



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 4, 2024 – 03:00 AM EST

PDB ID : 1PHJ
Title : CRYSTAL STRUCTURE OF THE OXYTRICHA NOVA TELOMERE
END-BINDING PROTEIN COMPLEXED WITH NONCOGNATE SSDNA
GG(3DR)GTTTTGGGG
Authors : Theobald, D.L.; Schultz, S.C.
Deposited on : 2003-05-29
Resolution : 2.50 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<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 : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

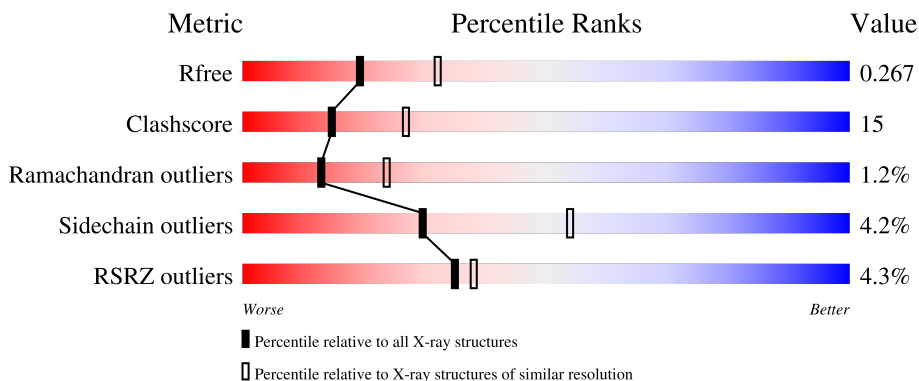
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	G	13	
1	H	13	
2	D	12	
3	A	461	
4	B	216	

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 6410 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 DNA chain called 5'-D(*GP*GP*GP*GP*TP*TP*TP*TP*GP*GP*GP*GP*P*T)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	G	12	Total 253	C 120	N 48	O 74	P 11	0	0	0
1	H	12	Total 253	C 120	N 48	O 74	P 11	0	0	0

- Molecule 2 is a DNA chain called 5'-D(*GP*GP*(3DR)P*GP*TP*TP*TP*TP*GP*GP*GP*GP*P*G)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	D	12	Total 242	C 115	N 43	O 73	P 11	0	0	0

- Molecule 3 is a protein called Telomere-binding protein alpha subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	A	449	Total 3636	C 2312	N 625	O 697	S 2	0	0	0

- Molecule 4 is a protein called Telomere-binding protein beta subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	B	215	Total 1723	C 1107	N 292	O 323	S 1	0	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	G	5	Total 5	O 5	0	0
5	D	18	Total 18	O 18	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	H	5	Total O 5 5	0	0
5	A	232	Total O 232 232	0	0
5	B	43	Total O 43 43	0	0

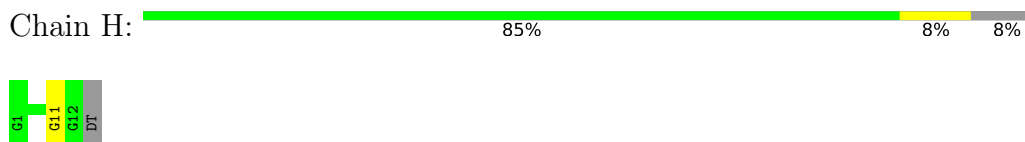
3 Residue-property plots [i](#)

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: 5'-D(*GP*GP*GP*GP*TP*TP*TP*TP*GP*GP*GP*GP*T)-3'



