Full wwPDB X-ray Structure Validation Report (i)

Mar 30, 2025 – 03:20 am BST

PDB ID	:	8QNK / pdb_00008qnk
Title	:	OPR3 variant R283D in complex with NADPH4
Authors	:	Bijelic, A.; Macheroux, P.; Kerschbaumer, B.
Deposited on	:	2023-09-27
Resolution	:	1.91 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 (i) 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 (i)) were used in the production of this report:

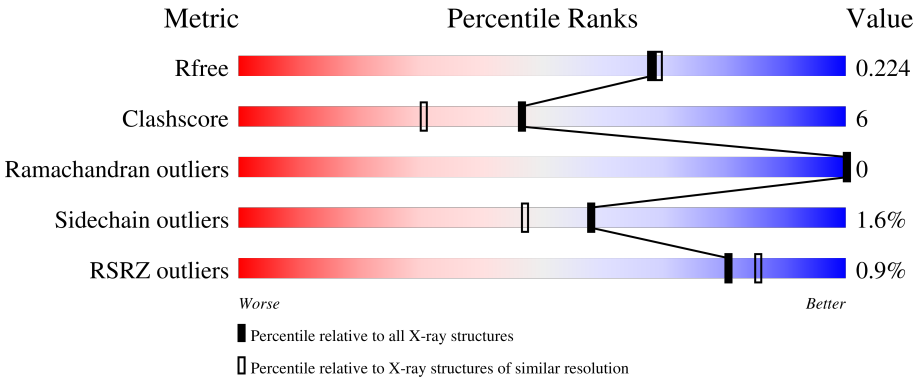
MolProbity	:	4.02b-467
Mogul	:	?.? (???), CSD ??CSD?? (????)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

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 1.91 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}	164625	1028 (1.92-1.92)
Clashscore	180529	1100 (1.92-1.92)
Ramachandran outliers	177936	1087 (1.92-1.92)
Sidechain outliers	177891	1087 (1.92-1.92)
RSRZ outliers	164620	1028 (1.92-1.92)

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 <=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	402	83% 10% 6%
1	B	402	79% 14% 7%
1	C	402	80% 9% 11%
1	D	402	75% 13% 11%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 12395 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 12-oxophytodienoate reductase 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	376	Total	C	N	O	S	0	0	0
			2898	1838	513	536	11			
1	B	375	Total	C	N	O	S	0	0	0
			2886	1834	509	532	11			
1	C	359	Total	C	N	O	S	0	0	0
			2754	1750	486	507	11			
1	D	356	Total	C	N	O	S	0	0	0
			2704	1721	473	499	11			

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-5	HIS	-	expression tag	UNP Q9FEW9
A	-4	HIS	-	expression tag	UNP Q9FEW9
A	-3	HIS	-	expression tag	UNP Q9FEW9
A	-2	HIS	-	expression tag	UNP Q9FEW9
A	-1	HIS	-	expression tag	UNP Q9FEW9
A	0	HIS	-	expression tag	UNP Q9FEW9
A	283	ASP	ARG	variant	UNP Q9FEW9
B	-5	HIS	-	expression tag	UNP Q9FEW9
B	-4	HIS	-	expression tag	UNP Q9FEW9
B	-3	HIS	-	expression tag	UNP Q9FEW9
B	-2	HIS	-	expression tag	UNP Q9FEW9
B	-1	HIS	-	expression tag	UNP Q9FEW9
B	0	HIS	-	expression tag	UNP Q9FEW9
B	283	ASP	ARG	variant	UNP Q9FEW9
C	-5	HIS	-	expression tag	UNP Q9FEW9
C	-4	HIS	-	expression tag	UNP Q9FEW9
C	-3	HIS	-	expression tag	UNP Q9FEW9
C	-2	HIS	-	expression tag	UNP Q9FEW9
C	-1	HIS	-	expression tag	UNP Q9FEW9
C	0	HIS	-	expression tag	UNP Q9FEW9
C	283	ASP	ARG	variant	UNP Q9FEW9

