Full wwPDB X-ray Structure Validation Report (i)

Feb 1, 2016 – 10:06 AM GMT

PDB ID	:	3KVR
Title	:	Trapping of an oxocarbenium ion intermediate in UP crystals
Authors	:	Paul, D.; O'Leary, S.; Rajashankar, K.; Bu, W.; Toms, A.; Settembre, E.; Sanders, J.; Begley, T.P.; Ealick, S.E.
Deposited on	:	2009-11-30
Resolution	:	2.60 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
http://wwpdb.org/validation/2016/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The following versions of software and data (see references (1)) were used in the production of this report:

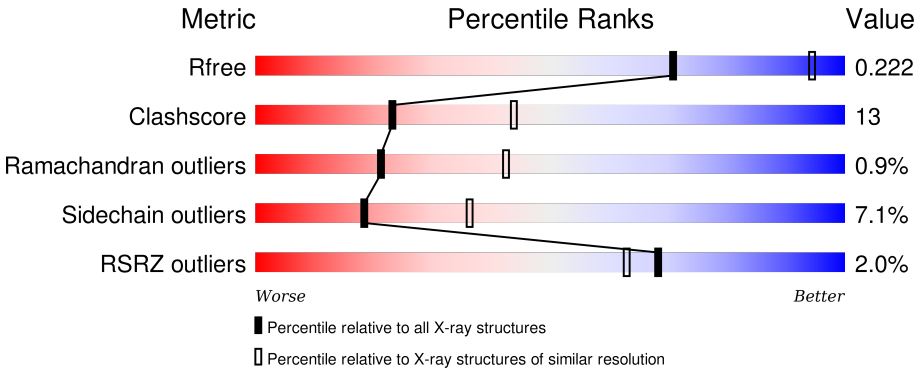
MolProbity	:	4.02b-467
Mogul	:	1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20026688
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	trunk26865

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	2328 (2.60-2.60)
Clashscore	102246	2679 (2.60-2.60)
Ramachandran outliers	100387	2635 (2.60-2.60)
Sidechain outliers	100360	2635 (2.60-2.60)
RSRZ outliers	91569	2334 (2.60-2.60)

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 >=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 <=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	309	2% 65% 25% • 5%
1	B	309	2% 69% 21% • 5%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	URF	A	2001	-	-	X	-
4	R2G	A	311	-	-	X	X

2 Entry composition (i)

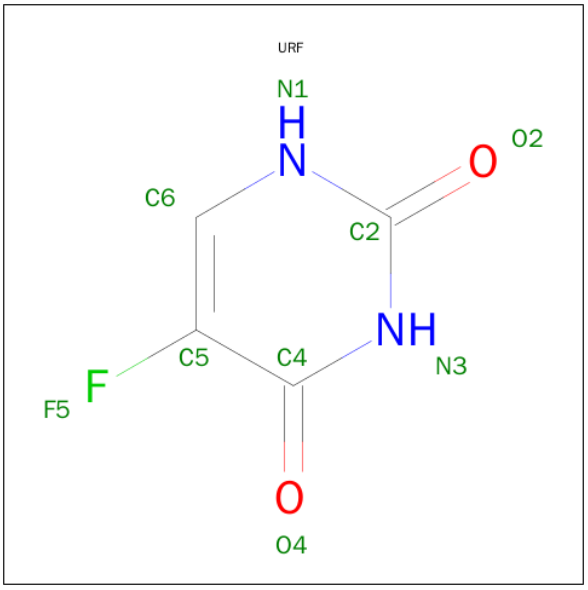
There are 5 unique types of molecules in this entry. The entry contains 4653 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Uridine phosphorylase.

