



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 3, 2024 – 06:30 PM EST

PDB ID : 1I75
Title : CRYSTAL STRUCTURE OF CYCLODEXTRIN GLUCANOTRANSFERASE FROM ALKALOPHILIC BACILLUS SP.#1011 COMPLEXED WITH 1-DEOXYNOJIRIMYCIN
Authors : Kanai, R.; Haga, K.; Yamane, K.; Harata, K.
Deposited on : 2001-03-08
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 : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.20.1
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

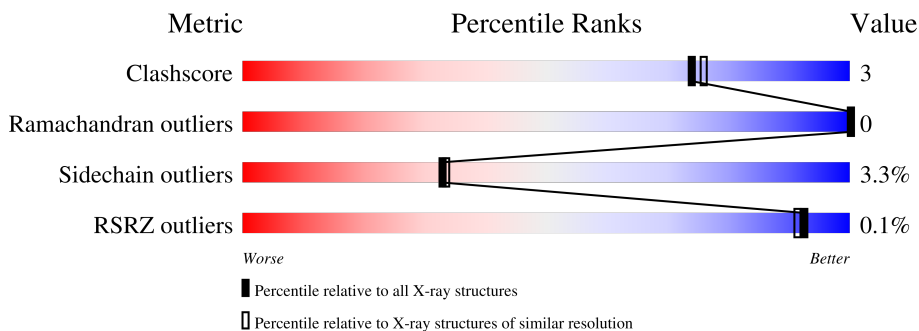
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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))
Clashscore	180529	10737 (2.00-2.00)
Ramachandran outliers	177936	10628 (2.00-2.00)
Sidechain outliers	177891	10627 (2.00-2.00)
RSRZ outliers	164620	9409 (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	686	
1	B	686	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 11262 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 CYCLODEXTRIN GLUCANOTRANSFERASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	686	5312	3354	906	1036	16	0	0	0
1	B	686	5312	3354	906	1036	16	0	0	0

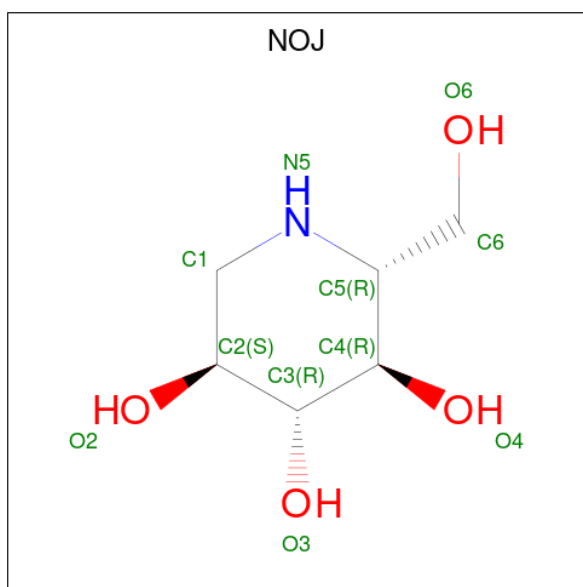
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	452	PRO	ARG	conflict	UNP P05618
A	454	GLY	ALA	conflict	UNP P05618
B	452	PRO	ARG	conflict	UNP P05618
B	454	GLY	ALA	conflict	UNP P05618

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 3 is 1-DEOXYNOJIRIMYCIN (three-letter code: NOJ) (formula: C₆H₁₃NO₄).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	11	6	1	4	0	0
3	A	1	11	6	1	4	0	0
3	B	1	11	6	1	4	0	0
3	B	1	11	6	1	4	0	0