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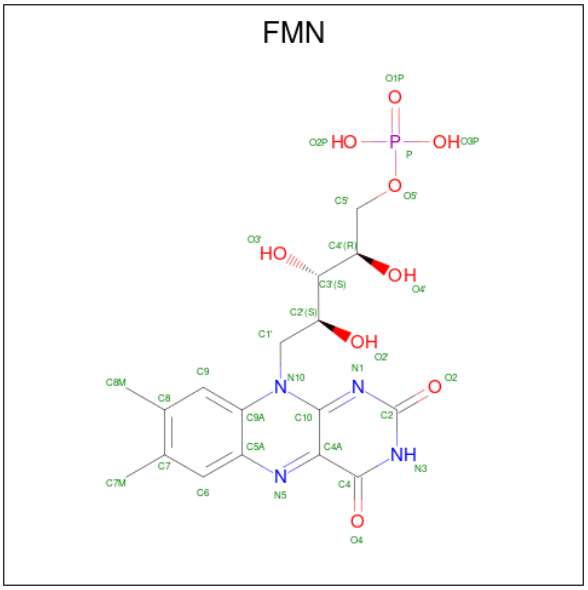
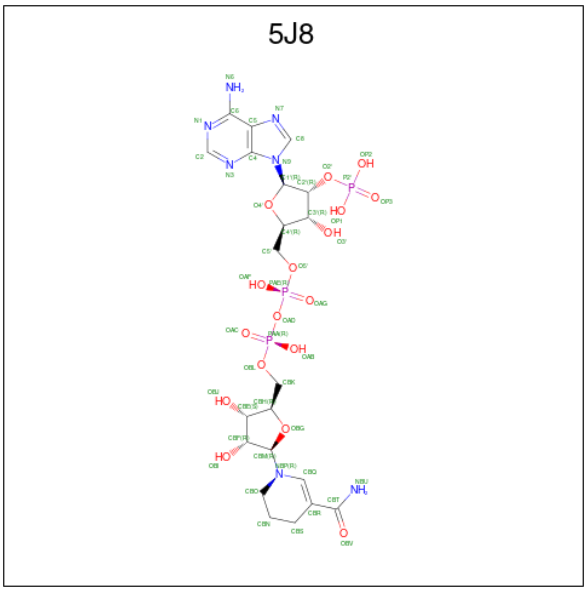
Chain	Residue	Modelled	Actual	Comment	Reference
D	-5	HIS	-	expression tag	UNP Q9FEW9
D	-4	HIS	-	expression tag	UNP Q9FEW9
D	-3	HIS	-	expression tag	UNP Q9FEW9
D	-2	HIS	-	expression tag	UNP Q9FEW9
D	-1	HIS	-	expression tag	UNP Q9FEW9
D	0	HIS	-	expression tag	UNP Q9FEW9
D	283	ASP	ARG	variant	UNP Q9FEW9

- Molecule 2 is FLAVIN MONONUCLEOTIDE (CCD ID: FMN) (formula: $C_{17}H_{21}N_4O_9P$).



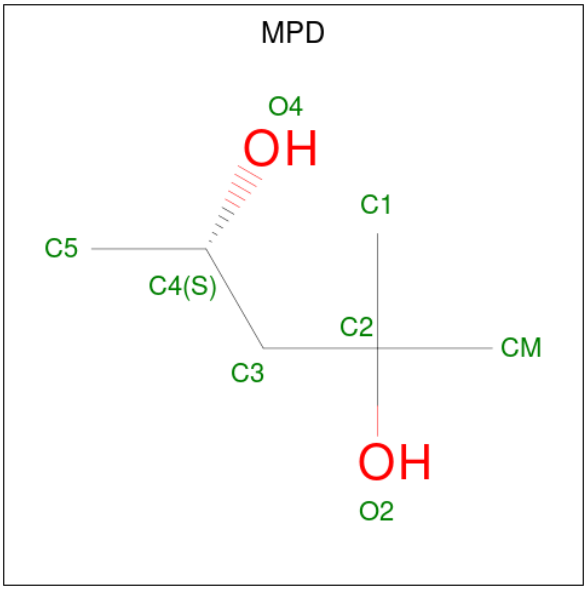
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	B	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	C	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	D	1	Total	C	N	O	P	0	0
			31	17	4	9	1		

- Molecule 3 is [[(2R,3S,4R,5R)-5-(5-aminocarbonyl-3,4-dihydro-2H-pyridin-1-yl)-3,4-bis(oxidanyl)oxolan-2-yl]methoxy-oxidanyl-phosphoryl] [(2R,3R,4R,5R)-5-(6-aminopurin-9-yl)-3-oxidanyl-4-phosphonooxy-oxolan-2-yl]methyl hydrogen phosphate (CCD ID: 5J8) (formula: $C_{21}H_{32}N_7O_{17}P_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
3	C	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 4 is (4S)-2-METHYL-2,4-PENTANEDIOL (CCD ID: MPD) (formula: $C_6H_{14}O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			8	6	2		

- Molecule 5 is water.

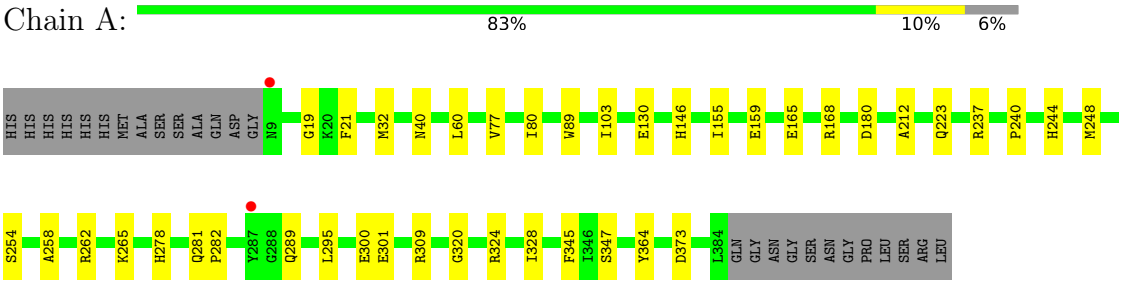
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	310	Total O 310 310	0	0
5	B	285	Total O 285 285	0	0
5	C	202	Total O 202 202	0	0
5	D	128	Total O 128 128	0	0

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.

