



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 31, 2016 – 06:35 PM EDT

PDB ID : 5DHR  
Title : Crystal structure of NAD kinase 1 from *Listeria monocytogenes* in complex with a novel inhibitor  
Authors : Gelin, M.; Paoletti, J.; Assairi, L.; Huteau, V.; Pochet, S.; Labesse, G.  
Deposited on : 2015-08-31  
Resolution : 2.31 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](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.7.1 (RC1), CSD as537be (2016)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20028320  
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) : rb-20028320

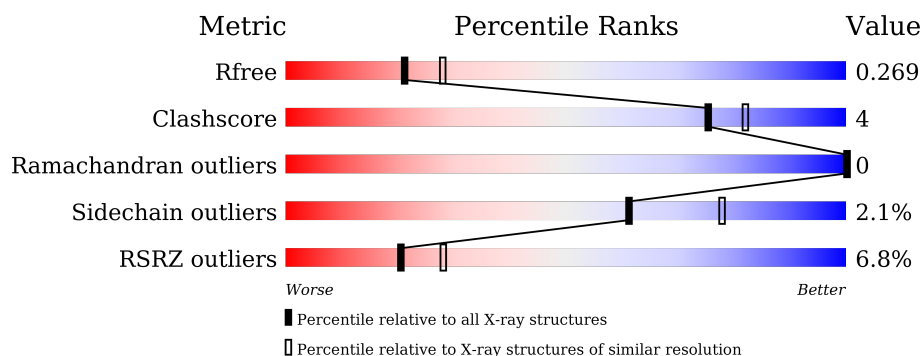
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.31 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))
$R_{free}$	91344	4425 (2.34-2.30)
Clashscore	102246	5057 (2.34-2.30)
Ramachandran outliers	100387	5008 (2.34-2.30)
Sidechain outliers	100360	5007 (2.34-2.30)
RSRZ outliers	91569	4432 (2.34-2.30)

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  $\geq 3$ , 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	272	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 0%, red 1%, orange 1%, orange 86%, yellow 86%, yellow 96%, green 96%, green 100%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>%</span> <span>86%</span> <span>10%</span> <span>.</span> </div> </div>
1	B	272	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 0%, red 11%, orange 11%, orange 84%, yellow 84%, yellow 96%, green 96%, green 100%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>11%</span> <span>84%</span> <span>12%</span> <span>.</span> </div> </div>
1	C	272	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 0%, red 4%, orange 4%, orange 85%, yellow 85%, yellow 95%, green 95%, green 100%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>4%</span> <span>85%</span> <span>10%</span> <span>5%</span> </div> </div>
1	D	272	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 0%, red 10%, orange 10%, orange 83%, yellow 83%, yellow 94%, green 94%, green 100%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>10%</span> <span>83%</span> <span>11%</span> <span>5%</span> </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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	CIT	A	301	-	-	-	X
2	CIT	B	301	-	-	-	X
4	GOL	C	301	-	-	-	X

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 8587 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 NAD kinase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	263	Total	C	N	O	S	0	0	0
			2071	1326	348	388	9			
1	B	262	Total	C	N	O	S	0	1	0
			2096	1345	351	391	9			
1	C	259	Total	C	N	O	S	0	0	0
			2010	1289	338	374	9			
1	D	259	Total	C	N	O	S	0	0	0
			2024	1298	342	375	9			

There are 32 discrepancies between the modelled and reference sequences:

