



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 6, 2021 – 05:20 am BST

PDB ID : 7ALC
Title : human GCH-GFRP stimulatory complex
Authors : Ebenhoch, R.; Nar, H.
Deposited on : 2020-10-06
Resolution : 1.73 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The 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 : 2.23.2
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0267
CCP4 : 7.1.010 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.23.2

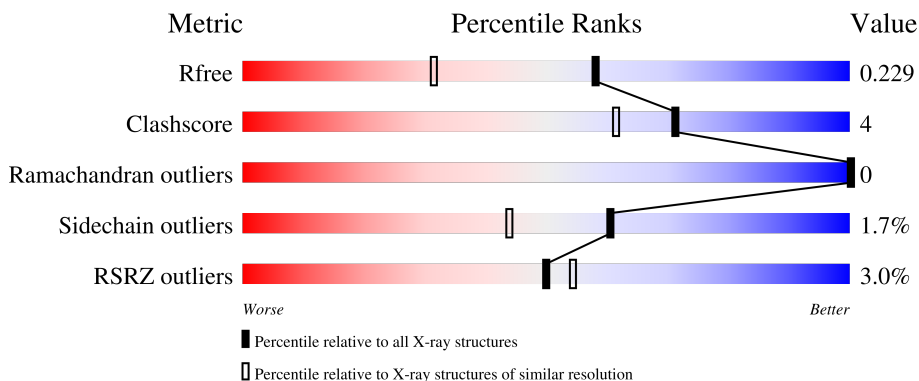
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.73 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.





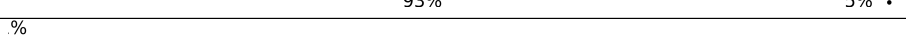
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5722 (1.74-1.70)
Clashscore	141614	6152 (1.74-1.70)
Ramachandran outliers	138981	6051 (1.74-1.70)
Sidechain outliers	138945	6051 (1.74-1.70)
RSRZ outliers	127900	5629 (1.74-1.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	209	
1	B	209	
1	C	209	
1	D	209	
1	E	209	

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Mol	Chain	Length	Quality of chain
2	F	87	 91% 5% 5%
2	G	87	 % 86% 10% .
2	H	87	 2% 87% 8% 5%
2	I	87	 93% 5% .
2	J	87	 % 91% . 6%

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 11273 atoms, of which 55 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 GTP cyclohydrolase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	184	Total 1452	C 917	N 252	O 274	S 9	0	0	0
1	B	166	Total 1304	C 828	N 228	O 240	S 8	0	0	0
1	C	162	Total 1271	C 810	N 222	O 230	S 9	0	0	0
1	D	182	Total 1436	C 908	N 249	O 271	S 8	0	0	0
1	E	171	Total 1350	C 856	N 237	O 247	S 10	0	0	0

- Molecule 2 is a protein called GTP cyclohydrolase 1 feedback regulatory protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	F	83	Total 669	C 424	N 118	O 121	S 6	0	0	0
2	G	84	Total 678	C 429	N 119	O 124	S 6	0	0	0
2	H	83	Total 669	C 424	N 118	O 121	S 6	0	0	0
2	I	85	Total 685	C 433	N 122	O 124	S 6	0	0	0
2	J	82	Total 660	C 418	N 116	O 120	S 6	0	0	0

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
F	-2	GLY	-	expression tag	UNP P30047
F	-1	SER	-	expression tag	UNP P30047
F	0	HIS	-	expression tag	UNP P30047
G	-2	GLY	-	expression tag	UNP P30047
G	-1	SER	-	expression tag	UNP P30047

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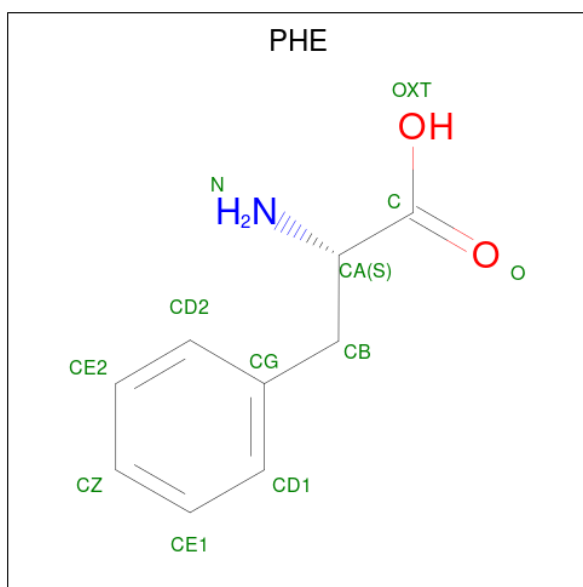
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Chain	Residue	Modelled	Actual	Comment	Reference
G	0	HIS	-	expression tag	UNP P30047
H	-2	GLY	-	expression tag	UNP P30047
H	-1	SER	-	expression tag	UNP P30047
H	0	HIS	-	expression tag	UNP P30047
I	-2	GLY	-	expression tag	UNP P30047
I	-1	SER	-	expression tag	UNP P30047
I	0	HIS	-	expression tag	UNP P30047
J	-2	GLY	-	expression tag	UNP P30047
J	-1	SER	-	expression tag	UNP P30047
J	0	HIS	-	expression tag	UNP P30047

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Zn 1 1	0	0
3	B	1	Total Zn 1 1	0	0
3	C	1	Total Zn 1 1	0	0
3	D	1	Total Zn 1 1	0	0
3	E	1	Total Zn 1 1	0	0

- Molecule 4 is PHENYLALANINE (three-letter code: PHE) (formula: C₉H₁₁NO₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	H	N	O		
4	F	1	23	9	11	1	2	11	1
4	F	1	23	9	11	1	2	11	0
4	G	1	23	9	11	1	2	11	1
4	H	1	23	9	11	1	2	11	0
4	I	1	23	9	11	1	2	11	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	148	Total	O	0	0
			148	148		
5	B	92	Total	O	0	0
			92	92		
5	C	95	Total	O	0	0
			95	95		
5	D	135	Total	O	0	0
			135	135		
5	E	98	Total	O	0	0
			98	98		
5	F	87	Total	O	0	0
			87	87		
5	G	81	Total	O	0	0
			81	81		

