Full wwPDB X-ray Structure Validation Report (i)

Sep 28, 2024 – 05:07 PM EDT

PDB ID	:	1XN0
Title	:	Catalytic Domain Of Human Phosphodiesterase 4B In Complex With (R,S)-Rolipram
Authors	:	Card, G.L.; England, B.P.; Suzuki, Y.; Fong, D.; Powell, B.; Lee, B.; Luu, C.; Tabrizizad, M.; Gillette, S.; Ibrahim, P.N.; Artis, D.R.; Bollag, G.; Milburn, M.V.; Kim, S.-H.; Schlessinger, J.; Zhang, K.Y.J.
Deposited on	:	2004-10-04
Resolution	:	2.31 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:

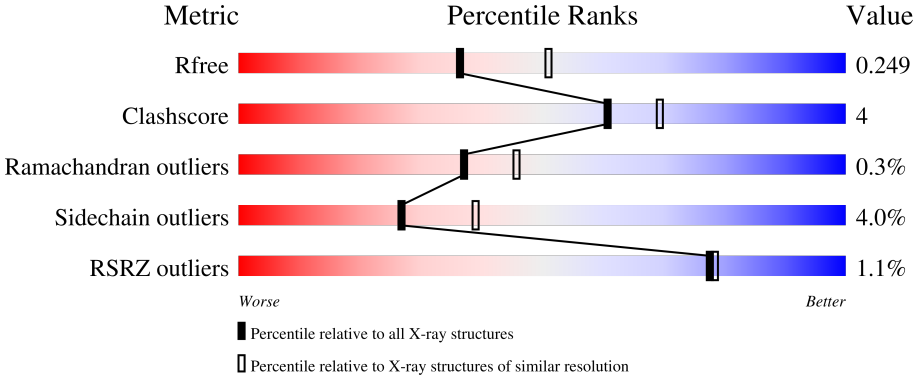
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 2.31 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	7250 (2.34-2.30)
Clashscore	180529	8063 (2.34-2.30)
Ramachandran outliers	177936	7993 (2.34-2.30)
Sidechain outliers	177891	7993 (2.34-2.30)
RSRZ outliers	164620	7250 (2.34-2.30)

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	398	% 66% 14% • 19%
1	B	398	% 69% 12% • 19%

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
4	ROL	A	1003[A]	X	-	-	-
4	ROL	B	1003[A]	X	-	-	-

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 5543 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 cAMP-specific 3',5'-cyclic phosphodiesterase 4B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	323	2625	1657	441	505	22	8	0	0
1	B	323	2625	1657	441	505	22	4	0	0

There are 42 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	131	MET	-	initiating methionine	UNP Q07343
A	132	GLY	-	cloning artifact	UNP Q07343
A	133	SER	-	cloning artifact	UNP Q07343
A	134	SER	-	cloning artifact	UNP Q07343
A	135	HIS	-	expression tag	UNP Q07343
A	136	HIS	-	expression tag	UNP Q07343
A	137	HIS	-	expression tag	UNP Q07343
A	138	HIS	-	expression tag	UNP Q07343
A	139	HIS	-	expression tag	UNP Q07343
A	140	HIS	-	expression tag	UNP Q07343
A	141	SER	-	cloning artifact	UNP Q07343
A	142	SER	-	cloning artifact	UNP Q07343
A	143	GLY	-	cloning artifact	UNP Q07343
A	144	LEU	-	cloning artifact	UNP Q07343
A	145	VAL	-	cloning artifact	UNP Q07343
A	146	PRO	-	cloning artifact	UNP Q07343
A	147	ARG	-	cloning artifact	UNP Q07343
A	148	GLY	-	cloning artifact	UNP Q07343
A	149	SER	-	cloning artifact	UNP Q07343
A	150	HIS	-	cloning artifact	UNP Q07343
A	151	MET	-	cloning artifact	UNP Q07343
B	131	MET	-	initiating methionine	UNP Q07343
B	132	GLY	-	cloning artifact	UNP Q07343
B	133	SER	-	cloning artifact	UNP Q07343
B	134	SER	-	cloning artifact	UNP Q07343

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Chain	Residue	Modelled	Actual	Comment	Reference
B	135	HIS	-	expression tag	UNP Q07343
B	136	HIS	-	expression tag	UNP Q07343
B	137	HIS	-	expression tag	UNP Q07343
B	138	HIS	-	expression tag	UNP Q07343
B	139	HIS	-	expression tag	UNP Q07343
B	140	HIS	-	expression tag	UNP Q07343
B	141	SER	-	cloning artifact	UNP Q07343
B	142	SER	-	cloning artifact	UNP Q07343
B	143	GLY	-	cloning artifact	UNP Q07343
B	144	LEU	-	cloning artifact	UNP Q07343
B	145	VAL	-	cloning artifact	UNP Q07343
B	146	PRO	-	cloning artifact	UNP Q07343
B	147	ARG	-	cloning artifact	UNP Q07343
B	148	GLY	-	cloning artifact	UNP Q07343
B	149	SER	-	cloning artifact	UNP Q07343
B	150	HIS	-	cloning artifact	UNP Q07343
B	151	MET	-	cloning artifact	UNP Q07343