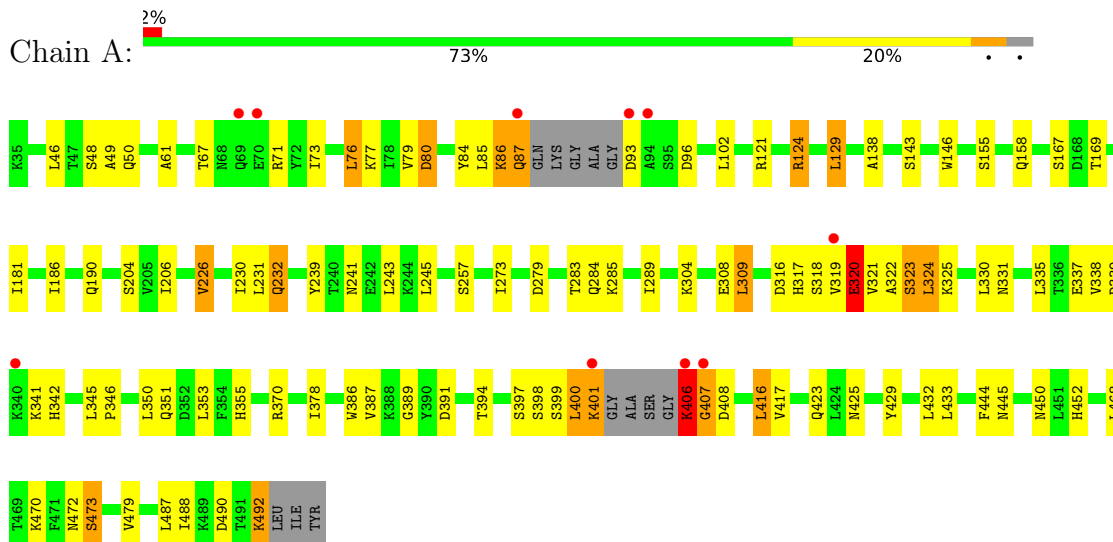
- Molecule 1: 5'-D(*GP*GP*GP*GP*TP*TP*TP*TP*GP*GP*GP*GP*T)-3'




- Molecule 2: 5'-D(*GP*GP*(3DR)P*GP*TP*TP*TP*TP*GP*GP*GP*G)-3'

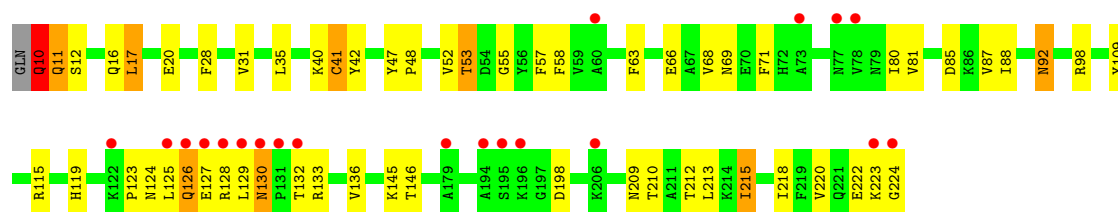


- Molecule 3: Telomere-binding protein alpha subunit



● Molecule 4: Telomere-binding protein beta subunit

Chain B:  9% 73% 23%



4 Data and refinement statistics

Property	Value	Source
Space group	P 61 2 2	Depositor
Cell constants a, b, c, α , β , γ	93.48Å 93.48Å 423.49Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	27.31 – 2.50 27.30 – 2.25	Depositor EDS
% Data completeness (in resolution range)	92.9 (27.31-2.50) 90.0 (27.30-2.25)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.96 (at 2.26Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.246 , 0.273 0.238 , 0.267	Depositor DCC
R_{free} test set	4755 reflections (9.92%)	wwPDB-VP
Wilson B-factor (Å ²)	31.3	Xtrriage
Anisotropy	0.373	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 34.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	6410	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.88% 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: 3DR

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	G	0.57	0/284	1.00	3/440 (0.7%)
1	H	0.32	0/284	0.74	0/440
2	D	0.41	1/258 (0.4%)	0.73	0/397
3	A	0.58	14/3706 (0.4%)	0.79	14/5010 (0.3%)
4	B	0.88	4/1761 (0.2%)	0.72	4/2379 (0.2%)
All	All	0.66	19/6293 (0.3%)	0.78	21/8666 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
4	B	0	1

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	10	GLN	N-CA	27.08	2.00	1.46
4	B	10	GLN	CA-C	17.64	1.98	1.52
3	A	492	LYS	CA-C	10.19	1.79	1.52
3	A	401	LYS	CB-CG	9.64	1.78	1.52
4	B	11	GLN	N-CA	8.31	1.62	1.46
4	B	10	GLN	CB-CG	7.11	1.71	1.52
3	A	406	LYS	N-CA	6.98	1.60	1.46
3	A	323	SER	CA-C	-6.75	1.35	1.52
3	A	406	LYS	CA-C	6.62	1.70	1.52
3	A	401	LYS	CD-CE	6.59	1.67	1.51
3	A	492	LYS	N-CA	6.46	1.59	1.46
3	A	401	LYS	CA-C	6.38	1.69	1.52
3	A	407	GLY	CA-C	6.13	1.61	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	401	LYS	CG-CD	5.96	1.72	1.52
3	A	407	GLY	N-CA	5.54	1.54	1.46
3	A	87	GLN	CB-CG	5.38	1.67	1.52
3	A	324	LEU	N-CA	-5.12	1.36	1.46
3	A	320	GLU	N-CA	-5.08	1.36	1.46
2	D	1	DG	C4'-C3'	-5.04	1.47	1.52