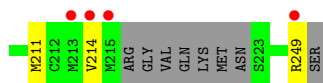
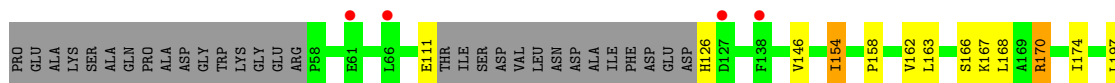
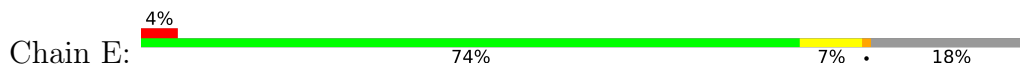
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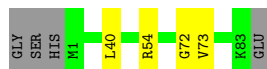
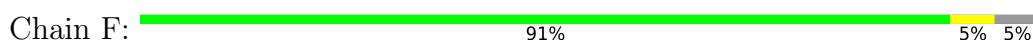
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	H	81	Total O 81 81	0	0
5	I	81	Total O 81 81	0	0
5	J	81	Total O 81 81	0	0



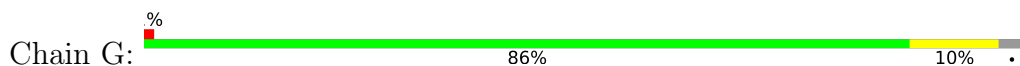
- Molecule 1: GTP cyclohydrolase 1



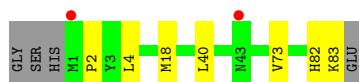
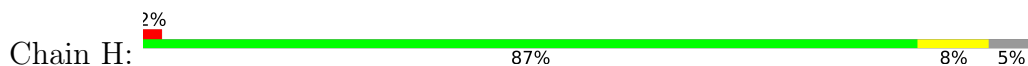
- Molecule 2: GTP cyclohydrolase 1 feedback regulatory protein



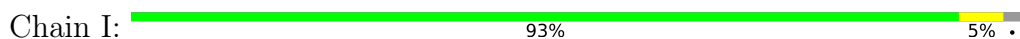
- Molecule 2: GTP cyclohydrolase 1 feedback regulatory protein



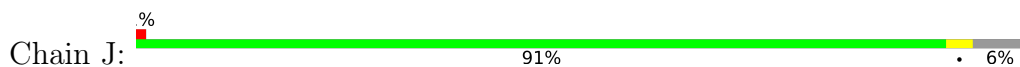
- Molecule 2: GTP cyclohydrolase 1 feedback regulatory protein



- Molecule 2: GTP cyclohydrolase 1 feedback regulatory protein



- Molecule 2: GTP cyclohydrolase 1 feedback regulatory protein



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	163.85Å 113.92Å 113.91Å 90.00° 130.21° 90.00°	Depositor
Resolution (Å)	86.99 – 1.73 86.99 – 1.73	Depositor EDS
% Data completeness (in resolution range)	62.6 (86.99-1.73) 62.6 (86.99-1.73)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.62 (at 1.73Å)	Xtriage
Refinement program	BUSTER 2.11.7 (18-SEP-2020)	Depositor
R, R_{free}	0.197 , 0.227 0.197 , 0.229	Depositor DCC
R_{free} test set	3017 reflections (2.88%)	wwPDB-VP
Wilson B-factor (Å ²)	21.9	Xtriage
Anisotropy	0.039	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	(Not available) , (Not available)	EDS
L-test for twinning ²	$\langle L \rangle = 0.52$, $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	11273	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.74% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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	0.45	0/1476	0.63	0/1994
1	B	0.39	0/1324	0.59	0/1787
1	C	0.42	0/1291	0.59	0/1741
1	D	0.42	0/1460	0.61	0/1973
1	E	0.42	0/1372	0.58	0/1849
2	F	0.40	0/683	0.59	0/922
2	G	0.41	0/692	0.58	0/934
2	H	0.44	0/683	0.59	0/922
2	I	0.39	0/700	0.57	0/945
2	J	0.43	0/674	0.58	0/911
All	All	0.42	0/10355	0.60	0/13978