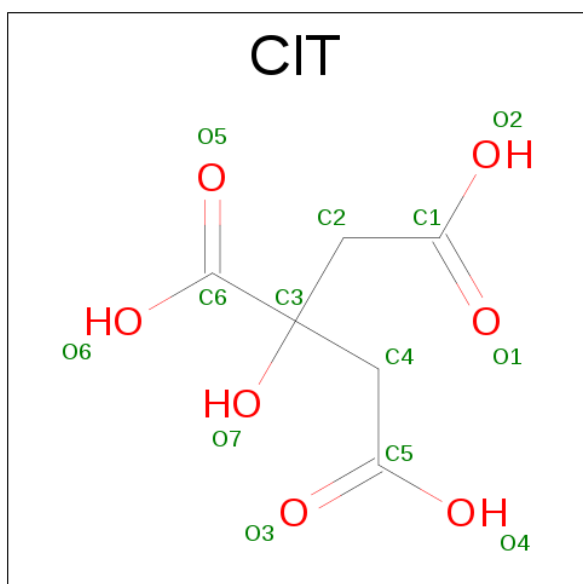
Chain	Residue	Modelled	Actual	Comment	Reference
A	265	LEU	-	expression tag	UNP Q8Y8D7
A	266	GLU	-	expression tag	UNP Q8Y8D7
A	267	HIS	-	expression tag	UNP Q8Y8D7
A	268	HIS	-	expression tag	UNP Q8Y8D7
A	269	HIS	-	expression tag	UNP Q8Y8D7
A	270	HIS	-	expression tag	UNP Q8Y8D7
A	271	HIS	-	expression tag	UNP Q8Y8D7
A	272	HIS	-	expression tag	UNP Q8Y8D7
B	265	LEU	-	expression tag	UNP Q8Y8D7
B	266	GLU	-	expression tag	UNP Q8Y8D7
B	267	HIS	-	expression tag	UNP Q8Y8D7
B	268	HIS	-	expression tag	UNP Q8Y8D7
B	269	HIS	-	expression tag	UNP Q8Y8D7
B	270	HIS	-	expression tag	UNP Q8Y8D7
B	271	HIS	-	expression tag	UNP Q8Y8D7
B	272	HIS	-	expression tag	UNP Q8Y8D7
C	265	LEU	-	expression tag	UNP Q8Y8D7
C	266	GLU	-	expression tag	UNP Q8Y8D7
C	267	HIS	-	expression tag	UNP Q8Y8D7
C	268	HIS	-	expression tag	UNP Q8Y8D7
C	269	HIS	-	expression tag	UNP Q8Y8D7

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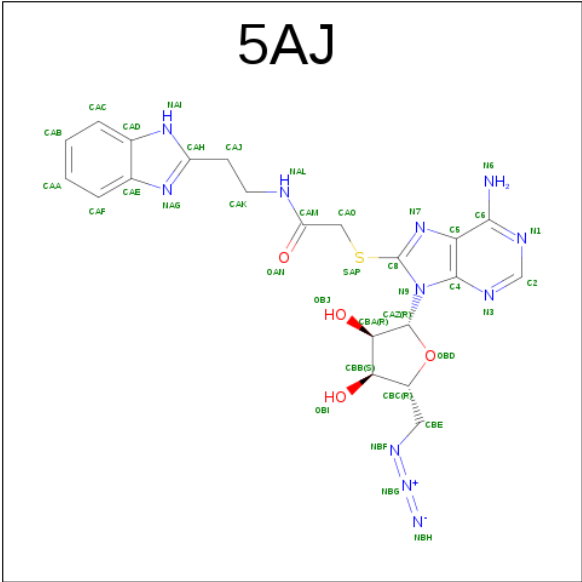
Chain	Residue	Modelled	Actual	Comment	Reference
C	270	HIS	-	expression tag	UNP Q8Y8D7
C	271	HIS	-	expression tag	UNP Q8Y8D7
C	272	HIS	-	expression tag	UNP Q8Y8D7
D	265	LEU	-	expression tag	UNP Q8Y8D7
D	266	GLU	-	expression tag	UNP Q8Y8D7
D	267	HIS	-	expression tag	UNP Q8Y8D7
D	268	HIS	-	expression tag	UNP Q8Y8D7
D	269	HIS	-	expression tag	UNP Q8Y8D7
D	270	HIS	-	expression tag	UNP Q8Y8D7
D	271	HIS	-	expression tag	UNP Q8Y8D7
D	272	HIS	-	expression tag	UNP Q8Y8D7

- Molecule 2 is CITRIC ACID (three-letter code: CIT) (formula:  $C_6H_8O_7$ ).