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	10	GLN	N-CA-C	16.73	156.18	111.00
4	B	10	GLN	CB-CA-C	-13.14	84.13	110.40
3	A	400	LEU	CA-CB-CG	-9.81	92.74	115.30
3	A	406	LYS	N-CA-C	9.73	137.28	111.00
3	A	401	LYS	N-CA-C	-9.00	86.70	111.00
3	A	401	LYS	CB-CA-C	8.70	127.79	110.40
3	A	86	LYS	N-CA-C	-8.35	88.45	111.00
3	A	87	GLN	CB-CA-C	7.68	125.77	110.40
3	A	408	ASP	N-CA-C	-7.25	91.44	111.00
3	A	87	GLN	C-N-CA	7.16	139.60	121.70
3	A	407	GLY	N-CA-C	6.51	129.38	113.10
3	A	323	SER	N-CA-CB	6.32	119.98	110.50
4	B	10	GLN	C-N-CA	5.96	136.59	121.70
3	A	401	LYS	CD-CE-NZ	5.86	125.17	111.70
3	A	401	LYS	CB-CG-CD	5.69	126.40	111.60
3	A	492	LYS	CA-C-O	-5.45	108.66	120.10
4	B	10	GLN	O-C-N	-5.27	114.27	122.70
1	G	9	DG	C5'-C4'-C3'	5.26	123.56	114.10
1	G	5	DT	C5'-C4'-C3'	-5.25	104.66	114.10
3	A	324	LEU	CB-CG-CD1	-5.22	102.12	111.00
1	G	10	DG	C5'-C4'-C3'	5.01	123.11	114.10

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	B	10	GLN	Mainchain

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	G	253	0	138	12	0
1	H	253	0	138	1	0
2	D	242	0	135	7	0
3	A	3636	0	3633	91	0
4	B	1723	0	1710	74	0
5	A	232	0	0	4	0
5	B	43	0	0	0	0
5	D	18	0	0	1	0
5	G	5	0	0	0	0
5	H	5	0	0	0	0
All	All	6410	0	5754	182	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 15.