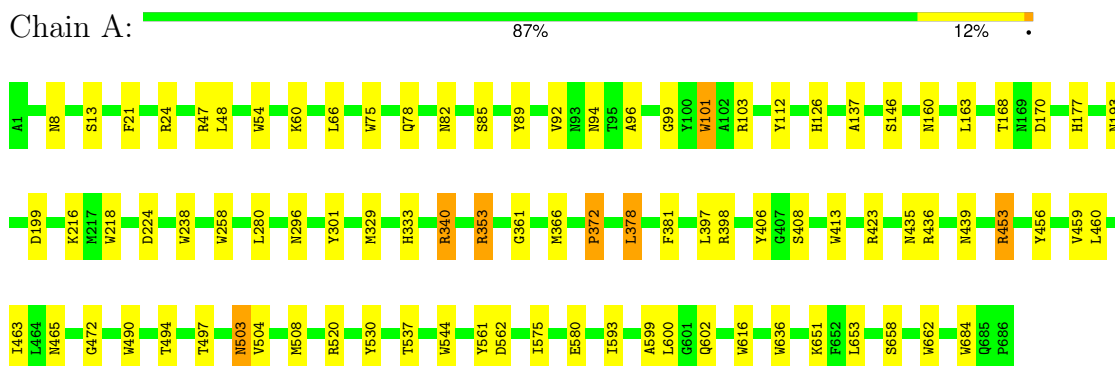
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	318	318	318	0	0
4	B	272	272	272	0	0

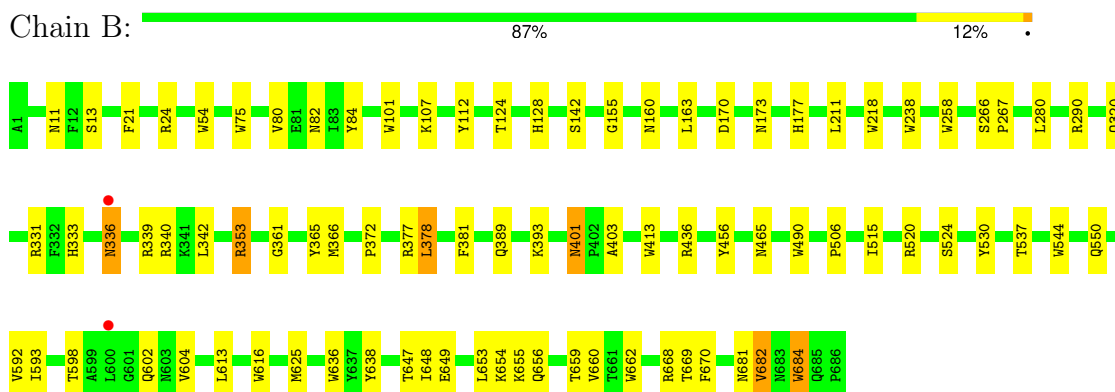
3 Residue-property plots [i](#)

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: CYCLODEXTRIN GLUCANOTRANSFERASE



- Molecule 1: CYCLODEXTRIN GLUCANOTRANSFERASE



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	64.78Å 74.24Å 79.03Å 85.03° 104.88° 101.02°	Depositor
Resolution (Å)	10.00 – 2.00 10.00 – 2.00	Depositor EDS
% Data completeness (in resolution range)	81.5 (10.00-2.00) 95.6 (10.00-2.00)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.62 (at 1.84Å)	Xtrriage
Refinement program	X-PLOR 3.1	Depositor
R, R_{free}	0.154 , 0.214 0.162 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	15.4	Xtrriage
Anisotropy	0.098	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 64.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11262	wwPDB-VP
Average B, all atoms (Å ²)	14.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.97% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: CA, NOJ

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	0.76	0/5446	1.37	54/7429 (0.7%)
1	B	0.74	0/5446	1.34	54/7429 (0.7%)
All	All	0.75	0/10892	1.36	108/14858 (0.7%)

There are no bond length outliers.

