



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 20, 2023 – 03:51 PM JST

PDB ID : 7CSE  
Title : AtPrR1 with NADP<sup>+</sup> and (-)lariciresinol  
Authors : Shao, K.; Zhang, P.  
Deposited on : 2020-08-14  
Resolution : 2.44 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

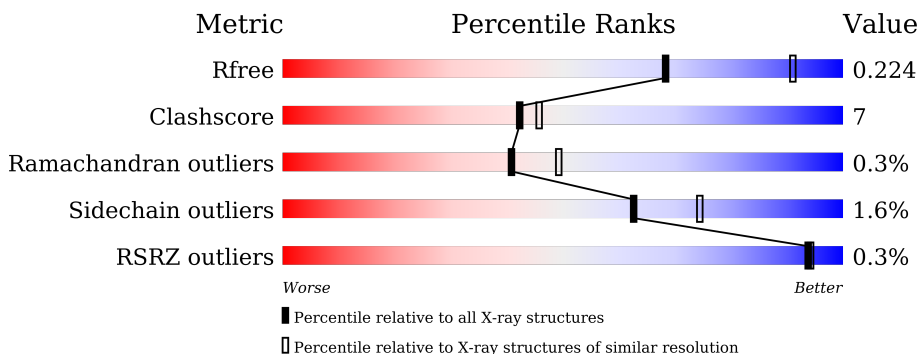
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.44 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))
$R_{free}$	130704	1564 (2.46-2.42)
Clashscore	141614	1631 (2.46-2.42)
Ramachandran outliers	138981	1617 (2.46-2.42)
Sidechain outliers	138945	1617 (2.46-2.42)
RSRZ outliers	127900	1547 (2.46-2.42)

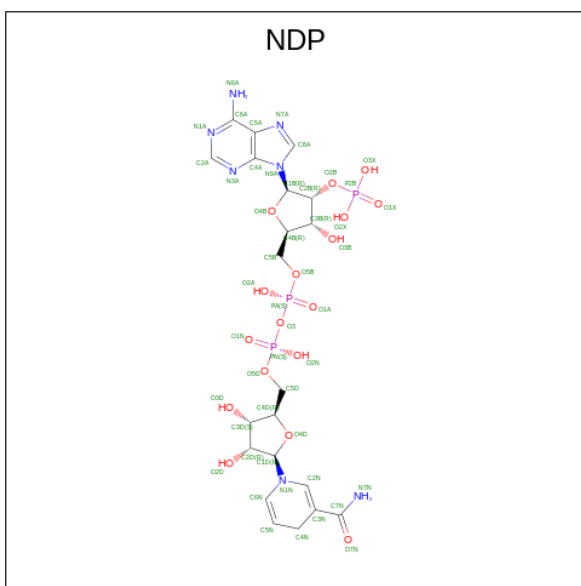
The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria 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	317	 85% 11% . .
1	B	317	 87% 9% . .
1	C	317	 79% 18% . .
1	D	317	 80% 16% . .
1	E	317	 83% 15% .
1	F	317	 90% 7% .



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	E	1	Total	C	O	0	0
			26	20	6		
2	F	1	Total	C	O	0	0
			26	20	6		
2	A	1	Total	C	O	0	0
			26	20	6		
2	B	1	Total	C	O	0	0
			26	20	6		
2	C	1	Total	C	O	0	0
			26	20	6		
2	D	1	Total	C	O	0	0
			26	20	6		

- Molecule 3 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula:  $C_{21}H_{30}N_7O_{17}P_3$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
3	E	1	Total	C	H	N	O	P	0	0
			74	21	26	7	17	3		
3	F	1	Total	C	H	N	O	P	0	0
			74	21	26	7	17	3		
3	A	1	Total	C	H	N	O	P	0	0
			74	21	26	7	17	3		
3	B	1	Total	C	H	N	O	P	0	0
			74	21	26	7	17	3		
3	C	1	Total	C	H	N	O	P	0	0
			74	21	26	7	17	3		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O	P		
3	D	1	74	21	26	7	17	3	0	0

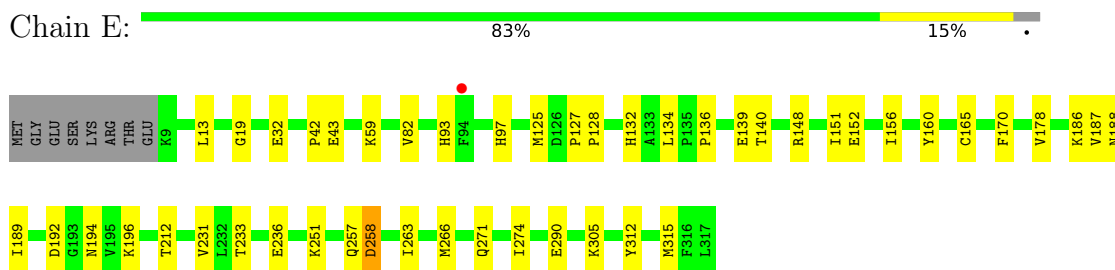
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	E	71	71	71	0	0
4	F	72	72	72	0	0
4	A	108	108	108	0	0
4	B	100	100	100	0	0
4	C	49	49	49	0	0
4	D	59	59	59	0	0

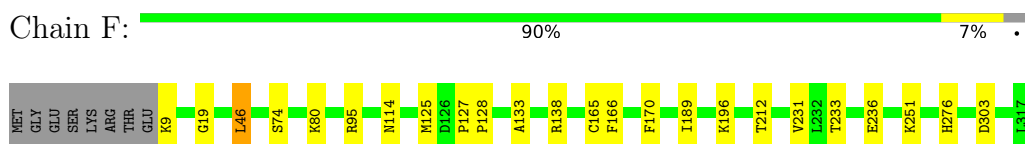
### 3 Residue-property plots

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.

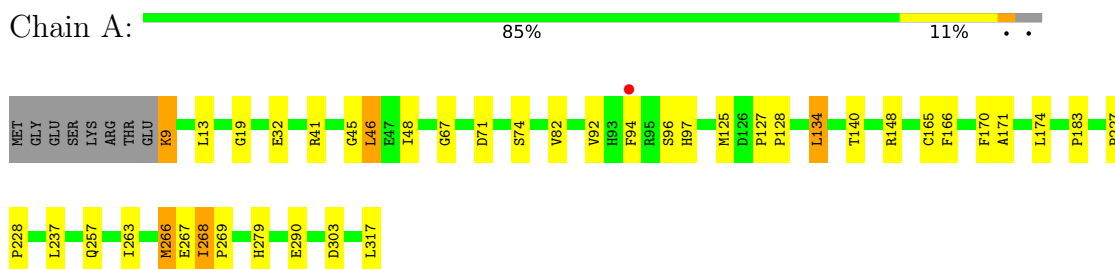
- Molecule 1: Pinoresinol reductase 1



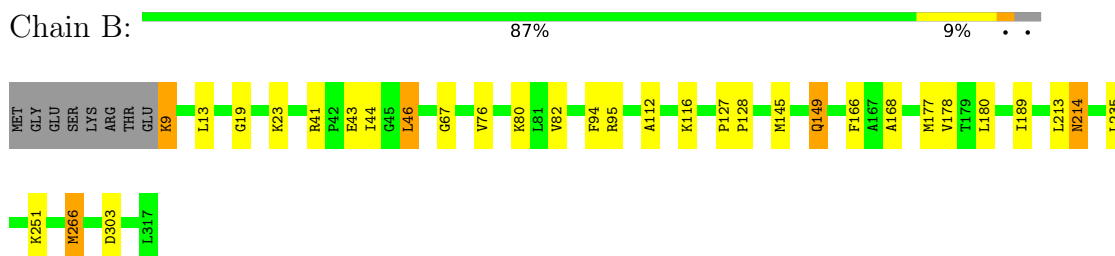
- Molecule 1: Pinoresinol reductase 1




- Molecule 1: Pinoresinol reductase 1

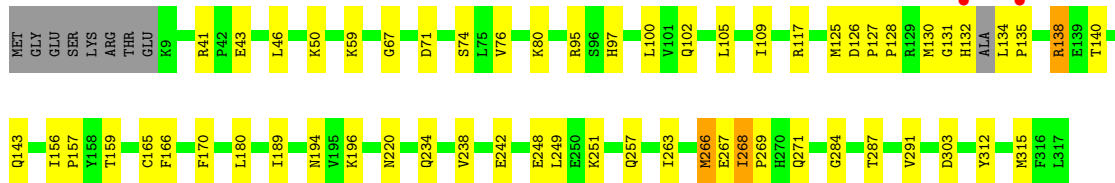


- Molecule 1: Pinoresinol reductase 1




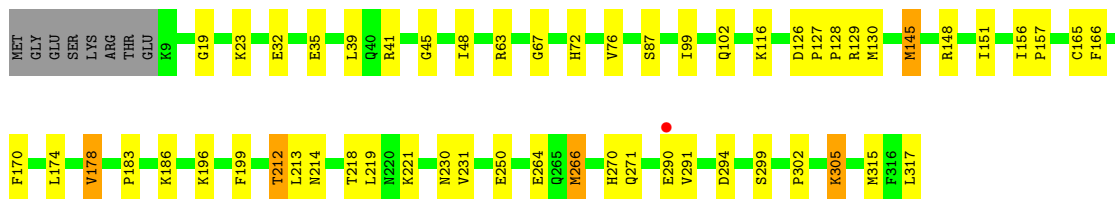
- Molecule 1: Pinoresinol reductase 1

Chain C:  79% 18% ..



- Molecule 1: Pinoreosinol reductase 1

Chain D:  80% 16% ..



## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	211.58Å 129.49Å 106.32Å 90.00° 90.76° 90.00°	Depositor
Resolution (Å)	47.75 – 2.44 49.14 – 2.44	Depositor EDS
% Data completeness (in resolution range)	99.6 (47.75-2.44) 93.2 (49.14-2.44)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.91 (at 2.45Å)	Xtrriage
Refinement program	PHENIX 1.10_2155	Depositor
R, $R_{free}$	0.182 , 0.222 0.183 , 0.224	Depositor DCC
$R_{free}$ test set	1979 reflections (1.86%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	40.3	Xtrriage
Anisotropy	0.181	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 37.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.004 for -1/2*h+3/2*k,1/2*h+1/2*k,-l 0.002 for -1/2*h-3/2*k,-1/2*h+1/2*k,-l 0.033 for 1/2*h+3/2*k,1/2*h-1/2*k,-l 0.027 for 1/2*h-3/2*k,-1/2*h-1/2*k,-l 0.016 for -h,-k,l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	15658	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.10% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: GFR, NDP

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	0.44	0/2484	0.58	0/3361
1	B	0.45	0/2484	0.58	0/3361
1	C	0.39	0/2478	0.55	0/3351
1	D	0.41	0/2484	0.55	0/3361
1	E	0.44	0/2484	0.57	0/3361
1	F	0.44	0/2484	0.58	0/3361
All	All	0.43	0/14898	0.57	0/20156

There are no bond length outliers.

There are no bond angle outliers.

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	2434	0	2449	35	0
1	B	2434	0	2449	34	0
1	C	2429	0	2443	46	0
1	D	2434	0	2449	47	0
1	E	2434	0	2449	34	0
1	F	2434	0	2449	18	0
2	A	26	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	26	0	0	1	0
2	C	26	0	0	0	0
2	D	26	0	0	0	0
2	E	26	0	0	0	0
2	F	26	0	0	0	0
3	A	48	26	24	4	0
3	B	48	26	25	4	0
3	C	48	26	24	3	0
3	D	48	26	24	2	0
3	E	48	26	24	1	0
3	F	48	26	24	3	0
4	A	108	0	0	4	0
4	B	100	0	0	4	0
4	C	49	0	0	1	0
4	D	59	0	0	1	0
4	E	71	0	0	1	0
4	F	72	0	0	4	0
All	All	15502	156	14833	205	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 7.