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 [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	1452	0	1465	8	0
1	B	1304	0	1337	13	0
1	C	1271	0	1313	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	1436	0	1450	16	0
1	E	1350	0	1380	17	0
2	F	669	0	674	4	0
2	G	678	0	680	11	0
2	H	669	0	674	7	0
2	I	685	0	686	4	0
2	J	660	0	661	3	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
4	F	24	22	8	0	0
4	G	12	11	0	0	0
4	H	12	11	8	0	0
4	I	12	11	8	0	0
5	A	148	0	0	0	0
5	B	92	0	0	1	0
5	C	95	0	0	0	0
5	D	135	0	0	0	0
5	E	98	0	0	0	0
5	F	87	0	0	0	0
5	G	81	0	0	1	0
5	H	81	0	0	0	0
5	I	81	0	0	1	0
5	J	81	0	0	0	0
All	All	11218	55	10344	72	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 (72) 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:E:167:LYS:NZ	1:E:170:ARG:HH12	1.60	0.99
1:D:249:ARG:HE	1:E:249:ARG:NH2	1.63	0.97
2:G:2:PRO:HA	2:G:83:LYS:HD3	1.49	0.92
1:E:167:LYS:HZ2	1:E:170:ARG:HH12	1.13	0.92
1:E:154:ILE:HD13	1:E:168:LEU:HD11	1.53	0.90
1:C:154:ILE:HD13	1:C:168:LEU:HD11	1.59	0.83
1:E:167:LYS:NZ	1:E:170:ARG:NH1	2.25	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:154:ILE:HD13	1:B:168:LEU:HD11	1.60	0.83
1:D:111:GLU:HG3	1:D:174:ILE:HG23	1.65	0.78
1:D:249:ARG:HE	1:E:249:ARG:HH22	1.31	0.78
2:G:2:PRO:HA	2:G:83:LYS:CD	2.13	0.77
1:A:249:ARG:HE	1:B:249:ARG:NH2	1.85	0.75
1:B:249:ARG:HE	1:C:249:ARG:NH2	1.85	0.74
1:B:228:SER:O	1:C:128:GLU:HB3	1.87	0.73
1:B:154:ILE:CD1	1:B:168:LEU:HD11	2.19	0.72
1:C:163:LEU:HB2	1:C:197:LEU:HD11	1.71	0.71
1:B:89:GLN:CD	1:B:89:GLN:H	1.94	0.71
1:C:228:SER:O	1:D:128:GLU:HB3	1.92	0.70
1:C:154:ILE:CD1	1:C:168:LEU:HD11	2.22	0.69
1:D:116:VAL:HG21	1:D:174:ILE:HD11	1.76	0.68
1:C:229:THR:HA	1:D:128:GLU:HG3	1.74	0.67
1:E:167:LYS:HZ2	1:E:170:ARG:NH1	1.86	0.66
1:D:127:ASP:O	1:D:128:GLU:HG2	1.98	0.64
1:A:249:ARG:HE	1:B:249:ARG:HH22	1.45	0.64
2:G:2:PRO:HA	2:G:83:LYS:CG	2.28	0.64
1:D:170:ARG:O	1:D:174:ILE:HG13	2.00	0.62
1:E:146:VAL:HG12	1:E:211:MET:HB2	1.82	0.62
2:G:2:PRO:HA	2:G:83:LYS:HG2	1.82	0.62
1:B:146:VAL:HG12	1:B:211:MET:HB2	1.83	0.61
1:A:146:VAL:HG12	1:A:211:MET:HB2	1.84	0.60
1:E:167:LYS:HZ3	1:E:170:ARG:NH1	1.99	0.59
2:I:61:GLU:OE1	2:J:82:HIS:NE2	2.38	0.57
1:C:146:VAL:HG12	1:C:211:MET:HB2	1.86	0.56
2:H:2:PRO:HB3	2:H:83:LYS:HD3	1.87	0.55
1:A:112:THR:HG22	1:A:115:ASP:H	1.72	0.54
1:A:170:ARG:O	1:A:174:ILE:HG13	2.07	0.54
2:I:72:GLY:HA3	2:J:73:VAL:HB	1.90	0.54
1:D:249:ARG:NE	1:E:249:ARG:NH2	2.45	0.53
1:B:231:LEU:HD22	2:G:40:LEU:HB3	1.91	0.53
1:E:146:VAL:CG1	1:E:211:MET:HB2	2.39	0.52
1:E:211:MET:HA	1:E:214:VAL:HG22	1.91	0.52
2:G:61:GLU:OE1	2:H:82:HIS:NE2	2.41	0.51
1:C:229:THR:HA	1:D:128:GLU:CG	2.43	0.48
2:F:54:ARG:HD2	2:G:3:TYR:O	2.14	0.48
1:C:231:LEU:HD22	2:H:40:LEU:HB3	1.94	0.47
1:A:231:LEU:HD22	2:F:40:LEU:HB3	1.96	0.46
2:G:72:GLY:HA3	2:H:73:VAL:HB	1.97	0.46
1:E:126:HIS:HB3	1:E:158:PRO:HG2	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:157:LEU:HD12	1:B:233:VAL:HG21	1.99	0.45
1:B:224:LYS:NZ	5:B:401:HOH:O	2.46	0.45
1:A:111:GLU:HB2	1:A:174:ILE:HG23	1.99	0.44
1:D:116:VAL:HG21	1:D:174:ILE:CD1	2.47	0.44
2:F:73:VAL:HB	2:J:72:GLY:HA3	2.00	0.44
2:H:2:PRO:HB3	2:H:83:LYS:NZ	2.33	0.44
5:G:2211:HOH:O	2:H:18:MET:HB3	2.18	0.43
1:C:249:ARG:HE	1:D:249:ARG:NH2	2.16	0.43
1:D:187:LYS:HE2	1:D:187:LYS:HB3	1.95	0.43
1:C:107:LYS:NZ	1:C:173:GLU:CD	2.73	0.42
1:A:249:ARG:HH22	1:E:249:ARG:HH11	1.67	0.42
1:D:163:LEU:HD22	1:D:197:LEU:HD11	2.01	0.42
1:D:62:GLU:O	1:D:66:LEU:HD13	2.19	0.42
1:E:163:LEU:HB2	1:E:197:LEU:HD11	2.01	0.42
2:G:2:PRO:O	2:G:83:LYS:HG2	2.20	0.42
2:G:2:PRO:CA	2:G:83:LYS:HD3	2.35	0.42
1:E:111:GLU:HB2	1:E:174:ILE:HG12	2.01	0.42
1:B:249:ARG:NE	1:C:249:ARG:NH2	2.62	0.42
1:B:187:LYS:HE2	1:B:187:LYS:HB3	1.90	0.41
2:H:2:PRO:HB3	2:H:83:LYS:CD	2.50	0.41
1:E:166:SER:O	1:E:170:ARG:HD3	2.21	0.41
2:F:72:GLY:HA3	2:G:73:VAL:HB	2.03	0.40
1:D:231:LEU:HD22	2:I:40:LEU:HB3	2.04	0.40
2:I:18:MET:HB3	5:I:2218:HOH:O	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [\(i\)](#)

5.3.1 Protein backbone [\(i\)](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	180/209 (86%)	178 (99%)	2 (1%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	160/209 (77%)	158 (99%)	2 (1%)	0	100	100
1	C	156/209 (75%)	155 (99%)	1 (1%)	0	100	100
1	D	178/209 (85%)	176 (99%)	2 (1%)	0	100	100
1	E	165/209 (79%)	163 (99%)	2 (1%)	0	100	100
2	F	81/87 (93%)	79 (98%)	2 (2%)	0	100	100
2	G	82/87 (94%)	80 (98%)	2 (2%)	0	100	100
2	H	81/87 (93%)	79 (98%)	2 (2%)	0	100	100
2	I	83/87 (95%)	81 (98%)	2 (2%)	0	100	100
2	J	80/87 (92%)	78 (98%)	2 (2%)	0	100	100
All	All	1246/1480 (84%)	1227 (98%)	19 (2%)	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	162/181 (90%)	156 (96%)	6 (4%)	34	14
1	B	145/181 (80%)	142 (98%)	3 (2%)	53	35
1	C	141/181 (78%)	139 (99%)	2 (1%)	67	52
1	D	160/181 (88%)	158 (99%)	2 (1%)	69	55
1	E	150/181 (83%)	147 (98%)	3 (2%)	55	37
2	F	74/77 (96%)	74 (100%)	0	100	100
2	G	75/77 (97%)	73 (97%)	2 (3%)	44	25
2	H	74/77 (96%)	73 (99%)	1 (1%)	67	52
2	I	76/77 (99%)	76 (100%)	0	100	100
2	J	73/77 (95%)	73 (100%)	0	100	100
All	All	1130/1290 (88%)	1111 (98%)	19 (2%)	60	44