All (108) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	398	ARG	NE-CZ-NH2	-19.38	110.61	120.30
1	A	398	ARG	NE-CZ-NH1	15.05	127.83	120.30
1	A	662	TRP	CD1-CG-CD2	8.82	113.36	106.30
1	B	413	TRP	CD1-CG-CD2	8.59	113.17	106.30
1	B	662	TRP	CD1-CG-CD2	8.56	113.15	106.30
1	A	75	TRP	CD1-CG-CD2	8.38	113.00	106.30
1	A	684	TRP	CD1-CG-CD2	8.33	112.97	106.30
1	B	75	TRP	CD1-CG-CD2	8.27	112.91	106.30
1	A	616	TRP	CD1-CG-CD2	8.20	112.86	106.30
1	B	616	TRP	CD1-CG-CD2	8.05	112.74	106.30
1	B	290	ARG	NE-CZ-NH2	7.82	124.21	120.30
1	A	684	TRP	CE2-CD2-CG	-7.80	101.06	107.30
1	B	490	TRP	CD1-CG-CD2	7.80	112.54	106.30
1	A	662	TRP	CE2-CD2-CG	-7.71	101.13	107.30
1	B	238	TRP	CD1-CG-CD2	7.66	112.42	106.30
1	B	662	TRP	CE2-CD2-CG	-7.61	101.22	107.30
1	A	103	ARG	NE-CZ-NH2	-7.60	116.50	120.30
1	B	490	TRP	CE2-CD2-CG	-7.59	101.22	107.30
1	B	684	TRP	CD1-CG-CD2	7.55	112.34	106.30
1	B	616	TRP	CE2-CD2-CG	-7.53	101.27	107.30
1	B	436	ARG	NE-CZ-NH1	7.53	124.06	120.30
1	B	218	TRP	CD1-CG-CD2	7.51	112.31	106.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	684	TRP	CE2-CD2-CG	-7.48	101.31	107.30
1	B	112	TYR	CB-CG-CD2	-7.44	116.54	121.00
1	A	544	TRP	CE2-CD2-CG	-7.39	101.38	107.30
1	B	353	ARG	NE-CZ-NH2	-7.39	116.61	120.30
1	A	413	TRP	CD1-CG-CD2	7.37	112.19	106.30
1	A	616	TRP	CE2-CD2-CG	-7.34	101.43	107.30
1	A	490	TRP	CD1-CG-CD2	7.33	112.16	106.30
1	B	636	TRP	CD1-CG-CD2	7.24	112.09	106.30
1	B	413	TRP	CE2-CD2-CG	-7.19	101.55	107.30
1	A	544	TRP	CD1-CG-CD2	7.16	112.03	106.30
1	A	101	TRP	CD1-CG-CD2	7.14	112.01	106.30
1	B	218	TRP	CE2-CD2-CG	-7.09	101.63	107.30
1	A	490	TRP	CE2-CD2-CG	-7.08	101.64	107.30
1	A	75	TRP	CE2-CD2-CG	-7.05	101.66	107.30
1	A	636	TRP	CD1-CG-CD2	7.01	111.91	106.30
1	B	336	ASN	CA-C-N	-6.99	102.21	116.20
1	B	238	TRP	CE2-CD2-CG	-6.84	101.83	107.30
1	A	54	TRP	CD1-CG-CD2	6.83	111.76	106.30
1	A	636	TRP	CE2-CD2-CG	-6.79	101.87	107.30
1	B	636	TRP	CE2-CD2-CG	-6.79	101.87	107.30
1	A	54	TRP	CE2-CD2-CG	-6.79	101.87	107.30
1	B	436	ARG	NE-CZ-NH2	-6.78	116.91	120.30
1	B	75	TRP	CE2-CD2-CG	-6.75	101.90	107.30
1	A	218	TRP	CE2-CD2-CG	-6.71	101.93	107.30
1	A	112	TYR	CB-CG-CD2	-6.71	116.97	121.00
1	B	101	TRP	CE2-CD2-CG	-6.67	101.97	107.30
1	B	544	TRP	CD1-CG-CD2	6.65	111.62	106.30
1	B	258	TRP	CD1-CG-CD2	6.62	111.59	106.30
1	A	238	TRP	CE2-CD2-CG	-6.57	102.05	107.30
1	A	413	TRP	CE2-CD2-CG	-6.56	102.05	107.30
1	B	544	TRP	CE2-CD2-CG	-6.54	102.07	107.30