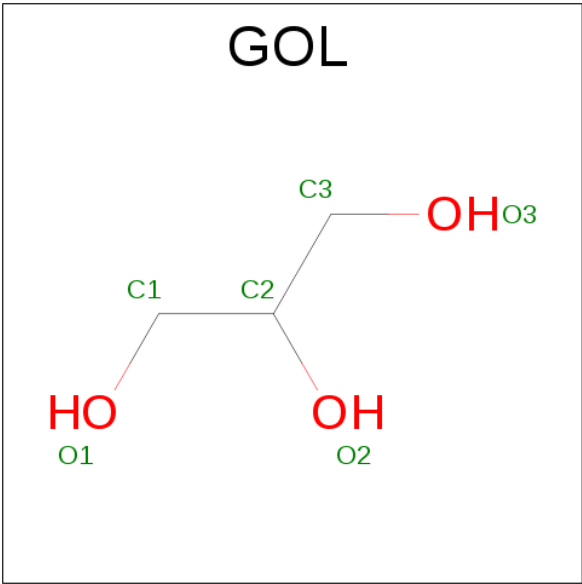
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			13	6	7		
2	B	1	Total	C	O	0	0
			13	6	7		

- Molecule 3 is 5'-azido-8-[(2-{[2-(1H-benzimidazol-2-yl)ethyl]amino}-2-oxoethyl)sulfanyl]-5'-deoxyadenosine (three-letter code: 5AJ) (formula:  $C_{21}H_{23}N_{11}O_4S$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			37	21	11	4	1		
3	B	1	Total	C	N	O	S	0	0
			37	21	11	4	1		
3	C	1	Total	C	N	O	S	0	0
			37	21	11	4	1		
3	D	1	Total	C	N	O	S	0	0
			37	21	11	4	1		

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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

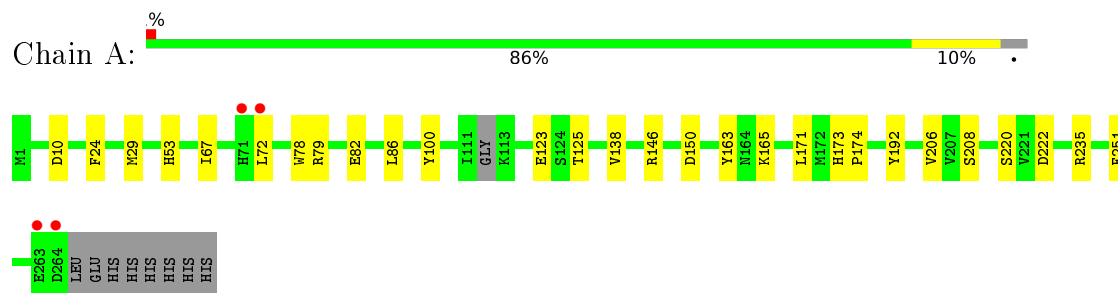
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	86	Total	O	0	0
			86	86		
5	B	30	Total	O	0	0
			30	30		
5	C	51	Total	O	0	0
			51	51		
5	D	39	Total	O	0	0
			39	39		

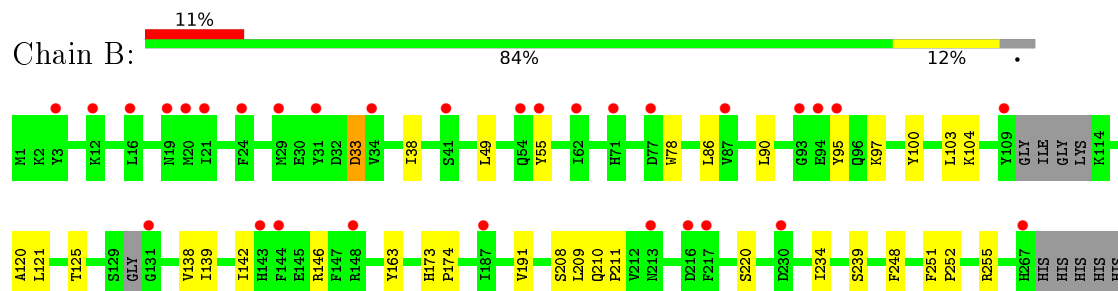
### 3 Residue-property plots [i](#)