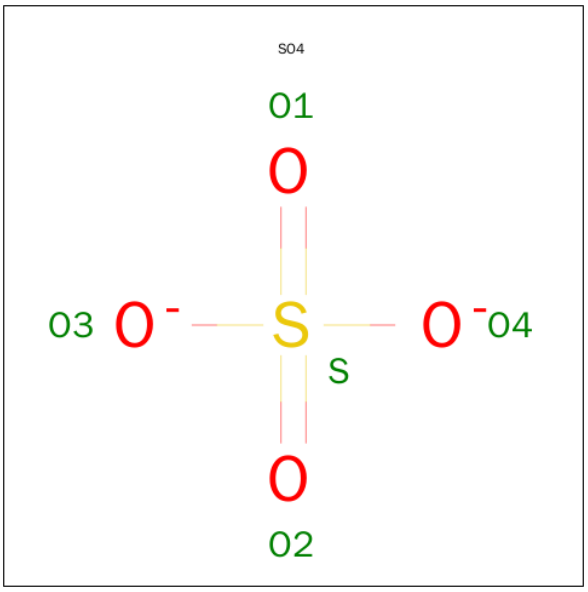
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	293	Total	C	N	O	S	0	0	0
			2238	1416	386	414	22			
1	B	293	Total	C	N	O	S	0	0	0
			2251	1422	390	417	22			

- Molecule 2 is 5-FLUOROURACIL (three-letter code: URF) (formula: $C_4H_3FN_2O_2$).



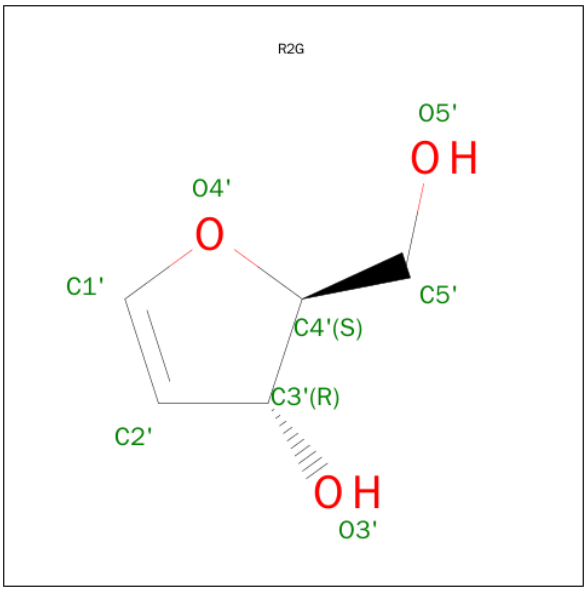
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	F	N	O	0	0
			9	4	1	2	2		
2	B	1	Total	C	F	N	O	0	0
			9	4	1	2	2		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

- Molecule 4 is 2,5-ANHYDRO-4-DEOXY-D-ERYTHRO-PENT-4-ENITOL (three-letter code: R2G) (formula: $C_5H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 8 5 3	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C O 8 5 3	0	0

- Molecule 5 is water.

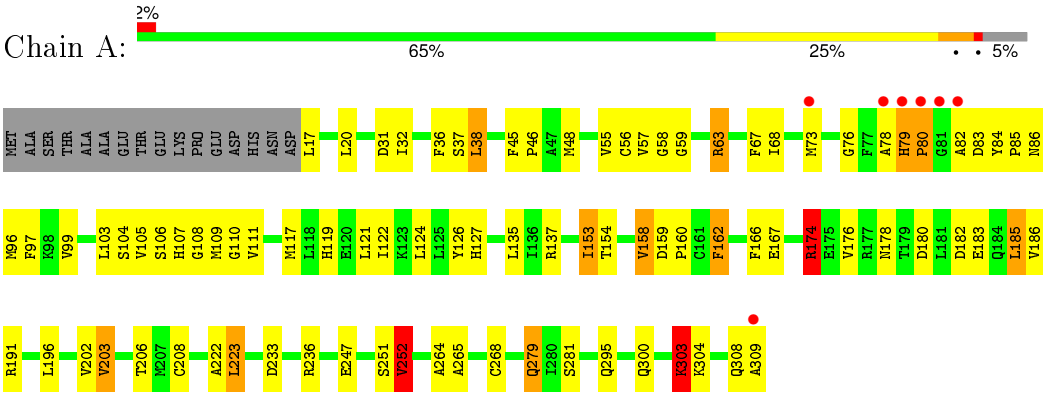
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	63	Total O 63 63	0	0
5	B	57	Total O 57 57	0	0

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.