1	B	101	TRP	CD1-CG-CD2	6.53	111.53	106.30
1	B	258	TRP	CE2-CD2-CG	-6.47	102.12	107.30
1	B	54	TRP	CE2-CD2-CG	-6.41	102.17	107.30
1	A	398	ARG	CG-CD-NE	-6.36	98.44	111.80
1	A	258	TRP	CD1-CG-CD2	6.32	111.36	106.30
1	B	339	ARG	NE-CZ-NH1	6.32	123.46	120.30
1	B	331	ARG	NE-CZ-NH2	-6.31	117.15	120.30
1	A	238	TRP	CD1-CG-CD2	6.29	111.33	106.30
1	A	218	TRP	CD1-CG-CD2	6.26	111.31	106.30
1	B	339	ARG	NE-CZ-NH2	-6.26	117.17	120.30
1	A	561	TYR	CB-CG-CD2	-6.26	117.25	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	101	TRP	CE2-CD2-CG	-6.26	102.29	107.30
1	B	75	TRP	CG-CD1-NE1	-6.24	103.86	110.10
1	A	238	TRP	CG-CD2-CE3	6.22	139.50	133.90
1	A	436	ARG	NE-CZ-NH2	-6.21	117.19	120.30
1	B	54	TRP	CD1-CG-CD2	6.18	111.24	106.30
1	A	103	ARG	NE-CZ-NH1	6.13	123.37	120.30
1	B	520	ARG	NE-CZ-NH2	6.13	123.37	120.30
1	B	616	TRP	CG-CD2-CE3	6.12	139.41	133.90
1	A	530	TYR	CB-CG-CD2	-6.05	117.37	121.00
1	A	453	ARG	NE-CZ-NH1	6.03	123.31	120.30
1	B	456	TYR	CB-CG-CD1	-6.00	117.40	121.00
1	A	301	TYR	CB-CG-CD2	-5.81	117.51	121.00
1	A	406	TYR	CB-CG-CD1	-5.81	117.52	121.00
1	A	616	TRP	CB-CG-CD1	-5.80	119.46	127.00
1	B	616	TRP	CB-CG-CD1	-5.70	119.59	127.00
1	B	24	ARG	NE-CZ-NH2	-5.67	117.47	120.30
1	B	331	ARG	NE-CZ-NH1	5.66	123.13	120.30
1	B	413	TRP	CG-CD1-NE1	-5.64	104.46	110.10
1	A	24	ARG	NE-CZ-NH1	5.63	123.12	120.30
1	A	258	TRP	CE2-CD2-CG	-5.61	102.81	107.30
1	A	75	TRP	CG-CD1-NE1	-5.57	104.53	110.10
1	A	684	TRP	CG-CD2-CE3	5.56	138.90	133.90
1	B	662	TRP	CG-CD1-NE1	-5.55	104.55	110.10
1	A	616	TRP	CG-CD1-NE1	-5.52	104.58	110.10
1	A	216	LYS	CB-CG-CD	-5.51	97.27	111.60
1	A	340	ARG	NE-CZ-NH1	5.51	123.06	120.30
1	B	413	TRP	CB-CG-CD1	-5.51	119.84	127.00
1	B	377	ARG	NE-CZ-NH2	5.49	123.05	120.30
1	B	24	ARG	NE-CZ-NH1	5.44	123.02	120.30
1	A	329	MET	CA-CB-CG	5.40	122.49	113.30
1	B	238	TRP	CG-CD1-NE1	-5.39	104.71	110.10
1	B	662	TRP	CG-CD2-CE3	5.38	138.75	133.90
1	A	436	ARG	NE-CZ-NH1	5.36	122.98	120.30
1	A	520	ARG	NE-CZ-NH1	-5.34	117.63	120.30
1	B	84	TYR	CB-CG-CD1	-5.26	117.84	121.00
1	A	353	ARG	NE-CZ-NH1	5.21	122.91	120.30
1	A	684	TRP	CG-CD1-NE1	-5.16	104.94	110.10
1	B	682	VAL	N-CA-CB	-5.15	100.16	111.50
1	A	456	TYR	CB-CG-CD1	-5.14	117.91	121.00
1	A	616	TRP	CG-CD2-CE3	5.14	138.52	133.90
1	A	544	TRP	CG-CD2-CE3	5.11	138.50	133.90
1	B	684	TRP	CG-CD2-CE3	5.10	138.49	133.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	218	TRP	CG-CD1-NE1	-5.09	105.00	110.10
1	B	530	TYR	CB-CG-CD1	-5.04	117.97	121.00