All (205) 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:C:268:ILE:HG22	1:C:269:PRO:HD3	1.39	1.03
1:D:305:LYS:HD3	1:D:305:LYS:H	1.27	0.99
1:F:133:ALA:O	4:F:501:HOH:O	1.86	0.94
1:C:263:ILE:HA	1:C:266:MET:HE2	1.52	0.92
1:C:268:ILE:HG22	1:C:269:PRO:CD	2.02	0.89
1:D:145:MET:HE3	1:D:148:ARG:HD2	1.56	0.86
1:D:290:GLU:OE2	1:D:291:VAL:N	2.07	0.86
1:D:266:MET:O	1:D:271:GLN:NE2	2.09	0.86
1:C:263:ILE:HA	1:C:266:MET:CE	2.06	0.85
1:A:267:GLU:O	1:A:268:ILE:HB	1.75	0.84
1:A:263:ILE:O	1:A:266:MET:HG3	1.77	0.83
1:C:194:ASN:ND2	4:C:501:HOH:O	2.10	0.83
1:C:59:LYS:HE3	1:D:315:MET:HB2	1.60	0.83
1:D:305:LYS:H	1:D:305:LYS:CD	1.94	0.81
1:A:9:LYS:N	4:A:501:HOH:O	2.15	0.79
1:D:145:MET:CE	1:D:148:ARG:HD2	2.14	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:233:THR:OG1	1:E:236:GLU:HG3	1.85	0.76
1:E:266:MET:HE1	1:E:274:ILE:HD12	1.68	0.75
1:D:145:MET:CE	1:D:145:MET:HA	2.18	0.73
1:B:189:ILE:HD13	1:B:251:LYS:HB3	1.70	0.73
1:B:80:LYS:HG2	1:B:112:ALA:HB1	1.70	0.71
1:B:19:GLY:O	1:B:23:LYS:HG2	1.92	0.70
1:C:50:LYS:NZ	3:C:402:NDP:O3X	2.24	0.70
1:D:116:LYS:O	1:D:157:PRO:HG2	1.92	0.69
1:C:242:GLU:HG2	1:C:248:GLU:HA	1.75	0.69
1:B:44:ILE:HD12	1:B:44:ILE:O	1.92	0.68
1:B:177:MET:O	1:B:178:VAL:HG22	1.95	0.67
1:F:189:ILE:HD13	1:F:251:LYS:HB3	1.76	0.66
1:C:267:GLU:O	1:C:269:PRO:HD2	1.96	0.66
1:C:189:ILE:HD13	1:C:251:LYS:HB3	1.76	0.65
1:E:59:LYS:HE2	4:B:590:HOH:O	1.95	0.65
1:C:312:TYR:O	1:C:315:MET:HG2	1.97	0.64
1:D:145:MET:HE3	1:D:145:MET:HA	1.80	0.64
1:B:9:LYS:N	4:B:504:HOH:O	2.30	0.63
1:B:145:MET:O	1:B:149:GLN:HG2	1.99	0.63
1:E:257:GLN:HG2	1:E:258:ASP:OD2	1.97	0.63
1:D:264:GLU:CD	1:D:264:GLU:H	2.01	0.62
1:E:266:MET:CE	1:E:274:ILE:HD12	2.28	0.62
1:A:46:LEU:HD23	1:A:46:LEU:O	2.00	0.62
1:A:48:ILE:HD12	1:B:180:LEU:HD13	1.81	0.62
1:D:174:LEU:HD12	1:D:183:PRO:HD2	1.82	0.62
1:E:148:ARG:O	1:E:152:GLU:HG3	2.00	0.62
1:D:151:ILE:HG23	1:D:156:ILE:HB	1.80	0.62
1:A:46:LEU:HD22	1:B:94:PHE:CE1	2.35	0.61
1:A:94:PHE:CE1	1:B:46:LEU:HD21	2.35	0.61
1:B:19:GLY:HA3	3:B:402:NDP:H52A	1.83	0.60
1:F:95:ARG:NH2	3:F:402:NDP:O1A	2.35	0.60
1:C:46:LEU:HD13	1:D:178:VAL:HA	1.82	0.60
1:E:42:PRO:HD2	1:E:43:GLU:OE1	2.00	0.60
1:F:19:GLY:HA3	3:F:402:NDP:H52A	1.83	0.60
1:A:257:GLN:NE2	4:A:505:HOH:O	2.34	0.60
1:D:290:GLU:CD	1:D:291:VAL:H	2.04	0.59
1:A:19:GLY:HA3	3:A:402:NDP:H52A	1.84	0.59
1:A:134:LEU:O	1:A:134:LEU:HD12	2.03	0.59
1:C:267:GLU:C	1:C:269:PRO:HD2	2.24	0.58
1:D:305:LYS:HD3	1:D:305:LYS:N	2.10	0.57
1:E:312:TYR:O	1:E:315:MET:HG2	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:72:HIS:O	1:D:76:VAL:HG23	2.05	0.57
1:A:267:GLU:O	1:A:268:ILE:CB	2.51	0.56
1:E:125:MET:O	1:E:127:PRO:HD3	2.06	0.56
1:E:165:CYS:HB3	1:E:170:PHE:CD2	2.41	0.55
1:D:178:VAL:HG12	1:D:178:VAL:O	2.06	0.55
1:C:263:ILE:HA	1:C:266:MET:HE1	1.88	0.54
1:B:127:PRO:N	1:B:128:PRO:HD2	2.22	0.54
1:C:267:GLU:O	1:C:268:ILE:HB	2.06	0.54
1:F:233:THR:OG1	1:F:236:GLU:HG3	2.07	0.54
1:E:136:PRO:O	1:E:139:GLU:HG3	2.08	0.54
1:C:46:LEU:CD1	1:D:178:VAL:HA	2.38	0.54
1:B:13:LEU:HB2	1:B:82:VAL:HG11	1.90	0.54
1:E:266:MET:O	1:E:271:GLN:NE2	2.41	0.53
1:C:131:GLY:O	1:C:138:ARG:NH1	2.41	0.53
1:F:166:PHE:H	3:F:402:NDP:H72N	1.56	0.53
1:D:39:LEU:HD11	1:D:67:GLY:HA3	1.91	0.53
1:D:186:LYS:HD3	1:D:250:GLU:OE2	2.08	0.53
1:D:41:ARG:HA	1:D:67:GLY:O	2.09	0.53
1:D:219:LEU:O	1:D:221:LYS:HG2	2.09	0.53
1:C:268:ILE:HA	1:C:271:GLN:HG3	1.91	0.52
1:D:212:THR:OG1	1:D:218:THR:HG21	2.09	0.52
1:E:127:PRO:N	1:E:128:PRO:HD2	2.25	0.52
1:B:76:VAL:O	1:B:80:LYS:HG3	2.09	0.52
1:D:145:MET:HA	1:D:145:MET:HE2	1.92	0.52
1:A:92:VAL:HG13	4:A:574:HOH:O	2.10	0.51
1:F:74:SER:O	4:F:502:HOH:O	2.18	0.51
1:D:270:HIS:HD2	4:D:551:HOH:O	1.92	0.51
1:D:19:GLY:HA3	3:D:402:NDP:H52A	1.92	0.51
1:B:43:GLU:OE1	1:B:43:GLU:N	2.42	0.51
1:C:284:GLY:O	1:C:287:THR:HG22	2.11	0.51
1:E:186:LYS:HZ1	1:E:188:ASN:CG	2.09	0.51
1:D:127:PRO:N	1:D:128:PRO:HD2	2.25	0.51
1:E:196:LYS:HD2	1:E:231:VAL:HG12	1.94	0.50
1:C:268:ILE:CG2	1:C:269:PRO:CD	2.85	0.50
1:C:126:ASP:O	1:C:130:MET:HG2	2.12	0.50
1:F:125:MET:O	1:F:127:PRO:HD3	2.12	0.50
1:B:166:PHE:H	3:B:402:NDP:H72N	1.58	0.49
1:B:41:ARG:HA	1:B:67:GLY:O	2.12	0.49
1:F:127:PRO:N	1:F:128:PRO:HD2	2.27	0.49
1:C:102:GLN:O	1:C:105:LEU:N	2.45	0.49
1:C:180:LEU:HD13	1:D:48:ILE:HD13	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:126:ASP:OD1	1:C:128:PRO:HD2	2.12	0.48
1:D:299:SER:O	1:D:302:PRO:HD3	2.13	0.48
1:A:46:LEU:HD21	1:B:94:PHE:CZ	2.48	0.48
1:C:76:VAL:HG12	1:C:80:LYS:HD2	1.95	0.48
1:B:213:LEU:C	1:B:213:LEU:HD12	2.33	0.48
1:D:35:GLU:OE2	1:D:63:ARG:NH1	2.46	0.48
1:A:127:PRO:HD2	1:A:148:ARG:NH2	2.29	0.48
1:A:13:LEU:HB2	1:A:82:VAL:HG11	1.96	0.48
1:E:93:HIS:HD2	4:E:560:HOH:O	1.95	0.48
1:F:138:ARG:HD2	4:F:501:HOH:O	2.13	0.48
1:C:100:LEU:HD11	1:C:143:GLN:HG2	1.94	0.48
1:C:234:GLN:O	1:C:238:VAL:HG23	2.14	0.48
1:C:117:ARG:HD3	1:C:159:THR:OG1	2.13	0.47
1:C:166:PHE:H	3:C:402:NDP:H72N	1.61	0.47
1:B:46:LEU:HD23	1:B:46:LEU:O	2.14	0.47
1:E:189:ILE:HD13	1:E:251:LYS:HB3	1.96	0.47
1:D:19:GLY:O	1:D:23:LYS:HG2	2.14	0.47
1:C:132:HIS:O	1:C:134:LEU:N	2.47	0.47
1:B:177:MET:O	1:B:178:VAL:CG2	2.61	0.47
1:A:46:LEU:CD2	1:B:94:PHE:CZ	2.98	0.46
1:C:125:MET:O	1:C:127:PRO:HD3	2.14	0.46
1:E:178:VAL:O	1:F:46:LEU:HD23	2.16	0.46
1:D:166:PHE:H	3:D:402:NDP:H72N	1.61	0.46
1:A:174:LEU:HD12	1:A:183:PRO:HD2	1.98	0.46
1:A:268:ILE:HB	1:A:269:PRO:HD3	1.97	0.46
1:E:151:ILE:HG23	1:E:156:ILE:HB	1.98	0.46
1:A:166:PHE:CD2	3:A:402:NDP:H41N	2.50	0.46
1:C:267:GLU:O	1:C:268:ILE:CB	2.64	0.46
1:E:97:HIS:CE1	1:E:140:THR:HA	2.51	0.46
2:A:401:GFR:CAJ	3:A:402:NDP:H42N	2.46	0.46
1:C:303:ASP:OD1	1:C:303:ASP:N	2.48	0.45
1:E:290:GLU:HA	1:E:290:GLU:OE1	2.16	0.45
1:F:138:ARG:NH1	4:F:501:HOH:O	2.13	0.45
1:A:71:ASP:HB3	1:A:74:SER:OG	2.16	0.45
1:B:41:ARG:O	1:B:44:ILE:HG13	2.16	0.45
1:A:166:PHE:H	3:A:402:NDP:H72N	1.63	0.45
1:F:80:LYS:HA	1:F:114:ASN:HD21	1.82	0.45
1:A:290:GLU:HG2	4:A:602:HOH:O	2.16	0.45
1:E:186:LYS:NZ	1:E:188:ASN:OD1	2.19	0.45
1:A:165:CYS:HB3	1:A:170:PHE:CD1	2.52	0.45
1:C:97:HIS:CE1	1:C:140:THR:HA	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:199:PHE:O	1:D:230:ASN:HB3	2.16	0.45
1:B:178:VAL:HG23	4:B:505:HOH:O	2.16	0.45
1:B:235:LEU:HD12	1:B:235:LEU:HA	1.78	0.45
1:F:9:LYS:HB2	1:F:9:LYS:HE3	1.77	0.45
1:A:41:ARG:HA	1:A:67:GLY:O	2.17	0.44
1:C:165:CYS:HB3	1:C:170:PHE:CD2	2.53	0.44
1:D:196:LYS:HD2	1:D:231:VAL:HG12	2.00	0.44
1:E:132:HIS:O	1:E:132:HIS:CG	2.70	0.44
1:E:148:ARG:HD3	1:E:160:TYR:CE1	2.53	0.43
1:E:258:ASP:OD2	1:E:258:ASP:N	2.51	0.43
1:C:135:PRO:HD3	1:C:138:ARG:HH21	1.83	0.43
1:D:213:LEU:HD12	1:D:214:ASN:N	2.33	0.43
1:E:192:ASP:HB3	1:E:194:ASN:OD1	2.19	0.43
1:B:303:ASP:OD1	1:B:303:ASP:N	2.51	0.43
1:A:303:ASP:OD2	1:A:303:ASP:N	2.44	0.43
1:B:266:MET:HE2	1:B:266:MET:HB3	1.99	0.43
1:B:189:ILE:CD1	1:B:251:LYS:HB3	2.44	0.43
1:C:41:ARG:HA	1:C:67:GLY:O	2.17	0.43
1:F:125:MET:HE1	1:F:276:HIS:HB3	2.01	0.43
1:A:48:ILE:HD11	1:B:168:ALA:HB1	2.00	0.43
1:E:32:GLU:O	1:E:32:GLU:HG3	2.18	0.43
1:A:97:HIS:CE1	1:A:140:THR:HA	2.54	0.43
1:C:71:ASP:HB3	1:C:74:SER:OG	2.19	0.43
1:A:317:LEU:HD23	1:A:317:LEU:HA	1.72	0.42
1:C:43:GLU:OE1	1:C:43:GLU:N	2.46	0.42
1:B:95:ARG:NH2	3:B:402:NDP:O2A	2.52	0.42
1:C:95:ARG:NH2	3:C:402:NDP:O2A	2.52	0.42
1:F:196:LYS:HD3	1:F:231:VAL:HG12	2.02	0.42
1:B:116:LYS:HD3	1:B:116:LYS:HA	1.70	0.42
1:A:127:PRO:N	1:A:128:PRO:HD2	2.35	0.42
1:E:19:GLY:HA3	3:E:402:NDP:H52A	2.01	0.42
1:F:165:CYS:HB3	1:F:170:PHE:CD1	2.54	0.42
1:C:109:ILE:CG2	1:C:156:ILE:HD13	2.50	0.42
1:C:249:LEU:O	1:C:251:LYS:HG3	2.19	0.42
1:A:125:MET:HE1	1:A:279:HIS:CB	2.49	0.42
1:A:227:PRO:HA	1:A:228:PRO:HD3	1.90	0.42
1:C:157:PRO:HA	1:C:220:ASN:OD1	2.20	0.41
1:C:268:ILE:HA	1:C:271:GLN:CG	2.49	0.41
1:D:165:CYS:HB3	1:D:170:PHE:CD1	2.55	0.41
1:D:212:THR:HG1	1:D:218:THR:HG21	1.85	0.41
1:B:127:PRO:N	1:B:128:PRO:CD	2.83	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:213:LEU:HD12	1:D:213:LEU:C	2.41	0.41
1:E:305:LYS:HE2	1:E:305:LYS:HB3	1.91	0.41
1:D:126:ASP:O	1:D:130:MET:HG2	2.21	0.41
1:E:186:LYS:HE2	1:E:187:VAL:C	2.41	0.41
1:B:178:VAL:CG2	4:B:505:HOH:O	2.69	0.41
1:D:128:PRO:HG3	1:D:148:ARG:HH12	1.85	0.41
1:F:303:ASP:OD1	1:F:303:ASP:N	2.52	0.41
1:C:196:LYS:O	1:C:287:THR:HB	2.20	0.41
1:D:32:GLU:O	1:D:32:GLU:HG3	2.20	0.41
1:E:43:GLU:OE1	1:E:43:GLU:N	2.49	0.41
1:A:32:GLU:O	1:A:32:GLU:HG3	2.21	0.41
1:D:99:ILE:HG23	1:D:102:GLN:NE2	2.36	0.41
1:A:263:ILE:O	1:A:266:MET:CG	2.60	0.41
2:B:401:GFR:CAL	3:B:402:NDP:H42N	2.51	0.41
1:D:126:ASP:HB3	1:D:129:ARG:HG3	2.02	0.41
1:D:129:ARG:HB2	1:D:130:MET:HE2	2.03	0.41
1:D:317:LEU:HA	1:D:317:LEU:HD23	1.83	0.41
1:E:263:ILE:HG13	1:E:266:MET:CE	2.51	0.41
1:A:171:ALA:HA	1:A:237:LEU:HD21	2.03	0.41
1:B:213:LEU:HD12	1:B:214:ASN:N	2.36	0.41
1:E:13:LEU:HB2	1:E:82:VAL:HG11	2.03	0.40
1:E:186:LYS:HD3	1:E:186:LYS:C	2.42	0.40
1:A:9:LYS:HZ3	1:A:9:LYS:HG3	1.66	0.40
1:C:266:MET:HE2	1:C:266:MET:HB2	1.86	0.40
1:D:266:MET:HE2	1:D:266:MET:HB2	1.56	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	307/317 (97%)	294 (96%)	11 (4%)	2 (1%)	22 26