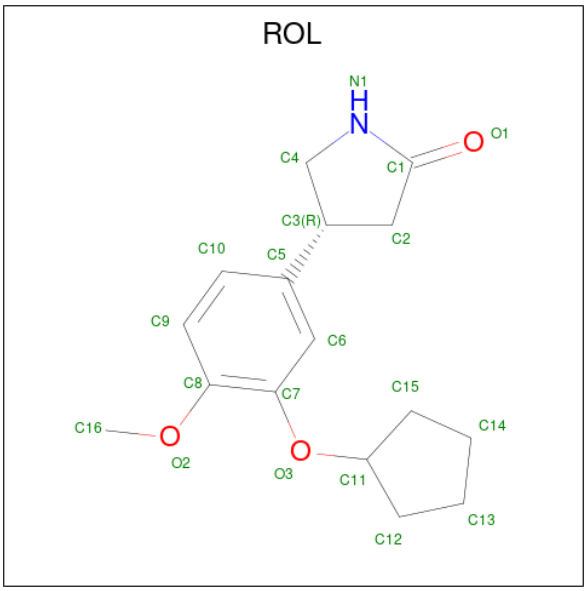
- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
2	A	1	1	1	0	0
			Total	Zn		
2	B	1	1	1	0	0

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
3	A	1	1	1	0	0
			Total	Mg		
3	B	1	1	1	0	0

- Molecule 4 is ROLIPRAM (three-letter code: ROL) (formula: $C_{16}H_{21}NO_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
4	A	1	20	16	1	3	0	1
			Total	C	N	O		
4	A	1	20	16	1	3	0	1
			Total	C	N	O		
4	B	1	20	16	1	3	0	1
			Total	C	N	O		
4	B	1	20	16	1	3	0	1

- Molecule 5 is water.

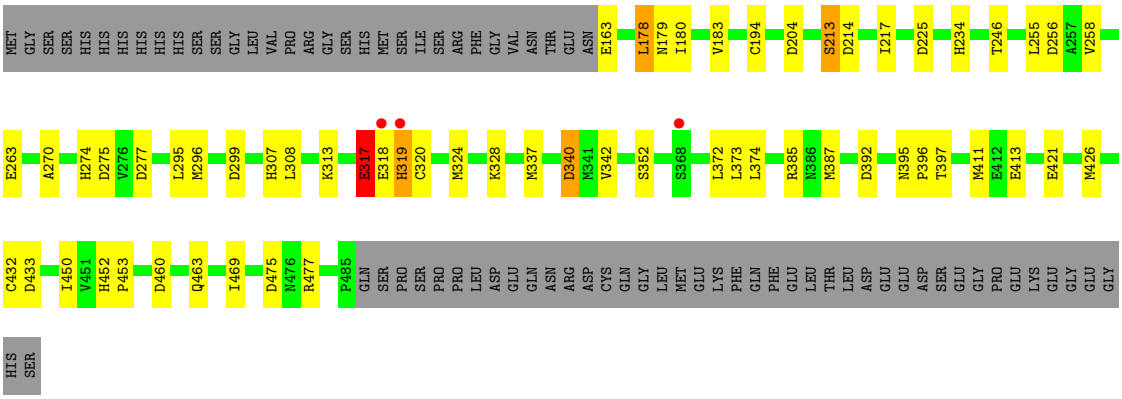
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	105	105	105	0	0
			Total	O		
5	B	104	104	104	0	0

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.

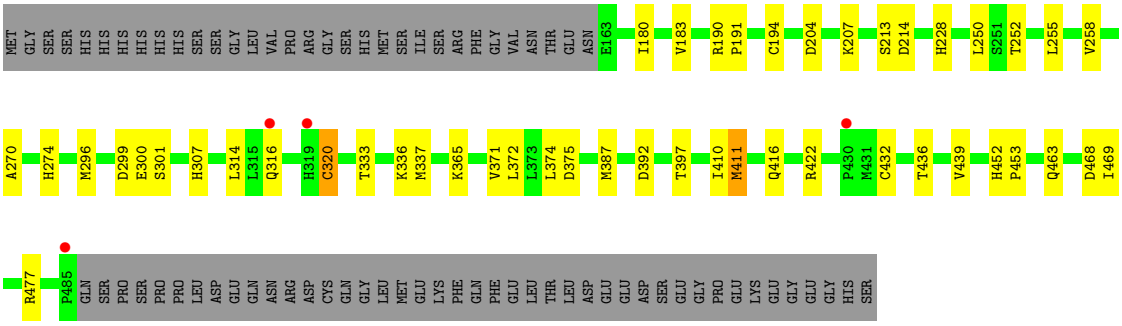
• Molecule 1: cAMP-specific 3',5'-cyclic phosphodiesterase 4B

Chain A:



• Molecule 1: cAMP-specific 3',5'-cyclic phosphodiesterase 4B

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	89.93Å 95.00Å 106.83Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	70.71 – 2.31 70.71 – 2.31	Depositor EDS
% Data completeness (in resolution range)	98.6 (70.71-2.31) 98.6 (70.71-2.31)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.88 (at 2.31Å)	Xtriage
Refinement program	REFMAC 5.1.25	Depositor
R, R_{free}	0.205 , 0.250 0.210 , 0.249	Depositor DCC
R_{free} test set	2013 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	35.0	Xtriage
Anisotropy	0.367	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 42.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	5543	wwPDB-VP
Average B, all atoms (Å^2)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 43.55 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.7340e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: CME, ROL, ZN, MG

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	0.79	3/2647 (0.1%)	0.92	11/3586 (0.3%)
1	B	0.72	1/2647 (0.0%)	0.86	5/3586 (0.1%)
All	All	0.76	4/5294 (0.1%)	0.89	16/7172 (0.2%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	328	LYS	CB-CG	-13.25	1.16	1.52
1	A	318	GLU	CB-CG	9.68	1.70	1.52
1	B	411	MET	SD-CE	-5.37	1.47	1.77
1	A	411	MET	SD-CE	-5.30	1.48	1.77

