



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 1, 2026 – 07:16 AM UTC

PDB ID : 4BVH / pdb_00004bvh
Title : CRYSTAL STRUCTURE OF HUMAN SIRT3 IN COMPLEX WITH THE INHIBITOR EX-527 AND 2'-O-ACETYL-ADP-RIBOSE
Authors : Gertz, M.; Weyand, M.; Steegborn, C.
Deposited on : 2013-06-25
Resolution : 1.90 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) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

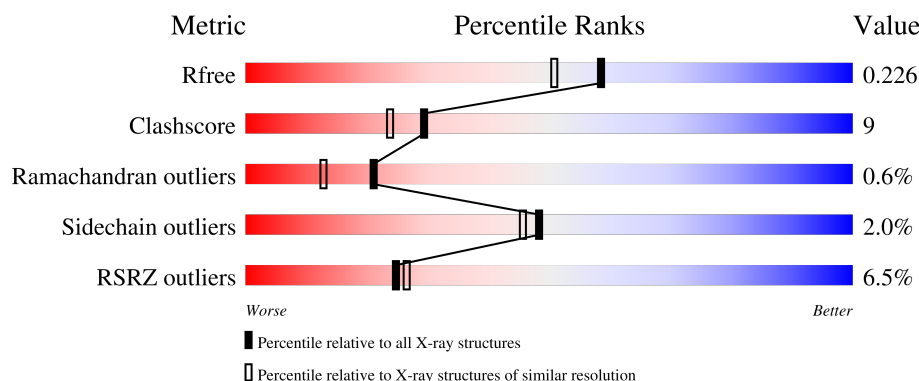
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

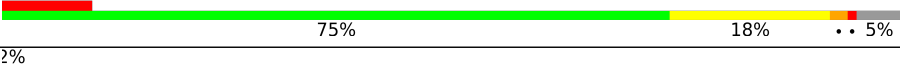
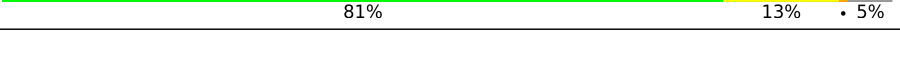
The reported resolution of this entry is 1.90 Å.

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}	180053	7789 (1.90-1.90)
Clashscore	190562	8410 (1.90-1.90)
Ramachandran outliers	187476	8333 (1.90-1.90)
Sidechain outliers	187428	8333 (1.90-1.90)
RSRZ outliers	180081	7790 (1.90-1.90)

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	284	 6% 77% 18% . .
1	B	284	 10% 75% 18% .. 5%
1	C	284	 2% 81% 13% . 5%

2 Entry composition [i](#)

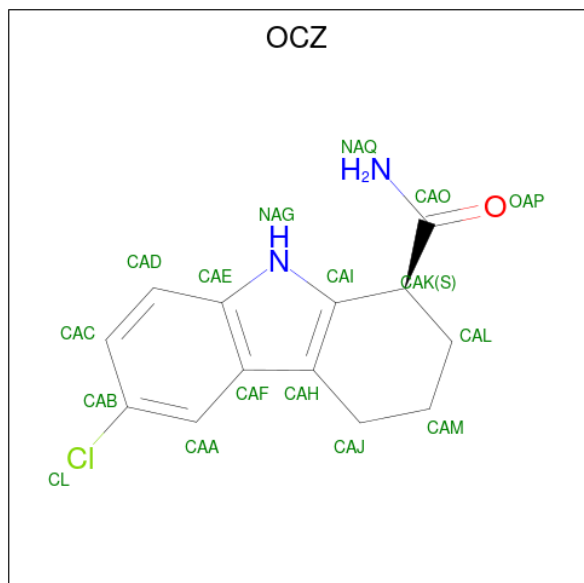
There are 10 unique types of molecules in this entry. The entry contains 7157 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called NAD-DEPENDENT PROTEIN DEACETYLASE SIRTUIN-3, MITOCHONDRIAL.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	272	Total	C	N	O	S	0	8	0
			2177	1409	374	385	9			
1	B	271	Total	C	N	O	S	0	4	0
			2144	1384	366	384	10			
1	C	270	Total	C	N	O	S	0	7	0
			2149	1393	366	381	9			

- Molecule 2 is (1S)-6-chloro-2,3,4,9-tetrahydro-1H-carbazole-1-carboxamide (CCD ID: OCZ) (formula: C₁₃H₁₃ClN₂O).



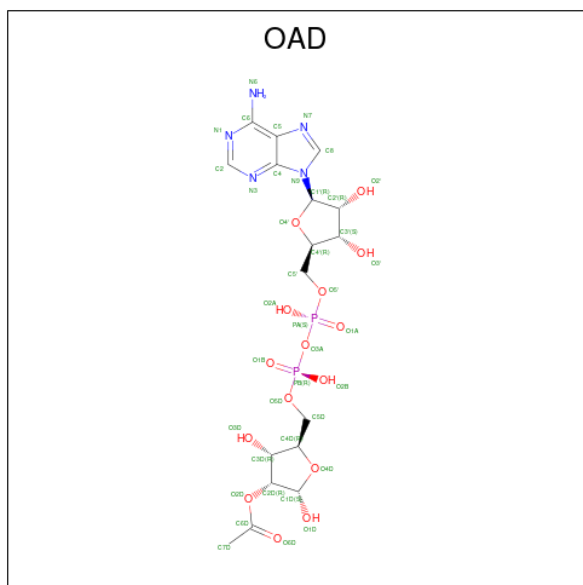
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Cl	N	O	0	0
			17	13	1	2	1		
2	B	1	Total	C	Cl	N	O	0	0
			17	13	1	2	1		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	Cl	N	O	0	0
			17	13	1	2	1		

- Molecule 3 is 2'-O-ACETYL ADENOSINE-5-DIPHOSPHORIBOSE (CCD ID: OAD) (formula: $C_{17}H_{25}N_5O_{15}P_2$).

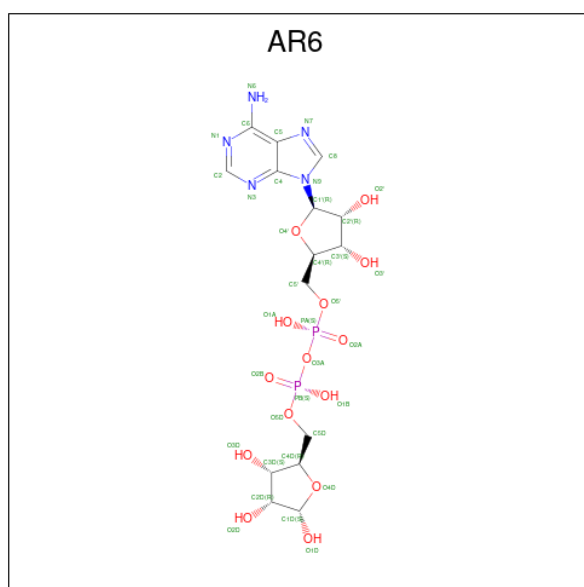


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total Na 1 1	0	0

- Molecule 6 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total Cl 1 1	0	0
6	B	1	Total Cl 1 1	0	0

- Molecule 7 is [(2R,3S,4R,5R)-5-(6-AMINOPURIN-9-YL)-3,4-DIHYDROXY-OXOLAN-2-YL]METHYL [HYDROXY-[(2R,3S,4R,5S)-3,4,5-TRIHYDROXYOXOLAN-2-YL]METHOXY]PHOSPHORYL] HYDROGEN PHOSPHATE (CCD ID: AR6) (formula: $C_{15}H_{23}N_5O_{14}P_2$).