All (182) 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)
3:A:401:LYS:CB	3:A:401:LYS:CG	1.78	1.56
3:A:492:LYS:CA	3:A:492:LYS:C	1.79	1.49
4:B:10:GLN:CA	4:B:10:GLN:C	1.98	1.31
4:B:10:GLN:CA	4:B:10:GLN:N	2.00	1.24
1:G:5:DT:H2''	1:G:6:DT:H5''	1.20	1.10
4:B:80:ILE:HD12	4:B:218:ILE:HD11	1.42	1.01
2:D:6:DT:H2''	2:D:7:DT:H5'	1.51	0.93
3:A:285:LYS:HB3	3:A:331:ASN:HD21	1.33	0.93
1:G:4:DG:H2''	1:G:5:DT:H5''	1.52	0.90
4:B:10:GLN:C	4:B:10:GLN:CB	2.42	0.87
4:B:40:LYS:HD3	4:B:128:ARG:NH2	1.93	0.84
4:B:10:GLN:N	4:B:10:GLN:HA	1.91	0.83
1:G:4:DG:C2'	1:G:5:DT:H5''	2.11	0.80
3:A:226:VAL:HG13	3:A:273:ILE:HB	1.65	0.79
4:B:10:GLN:HE21	4:B:12:SER:H	1.28	0.78
4:B:126:GLN:HE21	4:B:128:ARG:HD3	1.49	0.78
4:B:132:THR:HG22	4:B:133:ARG:O	1.87	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:320:GLU:O	3:A:322:ALA:N	2.22	0.73
2:D:12:DG:H2'	2:D:12:DG:N3	2.06	0.70
3:A:67:THR:HG21	3:A:73:ILE:HD12	1.75	0.68
3:A:285:LYS:HB3	3:A:331:ASN:ND2	2.09	0.67
3:A:76:LEU:HD23	3:A:76:LEU:N	2.10	0.67
4:B:129:LEU:O	4:B:130:ASN:HB2	1.97	0.65
3:A:285:LYS:CB	3:A:331:ASN:HD21	2.09	0.65
4:B:215:ILE:O	4:B:218:ILE:HG22	1.96	0.65
3:A:319:VAL:O	3:A:319:VAL:HG12	1.97	0.63
4:B:17:LEU:HD11	4:B:35:LEU:HB3	1.79	0.63
4:B:126:GLN:HG3	4:B:128:ARG:HG2	1.80	0.63
4:B:10:GLN:NE2	4:B:12:SER:H	1.96	0.63
4:B:68:VAL:HG21	4:B:213:LEU:HD11	1.80	0.63
1:G:5:DT:C2'	1:G:6:DT:H5''	2.13	0.62
4:B:28:PHE:O	4:B:31:VAL:HG12	1.99	0.62
4:B:40:LYS:HD3	4:B:128:ARG:HH21	1.65	0.62
3:A:61:ALA:HB2	3:A:76:LEU:HB3	1.81	0.61
1:H:11:DG:H5'	1:H:11:DG:N3	2.15	0.61
4:B:20:GLU:HB3	4:B:31:VAL:HG23	1.81	0.61
4:B:47:TYR:CG	4:B:48:PRO:HA	2.35	0.61
3:A:389:GLY:HA3	3:A:407:GLY:HA3	1.83	0.61
4:B:125:LEU:HD12	4:B:125:LEU:H	1.65	0.60
3:A:401:LYS:O	5:A:708:HOH:O	2.16	0.60
3:A:423:GLN:HG3	5:A:705:HOH:O	2.02	0.60
4:B:10:GLN:HE21	4:B:12:SER:N	1.96	0.58
1:G:4:DG:H2''	1:G:5:DT:C5'	2.30	0.58
3:A:169:THR:OG1	3:A:181:ILE:HD13	2.04	0.58
4:B:87:VAL:CG1	4:B:128:ARG:HG3	2.33	0.58
3:A:79:VAL:HG13	3:A:84:TYR:HB3	1.86	0.58
3:A:86:LYS:N	3:A:96:ASP:HB2	2.19	0.57
4:B:10:GLN:NE2	4:B:11:GLN:H	2.02	0.57
3:A:492:LYS:CA	3:A:492:LYS:O	2.46	0.57
4:B:109:TYR:CE1	4:B:145:LYS:HE2	2.39	0.57
3:A:155:SER:H	3:A:158:GLN:NE2	2.02	0.57
1:G:11:DG:H1'	1:G:12:DG:H5'	1.86	0.57
4:B:47:TYR:CD1	4:B:48:PRO:HA	2.40	0.57
3:A:124:ARG:HG3	3:A:124:ARG:NH1	2.20	0.56
4:B:48:PRO:O	4:B:215:ILE:HG21	2.05	0.56
4:B:87:VAL:HG11	4:B:128:ARG:HG3	1.88	0.56
3:A:391:ASP:HB3	3:A:394:THR:HG22	1.89	0.54
3:A:124:ARG:HG3	3:A:124:ARG:HH11	1.73	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:132:THR:HG22	4:B:133:ARG:N	2.23	0.54
4:B:132:THR:CG2	4:B:133:ARG:N	2.71	0.54
4:B:126:GLN:NE2	4:B:128:ARG:HD3	2.21	0.54