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	328	LYS	CA-CB-CG	10.91	137.40	113.40
1	B	392	ASP	CB-CG-OD2	6.98	124.59	118.30
1	B	375	ASP	CB-CG-OD2	6.86	124.47	118.30
1	A	225	ASP	CB-CG-OD2	6.76	124.38	118.30
1	B	468	ASP	CB-CG-OD2	6.56	124.20	118.30
1	A	299	ASP	CB-CG-OD2	6.26	123.93	118.30
1	B	299	ASP	CB-CG-OD2	5.51	123.26	118.30
1	A	318	GLU	CA-CB-CG	-5.48	101.35	113.40
1	A	433	ASP	CB-CG-OD2	5.43	123.19	118.30
1	B	214	ASP	CB-CG-OD2	5.40	123.16	118.30
1	A	277	ASP	CB-CG-OD2	5.34	123.11	118.30
1	A	392	ASP	CB-CG-OD2	5.27	123.05	118.30
1	A	214	ASP	CB-CG-OD2	5.25	123.03	118.30
1	A	256	ASP	CB-CG-OD2	5.23	123.01	118.30
1	A	340	ASP	CB-CG-OD2	5.19	122.97	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	475	ASP	CB-CG-OD1	5.02	122.82	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	2625	0	2550	21	0
1	B	2625	0	2550	21	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	40	0	42	1	0
4	B	40	0	42	4	0
5	A	105	0	0	0	0
5	B	104	0	0	3	0
All	All	5543	0	5184	43	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 4.

All (43) 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:252:THR:HG21	5:B:2039:HOH:O	1.90	0.71
1:A:296:MET:SD	1:B:296:MET:SD	2.91	0.69
1:B:410:ILE:HG23	1:B:411:MET:HE2	1.76	0.68
1:B:397:THR:HB	1:B:469:ILE:HG23	1.82	0.62
1:B:416:GLN:NE2	5:B:2077:HOH:O	2.33	0.60
1:A:270:ALA:O	1:A:274:HIS:HB3	2.05	0.56
1:B:411:MET:HE3	4:B:1004[B]:ROL:H122	1.89	0.53
1:B:314:LEU:O	1:B:320:CME:HE3	2.09	0.53
1:B:250:LEU:HG	1:B:387:MET:HE3	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:274:HIS:O	1:B:307:HIS:CD2	2.63	0.52
1:A:317:GLU:HB3	1:A:319:HIS:CE1	2.45	0.51
1:A:421:GLU:HA	1:A:426:MET:CE	2.41	0.50
1:B:270:ALA:O	1:B:274:HIS:HB3	2.11	0.50
1:B:180:ILE:HA	1:B:183:VAL:HG13	1.92	0.50
1:A:308:LEU:HD21	1:A:342:VAL:HB	1.94	0.50
1:A:340:ASP:OD1	1:A:385:ARG:HD3	2.13	0.48
1:A:180:ILE:HA	1:A:183:VAL:HG13	1.94	0.47
1:A:452:HIS:HB3	1:A:453:PRO:HD3	1.95	0.47
1:A:246:THR:HG23	1:A:387:MET:CE	2.45	0.46
1:A:178:LEU:HG	1:A:179:ASN:N	2.30	0.46
1:A:275:ASP:HA	1:A:307:HIS:CD2	2.51	0.46
1:B:300:GLU:O	1:B:301:SER:C	2.54	0.46
1:A:258:VAL:HG11	1:A:374:LEU:HD12	1.99	0.45
4:B:1003[A]:ROL:H101	5:B:2010:HOH:O	2.16	0.45
1:B:411:MET:HE3	4:B:1003[A]:ROL:H122	1.99	0.44
1:A:295:LEU:HD11	1:B:316:GLN:OE1	2.18	0.43
1:A:255:LEU:HD21	1:A:372:LEU:HD12	2.00	0.43
1:A:263:GLU:HG2	1:A:337:MET:SD	2.59	0.43
1:B:255:LEU:HD23	1:B:372:LEU:HD12	2.00	0.43
1:B:411:MET:HG3	1:B:439:VAL:HG13	2.01	0.43
4:B:1004[B]:ROL:H111	4:B:1004[B]:ROL:H61	1.77	0.43
1:B:258:VAL:HG11	1:B:374:LEU:HD12	2.00	0.42
1:A:213:SER:O	1:A:217:ILE:HG12	2.19	0.42
1:A:234:HIS:ND1	1:A:413:GLU:OE2	2.41	0.42
1:A:255:LEU:CD2	1:A:372:LEU:HD12	2.49	0.42
1:B:228:HIS:CD2	1:B:228:HIS:N	2.88	0.42
1:A:421:GLU:HA	1:A:426:MET:HE2	2.01	0.42
1:B:190:ARG:N	1:B:191:PRO:CD	2.83	0.41
1:A:397:THR:HB	1:A:469:ILE:HG23	2.03	0.41
4:A:1003[A]:ROL:H111	4:A:1003[A]:ROL:H61	1.84	0.41
1:B:452:HIS:HB3	1:B:453:PRO:HD3	2.02	0.41
1:B:333:THR:O	1:B:337:MET:HG3	2.21	0.41
1:A:395:ASN:HB2	1:A:396:PRO:HD3	2.04	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	318/398 (80%)	307 (96%)	9 (3%)	2 (1%)	22 26
1	B	318/398 (80%)	307 (96%)	11 (4%)	0	100 100
All	All	636/796 (80%)	614 (96%)	20 (3%)	2 (0%)	37 46

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	317	GLU
1	A	319	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	290/357 (81%)	277 (96%)	13 (4%)	23 34
1	B	290/357 (81%)	280 (97%)	10 (3%)	32 46
All	All	580/714 (81%)	557 (96%)	23 (4%)	27 39

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	163	GLU
1	A	178	LEU
1	A	204	ASP
1	A	213	SER