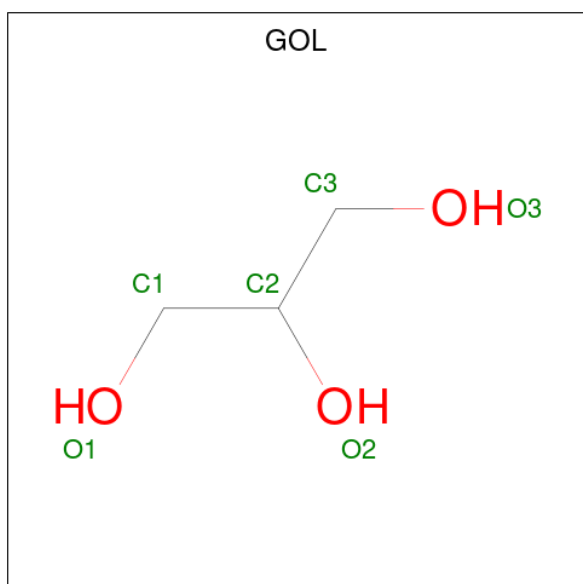
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
7	B	1	Total 36	C 15	N 5	O 14	P 2	0	0

- Molecule 8 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $\text{C}_2\text{H}_6\text{O}_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	B	1	Total	C	O	0	0
			4	2	2		
8	B	1	Total	C	O	0	0
			4	2	2		
8	C	1	Total	C	O	0	0
			4	2	2		
8	C	1	Total	C	O	0	0
			4	2	2		
8	C	1	Total	C	O	0	0
			4	2	2		

- Molecule 9 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

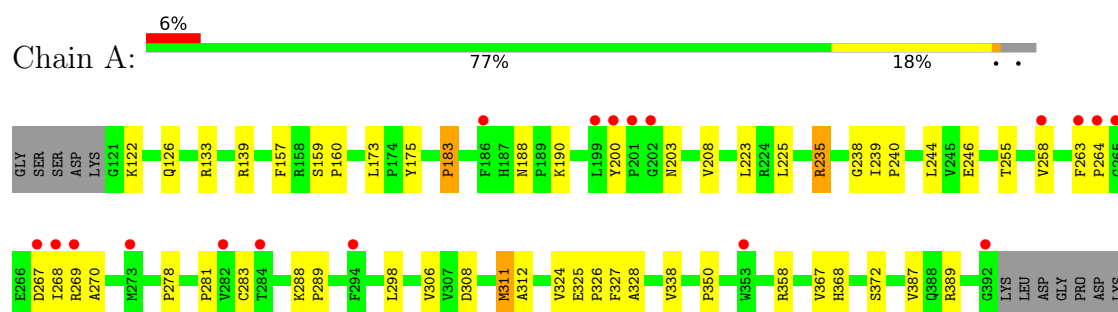
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	134	Total	O	0	1
			135	135		
10	B	158	Total	O	0	0
			158	158		
10	C	196	Total	O	0	1
			197	197		

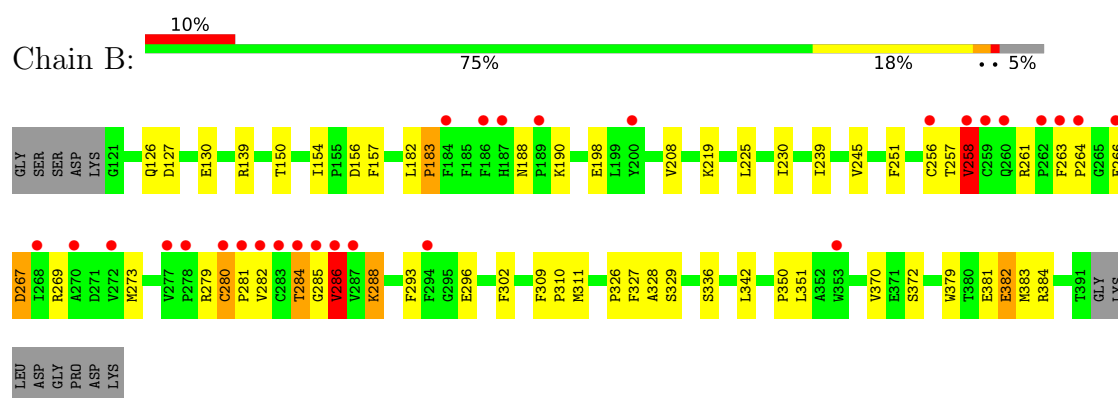
3 Residue-property plots

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 and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

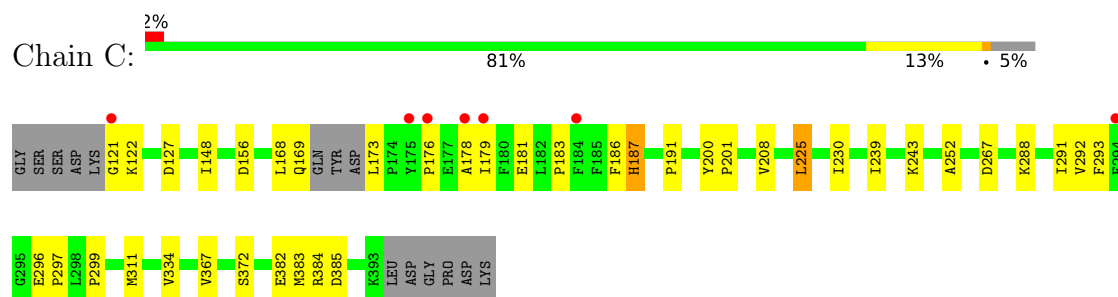
• Molecule 1: NAD-DEPENDENT PROTEIN DEACETYLASE SIRTUIN-3, MITOCHONDRIAL



• Molecule 1: NAD-DEPENDENT PROTEIN DEACETYLASE SIRTUIN-3, MITOCHONDRIAL



• Molecule 1: NAD-DEPENDENT PROTEIN DEACETYLASE SIRTUIN-3, MITOCHONDRIAL



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	63.71Å 66.53Å 201.24Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	34.44 – 1.90 34.44 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.8 (34.44-1.90) 99.8 (34.44-1.90)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.48 (at 1.89Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.172 , 0.226 0.172 , 0.226	Depositor DCC
R_{free} test set	3415 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	19.7	Xtriage
Anisotropy	0.530	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 46.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.024 for k,h,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7157	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 15.64% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, ZN, EDO, NA, CL, OAD, AR6, OCZ

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	1.11	2/2256 (0.1%)	1.14	8/3073 (0.3%)
1	B	1.22	5/2211 (0.2%)	1.18	7/3014 (0.2%)
1	C	1.31	4/2224 (0.2%)	1.19	1/3030 (0.0%)
All	All	1.21	11/6691 (0.2%)	1.17	16/9117 (0.2%)

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	372	SER	N-CA	6.78	1.54	1.46
1	C	334	VAL	CA-CB	6.45	1.61	1.54
1	B	372	SER	N-CA	5.92	1.53	1.46
1	B	336	SER	C-O	-5.72	1.16	1.24
1	A	312	ALA	C-O	5.69	1.30	1.23
1	B	127	ASP	N-CA	5.65	1.53	1.46
1	C	382	GLU	C-O	5.55	1.30	1.24
1	B	286	VAL	N-CA	5.52	1.52	1.46
1	C	127	ASP	N-CA	5.36	1.52	1.46
1	B	280	CYS	N-CA	5.29	1.53	1.46
1	C	372	SER	N-CA	5.07	1.52	1.46

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	308	ASP	N-CA-C	7.75	119.51	111.14
1	B	284	THR	N-CA-C	7.74	122.12	111.90
1	A	175	TYR	N-CA-C	-6.49	102.29	108.13
1	B	286	VAL	N-CA-C	6.45	117.36	108.84
1	B	370	VAL	N-CA-C	5.89	116.63	110.62
1	A	173	LEU	CA-C-N	5.27	125.08	119.28
1	A	173	LEU	C-N-CA	5.27	125.08	119.28