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	307/317 (97%)	295 (96%)	12 (4%)	0	100	100
1	C	304/317 (96%)	292 (96%)	11 (4%)	1 (0%)	41	49
1	D	307/317 (97%)	299 (97%)	6 (2%)	2 (1%)	22	26
1	E	307/317 (97%)	296 (96%)	11 (4%)	0	100	100
1	F	307/317 (97%)	294 (96%)	13 (4%)	0	100	100
All	All	1839/1902 (97%)	1770 (96%)	64 (4%)	5 (0%)	41	49

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	268	ILE
1	C	268	ILE
1	A	45	GLY
1	D	45	GLY
1	D	178	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	262/270 (97%)	257 (98%)	5 (2%)	57	69
1	B	262/270 (97%)	257 (98%)	5 (2%)	57	69
1	C	262/270 (97%)	258 (98%)	4 (2%)	65	76
1	D	262/270 (97%)	256 (98%)	6 (2%)	50	63
1	E	262/270 (97%)	259 (99%)	3 (1%)	73	83
1	F	262/270 (97%)	260 (99%)	2 (1%)	81	88
All	All	1572/1620 (97%)	1547 (98%)	25 (2%)	62	74

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	134	LEU

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Mol	Chain	Res	Type
1	E	212	THR
1	E	258	ASP
1	F	46	LEU
1	F	212	THR
1	A	9	LYS
1	A	46	LEU
1	A	96	SER
1	A	134	LEU
1	A	266	MET
1	B	9	LYS
1	B	46	LEU
1	B	149	GLN
1	B	214	ASN
1	B	266	MET
1	C	138	ARG
1	C	257	GLN
1	C	266	MET
1	C	291	VAL
1	D	87	SER
1	D	145	MET
1	D	212	THR
1	D	266	MET
1	D	294	ASP
1	D	305	LYS

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](#)

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

### 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry

12 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NDP	F	402	-	45,52,52	3.91	16 (35%)	53,80,80	2.14	6 (11%)
3	NDP	A	402	-	45,52,52	3.89	17 (37%)	53,80,80	2.05	4 (7%)
2	GFR	E	401	-	28,28,28	2.58	5 (17%)	37,39,39	6.18	18 (48%)
3	NDP	C	402	-	45,52,52	3.93	18 (40%)	53,80,80	1.95	6 (11%)
2	GFR	C	401	-	28,28,28	2.56	5 (17%)	37,39,39	6.19	17 (45%)
3	NDP	D	402	-	45,52,52	3.91	19 (42%)	53,80,80	2.01	6 (11%)
2	GFR	F	401	-	28,28,28	2.61	5 (17%)	37,39,39	6.05	17 (45%)
2	GFR	A	401	-	28,28,28	2.66	5 (17%)	37,39,39	6.07	18 (48%)
2	GFR	D	401	-	28,28,28	2.72	6 (21%)	37,39,39	6.38	17 (45%)
3	NDP	B	402	-	45,52,52	3.77	17 (37%)	53,80,80	2.16	6 (11%)
2	GFR	B	401	-	28,28,28	2.78	7 (25%)	37,39,39	6.21	18 (48%)
3	NDP	E	402	-	45,52,52	3.95	18 (40%)	53,80,80	2.05	5 (9%)

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
3	NDP	F	402	-	-	3/30/77/77	0/5/5/5
3	NDP	A	402	-	-	3/30/77/77	0/5/5/5
2	GFR	E	401	-	-	7/14/27/27	0/3/3/3
3	NDP	C	402	-	-	5/30/77/77	0/5/5/5
2	GFR	C	401	-	-	7/14/27/27	0/3/3/3
3	NDP	D	402	-	-	2/30/77/77	0/5/5/5
2	GFR	F	401	-	-	6/14/27/27	0/3/3/3
2	GFR	A	401	-	-	8/14/27/27	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GFR	D	401	-	-	6/14/27/27	0/3/3/3
3	NDP	B	402	-	-	4/30/77/77	0/5/5/5
2	GFR	B	401	-	-	8/14/27/27	0/3/3/3
3	NDP	E	402	-	-	4/30/77/77	0/5/5/5

All (138) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	402	NDP	O4B-C1B	14.96	1.61	1.41
3	E	402	NDP	O4B-C1B	14.93	1.61	1.41
3	C	402	NDP	O4B-C1B	14.60	1.61	1.41
3	D	402	NDP	O4B-C1B	14.48	1.61	1.41
3	A	402	NDP	O4B-C1B	14.37	1.61	1.41
3	B	402	NDP	O4B-C1B	13.96	1.60	1.41
3	E	402	NDP	C6N-C5N	11.66	1.54	1.33
3	D	402	NDP	C6N-C5N	11.56	1.54	1.33
3	A	402	NDP	C6N-C5N	11.41	1.53	1.33
3	C	402	NDP	C6N-C5N	11.35	1.53	1.33
3	F	402	NDP	C6N-C5N	11.34	1.53	1.33
3	B	402	NDP	C6N-C5N	11.18	1.53	1.33
3	D	402	NDP	O4D-C1D	8.09	1.61	1.42
3	C	402	NDP	O4D-C1D	8.08	1.61	1.42
3	A	402	NDP	O4D-C1D	7.98	1.60	1.42
3	E	402	NDP	O4D-C1D	7.93	1.60	1.42
3	B	402	NDP	O4D-C1D	7.69	1.60	1.42
3	F	402	NDP	O4D-C1D	7.63	1.60	1.42
3	A	402	NDP	C2D-C1D	-7.24	1.30	1.53
3	C	402	NDP	C2D-C1D	-7.17	1.30	1.53
2	A	401	GFR	OAM-CAN	7.12	1.54	1.43
2	A	401	GFR	CAO-CAN	-7.04	1.41	1.54
3	B	402	NDP	C2D-C1D	-6.99	1.31	1.53
3	E	402	NDP	C2D-C1D	-6.97	1.31	1.53
3	F	402	NDP	C2D-C1D	-6.95	1.31	1.53
2	E	401	GFR	CAJ-CAE	-6.85	1.34	1.51
2	B	401	GFR	OAM-CAN	6.84	1.53	1.43
3	D	402	NDP	C2D-C1D	-6.80	1.31	1.53
2	D	401	GFR	CAO-CAN	-6.72	1.41	1.54
2	D	401	GFR	CAL-CAK	6.71	1.65	1.52
2	B	401	GFR	CAJ-CAE	-6.67	1.35	1.51
3	D	402	NDP	O4D-C4D	-6.62	1.30	1.45
2	D	401	GFR	CAJ-CAE	-6.58	1.35	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	402	NDP	O4B-C4B	-6.56	1.30	1.45
2	F	401	GFR	CAL-CAK	6.53	1.65	1.52
2	F	401	GFR	OAM-CAN	6.52	1.53	1.43
3	F	402	NDP	O4B-C4B	-6.51	1.30	1.45
3	A	402	NDP	O4D-C4D	-6.45	1.30	1.45
2	B	401	GFR	CAL-CAK	6.45	1.65	1.52
2	A	401	GFR	CAJ-CAE	-6.43	1.35	1.51
2	C	401	GFR	CAL-CAK	6.43	1.65	1.52
3	C	402	NDP	O4D-C4D	-6.40	1.30	1.45
3	E	402	NDP	O4D-C4D	-6.31	1.30	1.45
2	C	401	GFR	CAJ-CAE	-6.29	1.36	1.51
3	E	402	NDP	O4B-C4B	-6.28	1.31	1.45
3	A	402	NDP	O4B-C4B	-6.25	1.31	1.45
2	C	401	GFR	OAM-CAN	6.16	1.52	1.43
3	F	402	NDP	O4D-C4D	-6.14	1.31	1.45
3	B	402	NDP	O4B-C4B	-6.04	1.31	1.45
3	D	402	NDP	O4B-C4B	-6.04	1.31	1.45
2	F	401	GFR	CAJ-CAE	-6.01	1.36	1.51
3	B	402	NDP	O4D-C4D	-5.90	1.31	1.45
2	D	401	GFR	OAM-CAN	5.90	1.52	1.43
2	E	401	GFR	CAO-CAN	-5.82	1.43	1.54
2	E	401	GFR	OAM-CAN	5.79	1.52	1.43
2	F	401	GFR	CAO-CAN	-5.70	1.43	1.54
2	B	401	GFR	CAO-CAN	-5.65	1.43	1.54
2	E	401	GFR	CAL-CAK	5.61	1.63	1.52
2	C	401	GFR	CAO-CAN	-5.51	1.44	1.54
3	D	402	NDP	C2N-C3N	5.41	1.50	1.34
3	E	402	NDP	C2N-C3N	5.30	1.49	1.34
3	C	402	NDP	C2N-C3N	5.29	1.49	1.34
3	F	402	NDP	C2N-C3N	5.25	1.49	1.34
2	B	401	GFR	CAR-CAN	-5.17	1.42	1.51
3	A	402	NDP	C2N-C3N	5.07	1.49	1.34
2	E	401	GFR	CAR-CAN	-4.94	1.42	1.51
2	F	401	GFR	CAR-CAN	-4.89	1.42	1.51
3	B	402	NDP	C2N-C3N	4.78	1.48	1.34
2	A	401	GFR	CAL-CAK	4.75	1.62	1.52
2	D	401	GFR	CAR-CAN	-4.52	1.43	1.51
3	C	402	NDP	C7N-N7N	4.47	1.45	1.33
3	F	402	NDP	C7N-N7N	4.40	1.45	1.33
2	A	401	GFR	CAR-CAN	-4.29	1.43	1.51
2	C	401	GFR	CAR-CAN	-4.28	1.43	1.51
3	D	402	NDP	C7N-N7N	4.23	1.44	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	402	NDP	C7N-N7N	4.22	1.44	1.33
3	C	402	NDP	C6A-N6A	3.80	1.47	1.34
3	A	402	NDP	C6A-N6A	3.79	1.47	1.34
3	A	402	NDP	C7N-N7N	3.75	1.43	1.33
3	E	402	NDP	C7N-N7N	3.68	1.43	1.33
3	E	402	NDP	C6A-N6A	3.66	1.47	1.34
3	F	402	NDP	C6A-N6A	3.61	1.47	1.34
3	D	402	NDP	C6A-N6A	3.61	1.47	1.34
3	B	402	NDP	C6A-N6A	3.56	1.47	1.34
3	E	402	NDP	O3D-C3D	-3.39	1.35	1.43
3	A	402	NDP	O3D-C3D	-3.30	1.35	1.43
3	A	402	NDP	O3B-C3B	-3.01	1.35	1.43
3	E	402	NDP	C2A-N3A	2.95	1.36	1.32
3	B	402	NDP	O3D-C3D	-2.95	1.36	1.43
3	E	402	NDP	C5A-C4A	-2.94	1.33	1.40
3	F	402	NDP	O3B-C3B	-2.93	1.36	1.43
3	E	402	NDP	O3B-C3B	-2.93	1.36	1.43
3	D	402	NDP	C4N-C5N	2.89	1.56	1.48
3	F	402	NDP	C5A-C4A	-2.84	1.33	1.40
3	D	402	NDP	O3D-C3D	-2.78	1.36	1.43
3	B	402	NDP	O2D-C2D	2.77	1.49	1.43
3	C	402	NDP	O3B-C3B	-2.77	1.36	1.43
3	A	402	NDP	C2A-N3A	2.76	1.36	1.32
3	B	402	NDP	C4N-C5N	2.74	1.56	1.48
3	D	402	NDP	O3B-C3B	-2.73	1.36	1.43
3	F	402	NDP	O3D-C3D	-2.72	1.36	1.43
3	C	402	NDP	C2A-N3A	2.70	1.36	1.32
3	F	402	NDP	C4N-C5N	2.69	1.55	1.48
3	D	402	NDP	O2D-C2D	2.68	1.49	1.43
3	D	402	NDP	C5A-C4A	-2.67	1.33	1.40
3	C	402	NDP	C7N-C3N	2.67	1.54	1.48
3	B	402	NDP	C2A-N3A	2.67	1.36	1.32
3	C	402	NDP	O2D-C2D	2.65	1.49	1.43
3	A	402	NDP	C5A-C4A	-2.64	1.33	1.40
3	A	402	NDP	O2D-C2D	2.62	1.49	1.43
3	C	402	NDP	O3D-C3D	-2.62	1.36	1.43
3	E	402	NDP	C4N-C5N	2.61	1.55	1.48
3	F	402	NDP	C6N-N1N	2.59	1.43	1.37
3	B	402	NDP	C5A-C4A	-2.58	1.34	1.40
3	B	402	NDP	O3B-C3B	-2.57	1.36	1.43
3	B	402	NDP	C6N-N1N	2.57	1.43	1.37
3	D	402	NDP	C2A-N3A	2.56	1.36	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	402	NDP	C4N-C5N	2.51	1.55	1.48
3	F	402	NDP	O2D-C2D	2.48	1.48	1.43
3	C	402	NDP	C5A-C4A	-2.48	1.34	1.40
3	E	402	NDP	C7N-C3N	2.43	1.53	1.48
3	D	402	NDP	O7N-C7N	-2.43	1.18	1.24
3	F	402	NDP	C2A-N3A	2.41	1.36	1.32
2	B	401	GFR	CAJ-CAK	-2.39	1.50	1.53
2	B	401	GFR	CAO-CAK	-2.38	1.48	1.54
3	E	402	NDP	O7N-C7N	-2.37	1.18	1.24
3	E	402	NDP	C6N-N1N	2.36	1.43	1.37
3	B	402	NDP	C7N-C3N	2.36	1.53	1.48
3	D	402	NDP	C6N-N1N	2.35	1.43	1.37
3	A	402	NDP	C4N-C5N	2.33	1.55	1.48
3	C	402	NDP	P2B-O2B	2.28	1.63	1.59
3	A	402	NDP	O7N-C7N	-2.26	1.19	1.24
3	D	402	NDP	P2B-O2B	2.25	1.63	1.59
3	C	402	NDP	C6N-N1N	2.16	1.42	1.37
3	D	402	NDP	C7N-C3N	2.14	1.53	1.48
2	D	401	GFR	CAP-CAO	-2.13	1.48	1.52
3	E	402	NDP	O2D-C2D	2.09	1.47	1.43
3	A	402	NDP	C7N-C3N	2.06	1.53	1.48