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Mol	Chain	Res	Type
1	A	313	LYS
1	A	317	GLU
1	A	324	MET
1	A	352	SER
1	A	373	LEU
1	A	450	ILE
1	A	460	ASP
1	A	463	GLN
1	A	477	ARG
1	B	204	ASP
1	B	207	LYS
1	B	213	SER
1	B	336	LYS
1	B	365	LYS
1	B	371	VAL
1	B	422	ARG
1	B	436	THR
1	B	463	GLN
1	B	477	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

6 non-standard protein/DNA/RNA residues 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	$\#\|Z\| > 2$
1	CME	B	194	1	8,9,10	1.69	2 (25%)	6,9,11	1.88	2 (33%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
1	CME	A	320	1	8,9,10	1.59	1 (12%)	6,9,11	2.11	1 (16%)
1	CME	A	194	1	8,9,10	1.53	1 (12%)	6,9,11	2.01	1 (16%)
1	CME	B	432	1	8,9,10	1.63	1 (12%)	6,9,11	2.83	3 (50%)
1	CME	B	320	1	8,9,10	1.74	2 (25%)	6,9,11	2.10	2 (33%)
1	CME	A	432	1	8,9,10	1.69	1 (12%)	6,9,11	1.48	2 (33%)

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
1	CME	B	194	1	-	0/5/8/10	-
1	CME	A	320	1	-	2/5/8/10	-
1	CME	A	194	1	-	2/5/8/10	-
1	CME	B	432	1	-	3/5/8/10	-
1	CME	B	320	1	-	3/5/8/10	-
1	CME	A	432	1	-	3/5/8/10	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	432	CME	OH-CZ	-4.22	1.20	1.42
1	B	432	CME	OH-CZ	-3.97	1.21	1.42
1	A	320	CME	OH-CZ	-3.88	1.22	1.42
1	B	194	CME	OH-CZ	-3.73	1.23	1.42
1	A	194	CME	OH-CZ	-3.71	1.23	1.42
1	B	320	CME	OH-CZ	-3.70	1.23	1.42
1	B	320	CME	CE-SD	-2.11	1.73	1.82
1	B	194	CME	CA-N	-2.07	1.42	1.48

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	432	CME	CB-SG-SD	5.15	117.18	103.86
1	A	320	CME	CB-SG-SD	4.12	114.51	103.86
1	B	320	CME	CB-SG-SD	3.96	114.10	103.86
1	A	194	CME	CB-SG-SD	3.69	113.41	103.86
1	B	432	CME	CB-CA-C	3.27	119.68	110.80
1	B	194	CME	CB-SG-SD	3.26	112.30	103.86

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	432	CME	CZ-CE-SD	-2.49	105.05	113.39
1	B	320	CME	CE-SD-SG	2.45	114.20	103.46
1	B	194	CME	OH-CZ-CE	2.19	119.36	110.82
1	A	432	CME	CZ-CE-SD	-2.07	106.45	113.39
1	A	432	CME	CB-SG-SD	2.03	109.12	103.86

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	194	CME	CE-SD-SG-CB
1	B	320	CME	CE-SD-SG-CB
1	B	432	CME	SD-CE-CZ-OH
1	A	320	CME	CE-SD-SG-CB
1	B	432	CME	CE-SD-SG-CB
1	A	432	CME	SD-CE-CZ-OH
1	B	320	CME	SD-CE-CZ-OH
1	A	320	CME	CA-CB-SG-SD
1	A	432	CME	CE-SD-SG-CB
1	A	194	CME	N-CA-CB-SG
1	A	432	CME	CZ-CE-SD-SG
1	B	432	CME	CA-CB-SG-SD
1	B	320	CME	CA-CB-SG-SD

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	320	CME	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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	$\#\|Z\| > 2$
4	ROL	B	1003[A]	-	22,22,22	1.32	3 (13%)	30,30,30	1.64	4 (13%)
4	ROL	A	1003[A]	-	22,22,22	1.24	2 (9%)	30,30,30	1.94	6 (20%)
4	ROL	B	1004[B]	-	22,22,22	1.21	2 (9%)	30,30,30	1.67	5 (16%)
4	ROL	A	1004[B]	-	22,22,22	1.00	1 (4%)	30,30,30	1.75	5 (16%)

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	ROL	B	1003[A]	-	1/1/3/4	2/10/26/26	0/3/3/3
4	ROL	A	1003[A]	-	1/1/3/4	4/10/26/26	0/3/3/3
4	ROL	B	1004[B]	-	-	2/10/26/26	0/3/3/3
4	ROL	A	1004[B]	-	-	1/10/26/26	0/3/3/3

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1003[A]	ROL	C2-C3	-3.56	1.48	1.54
4	B	1003[A]	ROL	C2-C3	-3.09	1.49	1.54
4	B	1004[B]	ROL	O3-C7	2.80	1.42	1.37
4	B	1004[B]	ROL	C12-C11	-2.53	1.39	1.52
4	A	1004[B]	ROL	C12-C11	-2.49	1.39	1.52
4	B	1003[A]	ROL	C12-C11	-2.48	1.39	1.52
4	A	1003[A]	ROL	C12-C11	-2.48	1.39	1.52
4	B	1003[A]	ROL	O3-C7	2.20	1.41	1.37