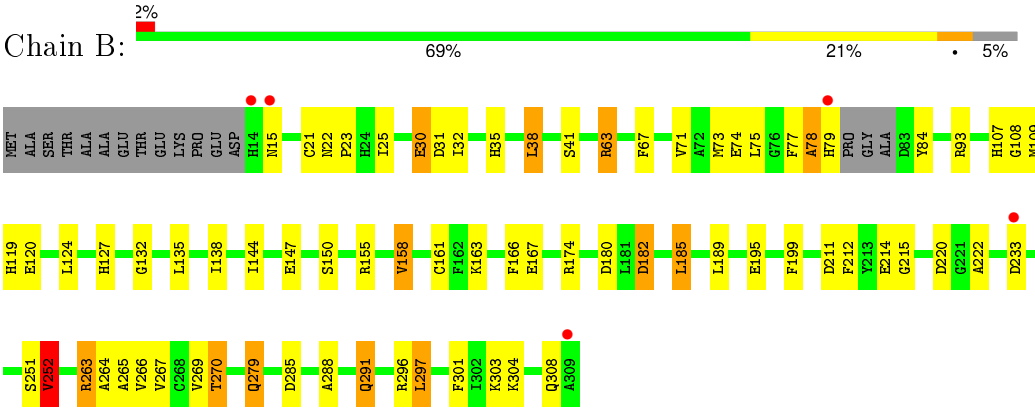
- Molecule 1: Uridine phosphorylase

Chain A:



- Molecule 1: Uridine phosphorylase

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α, β, γ	82.42Å 82.42Å 258.59Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	(Not available) – 2.60 48.28 – 2.60	Depositor EDS
% Data completeness (in resolution range)	94.7 ((Not available)-2.60) 99.4 (48.28-2.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.87 (at 2.61Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.167 , 0.205 0.178 , 0.222	Depositor DCC
R_{free} test set	1426 reflections (5.31%)	DCC
Wilson B-factor (Å^2)	36.2	Xtriage
Anisotropy	0.696	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 39.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.32$	Xtriage
Outliers	1 of 28268 reflections (0.004%)	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	4653	wwPDB-VP
Average B, all atoms (Å^2)	33.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.11% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: R2G, URF, SO4

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	1.23	7/2282 (0.3%)	1.13	11/3086 (0.4%)
1	B	1.24	10/2294 (0.4%)	1.16	14/3099 (0.5%)
All	All	1.24	17/4576 (0.4%)	1.14	25/6185 (0.4%)

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	147	GLU	CG-CD	7.53	1.63	1.51
1	B	158	VAL	CB-CG2	-6.98	1.38	1.52
1	A	63	ARG	CG-CD	6.82	1.69	1.51
1	A	203	VAL	CB-CG1	-6.71	1.38	1.52
1	A	183	GLU	CG-CD	6.67	1.61	1.51
1	B	30	GLU	CG-CD	6.23	1.61	1.51
1	B	212	PHE	CE1-CZ	6.17	1.49	1.37
1	B	147	GLU	CD-OE1	6.13	1.32	1.25
1	B	266	VAL	CB-CG1	5.92	1.65	1.52
1	B	167	GLU	CG-CD	5.61	1.60	1.51
1	A	303	LYS	CD-CE	5.43	1.64	1.51
1	A	268	CYS	CB-SG	-5.37	1.73	1.81
1	B	30	GLU	CD-OE2	5.34	1.31	1.25
1	A	183	GLU	CD-OE2	5.15	1.31	1.25
1	A	303	LYS	CE-NZ	5.12	1.61	1.49
1	B	167	GLU	CD-OE1	5.06	1.31	1.25
1	B	301	PHE	CE1-CZ	5.02	1.46	1.37