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	338	VAL	CA-C-N	-5.26	114.36	119.78
1	A	338	VAL	C-N-CA	-5.26	114.36	119.78
1	B	288	LYS	CA-C-N	-5.17	114.46	119.78
1	B	288	LYS	C-N-CA	-5.17	114.46	119.78
1	C	148	ILE	N-CA-C	5.11	119.65	113.00
1	B	280	CYS	CA-CB-SG	5.11	126.16	114.40
1	B	326	PRO	N-CA-C	5.08	125.30	112.10
1	A	255	THR	N-CA-C	5.07	116.84	108.13
1	A	126	GLN	N-CA-C	5.01	117.39	111.33

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	2177	0	2224	36	0
1	B	2144	0	2169	46	0
1	C	2149	0	2194	36	0
2	A	17	0	13	0	0
2	B	17	0	13	0	0
2	C	17	0	13	0	0
3	A	39	0	23	1	0
3	C	39	0	23	1	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
5	A	1	0	0	0	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
7	B	36	0	21	2	0
8	B	8	0	12	0	0
8	C	12	0	18	0	0
9	C	6	0	8	2	0
10	A	135	0	0	11	0
10	B	158	0	0	6	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	C	197	0	0	5	0
All	All	7157	0	6731	115	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 9.

All (115) 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:257:THR:HB	10:B:2096:HOH:O	1.25	1.31
1:A:235:ARG:HD2	1:B:130:GLU:OE2	1.67	0.93
1:A:311:MET:HA	1:A:311:MET:HE2	1.55	0.87
1:A:389:ARG:HD3	10:A:2130:HOH:O	1.74	0.86
1:A:208[A]:VAL:HG23	10:A:2042:HOH:O	1.75	0.85
1:B:286:VAL:HG12	10:B:2100:HOH:O	1.78	0.83
1:C:178:ALA:HA	1:C:181:GLU:HG3	1.60	0.82
1:C:208[B]:VAL:HG11	1:C:367:VAL:HG13	1.62	0.81
1:A:133:ARG:NH1	10:A:2013:HOH:O	2.13	0.81
1:B:139:ARG:NH1	1:B:311[A]:MET:HE1	1.97	0.79
1:B:258:VAL:CG2	1:B:285:GLY:HA3	2.12	0.78
1:B:382:GLU:HG3	10:B:2153:HOH:O	1.84	0.77
1:B:258:VAL:HG23	1:B:285:GLY:HA3	1.71	0.72
1:C:168:LEU:HD13	1:C:179:ILE:CG2	2.21	0.70
1:B:230:ILE:HD12	1:B:251:PHE:CE2	2.26	0.69
1:C:239[A]:ILE:HD11	10:C:2064:HOH:O	1.94	0.68
1:A:225:LEU:HD12	1:A:239[B]:ILE:HD13	1.77	0.67
1:C:173:LEU:CD1	1:C:179:ILE:HG23	2.24	0.67
1:C:168:LEU:HD13	1:C:179:ILE:HG21	1.76	0.67
1:A:122:LYS:NZ	10:A:2003:HOH:O	2.26	0.65
1:A:225:LEU:CD1	1:A:239[B]:ILE:HD13	2.26	0.65
1:B:264:PRO:O	1:B:267:ASP:HB2	1.96	0.65
1:C:267:ASP:OD1	9:C:1397:GOL:H12	1.96	0.65
1:B:139:ARG:NH1	1:B:311[A]:MET:CE	2.59	0.64
1:C:208[B]:VAL:CG1	1:C:367:VAL:HG13	2.26	0.64
1:B:198:GLU:HB3	1:C:311:MET:HG2	1.79	0.63
1:B:230:ILE:HD12	1:B:251:PHE:HE2	1.63	0.63
1:C:173:LEU:HD11	1:C:179:ILE:HG23	1.80	0.62
1:B:327:PHE:HB2	10:B:2071:HOH:O	2.00	0.62
1:C:121:GLY:O	1:C:122:LYS:HG2	2.00	0.61
1:C:288:LYS:HE2	1:C:293:PHE:CE1	2.35	0.61
1:B:263:PHE:CZ	1:B:281:PRO:HD2	2.35	0.61