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	1003[A]	ROL	O3-C11-C12	-5.26	90.61	108.71
4	A	1003[A]	ROL	C16-O2-C8	5.09	124.97	117.51
4	A	1004[B]	ROL	O3-C11-C12	-4.89	91.88	108.71
4	B	1004[B]	ROL	C16-O2-C8	4.85	124.63	117.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	1003[A]	ROL	O3-C11-C12	-4.78	92.25	108.71
4	B	1004[B]	ROL	O3-C11-C12	-4.52	93.15	108.71
4	A	1004[B]	ROL	C16-O2-C8	4.06	123.47	117.51
4	B	1003[A]	ROL	C16-O2-C8	3.81	123.11	117.51
4	A	1003[A]	ROL	O1-C1-C2	-3.71	121.75	126.48
4	A	1003[A]	ROL	C3-C4-N1	-3.59	100.10	103.09
4	B	1003[A]	ROL	O1-C1-C2	-3.52	121.99	126.48
4	A	1004[B]	ROL	O2-C8-C7	3.44	120.07	115.40
4	A	1004[B]	ROL	O1-C1-C2	-2.96	122.70	126.48
4	A	1003[A]	ROL	O2-C8-C7	2.83	119.25	115.40
4	A	1004[B]	ROL	O2-C8-C9	-2.47	120.14	124.30
4	B	1003[A]	ROL	O2-C8-C7	2.16	118.33	115.40
4	A	1003[A]	ROL	C3-C2-C1	-2.07	102.25	104.96
4	B	1004[B]	ROL	C7-O3-C11	-2.07	113.50	120.14
4	B	1004[B]	ROL	O1-C1-C2	-2.06	123.86	126.48
4	B	1004[B]	ROL	C12-C11-C15	2.01	110.63	104.44

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	A	1003[A]	ROL	C3
4	B	1003[A]	ROL	C3

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1003[A]	ROL	C15-C11-O3-C7
4	A	1003[A]	ROL	C12-C11-O3-C7
4	B	1004[B]	ROL	C12-C11-O3-C7
4	B	1004[B]	ROL	C15-C11-O3-C7
4	B	1003[A]	ROL	C7-C8-O2-C16
4	B	1003[A]	ROL	C9-C8-O2-C16
4	A	1003[A]	ROL	C2-C3-C5-C10
4	A	1004[B]	ROL	C15-C11-O3-C7
4	A	1003[A]	ROL	C2-C3-C5-C6

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	1003[A]	ROL	2	0

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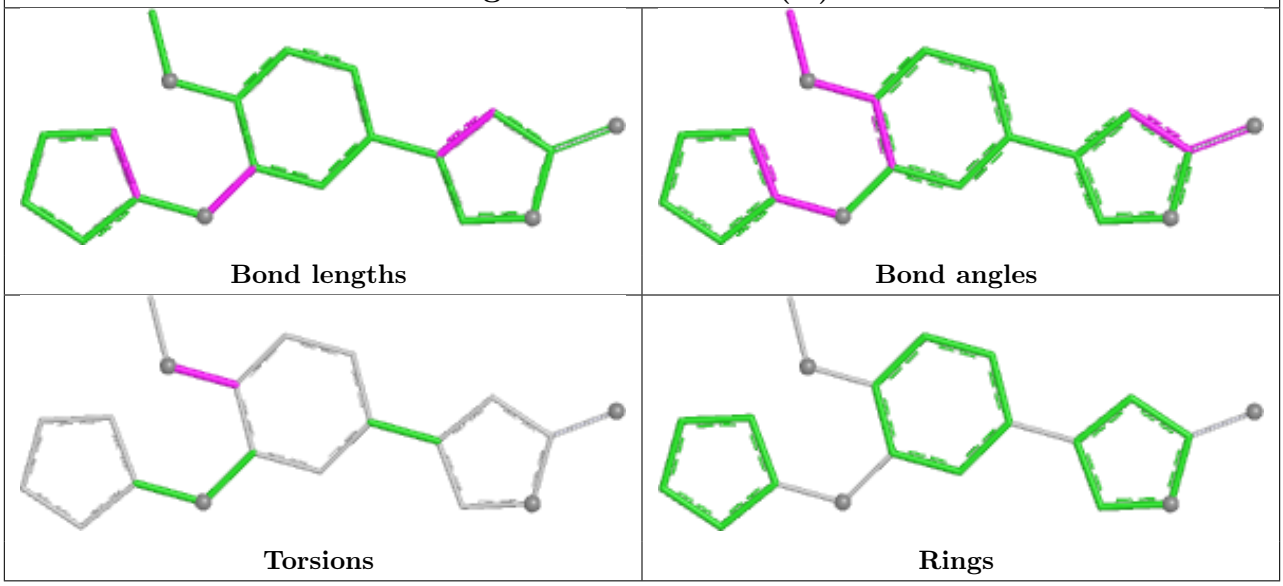
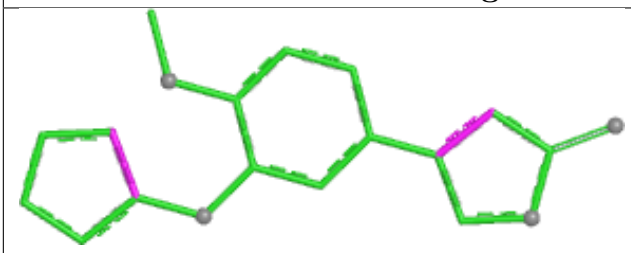
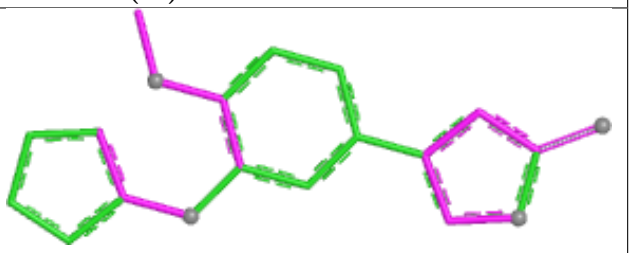
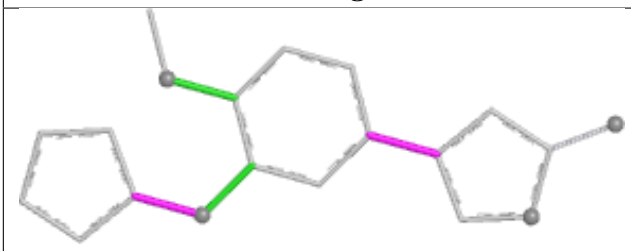
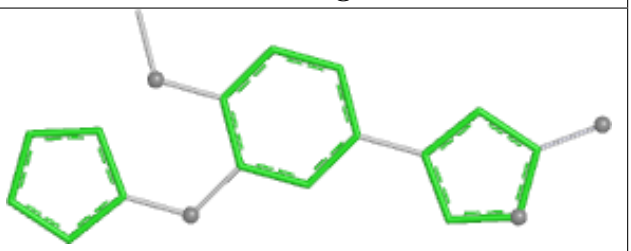
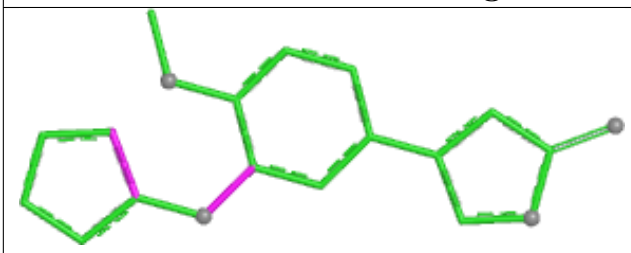
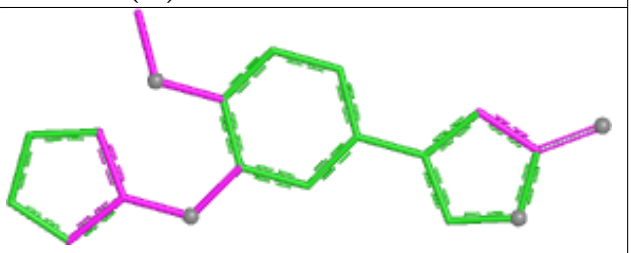
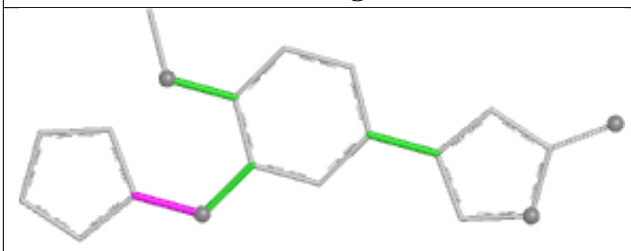
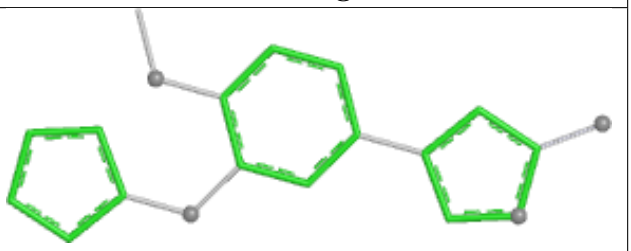
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1003[A]	ROL	1	0
4	B	1004[B]	ROL	2	0

