B:284:ASN:HB2	2:E:36:LYS:HE3	1.96	0.47
1:C:280:ALA:HA	1:C:283:TRP:CE3	2.50	0.47
1:D:14:ASP:HB3	1:D:73:GLY:HA3	1.97	0.47
2:G:110:ILE:H	2:G:110:ILE:HD13	1.79	0.47
2:H:118:TYR:CE2	2:H:125:ARG:HD3	2.49	0.47
1:A:257:ASP:OD1	1:A:287:ARG:NE	2.46	0.47
1:C:277:PRO:C	1:C:279:GLU:H	2.18	0.47
2:H:34:THR:OG1	2:H:37:HIS:CE1	2.68	0.47
1:B:34:TYR:HA	1:B:38:SER:HB2	1.97	0.47
1:C:20:LEU:HB3	1:C:308:ALA:HB2	1.97	0.46
1:C:119:LYS:HD2	1:C:119:LYS:C	2.34	0.46
1:C:179:ARG:NE	1:C:183:GLU:OE2	2.48	0.46
1:D:11:PRO:HA	1:D:107:TYR:HA	1.96	0.46
1:B:20:LEU:HB3	1:B:308:ALA:HB2	1.98	0.46
1:B:48:LEU:O	1:B:52:ILE:HG12	2.15	0.46
2:E:98:ILE:HD11	2:E:127:ILE:HD11	1.97	0.46
2:H:37:HIS:ND1	2:H:41:LYS:HE3	2.27	0.46
1:C:283:TRP:HB2	1:C:285:LYS:HD2	1.98	0.46
2:E:78:ILE:HG13	2:E:79:ALA:H	1.81	0.46
2:E:103:GLU:OE1	2:E:105:GLU:N	2.48	0.46
1:D:223:LYS:HB2	1:D:249:TRP:CZ3	2.51	0.46
1:C:241:ILE:HA	3:C:401:NAD:H4D	1.98	0.46
1:D:141:GLU:OE2	2:G:41:LYS:NZ	2.45	0.46
2:H:111:LYS:O	2:H:112:PRO:C	2.53	0.46
1:C:113:ILE:HD13	1:C:113:ILE:O	2.16	0.46
1:C:278:ARG:O	1:D:125:ARG:NH2	2.49	0.46
1:D:161:TYR:CE2	1:D:221:LEU:HD22	2.50	0.46
1:A:163:LEU:HD22	1:A:213:ILE:HD11	1.97	0.46
1:C:244:HIS:HB2	1:C:272:LEU:CD2	2.43	0.46
1:D:236:ILE:HG21	1:D:243:LYS:HG3	1.97	0.46
2:H:74:ILE:HD12	2:H:90:LEU:HD22	1.97	0.46
1:A:163:LEU:HD21	1:A:202:LEU:HD21	1.97	0.45
1:D:55:ALA:O	1:D:58:ARG:NH1	2.46	0.45
1:D:124:HIS:NE2	1:D:133:PHE:CD1	2.82	0.45
1:C:11:PRO:HA	1:C:107:TYR:HA	1.99	0.45
2:G:28:GLU:HB2	2:G:45:VAL:HB	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:G:77:ILE:CD1	2:G:85:ILE:HG12	2.46	0.45
2:G:106:LEU:HA	2:G:109:LYS:HE2	1.98	0.45
1:C:3:ASN:ND2	1:C:5:GLU:OE2	2.42	0.45
1:C:289:ASN:OD1	1:C:289:ASN:N	2.48	0.45
2:F:37:HIS:CE1	2:F:41:LYS:HD2	2.52	0.45
1:A:18:ARG:NH1	1:A:19:ASP:OD1	2.50	0.45
1:C:163:LEU:HD22	1:C:211:PHE:HZ	1.81	0.45
2:E:87:VAL:O	2:E:95:THR:HA	2.17	0.45
1:C:80:LYS:NZ	1:C:174:SER:O	2.30	0.45
1:C:166:GLU:O	1:C:169:LYS:HB2	2.17	0.45
1:D:61:SER:HA	1:D:88:VAL:O	2.17	0.45
1:D:276:LYS:HB3	1:D:277:PRO:CD	2.47	0.45
1:A:283:TRP:CB	1:A:285:LYS:HD2	2.47	0.44
1:D:176:SER:HB3	1:D:179:ARG:HB2	1.98	0.44
1:B:226:VAL:HG11	1:B:249:TRP:O	2.17	0.44
2:G:9:GLY:HA3	2:G:61:VAL:HG22	2.00	0.44
1:B:23:TYR:HD1	1:D:23:TYR:HD1	1.65	0.44
1:B:286:ILE:HG12	1:B:287:ARG:N	2.31	0.44
2:E:18:VAL:HG23	2:E:68:PRO:HD3	1.99	0.44
2:G:110:ILE:O	2:G:110:ILE:HG12	2.18	0.44
2:E:3:ILE:HG13	2:E:66:GLU:HB3	2.00	0.44
2:E:36:LYS:H	2:E:36:LYS:CD	2.15	0.44
1:D:159:PRO:HB3	1:D:217:GLU:HB2	1.99	0.44
2:E:83:ASN:HD22	2:E:83:ASN:H	1.65	0.44
2:G:87:VAL:CG1	2:G:88:MET:H	2.25	0.44
1:A:254:ASP:OD1	1:A:287:ARG:HA	2.18	0.44
1:D:124:HIS:NE2	2:G:36:LYS:HG2	2.32	0.44
2:G:22:GLU:OE1	2:G:50:PHE:HB2	2.17	0.44
2:H:31:LYS:HE3	2:H:61:VAL:HG11	2.00	0.44
2:G:117:GLU:HB3	2:G:131:LYS:HD2	2.00	0.44
1:A:14:ASP:HB3	1:A:73:GLY:HA3	1.99	0.43
1:A:119:LYS:HG3	1:B:284:ASN:ND2	2.33	0.43
2:G:86:GLN:HG2	2:G:97:GLU:HB3	2.00	0.43
2:H:44:VAL:HG22	2:H:57:LEU:HB3	2.00	0.43
2:G:126:LYS:HD3	2:G:127:ILE:N	2.32	0.43
1:A:253:LYS:NZ	1:A:255:GLY:O	2.51	0.43
1:C:214:ASN:ND2	1:C:217:GLU:HG2	2.34	0.43
2:E:70:ILE:HG22	2:E:72:LYS:HG2	2.00	0.43
1:A:124:HIS:CE1	1:A:133:PHE:HA	2.53	0.43
1:C:211:PHE:O	1:C:212:LYS:HD3	2.19	0.43
2:E:94:GLU:O	2:E:96:PHE:HD1	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:54:LYS:HE2	2:H:54:LYS:HB2	1.83	0.43
1:C:281:ILE:HG13	1:C:286:ILE:HD11	2.00	0.43
1:D:244:HIS:O	1:D:248:TRP:N	2.45	0.43
2:F:49:VAL:HG11	2:F:121:ILE:HD11	2.01	0.43
1:A:226:VAL:HG11	1:A:249:TRP:O	2.18	0.43
2:E:78:ILE:HG13	2:E:79:ALA:N	2.34	0.43
2:E:8:VAL:HG21	2:E:59:ALA:HB3	2.00	0.43
2:E:68:PRO:HB2	2:E:121:ILE:CG2	2.49	0.43
2:G:23:PRO:HB3	2:G:68:PRO:HG3	2.00	0.42
1:C:213:ILE:HD12	1:C:215:LEU:HG	2.01	0.42
2:G:72:LYS:HG3	2:G:119:TRP:HE1	1.84	0.42
2:E:44:VAL:HG22	2:E:57:LEU:HB3	2.00	0.42
1:A:133:PHE:CD2	2:E:35:GLY:HA2	2.54	0.42
2:G:89:ASP:OD1	2:G:90:LEU:N	2.53	0.42
1:C:75:PHE:O	1:C:79:VAL:HG12	2.19	0.42
1:D:169:LYS:HA	1:D:182:TYR:CD2	2.54	0.42
1:B:166:GLU:O	1:B:170:ARG:NH1	2.48	0.42
1:B:126:LEU:HD21	3:B:401:NAD:H72N	1.84	0.42
2:G:97:GLU:O	2:G:125:ARG:NH2	2.52	0.42
1:B:185:LYS:HD2	1:B:185:LYS:HA	1.88	0.42
1:D:48:LEU:O	1:D:52:ILE:HG12	2.20	0.42
1:B:79:VAL:HG21	1:B:87:ILE:HD11	2.02	0.42
2:G:78:ILE:N	2:G:87:VAL:HG21	2.29	0.42
1:C:3:ASN:HD22	1:C:5:GLU:CD	2.22	0.42
1:D:286:ILE:HG13	1:D:292:HIS:CE1	2.55	0.42
2:G:8:VAL:HA	2:G:11:LEU:HD12	2.02	0.42
1:C:215:LEU:O	1:C:219:MET:HG2	2.19	0.41
1:C:277:PRO:O	1:C:281:ILE:HD12	2.19	0.41
1:D:286:ILE:HG13	1:D:292:HIS:NE2	2.34	0.41
2:G:86:GLN:C	2:G:87:VAL:HG23	2.39	0.41
1:B:276:LYS:O	1:B:279:GLU:HB3	2.20	0.41
1:D:284:ASN:ND2	2:H:34:THR:HB	2.18	0.41
2:G:85:ILE:N	2:G:98:ILE:O	2.48	0.41
2:H:13:VAL:HA	2:H:26:VAL:HG23	2.01	0.41
2:E:118:TYR:CE2	2:E:125:ARG:HD3	2.54	0.41
1:A:251:GLN:OE1	2:F:36:LYS:HB3	2.20	0.41
1:C:251:GLN:HB2	1:C:285:LYS:CG	2.50	0.41
1:D:215:LEU:O	1:D:219:MET:HG2	2.19	0.41
1:C:16:ALA:HB1	1:C:77:ASP:OD2	2.21	0.41
1:C:248:TRP:O	1:C:251:GLN:HB3	2.21	0.41
1:D:159:PRO:HB2	1:D:161:TYR:CE1	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:252:PHE:CE1	2:H:37:HIS:CE1	3.08	0.41
2:F:2:SER:HB3	2:F:69:ILE:H	1.86	0.41
2:F:33:LYS:HE3	2:F:33:LYS:HB2	1.77	0.41
2:H:109:LYS:HE2	2:H:109:LYS:HB3	1.90	0.41
1:C:248:TRP:HA	1:C:285:LYS:HE2	2.02	0.41
1:D:148:LEU:HD23	1:D:205:GLN:HB2	2.03	0.41
1:A:184:LYS:HB2	1:A:186:VAL:HG23	2.03	0.41
1:C:4:ARG:HG2	1:C:8:LEU:HD23	2.02	0.41
1:C:54:ASP:OD1	1:C:231:LYS:HD2	2.21	0.41
1:D:276:LYS:HB3	1:D:277:PRO:HD2	2.03	0.41
2:G:103:GLU:N	2:G:106:LEU:HD11	2.33	0.41
1:B:284:ASN:OD1	1:B:284:ASN:N	2.54	0.40
1:D:71:LEU:HD11	1:D:300:THR:HA	2.02	0.40
1:A:70:GLY:HA3	1:C:33:ILE:HA	2.02	0.40
1:A:148:LEU:HD23	1:A:205:GLN:HB2	2.04	0.40
1:C:208:PHE:HE1	2:H:65:VAL:HG23	1.86	0.40
2:G:77:ILE:HD12	2:G:78:ILE:H	1.86	0.40
2:H:55:LYS:HA	2:H:55:LYS:HD2	1.76	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	310/312 (99%)	306 (99%)	4 (1%)	0	100	100
1	B	310/312 (99%)	302 (97%)	8 (3%)	0	100	100
1	C	310/312 (99%)	305 (98%)	5 (2%)	0	100	100
1	D	310/312 (99%)	300 (97%)	9 (3%)	1 (0%)	41	37
2	E	127/131 (97%)	119 (94%)	8 (6%)	0	100	100
2	F	128/131 (98%)	114 (89%)	12 (9%)	2 (2%)	9	4