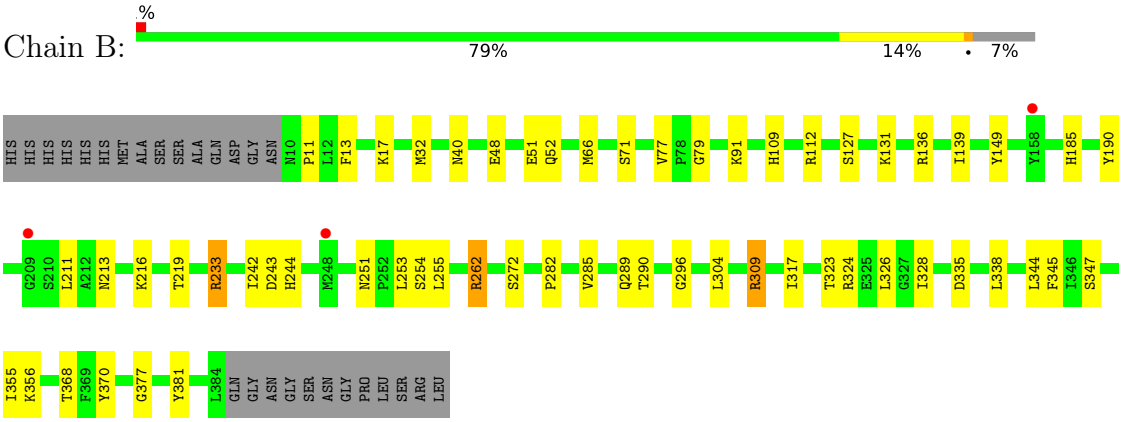
• Molecule 1: 12-oxophytodienoate reductase 3

Chain A:



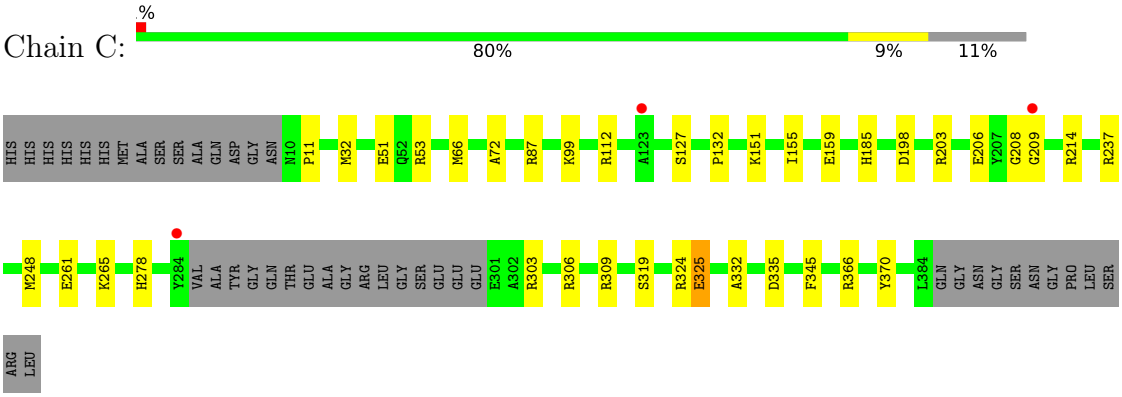
• Molecule 1: 12-oxophytodienoate reductase 3

Chain B:



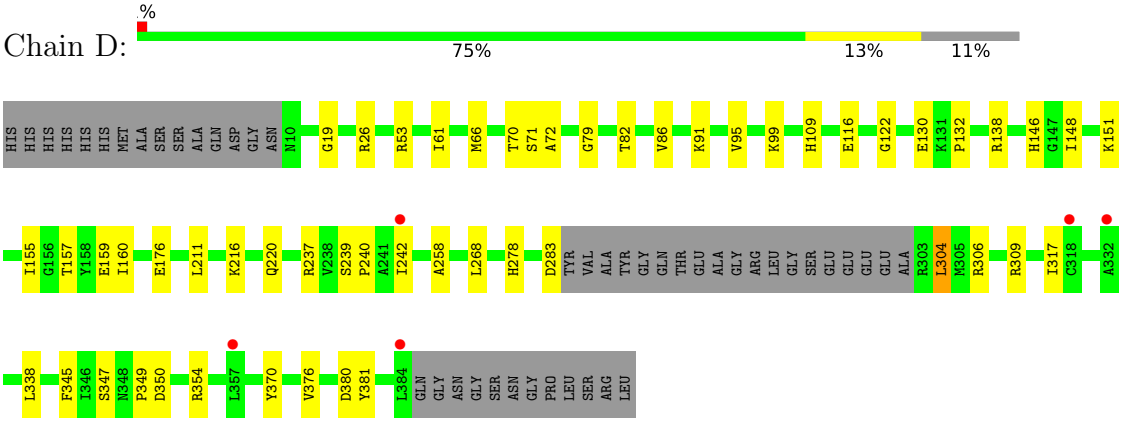
• Molecule 1: 12-oxophytodienoate reductase 3

