



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 03:00 AM UTC

PDB ID : 1JFT / pdb_00001jft
Title : PURINE REPRESSOR MUTANT-HYPOXANTHINE-PURF OPERATOR
COMPLEX
Authors : Huffman, J.L.; Lu, F.; Zalkin, H.; Brennan, R.G.
Deposited on : 2001-06-21
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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

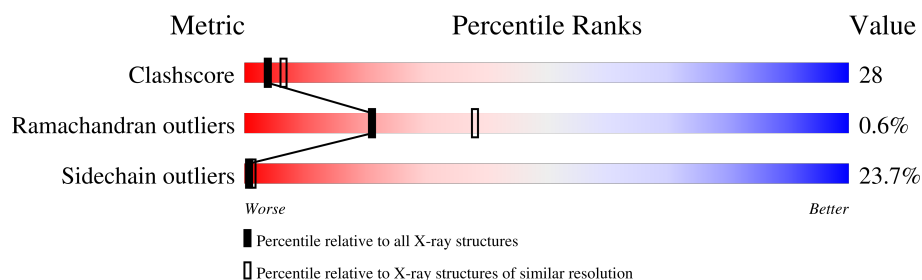
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	B	17	
2	A	340	

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 3085 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(*TP*AP*CP*GP*CP*AP*AP*AP*CP*GP*TP*TP*TP*GP*CP*GP*T)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	17	Total	C	N	O	P	0	0	0
			345	166	62	101	16			

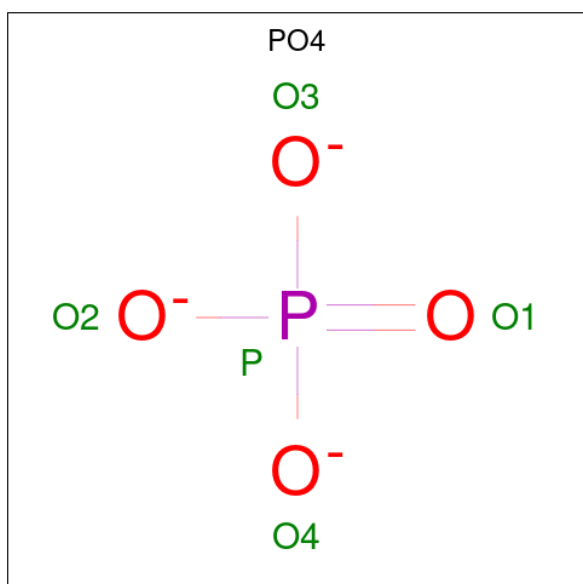
- Molecule 2 is a protein called PURINE NUCLEOTIDE SYNTHESIS REPRESSOR.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	A	340	Total	C	N	O	S	0	0	0
			2660	1672	473	496	19			

There is a discrepancy between the modelled and reference sequences:

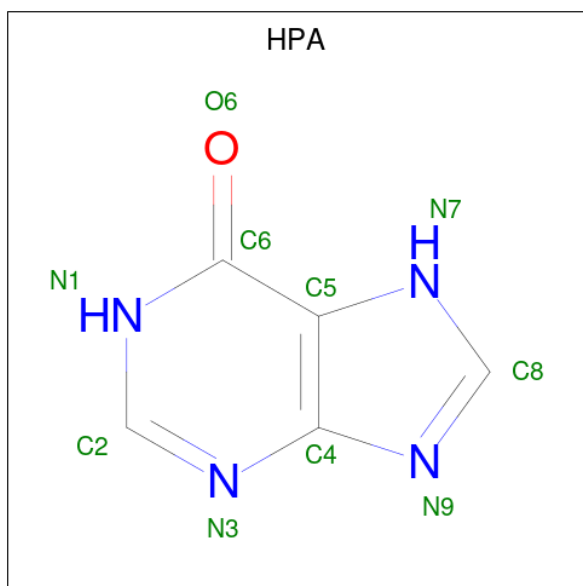
Chain	Residue	Modelled	Actual	Comment	Reference
A	147	ALA	TRP	engineered mutation	UNP P0ACP7

- Molecule 3 is PHOSPHATE ION (CCD ID: PO4) (formula: O₄P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	P	0	0
			5	4	1		

- Molecule 4 is HYPOXANTHINE (CCD ID: HPA) (formula: $C_5H_4N_4O$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			10	5	4	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	5	Total	O	0	0
			5	5		
5	A	60	Total	O	0	0
			60	60		

3 Residue-property plots

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. 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. 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.