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	252	VAL	CB-CA-C	-7.56	97.04	111.40
1	B	63	ARG	NE-CZ-NH1	-7.40	116.60	120.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	189	LEU	CA-CB-CG	7.36	132.23	115.30
1	B	220	ASP	N-CA-CB	-7.14	97.74	110.60
1	B	244	ARG	NE-CZ-NH2	-7.13	116.73	120.30
1	B	182	ASP	CB-CG-OD1	6.86	124.48	118.30
1	A	252	VAL	CB-CA-C	-6.83	98.43	111.40
1	B	296	ARG	NE-CZ-NH1	6.53	123.56	120.30
1	B	180	ASP	CB-CG-OD2	-6.27	112.66	118.30
1	B	180	ASP	CB-CG-OD1	6.24	123.92	118.30
1	B	63	ARG	NE-CZ-NH2	5.88	123.24	120.30
1	A	174	ARG	NE-CZ-NH1	5.75	123.17	120.30
1	A	236	ARG	NE-CZ-NH2	-5.68	117.46	120.30
1	A	56	CYS	CA-CB-SG	-5.66	103.82	114.00
1	A	303	LYS	CD-CE-NZ	5.57	124.52	111.70
1	A	174	ARG	NE-CZ-NH2	-5.54	117.53	120.30
1	A	236	ARG	NE-CZ-NH1	5.53	123.06	120.30
1	B	263	ARG	NE-CZ-NH1	5.45	123.02	120.30
1	B	38	LEU	CA-CB-CG	5.44	127.82	115.30
1	B	174	ARG	NE-CZ-NH1	5.34	122.97	120.30
1	A	233	ASP	CB-CG-OD2	5.20	122.98	118.30
1	B	285	ASP	CB-CG-OD2	5.20	122.98	118.30
1	B	233	ASP	CB-CG-OD2	5.19	122.97	118.30
1	A	191	ARG	NE-CZ-NH1	5.14	122.87	120.30
1	A	182	ASP	CB-CG-OD2	-5.01	113.79	118.30

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	2238	0	2220	67	0
1	B	2251	0	2230	57	0
2	A	9	0	3	4	0
2	B	9	0	3	2	0
3	A	5	0	0	1	0
3	B	5	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	8	0	8	8	0
4	B	8	0	7	3	0
5	A	63	0	0	0	0
5	B	57	0	0	2	0
All	All	4653	0	4471	121	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 13.

All (121) 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:2001:URF:HN1	4:A:311:R2G:C1'	1.69	1.03
1:A:222:ALA:H	1:B:119:HIS:HD2	1.06	0.98
1:A:153:ILE:HD11	1:A:186:VAL:HB	1.45	0.95
2:B:2011:URF:HN1	4:B:311:R2G:C1'	1.81	0.92
1:B:74:GLU:OE2	1:B:303:LYS:NZ	2.04	0.90
1:A:154:THR:OG1	1:A:206:THR:OG1	1.91	0.88
2:A:2001:URF:HN1	4:A:311:R2G:H1'	1.40	0.86
1:A:119:HIS:HD2	1:B:222:ALA:H	1.28	0.80
1:A:222:ALA:H	1:B:119:HIS:CD2	1.95	0.79
1:A:222:ALA:N	1:B:119:HIS:HD2	1.83	0.76
1:A:73:MET:CB	1:A:78:ALA:HB2	2.16	0.76
1:A:279:GLN:HE22	1:B:32:ILE:H	1.35	0.74
1:B:67:PHE:O	1:B:71:VAL:HG23	1.89	0.73
1:B:30:GLU:HG3	1:B:41:SER:HB3	1.69	0.72
1:A:79:HIS:HB3	1:A:80:PRO:HD3	1.70	0.72
1:B:138:ILE:HG13	1:B:138:ILE:O	1.91	0.71
1:A:67:PHE:HD2	1:A:295:GLN:HG2	1.54	0.71
1:B:182:ASP:OD2	1:B:263:ARG:HD2	1.89	0.71
3:A:310:SO4:O2	4:A:311:R2G:H3'	1.91	0.70
1:A:79:HIS:HB3	1:A:80:PRO:CD	2.25	0.67
1:B:63:ARG:HD2	1:B:291:GLN:HG2	1.77	0.66
1:B:35:HIS:HD2	1:B:120:GLU:OE2	1.78	0.66
1:A:67:PHE:CD2	1:A:295:GLN:HG2	2.30	0.66
1:B:166:PHE:CZ	1:B:252:VAL:HG13	2.31	0.66
1:A:73:MET:HB3	1:A:78:ALA:HB2	1.78	0.65
1:B:31:ASP:OD2	1:B:127:HIS:HE1	1.80	0.65
1:B:111:VAL:HG22	1:B:252:VAL:HG22	1.80	0.63
1:B:150:SER:O	1:B:270:THR:HB	1.98	0.63
1:A:107:HIS:HD2	1:A:108:GLY:O	1.82	0.62