3:A:317:HIS:HA	3:A:320:GLU:OE1	2.08	0.54
4:B:57:PHE:CD2	4:B:136:VAL:HG23	2.43	0.54
3:A:401:LYS:O	3:A:406:LYS:HB2	2.08	0.54
3:A:79:VAL:CG1	3:A:80:ASP:N	2.72	0.53
3:A:230:ILE:HD12	3:A:243:LEU:HG	1.91	0.53
2:D:10:DG:N3	2:D:10:DG:H2'	2.24	0.52
3:A:319:VAL:O	3:A:319:VAL:CG1	2.57	0.52
3:A:432:LEU:HB2	3:A:487:LEU:HD22	1.91	0.52
4:B:129:LEU:O	4:B:130:ASN:CB	2.58	0.52
1:G:4:DG:H1'	1:G:5:DT:H5''	1.91	0.52
4:B:47:TYR:HB2	4:B:81:VAL:CG1	2.39	0.52
4:B:87:VAL:HG13	4:B:124:ASN:HB2	1.91	0.52
4:B:126:GLN:HE21	4:B:128:ARG:CD	2.21	0.52
1:G:6:DT:H2''	1:G:8:DT:O4	2.09	0.52
4:B:17:LEU:CD1	4:B:35:LEU:HB3	2.39	0.52
3:A:46:LEU:CD2	3:A:129:LEU:HD13	2.41	0.51
4:B:55:GLY:HA2	4:B:132:THR:HG21	1.93	0.51
2:D:4:DG:H3'	2:D:4:DG:OP2	2.10	0.51
3:A:230:ILE:HD13	3:A:245:LEU:CD2	2.41	0.51
1:G:4:DG:C1'	1:G:5:DT:H5''	2.40	0.51
4:B:212:THR:HG22	4:B:213:LEU:N	2.25	0.51
1:G:3:DG:H2'	1:G:3:DG:N3	2.26	0.51
3:A:323:SER:C	3:A:325:LYS:N	2.63	0.51
3:A:241:ASN:HB2	3:A:257:SER:O	2.11	0.50
3:A:285:LYS:HD3	3:A:331:ASN:ND2	2.26	0.50
3:A:71:ARG:NE	3:A:73:ILE:HD11	2.25	0.50
4:B:71:PHE:HE1	4:B:123:PRO:HG3	1.77	0.50
3:A:283:THR:HG21	4:B:10:GLN:N	2.26	0.50
3:A:79:VAL:CG1	3:A:84:TYR:HB3	2.41	0.50
3:A:230:ILE:HD13	3:A:245:LEU:HD23	1.94	0.50
3:A:48:SER:C	3:A:50:GLN:H	2.15	0.49
3:A:124:ARG:HH11	3:A:124:ARG:CG	2.25	0.49
3:A:492:LYS:C	3:A:492:LYS:HA	2.14	0.49
1:G:9:DG:H2'	1:G:9:DG:N3	2.28	0.49
4:B:92:ASN:HB3	4:B:119:HIS:HB2	1.95	0.49
4:B:81:VAL:HG23	4:B:222:GLU:OE1	2.13	0.48
4:B:220:VAL:HG13	4:B:224:GLY:HA2	1.96	0.48
4:B:42:TYR:CE1	4:B:85:ASP:HA	2.48	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:212:THR:CG2	4:B:213:LEU:N	2.76	0.48
3:A:391:ASP:CG	3:A:394:THR:HG22	2.34	0.48
4:B:126:GLN:O	4:B:127:GLU:C	2.52	0.48
3:A:76:LEU:N	3:A:76:LEU:CD2	2.76	0.48
3:A:345:LEU:HD23	3:A:370:ARG:HB2	1.96	0.48
4:B:47:TYR:HB2	4:B:81:VAL:HG13	1.96	0.47
3:A:323:SER:C	3:A:325:LYS:H	2.16	0.47
3:A:330:LEU:HD22	4:B:146:THR:HG22	1.97	0.47
3:A:350:LEU:HD21	3:A:417:VAL:HG23	1.95	0.47
3:A:339:ASP:OD1	3:A:341:LYS:HG2	2.15	0.47
3:A:387:VAL:HG12	3:A:400:LEU:HD12	1.96	0.47
4:B:87:VAL:CG1	4:B:124:ASN:HB2	2.45	0.47
3:A:79:VAL:HG12	3:A:80:ASP:N	2.29	0.47
2:D:6:DT:H2''	2:D:7:DT:C5'	2.36	0.47
4:B:126:GLN:HG3	4:B:128:ARG:HD3	1.97	0.46
3:A:429:TYR:N	3:A:429:TYR:CD1	2.83	0.46
3:A:85:LEU:C	3:A:96:ASP:HB2	2.35	0.46
4:B:10:GLN:C	4:B:10:GLN:HB3	2.34	0.46
3:A:338:VAL:CG1	3:A:342:HIS:HB2	2.46	0.46
3:A:399:SER:C	3:A:401:LYS:H	2.20	0.45
3:A:309:LEU:HD12	3:A:309:LEU:HA	1.75	0.45
4:B:126:GLN:HG3	4:B:128:ARG:CG	2.44	0.45
3:A:378:ILE:HG21	3:A:386:TRP:CZ2	2.52	0.45
3:A:391:ASP:HB3	3:A:394:THR:CG2	2.46	0.45
2:D:8:DT:H2''	2:D:9:DG:H5'	1.98	0.45