Chain C:



• Molecule 1: 12-oxophytodienoate reductase 3

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	80.58Å 90.48Å 114.63Å 90.00° 110.02° 90.00°	Depositor
Resolution (Å)	35.90 – 1.91 35.90 – 1.91	Depositor EDS
% Data completeness (in resolution range)	95.5 (35.90-1.91) 95.5 (35.90-1.91)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.83 (at 1.91Å)	Xtriage
Refinement program	PHENIX (dev_4761)	Depositor
R, R_{free}	0.195 , 0.222 0.199 , 0.224	Depositor DCC
R_{free} test set	5790 reflections (4.81%)	wwPDB-VP
Wilson B-factor (Å^2)	24.1	Xtriage
Anisotropy	0.365	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 44.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.027 for h,-k,-h-l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	12395	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 10.49% 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, 0.333 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: FMN, 5J8, MPD

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	A	0.39	0/2965	0.61	1/4029 (0.0%)
1	B	0.36	0/2954	0.57	0/4016
1	C	0.36	0/2818	0.57	0/3835
1	D	0.31	0/2768	0.54	0/3771
All	All	0.36	0/11505	0.57	1/15651 (0.0%)

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
1	B	0	1
1	C	0	1
All	All	0	2

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	32	MET	CG-SD-CE	-7.10	88.84	100.20

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	233	ARG	Sidechain
1	C	53	ARG	Sidechain

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	2898	0	2847	25	0
1	B	2886	0	2833	40	0
1	C	2754	0	2690	25	0
1	D	2704	0	2618	35	0
2	A	31	0	19	5	0
2	B	31	0	19	3	0
2	C	31	0	19	3	0
2	D	31	0	19	1	0
3	A	48	0	0	0	0
3	C	48	0	0	2	0
4	A	8	0	14	4	0
5	A	310	0	0	7	1
5	B	285	0	0	10	1
5	C	202	0	0	8	0
5	D	128	0	0	8	0
All	All	12395	0	11078	127	2

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 6.