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	G	127/131 (97%)	116 (91%)	8 (6%)	3 (2%)	6	2
2	H	127/131 (97%)	120 (94%)	7 (6%)	0	100	100
All	All	1749/1772 (99%)	1682 (96%)	61 (4%)	6 (0%)	41	37

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	120	ASP
2	F	81	MET
2	G	87	VAL
2	F	104	ASP
2	G	122	MET
2	G	130	VAL

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	267/267 (100%)	257 (96%)	10 (4%)	34	32
1	B	267/267 (100%)	259 (97%)	8 (3%)	41	41
1	C	267/267 (100%)	247 (92%)	20 (8%)	13	9
1	D	267/267 (100%)	249 (93%)	18 (7%)	16	11
2	E	110/112 (98%)	104 (94%)	6 (6%)	21	17
2	F	111/112 (99%)	106 (96%)	5 (4%)	27	24
2	G	110/112 (98%)	98 (89%)	12 (11%)	6	3
2	H	110/112 (98%)	102 (93%)	8 (7%)	14	9
All	All	1509/1516 (100%)	1422 (94%)	87 (6%)	20	15

All (87) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	ILE

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Mol	Chain	Res	Type
1	A	36	PHE
1	A	120	ASP
1	A	150	GLU
1	A	154	ASP
1	A	176	SER
1	A	272	LEU
1	A	276	LYS
1	A	286	ILE
1	A	291	LYS
1	B	1	MET
1	B	18	ARG
1	B	36	PHE
1	B	120	ASP
1	B	182	TYR
1	B	272	LEU
1	B	284	ASN
1	B	286	ILE
1	C	9	LYS
1	C	14	ASP
1	C	18	ARG
1	C	21	GLU
1	C	36	PHE
1	C	43	ARG
1	C	53	LYS
1	C	113	ILE
1	C	117	MET
1	C	119	LYS
1	C	121	LEU
1	C	156	LYS
1	C	170	ARG
1	C	218	ASP
1	C	242	SER
1	C	272	LEU
1	C	278	ARG
1	C	279	GLU
1	C	283	TRP
1	C	286	ILE
1	D	2	ILE
1	D	6	ASP
1	D	8	LEU
1	D	18	ARG
1	D	36	PHE

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Mol	Chain	Res	Type
1	D	81	ARG
1	D	120	ASP
1	D	124	HIS
1	D	145	ARG
1	D	153	LYS
1	D	156	LYS
1	D	179	ARG
1	D	194	VAL
1	D	223	LYS
1	D	272	LEU
1	D	278	ARG
1	D	279	GLU
1	D	283	TRP
2	E	4	THR
2	E	15	SER
2	E	36	LYS
2	E	64	GLN
2	E	83	ASN
2	E	111	LYS
2	F	15	SER
2	F	54	LYS
2	F	70	ILE
2	F	81	MET
2	F	111	LYS
2	G	4	THR
2	G	5	TYR
2	G	22	GLU
2	G	49	VAL
2	G	61	VAL
2	G	105	GLU
2	G	110	ILE
2	G	116	LEU
2	G	121	ILE
2	G	124	ARG
2	G	125	ARG
2	G	131	LYS
2	H	33	LYS
2	H	72	LYS
2	H	74	ILE
2	H	89	ASP
2	H	100	LYS
2	H	122	MET

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Mol	Chain	Res	Type
2	H	124	ARG
2	H	131	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	244	HIS
1	C	210	ASN
1	C	251	GLN
1	C	284	ASN
1	D	214	ASN
1	D	284	ASN
2	G	63	GLN
2	G	64	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