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:201:PRO:HD3	10:C:2047:HOH:O	2.00	0.61
1:C:288:LYS:HE2	1:C:293:PHE:HE1	1.66	0.61
1:B:288:LYS:HE2	1:B:293:PHE:CE1	2.35	0.61
1:A:311:MET:HA	1:A:311:MET:CE	2.28	0.60
1:C:186:PHE:O	1:C:187:HIS:HB3	2.01	0.60
1:C:186:PHE:O	1:C:187:HIS:CB	2.49	0.60
1:C:239[A]:ILE:CD1	10:C:2064:HOH:O	2.47	0.59
1:C:183:PRO:O	1:C:186:PHE:O	2.21	0.59
1:C:156:ASP:OD2	3:C:1395:OAD:H8	2.03	0.59
1:C:173:LEU:HD11	1:C:179:ILE:CG2	2.33	0.58
1:B:258:VAL:HG21	1:B:285:GLY:HA3	1.87	0.57
1:B:381:GLU:HG3	1:B:384:ARG:HH12	1.69	0.57
1:B:139:ARG:HH11	1:B:311[A]:MET:CE	2.18	0.57
1:A:139[B]:ARG:NH1	10:A:2017:HOH:O	2.27	0.55
1:C:384:ARG:HH21	1:C:385[A]:ASP:CG	2.15	0.55
1:B:263:PHE:CE1	1:B:281:PRO:HD2	2.42	0.54
1:C:292:VAL:HG21	1:C:299:PRO:HD3	1.90	0.54
1:A:157:PHE:CE2	3:A:1394:OAD:HR'3	2.42	0.53
1:C:168:LEU:HD13	1:C:179:ILE:HG23	1.89	0.52
1:B:327:PHE:O	1:B:328:ALA:C	2.53	0.52
1:B:288:LYS:HE2	1:B:293:PHE:CD1	2.46	0.51
1:B:150:THR:HA	1:B:154:ILE:O	2.11	0.50
1:C:178:ALA:CA	1:C:181:GLU:HG3	2.37	0.50
1:A:324:VAL:HG12	1:A:325:GLU:O	2.11	0.50
1:C:173:LEU:HD21	10:C:2036:HOH:O	2.12	0.49
1:A:240:PRO:HA	1:B:126:GLN:HE22	1.77	0.49
1:A:368:HIS:HD2	10:A:2118:HOH:O	1.94	0.49
1:A:208[B]:VAL:HG21	1:A:367:VAL:HG13	1.94	0.49
1:C:225:LEU:CD1	1:C:239[A]:ILE:HD13	2.43	0.49
1:A:239[B]:ILE:HD11	10:A:2044:HOH:O	2.13	0.48
1:B:329:SER:HB2	10:B:2119:HOH:O	2.13	0.48
1:A:188:ASN:OD1	1:A:190:LYS:HB2	2.13	0.48
1:B:280:CYS:O	1:B:284:THR:HA	2.14	0.48
1:B:208:VAL:HG13	1:B:383:MET:HE2	1.96	0.47
1:C:168:LEU:HD11	1:C:179:ILE:HD13	1.95	0.47
1:B:269:ARG:CZ	1:B:273:MET:HE3	2.44	0.47
1:B:279:ARG:HA	1:B:285:GLY:O	2.15	0.47
1:A:288:LYS:NZ	1:A:289:PRO:O	2.48	0.46
1:B:261:ARG:NH2	1:B:282:VAL:HG11	2.30	0.46
1:B:261:ARG:HD2	1:B:263:PHE:CE1	2.50	0.45
1:B:245:VAL:HG11	1:B:302:PHE:HA	1.98	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:358:ARG:NH2	10:A:2111:HOH:O	2.46	0.45
1:A:203:ASN:OD1	1:A:203:ASN:N	2.42	0.45
1:B:261:ARG:HH21	1:B:282:VAL:HG11	1.82	0.45
1:B:225:LEU:HD12	1:B:239[B]:ILE:HD13	1.98	0.45
1:C:178:ALA:HA	1:C:181:GLU:CG	2.40	0.45
1:B:139:ARG:HH11	1:B:311[A]:MET:HE3	1.82	0.45
1:A:183:PRO:HB2	10:A:2033:HOH:O	2.18	0.44
1:A:239[B]:ILE:CD1	10:A:2044:HOH:O	2.65	0.44
1:B:156:ASP:OD2	7:B:1393:AR6:H8	2.17	0.44
1:B:257:THR:HG22	1:B:286:VAL:O	2.18	0.44
1:B:157:PHE:CE1	7:B:1393:AR6:H3D	2.52	0.44
1:C:169:GLN:H	1:C:169:GLN:CD	2.25	0.44
1:B:219:LYS:HD3	1:B:379:TRP:CZ2	2.53	0.44
1:C:383:MET:HA	1:C:383:MET:HE2	1.99	0.44
1:B:182:LEU:N	1:B:183:PRO:HD2	2.33	0.44
1:A:208[B]:VAL:CG2	1:A:367:VAL:HG13	2.49	0.43
1:A:244[B]:LEU:HG	1:A:246:GLU:HG3	2.01	0.43
1:B:382:GLU:CG	10:B:2153:HOH:O	2.53	0.43
1:C:296:GLU:HB3	1:C:297:PRO:HD2	2.00	0.43
1:A:258:VAL:HB	1:A:283:CYS:SG	2.59	0.43
1:A:269:ARG:O	1:A:270:ALA:C	2.60	0.43
1:B:256:CYS:SG	1:B:258:VAL:N	2.82	0.42
1:C:252:ALA:HA	10:C:2050[B]:HOH:O	2.18	0.42
1:B:309:PHE:N	1:B:310:PRO:CD	2.82	0.42
1:C:176:PRO:O	1:C:179:ILE:HG12	2.20	0.42
1:A:298:LEU:HD11	1:A:326:PRO:HG3	2.02	0.42
1:C:230:ILE:HG21	1:C:291:ILE:HG23	2.00	0.42
1:A:268:ILE:HD12	1:A:278:PRO:HB3	2.01	0.42
1:A:139[B]:ARG:HB3	1:A:223[B]:LEU:HD12	2.01	0.42
1:A:263:PHE:CE2	1:A:281:PRO:HD2	2.54	0.42
1:B:293:PHE:O	1:B:296:GLU:HB2	2.20	0.42
1:A:238:GLY:HA2	10:A:2061:HOH:O	2.19	0.42
1:B:342:LEU:HB2	1:B:351:LEU:HD22	2.02	0.41
1:A:208[B]:VAL:HG12	1:A:387:VAL:HG21	2.03	0.41
1:A:159:SER:HA	1:A:160:PRO:HD3	1.96	0.41
1:B:256:CYS:SG	1:B:280:CYS:HB2	2.61	0.41
1:B:280:CYS:N	1:B:285:GLY:O	2.45	0.41
1:C:267:ASP:OD1	9:C:1397:GOL:C1	2.66	0.41
1:A:264:PRO:HG2	1:A:267:ASP:OD2	2.22	0.40
1:C:243[B]:LYS:HA	1:C:243[B]:LYS:HD3	1.84	0.40
1:A:327:PHE:O	1:A:328:ALA:C	2.60	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:328:ALA:O	1:A:350:PRO:HG2	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	
1	A	278/284 (98%)	265 (95%)	13 (5%)	0	100	100
1	B	273/284 (96%)	261 (96%)	8 (3%)	4 (2%)	8	2
1	C	273/284 (96%)	267 (98%)	5 (2%)	1 (0%)	30	22
All	All	824/852 (97%)	793 (96%)	26 (3%)	5 (1%)	21	13

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	266	GLU
1	C	187	HIS
1	B	188	ASN
1	B	183	PRO
1	B	258	VAL

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	243/245 (99%)	238 (98%)	5 (2%)	47	44
1	B	239/245 (98%)	233 (98%)	6 (2%)	42	37
1	C	240/245 (98%)	236 (98%)	4 (2%)	53	52
All	All	722/735 (98%)	707 (98%)	15 (2%)	48	44

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	183	PRO
1	A	200	TYR
1	A	235	ARG
1	A	306	VAL
1	A	311	MET
1	B	190	LYS
1	B	258	VAL
1	B	267	ASP
1	B	286	VAL
1	B	350	PRO
1	B	382	GLU
1	C	191	PRO
1	C	200[A]	TYR
1	C	200[B]	TYR
1	C	225	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	126	GLN
1	A	305	HIS
1	A	368	HIS
1	B	126	GLN
1	B	203	ASN
1	B	344	ASN
1	B	354	HIS
1	B	388	GLN
1	C	126	GLN
1	C	344	ASN
1	C	388	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 oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 18 ligands modelled in this entry, 6 are monoatomic - leaving 12 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	$\# Z > 2$
7	AR6	B	1393	-	39,39,39	1.24	5 (12%)	56,60,60	2.16	18 (32%)
8	EDO	B	1394	-	3,3,3	0.49	0	2,2,2	0.59	0
3	OAD	A	1394	-	42,42,42	1.80	10 (23%)	58,64,64	2.20	14 (24%)
8	EDO	B	1395	-	3,3,3	0.70	0	2,2,2	0.52	0
2	OCZ	A	1393	-	19,19,19	2.52	8 (42%)	23,28,28	2.05	5 (21%)
3	OAD	C	1395	-	42,42,42	1.79	9 (21%)	58,64,64	2.17	11 (18%)
8	EDO	C	1396	-	3,3,3	0.47	0	2,2,2	0.46	0
8	EDO	C	1398	-	3,3,3	0.46	0	2,2,2	1.14	0
8	EDO	C	1399	-	3,3,3	0.52	0	2,2,2	0.32	0
2	OCZ	C	1394	-	19,19,19	2.41	9 (47%)	23,28,28	1.23	3 (13%)
9	GOL	C	1397	-	5,5,5	1.07	0	5,5,5	1.04	0
2	OCZ	B	1392	-	19,19,19	2.38	8 (42%)	23,28,28	2.12	7 (30%)

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
7	AR6	B	1393	-	-	2/22/54/54	0/4/4/4
8	EDO	B	1394	-	-	0/1/1/1	-
3	OAD	A	1394	-	-	3/26/58/58	0/4/4/4
8	EDO	B	1395	-	-	1/1/1/1	-
2	OCZ	A	1393	-	-	2/4/14/14	0/3/3/3
3	OAD	C	1395	-	-	3/26/58/58	0/4/4/4
8	EDO	C	1396	-	-	0/1/1/1	-
8	EDO	C	1398	-	-	0/1/1/1	-
8	EDO	C	1399	-	-	1/1/1/1	-
2	OCZ	C	1394	-	-	2/4/14/14	0/3/3/3
9	GOL	C	1397	-	-	2/4/4/4	-
2	OCZ	B	1392	-	-	2/4/14/14	0/3/3/3