All (138) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	401	GFR	CAJ-CAK-CAL	-24.42	78.32	112.67
2	B	401	GFR	CAJ-CAK-CAL	-23.94	78.99	112.67
2	E	401	GFR	CAJ-CAK-CAL	-23.47	79.66	112.67
2	C	401	GFR	CAJ-CAK-CAL	-23.44	79.70	112.67
2	F	401	GFR	CAJ-CAK-CAL	-23.16	80.09	112.67
2	A	401	GFR	CAJ-CAK-CAL	-22.97	80.35	112.67
2	D	401	GFR	OAM-CAN-CAR	14.62	126.79	110.41
2	D	401	GFR	CAL-CAK-CAO	-14.60	84.05	101.59
2	C	401	GFR	CAL-CAK-CAO	-14.46	84.21	101.59
2	E	401	GFR	CAL-CAK-CAO	-14.37	84.33	101.59
2	C	401	GFR	OAM-CAN-CAR	14.35	126.49	110.41
2	A	401	GFR	CAL-CAK-CAO	-14.13	84.61	101.59
2	F	401	GFR	CAL-CAK-CAO	-14.12	84.63	101.59
2	B	401	GFR	CAL-CAK-CAO	-13.97	84.81	101.59
2	B	401	GFR	OAM-CAN-CAR	13.77	125.84	110.41
2	F	401	GFR	OAM-CAN-CAR	13.71	125.77	110.41
2	E	401	GFR	OAM-CAN-CAR	13.63	125.68	110.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	401	GFR	OAM-CAN-CAR	13.40	125.42	110.41
2	B	401	GFR	CAL-OAM-CAN	-11.67	82.39	106.55
2	D	401	GFR	CAL-OAM-CAN	-11.65	82.45	106.55
2	E	401	GFR	CAL-OAM-CAN	-11.14	83.49	106.55
2	F	401	GFR	CAL-OAM-CAN	-11.03	83.73	106.55
2	A	401	GFR	CAL-OAM-CAN	-10.97	83.85	106.55
2	C	401	GFR	CAL-OAM-CAN	-10.87	84.06	106.55
3	A	402	NDP	C5A-C6A-N6A	8.39	133.10	120.35
3	D	402	NDP	C5A-C6A-N6A	8.34	133.03	120.35
3	F	402	NDP	C5A-C6A-N6A	8.29	132.95	120.35
3	B	402	NDP	C5A-C6A-N6A	8.25	132.88	120.35
3	E	402	NDP	C5A-C6A-N6A	8.21	132.82	120.35
3	F	402	NDP	C1B-N9A-C4A	-8.12	112.37	126.64
3	C	402	NDP	C5A-C6A-N6A	7.81	132.23	120.35
3	B	402	NDP	C1B-N9A-C4A	-7.43	113.59	126.64
2	D	401	GFR	CAJ-CAE-CAD	-7.42	107.71	120.44
2	C	401	GFR	CAA-OAB-CAC	-7.37	106.41	117.53
3	D	402	NDP	C1B-N9A-C4A	-7.26	113.88	126.64
2	B	401	GFR	CAJ-CAE-CAD	-7.23	108.02	120.44
2	E	401	GFR	CAJ-CAE-CAD	-7.21	108.06	120.44
2	C	401	GFR	CAK-CAO-CAN	7.14	114.74	103.10
2	A	401	GFR	CAK-CAO-CAN	7.08	114.63	103.10
3	E	402	NDP	C1B-N9A-C4A	-6.97	114.39	126.64
3	C	402	NDP	C1B-N9A-C4A	-6.85	114.60	126.64
2	E	401	GFR	CAK-CAO-CAN	6.84	114.25	103.10
3	A	402	NDP	C1B-N9A-C4A	-6.75	114.79	126.64
2	D	401	GFR	CAK-CAO-CAN	6.75	114.09	103.10
2	F	401	GFR	CAJ-CAE-CAD	-6.67	108.99	120.44
2	A	401	GFR	CAJ-CAE-CAD	-6.65	109.02	120.44
2	E	401	GFR	CAP-CAO-CAK	-6.59	99.44	113.56
2	D	401	GFR	CAR-CAN-CAO	-6.51	106.88	115.88
2	B	401	GFR	CAP-CAO-CAK	-6.43	99.78	113.56
2	B	401	GFR	CAK-CAO-CAN	6.39	113.51	103.10
2	A	401	GFR	OAQ-CAP-CAO	-6.31	96.74	111.29
2	A	401	GFR	OAM-CAN-CAO	-6.30	97.98	104.77
2	A	401	GFR	CAP-CAO-CAK	-6.29	100.09	113.56
2	F	401	GFR	CAK-CAO-CAN	6.23	113.25	103.10
2	C	401	GFR	CAJ-CAE-CAD	-6.07	110.03	120.44
2	D	401	GFR	OAQ-CAP-CAO	-6.04	97.37	111.29
3	A	402	NDP	N6A-C6A-N1A	-5.88	106.38	118.57
3	D	402	NDP	N6A-C6A-N1A	-5.79	106.55	118.57
2	B	401	GFR	CAR-CAN-CAO	-5.79	107.88	115.88

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	401	GFR	CAR-CAN-CAO	-5.78	107.89	115.88
3	E	402	NDP	N6A-C6A-N1A	-5.76	106.62	118.57
3	F	402	NDP	N6A-C6A-N1A	-5.76	106.63	118.57
3	B	402	NDP	N6A-C6A-N1A	-5.72	106.69	118.57
2	C	401	GFR	CAP-CAO-CAK	-5.65	101.46	113.56
3	B	402	NDP	N3A-C2A-N1A	-5.64	119.86	128.68
2	E	401	GFR	OAQ-CAP-CAO	-5.47	98.68	111.29
3	F	402	NDP	N3A-C2A-N1A	-5.43	120.19	128.68
2	E	401	GFR	OAM-CAL-CAK	5.43	112.94	105.87
3	E	402	NDP	N3A-C2A-N1A	-5.39	120.25	128.68
2	B	401	GFR	OAM-CAL-CAK	5.35	112.84	105.87
2	D	401	GFR	OAM-CAL-CAK	5.30	112.77	105.87
3	A	402	NDP	N3A-C2A-N1A	-5.27	120.44	128.68
2	C	401	GFR	OAM-CAL-CAK	5.26	112.73	105.87
2	F	401	GFR	OAM-CAL-CAK	5.24	112.70	105.87
2	C	401	GFR	CAR-CAN-CAO	-5.22	108.66	115.88
3	C	402	NDP	N6A-C6A-N1A	-5.21	107.76	118.57
2	D	401	GFR	CAP-CAO-CAK	-5.16	102.50	113.56
2	E	401	GFR	OAM-CAN-CAO	-5.16	99.21	104.77
2	C	401	GFR	OAM-CAN-CAO	-5.15	99.21	104.77
2	F	401	GFR	CAA-OAB-CAC	-5.11	109.81	117.53
2	A	401	GFR	OAM-CAL-CAK	5.09	112.51	105.87
2	E	401	GFR	CAR-CAN-CAO	-5.03	108.93	115.88
3	D	402	NDP	N3A-C2A-N1A	-4.95	120.94	128.68
2	F	401	GFR	OAM-CAN-CAO	-4.87	99.52	104.77
2	F	401	GFR	CAP-CAO-CAK	-4.86	103.15	113.56
2	C	401	GFR	OAQ-CAP-CAO	-4.83	100.16	111.29
2	B	401	GFR	OAQ-CAP-CAO	-4.72	100.41	111.29
3	C	402	NDP	N3A-C2A-N1A	-4.70	121.33	128.68
2	B	401	GFR	OAM-CAN-CAO	-4.69	99.72	104.77
2	D	401	GFR	CAJ-CAE-CAF	4.62	130.08	120.91
2	E	401	GFR	CAA-OAB-CAC	-4.60	110.58	117.53
2	D	401	GFR	CAY-OAX-CAV	-4.58	110.62	117.53
2	A	401	GFR	CAR-CAN-CAO	-4.47	109.70	115.88
2	A	401	GFR	CAA-OAB-CAC	-4.43	110.85	117.53
2	B	401	GFR	OAB-CAC-CAH	4.41	120.95	114.57
2	F	401	GFR	CAJ-CAE-CAF	4.39	129.62	120.91
2	B	401	GFR	CAJ-CAE-CAF	4.11	129.07	120.91
3	B	402	NDP	C3N-C2N-N1N	-4.08	117.28	123.10
2	A	401	GFR	CAJ-CAE-CAF	4.06	128.97	120.91
2	E	401	GFR	CAJ-CAE-CAF	4.02	128.89	120.91
2	F	401	GFR	OAQ-CAP-CAO	-4.00	102.06	111.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	401	GFR	CAY-OAX-CAV	-3.90	111.64	117.53
2	D	401	GFR	CAA-OAB-CAC	-3.87	111.69	117.53
2	F	401	GFR	OAB-CAC-CAH	3.82	120.10	114.57
2	E	401	GFR	OAB-CAC-CAH	3.73	119.97	114.57
2	C	401	GFR	CAJ-CAE-CAF	3.54	127.94	120.91
2	B	401	GFR	CAY-OAX-CAV	-3.52	112.22	117.53
2	A	401	GFR	OAB-CAC-CAH	3.49	119.63	114.57
2	D	401	GFR	OAM-CAN-CAO	-3.44	101.06	104.77
2	C	401	GFR	OAB-CAC-CAH	3.37	119.45	114.57
2	D	401	GFR	OAB-CAC-CAH	3.37	119.45	114.57
2	E	401	GFR	CAY-OAX-CAV	-3.27	112.59	117.53
2	B	401	GFR	CAA-OAB-CAC	-3.15	112.77	117.53
3	F	402	NDP	C3N-C2N-N1N	-2.87	119.00	123.10
2	E	401	GFR	CAF-CAE-CAD	2.85	122.53	118.54
2	B	401	GFR	OAB-CAC-CAD	-2.67	119.52	124.12
2	D	401	GFR	CAG-CAF-CAE	-2.66	117.36	121.03
3	B	402	NDP	PN-O3-PA	-2.62	123.84	132.83
2	B	401	GFR	CAF-CAE-CAD	2.59	122.17	118.54
2	C	401	GFR	OAB-CAC-CAD	-2.51	119.80	124.12
2	E	401	GFR	CAG-CAF-CAE	-2.47	117.63	121.03
2	B	401	GFR	CAG-CAF-CAE	-2.47	117.63	121.03
3	C	402	NDP	C3N-C2N-N1N	-2.46	119.59	123.10
3	C	402	NDP	PN-O3-PA	-2.44	124.45	132.83
3	F	402	NDP	PN-O3-PA	-2.44	124.46	132.83
2	A	401	GFR	OAB-CAC-CAD	-2.35	120.08	124.12
3	E	402	NDP	PN-O3-PA	-2.33	124.84	132.83
2	F	401	GFR	OAB-CAC-CAD	-2.30	120.17	124.12
2	E	401	GFR	OAB-CAC-CAD	-2.25	120.26	124.12
2	D	401	GFR	CAF-CAE-CAD	2.21	121.64	118.54
3	D	402	NDP	PN-O3-PA	-2.18	125.34	132.83
2	C	401	GFR	CAF-CAE-CAD	2.15	121.55	118.54
2	F	401	GFR	CAG-CAF-CAE	-2.14	118.08	121.03
2	A	401	GFR	CAF-CAE-CAD	2.13	121.52	118.54
2	C	401	GFR	CAG-CAF-CAE	-2.06	118.19	121.03
2	A	401	GFR	CAY-OAX-CAV	-2.05	114.44	117.53
3	D	402	NDP	C3N-C2N-N1N	-2.03	120.20	123.10
2	A	401	GFR	CAG-CAF-CAE	-2.03	118.24	121.03

There are no chirality outliers.