7 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
4	PEG	A	402	-	6,6,6	0.48	0	5,5,5	0.46	0
3	NAD	B	401	-	42,48,48	4.23	15 (35%)	50,73,73	1.29	4 (8%)
3	NAD	C	401	-	42,48,48	4.23	15 (35%)	50,73,73	1.28	4 (8%)
3	NAD	A	401	-	42,48,48	4.24	15 (35%)	50,73,73	1.24	3 (6%)
3	NAD	C	402	-	42,48,48	4.24	15 (35%)	50,73,73	1.28	4 (8%)
4	PEG	B	402	-	6,6,6	0.49	0	5,5,5	0.43	0
4	PEG	B	403	-	6,6,6	0.49	0	5,5,5	0.45	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	PEG	A	402	-	-	3/4/4/4	-
3	NAD	B	401	-	-	9/26/62/62	0/5/5/5
3	NAD	C	401	-	-	5/26/62/62	0/5/5/5
3	NAD	A	401	-	-	14/26/62/62	0/5/5/5
3	NAD	C	402	-	-	9/26/62/62	0/5/5/5
4	PEG	B	402	-	-	3/4/4/4	-
4	PEG	B	403	-	-	3/4/4/4	-

All (60) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	401	NAD	O4D-C1D	13.29	1.59	1.41
3	C	402	NAD	O4D-C1D	13.24	1.59	1.41
3	B	401	NAD	O4D-C1D	13.22	1.59	1.41
3	C	401	NAD	O4D-C1D	13.13	1.59	1.41
3	A	401	NAD	C2D-C1D	-12.75	1.34	1.53
3	C	402	NAD	C2D-C1D	-12.66	1.34	1.53
3	B	401	NAD	C2D-C1D	-12.64	1.34	1.53
3	C	401	NAD	C2D-C1D	-12.50	1.34	1.53
3	C	401	NAD	C2B-C3B	-10.91	1.23	1.53
3	A	401	NAD	C2B-C3B	-10.86	1.23	1.53
3	B	401	NAD	C2B-C3B	-10.82	1.23	1.53
3	C	402	NAD	C2B-C3B	-10.79	1.23	1.53
3	C	402	NAD	C2B-C1B	8.22	1.66	1.53
3	C	401	NAD	C2B-C1B	8.06	1.66	1.53
3	B	401	NAD	C2B-C1B	8.02	1.65	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	401	NAD	C2B-C1B	8.00	1.65	1.53
3	C	402	NAD	O4B-C1B	-6.97	1.31	1.41
3	B	401	NAD	O4B-C1B	-6.84	1.31	1.41
3	C	401	NAD	O4B-C1B	-6.81	1.31	1.41
3	A	401	NAD	O4B-C1B	-6.80	1.31	1.41
3	C	401	NAD	O4D-C4D	-6.67	1.30	1.45
3	C	402	NAD	C7N-N7N	6.63	1.45	1.33
3	C	401	NAD	C7N-N7N	6.63	1.45	1.33
3	A	401	NAD	C7N-N7N	6.62	1.45	1.33
3	B	401	NAD	C7N-N7N	6.62	1.45	1.33
3	B	401	NAD	O4D-C4D	-6.54	1.30	1.45
3	A	401	NAD	O4D-C4D	-6.48	1.30	1.45
3	C	402	NAD	O4D-C4D	-6.48	1.30	1.45
3	C	401	NAD	C3N-C7N	3.55	1.55	1.50
3	B	401	NAD	C3N-C7N	3.48	1.55	1.50
3	A	401	NAD	C3N-C7N	3.46	1.55	1.50
3	C	402	NAD	C3N-C7N	3.45	1.55	1.50
3	A	401	NAD	C6A-N6A	3.42	1.46	1.34
3	B	401	NAD	C6A-N6A	3.41	1.46	1.34
3	C	401	NAD	C6A-N6A	3.40	1.46	1.34
3	C	402	NAD	C6A-N6A	3.39	1.46	1.34
3	C	402	NAD	O2B-C2B	3.28	1.50	1.43
3	B	401	NAD	O2B-C2B	3.20	1.50	1.43
3	C	401	NAD	O2B-C2B	3.19	1.50	1.43
3	A	401	NAD	O2B-C2B	3.17	1.50	1.43
3	B	401	NAD	O2D-C2D	3.16	1.50	1.43
3	C	402	NAD	O2D-C2D	3.15	1.50	1.43
3	C	401	NAD	O2D-C2D	3.13	1.50	1.43
3	B	401	NAD	C3B-C4B	3.13	1.61	1.53
3	C	401	NAD	C3B-C4B	3.11	1.60	1.53
3	A	401	NAD	O2D-C2D	3.09	1.50	1.43
3	C	402	NAD	C3B-C4B	3.08	1.60	1.53
3	A	401	NAD	C3B-C4B	3.07	1.60	1.53
3	A	401	NAD	C5B-C4B	-2.93	1.42	1.51
3	B	401	NAD	C5B-C4B	-2.92	1.42	1.51
3	C	401	NAD	C5B-C4B	-2.91	1.42	1.51
3	C	402	NAD	C5B-C4B	-2.84	1.42	1.51
3	B	401	NAD	O3B-C3B	2.62	1.49	1.43
3	C	402	NAD	O3B-C3B	2.62	1.49	1.43
3	C	401	NAD	O3B-C3B	2.60	1.49	1.43
3	A	401	NAD	O3B-C3B	2.60	1.49	1.43
3	A	401	NAD	PA-O5B	2.49	1.69	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	401	NAD	PA-O5B	2.49	1.69	1.59
3	B	401	NAD	PA-O5B	2.48	1.69	1.59
3	C	402	NAD	PA-O5B	2.48	1.69	1.59

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	401	NAD	C3B-C2B-C1B	4.27	107.41	100.98
3	C	401	NAD	N3A-C2A-N1A	-4.23	122.06	128.68
3	C	402	NAD	N3A-C2A-N1A	-4.23	122.07	128.68
3	A	401	NAD	N3A-C2A-N1A	-4.18	122.15	128.68
3	B	401	NAD	N3A-C2A-N1A	-4.11	122.25	128.68
3	C	402	NAD	C3B-C2B-C1B	4.06	107.10	100.98
3	A	401	NAD	C3B-C2B-C1B	3.87	106.81	100.98
3	C	401	NAD	C3B-C2B-C1B	3.71	106.56	100.98
3	C	401	NAD	C3D-C2D-C1D	3.02	105.53	100.98
3	C	402	NAD	C4A-C5A-N7A	-2.48	106.82	109.40
3	A	401	NAD	C4A-C5A-N7A	-2.46	106.84	109.40
3	C	401	NAD	C4A-C5A-N7A	-2.45	106.84	109.40
3	B	401	NAD	C4A-C5A-N7A	-2.36	106.94	109.40
3	B	401	NAD	C3D-C2D-C1D	2.17	104.25	100.98
3	C	402	NAD	C3D-C2D-C1D	2.12	104.17	100.98

There are no chirality outliers.

All (46) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	401	NAD	C5B-O5B-PA-O2A
3	A	401	NAD	O4B-C4B-C5B-O5B
3	A	401	NAD	C5D-O5D-PN-O3
3	B	401	NAD	C5D-O5D-PN-O1N
3	B	401	NAD	C2N-C3N-C7N-O7N
3	B	401	NAD	C2N-C3N-C7N-N7N
3	C	401	NAD	C5D-O5D-PN-O1N
3	C	401	NAD	C5D-O5D-PN-O2N
3	C	402	NAD	C5D-O5D-PN-O3
3	C	402	NAD	C5D-O5D-PN-O1N
3	C	402	NAD	C2N-C3N-C7N-O7N
3	C	402	NAD	C2N-C3N-C7N-N7N
3	C	402	NAD	C4N-C3N-C7N-O7N
3	C	402	NAD	C4N-C3N-C7N-N7N
3	B	401	NAD	C4N-C3N-C7N-N7N