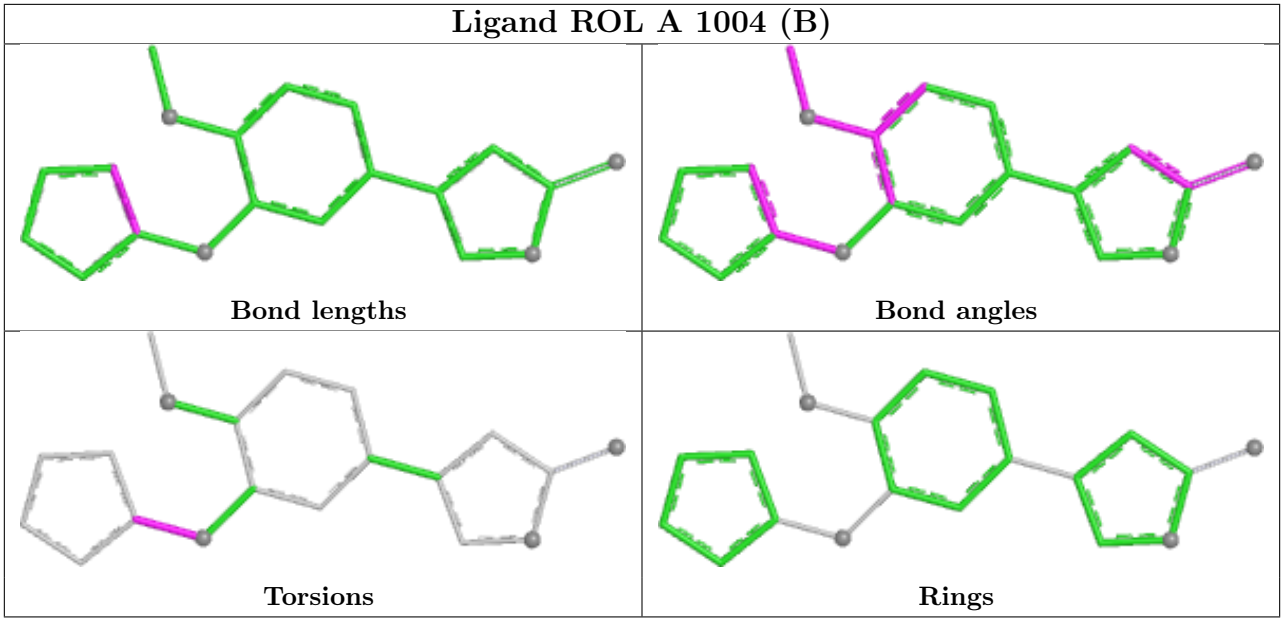
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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 ROL B 1003 (A)