All (63) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	401	GFR	CAE-CAJ-CAK-CAL
2	F	401	GFR	CAE-CAJ-CAK-CAL
2	A	401	GFR	CAE-CAJ-CAK-CAO
2	A	401	GFR	CAE-CAJ-CAK-CAL
2	B	401	GFR	CAE-CAJ-CAK-CAO
2	B	401	GFR	CAE-CAJ-CAK-CAL
2	C	401	GFR	CAE-CAJ-CAK-CAL
2	D	401	GFR	CAE-CAJ-CAK-CAL
3	B	402	NDP	C2N-C3N-C7N-O7N
2	B	401	GFR	CAF-CAE-CAJ-CAK
2	E	401	GFR	CAF-CAE-CAJ-CAK
2	F	401	GFR	CAF-CAE-CAJ-CAK
2	D	401	GFR	CAF-CAE-CAJ-CAK
2	B	401	GFR	CAD-CAE-CAJ-CAK
2	C	401	GFR	CAF-CAE-CAJ-CAK
2	B	401	GFR	CAO-CAN-CAR-CAS
2	E	401	GFR	CAD-CAE-CAJ-CAK
2	A	401	GFR	CAF-CAE-CAJ-CAK
2	E	401	GFR	OAM-CAN-CAR-CAS
2	B	401	GFR	OAM-CAN-CAR-CAW
2	F	401	GFR	CAD-CAE-CAJ-CAK
3	C	402	NDP	O4D-C1D-N1N-C2N
2	E	401	GFR	OAM-CAN-CAR-CAW
2	C	401	GFR	OAM-CAN-CAR-CAS
2	D	401	GFR	OAM-CAN-CAR-CAS
3	E	402	NDP	C2B-O2B-P2B-O1X
3	F	402	NDP	C2B-O2B-P2B-O1X
3	A	402	NDP	C2B-O2B-P2B-O1X
3	B	402	NDP	C2B-O2B-P2B-O1X
3	D	402	NDP	C2B-O2B-P2B-O1X
2	F	401	GFR	OAM-CAN-CAR-CAS
2	A	401	GFR	OAM-CAN-CAR-CAS
2	D	401	GFR	CAD-CAE-CAJ-CAK
3	C	402	NDP	C5B-O5B-PA-O3
2	E	401	GFR	CAO-CAN-CAR-CAS
2	B	401	GFR	CAO-CAN-CAR-CAW
2	B	401	GFR	OAM-CAN-CAR-CAS
3	B	402	NDP	O4D-C1D-N1N-C2N
3	B	402	NDP	C2N-C3N-C7N-N7N
2	E	401	GFR	CAO-CAN-CAR-CAW
3	D	402	NDP	O4D-C1D-N1N-C2N
2	A	401	GFR	OAM-CAN-CAR-CAW
2	A	401	GFR	CAO-CAN-CAR-CAS

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Mol	Chain	Res	Type	Atoms
2	C	401	GFR	CAO-CAN-CAR-CAS
2	C	401	GFR	OAM-CAN-CAR-CAW
2	D	401	GFR	CAO-CAN-CAR-CAS
2	F	401	GFR	CAO-CAN-CAR-CAS
3	E	402	NDP	O4D-C1D-N1N-C2N
3	F	402	NDP	O4D-C1D-N1N-C2N
2	D	401	GFR	OAM-CAN-CAR-CAW
3	E	402	NDP	C2D-C1D-N1N-C2N
3	A	402	NDP	O4D-C1D-N1N-C2N
3	A	402	NDP	C2D-C1D-N1N-C2N
2	C	401	GFR	CAD-CAE-CAJ-CAK
2	F	401	GFR	OAM-CAN-CAR-CAW
2	A	401	GFR	CAO-CAN-CAR-CAW
2	A	401	GFR	CAD-CAE-CAJ-CAK
3	C	402	NDP	C2B-O2B-P2B-O1X
3	E	402	NDP	C2B-O2B-P2B-O3X
3	C	402	NDP	C2B-O2B-P2B-O3X
2	C	401	GFR	CAO-CAN-CAR-CAW
3	C	402	NDP	C3B-C2B-O2B-P2B
3	F	402	NDP	C2D-C1D-N1N-C2N

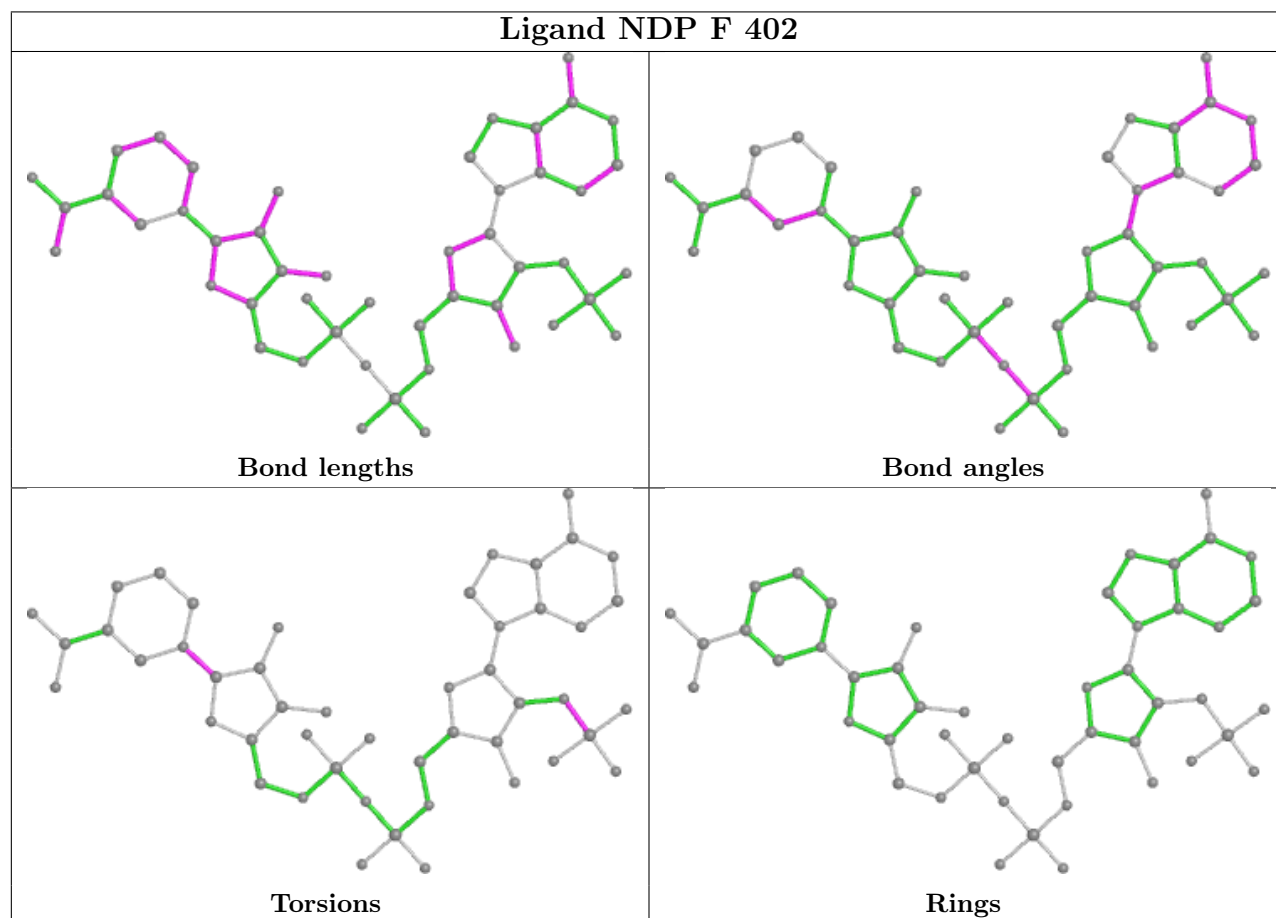
There are no ring outliers.

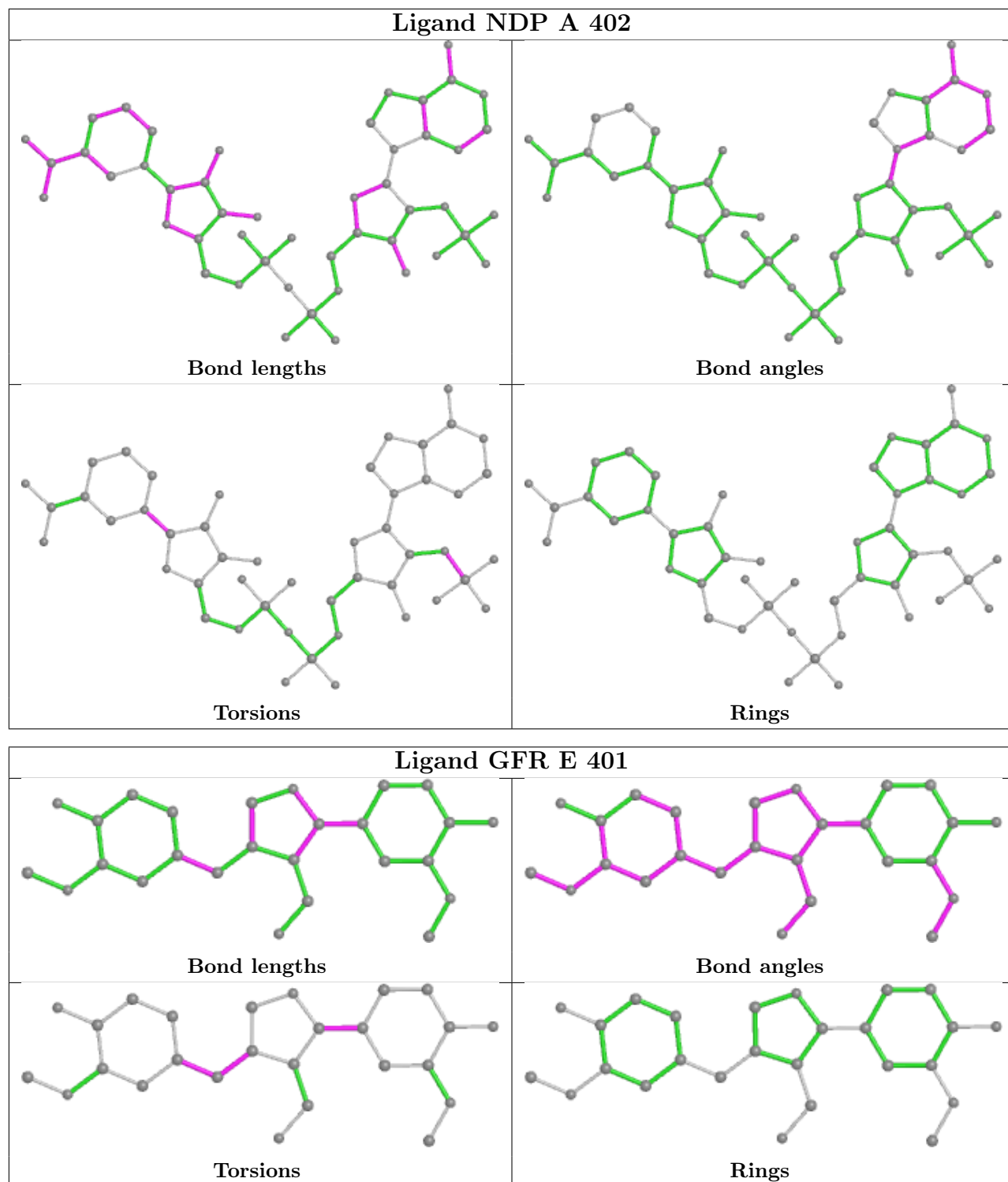
8 monomers are involved in 17 short contacts:

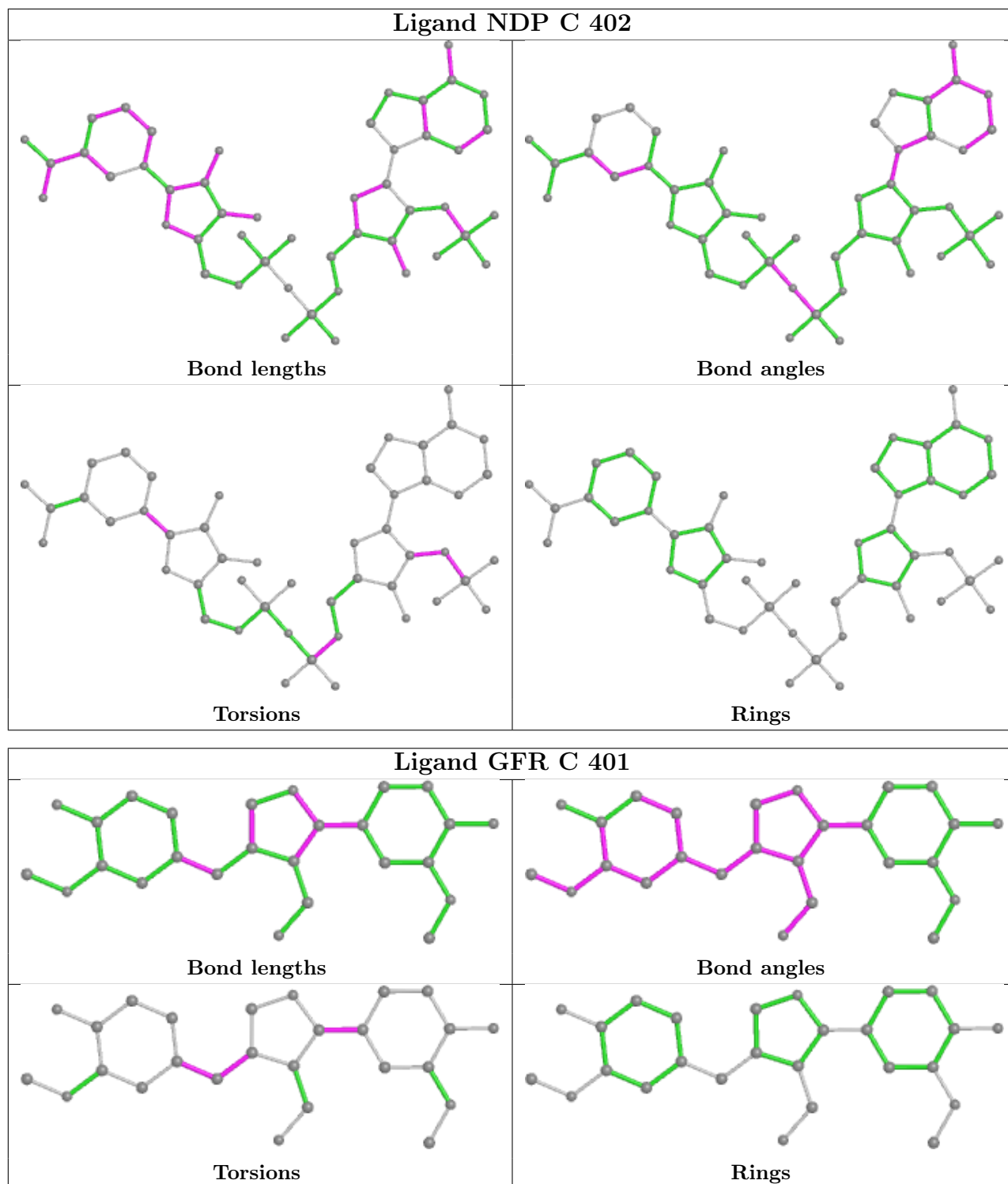
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	F	402	NDP	3	0
3	A	402	NDP	4	0
3	C	402	NDP	3	0
3	D	402	NDP	2	0
2	A	401	GFR	1	0
3	B	402	NDP	4	0
2	B	401	GFR	1	0
3	E	402	NDP	1	0