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Mol	Chain	Res	Type	Atoms
3	B	401	NAD	C4N-C3N-C7N-O7N
3	A	401	NAD	C3B-C4B-C5B-O5B
3	B	401	NAD	O4D-C4D-C5D-O5D
3	C	402	NAD	O4D-C4D-C5D-O5D
4	A	402	PEG	O2-C3-C4-O4
4	A	402	PEG	O1-C1-C2-O2
3	A	401	NAD	O4D-C4D-C5D-O5D
4	B	402	PEG	O2-C3-C4-O4
4	B	403	PEG	O2-C3-C4-O4
3	B	401	NAD	PN-O3-PA-O1A
4	B	402	PEG	O1-C1-C2-O2
3	B	401	NAD	C3D-C4D-C5D-O5D
4	B	402	PEG	C4-C3-O2-C2
3	A	401	NAD	C5B-O5B-PA-O3
3	B	401	NAD	C5D-O5D-PN-O3
3	C	401	NAD	PN-O3-PA-O2A
3	C	402	NAD	PN-O3-PA-O2A
3	A	401	NAD	C5B-O5B-PA-O1A
3	A	401	NAD	C5D-O5D-PN-O1N
3	A	401	NAD	C5D-O5D-PN-O2N
3	C	402	NAD	C3D-C4D-C5D-O5D
4	B	403	PEG	C4-C3-O2-C2
3	A	401	NAD	C2N-C3N-C7N-O7N
3	A	401	NAD	C2N-C3N-C7N-N7N
4	B	403	PEG	O1-C1-C2-O2
3	A	401	NAD	C4N-C3N-C7N-N7N
4	A	402	PEG	C1-C2-O2-C3
3	A	401	NAD	C4N-C3N-C7N-O7N
3	C	401	NAD	C5D-O5D-PN-O3
3	A	401	NAD	PA-O3-PN-O1N
3	C	401	NAD	PN-O3-PA-O1A

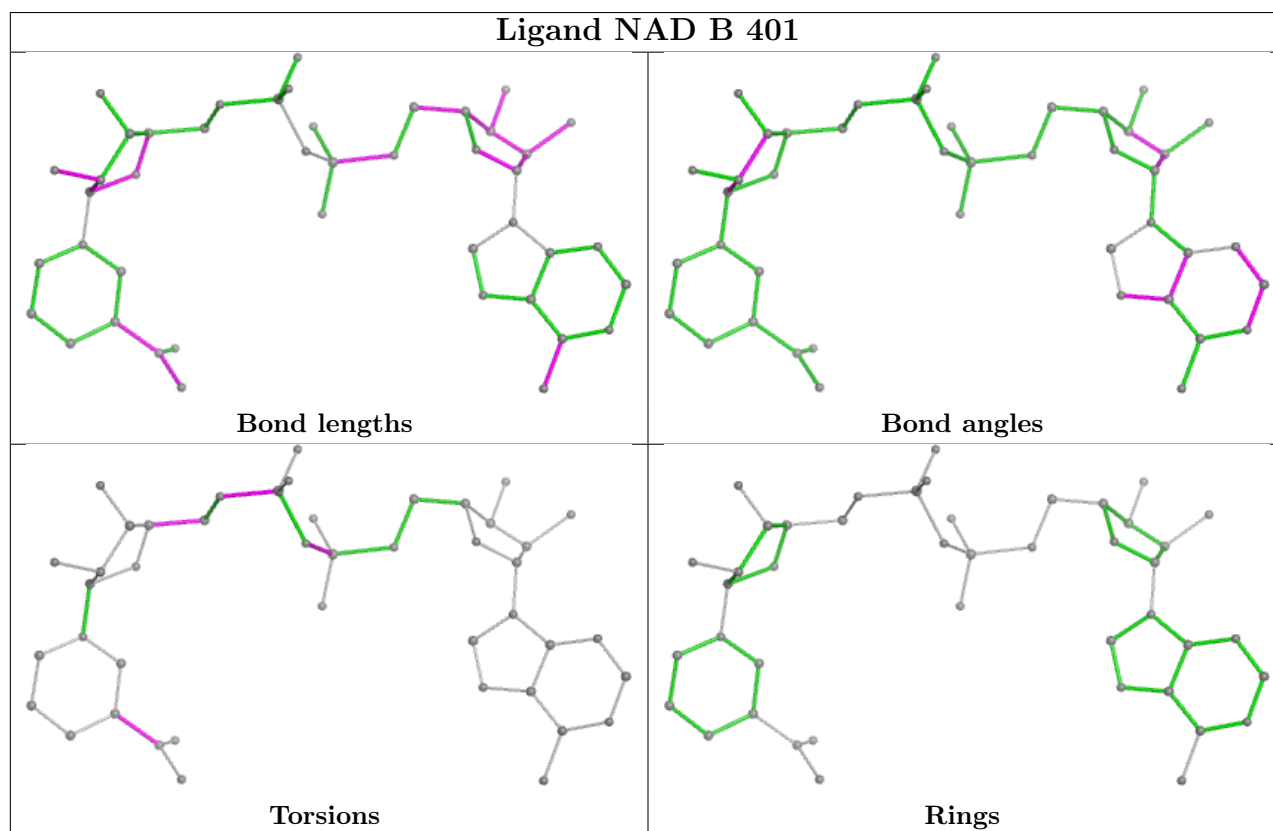
There are no ring outliers.