4:B:127:GLU:O	4:B:129:LEU:HG	2.17	0.45
4:B:125:LEU:O	4:B:127:GLU:N	2.50	0.44
3:A:186:ILE:O	3:A:190:GLN:HG2	2.18	0.44
4:B:81:VAL:HG12	4:B:81:VAL:O	2.17	0.44
3:A:335:LEU:CD1	3:A:468:LEU:HD23	2.48	0.44
3:A:444:PHE:O	3:A:445:ASN:HB2	2.18	0.44
4:B:109:TYR:CE2	4:B:145:LYS:HG2	2.53	0.43
1:G:11:DG:H2''	1:G:12:DG:C8	2.53	0.43
3:A:416:LEU:HA	3:A:416:LEU:HD12	1.78	0.43
3:A:155:SER:H	3:A:158:GLN:HE21	1.65	0.43
3:A:433:LEU:HD12	3:A:488:ILE:HB	2.00	0.43
3:A:479:VAL:HG12	3:A:488:ILE:HD13	2.00	0.43
3:A:318:SER:C	3:A:320:GLU:N	2.72	0.43
4:B:41:CYS:HB3	4:B:53:THR:O	2.19	0.43
3:A:121:ARG:O	3:A:146:TRP:HA	2.19	0.43
3:A:167:SER:OG	3:A:169:THR:HG22	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:68:VAL:HG11	4:B:213:LEU:HD12	2.00	0.43
4:B:98:ARG:HG3	4:B:115:ARG:HD2	1.99	0.43
3:A:71:ARG:CZ	3:A:73:ILE:HD11	2.49	0.42
3:A:80:ASP:C	3:A:80:ASP:OD1	2.57	0.42
4:B:68:VAL:HG11	4:B:218:ILE:HD12	2.01	0.42
4:B:209:ASN:OD1	4:B:209:ASN:N	2.47	0.42
3:A:204:SER:O	3:A:206:ILE:N	2.52	0.42
3:A:401:LYS:CA	5:A:708:HOH:O	2.68	0.42
3:A:338:VAL:CG1	3:A:339:ASP:N	2.83	0.42
4:B:52:VAL:HG11	4:B:88:ILE:HD11	2.00	0.42
4:B:58:PHE:C	4:B:58:PHE:CD1	2.93	0.42
4:B:223:LYS:O	4:B:224:GLY:C	2.57	0.42
3:A:391:ASP:CB	3:A:394:THR:HG22	2.48	0.42
3:A:450:ASN:OD1	3:A:452:HIS:HB2	2.20	0.42
3:A:351:GLN:O	3:A:355:HIS:HB2	2.20	0.42
3:A:304:LYS:HE2	3:A:308:GLU:OE2	2.19	0.41
3:A:284:GLN:HG3	3:A:330:LEU:HG	2.01	0.41
3:A:389:GLY:O	3:A:397:SER:HA	2.19	0.41
3:A:425:ASN:HA	4:B:198:ASP:O	2.20	0.41
5:D:158:HOH:O	3:A:77:LYS:HE3	2.19	0.41
3:A:335:LEU:HD12	3:A:468:LEU:HD23	2.02	0.41
3:A:339:ASP:HB2	3:A:490:ASP:HB3	2.03	0.41
3:A:46:LEU:HD22	3:A:129:LEU:HD13	2.02	0.41
3:A:400:LEU:HD23	3:A:406:LYS:H	1.85	0.41
3:A:470:LYS:O	3:A:473:SER:HB2	2.21	0.41
2:D:7:DT:H6	2:D:7:DT:H2'	1.70	0.41
3:A:279:ASP:HB2	3:A:289:ILE:HG13	2.02	0.41
4:B:68:VAL:HG23	4:B:69:ASN:N	2.36	0.41
4:B:85:ASP:O	4:B:85:ASP:OD1	2.38	0.41
3:A:71:ARG:NH2	3:A:73:ILE:HD11	2.36	0.41
3:A:124:ARG:NH1	3:A:143:SER:O	2.53	0.41
4:B:55:GLY:O	4:B:132:THR:HG23	2.20	0.41
4:B:126:GLN:H	4:B:126:GLN:HG2	1.71	0.41
3:A:71:ARG:HE	3:A:73:ILE:HD11	1.85	0.41
3:A:102:LEU:HD23	3:A:138:ALA:HB3	2.02	0.41
3:A:232:GLN:NE2	5:A:726:HOH:O	2.27	0.40
4:B:87:VAL:HG22	4:B:88:ILE:N	2.36	0.40
4:B:127:GLU:O	4:B:127:GLU:HG3	2.21	0.40
3:A:345:LEU:HD12	3:A:346:PRO:HD2	2.03	0.40
4:B:53:THR:HA	4:B:57:PHE:O	2.21	0.40
4:B:10:GLN:HG2	4:B:16:GLN:HB2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:63:PHE:O	4:B:212:THR:HG23	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	A	447/461 (97%)	421 (94%)	21 (5%)	5 (1%)	14	26
4	B	213/216 (99%)	189 (89%)	21 (10%)	3 (1%)	11	20
All	All	660/677 (98%)	610 (92%)	42 (6%)	8 (1%)	13	24