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

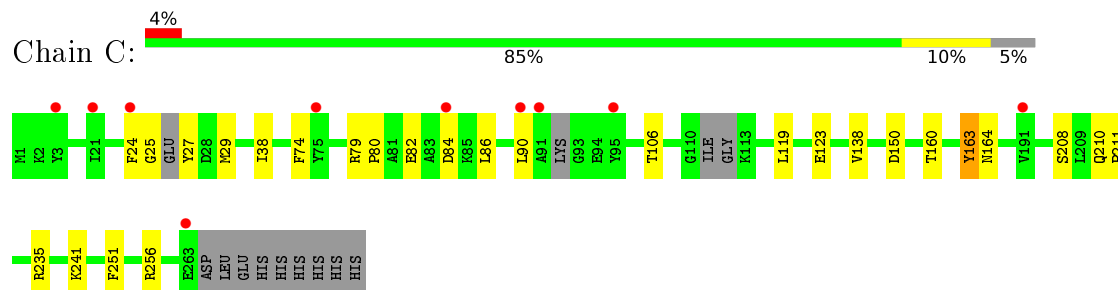
- Molecule 1: NAD kinase 1



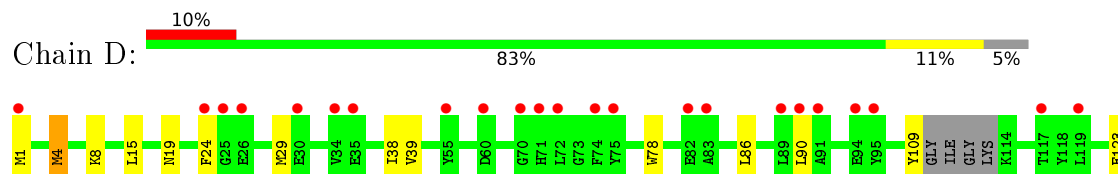
- Molecule 1: NAD kinase 1



- Molecule 1: NAD kinase 1



- Molecule 1: NAD kinase 1







## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	66.53Å 118.71Å 66.60Å 90.00° 100.43° 90.00°	Depositor
Resolution (Å)	57.30 – 2.31 59.35 – 2.31	Depositor EDS
% Data completeness (in resolution range)	99.4 (57.30-2.31) 99.4 (59.35-2.31)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.04	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.14 (at 2.32Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.9_1692)	Depositor
R, $R_{free}$	0.224 , 0.266 0.225 , 0.269	Depositor DCC
$R_{free}$ test set	1377 reflections (3.11%)	DCC
Wilson B-factor (Å <sup>2</sup> )	40.7	Xtriage
Anisotropy	0.414	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 58.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.017 for l,-k,h	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	8587	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	65.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.12% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: GOL, 5AJ, CIT

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	0.21	0/2121	0.35	0/2871
1	B	0.21	0/2147	0.34	0/2902
1	C	0.20	0/2058	0.35	0/2785
1	D	0.21	0/2074	0.35	0/2809
All	All	0.21	0/8400	0.35	0/11367

There are no bond length outliers.

There are no bond angle outliers.