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

Mol	Chain	Res	Type
1	A	112	THR
1	A	140	MET
1	A	141	CYS
1	A	157	LEU
1	A	162	VAL
1	A	174	ILE
1	B	141	CYS
1	B	222	ASN
1	B	223	SER
1	C	222	ASN
1	C	223	SER
1	D	141	CYS
1	D	163	LEU
1	E	154	ILE
1	E	162	VAL
1	E	170	ARG
2	G	66	ARG
2	G	84	GLU
2	H	4	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	118	ASN
1	C	222	ASN
1	D	161	GLN
2	F	75	GLN
2	G	75	GLN
2	H	75	GLN
2	I	0	HIS
2	I	75	GLN
2	J	75	GLN

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 [i](#)

Of 12 ligands modelled in this entry, 5 are monoatomic - leaving 7 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	PHE	I	2101	-	9,12,12	0.26	0	10,15,15	0.40	0
4	PHE	H	2101	-	9,12,12	0.51	0	10,15,15	0.25	0
4	PHE	F	2102	-	9,12,12	0.47	0	10,15,15	0.22	0

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	PHE	I	2101	-	-	0/4/8/8	0/1/1/1
4	PHE	H	2101	-	-	0/4/8/8	0/1/1/1
4	PHE	F	2102	-	-	0/4/8/8	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

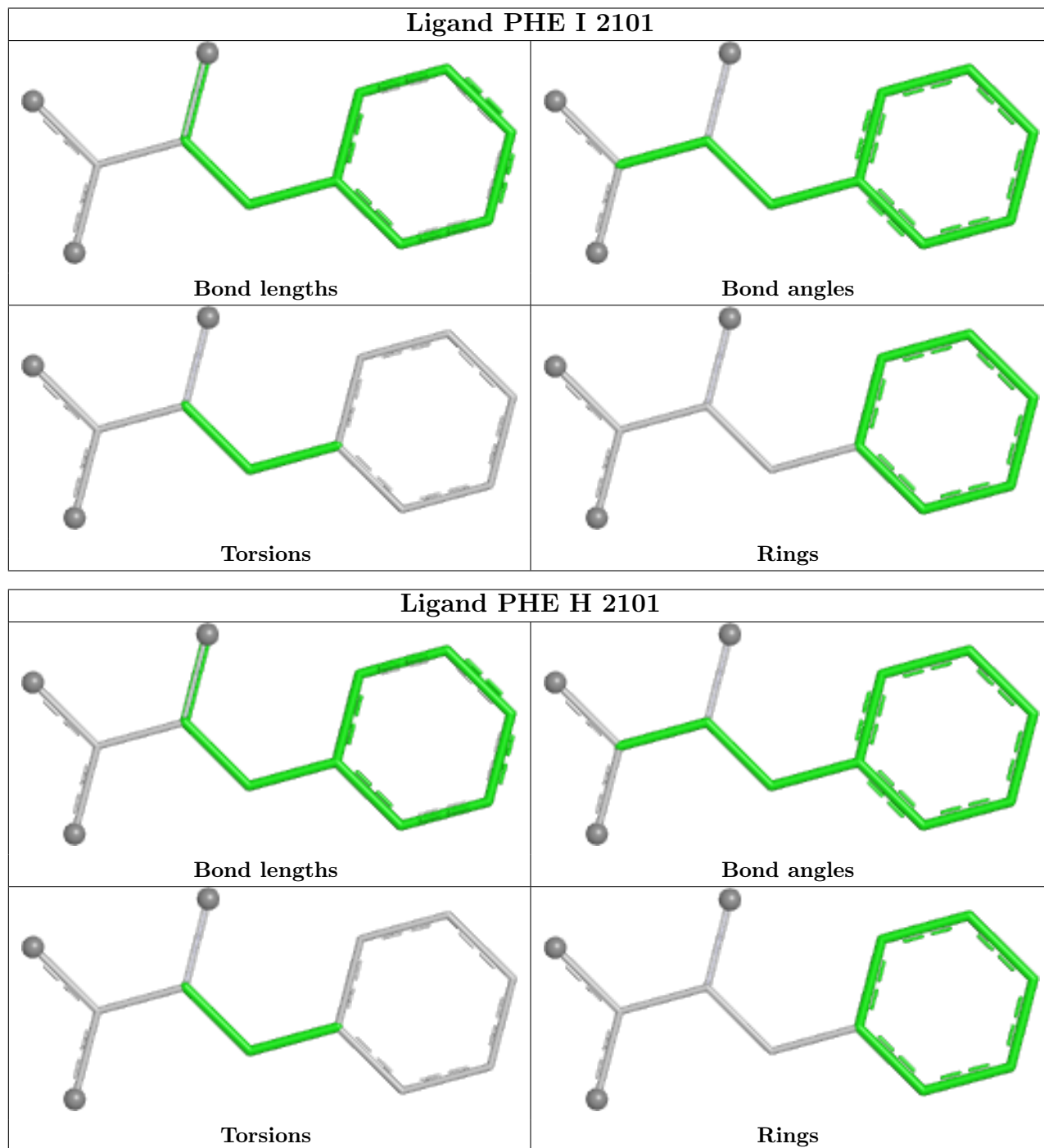
There are no torsion outliers.