Note EDS was not executed.

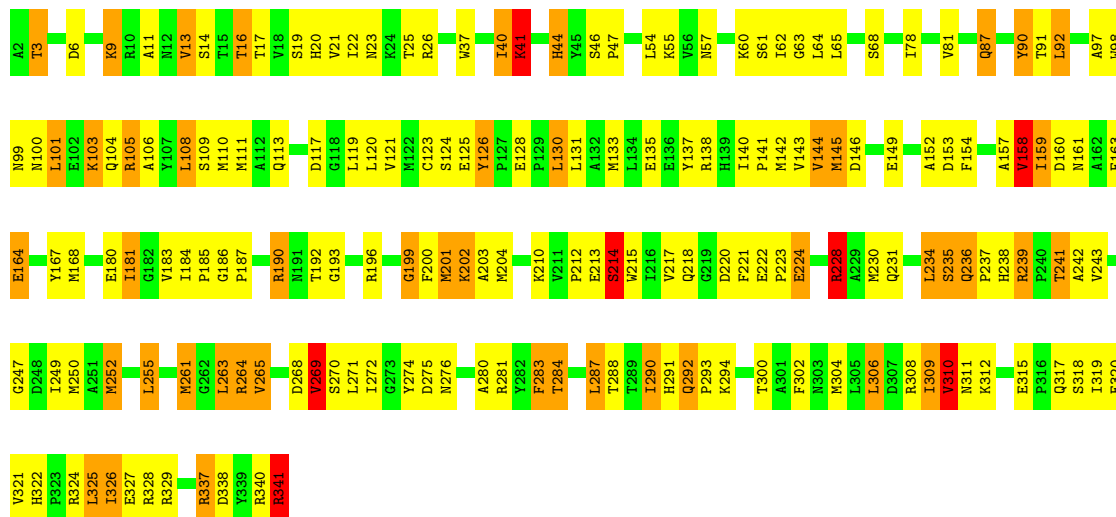
- Molecule 1: 5'-D(*TP*AP*CP*GP*CP*AP*AP*AP*CP*GP*TP*TP*TP*GP*CP*GP*T)-3',

Chain B: 



- Molecule 2: PURINE NUCLEOTIDE SYNTHESIS REPRESSOR

Chain A: 



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	175.92Å 95.25Å 81.35Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	10.00 – 2.50	Depositor
% Data completeness (in resolution range)	(Not available) (10.00-2.50)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	0.06	Depositor
Refinement program	TNT	Depositor
R, R_{free}	0.192 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3085	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

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: PO4, HPA

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	B	1.01	0/386	2.70	31/594 (5.2%)
2	A	2.50	5/2712 (0.2%)	1.39	31/3665 (0.8%)
All	All	2.37	5/3098 (0.2%)	1.64	62/4259 (1.5%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	341	ARG	C-OXT	111.25	3.46	1.23
2	A	290	ILE	CA-CB	-5.87	1.47	1.54
2	A	319	ILE	CA-CB	-5.15	1.48	1.54
2	A	78	ILE	CA-CB	-5.04	1.48	1.54
2	A	159	ILE	CA-CB	-5.00	1.48	1.54

All (62) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	715	DT	C6-N1-C1'	-17.01	93.84	119.35
1	B	715	DT	C2-N1-C1'	15.42	142.48	119.35
1	B	702	DG	C8-N9-C1'	-15.24	104.13	127.00
1	B	702	DG	C4-N9-C1'	14.48	148.72	127.00
1	B	705	DA	C4-N9-C1'	-12.19	108.77	127.05
1	B	705	DA	C8-N9-C1'	12.13	145.25	127.05
1	B	700	DA	C8-N9-C1'	-11.35	110.03	127.05
1	B	711	DT	C2-N1-C1'	-10.35	103.82	119.35
1	B	714	DG	C4-N9-C1'	-10.19	111.71	127.00
1	B	712	DG	C4-N9-C1'	-9.59	112.61	127.00
1	B	714	DG	C8-N9-C1'	9.52	141.28	127.00
1	B	700	DA	C4-N9-C1'	9.41	141.16	127.05
1	B	708	DG	O3'-P-O5'	-9.04	90.44	104.00
2	A	146	ASP	N-CA-C	8.51	121.25	110.61