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	2071	0	1994	15	0
1	B	2096	0	2033	19	0
1	C	2010	0	1913	14	0
1	D	2024	0	1939	15	0
2	A	13	0	5	1	0
2	B	13	0	5	2	0
3	A	37	0	0	1	0
3	B	37	0	0	1	0
3	C	37	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	D	37	0	0	1	0
4	C	6	0	8	0	0
5	A	86	0	0	1	0
5	B	30	0	0	1	0
5	C	51	0	0	0	0
5	D	39	0	0	1	0
All	All	8587	0	7897	64	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 (64) 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:125:THR:HG1	1:A:220:SER:HG	1.34	0.72
1:D:38:ILE:HG21	1:D:90:LEU:HD21	1.74	0.70
1:B:125:THR:HG1	1:B:220:SER:HG	1.38	0.64
1:D:160:THR:HG21	1:D:172:MET:HG2	1.79	0.63
1:C:24:PHE:HB3	1:C:29:MET:HB2	1.84	0.59
1:A:165:LYS:NZ	5:A:404:HOH:O	2.37	0.57
1:B:103:LEU:HB3	1:B:120:ALA:HB3	1.87	0.56
1:C:25:GLY:O	1:C:27:TYR:N	2.38	0.56
1:B:138:VAL:HB	1:B:208:SER:HB3	1.88	0.56
1:B:38:ILE:HD13	1:B:90:LEU:HD22	1.87	0.55
1:B:100:TYR:OH	2:B:301:CIT:O6	2.25	0.54
1:A:100:TYR:OH	2:A:301:CIT:O5	2.25	0.53
1:B:252:PRO:HD2	1:B:255:ARG:HD3	1.90	0.53
1:B:173:HIS:CE1	2:B:301:CIT:H42	2.44	0.53
1:A:165:LYS:HD2	1:A:171:LEU:HD21	1.91	0.53
1:B:146:ARG:NH2	1:B:191:VAL:O	2.41	0.52
1:C:38:ILE:HG21	1:C:90:LEU:HD21	1.92	0.52
1:B:104:LYS:HB2	1:B:239:SER:HB2	1.92	0.52
1:B:209:LEU:HB2	1:B:234:ILE:HB	1.91	0.52
1:D:78:TRP:HZ2	1:D:248:PHE:HB2	1.76	0.51
1:A:24:PHE:HD1	1:A:29:MET:HG3	1.76	0.50
1:B:49:LEU:HD23	1:B:121:LEU:HD23	1.93	0.50
1:C:74:PHE:HA	1:C:256:ARG:HD2	1.95	0.49
1:D:15:LEU:O	1:D:19:ASN:ND2	2.32	0.49
1:C:119:LEU:HD11	1:C:241:LYS:HD2	1.95	0.48
3:B:302:5AJ:NAG	3:B:302:5AJ:NAL	2.61	0.48
3:D:301:5AJ:OBD	3:D:301:5AJ:SAP	2.74	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:210:GLN:HA	1:C:211:PRO:HD3	1.83	0.46
1:C:79:ARG:HG3	1:C:80:PRO:HD2	1.98	0.45
1:D:1:MET:N	1:D:29:MET:SD	2.86	0.45
1:D:173:HIS:HA	1:D:174:PRO:HD3	1.86	0.45
1:A:53:HIS:NE2	1:A:222:ASP:OD2	2.43	0.45
1:C:38:ILE:HD13	1:C:90:LEU:HD11	1.98	0.45
1:A:150:ASP:OD2	1:C:163:TYR:OH	2.20	0.44
3:A:302:5AJ:N6	1:C:150:ASP:OD1	2.50	0.44
1:B:139:ILE:O	1:B:142:ILE:HG22	2.18	0.44
1:C:106:THR:HB	1:C:235:ARG:HB2	1.99	0.43
1:D:211:PRO:HG3	1:D:217:PHE:HE2	1.83	0.43
1:C:138:VAL:HB	1:C:208:SER:HB3	2.00	0.43
1:D:160:THR:HA	1:D:164:ASN:HB3	1.99	0.43
1:B:97:LYS:NZ	5:B:404:HOH:O	2.46	0.43
1:B:173:HIS:HA	1:B:174:PRO:HD3	1.84	0.43
1:D:210:GLN:HA	1:D:211:PRO:HD3	1.85	0.43
1:A:206:VAL:HG11	1:A:235:ARG:NH2	2.34	0.42
1:D:133:PHE:CD2	1:D:151:GLY:HA2	2.55	0.42
1:A:67:ILE:HG12	1:A:78:TRP:HB2	2.00	0.42
1:A:79:ARG:NH2	1:A:82:GLU:OE2	2.52	0.42
1:D:4:MET:HG2	1:D:39:VAL:HG22	2.01	0.42
1:C:160:THR:HA	1:C:164:ASN:HB3	2.00	0.42
1:C:82:GLU:O	1:C:86:LEU:HG	2.19	0.42
1:A:146:ARG:HG2	1:A:192:TYR:HD1	1.84	0.42
1:B:78:TRP:CE2	1:B:86:LEU:HD21	2.54	0.42
1:D:191:VAL:HG23	1:D:192:TYR:CD2	2.55	0.42
1:A:173:HIS:HA	1:A:174:PRO:HD3	1.84	0.41
1:B:33:ASP:O	1:B:55:TYR:OH	2.38	0.41
1:B:95:TYR:HB3	1:B:248:PHE:CE2	2.55	0.41
1:D:206:VAL:HG11	1:D:235:ARG:NH2	2.35	0.41
1:D:220:SER:HA	1:D:225:SER:HA	2.02	0.41
1:D:8:LYS:NZ	5:D:407:HOH:O	2.50	0.41
1:B:142:ILE:HA	1:B:142:ILE:HD12	1.96	0.41
1:A:10:ASP:N	1:A:10:ASP:OD1	2.54	0.41
1:B:210:GLN:HA	1:B:211:PRO:HD3	1.87	0.41
1:A:138:VAL:HB	1:A:208:SER:HB3	2.03	0.40
1:A:146:ARG:HG2	1:A:192:TYR:CD1	2.57	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	259/272 (95%)	246 (95%)	13 (5%)	0	100	100
1	B	257/272 (94%)	246 (96%)	11 (4%)	0	100	100
1	C	251/272 (92%)	235 (94%)	16 (6%)	0	100	100
1	D	255/272 (94%)	241 (94%)	14 (6%)	0	100	100
All	All	1022/1088 (94%)	968 (95%)	54 (5%)	0	100	100