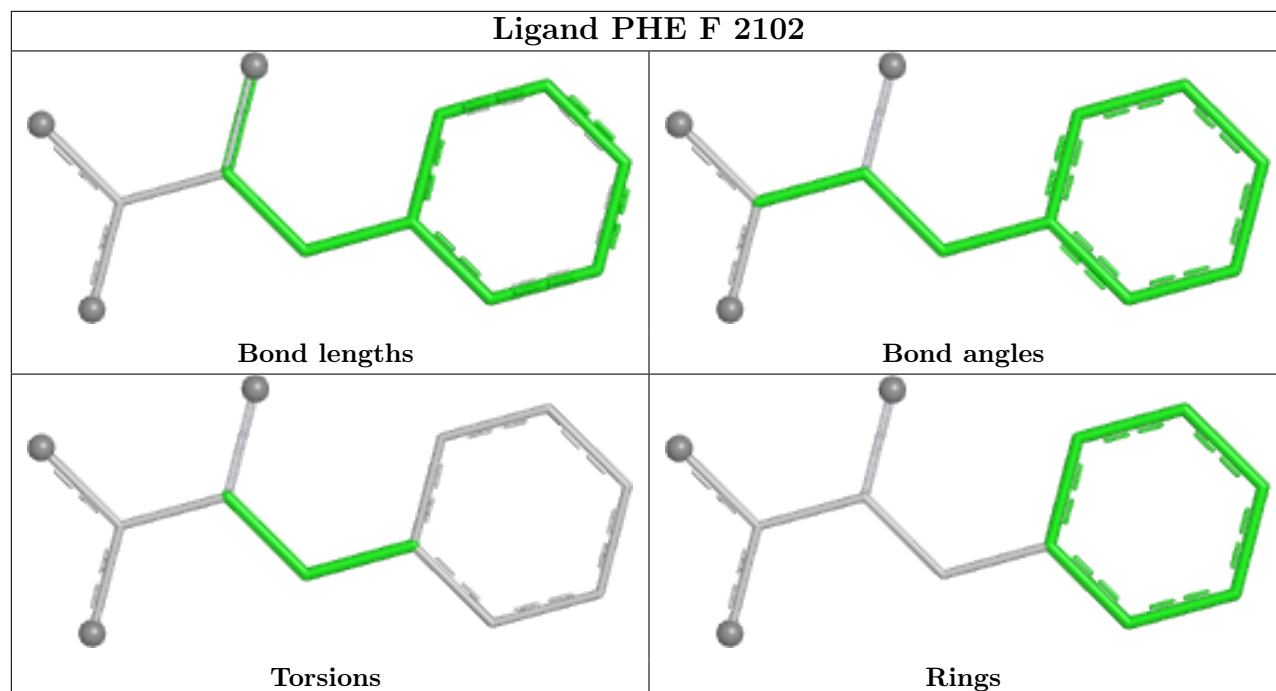
There are no ring outliers.

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 than 5% of the Mogul distribution of torsion angles is

within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	184/209 (88%)	-0.03	4 (2%) 62 66	15, 23, 40, 53	0
1	B	166/209 (79%)	0.18	8 (4%) 30 34	16, 29, 51, 66	0
1	C	162/209 (77%)	0.18	8 (4%) 29 33	15, 25, 47, 71	0
1	D	182/209 (87%)	0.03	6 (3%) 46 51	15, 27, 43, 59	0
1	E	171/209 (81%)	0.13	8 (4%) 31 35	16, 24, 47, 58	0
2	F	83/87 (95%)	-0.18	0 100 100	14, 24, 38, 45	0
2	G	84/87 (96%)	-0.18	1 (1%) 79 83	14, 24, 39, 53	0
2	H	83/87 (95%)	-0.19	2 (2%) 59 63	14, 21, 37, 49	0
2	I	85/87 (97%)	-0.14	0 100 100	13, 25, 39, 48	0
2	J	82/87 (94%)	-0.20	1 (1%) 79 83	14, 22, 37, 48	0
All	All	1282/1480 (86%)	0.01	38 (2%) 50 54	13, 25, 44, 71	0

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	214	VAL	7.5
1	A	213	MET	4.7
1	C	113	ILE	4.5
1	C	96	TRP	4.1
1	B	138	PHE	3.7
1	A	138	PHE	3.7
1	C	68	LEU	3.3
1	E	215	MET	3.3
1	B	96	TRP	3.1
1	B	66	LEU	3.1
1	B	113	ILE	3.1
1	C	160	LYS	3.1
1	C	138	PHE	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	222	ASN	2.9
1	D	138	PHE	2.9
1	D	66	LEU	2.9
1	E	249	ARG	2.9
1	B	64	ASN	2.8
1	E	213	MET	2.8
1	C	114	SER	2.8
1	E	61	GLU	2.8
1	B	65	GLU	2.8
1	D	62	GLU	2.7
2	J	1	MET	2.6
1	D	249	ARG	2.5
1	D	165	LEU	2.5
1	E	127	ASP	2.4
1	E	66	LEU	2.4
1	E	138	PHE	2.4
2	H	1	MET	2.4
2	H	43	ASN	2.4
1	C	249	ARG	2.3
1	A	61	GLU	2.3
1	B	170	ARG	2.3
1	B	127	ASP	2.2
2	G	84	GLU	2.2
1	C	112	THR	2.1
1	D	174	ILE	2.1

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](#)