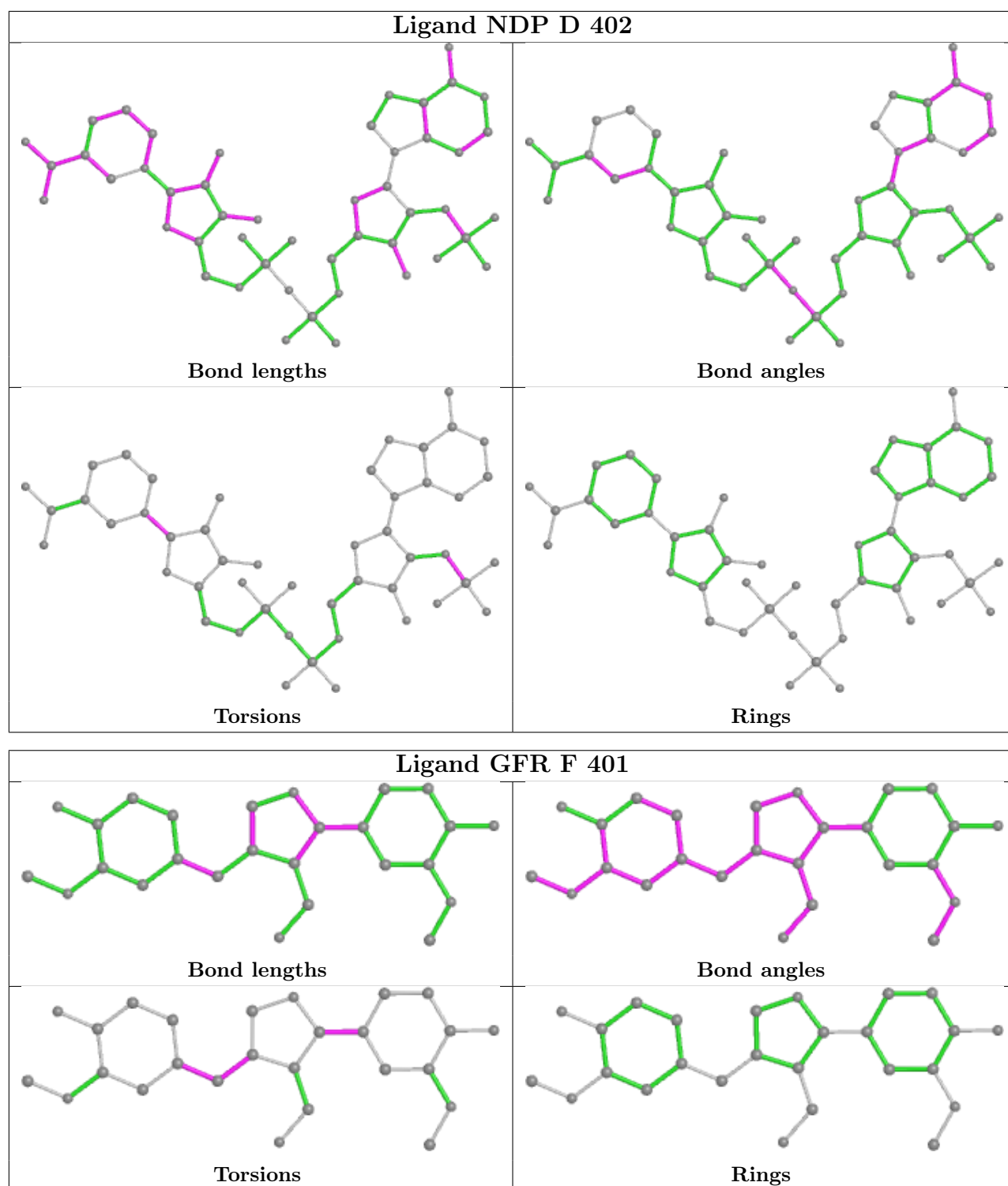
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

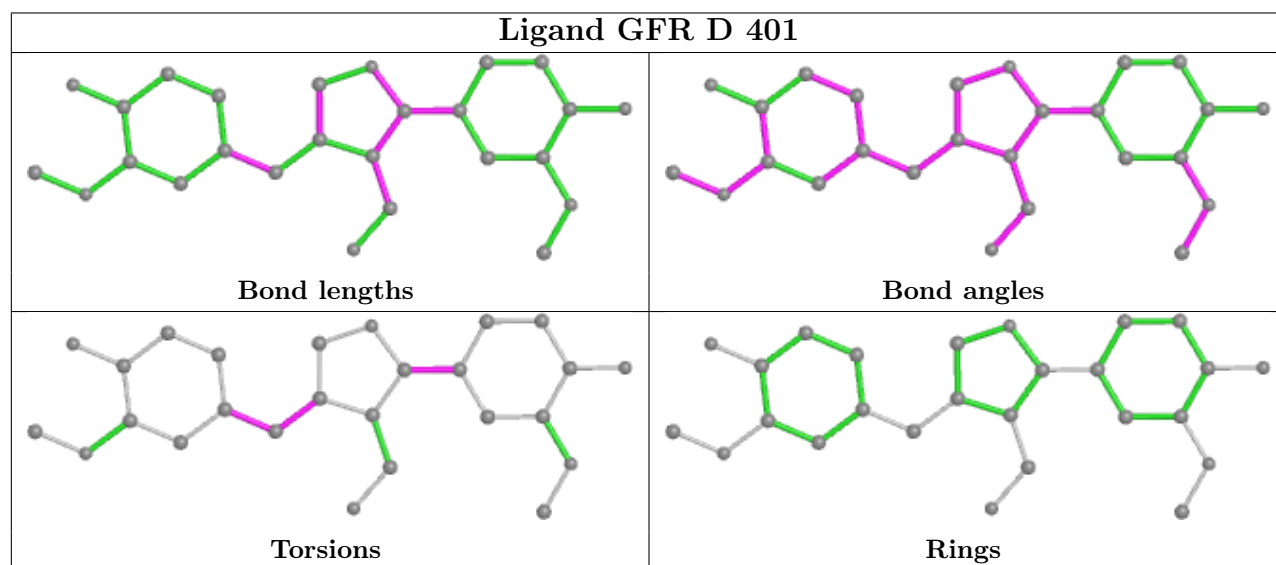
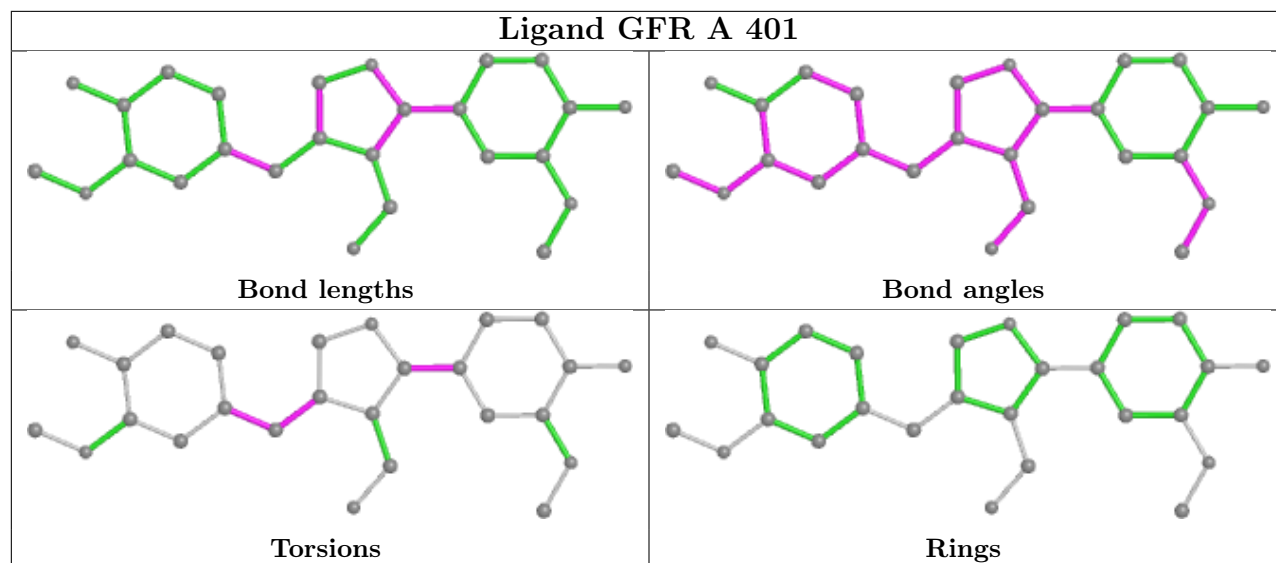
average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