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:166:PHE:CZ	1:A:252:VAL:HG13	2.35	0.62
1:B:195:GLU:OE1	1:B:304:LYS:HD2	2.01	0.61
1:B:15:ASN:HB2	1:B:132:GLY:N	2.16	0.61
1:A:55:VAL:HG11	1:A:121:LEU:HD21	1.83	0.61
2:B:2011:URF:HN1	4:B:311:R2G:H1'	1.64	0.60
1:B:291:GLN:HE21	1:B:291:GLN:CA	2.14	0.60
1:B:297:LEU:HD12	1:B:297:LEU:C	2.21	0.59
1:B:161:CYS:HB2	1:B:163:LYS:HE3	1.84	0.59
1:B:63:ARG:HD2	1:B:291:GLN:CG	2.32	0.59
1:B:269:VAL:HG22	1:B:270:THR:N	2.19	0.57
4:A:311:R2G:O5'	1:B:35:HIS:HE1	1.88	0.57
1:A:153:ILE:O	1:A:153:ILE:HG13	2.04	0.57
2:A:2001:URF:N1	4:A:311:R2G:H1'	2.15	0.57
1:B:109:MET:SD	4:B:311:R2G:H5'A	2.45	0.56
1:B:269:VAL:HG22	1:B:270:THR:H	1.69	0.56
1:B:297:LEU:HD12	1:B:297:LEU:O	2.05	0.56
1:B:124:LEU:HD23	1:B:124:LEU:C	2.27	0.55
1:B:144:ILE:HD11	1:B:246:ILE:HD11	1.89	0.55
1:A:119:HIS:CD2	1:B:222:ALA:H	2.18	0.55
1:B:135:LEU:O	1:B:264:ALA:HA	2.07	0.54
1:B:107:HIS:HD2	1:B:108:GLY:O	1.90	0.54
1:A:68:ILE:HG13	1:A:99:VAL:HG12	1.89	0.53
1:A:135:LEU:O	1:A:264:ALA:HA	2.08	0.53
1:A:208:CYS:HG	1:A:251:SER:HG	1.54	0.53
1:B:15:ASN:HB2	1:B:132:GLY:CA	2.39	0.53
1:A:32:ILE:H	1:B:279:GLN:HE22	1.57	0.53
1:A:36:PHE:HB3	1:A:38:LEU:HD22	1.91	0.52
1:B:185:LEU:HD13	1:B:265:ALA:HB2	1.91	0.52
1:A:45:PHE:N	1:A:46:PRO:CD	2.72	0.51
1:A:167:GLU:CD	1:A:174:ARG:HE	2.14	0.51
1:A:109:MET:SD	4:A:311:R2G:H5'A	2.50	0.51
1:A:308:GLN:O	1:A:309:ALA:HB2	2.11	0.51
1:A:97:PHE:O	1:A:103:LEU:HD12	2.11	0.51
1:A:185:LEU:HD13	1:A:265:ALA:HB2	1.94	0.50
1:A:111:VAL:HG13	1:A:252:VAL:CG2	2.42	0.50
1:A:111:VAL:HG13	1:A:252:VAL:HG22	1.92	0.50
1:B:199:PHE:N	5:B:331:HOH:O	2.33	0.50
1:A:178:ASN:ND2	1:A:180:ASP:H	2.10	0.49
1:A:159:ASP:HB2	1:A:160:PRO:CD	2.42	0.49
1:A:73:MET:HB2	1:A:78:ALA:HB2	1.94	0.49
1:B:211:ASP:OD2	1:B:214:GLU:N	2.45	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:36:PHE:O	1:A:37:SER:HB3	2.11	0.49
1:B:84:TYR:N	1:B:84:TYR:CD2	2.80	0.49
1:A:107:HIS:HE1	1:A:137:ARG:HH11	1.61	0.49
1:B:304:LYS:O	1:B:308:GLN:HG3	2.12	0.49
1:A:31:ASP:OD2	1:A:127:HIS:HE1	1.96	0.48
1:A:45:PHE:HB2	1:A:46:PRO:HD3	1.94	0.48
1:A:223:LEU:HD12	1:B:21:CYS:HB2	1.96	0.48