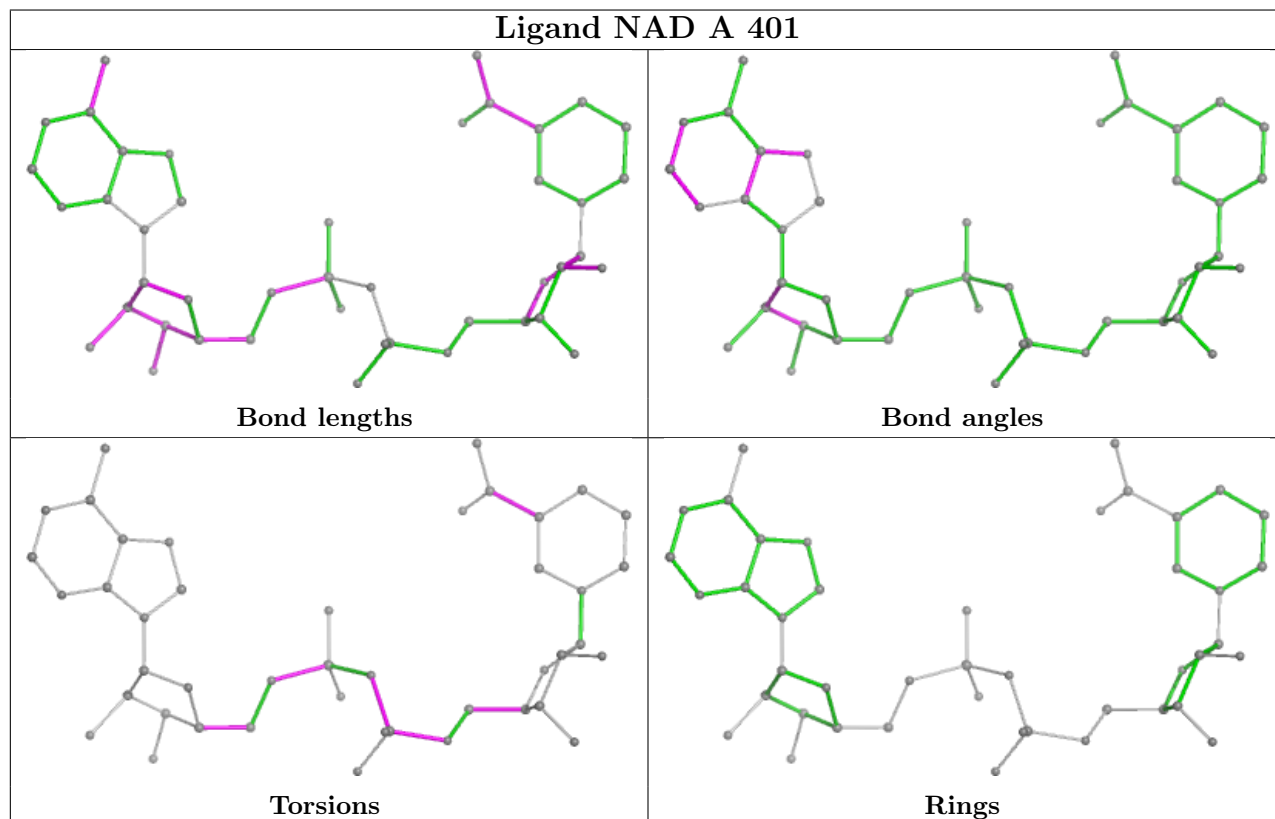
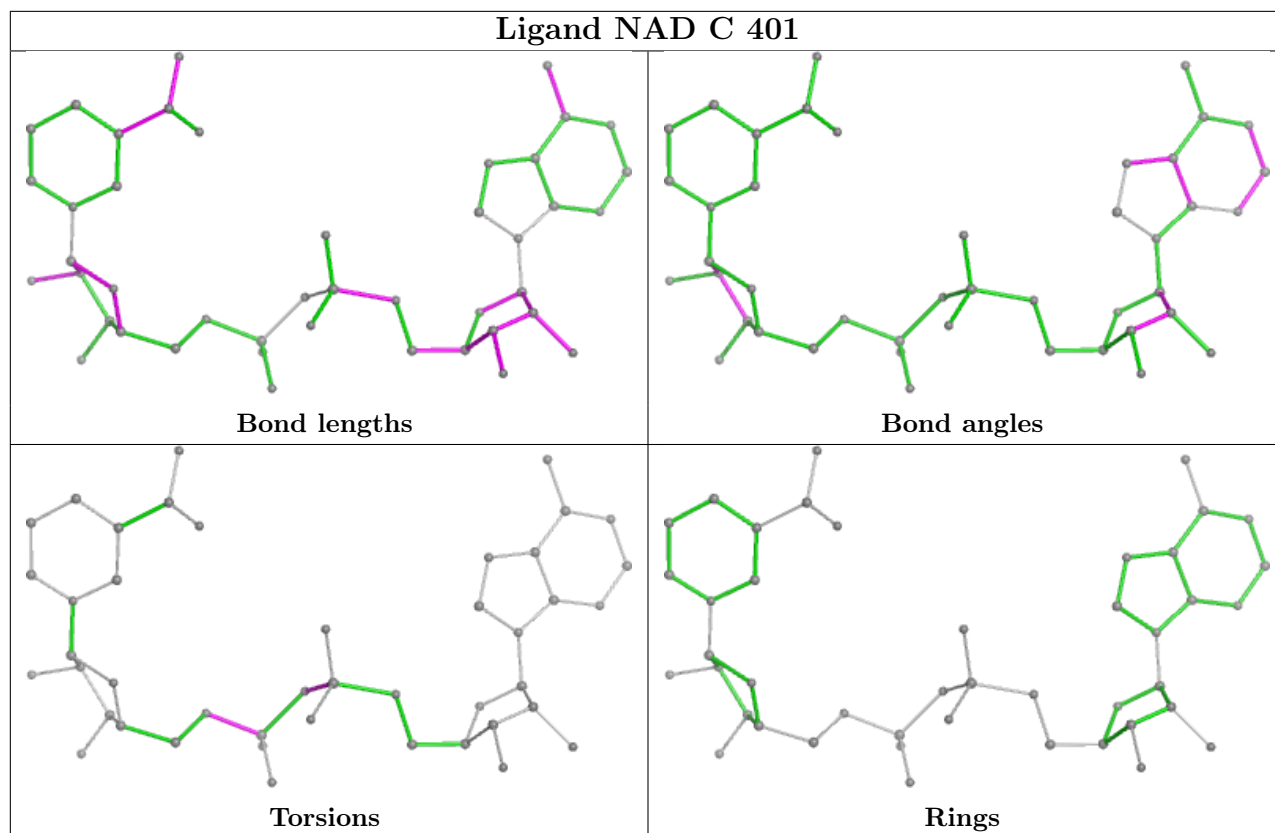
4 monomers are involved in 6 short contacts:

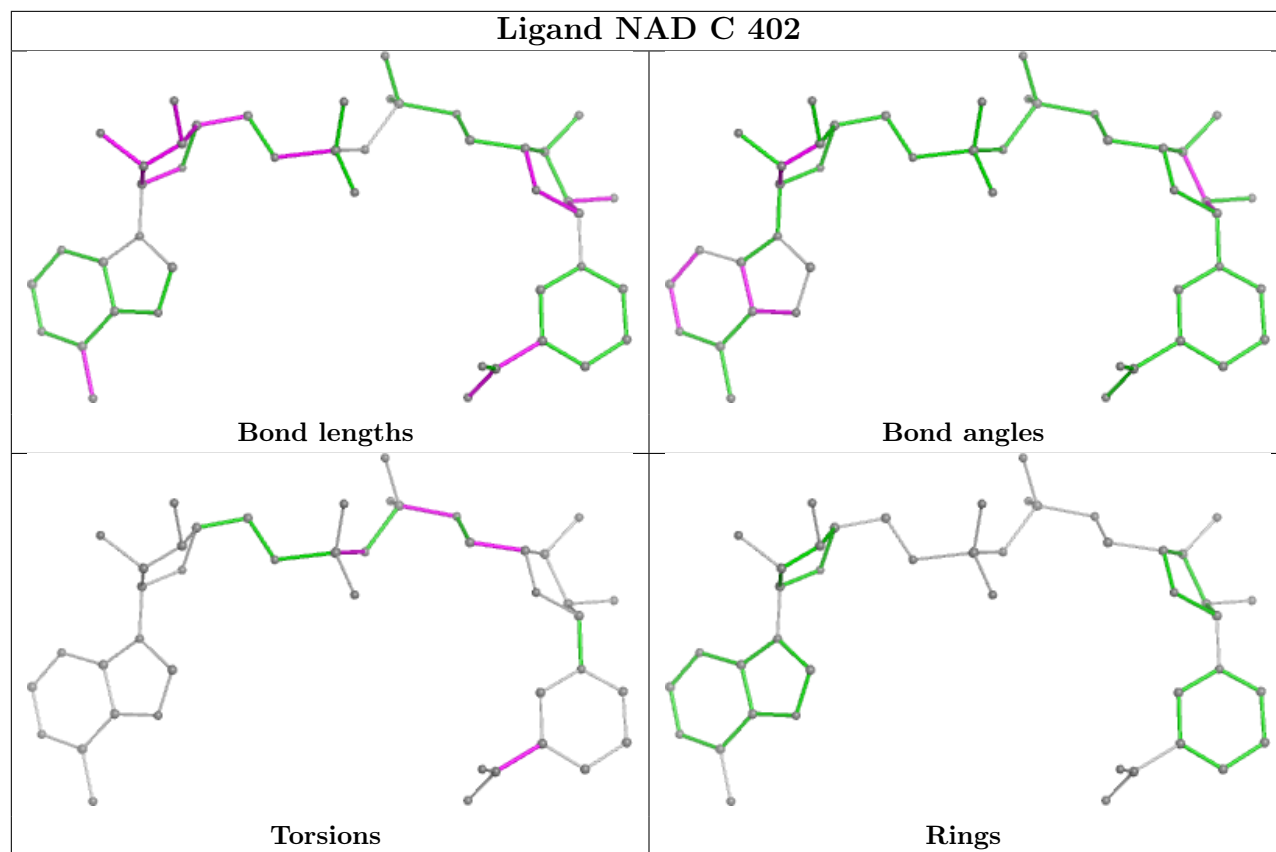
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	401	NAD	2	0
3	C	401	NAD	1	0
3	A	401	NAD	2	0
3	C	402	NAD	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.