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	5312	0	5050	30	0
1	B	5312	0	5050	32	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	22	0	26	0	0
3	B	22	0	26	0	0
4	A	318	0	0	4	0
4	B	272	0	0	3	0
All	All	11262	0	10152	62	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 3.

All (62) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:340:ARG:HH12	1:B:465:ASN:HD22	1.29	0.79
1:A:340:ARG:HH12	1:A:465:ASN:HD22	1.33	0.74
1:A:82:ASN:HD22	1:A:96:ALA:HB1	1.56	0.70
1:B:333:HIS:HD2	4:B:779:HOH:O	1.85	0.59
1:B:124:THR:O	1:B:128:HIS:HD2	1.87	0.58
1:A:453:ARG:HH11	1:A:472:GLY:HA2	1.69	0.57
1:A:82:ASN:ND2	1:A:101:TRP:H	2.03	0.56
1:A:170:ASP:OD1	1:A:177:HIS:HE1	1.88	0.56
1:B:361:GLY:HA3	1:B:366:MET:SD	2.45	0.56
1:A:503:ASN:HD22	1:A:504:VAL:H	1.55	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:655:LYS:HG2	1:B:660:VAL:HG22	1.89	0.55
1:A:126:HIS:HE1	1:A:224:ASP:OD2	1.90	0.54
1:A:177:HIS:HD2	4:A:1147:HOH:O	1.90	0.54
1:B:401:ASN:HD22	1:B:403:ALA:H	1.56	0.53
1:B:11:ASN:ND2	4:B:1225:HOH:O	2.41	0.52
1:A:397:LEU:HD11	1:A:459:VAL:HG11	1.90	0.52
1:B:592:VAL:HB	1:B:681:ASN:HA	1.92	0.52
1:A:378:LEU:HD21	1:A:381:PHE:CZ	2.45	0.52
1:A:562:ASP:HB3	1:A:575:ILE:HG23	1.92	0.52
1:A:78:GLN:NE2	1:A:137:ALA:H	2.09	0.50
1:B:170:ASP:OD1	1:B:177:HIS:HE1	1.94	0.49
1:B:653:LEU:HD12	1:B:660:VAL:HG13	1.95	0.49
1:B:389:GLN:O	1:B:393:LYS:HG2	2.13	0.49
1:B:342:LEU:HD23	1:B:365:TYR:CD1	2.48	0.48
1:A:408:SER:O	1:A:423:ARG:HA	2.14	0.48
1:B:378:LEU:HD21	1:B:381:PHE:CZ	2.48	0.48
1:A:361:GLY:HA3	1:A:366:MET:SD	2.54	0.48
1:A:60:LYS:HD3	1:A:60:LYS:HA	1.74	0.47
1:A:193:ASN:OD1	1:A:199:ASP:HB2	2.14	0.47
1:B:80:VAL:HA	1:B:107:LYS:O	2.15	0.47
1:A:599:ALA:H	1:A:602:GLN:HE21	1.62	0.46
1:B:649:GLU:HA	1:B:668:ARG:O	2.16	0.45
1:A:460:LEU:O	1:A:463:ILE:HG12	2.16	0.45
1:B:280:LEU:H	1:B:320:GLN:NE2	2.14	0.45
1:A:47:ARG:HH11	1:A:92:VAL:HG11	1.82	0.45
1:B:537:THR:HB	4:B:1068:HOH:O	2.16	0.45
1:B:506:PRO:HD2	1:B:515:ILE:HG22	2.00	0.44
1:A:296:ASN:HB2	4:A:1030:HOH:O	2.17	0.44
1:B:340:ARG:HH22	1:B:465:ASN:ND2	2.15	0.44
1:B:266:SER:HA	1:B:267:PRO:HD3	1.87	0.44
1:A:340:ARG:HH22	1:A:465:ASN:ND2	2.16	0.44
1:B:598:THR:HG22	1:B:654:LYS:HD2	2.00	0.44
1:B:648:ILE:O	1:B:669:THR:HA	2.18	0.44
1:B:647:THR:HA	1:B:670:PHE:O	2.17	0.43
1:B:598:THR:HB	1:B:602:GLN:HB3	2.00	0.43
1:A:92:VAL:HG13	1:A:94:ASN:HD21	1.84	0.42
1:A:82:ASN:HD21	1:A:101:TRP:H	1.68	0.42
1:B:515:ILE:O	1:B:550:GLN:HA	2.19	0.42
1:B:340:ARG:HH12	1:B:465:ASN:ND2	2.08	0.42
1:B:656:GLN:O	1:B:659:THR:HG22	2.19	0.42
1:A:47:ARG:HH21	1:A:372:PRO:HD3	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:142:SER:OG	1:B:155:GLY:HA2	2.20	0.42
1:B:593:ILE:HG21	1:B:604:VAL:HG11	2.02	0.41
1:A:89:TYR:O	1:A:92:VAL:HG12	2.19	0.41
1:B:340:ARG:NH1	1:B:465:ASN:HD22	2.06	0.41
1:B:593:ILE:HD11	1:B:684:TRP:HA	2.03	0.41
1:A:508:MET:HA	1:A:580:GLU:O	2.20	0.41
1:A:651:LYS:HG2	4:A:1002:HOH:O	2.21	0.41
1:A:333:HIS:HD2	4:A:803:HOH:O	2.04	0.41
1:A:146:SER:HA	1:A:168:THR:OG1	2.21	0.41
1:A:82:ASN:HD21	1:A:99:GLY:C	2.24	0.40
1:B:625:MET:HG2	1:B:638:TYR:HB2	2.02	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	684/686 (100%)	665 (97%)	19 (3%)	0	100	100
1	B	684/686 (100%)	661 (97%)	23 (3%)	0	100	100
All	All	1368/1372 (100%)	1326 (97%)	42 (3%)	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	564/564 (100%)	542 (96%)	22 (4%)	27	27
1	B	564/564 (100%)	549 (97%)	15 (3%)	40	42
All	All	1128/1128 (100%)	1091 (97%)	37 (3%)	33	33