Ligand ROL A 1003 (A)	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand ROL B 1004 (B)	
 Bond lengths	 Bond angles
 Torsions	 Rings



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 (i)

6.1 Protein, DNA and RNA chains (i)

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	320/398 (80%)	-0.02	3 (0%)	81	82	11, 19, 34, 57	2 (0%)
1	B	320/398 (80%)	-0.21	4 (1%)	74	75	12, 19, 34, 50	1 (0%)
All	All	640/796 (80%)	-0.11	7 (1%)	77	78	11, 19, 34, 57	3 (0%)

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	368	SER	2.4
1	A	319	HIS	2.3
1	A	318	GLU	2.2
1	B	430	PRO	2.1
1	B	485	PRO	2.1
1	B	319	HIS	2.0
1	B	316	GLN	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	CME	B	320	10/11	0.89	0.14	27,28,38,39	0
1	CME	A	432	10/11	0.91	0.12	24,25,36,38	0
1	CME	B	432	10/11	0.92	0.12	19,22,42,43	0
1	CME	A	320	10/11	0.93	0.10	33,35,41,41	0
1	CME	A	194	10/11	0.95	0.08	14,15,26,29	0
1	CME	B	194	10/11	0.97	0.06	15,16,25,29	0

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

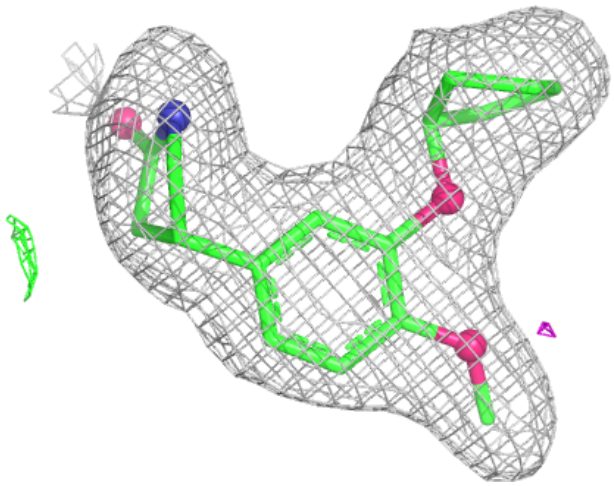
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

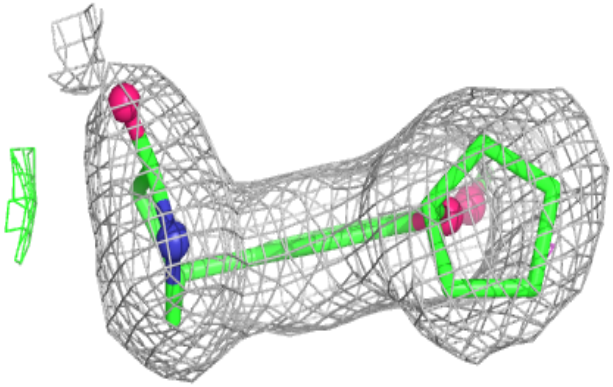
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	ROL	A	1003[A]	20/20	0.93	0.08	30,34,35,35	20
4	ROL	A	1004[B]	20/20	0.94	0.08	26,29,33,33	20
4	ROL	B	1004[B]	20/20	0.94	0.07	25,26,29,29	20
4	ROL	B	1003[A]	20/20	0.95	0.08	34,35,37,37	20
2	ZN	B	1001	1/1	0.99	0.02	28,28,28,28	0
3	MG	A	1002	1/1	0.99	0.02	12,12,12,12	0
2	ZN	A	1001	1/1	1.00	0.02	26,26,26,26	0
3	MG	B	1002	1/1	1.00	0.02	17,17,17,17	0

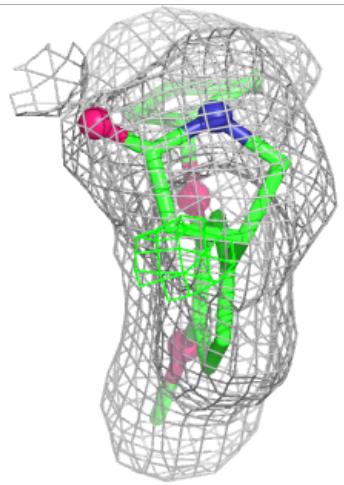
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around ROL A 1003 (A):