1:A:107:HIS:CE1	1:A:137:ARG:HH11	2.32	0.47
1:A:176:VAL:HG23	1:A:176:VAL:O	2.14	0.47
1:A:20:LEU:CD2	1:A:122:ILE:HG22	2.45	0.47
1:B:138:ILE:CG1	1:B:138:ILE:O	2.63	0.47
1:A:158:VAL:HG22	1:A:162:PHE:C	2.35	0.47
4:A:311:R2G:C5'	1:B:35:HIS:HE1	2.28	0.46
1:B:138:ILE:HA	1:B:267:VAL:O	2.16	0.46
1:B:211:ASP:HB3	1:B:215:GLY:HA3	1.97	0.45
1:A:119:HIS:HD2	1:B:222:ALA:N	2.07	0.45
1:B:15:ASN:CB	1:B:132:GLY:HA3	2.47	0.45
1:A:20:LEU:HD23	1:A:122:ILE:HG22	1.98	0.45
1:A:107:HIS:HB3	1:A:117:MET:HE2	1.98	0.45
1:B:111:VAL:HG22	1:B:252:VAL:CG2	2.47	0.45
1:A:187:GLN:HG3	1:A:187:GLN:O	2.17	0.45
1:A:96:MET:HG3	1:A:105:VAL:HG22	1.98	0.44
1:A:58:GLY:O	1:A:106:SER:HA	2.17	0.44
1:A:55:VAL:HB	1:A:135:LEU:HD13	1.99	0.44
1:B:107:HIS:CD2	1:B:108:GLY:O	2.71	0.44
1:A:48:MET:CE	1:A:87:ILE:HD13	2.48	0.44
1:A:154:THR:HG21	1:A:206:THR:HB	1.99	0.44
1:A:308:GLN:O	1:A:309:ALA:CB	2.66	0.43
1:A:162:PHE:CD2	1:A:162:PHE:N	2.86	0.43
1:B:291:GLN:HE21	1:B:291:GLN:N	2.16	0.43
1:B:22:ASN:ND2	1:B:25:ILE:HD11	2.33	0.43
1:B:155:ARG:HD3	5:B:313:HOH:O	2.17	0.43
1:B:15:ASN:HB2	1:B:132:GLY:HA3	2.00	0.43
1:A:166:PHE:CE1	1:A:252:VAL:HG13	2.54	0.43
1:A:57:VAL:HA	1:A:105:VAL:O	2.19	0.43
1:B:22:ASN:HA	1:B:23:PRO:HD2	1.90	0.43
1:A:86:ASN:HB3	1:A:89:GLU:HG2	2.01	0.42
1:B:288:ALA:O	1:B:291:GLN:HB2	2.20	0.42
1:A:68:ILE:HD13	1:A:104:SER:HB2	2.02	0.42
1:B:77:PHE:O	1:B:78:ALA:O	2.38	0.42
2:A:2001:URF:N1	4:A:311:R2G:C1'	2.54	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:38:LEU:HD21	1:A:87:ILE:HD11	2.02	0.42
1:A:124:LEU:HD23	1:A:124:LEU:C	2.40	0.42
1:A:20:LEU:HD11	1:A:126:TYR:CD1	2.55	0.42
1:A:300:GLN:HE21	1:A:303:LYS:NZ	2.17	0.42
1:A:110:GLY:HA3	1:B:112:PRO:HB2	2.02	0.41
1:A:84:TYR:HA	1:A:85:PRO:HD2	1.91	0.41
1:A:196:LEU:HG	1:A:300:GLN:HG3	2.03	0.41
1:A:59:GLY:HA2	1:A:107:HIS:CD2	2.55	0.41
1:A:107:HIS:HB3	1:A:117:MET:CE	2.51	0.40
1:B:75:LEU:HB2	1:B:77:PHE:HD1	1.86	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	291/309 (94%)	276 (95%)	11 (4%)	4 (1%)	14	28
1	B	289/309 (94%)	279 (96%)	9 (3%)	1 (0%)	46	72
All	All	580/618 (94%)	555 (96%)	20 (3%)	5 (1%)	21	42