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	711	DT	C6-N1-C1'	8.46	132.05	119.35
2	A	283	PHE	N-CA-C	-8.41	99.68	110.53
2	A	340	ARG	CB-CA-C	-8.40	97.34	110.78
1	B	712	DG	C8-N9-C1'	8.29	139.44	127.00
2	A	287	LEU	N-CA-C	8.19	122.11	110.23
2	A	243	VAL	N-CA-C	8.06	119.73	108.12
1	B	713	DC	C3'-C2'-C1'	-7.60	90.20	101.60
2	A	142	MET	N-CA-C	7.60	120.93	108.99
2	A	340	ARG	N-CA-C	7.57	121.14	108.20
1	B	704	DA	C4-N9-C1'	-7.54	115.74	127.05
2	A	322	HIS	N-CA-C	7.40	123.07	107.91
1	B	712	DG	N9-C1'-C2'	-6.96	103.06	113.50
2	A	292	GLN	N-CA-C	-6.93	99.57	109.62
2	A	261	MET	N-CA-C	-6.89	105.22	112.93
2	A	90	TYR	N-CA-C	6.67	119.16	110.43
2	A	183	VAL	N-CA-C	6.59	118.20	108.45
1	B	704	DA	C8-N9-C1'	6.38	136.62	127.05
2	A	199	GLY	N-CA-C	-6.37	105.09	112.73
1	B	712	DG	P-O3'-C3'	6.14	129.41	120.20
2	A	310	VAL	N-CA-C	6.08	116.26	110.42
2	A	149	GLU	N-CA-C	-5.98	100.86	109.29
2	A	158	VAL	N-CA-C	-5.93	99.80	108.11
1	B	710	DT	P-O5'-C5'	-5.93	111.11	120.00
2	A	41	LYS	N-CA-C	5.89	118.59	111.40
2	A	252	MET	N-CA-C	-5.82	105.02	111.71
1	B	701	DC	C1'-O4'-C4'	-5.78	101.03	109.70
2	A	121	VAL	CB-CA-C	-5.77	102.23	110.83
2	A	214	SER	N-CA-C	-5.64	106.25	113.01
2	A	57	ASN	N-CA-C	5.51	119.45	111.56
1	B	715	DT	O5'-C5'-C4'	-5.49	102.56	110.80
1	B	699	DT	C2-N1-C1'	-5.44	111.19	119.35
2	A	269	VAL	CB-CA-C	-5.40	101.15	110.65
2	A	340	ARG	NE-CZ-NH2	5.38	124.05	119.20
1	B	709	DT	C2'-C3'-O3'	-5.35	103.48	111.50
2	A	126	TYR	N-CA-C	5.31	118.64	108.97
1	B	699	DT	C4'-C3'-O3'	-5.30	102.05	110.00
2	A	164	GLU	N-CA-C	-5.26	106.70	113.01
2	A	16	THR	CB-CA-C	-5.18	102.53	110.81
2	A	326	ILE	CB-CA-C	-5.17	104.27	110.99
1	B	713	DC	P-O3'-C3'	5.17	127.95	120.20
2	A	181	ILE	N-CA-C	5.16	115.92	108.48
1	B	702	DG	P-O5'-C5'	-5.16	112.27	120.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	144	VAL	N-CA-CB	5.11	116.29	110.72
2	A	44	HIS	N-CA-C	-5.09	104.95	110.91
2	A	228	ARG	N-CA-C	5.08	116.81	111.28
1	B	708	DG	P-O5'-C5'	-5.06	112.40	120.00
1	B	708	DG	C8-N9-C1'	-5.04	119.44	127.00
1	B	700	DA	O3'-P-O5'	-5.00	96.50	104.00

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	B	345	0	193	8	1
2	A	2660	0	2649	159	1
3	A	5	0	0	1	0
4	A	10	0	4	0	0
5	A	60	0	0	2	0
5	B	5	0	0	1	0
All	All	3085	0	2846	167	1

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 28.