All (127) 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:A:289:GLN:HG3	4:A:403:MPD:HM2	1.51	0.91
2:A:401:FMN:H5'2	1:B:289:GLN:HB2	1.57	0.86
1:C:324:ARG:NH2	5:C:502:HOH:O	1.95	0.79
3:C:402:5J8:OAC	5:C:503:HOH:O	2.02	0.76
1:C:324:ARG:NH1	5:C:501:HOH:O	1.86	0.75
1:A:300:GLU:OE2	5:A:502:HOH:O	2.05	0.74
1:B:17:LYS:HE3	5:B:610:HOH:O	1.93	0.68
1:B:91:LYS:NZ	5:B:506:HOH:O	2.25	0.68
1:C:206:GLU:OE2	5:C:505:HOH:O	2.11	0.68
1:B:51:GLU:OE1	5:B:501:HOH:O	2.12	0.68
1:B:324:ARG:HG3	1:B:355:ILE:HG23	1.78	0.66
1:D:176:GLU:OE2	5:D:504:HOH:O	2.14	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:283:ASP:OD1	5:D:503:HOH:O	2.14	0.65
1:A:130:GLU:OE2	5:A:503:HOH:O	2.14	0.64
1:D:157:THR:HA	1:D:160:ILE:HD12	1.81	0.61
4:A:403:MPD:H53	5:B:598:HOH:O	2.01	0.60
2:A:401:FMN:HM82	5:B:642:HOH:O	2.02	0.59
1:C:306:ARG:NH1	1:C:335:ASP:OD1	2.27	0.59
1:C:370:TYR:CZ	2:C:401:FMN:HM72	2.38	0.58
4:A:403:MPD:H51	1:B:190:TYR:OH	2.02	0.58
1:B:285:VAL:O	5:B:502:HOH:O	2.17	0.58
1:B:309:ARG:HG3	1:B:335:ASP:O	2.04	0.58
1:D:239:SER:HB2	1:D:242:ILE:HG13	1.86	0.57
1:B:48:GLU:O	1:B:52:GLN:HG3	2.04	0.57
1:A:165:GLU:OE2	1:A:168:ARG:NH2	2.37	0.57
1:C:203:ARG:HB2	1:C:208:GLY:HA3	1.87	0.56
1:B:112:ARG:HB3	1:B:127:SER:HB2	1.88	0.55
1:D:53:ARG:HG2	1:D:349:PRO:HA	1.87	0.55
1:A:373:ASP:OD2	5:A:504:HOH:O	2.18	0.55
1:A:320:GLY:HA2	2:A:401:FMN:H5'1	1.90	0.54
4:A:403:MPD:H52	4:A:403:MPD:H11	1.89	0.54
1:A:248:MET:HB2	5:A:581:HOH:O	2.07	0.54
1:D:317:ILE:HG12	1:D:338:LEU:HB2	1.89	0.54
1:B:13:PHE:CZ	1:B:356:LYS:HB2	2.43	0.53
1:D:216:LYS:O	1:D:220:GLN:HG3	2.08	0.53
1:D:240:PRO:HG2	1:D:304:LEU:HD21	1.91	0.53
1:D:61:ILE:O	5:D:505:HOH:O	2.19	0.52
1:A:80:ILE:HD12	1:A:89:TRP:CD1	2.44	0.52
1:D:370:TYR:CZ	2:D:401:FMN:HM72	2.44	0.52
1:D:130:GLU:HB3	1:D:151:LYS:HE2	1.92	0.52
1:D:71:SER:HB2	1:D:109:HIS:HA	1.92	0.52
1:A:258:ALA:O	1:A:262:ARG:HG2	2.10	0.51
1:B:213:ASN:HA	1:B:216:LYS:HG3	1.91	0.51
1:B:11:PRO:HD2	1:B:328:ILE:HG23	1.92	0.51
1:B:219:THR:OG1	1:B:262:ARG:HG2	2.11	0.50
1:B:317:ILE:HG12	1:B:338:LEU:HB2	1.94	0.50
1:A:281:GLN:HB3	1:A:282:PRO:HD2	1.94	0.49
2:A:401:FMN:H4'	1:B:289:GLN:O	2.12	0.49
1:B:136:ARG:NH1	1:B:136:ARG:HB2	2.28	0.49
1:A:40:ASN:HA	1:A:77:VAL:O	2.12	0.49
1:A:19:GLY:HA3	5:A:611:HOH:O	2.13	0.48
1:C:112:ARG:HB3	1:C:127:SER:HB2	1.95	0.48
1:C:198:ASP:HB3	1:C:214:ARG:CZ	2.44	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:325:GLU:H	1:C:325:GLU:CD	2.16	0.48
1:A:155:ILE:HB	1:A:159:GLU:HB3	1.96	0.48
1:B:66:MET:HB2	1:B:79:GLY:HA2	1.95	0.48
1:B:32:MET:HA	2:B:401:FMN:N5	2.29	0.47
1:C:206:GLU:CG	5:C:505:HOH:O	2.63	0.47
1:B:309:ARG:NH1	5:B:509:HOH:O	2.31	0.47
1:C:306:ARG:HD3	1:C:335:ASP:OD1	2.14	0.47
1:B:243:ASP:OD2	5:B:503:HOH:O	2.21	0.47
1:A:295:LEU:HD13	1:A:301:GLU:HA	1.96	0.46
1:C:66:MET:SD	1:C:72:ALA:HB2	2.55	0.46
1:C:366:ARG:NH2	3:C:402:5J8:OP1	2.48	0.46
1:D:211:LEU:HD13	1:D:258:ALA:HB2	1.97	0.46
1:B:253:LEU:HA	1:B:304:LEU:HD11	1.96	0.46
1:D:82:THR:O	1:D:86:VAL:HG23	2.16	0.46
1:B:71:SER:HB2	1:B:109:HIS:HA	1.98	0.45
1:D:99:LYS:HE3	1:D:99:LYS:HB3	1.79	0.45
1:A:244:HIS:CD2	1:B:290:THR:HB	2.52	0.45
1:C:11:PRO:HG3	1:C:332:ALA:HB2	1.97	0.45
1:D:66:MET:HB2	1:D:79:GLY:HA2	1.99	0.45
1:C:237:ARG:HA	1:C:278:HIS:O	2.17	0.45
1:D:132:PRO:HB3	1:D:151:LYS:HA	1.99	0.45
1:C:319:SER:OG	5:C:504:HOH:O	2.10	0.45
1:D:376:VAL:HA	1:D:380:ASP:OD2	2.16	0.45
1:B:40:ASN:HA	1:B:77:VAL:O	2.18	0.44
1:C:32:MET:HA	2:C:401:FMN:N5	2.32	0.44
1:B:233:ARG:NH2	5:B:512:HOH:O	2.38	0.44
1:A:324:ARG:O	1:A:328:ILE:HG13	2.17	0.44
1:C:324:ARG:HB3	1:C:325:GLU:OE2	2.18	0.44
1:D:268:LEU:HD12	1:D:268:LEU:HA	1.83	0.44
1:D:130:GLU:HG2	5:D:581:HOH:O	2.17	0.44
1:C:206:GLU:HG3	5:C:505:HOH:O	2.18	0.43
1:D:155:ILE:HB	1:D:159:GLU:HB2	1.99	0.43
1:B:323:THR:H	1:B:326:LEU:HB2	1.82	0.43
1:B:370:TYR:CE1	2:B:401:FMN:HM72	2.53	0.43
1:D:350:ASP:OD1	1:D:350:ASP:N	2.52	0.43
1:D:19:GLY:HA3	5:D:525:HOH:O	2.18	0.43
1:B:347:SER:HA	1:B:381:TYR:CG	2.54	0.43
1:D:350:ASP:O	1:D:354:ARG:HG3	2.19	0.43
1:D:138:ARG:HB3	1:D:146:HIS:HB3	2.00	0.42
1:A:347:SER:HB3	1:A:364:TYR:HB3	2.00	0.42
1:B:32:MET:HA	2:B:401:FMN:C5A	2.48	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:66:MET:SD	1:D:72:ALA:HB2	2.59	0.42
1:D:237:ARG:HA	1:D:278:HIS:O	2.19	0.42
1:A:212:ALA:HA	1:A:262:ARG:HH21	1.85	0.42
1:A:60:LEU:O	1:A:103:ILE:HA	2.19	0.42
1:C:51:GLU:HG3	1:C:99:LYS:HD2	2.02	0.42
1:C:155:ILE:HB	1:C:159:GLU:HB3	2.00	0.42
1:C:209:GLY:N	5:C:506:HOH:O	2.17	0.42
1:A:320:GLY:HA2	2:A:401:FMN:C5'	2.50	0.41
1:B:282:PRO:O	5:B:504:HOH:O	2.22	0.41
1:D:116:GLU:O	1:D:122:GLY:HA2	2.20	0.41
1:C:132:PRO:HB3	1:C:151:LYS:HA	2.02	0.41
1:D:26:ARG:NH1	5:D:501:HOH:O	1.96	0.41
1:A:265:LYS:HE3	5:A:543:HOH:O	2.21	0.41
1:B:242:ILE:HG22	1:B:244:HIS:H	1.86	0.41
1:D:148:ILE:HG13	5:D:540:HOH:O	2.20	0.41
1:A:223:GLN:NE2	5:A:517:HOH:O	2.49	0.41
1:B:139:ILE:HB	1:B:149:TYR:CE1	2.56	0.41
1:B:344:LEU:HD23	1:B:344:LEU:HA	1.86	0.41
1:A:21:PHE:CE1	1:A:180:ASP:HB3	2.55	0.41
1:D:211:LEU:HA	1:D:211:LEU:HD23	1.86	0.41
1:D:306:ARG:HD2	1:D:306:ARG:HA	1.67	0.41
1:D:347:SER:HA	1:D:381:TYR:CG	2.56	0.41
1:A:237:ARG:HA	1:A:278:HIS:O	2.21	0.41
1:B:211:LEU:HD11	1:B:255:LEU:HA	2.03	0.41
1:D:91:LYS:O	1:D:95:VAL:HG23	2.20	0.41
1:C:261:GLU:O	1:C:265:LYS:HG3	2.22	0.40
1:B:131:LYS:HB2	1:B:131:LYS:HE3	1.87	0.40
1:A:146:HIS:ND1	1:B:296:GLY:N	2.61	0.40
1:B:251:ASN:CG	1:B:254:SER:HB3	2.42	0.40
1:B:253:LEU:HA	1:B:304:LEU:CD1	2.52	0.40
1:B:368:THR:HB	1:B:377:GLY:HA3	2.03	0.40
1:C:370:TYR:CE1	2:C:401:FMN:HM72	2.56	0.40
1:D:70:THR:OG1	5:D:506:HOH:O	2.21	0.40