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	8	ASN
1	A	13	SER
1	A	21	PHE
1	A	48	LEU
1	A	66	LEU
1	A	85	SER
1	A	160	ASN
1	A	163	LEU
1	A	280	LEU
1	A	353	ARG
1	A	372	PRO
1	A	378	LEU
1	A	435	ASN
1	A	439	ASN
1	A	494	THR
1	A	497	THR
1	A	503	ASN
1	A	537	THR
1	A	593	ILE
1	A	600	LEU
1	A	653	LEU
1	A	658	SER
1	B	13	SER
1	B	21	PHE
1	B	82	ASN
1	B	160	ASN
1	B	163	LEU
1	B	173	ASN
1	B	211	LEU
1	B	336	ASN
1	B	353	ARG
1	B	372	PRO
1	B	378	LEU
1	B	401	ASN
1	B	524	SER

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Mol	Chain	Res	Type
1	B	613	LEU
1	B	682	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	8	ASN
1	A	78	GLN
1	A	82	ASN
1	A	94	ASN
1	A	126	HIS
1	A	128	HIS
1	A	177	HIS
1	A	239	GLN
1	A	247	ASN
1	A	333	HIS
1	A	435	ASN
1	A	465	ASN
1	A	503	ASN
1	A	594	ASN
1	A	602	GLN
1	A	619	ASN
1	B	11	ASN
1	B	177	HIS
1	B	239	GLN
1	B	320	GLN
1	B	333	HIS
1	B	364	GLN
1	B	401	ASN
1	B	465	ASN
1	B	548	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NOJ	A	2691	-	11,11,11	1.67	3 (27%)	13,15,15	1.64	3 (23%)
3	NOJ	B	2693	-	11,11,11	1.92	3 (27%)	13,15,15	2.98	7 (53%)
3	NOJ	B	2694	-	11,11,11	1.89	3 (27%)	13,15,15	1.73	4 (30%)
3	NOJ	A	2692	-	11,11,11	2.44	3 (27%)	13,15,15	1.84	5 (38%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NOJ	A	2691	-	-	2/2/19/19	0/1/1/1
3	NOJ	B	2693	-	-	0/2/19/19	0/1/1/1
3	NOJ	B	2694	-	-	2/2/19/19	0/1/1/1
3	NOJ	A	2692	-	-	2/2/19/19	0/1/1/1