All (167) 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)
2:A:40:ILE:HG22	2:A:41:LYS:HD3	1.46	0.96
2:A:22:ILE:HG22	2:A:23:ASN:ND2	1.82	0.93
2:A:100:ASN:ND2	2:A:103:LYS:HB2	1.83	0.92
2:A:341:ARG:HH11	2:A:341:ARG:HG3	1.36	0.90
2:A:159:ILE:HG13	2:A:320:GLU:HA	1.54	0.89
2:A:20:HIS:ND1	2:A:25:THR:HG23	1.90	0.87
2:A:22:ILE:HD11	2:A:40:ILE:HD11	1.57	0.85
2:A:237:PRO:HG2	2:A:238:HIS:H	1.43	0.84

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:105:ARG:HB2	2:A:105:ARG:HH11	1.43	0.83
2:A:239:ARG:HH11	2:A:239:ARG:HB3	1.42	0.82
2:A:341:ARG:OXT	2:A:341:ARG:HA	1.82	0.78
2:A:276:ASN:HD22	2:A:291:HIS:CD2	2.01	0.78
2:A:101:LEU:HA	2:A:104:GLN:HE21	1.49	0.77
2:A:187:PRO:HB2	2:A:190:ARG:HD3	1.68	0.75
2:A:292:GLN:HE21	2:A:293:PRO:HD3	1.53	0.74
2:A:135:GLU:O	2:A:138:ARG:HG2	1.88	0.74
2:A:101:LEU:HA	2:A:104:GLN:NE2	2.03	0.73
2:A:152:ALA:HB1	2:A:154:PHE:CE2	2.23	0.73
2:A:276:ASN:HD22	2:A:291:HIS:HD2	1.35	0.73
2:A:265:VAL:HG13	2:A:269:VAL:O	1.89	0.73
2:A:325:LEU:HD22	2:A:326:ILE:N	2.04	0.73
2:A:292:GLN:HE21	2:A:293:PRO:CD	2.03	0.72
2:A:160:ASP:HA	2:A:321:VAL:HG12	1.73	0.71
2:A:341:ARG:HG3	2:A:341:ARG:NH1	2.06	0.71
2:A:239:ARG:HH11	2:A:239:ARG:CB	2.05	0.69
2:A:214:SER:HB2	2:A:236:GLN:OE1	1.93	0.69
2:A:255:LEU:HD13	2:A:271:LEU:HD23	1.76	0.68
2:A:100:ASN:HD22	2:A:103:LYS:HB2	1.56	0.68
2:A:264:ARG:HD2	2:A:265:VAL:N	2.09	0.68
2:A:304:MET:CE	2:A:317:GLN:HB3	2.24	0.68
2:A:309:ILE:HG22	2:A:310:VAL:N	2.09	0.67
2:A:255:LEU:CD1	2:A:271:LEU:HD23	2.25	0.66
2:A:159:ILE:HG12	2:A:320:GLU:HG2	1.77	0.66
2:A:230:MET:HG3	2:A:234:LEU:HD11	1.77	0.66
2:A:135:GLU:HA	2:A:154:PHE:CE1	2.30	0.66
2:A:180:GLU:HB2	2:A:241:THR:HG23	1.78	0.65
2:A:202:LYS:HG3	2:A:203:ALA:N	2.11	0.65
2:A:100:ASN:HD22	2:A:103:LYS:HD3	1.62	0.64
2:A:236:GLN:HB3	2:A:237:PRO:HD2	1.77	0.64
2:A:280:ALA:HA	2:A:283:PHE:CE1	2.33	0.64
2:A:22:ILE:HG22	2:A:23:ASN:HD21	1.60	0.63
2:A:105:ARG:HB2	2:A:105:ARG:NH1	2.13	0.63
2:A:180:GLU:HG2	5:A:801:HOH:O	1.99	0.63
1:B:709:DT:H2''	1:B:710:DT:H5'	1.82	0.61
2:A:159:ILE:CG1	2:A:320:GLU:HG2	2.30	0.61
2:A:20:HIS:HA	2:A:25:THR:CG2	2.31	0.60
2:A:293:PRO:HG2	2:A:321:VAL:HG22	1.84	0.60
2:A:160:ASP:HA	2:A:321:VAL:CG1	2.32	0.60
2:A:105:ARG:HG3	2:A:106:ALA:N	2.15	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:700:DA:H2''	1:B:701:DC:O5'	2.00	0.60
2:A:106:ALA:O	2:A:110:MET:HG3	2.01	0.59
1:B:707:DC:C2'	1:B:708:DG:H5'	2.33	0.59
2:A:310:VAL:HG23	2:A:311:ASN:OD1	2.02	0.58
2:A:97:ALA:HB1	2:A:104:GLN:HG3	1.85	0.58