All (49) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	1395	OAD	PB-O3A	7.07	1.67	1.59
2	C	1394	OCZ	CAB-CL	5.35	1.86	1.74
3	A	1394	OAD	PA-O3A	5.24	1.65	1.59
2	A	1393	OCZ	CAF-CAE	-5.22	1.34	1.41
2	A	1393	OCZ	CAB-CL	4.95	1.86	1.74
2	B	1392	OCZ	CAK-CAI	-4.37	1.46	1.50
3	A	1394	OAD	C1D-C2D	4.35	1.57	1.52
2	B	1392	OCZ	CAF-CAE	-4.15	1.36	1.41
2	C	1394	OCZ	CAF-CAE	-4.11	1.36	1.41
2	A	1393	OCZ	CAJ-CAH	-4.06	1.45	1.50
2	B	1392	OCZ	CAA-CAB	3.93	1.44	1.38
7	B	1393	AR6	O4'-C4'	-3.46	1.37	1.45
3	A	1394	OAD	C5-C4	-3.37	1.33	1.39
3	C	1395	OAD	C3'-C4'	3.25	1.61	1.53
2	B	1392	OCZ	CAK-CAO	-3.16	1.46	1.52
3	C	1395	OAD	C1D-C2D	3.13	1.55	1.52
2	A	1393	OCZ	CAF-CAH	-3.11	1.38	1.44
2	C	1394	OCZ	CAA-CAB	3.08	1.43	1.38
7	B	1393	AR6	C5-C4	3.00	1.44	1.39
2	C	1394	OCZ	CAM-CAJ	2.99	1.61	1.52
3	C	1395	OAD	C5-C4	-2.98	1.33	1.39
3	A	1394	OAD	C5-N7	-2.93	1.33	1.39
3	C	1395	OAD	C6-N6	2.91	1.41	1.34
2	A	1393	OCZ	CAM-CAJ	2.91	1.61	1.52

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1394	OCZ	CAK-CAI	-2.85	1.47	1.50
2	C	1394	OCZ	CAF-CAH	-2.85	1.38	1.44
2	B	1392	OCZ	CAO-NAQ	2.82	1.39	1.32
2	B	1392	OCZ	CAF-CAH	-2.81	1.39	1.44
2	B	1392	OCZ	CAB-CL	2.79	1.80	1.74
2	A	1393	OCZ	CAA-CAF	-2.64	1.35	1.39
7	B	1393	AR6	O5D-C5D	-2.63	1.34	1.44
3	A	1394	OAD	C2-N3	2.62	1.38	1.33
2	A	1393	OCZ	CAK-CAO	-2.62	1.47	1.52
3	C	1395	OAD	O3D-C3D	2.61	1.49	1.43
2	A	1393	OCZ	CAM-CAL	2.54	1.59	1.53
3	C	1395	OAD	O2D-C6D	2.48	1.40	1.35
3	A	1394	OAD	O4D-C1D	2.48	1.46	1.43
7	B	1393	AR6	C5-N7	-2.45	1.34	1.39
3	A	1394	OAD	O3'-C3'	-2.42	1.37	1.43
2	C	1394	OCZ	CAO-NAQ	2.38	1.38	1.32
3	C	1395	OAD	C2-N1	2.36	1.38	1.33
3	A	1394	OAD	O3D-C3D	2.25	1.48	1.43
3	A	1394	OAD	O2'-C2'	2.20	1.48	1.43
3	C	1395	OAD	PB-O1B	-2.18	1.43	1.50
3	A	1394	OAD	PB-O3A	-2.17	1.57	1.59
2	B	1392	OCZ	CAL-CAK	2.10	1.60	1.55
7	B	1393	AR6	PA-O3A	2.06	1.61	1.59
2	C	1394	OCZ	CAI-NAG	2.03	1.40	1.38
2	C	1394	OCZ	CAJ-CAH	-2.01	1.47	1.50

All (58) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	1395	OAD	N3-C2-N1	-7.04	117.93	128.58
3	A	1394	OAD	O1D-C1D-O4D	-6.58	102.73	111.12
3	A	1394	OAD	N3-C2-N1	-6.55	118.67	128.58
7	B	1393	AR6	C5D-C4D-C3D	-6.14	93.10	115.21
3	C	1395	OAD	N9-C8-N7	-5.64	105.94	113.94
3	A	1394	OAD	C2D-O2D-C6D	5.26	125.89	117.72
3	C	1395	OAD	O4'-C1'-N9	-5.18	98.14	108.09
7	B	1393	AR6	C4-N9-C8	5.11	111.10	105.74
3	C	1395	OAD	O2D-C6D-C7D	5.10	120.19	111.09
2	A	1393	OCZ	CAH-CAI-NAG	-4.76	105.96	110.22
2	B	1392	OCZ	CAH-CAI-NAG	-4.70	106.01	110.22
3	A	1394	OAD	C5-N7-C8	4.69	110.83	103.45
7	B	1393	AR6	N3-C4-N9	4.60	134.99	127.17

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1394	OAD	N9-C8-N7	-4.40	107.69	113.94
3	C	1395	OAD	C5-N7-C8	4.34	110.27	103.45
2	B	1392	OCZ	CAD-CAC-CAB	-4.34	114.88	119.24
3	A	1394	OAD	C5-C4-N3	-4.19	120.94	126.72
2	A	1393	OCZ	CAM-CAL-CAK	-4.07	106.43	111.30
3	C	1395	OAD	C4-C5-N7	-4.06	105.94	110.58
3	C	1395	OAD	C5-C4-N3	-4.01	121.20	126.72
3	C	1395	OAD	C2-N3-C4	4.00	121.60	111.83
7	B	1393	AR6	C5-C4-N3	-3.91	121.33	126.72
7	B	1393	AR6	N9-C8-N7	-3.84	108.48	113.94
7	B	1393	AR6	N3-C2-N1	-3.84	122.77	128.58
3	C	1395	OAD	C5-C4-N9	3.77	109.92	105.81
2	A	1393	OCZ	CAD-CAC-CAB	-3.61	115.61	119.24
3	A	1394	OAD	C4-C5-N7	-3.55	106.53	110.58
3	A	1394	OAD	O2D-C6D-C7D	3.37	117.10	111.09
2	B	1392	OCZ	CAE-NAG-CAI	3.34	111.42	108.53
7	B	1393	AR6	O3A-PA-O2A	-3.30	100.77	110.70
3	A	1394	OAD	C2-N3-C4	3.30	119.89	111.83
2	B	1392	OCZ	CAM-CAJ-CAH	3.17	117.31	111.10
2	B	1392	OCZ	CAA-CAF-CAE	-3.15	116.32	119.39
3	C	1395	OAD	C2D-O2D-C6D	3.12	122.57	117.72
2	A	1393	OCZ	OAP-CAO-NAQ	-3.06	117.64	123.04
7	B	1393	AR6	C5-N7-C8	3.03	108.21	103.45
2	A	1393	OCZ	CAE-CAF-CAH	3.02	109.59	106.84
7	B	1393	AR6	O4D-C4D-C5D	-3.00	99.71	109.33
7	B	1393	AR6	C2-N3-C4	3.00	119.16	111.83
2	C	1394	OCZ	CAM-CAL-CAK	-2.94	107.78	111.30
3	C	1395	OAD	O4'-C1'-C2'	-2.90	100.42	106.62
7	B	1393	AR6	C2'-C3'-C4'	2.59	107.61	102.61
3	A	1394	OAD	C5-C4-N9	2.57	108.61	105.81
7	B	1393	AR6	O3'-C3'-C4'	-2.48	103.97	111.08
3	A	1394	OAD	C5'-C4'-C3'	-2.46	106.35	115.21
2	B	1392	OCZ	CAF-CAE-NAG	-2.43	105.49	108.23
3	A	1394	OAD	O4'-C1'-C2'	-2.42	101.43	106.62
3	A	1394	OAD	O2D-C2D-C1D	2.40	114.93	108.28
2	B	1392	OCZ	CAE-CAF-CAH	2.29	108.92	106.84
7	B	1393	AR6	O2'-C2'-C1'	-2.29	102.23	110.10
2	C	1394	OCZ	CAE-CAF-CAH	2.25	108.88	106.84
7	B	1393	AR6	O2'-C2'-C3'	2.22	118.95	111.82
7	B	1393	AR6	C1D-C2D-C3D	-2.14	99.66	102.29
2	C	1394	OCZ	CAH-CAI-NAG	-2.14	108.31	110.22
3	A	1394	OAD	O4'-C1'-N9	-2.11	104.04	108.09

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	1393	AR6	O3D-C3D-C2D	2.04	118.36	111.82
7	B	1393	AR6	O5D-PB-O2B	-2.03	100.87	108.94
7	B	1393	AR6	C5-C6-N6	-2.03	118.27	123.29

There are no chirality outliers.