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	78	ALA
1	A	82	ALA
1	A	80	PRO
1	A	76	GLY
1	A	79	HIS

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	239/255 (94%)	219 (92%)	20 (8%)	14 26
1	B	242/255 (95%)	228 (94%)	14 (6%)	25 49
All	All	481/510 (94%)	447 (93%)	34 (7%)	18 36

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	LEU
1	A	38	LEU
1	A	63	ARG
1	A	83	ASP
1	A	87	ILE
1	A	153	ILE
1	A	158	VAL
1	A	162	PHE
1	A	174	ARG
1	A	185	LEU
1	A	189	LEU
1	A	202	VAL
1	A	203	VAL
1	A	223	LEU
1	A	247	GLU
1	A	252	VAL
1	A	279	GLN
1	A	281	SER
1	A	303	LYS
1	A	304	LYS
1	B	38	LEU
1	B	73	MET
1	B	79	HIS
1	B	93	ARG
1	B	158	VAL
1	B	185	LEU
1	B	189	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	247	GLU
1	B	251	SER
1	B	252	VAL
1	B	270	THR
1	B	279	GLN
1	B	291	GLN
1	B	297	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	107	HIS
1	A	119	HIS
1	A	127	HIS
1	A	168	GLN
1	A	178	ASN
1	A	187	GLN
1	A	258	ASN
1	A	279	GLN
1	A	300	GLN
1	B	19	GLN
1	B	35	HIS
1	B	107	HIS
1	B	119	HIS
1	B	127	HIS
1	B	279	GLN
1	B	291	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry (i)

6 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	URF	A	2001	-	5,9,9	2.41	1 (20%)	5,12,12	6.49	5 (100%)
3	SO4	A	310	-	4,4,4	1.09	0	6,6,6	0.61	0
4	R2G	A	311	-	7,8,8	2.85	2 (28%)	6,10,10	4.71	4 (66%)
2	URF	B	2011	-	5,9,9	4.19	1 (20%)	5,12,12	5.72	4 (80%)
3	SO4	B	310	-	4,4,4	0.61	0	6,6,6	0.39	0
4	R2G	B	311	-	7,8,8	4.05	3 (42%)	6,10,10	3.70	4 (66%)