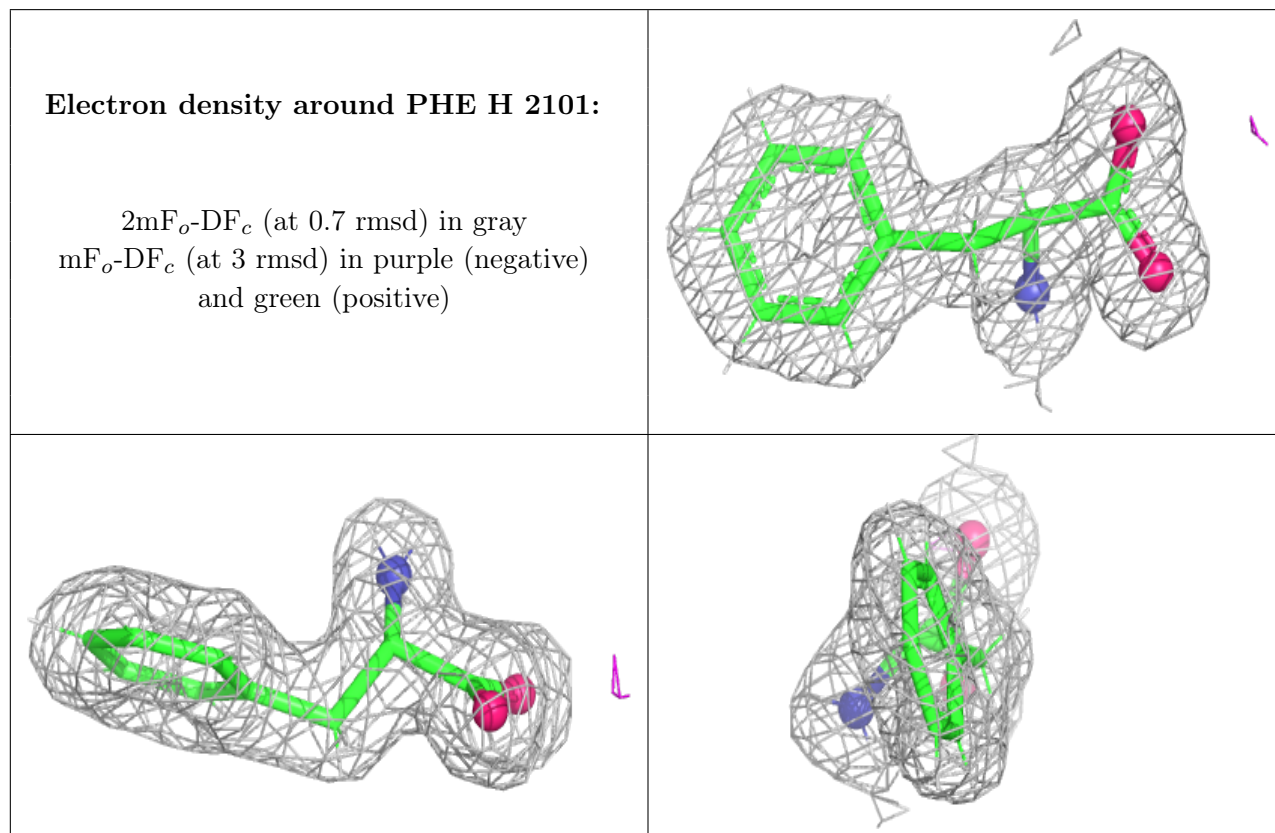
There are no monosaccharides in this entry.

6.4 Ligands [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.

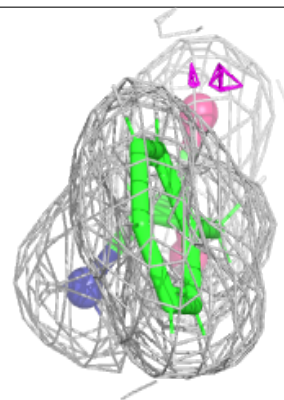
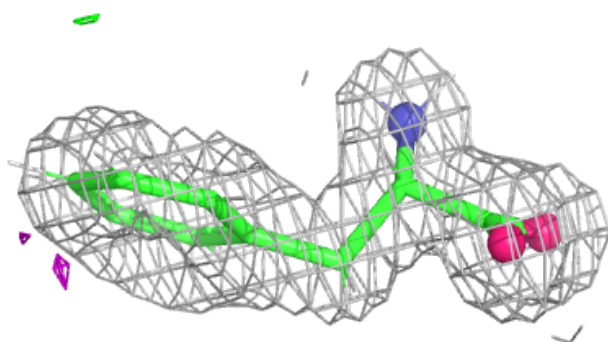
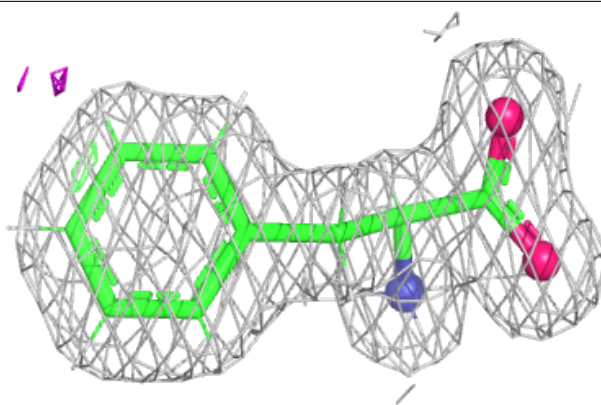
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	PHE	H	2101	12/12	0.97	0.07	12,14,16,17	11
4	PHE	F	2101[B]	12/12	0.98	0.07	13,15,16,17	10
4	PHE	F	2102	12/12	0.98	0.06	12,14,16,17	11
4	PHE	F	2101[A]	12/12	0.98	0.07	13,15,16,17	10
4	PHE	I	2101	12/12	0.98	0.07	13,14,17,17	11
4	PHE	G	2101[A]	12/12	0.99	0.06	13,15,18,19	10
4	PHE	G	2101[B]	12/12	0.99	0.06	13,15,18,19	10
3	ZN	C	301	1/1	0.99	0.04	33,33,33,33	0
3	ZN	B	301	1/1	0.99	0.07	37,37,37,37	0
3	ZN	D	301	1/1	1.00	0.06	33,33,33,33	0
3	ZN	E	301	1/1	1.00	0.05	28,28,28,28	0
3	ZN	A	301	1/1	1.00	0.06	29,29,29,29	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.