2:A:236:GLN:CB	2:A:237:PRO:HD2	2.34	0.57
2:A:125:GLU:HG2	2:A:190:ARG:HG3	1.85	0.57
2:A:237:PRO:CG	2:A:238:HIS:H	2.15	0.57
2:A:230:MET:HG3	2:A:234:LEU:CD1	2.35	0.57
2:A:325:LEU:HD22	2:A:326:ILE:H	1.69	0.57
2:A:105:ARG:CA	2:A:133:MET:HE1	2.35	0.56
2:A:157:ALA:O	2:A:318:SER:HA	2.05	0.56
2:A:281:ARG:O	2:A:281:ARG:HD3	2.06	0.55
2:A:302:PHE:CE2	2:A:306:LEU:HD22	2.41	0.55
2:A:40:ILE:HG22	2:A:41:LYS:CD	2.30	0.55
2:A:145:MET:HA	2:A:158:VAL:HG13	1.89	0.55
2:A:117:ASP:O	2:A:141:PRO:HG2	2.07	0.55
2:A:168:MET:HE1	2:A:324:ARG:HA	1.89	0.54
2:A:239:ARG:HH11	2:A:239:ARG:CG	2.20	0.54
2:A:22:ILE:C	2:A:23:ASN:HD22	2.15	0.54
2:A:163:PHE:O	2:A:199:GLY:HA3	2.08	0.54
2:A:292:GLN:HE21	2:A:292:GLN:HA	1.73	0.54
2:A:264:ARG:HD2	2:A:265:VAL:H	1.71	0.54
2:A:37:TRP:HA	2:A:37:TRP:CE3	2.43	0.53
2:A:159:ILE:HD11	2:A:320:GLU:CG	2.39	0.53
2:A:159:ILE:HD11	2:A:320:GLU:HB3	1.91	0.52
2:A:287:LEU:HG	2:A:288:THR:N	2.24	0.52
2:A:63:GLY:HA3	2:A:111:MET:HE2	1.92	0.52
2:A:159:ILE:O	2:A:321:VAL:HG12	2.10	0.51
2:A:65:LEU:HD22	2:A:108:LEU:HD13	1.92	0.51
2:A:287:LEU:O	2:A:328:ARG:HD2	2.11	0.51
2:A:159:ILE:HD11	2:A:320:GLU:CB	2.41	0.51
2:A:290:ILE:HD13	2:A:325:LEU:HD23	1.93	0.50
2:A:317:GLN:HA	5:A:769:HOH:O	2.10	0.50
2:A:325:LEU:CD1	2:A:327:GLU:HG3	2.42	0.50
2:A:22:ILE:CD1	2:A:40:ILE:HD11	2.35	0.50
2:A:62:ILE:HD13	2:A:302:PHE:CE1	2.47	0.50
2:A:181:ILE:HD13	2:A:204:MET:HE1	1.94	0.50
2:A:284:THR:O	2:A:284:THR:HG22	2.10	0.50
2:A:90:TYR:N	2:A:90:TYR:CD2	2.79	0.50
2:A:62:ILE:HD13	2:A:302:PHE:HE1	1.77	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:14:SER:OG	2:A:16:THR:HB	2.12	0.49
2:A:231:GLN:O	2:A:235:SER:HB2	2.13	0.49
2:A:187:PRO:HD2	2:A:221:PHE:CE2	2.47	0.49
2:A:192:THR:O	2:A:196:ARG:HD2	2.13	0.48
2:A:105:ARG:CB	2:A:133:MET:HE1	2.44	0.48
2:A:292:GLN:HA	2:A:292:GLN:NE2	2.29	0.48
2:A:123:CYS:O	2:A:124:SER:HB2	2.14	0.47
2:A:3:THR:HG22	2:A:6:ASP:OD2	2.14	0.47
2:A:130:LEU:HD22	2:A:130:LEU:O	2.15	0.47
2:A:160:ASP:O	2:A:161:ASN:HB2	2.13	0.47
2:A:184:ILE:HA	2:A:217:VAL:O	2.15	0.47
2:A:202:LYS:HE3	2:A:202:LYS:HB2	1.67	0.47
2:A:264:ARG:H	2:A:268:ASP:HB2	1.79	0.47
2:A:337:ARG:NH1	2:A:338:ASP:HA	2.30	0.47
2:A:98:TRP:O	2:A:99:ASN:HB2	2.15	0.46
1:B:713:DC:H5''	5:B:800:HOH:O	2.14	0.46
2:A:223:PRO:HG3	2:A:249:ILE:HG22	1.97	0.46
1:B:714:DG:C2'	1:B:715:DT:H5'	2.44	0.46
2:A:234:LEU:HD22	2:A:263:LEU:HD23	1.98	0.46
1:B:703:DC:H2''	1:B:704:DA:C8	2.51	0.46
2:A:105:ARG:NH1	2:A:105:ARG:CB	2.78	0.45
2:A:187:PRO:HD3	2:A:220:ASP:HA	1.98	0.45