There are no Ramachandran outliers to report.

### 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	220/237 (93%)	215 (98%)	5 (2%)	58	75
1	B	226/237 (95%)	223 (99%)	3 (1%)	76	87
1	C	210/237 (89%)	206 (98%)	4 (2%)	65	80
1	D	212/237 (90%)	206 (97%)	6 (3%)	51	67
All	All	868/948 (92%)	850 (98%)	18 (2%)	61	78

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	72	LEU
1	A	86	LEU

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Mol	Chain	Res	Type
1	A	123	GLU
1	A	163	TYR
1	A	251	PHE
1	B	33	ASP
1	B	163	TYR
1	B	251	PHE
1	C	84	ASP
1	C	123	GLU
1	C	163	TYR
1	C	251	PHE
1	D	4	MET
1	D	24	PHE
1	D	86	LEU
1	D	109	TYR
1	D	123	GLU
1	D	251	PHE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	205	HIS

### 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 [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	$\# Z  > 2$
2	CIT	A	301	-	3,12,12	1.34	0	3,17,17	2.54	2 (66%)
3	5AJ	A	302	-	33,41,41	1.89	11 (33%)	28,58,58	2.44	7 (25%)
2	CIT	B	301	-	3,12,12	1.28	0	3,17,17	2.09	1 (33%)
3	5AJ	B	302	-	33,41,41	1.53	5 (15%)	28,58,58	2.58	6 (21%)
4	GOL	C	301	-	5,5,5	0.36	0	5,5,5	0.21	0
3	5AJ	C	302	-	33,41,41	1.80	10 (30%)	28,58,58	2.33	5 (17%)
3	5AJ	D	301	-	33,41,41	1.60	7 (21%)	28,58,58	2.53	6 (21%)

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	CIT	A	301	-	-	0/6/16/16	0/0/0/0
3	5AJ	A	302	-	-	0/13/35/35	0/5/5/5
2	CIT	B	301	-	-	0/6/16/16	0/0/0/0
3	5AJ	B	302	-	-	0/13/35/35	0/5/5/5
4	GOL	C	301	-	-	0/4/4/4	0/0/0/0
3	5AJ	C	302	-	-	0/13/35/35	0/5/5/5
3	5AJ	D	301	-	-	0/13/35/35	0/5/5/5