All (2) 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)
5:B:703:HOH:O	5:B:710:HOH:O[2_746]	2.07	0.13
5:A:571:HOH:O	5:A:736:HOH:O[2_646]	2.10	0.10

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	374/402 (93%)	360 (96%)	14 (4%)	0	100	100
1	B	373/402 (93%)	361 (97%)	12 (3%)	0	100	100
1	C	355/402 (88%)	344 (97%)	11 (3%)	0	100	100
1	D	352/402 (88%)	339 (96%)	13 (4%)	0	100	100
All	All	1454/1608 (90%)	1404 (97%)	50 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	301/328 (92%)	297 (99%)	4 (1%)	65	55
1	B	299/328 (91%)	294 (98%)	5 (2%)	56	45
1	C	285/328 (87%)	278 (98%)	7 (2%)	42	27
1	D	277/328 (84%)	274 (99%)	3 (1%)	70	63
All	All	1162/1312 (89%)	1143 (98%)	19 (2%)	58	47

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	240	PRO
1	A	254	SER

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Mol	Chain	Res	Type
1	A	309	ARG
1	A	345	PHE
1	B	185	HIS
1	B	262	ARG
1	B	272	SER
1	B	309	ARG
1	B	345	PHE
1	C	87	ARG
1	C	185	HIS
1	C	248	MET
1	C	303	ARG
1	C	309	ARG
1	C	325	GLU
1	C	345	PHE
1	D	304	LEU
1	D	309	ARG
1	D	345	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	162	GLN
1	D	43	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

7 ligands are modelled in this entry.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