2:A:140:ILE:HG22	2:A:141:PRO:HD2	1.99	0.45
2:A:126:TYR:HB3	2:A:131:LEU:CD1	2.47	0.45
2:A:239:ARG:CG	2:A:239:ARG:NH1	2.79	0.45
2:A:263:LEU:HD12	2:A:263:LEU:HA	1.45	0.45
2:A:161:ASN:HB3	2:A:164:GLU:HG2	1.99	0.44
2:A:16:THR:HG22	2:A:20:HIS:HD2	1.82	0.44
2:A:186:GLY:C	2:A:218:GLN:HE22	2.26	0.44
2:A:293:PRO:HA	3:A:717:PO4:O4	2.18	0.44
2:A:325:LEU:HD11	2:A:327:GLU:HG3	2.00	0.44
2:A:135:GLU:C	2:A:137:TYR:H	2.24	0.44
2:A:304:MET:HE3	2:A:317:GLN:HB3	2.00	0.44
2:A:308:ARG:O	2:A:312:LYS:HA	2.18	0.43
2:A:135:GLU:C	2:A:137:TYR:N	2.76	0.43
2:A:137:TYR:HB3	2:A:140:ILE:HD13	2.01	0.43
2:A:64:LEU:HB2	2:A:92:LEU:HD21	2.01	0.43
2:A:200:PHE:CD2	2:A:201:MET:HE2	2.53	0.43
2:A:9:LYS:HE3	2:A:9:LYS:HB2	1.35	0.43
2:A:101:LEU:HA	2:A:101:LEU:HD12	1.47	0.43
2:A:222:GLU:HA	2:A:223:PRO:HD3	1.80	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:276:ASN:ND2	2:A:291:HIS:HD2	2.07	0.43
2:A:181:ILE:HA	2:A:242:ALA:O	2.18	0.43
2:A:224:GLU:HG3	2:A:228:ARG:CD	2.49	0.43
2:A:290:ILE:HD13	2:A:325:LEU:HA	2.01	0.43
2:A:41:LYS:HD2	2:A:41:LYS:HA	1.81	0.42
2:A:200:PHE:HD2	2:A:201:MET:CE	2.31	0.42
2:A:185:PRO:HD2	2:A:218:GLN:HA	2.00	0.42
2:A:212:PRO:O	2:A:215:TRP:HB2	2.19	0.42
2:A:187:PRO:O	2:A:193:GLY:HA3	2.20	0.42
2:A:20:HIS:ND1	2:A:25:THR:CG2	2.73	0.42
1:B:714:DG:H2''	1:B:715:DT:H5'	2.01	0.42
2:A:152:ALA:HB1	2:A:154:PHE:CD2	2.55	0.42
2:A:159:ILE:HD11	2:A:320:GLU:HG2	2.02	0.42
2:A:167:TYR:CD2	2:A:202:LYS:HG3	2.55	0.42
2:A:46:SER:HA	2:A:47:PRO:HD2	1.87	0.42
2:A:154:PHE:CD2	2:A:154:PHE:N	2.87	0.42
2:A:223:PRO:HG3	2:A:249:ILE:CG2	2.50	0.42
2:A:159:ILE:CD1	2:A:320:GLU:HG2	2.49	0.41
2:A:20:HIS:HA	2:A:25:THR:HG22	2.00	0.41
2:A:140:ILE:CG2	2:A:141:PRO:HD2	2.49	0.41
2:A:11:ALA:HB3	2:A:13:VAL:CG2	2.51	0.41
1:B:707:DC:H2''	1:B:708:DG:H5'	2.02	0.41
2:A:140:ILE:HD12	2:A:140:ILE:H	1.85	0.41
2:A:145:MET:HE3	2:A:145:MET:HB3	1.77	0.41
2:A:87:GLN:HE21	2:A:87:GLN:HB2	1.74	0.41
2:A:201:MET:HE3	2:A:201:MET:HB2	1.63	0.41
2:A:247:GLY:HA2	2:A:274:TYR:O	2.21	0.41
2:A:261:MET:HE3	2:A:261:MET:HB3	1.85	0.41
2:A:325:LEU:HD22	2:A:325:LEU:C	2.44	0.41
2:A:255:LEU:HD12	2:A:255:LEU:HA	1.70	0.41
2:A:224:GLU:HG3	2:A:228:ARG:HD3	2.04	0.40
2:A:37:TRP:CZ3	2:A:40:ILE:HD12	2.56	0.40
2:A:264:ARG:HD2	2:A:264:ARG:C	2.43	0.40
2:A:281:ARG:HD3	2:A:281:ARG:C	2.47	0.40
2:A:22:ILE:HD11	2:A:40:ILE:CD1	2.39	0.40
2:A:190:ARG:HH11	2:A:190:ARG:HD2	1.71	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:715:DT:OP2	2:A:337:ARG:NH2[5_445]	2.06	0.14