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

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	312/312 (100%)	0.55	26 (8%) 11 10	13, 30, 129, 290	0
1	B	312/312 (100%)	0.85	28 (8%) 9 8	13, 33, 140, 291	0
1	C	312/312 (100%)	1.11	39 (12%) 3 3	28, 65, 141, 310	0
1	D	312/312 (100%)	1.19	39 (12%) 3 3	22, 66, 158, 369	0
2	E	129/131 (98%)	1.30	37 (28%) 0 0	36, 104, 172, 189	0
2	F	130/131 (99%)	1.93	48 (36%) 0 0	32, 108, 175, 203	0
2	G	129/131 (98%)	3.41	68 (52%) 0 0	75, 145, 205, 217	0
2	H	129/131 (98%)	1.77	49 (37%) 0 0	80, 118, 145, 179	0
All	All	1765/1772 (99%)	1.27	334 (18%) 1 1	13, 65, 175, 369	0

All (334) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	281	ILE	29.9
1	D	283	TRP	29.5
1	C	281	ILE	28.1
1	D	282	SER	26.0
1	B	279	GLU	23.4
1	C	284	ASN	22.0
1	D	284	ASN	22.0
1	C	282	SER	21.9
1	B	280	ALA	20.3
1	A	281	ILE	19.9
1	B	284	ASN	19.5
1	B	288	PRO	19.5
2	G	74	ILE	19.3
1	C	283	TRP	18.8
1	B	286	ILE	18.0
1	D	279	GLU	17.9

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Mol	Chain	Res	Type	RSRZ
1	C	279	GLU	17.4
1	D	280	ALA	17.1
1	C	280	ALA	16.7
1	D	286	ILE	16.4
1	A	282	SER	16.0
1	B	282	SER	15.9
1	C	277	PRO	14.8
1	D	275	ALA	14.5
1	D	285	LYS	14.0
1	A	283	TRP	13.7
2	F	130	VAL	13.0
1	B	281	ILE	12.7
2	G	78	ILE	12.7
2	F	85	ILE	12.2
1	D	288	PRO	12.1
2	G	110	ILE	11.7
1	C	285	LYS	11.7
1	D	276	LYS	11.7
1	B	278	ARG	11.6
2	G	93	TYR	11.5
2	G	112	PRO	11.4
1	B	285	LYS	11.2
2	G	108	SER	10.9
1	B	289	ASN	10.6
1	B	1	MET	10.1
1	D	287	ARG	9.8
1	A	285	LYS	9.7
2	G	85	ILE	9.5
1	A	277	PRO	9.4
1	C	286	ILE	9.3
2	G	91	GLU	9.2
2	G	116	LEU	9.2
2	G	87	VAL	9.2
1	B	283	TRP	9.1
1	B	277	PRO	8.9
1	A	286	ILE	8.8
1	C	278	ARG	8.6
1	C	270	GLY	8.6
2	F	98	ILE	8.6
1	C	273	SER	8.5
2	G	98	ILE	8.5
2	F	112	PRO	8.5

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Mol	Chain	Res	Type	RSRZ
2	H	74	ILE	8.4
2	F	110	ILE	8.3
1	C	288	PRO	8.3
2	G	86	GLN	8.2
2	G	131	LYS	8.2
1	B	111	PHE	8.1
2	G	96	PHE	8.1
2	G	130	VAL	8.1
2	G	75	GLY	7.9
1	D	278	ARG	7.8
2	E	85	ILE	7.6
1	C	2	ILE	7.5
2	F	129	ARG	7.2
2	G	129	ARG	7.2
2	F	119	TRP	7.0
1	A	289	ASN	6.9
2	G	79	ALA	6.9
2	F	72	LYS	6.9
2	G	127	ILE	6.8
1	A	288	PRO	6.8
2	G	92	SER	6.7
2	F	116	LEU	6.6
2	F	93	TYR	6.6
1	A	280	ALA	6.5
1	B	276	LYS	6.4
2	G	107	ALA	6.4
1	D	289	ASN	6.4
2	G	109	LYS	6.4
2	G	119	TRP	6.4
2	F	81	MET	6.3
1	B	268	TYR	6.3
1	C	113	ILE	6.2
2	E	87	VAL	6.2
1	D	111	PHE	6.2
1	A	284	ASN	6.2
2	E	116	LEU	6.1
2	F	111	LYS	6.1
2	F	74	ILE	6.1
2	E	98	ILE	6.0
2	H	83	ASN	6.0
1	C	276	LYS	6.0
1	A	268	TYR	6.0

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Mol	Chain	Res	Type	RSRZ
1	D	272	LEU	6.0
2	G	106	LEU	6.0
2	G	111	LYS	5.9
2	E	106	LEU	5.9
2	G	90	LEU	5.8
1	C	1	MET	5.8
1	C	289	ASN	5.8
2	F	113	ASN	5.8
2	E	112	PRO	5.8
2	G	3	ILE	5.8
2	G	113	ASN	5.7
2	F	114	ALA	5.7
2	F	88	MET	5.7
1	D	277	PRO	5.6
2	F	104	ASP	5.6
2	F	106	LEU	5.6
1	D	270	GLY	5.5
1	C	272	LEU	5.5
1	D	116	ALA	5.5
1	A	112	ASP	5.5
2	G	70	ILE	5.5
1	C	287	ARG	5.4
2	E	109	LYS	5.4
1	C	275	ALA	5.3
1	D	271	SER	5.3
2	F	92	SER	5.3
2	F	109	LYS	5.3
1	C	266	GLN	5.2
1	D	290	ALA	5.2
2	F	107	ALA	5.2
1	D	274	GLY	5.2
1	A	111	PHE	5.1
2	G	118	TYR	5.1
2	H	93	TYR	5.1
2	G	77	ILE	5.1
1	B	274	GLY	5.0
1	A	270	GLY	4.9
2	E	88	MET	4.9
2	H	123	GLY	4.9
2	E	110	ILE	4.9
2	F	131	LYS	4.9
1	D	273	SER	4.8

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Mol	Chain	Res	Type	RSRZ
1	B	272	LEU	4.7
2	E	79	ALA	4.7
2	E	113	ASN	4.7
2	F	115	GLU	4.5
2	G	105	GLU	4.5
2	G	89	ASP	4.5
2	G	33	LYS	4.5
1	B	287	ARG	4.5
1	D	266	GLN	4.4
2	G	88	MET	4.4
2	G	5	TYR	4.4
1	A	287	ARG	4.4
1	C	118	LEU	4.4
2	G	72	LYS	4.4
2	H	36	LYS	4.4
2	F	77	ILE	4.4
2	H	88	MET	4.4
2	H	8	VAL	4.3
1	B	112	ASP	4.3
2	G	80	ASP	4.3
2	G	125	ARG	4.3
2	G	82	GLY	4.3
1	A	279	GLU	4.2
2	H	34	THR	4.2
1	B	290	ALA	4.2
1	A	276	LYS	4.2
2	G	83	ASN	4.1
2	E	97	GLU	4.1
2	G	115	GLU	4.1
2	F	82	GLY	4.1
2	G	65	VAL	4.1
2	G	128	VAL	4.1
2	G	95	THR	4.1
2	E	77	ILE	4.0
2	F	83	ASN	4.0
1	C	211	PHE	4.0
2	H	37	HIS	4.0
2	H	95	THR	3.9
2	G	114	ALA	3.9
1	D	8	LEU	3.9
2	G	68	PRO	3.8
2	H	11	LEU	3.8

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Mol	Chain	Res	Type	RSRZ
1	B	273	SER	3.8
1	C	290	ALA	3.8
2	F	90	LEU	3.7
2	G	76	GLN	3.7
1	B	275	ALA	3.7
2	G	81	MET	3.7
2	H	65	VAL	3.7
2	E	114	ALA	3.7
2	G	117	GLU	3.7
2	H	32	ALA	3.7
2	E	3	ILE	3.7
2	E	93	TYR	3.7
2	H	118	TYR	3.6
2	G	104	ASP	3.6
1	A	271	SER	3.6
2	G	84	LYS	3.6
1	D	124	HIS	3.6
2	H	129	ARG	3.6
1	A	290	ALA	3.6
2	G	69	ILE	3.6
2	H	99	GLU	3.5
2	E	104	ASP	3.5
2	H	128	VAL	3.5
2	G	50	PHE	3.5
2	F	76	GLN	3.5
2	H	96	PHE	3.5
2	F	78	ILE	3.5
2	F	91	GLU	3.4
1	A	2	ILE	3.4
2	E	96	PHE	3.4
1	C	115	ASP	3.4
2	G	102	THR	3.4
2	G	49	VAL	3.4
1	B	113	ILE	3.3
2	F	100	LYS	3.3
1	C	112	ASP	3.3
2	F	99	GLU	3.3
1	A	278	ARG	3.2
2	E	78	ILE	3.2
1	C	274	GLY	3.2
1	B	36	PHE	3.2
1	D	2	ILE	3.2