All (33) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	302	5AJ	C8-N9	-5.64	1.30	1.36
3	D	301	5AJ	C8-N9	-4.67	1.31	1.36
3	B	302	5AJ	C8-N9	-4.66	1.31	1.36
3	C	302	5AJ	C8-N9	-4.41	1.31	1.36
3	C	302	5AJ	C4-N3	-3.16	1.30	1.35
3	A	302	5AJ	C4-N3	-3.11	1.31	1.35
3	A	302	5AJ	C8-SAP	-2.62	1.68	1.75
3	A	302	5AJ	CAF-CAE	-2.59	1.37	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	302	5AJ	C2-N1	-2.59	1.28	1.33
3	C	302	5AJ	CAE-NAG	-2.57	1.30	1.39
3	C	302	5AJ	CAF-CAE	-2.54	1.37	1.41
3	C	302	5AJ	OBD-CBC	-2.52	1.39	1.45
3	A	302	5AJ	CAE-NAG	-2.45	1.30	1.39
3	B	302	5AJ	CAF-CAE	-2.43	1.37	1.41
3	A	302	5AJ	CAD-NAI	-2.43	1.30	1.39
3	A	302	5AJ	CAC-CAD	-2.38	1.37	1.41
3	C	302	5AJ	CAD-NAI	-2.34	1.31	1.39
3	B	302	5AJ	CAC-CAD	-2.31	1.37	1.41
3	B	302	5AJ	CAE-NAG	-2.28	1.31	1.39
3	C	302	5AJ	C5-C4	-2.26	1.35	1.40
3	D	301	5AJ	OBD-CBC	-2.25	1.39	1.45
3	A	302	5AJ	OBD-CBC	-2.24	1.39	1.45
3	B	302	5AJ	CAD-NAI	-2.20	1.31	1.39
3	D	301	5AJ	C4-N3	-2.18	1.32	1.35
3	A	302	5AJ	C5-C4	-2.16	1.35	1.40
3	C	302	5AJ	CAC-CAD	-2.16	1.37	1.41
3	A	302	5AJ	OBD-CAZ	-2.10	1.38	1.41
3	D	301	5AJ	CAD-NAI	-2.08	1.32	1.39
3	D	301	5AJ	CAC-CAD	-2.07	1.38	1.41
3	D	301	5AJ	C8-SAP	-2.01	1.70	1.75
3	D	301	5AJ	NBG-NBF	2.52	1.30	1.23
3	C	302	5AJ	NBG-NBF	2.54	1.30	1.23
3	A	302	5AJ	NBG-NBF	2.85	1.31	1.23

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	302	5AJ	N3-C2-N1	-9.22	121.62	128.87
3	A	302	5AJ	N3-C2-N1	-9.03	121.78	128.87
3	D	301	5AJ	N3-C2-N1	-9.02	121.79	128.87
3	C	302	5AJ	N3-C2-N1	-8.71	122.03	128.87
3	D	301	5AJ	CBC-OBD-CAZ	-6.70	102.54	109.64
3	B	302	5AJ	CBE-CBC-CBB	-6.08	102.86	114.07
3	C	302	5AJ	CAZ-N9-C4	-5.53	121.01	126.92
3	A	302	5AJ	CBC-OBD-CAZ	-5.13	104.21	109.64
3	B	302	5AJ	CAZ-N9-C4	-3.82	122.84	126.92
3	D	301	5AJ	CBE-CBC-CBB	-3.47	107.67	114.07
2	B	301	CIT	C3-C4-C5	-3.31	109.78	114.95
2	A	301	CIT	C3-C2-C1	-3.29	109.80	114.95
3	A	302	5AJ	CAZ-N9-C4	-3.26	123.43	126.92

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	302	5AJ	OBD-CAZ-N9	-3.15	104.63	108.30
3	B	302	5AJ	CBC-OBD-CAZ	-2.99	106.47	109.64
2	A	301	CIT	C3-C4-C5	-2.91	110.40	114.95
3	C	302	5AJ	CBE-CBC-CBB	-2.85	108.82	114.07
3	D	301	5AJ	OBD-CBC-CBB	-2.84	99.40	105.16
3	C	302	5AJ	CBC-OBD-CAZ	-2.70	106.78	109.64
3	B	302	5AJ	CAK-NAL-CAM	-2.66	117.52	122.79
3	A	302	5AJ	OBD-CBC-CBB	-2.29	100.52	105.16
3	A	302	5AJ	CBE-CBC-CBB	-2.22	109.97	114.07
3	D	301	5AJ	OBD-CAZ-N9	-2.19	105.74	108.30
3	D	301	5AJ	CBE-NBF-NBG	3.64	121.50	115.30
3	B	302	5AJ	CBE-NBF-NBG	3.67	121.55	115.30
3	C	302	5AJ	CBE-NBF-NBG	3.96	122.03	115.30
3	A	302	5AJ	CBE-NBF-NBG	3.96	122.04	115.30