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	2692	NOJ	C1-C2	6.78	1.58	1.52
3	B	2693	NOJ	C4-C5	4.07	1.61	1.52
3	A	2692	NOJ	C4-C5	3.54	1.59	1.52
3	A	2691	NOJ	C1-C2	3.30	1.55	1.52
3	B	2693	NOJ	C1-C2	3.29	1.55	1.52
3	B	2694	NOJ	C4-C5	3.25	1.59	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	2694	NOJ	C1-C2	3.22	1.55	1.52
3	A	2691	NOJ	C4-C5	3.17	1.59	1.52
3	B	2694	NOJ	C6-C5	2.76	1.57	1.52
3	A	2691	NOJ	C6-C5	2.31	1.57	1.52
3	B	2693	NOJ	C4-C3	2.26	1.58	1.52
3	A	2692	NOJ	C6-C5	2.10	1.56	1.52

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	2693	NOJ	C3-C4-C5	-4.59	104.29	111.02
3	B	2693	NOJ	O2-C2-C1	4.18	117.75	109.65
3	B	2693	NOJ	O2-C2-C3	-4.08	101.70	110.15
3	B	2693	NOJ	C1-C2-C3	3.95	115.07	110.25
3	B	2693	NOJ	O3-C3-C2	-3.91	102.08	110.05
3	B	2694	NOJ	C1-N5-C5	3.86	118.18	109.71
3	A	2692	NOJ	C1-N5-C5	3.58	117.57	109.71
3	A	2691	NOJ	C1-N5-C5	3.28	116.91	109.71
3	A	2692	NOJ	C1-C2-C3	3.04	113.97	110.25
3	B	2693	NOJ	O4-C4-C5	3.01	115.66	109.40
3	B	2693	NOJ	C6-C5-C4	2.89	122.44	112.03
3	A	2691	NOJ	C3-C4-C5	-2.75	106.98	111.02
3	A	2692	NOJ	O2-C2-C3	-2.61	104.75	110.15
3	A	2691	NOJ	O4-C4-C5	2.52	114.63	109.40
3	A	2692	NOJ	C4-C5-N5	2.39	113.95	109.12
3	B	2694	NOJ	C2-C3-C4	-2.33	106.77	110.86
3	B	2694	NOJ	O2-C2-C3	-2.06	105.89	110.15
3	B	2694	NOJ	O2-C2-C1	2.05	113.63	109.65
3	A	2692	NOJ	O4-C4-C3	-2.04	105.57	110.38

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	2691	NOJ	N5-C5-C6-O6
3	A	2692	NOJ	C4-C5-C6-O6
3	A	2692	NOJ	N5-C5-C6-O6
3	B	2694	NOJ	C4-C5-C6-O6
3	B	2694	NOJ	N5-C5-C6-O6
3	A	2691	NOJ	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data [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	686/686 (100%)	-0.83	0 100 100	4, 11, 25, 46	0
1	B	686/686 (100%)	-0.65	2 (0%) 90 89	6, 14, 32, 53	0
All	All	1372/1372 (100%)	-0.74	2 (0%) 92 91	4, 12, 30, 53	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	600	LEU	3.8
1	B	336	ASN	3.0

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(Å ²)	Q<0.9
3	NOJ	A	2691	11/11	0.34	0.31	6,15,19,25	0
3	NOJ	B	2693	11/11	0.54	0.30	8,15,18,21	0
3	NOJ	A	2692	11/11	0.57	0.31	7,11,17,18	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	NOJ	B	2694	11/11	0.71	0.23	8,13,21,24	0
2	CA	B	1690	1/1	0.91	0.05	12,12,12,12	0
2	CA	A	1688	1/1	0.95	0.04	10,10,10,10	0
2	CA	B	1689	1/1	0.97	0.05	11,11,11,11	0
2	CA	A	1687	1/1	0.98	0.05	7,7,7,7	0

6.5 Other polymers [i](#)

There are no such residues in this entry.