All (18) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1394	OAD	O6D-C6D-O2D-C2D
3	A	1394	OAD	C7D-C6D-O2D-C2D
3	C	1395	OAD	O6D-C6D-O2D-C2D
3	C	1395	OAD	C7D-C6D-O2D-C2D
9	C	1397	GOL	C1-C2-C3-O3
7	B	1393	AR6	O4D-C4D-C5D-O5D
2	C	1394	OCZ	CAL-CAK-CAO-NAQ
7	B	1393	AR6	C3D-C4D-C5D-O5D
2	A	1393	OCZ	CAI-CAK-CAO-OAP
3	A	1394	OAD	C5D-O5D-PB-O1B
3	C	1395	OAD	C5D-O5D-PB-O1B
2	B	1392	OCZ	CAL-CAK-CAO-NAQ
2	A	1393	OCZ	CAL-CAK-CAO-OAP
2	B	1392	OCZ	CAL-CAK-CAO-OAP
2	C	1394	OCZ	CAL-CAK-CAO-OAP
8	B	1395	EDO	O1-C1-C2-O2
9	C	1397	GOL	O1-C1-C2-C3
8	C	1399	EDO	O1-C1-C2-O2

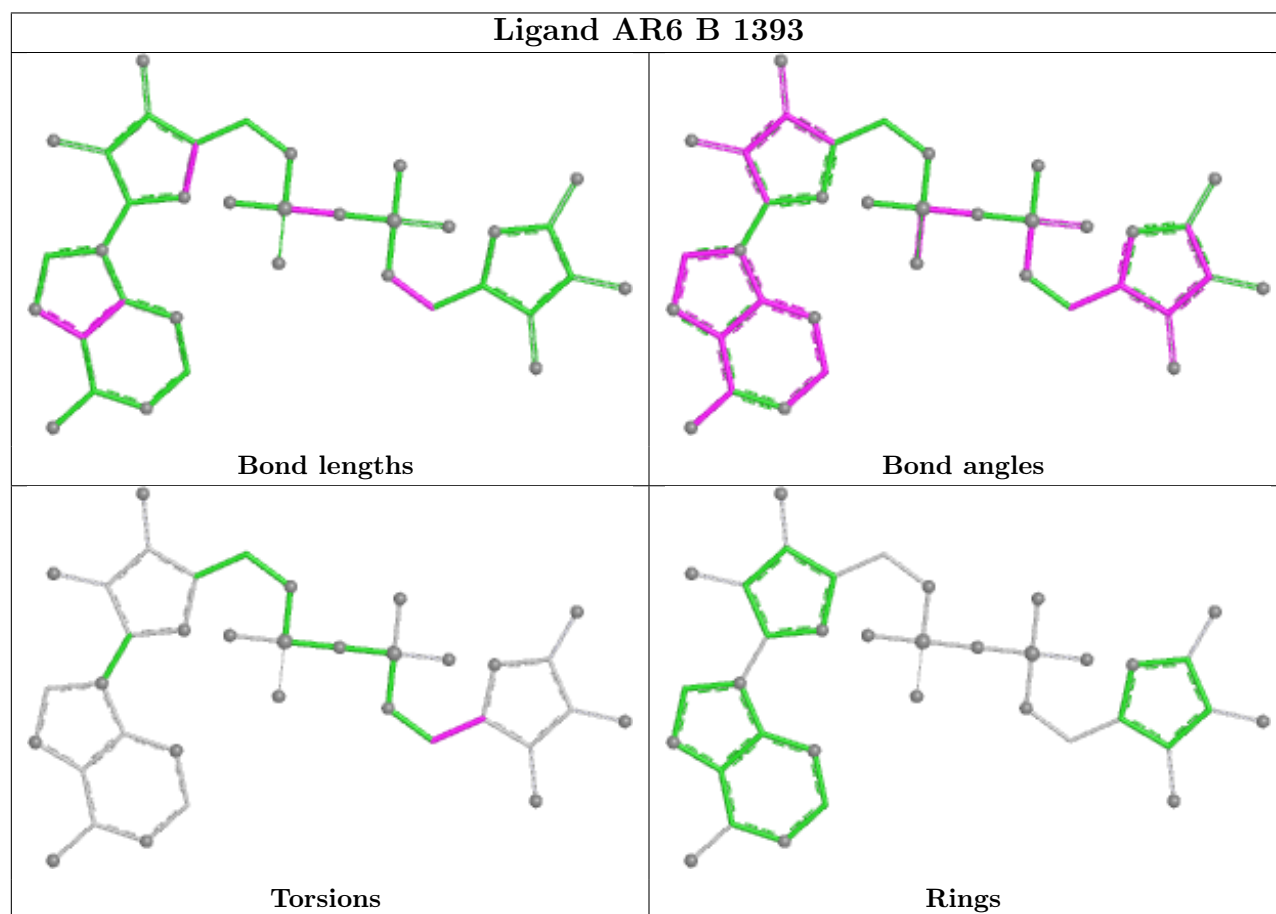
There are no ring outliers.

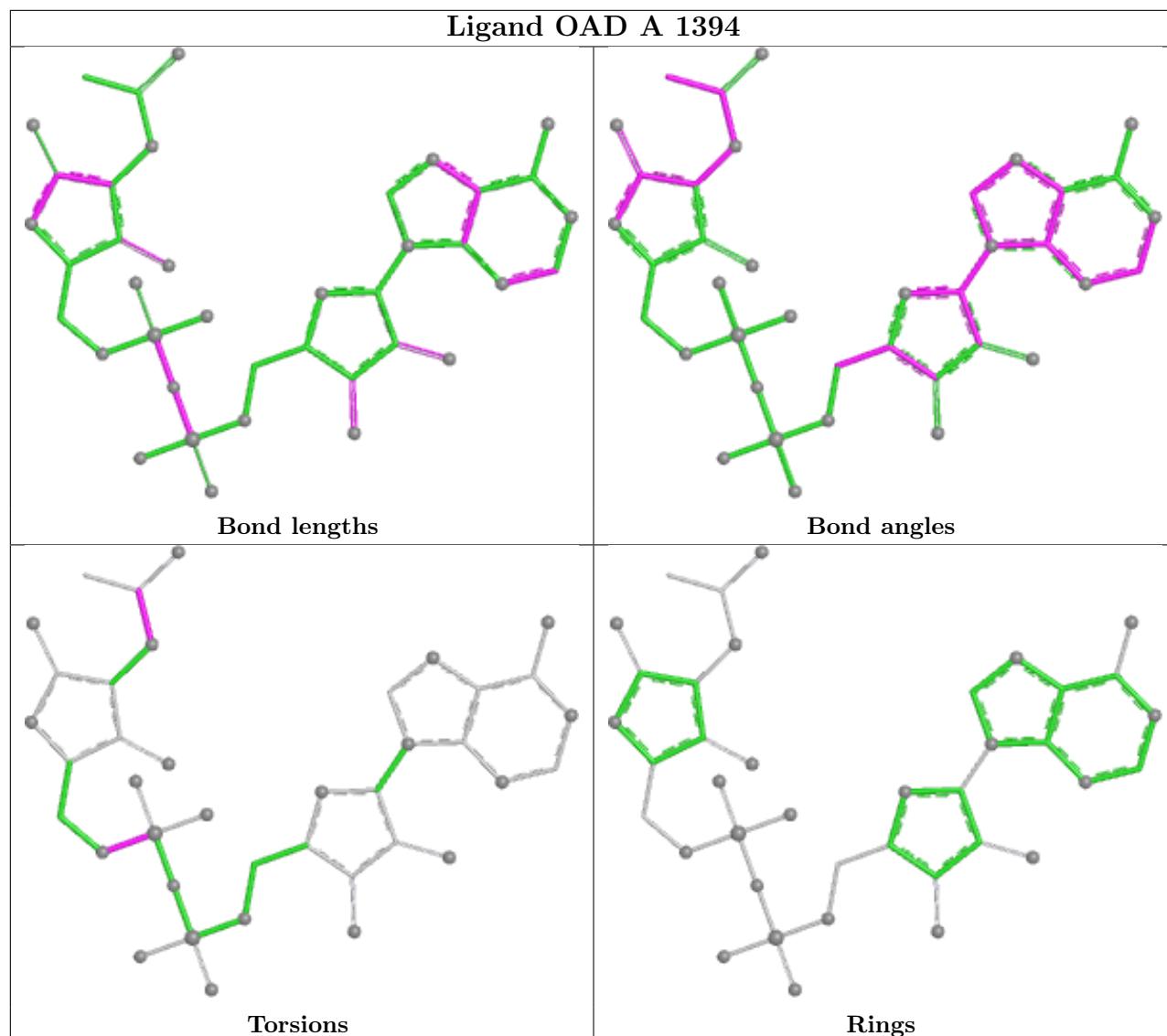
4 monomers are involved in 6 short contacts:

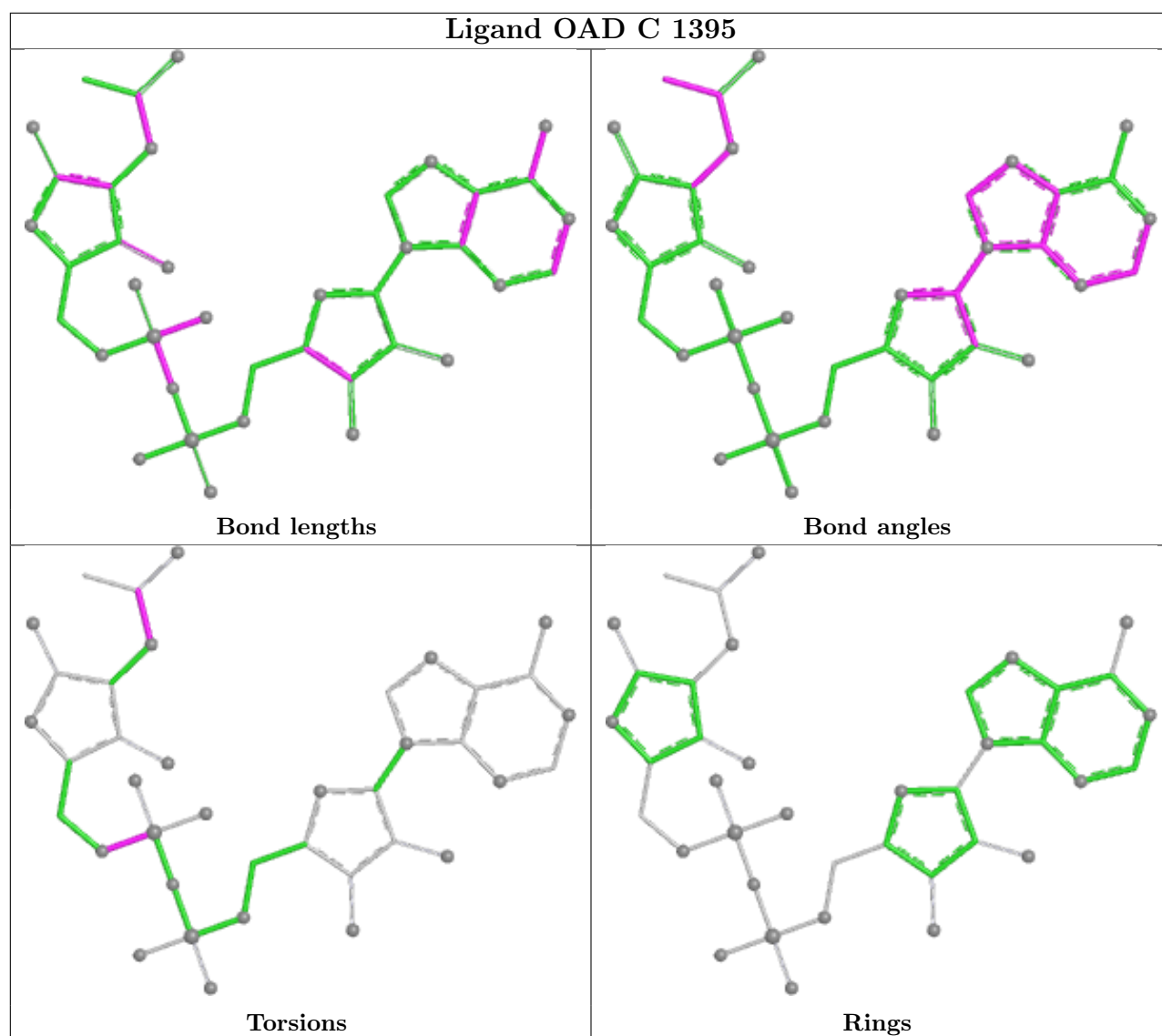
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	1393	AR6	2	0
3	A	1394	OAD	1	0
3	C	1395	OAD	1	0
9	C	1397	GOL	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.







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	A	272/284 (95%)	0.17	18 (6%) 24 26	8, 26, 58, 88	8 (2%)
1	B	271/284 (95%)	0.20	28 (10%) 12 12	7, 24, 59, 85	8 (2%)
1	C	270/284 (95%)	-0.26	7 (2%) 57 61	6, 18, 44, 69	8 (2%)
All	All	813/852 (95%)	0.04	53 (6%) 25 26	6, 21, 56, 88	24 (2%)

All (53) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	281	PRO	5.8
1	A	294	PHE	5.2
1	C	121	GLY	4.8
1	A	353	TRP	4.4
1	B	353	TRP	4.2
1	B	277	VAL	4.1
1	A	199	LEU	4.0
1	B	256	CYS	3.9
1	B	282	VAL	3.9
1	B	294	PHE	3.8
1	C	178	ALA	3.6
1	B	187	HIS	3.4
1	A	263	PHE	3.3
1	A	264	PRO	3.3
1	B	186	PHE	3.2
1	A	201	PRO	3.1
1	B	263	PHE	3.0
1	A	200	TYR	2.9
1	A	284	THR	2.9
1	C	179	ILE	2.9
1	B	258	VAL	2.8
1	B	200	TYR	2.8
1	C	184	PHE	2.8

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	278	PRO	2.8
1	A	186	PHE	2.8
1	B	270	ALA	2.7
1	B	284	THR	2.7
1	B	272	VAL	2.7
1	B	283	CYS	2.6
1	A	269	ARG	2.5
1	B	287	VAL	2.5
1	A	282	VAL	2.5
1	A	267	ASP	2.4
1	A	268	ILE	2.4
1	B	268	ILE	2.4
1	B	259	CYS	2.4
1	B	286	VAL	2.3
1	A	392	GLY	2.3
1	C	175	TYR	2.3
1	B	260	GLN	2.3
1	A	265	GLY	2.2
1	B	262	PRO	2.2
1	C	176	PRO	2.2
1	C	294	PHE	2.2
1	B	280	CYS	2.1
1	B	184	PHE	2.1
1	B	285	GLY	2.1
1	A	273	MET	2.1
1	B	266	GLU	2.1
1	B	264	PRO	2.1
1	A	202	GLY	2.0
1	B	189	PRO	2.0
1	A	258	VAL	2.0

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 oligosaccharides in this entry.