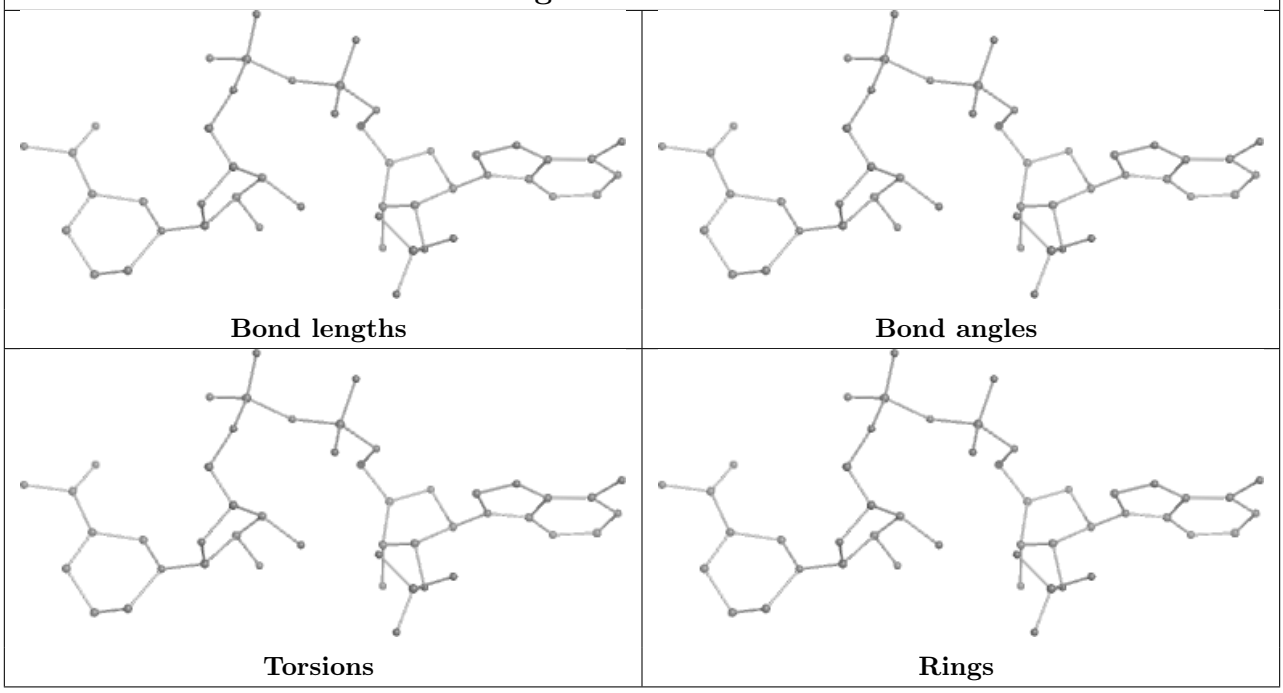
There are no torsion outliers.

There are no ring outliers.

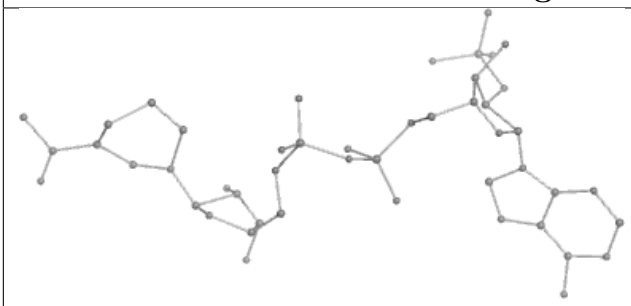
No monomer is involved in short contacts.

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 then 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.

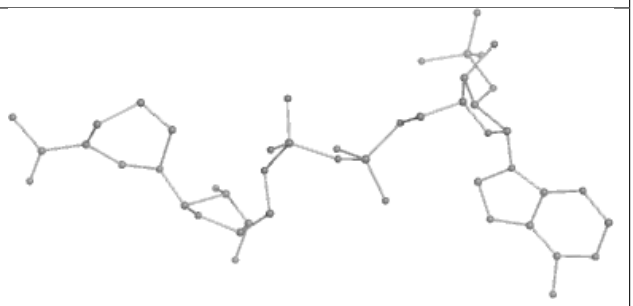
Ligand 5J8 A 402



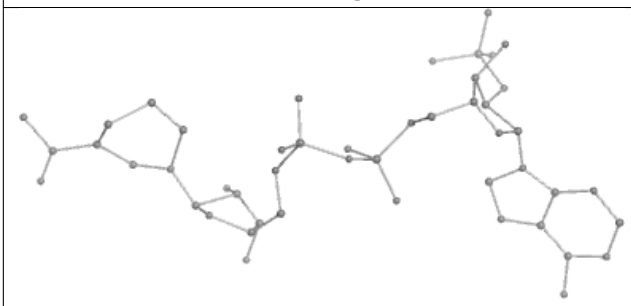
Ligand 5J8 C 402



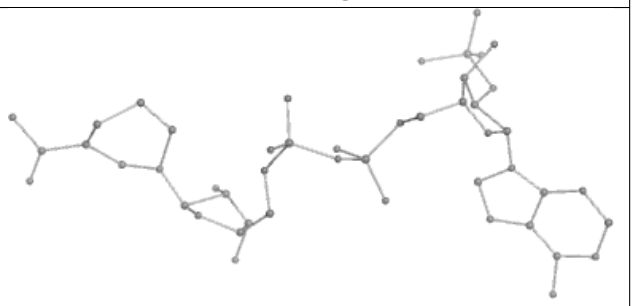
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