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

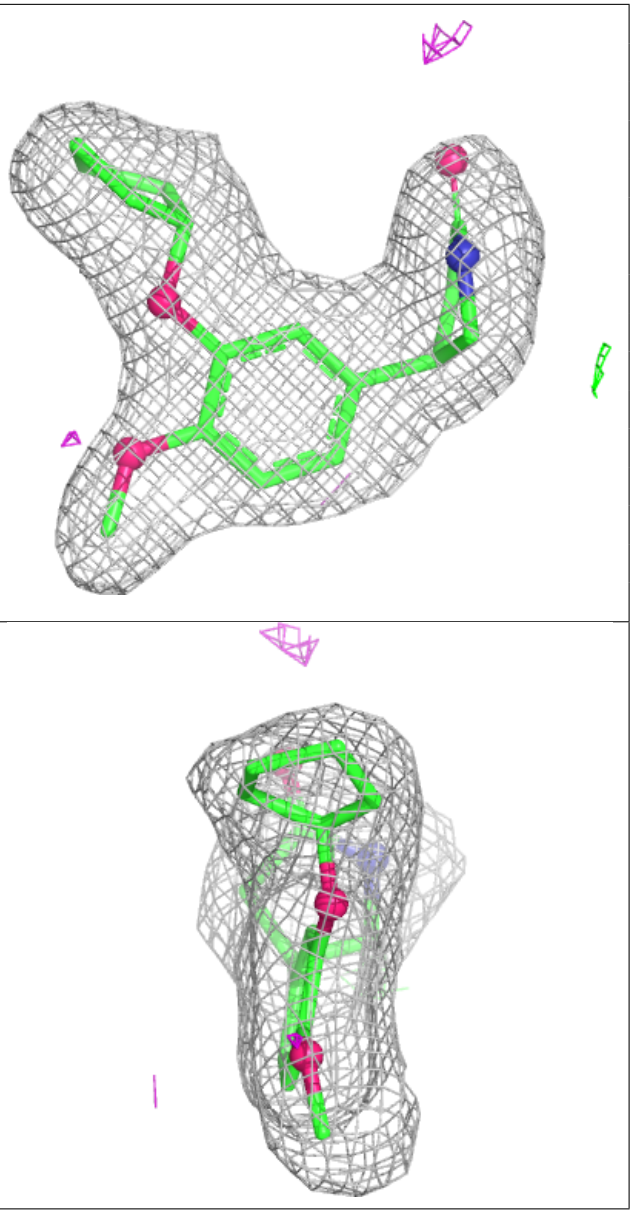






Electron density around ROL A 1004 (B):

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



Electron density around ROL B 1004 (B):

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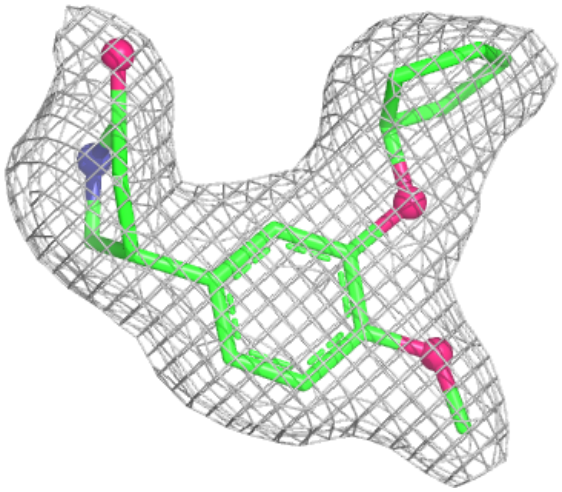
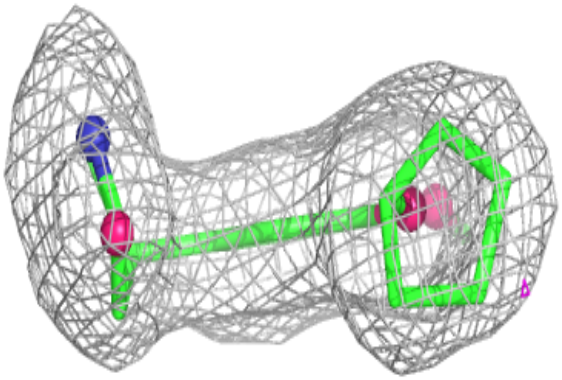
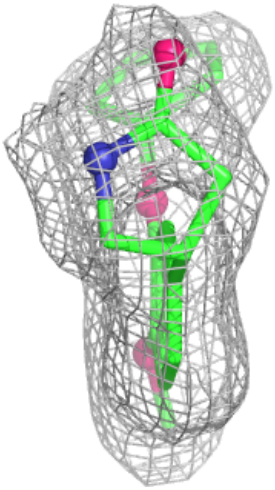
and green (positive)

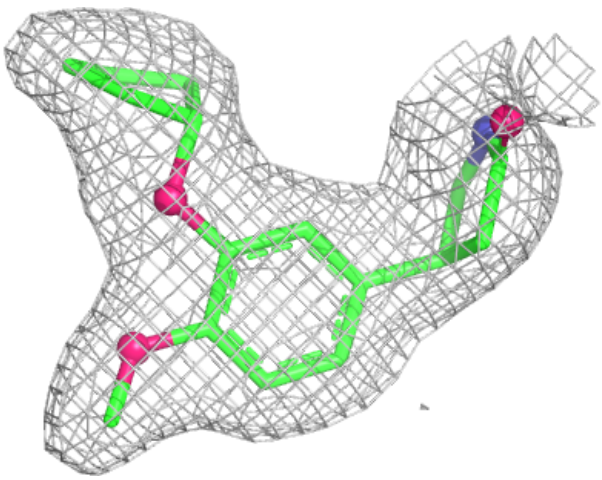


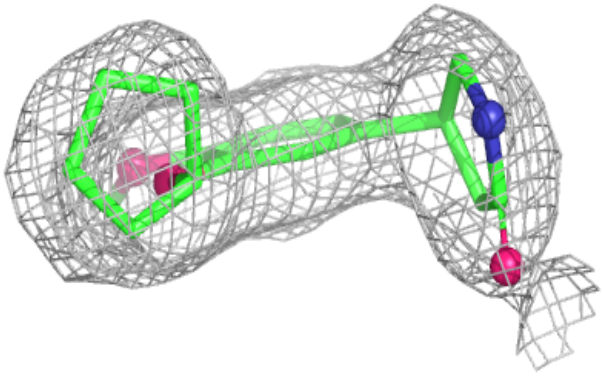


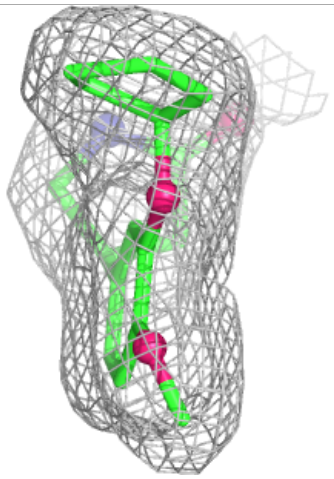


Electron density around ROL B 1003 (A):

$2mF_o$-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.