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	
2	A	338/340 (99%)	305 (90%)	31 (9%)	2 (1%)	21	38

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	275	ASP
2	A	309	ILE

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	
2	A	279/279 (100%)	213 (76%)	66 (24%)	1	1

All (66) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	3	THR
2	A	9	LYS
2	A	13	VAL
2	A	17	THR

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Mol	Chain	Res	Type
2	A	19	SER
2	A	21	VAL
2	A	26	ARG
2	A	40	ILE
2	A	41	LYS
2	A	44	HIS
2	A	54	LEU
2	A	55	LYS
2	A	60	LYS
2	A	61	SER
2	A	68	SER
2	A	81	VAL
2	A	87	GLN
2	A	91	THR
2	A	92	LEU
2	A	101	LEU
2	A	103	LYS
2	A	105	ARG
2	A	108	LEU
2	A	109	SER
2	A	113	GLN
2	A	119	LEU
2	A	120	LEU
2	A	128	GLU
2	A	130	LEU
2	A	143	VAL
2	A	144	VAL
2	A	145	MET
2	A	153	ASP
2	A	158	VAL
2	A	190	ARG
2	A	201	MET
2	A	202	LYS
2	A	210	LYS
2	A	213	GLU
2	A	214	SER
2	A	224	GLU
2	A	228	ARG
2	A	234	LEU
2	A	235	SER
2	A	236	GLN
2	A	239	ARG

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Mol	Chain	Res	Type
2	A	241	THR
2	A	250	MET
2	A	252	MET
2	A	255	LEU
2	A	263	LEU
2	A	264	ARG
2	A	265	VAL
2	A	269	VAL
2	A	270	SER
2	A	272	ILE
2	A	284	THR
2	A	294	LYS
2	A	300	THR
2	A	306	LEU
2	A	310	VAL
2	A	315	GLU
2	A	325	LEU
2	A	329	ARG
2	A	337	ARG
2	A	341	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
2	A	23	ASN
2	A	34	ASN
2	A	58	HIS
2	A	99	ASN
2	A	100	ASN
2	A	104	GLN
2	A	161	ASN
2	A	291	HIS
2	A	292	GLN
2	A	322	HIS

5.3.3 RNA ⓘ

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](#)

2 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	HPA	A	599	-	10,11,11	1.32	2 (20%)	11,15,15	1.51	2 (18%)
3	PO4	A	717	-	4,4,4	2.48	2 (50%)	6,6,6	0.64	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	HPA	A	599	-	-	-	0/2/2/2

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	717	PO4	P-O4	-4.27	1.42	1.54
4	A	599	HPA	C8-N7	-2.50	1.30	1.35
3	A	717	PO4	P-O3	-2.23	1.48	1.54
4	A	599	HPA	C8-N9	2.17	1.37	1.33

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
4	A	599	HPA	C6-C5-C4	-3.51	119.21	121.61
4	A	599	HPA	C8-N7-C5	-2.21	104.10	106.59

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	717	PO4	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

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.