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	93	ASP
3	A	321	VAL
3	A	406	LYS
4	B	126	GLN
4	B	130	ASN
4	B	210	THR
3	A	320	GLU
3	A	49	ALA

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	
3	A	403/409 (98%)	385 (96%)	18 (4%)	27	51
4	B	188/189 (100%)	181 (96%)	7 (4%)	34	60
All	All	591/598 (99%)	566 (96%)	25 (4%)	30	54

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	A	76	LEU
3	A	80	ASP
3	A	87	GLN
3	A	124	ARG
3	A	129	LEU
3	A	226	VAL
3	A	231	LEU
3	A	232	GLN
3	A	239	TYR
3	A	309	LEU
3	A	316	ASP
3	A	324	LEU
3	A	337	GLU
3	A	353	LEU
3	A	398	SER
3	A	416	LEU
3	A	472	ASN
3	A	473	SER
4	B	10	GLN
4	B	17	LEU
4	B	41	CYS
4	B	53	THR
4	B	66	GLU
4	B	92	ASN
4	B	215	ILE

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

Mol	Chain	Res	Type
3	A	158	GLN
3	A	327	ASN
3	A	331	ASN
3	A	372	GLN
4	B	10	GLN

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Mol	Chain	Res	Type
4	B	92	ASN
4	B	126	GLN
4	B	149	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](#)

1 non-standard protein/DNA/RNA residue is 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	3DR	D	3	2	8,11,12	0.34	0	9,14,17	0.74	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
2	3DR	D	3	2	-	1/3/15/16	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	3	3DR	O4'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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	G	12/13 (92%)	0.04	0 100 100	34, 43, 49, 50	0
1	H	12/13 (92%)	0.18	0 100 100	40, 46, 50, 50	0
2	D	11/12 (91%)	-0.47	0 100 100	25, 34, 52, 52	0
3	A	449/461 (97%)	-0.09	10 (2%) 62 65	17, 29, 49, 60	0
4	B	215/216 (99%)	0.49	20 (9%) 8 8	23, 46, 61, 70	0
All	All	699/715 (97%)	0.09	30 (4%) 35 38	17, 33, 57, 70	0

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	A	407	GLY	9.8
4	B	127	GLU	7.6
3	A	406	LYS	6.6
4	B	130	ASN	6.3
4	B	126	GLN	5.9
4	B	129	LEU	5.3
4	B	78	VAL	5.1
3	A	87	GLN	4.8
3	A	70	GLU	4.5
4	B	223	LYS	4.2
3	A	69	GLN	4.2
4	B	77	ASN	3.9
4	B	131	PRO	3.9
3	A	319	VAL	3.9
4	B	196	LYS	3.9
4	B	73	ALA	3.8
4	B	179	ALA	3.6
3	A	93	ASP	3.4
4	B	224	GLY	3.3
4	B	194	ALA	3.3

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Mol	Chain	Res	Type	RSRZ
4	B	206	LYS	2.9
3	A	94	ALA	2.9
3	A	401	LYS	2.7
4	B	132	THR	2.6
4	B	125	LEU	2.4
4	B	128	ARG	2.3
4	B	195	SER	2.3
4	B	60	ALA	2.3
3	A	340	LYS	2.2
4	B	122	LYS	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
2	3DR	D	3	11/12	0.79	0.29	50,53,63,68	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.