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	376/402 (93%)	-0.20	2 (0%)	87	91	16, 25, 37, 52	0
1	B	375/402 (93%)	-0.07	3 (0%)	82	87	19, 28, 42, 49	0
1	C	359/402 (89%)	0.09	3 (0%)	82	87	22, 32, 45, 58	0
1	D	356/402 (88%)	0.61	5 (1%)	73	79	33, 43, 55, 64	0
All	All	1466/1608 (91%)	0.10	13 (0%)	81	85	16, 32, 49, 64	0

All (13) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	384	LEU	3.8
1	C	209	GLY	3.1
1	A	287	TYR	3.1
1	D	318	CYS	2.7
1	C	284	TYR	2.5
1	D	242	ILE	2.4
1	C	123	ALA	2.4
1	B	158	TYR	2.3
1	A	9	ASN	2.2
1	D	332	ALA	2.2
1	D	357	LEU	2.2
1	B	248	MET	2.2
1	B	209	GLY	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 (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

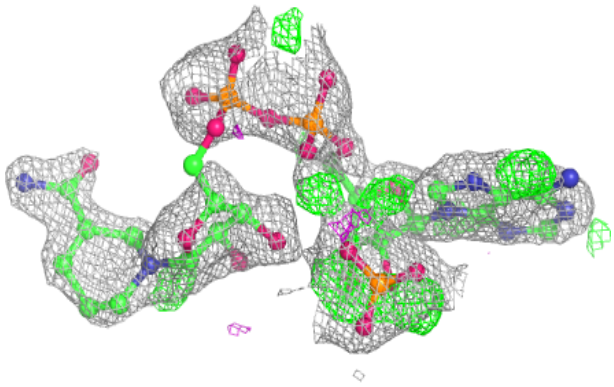
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

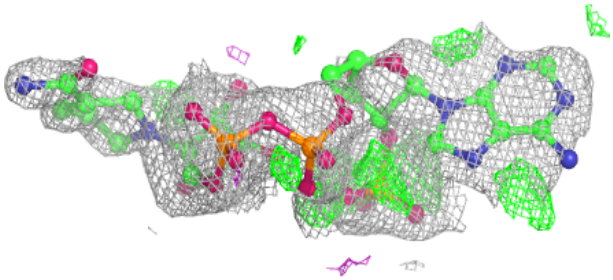
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	5J8	A	402	48/48	0.80	0.15	28,39,53,57	48
4	MPD	A	403	8/8	0.85	0.15	27,29,37,38	0
3	5J8	C	402	48/48	0.88	0.10	21,51,56,64	0
2	FMN	D	401	31/31	0.92	0.08	31,36,42,46	0
2	FMN	B	401	31/31	0.95	0.07	20,23,28,35	0
2	FMN	A	401	31/31	0.96	0.07	15,18,24,26	0
2	FMN	C	401	31/31	0.96	0.06	20,24,26,28	0

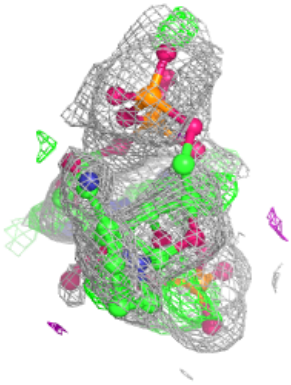
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 5J8 A 402:

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

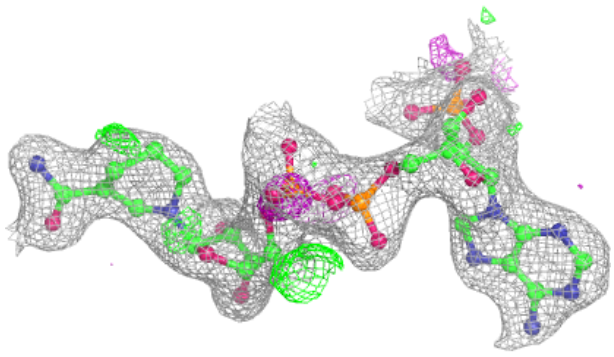


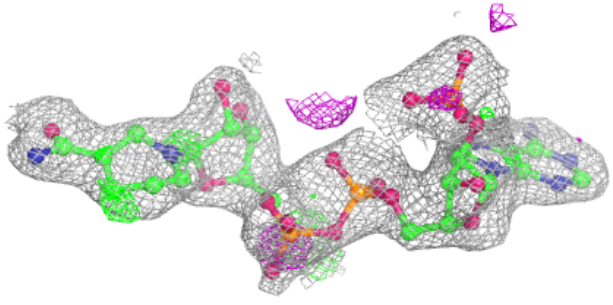


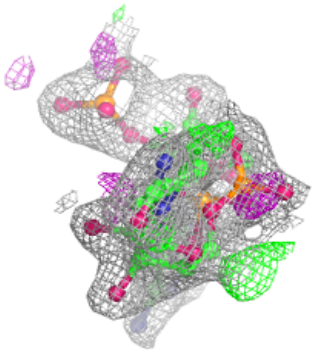


Electron density around 5J8 C 402:

$2mF_o$-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.