6.4 Ligands ⓘ

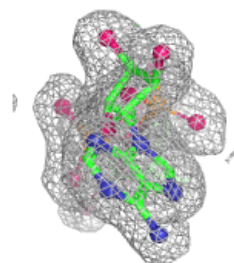
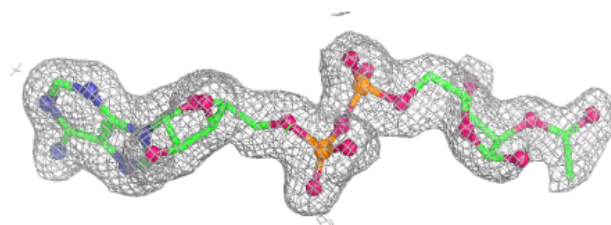
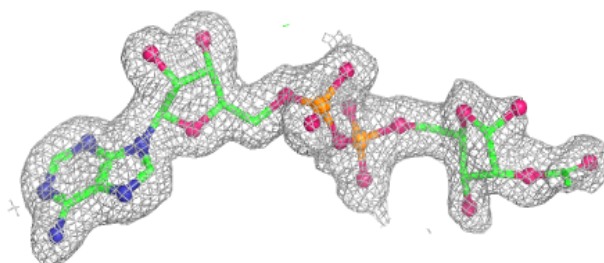
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
8	EDO	B	1395	4/4	0.80	0.16	42,44,49,51	0
8	EDO	C	1399	4/4	0.82	0.17	56,58,58,60	0
4	ZN	B	1396	1/1	0.84	0.13	87,87,87,87	0
9	GOL	C	1397	6/6	0.84	0.10	28,32,34,38	0
8	EDO	B	1394	4/4	0.85	0.19	47,51,52,53	0
8	EDO	C	1396	4/4	0.86	0.11	41,41,42,43	0
8	EDO	C	1398	4/4	0.87	0.10	30,31,31,33	0
6	CL	B	1397	1/1	0.88	0.15	72,72,72,72	0
5	NA	A	1396	1/1	0.91	0.15	33,33,33,33	0
6	CL	A	1397	1/1	0.92	0.12	56,56,56,56	0
2	OCZ	A	1393	17/17	0.94	0.08	16,23,30,33	0
4	ZN	A	1395	1/1	0.94	0.09	42,42,42,42	0
2	OCZ	C	1394	17/17	0.97	0.05	10,12,17,24	0
2	OCZ	B	1392	17/17	0.97	0.05	13,20,24,31	0
4	ZN	C	1400	1/1	0.98	0.04	27,27,27,27	0
3	OAD	A	1394	39/39	0.98	0.06	15,18,39,50	3
7	AR6	B	1393	36/36	0.98	0.05	15,18,36,44	0
3	OAD	C	1395	39/39	0.99	0.04	9,11,23,35	0

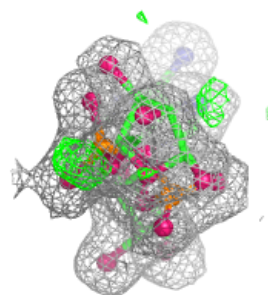
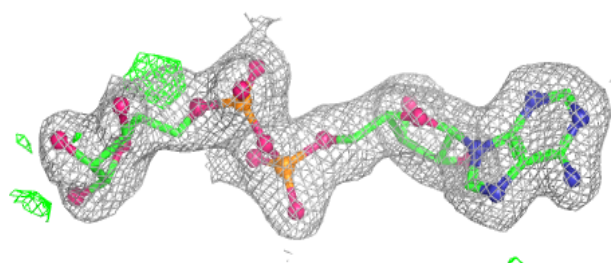
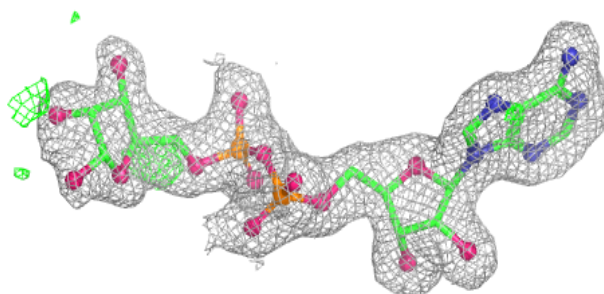
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

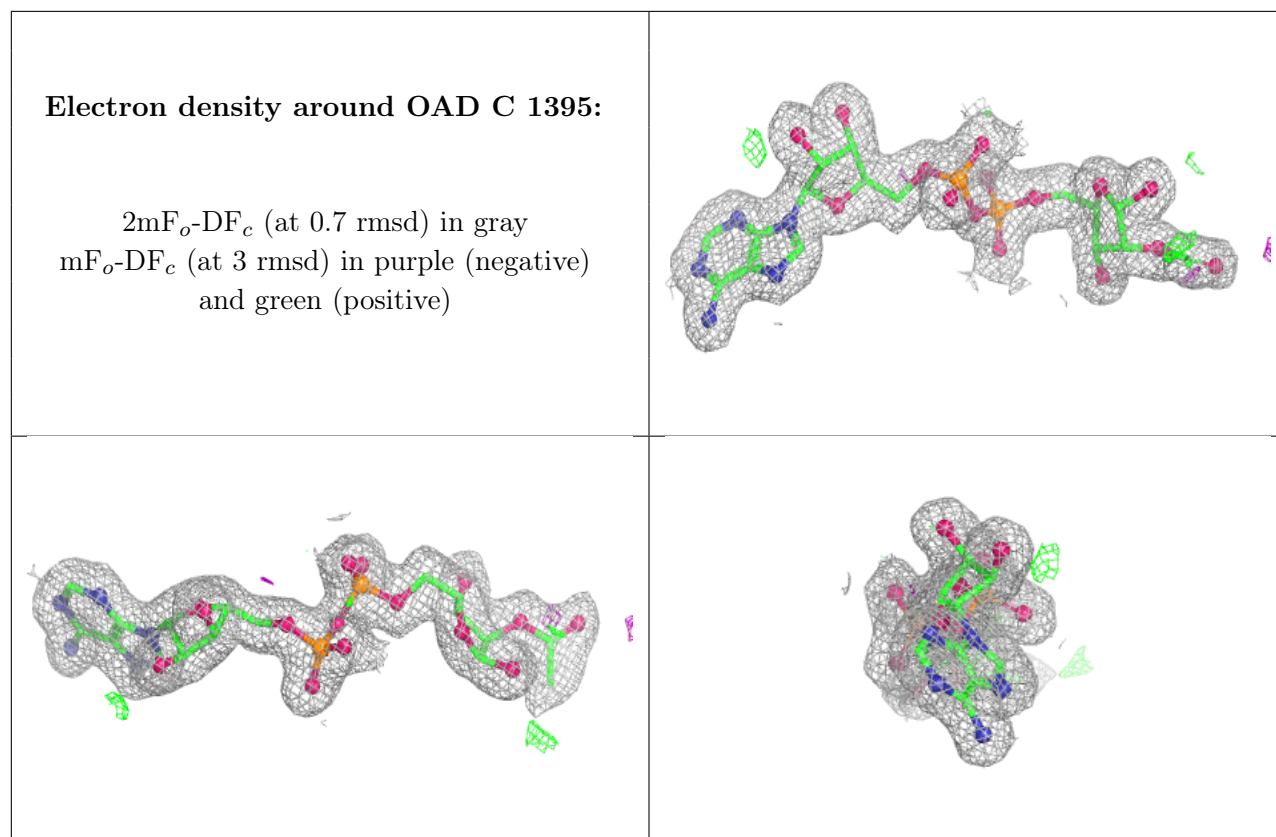
Electron density around OAD A 1394:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around AR6 B 1393:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





6.5 Other polymers [i](#)

There are no such residues in this entry.