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	URF	A	2001	-	-	0/0/0/0	0/1/1/1
3	SO4	A	310	-	-	0/0/0/0	0/0/0/0
4	R2G	A	311	-	-	0/2/12/12	0/1/1/1
2	URF	B	2011	-	-	0/0/0/0	0/1/1/1
3	SO4	B	310	-	-	0/0/0/0	0/0/0/0
4	R2G	B	311	-	-	0/2/12/12	0/1/1/1

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	311	R2G	O3'-C3'	-2.45	1.38	1.43
4	B	311	R2G	O4'-C1'	2.31	1.42	1.38
4	B	311	R2G	C1'-C2'	2.43	1.36	1.32
2	A	2001	URF	C4-C5	5.03	1.44	1.38
4	A	311	R2G	C3'-C2'	6.83	1.56	1.50
2	B	2011	URF	C4-C5	9.23	1.49	1.38
4	B	311	R2G	C3'-C2'	10.00	1.59	1.50

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	2001	URF	N1-C2-N3	-10.10	121.89	128.33
2	B	2011	URF	N1-C2-N3	-9.63	122.19	128.33
4	A	311	R2G	O4'-C1'-C2'	-6.89	106.88	114.79
2	A	2001	URF	C5-C4-N3	-5.74	115.95	122.34
4	B	311	R2G	O4'-C1'-C2'	-3.95	110.25	114.79
2	B	2011	URF	C5-C4-N3	-3.92	117.97	122.34
4	A	311	R2G	O3'-C3'-C2'	-3.03	105.82	110.83
4	A	311	R2G	C3'-C2'-C1'	-3.01	100.15	107.66
4	B	311	R2G	C3'-C2'-C1'	-2.52	101.39	107.66
2	A	2001	URF	F5-C5-C4	-2.41	114.08	118.56
4	B	311	R2G	O4'-C4'-C5'	3.08	113.85	108.46
2	A	2001	URF	C6-N1-C2	3.57	121.21	115.47
2	B	2011	URF	C6-N1-C2	4.63	122.92	115.47
2	B	2011	URF	C4-N3-C2	5.52	120.02	115.25
4	B	311	R2G	C5'-C4'-C3'	7.10	131.89	115.08
2	A	2001	URF	C4-N3-C2	7.54	121.77	115.25
4	A	311	R2G	C5'-C4'-C3'	7.94	133.88	115.08

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	2001	URF	4	0
3	A	310	SO4	1	0
4	A	311	R2G	8	0
2	B	2011	URF	2	0
4	B	311	R2G	3	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^{th} 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	293/309 (94%)	-0.54	7 (2%)	62	56	16, 30, 57, 93	0
1	B	293/309 (94%)	-0.43	5 (1%)	73	68	18, 31, 54, 89	0
All	All	586/618 (94%)	-0.48	12 (2%)	68	63	16, 31, 57, 93	0

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	80	PRO	6.6
1	A	81	GLY	5.4
1	B	309	ALA	4.9
1	A	309	ALA	3.6
1	B	14	HIS	3.6
1	B	233	ASP	3.5
1	A	79	HIS	3.5
1	A	78	ALA	3.1
1	B	15	ASN	2.4
1	A	73	MET	2.2
1	A	82	ALA	2.2
1	B	79	HIS	2.1

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

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

6.3 Carbohydrates

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^{th} 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^2)	Q<0.9
4	R2G	A	311	8/8	0.93	0.20	3.67	40,45,47,49	0
4	R2G	B	311	8/8	0.93	0.18	1.05	39,41,44,45	0
2	URF	B	2011	9/9	0.98	0.12	-0.42	20,23,27,27	0
2	URF	A	2001	9/9	0.98	0.11	-0.68	24,24,27,29	0
3	SO4	B	310	5/5	0.99	0.10	-2.45	31,34,36,38	0
3	SO4	A	310	5/5	0.99	0.09	-2.91	27,30,36,37	0

6.5 Other polymers (i)

There are no such residues in this entry.