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Mol	Chain	Res	Type	RSRZ
2	G	121	ILE	3.2
2	H	124	ARG	3.2
2	F	75	GLY	3.2
2	G	4	THR	3.2
2	E	108	SER	3.2
2	E	69	ILE	3.2
2	G	34	THR	3.1
2	H	73	HIS	3.1
1	D	1	MET	3.1
2	E	74	ILE	3.1
2	F	127	ILE	3.1
2	E	70	ILE	3.1
2	E	105	GLU	3.1
1	A	1	MET	3.1
1	C	120	ASP	3.1
1	A	272	LEU	3.0
1	D	112	ASP	3.0
2	H	80	ASP	3.0
2	F	108	SER	3.0
2	H	38	GLY	3.0
2	G	97	GLU	3.0
2	G	36	LYS	2.9
2	H	10	GLU	2.9
2	F	79	ALA	2.9
1	C	271	SER	2.9
2	E	107	ALA	2.9
2	H	82	GLY	2.9
2	F	103	GLU	2.9
2	G	13	VAL	2.9
2	E	130	VAL	2.9
2	H	6	THR	2.9
2	H	127	ILE	2.8
2	F	118	TYR	2.8
2	G	6	THR	2.8
2	H	125	ARG	2.8
2	H	101	PRO	2.8
1	C	268	TYR	2.8
2	G	126	LYS	2.8
2	E	119	TRP	2.8
2	F	35	GLY	2.8
2	F	34	THR	2.8
2	G	73	HIS	2.8

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Mol	Chain	Res	Type	RSRZ
2	H	5	TYR	2.7
1	D	114	ASP	2.7
2	H	87	VAL	2.7
1	D	268	TYR	2.7
1	C	124	HIS	2.7
1	D	211	PHE	2.6
2	H	33	LYS	2.6
2	H	44	VAL	2.6
2	H	50	PHE	2.6
1	A	274	GLY	2.5
2	H	3	ILE	2.5
1	A	18	ARG	2.5
1	D	121	LEU	2.5
2	E	111	LYS	2.5
2	F	96	PHE	2.5
1	B	35	GLY	2.5
1	C	209	LEU	2.5
2	E	118	TYR	2.5
2	H	31	LYS	2.5
2	F	70	ILE	2.5
1	B	266	GLN	2.5
1	D	269	ASP	2.5
2	E	82	GLY	2.5
2	E	84	LYS	2.5
2	E	131	LYS	2.5
2	H	90	LEU	2.4
1	D	36	PHE	2.4
2	H	7	THR	2.4
2	F	128	VAL	2.4
2	H	110	ILE	2.4
1	C	117	MET	2.4
1	C	121	LEU	2.4
2	H	130	VAL	2.4
2	H	53	ALA	2.4
2	E	90	LEU	2.3
1	C	111	PHE	2.3
2	H	98	ILE	2.3
1	D	209	LEU	2.3
2	G	10	GLU	2.3
1	B	110	SER	2.3
1	D	213	ILE	2.2
1	C	265	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
1	C	116	ALA	2.2
2	H	114	ALA	2.2
2	G	94	GLU	2.2
2	F	117	GLU	2.2
2	E	95	THR	2.2
2	H	116	LEU	2.1
2	H	117	GLU	2.1
2	F	95	THR	2.1
2	F	69	ILE	2.1
1	C	126	LEU	2.1
2	H	122	MET	2.1
2	F	101	PRO	2.1
2	E	125	ARG	2.1
2	E	83	ASN	2.1
1	A	266	GLN	2.1
2	F	84	LYS	2.1
2	H	84	LYS	2.1
2	H	51	SER	2.0
2	G	47	ILE	2.0
1	D	215	LEU	2.0
2	H	4	THR	2.0
1	D	252	PHE	2.0
2	E	36	LYS	2.0
2	H	29	VAL	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](#)

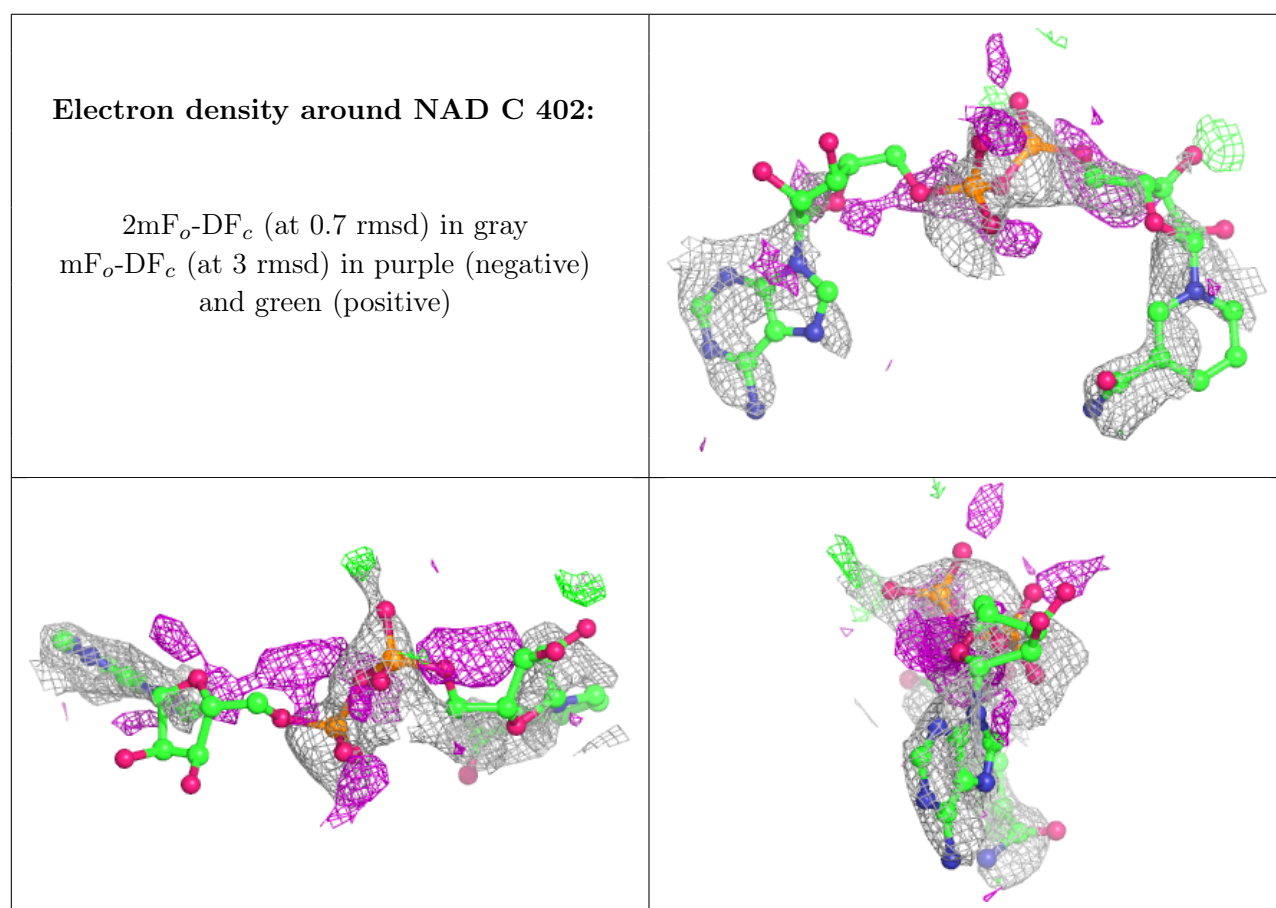
There are no monosaccharides in this entry.