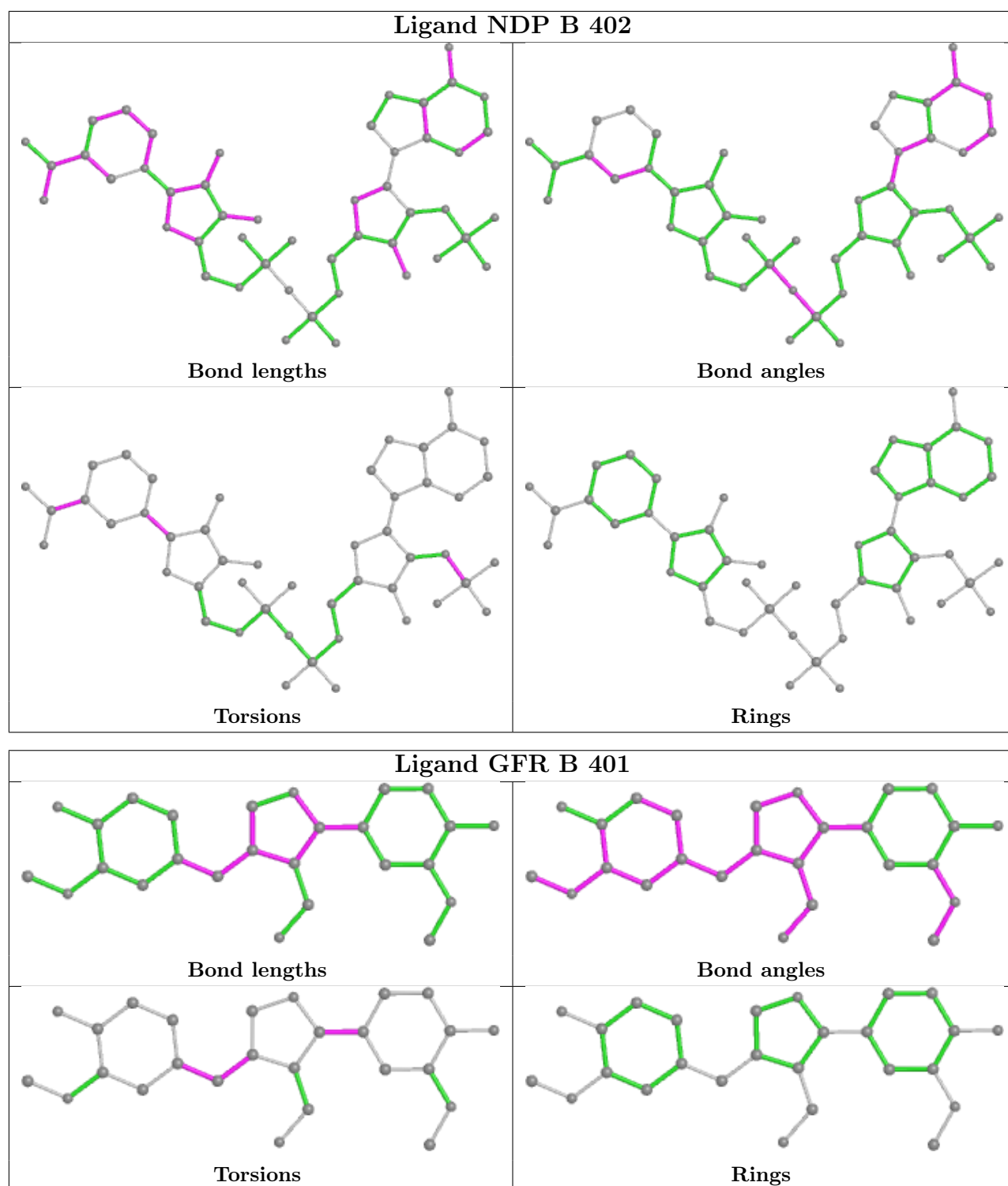


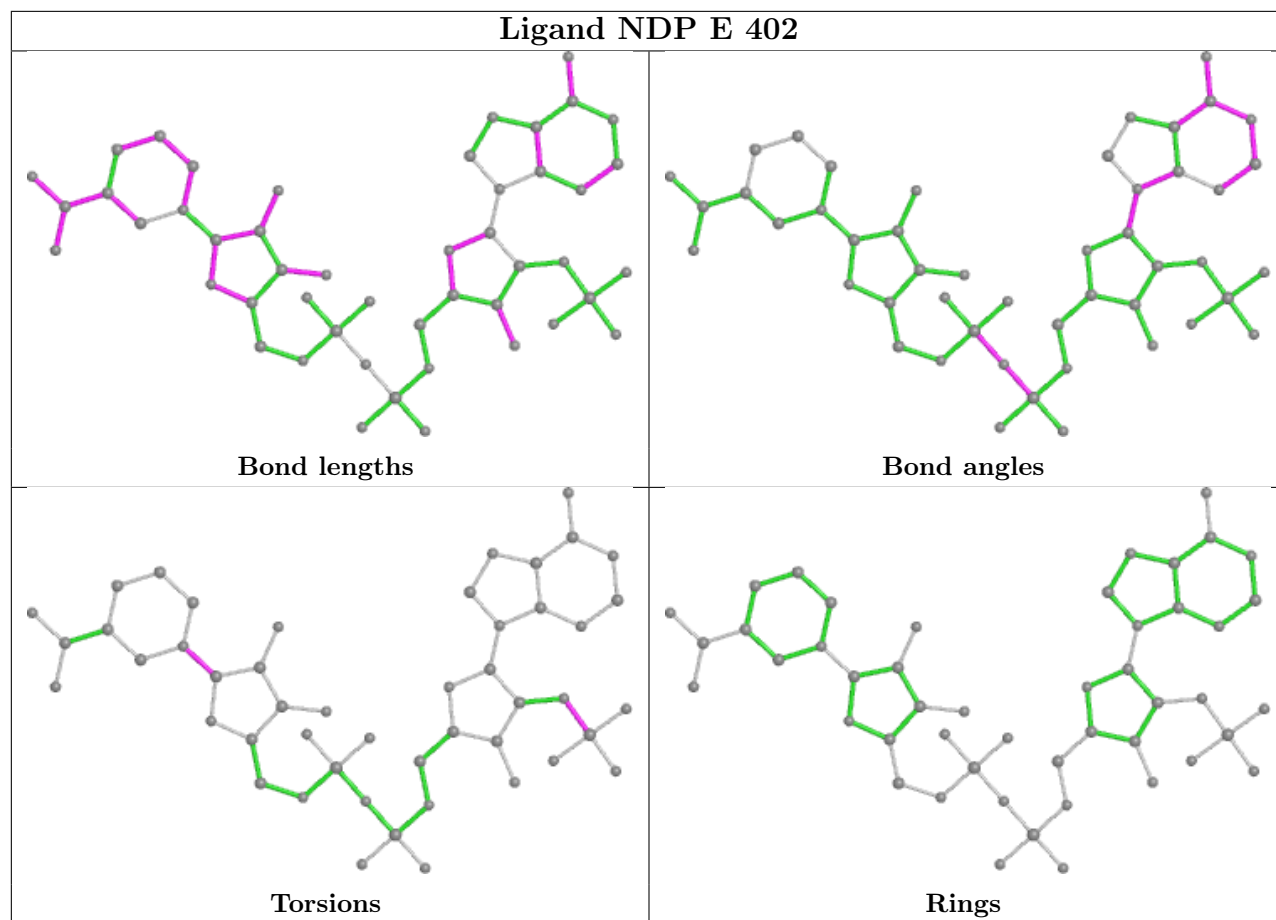












## 5.7 Other polymers [\(i\)](#)

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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	309/317 (97%)	-0.43	1 (0%) 94   94	26, 35, 52, 59	0
1	B	309/317 (97%)	-0.42	0 100   100	25, 36, 50, 64	0
1	C	308/317 (97%)	-0.21	2 (0%) 89   89	30, 47, 63, 86	0
1	D	309/317 (97%)	-0.25	1 (0%) 94   94	30, 47, 63, 73	0
1	E	309/317 (97%)	-0.38	1 (0%) 94   94	27, 40, 56, 64	0
1	F	309/317 (97%)	-0.43	0 100   100	26, 38, 53, 65	0
All	All	1853/1902 (97%)	-0.35	5 (0%) 94   94	25, 40, 60, 86	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	132	HIS	2.9
1	A	94	PHE	2.4
1	E	94	PHE	2.4
1	D	290	GLU	2.4
1	C	135	PRO	2.0

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

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

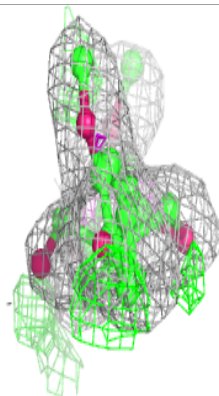
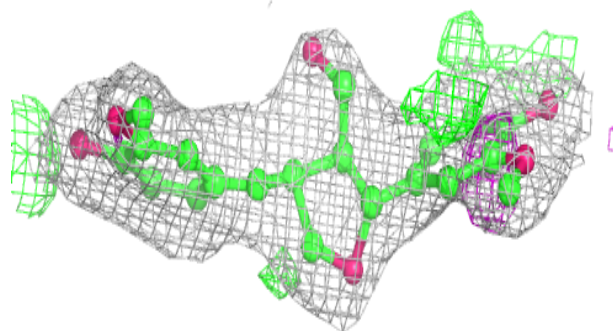
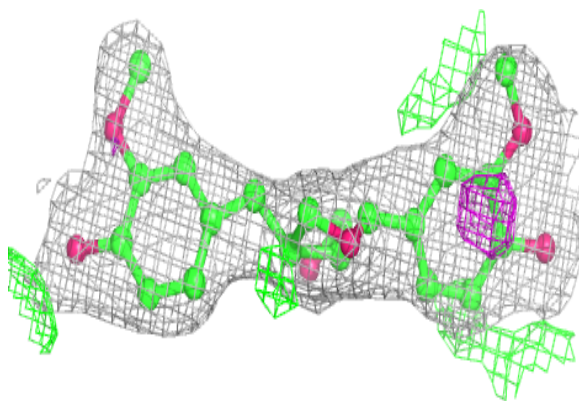
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	GFR	F	401	26/26	0.90	0.17	37,48,55,56	0
2	GFR	E	401	26/26	0.91	0.19	34,51,56,59	0
2	GFR	C	401	26/26	0.91	0.19	40,52,57,59	0
2	GFR	B	401	26/26	0.92	0.16	29,44,49,52	0
2	GFR	A	401	26/26	0.93	0.15	26,42,47,54	0
2	GFR	D	401	26/26	0.94	0.16	38,46,50,52	0
3	NDP	C	402	48/48	0.97	0.13	31,41,53,65	0
3	NDP	F	402	48/48	0.98	0.12	27,36,49,60	0
3	NDP	A	402	48/48	0.98	0.13	26,35,44,53	0
3	NDP	B	402	48/48	0.98	0.12	27,36,44,53	0
3	NDP	E	402	48/48	0.98	0.13	29,39,50,56	0
3	NDP	D	402	48/48	0.98	0.12	36,45,54,62	0

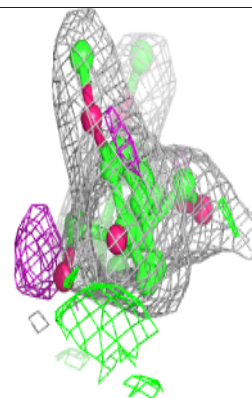
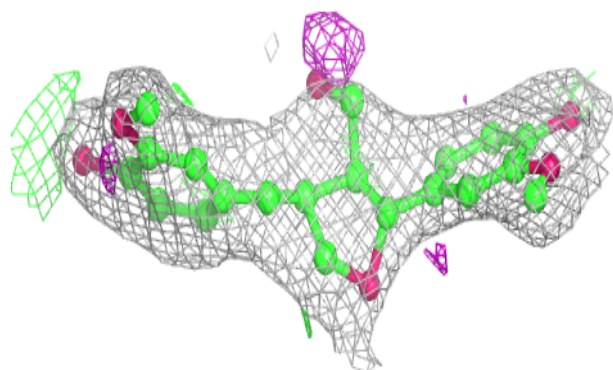
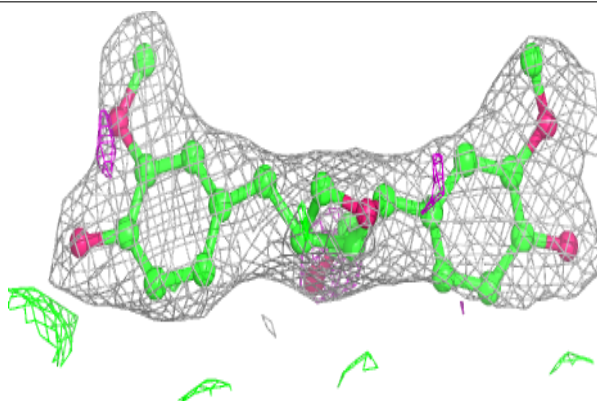
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around GFR F 401:**

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

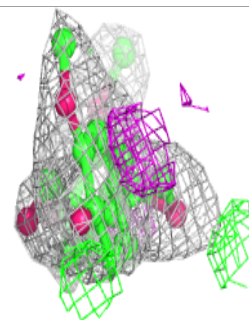
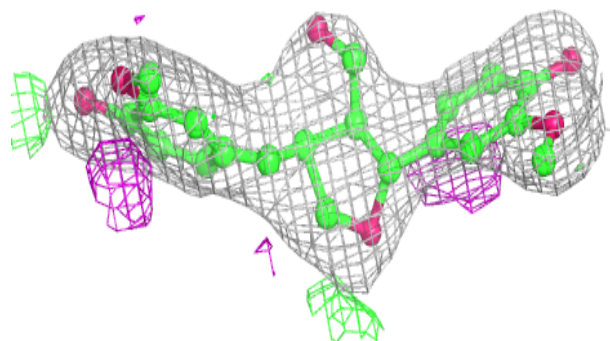
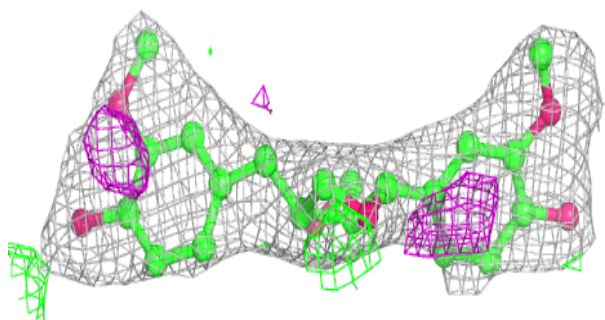
**Electron density around GFR E 401:**

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

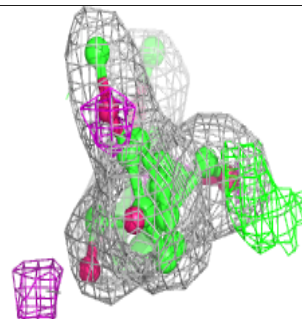
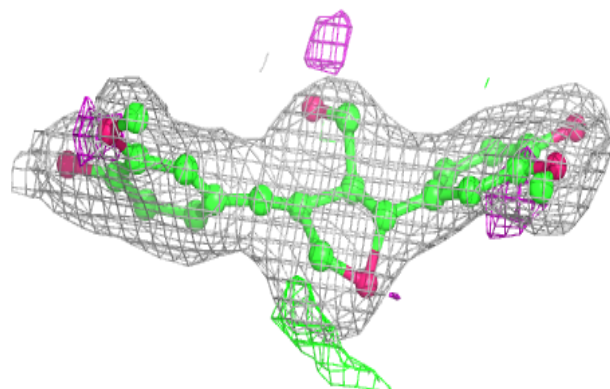
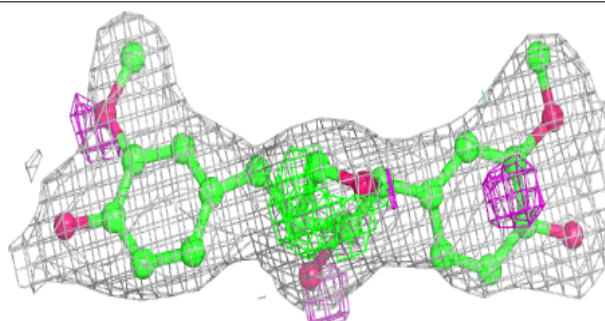