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	301	CIT	1	0
3	A	302	5AJ	1	0
2	B	301	CIT	2	0
3	B	302	5AJ	1	0
3	D	301	5AJ	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 ⓘ

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	263/272 (96%)	0.22	4 (1%) 76 82	23, 47, 86, 134	53 (20%)
1	B	262/272 (96%)	0.89	31 (11%) 6 10	31, 76, 116, 139	46 (17%)
1	C	259/272 (95%)	0.43	10 (3%) 43 52	26, 57, 110, 124	41 (15%)
1	D	259/272 (95%)	0.75	26 (10%) 9 14	33, 72, 119, 146	36 (13%)
All	All	1043/1088 (95%)	0.57	71 (6%) 20 28	23, 62, 111, 146	176 (16%)

All (71) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	20	MET	6.0
1	D	91	ALA	5.2
1	B	87	VAL	5.1
1	B	31	TYR	4.4
1	D	70	GLY	4.4
1	D	24	PHE	4.3
1	B	217	PHE	4.1
1	B	29	MET	4.0
1	D	119	LEU	4.0
1	B	187	ILE	3.8
1	D	34	VAL	3.8
1	B	267	HIS	3.8
1	C	91	ALA	3.7
1	A	71	HIS	3.7
1	C	24	PHE	3.7
1	D	1	MET	3.6
1	B	71	HIS	3.4
1	A	72	LEU	3.3
1	D	248	PHE	3.2
1	D	94	GLU	3.1
1	B	109	TYR	3.1

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Mol	Chain	Res	Type	RSRZ
1	C	95	TYR	3.0
1	B	16	LEU	3.0
1	D	117	THR	3.0
1	B	230	ASP	3.0
1	B	62	ILE	2.9
1	D	226	ILE	2.9
1	C	21	ILE	2.9
1	B	143	HIS	2.9
1	D	55	TYR	2.8
1	D	90	LEU	2.8
1	B	216	ASP	2.7
1	B	95	TYR	2.7
1	B	144	PHE	2.7
1	C	75	TYR	2.7
1	D	95	TYR	2.6
1	D	71	HIS	2.6
1	C	3	TYR	2.6
1	B	3	TYR	2.5
1	B	213	ASN	2.5
1	B	34	VAL	2.4
1	D	26	GLU	2.4
1	D	75	TYR	2.4
1	D	89	LEU	2.4
1	A	263	GLU	2.4
1	B	131	GLY	2.4
1	C	191	VAL	2.4
1	B	21	ILE	2.3
1	B	77	ASP	2.3
1	D	74	PHE	2.3
1	C	90	LEU	2.3
1	D	83	ALA	2.3
1	D	60	ASP	2.3
1	B	55	TYR	2.2
1	B	12	LYS	2.2
1	D	72	LEU	2.2
1	B	24	PHE	2.2
1	D	25	GLY	2.2
1	D	82	GLU	2.2
1	B	54	GLN	2.2
1	B	148	ARG	2.2
1	B	93	GLY	2.1
1	B	19	ASN	2.1

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Mol	Chain	Res	Type	RSRZ
1	D	30	GLU	2.1
1	C	263	GLU	2.1
1	D	262	ILE	2.1
1	C	84	ASP	2.1
1	D	35	GLU	2.0
1	B	94	GLU	2.0
1	B	41	SER	2.0
1	A	264	ASP	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 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
2	CIT	B	301	13/13	0.74	0.29	5.19	65,75,81,89	13
2	CIT	A	301	13/13	0.68	0.42	5.14	62,65,74,74	13
4	GOL	C	301	6/6	0.87	0.24	2.72	64,70,71,73	0
3	5AJ	D	301	37/37	0.87	0.20	0.27	55,70,90,91	3
3	5AJ	A	302	37/37	0.94	0.15	0.23	30,41,63,64	4
3	5AJ	B	302	37/37	0.92	0.14	-0.83	48,60,81,86	3
3	5AJ	C	302	37/37	0.95	0.12	-0.93	23,35,62,67	4

## 6.5 Other polymers [i](#)

There are no such residues in this entry.