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.

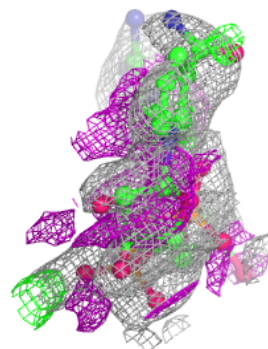
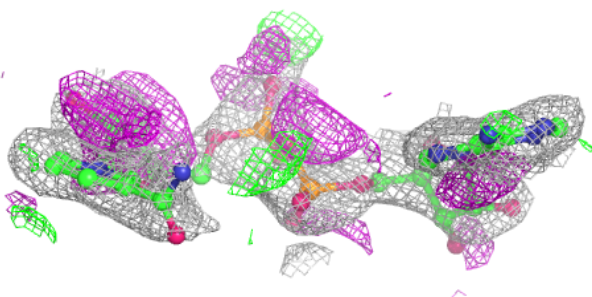
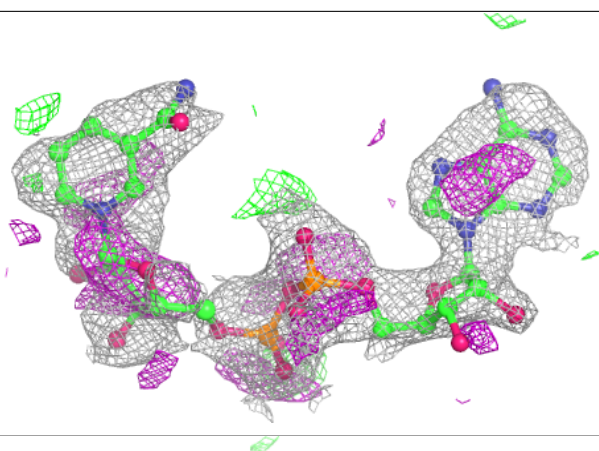
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	NAD	C	402	44/44	0.59	0.56	143,164,174,175	0
3	NAD	B	401	44/44	0.73	0.31	100,109,122,129	0
3	NAD	C	401	44/44	0.81	0.41	112,119,126,129	0
3	NAD	A	401	44/44	0.82	0.27	75,94,116,122	0
4	PEG	B	402	7/7	0.89	0.17	52,57,67,69	0
4	PEG	B	403	7/7	0.92	0.14	52,52,68,71	0
4	PEG	A	402	7/7	0.94	0.12	50,51,55,56	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

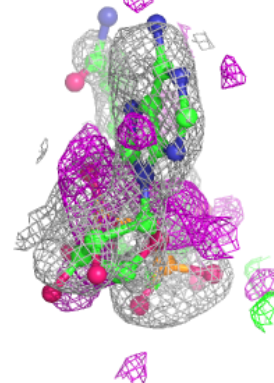
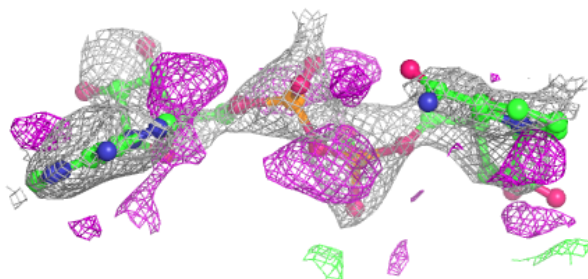
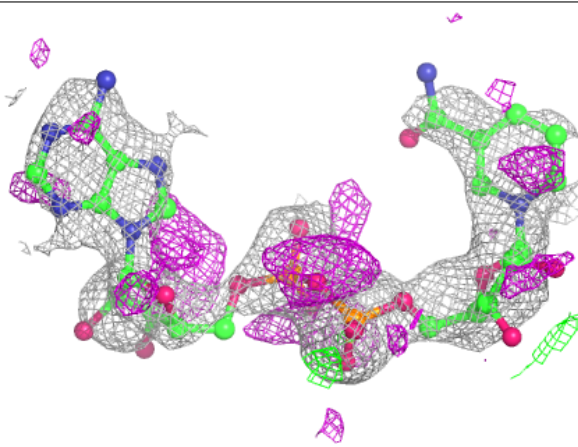


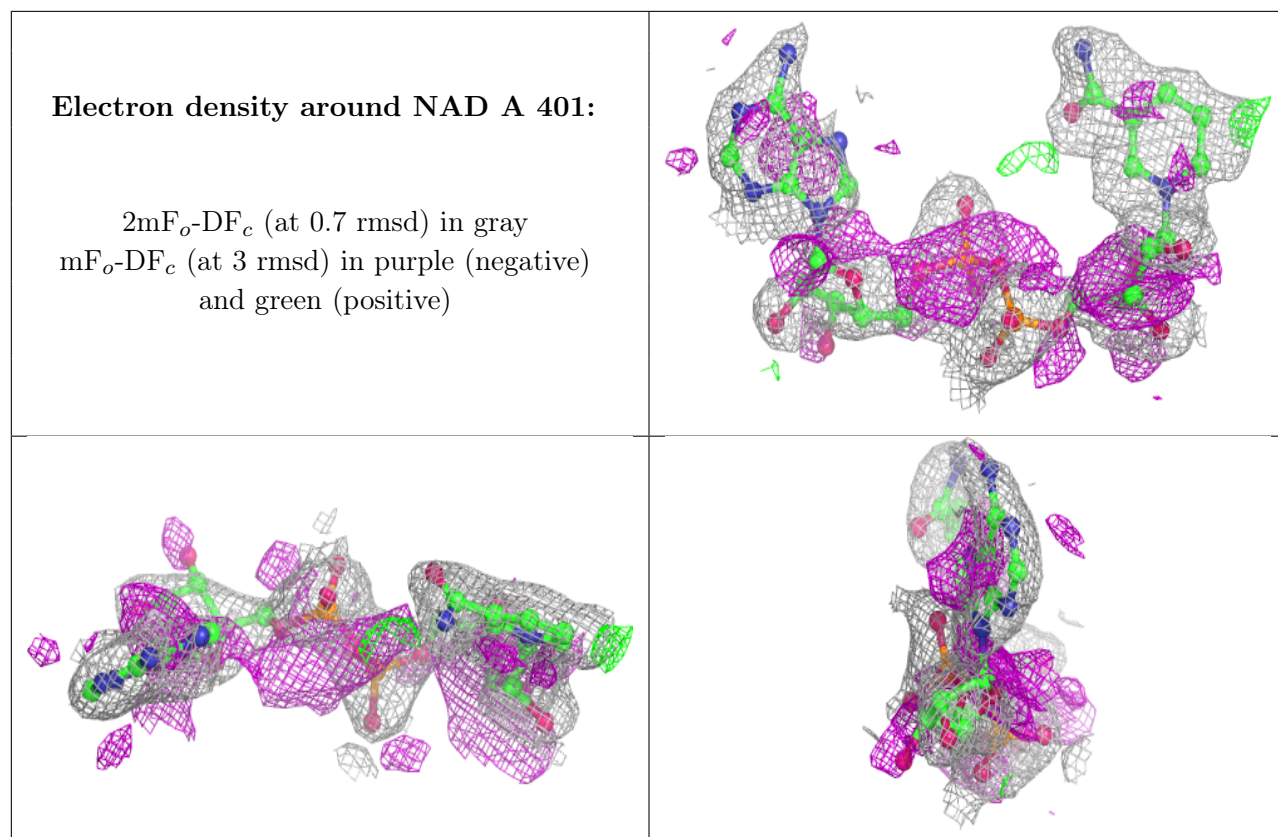
Electron density around NAD B 401:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around NAD C 401:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





6.5 Other polymers [i](#)

There are no such residues in this entry.