**Electron density around GFR C 401:**

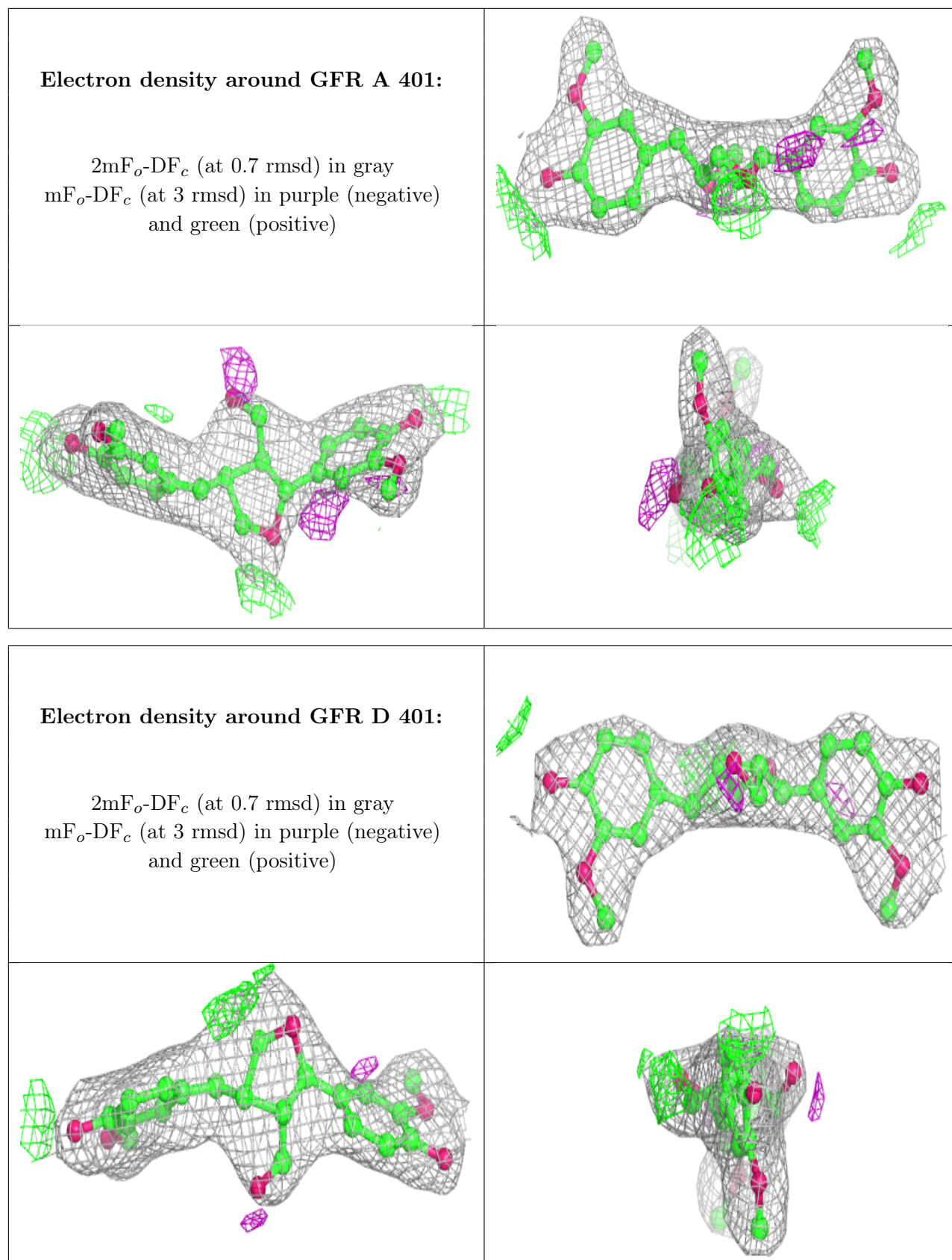
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around GFR B 401:**

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

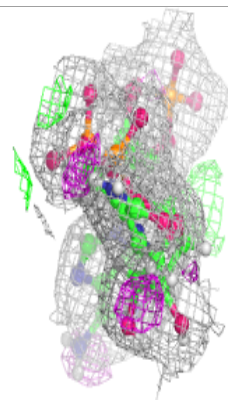
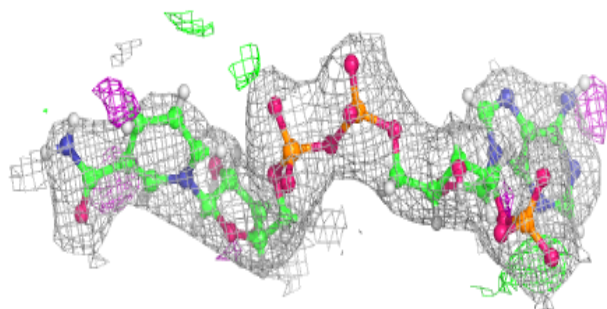
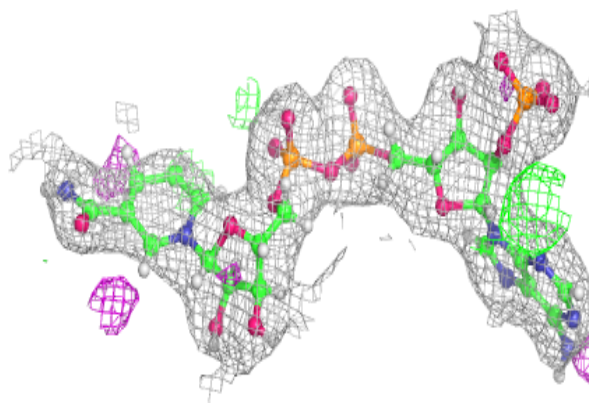




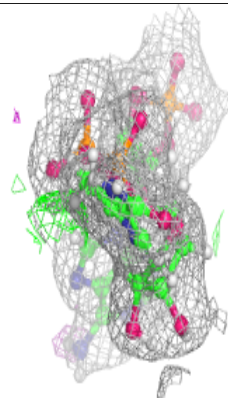
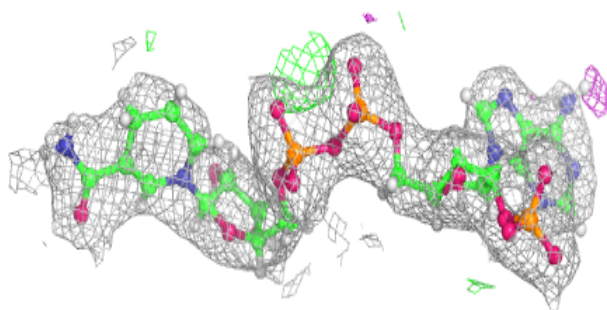
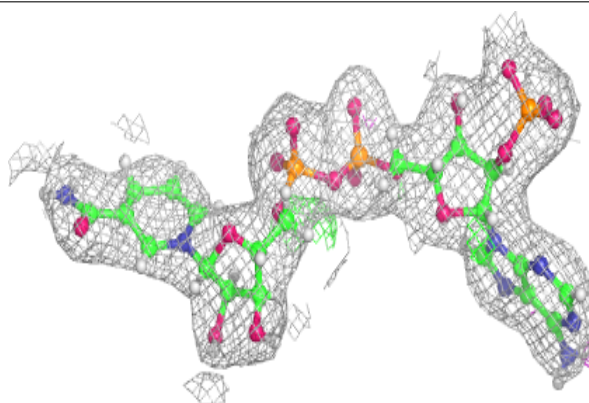


**Electron density around NDP C 402:**

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

**Electron density around NDP F 402:**

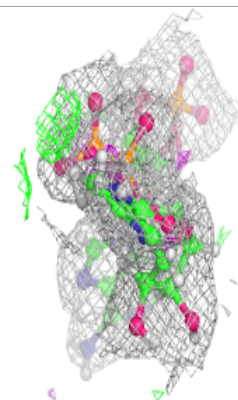
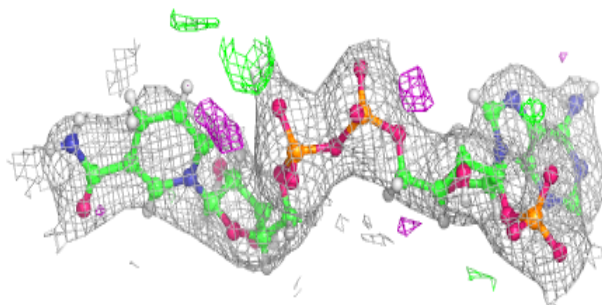
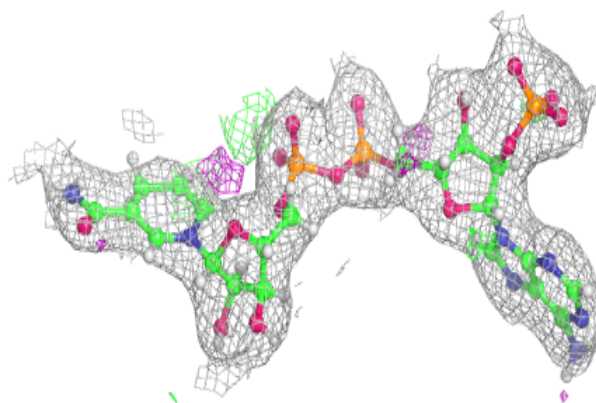
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



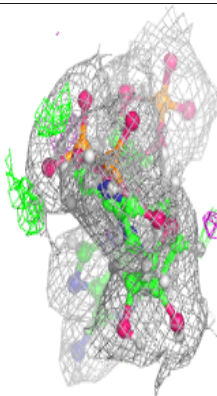
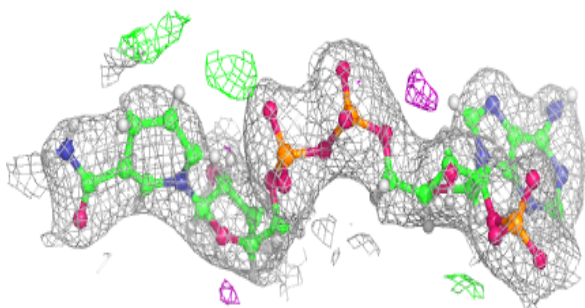
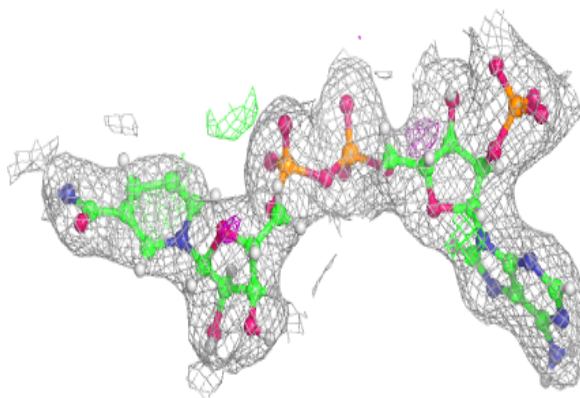


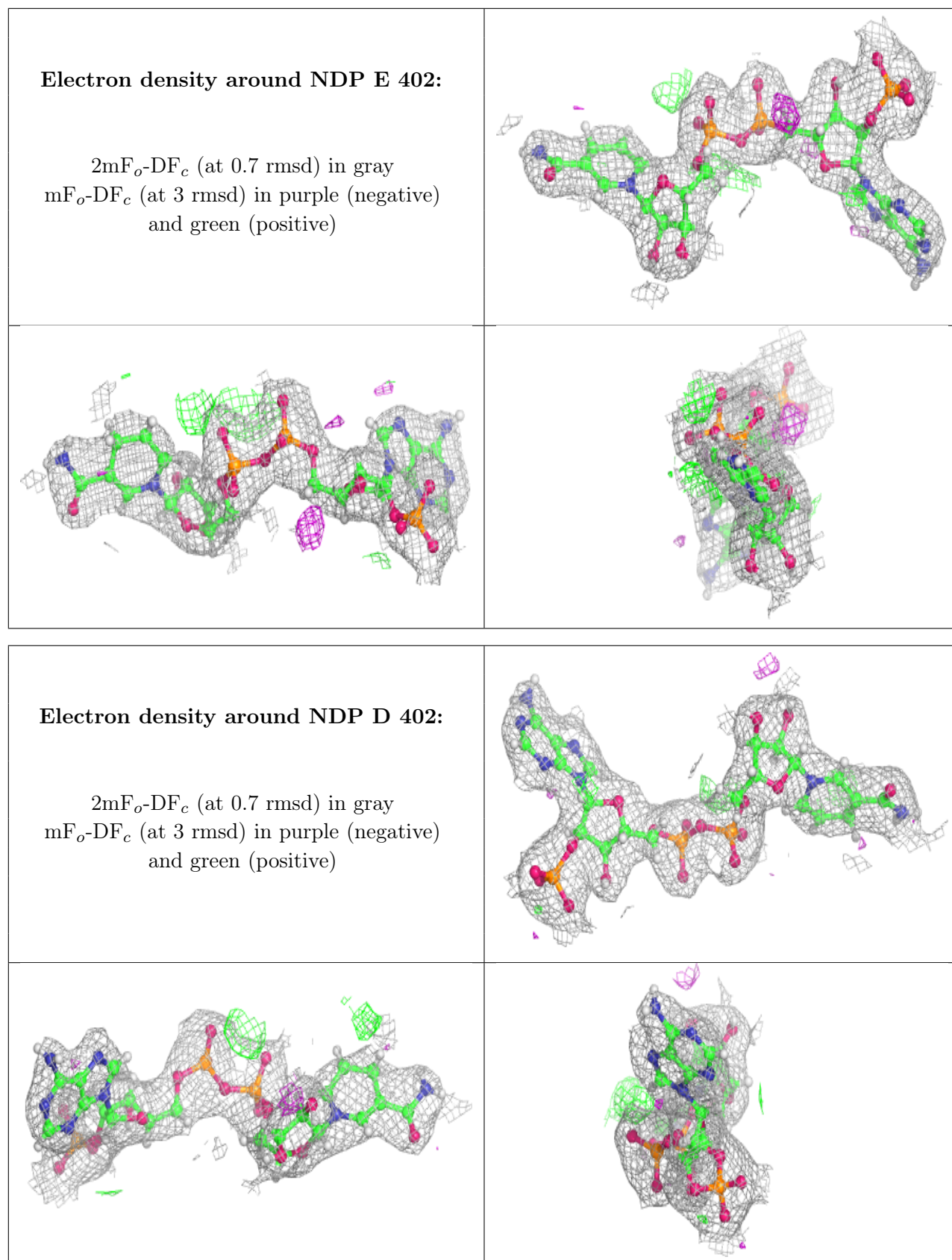
**Electron density around NDP A 402:**

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

**Electron density around NDP B 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.