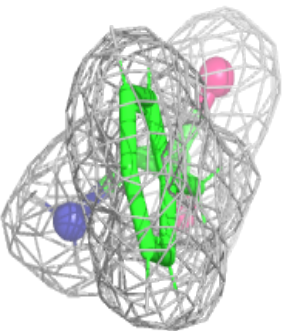
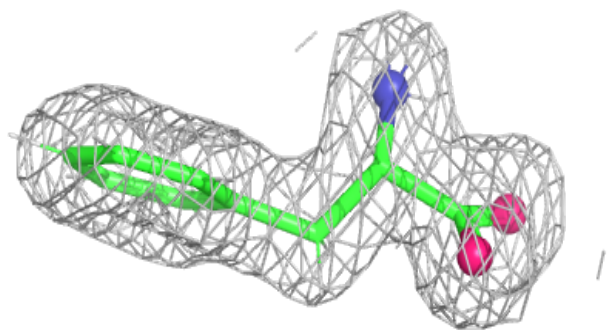
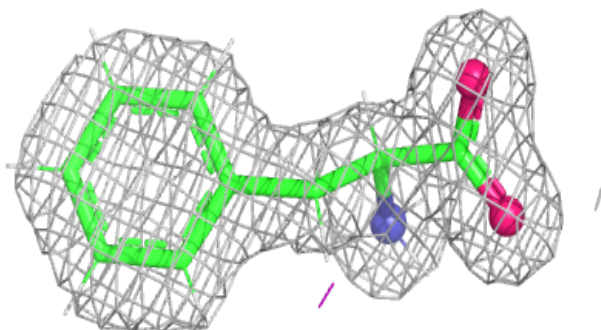


Electron density around PHE F 2102:

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

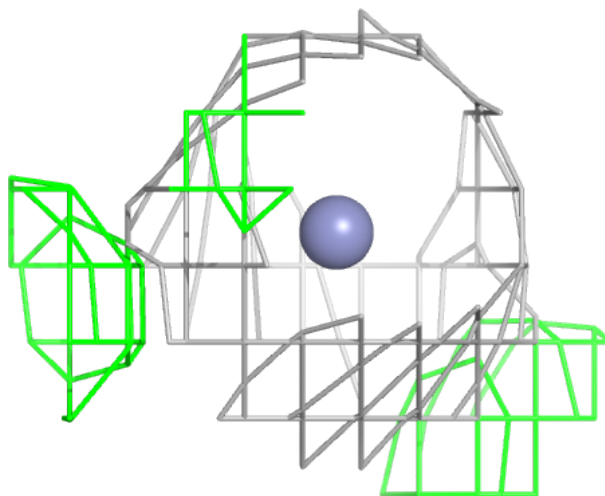
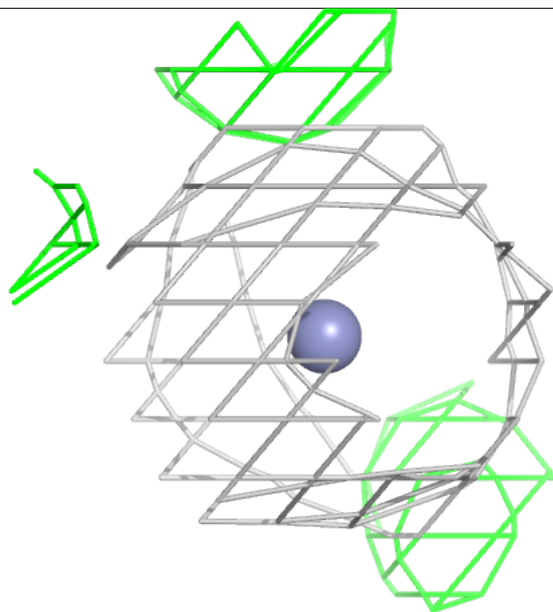
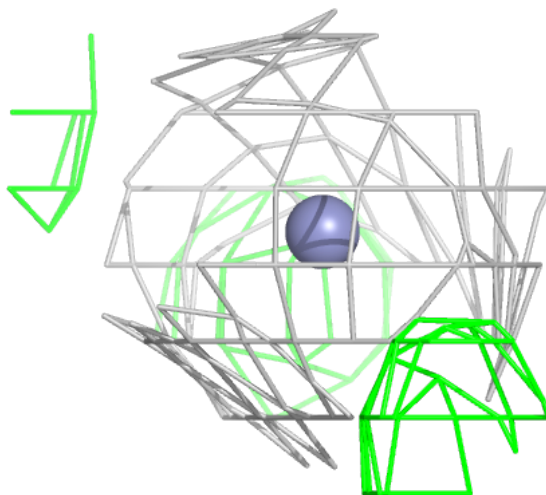
**Electron density around PHE I 2101:**

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



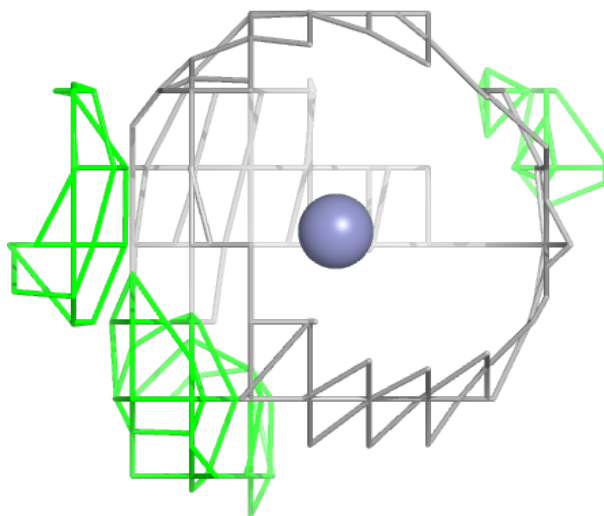
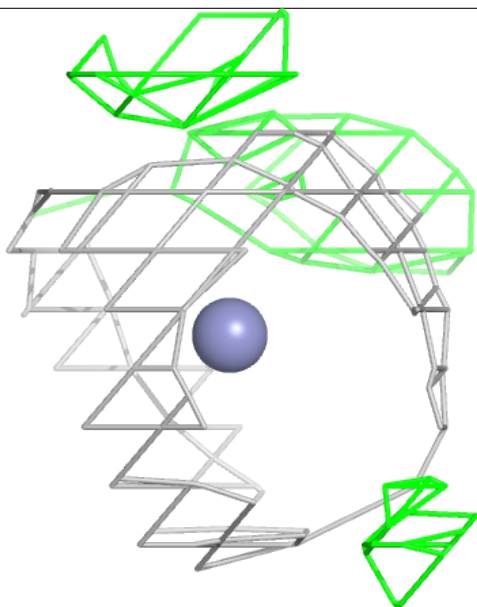
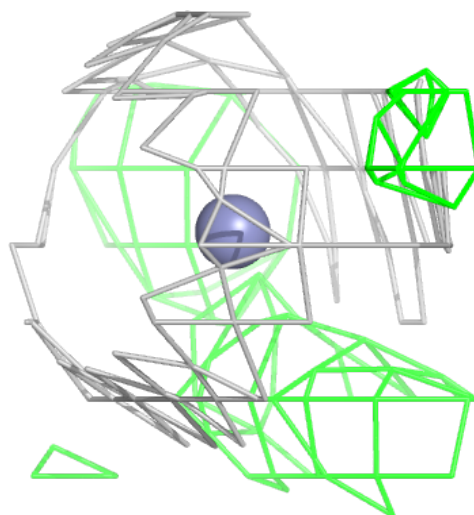
Electron density around ZN C 301:

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



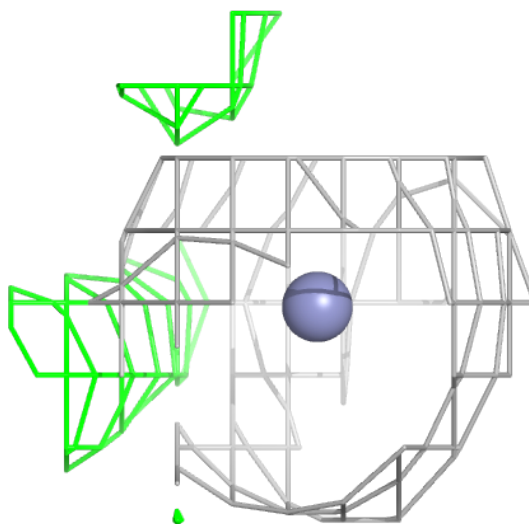
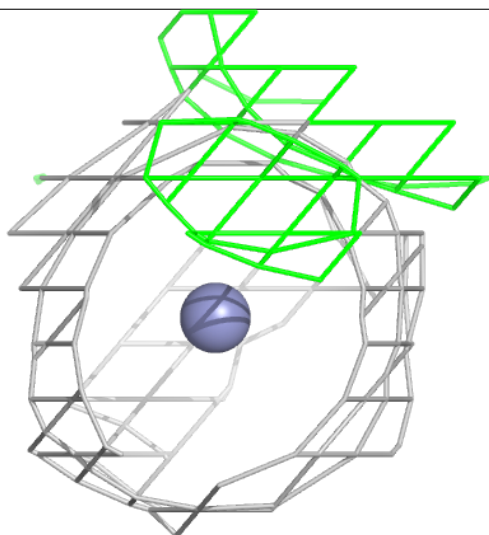
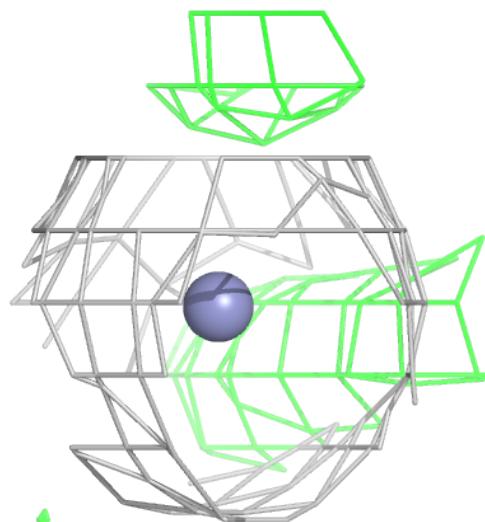
Electron density around ZN B 301:

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



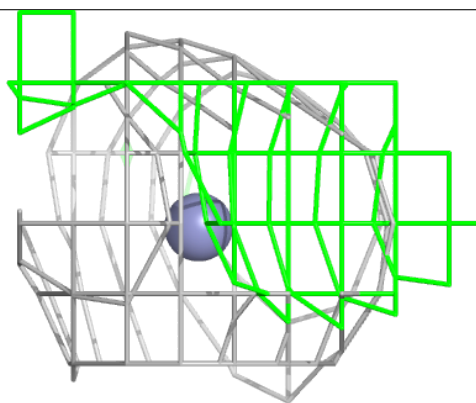
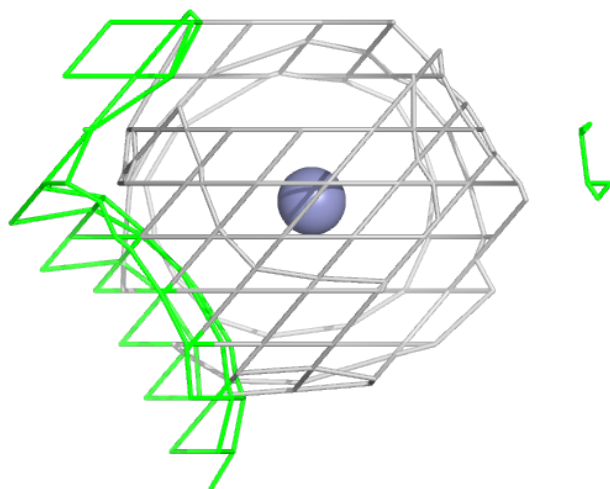
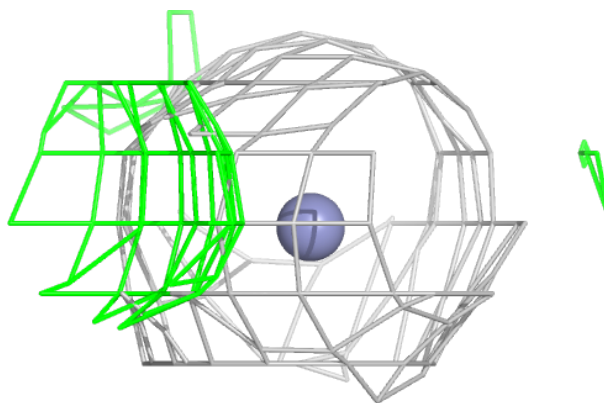
Electron density around ZN D 301:

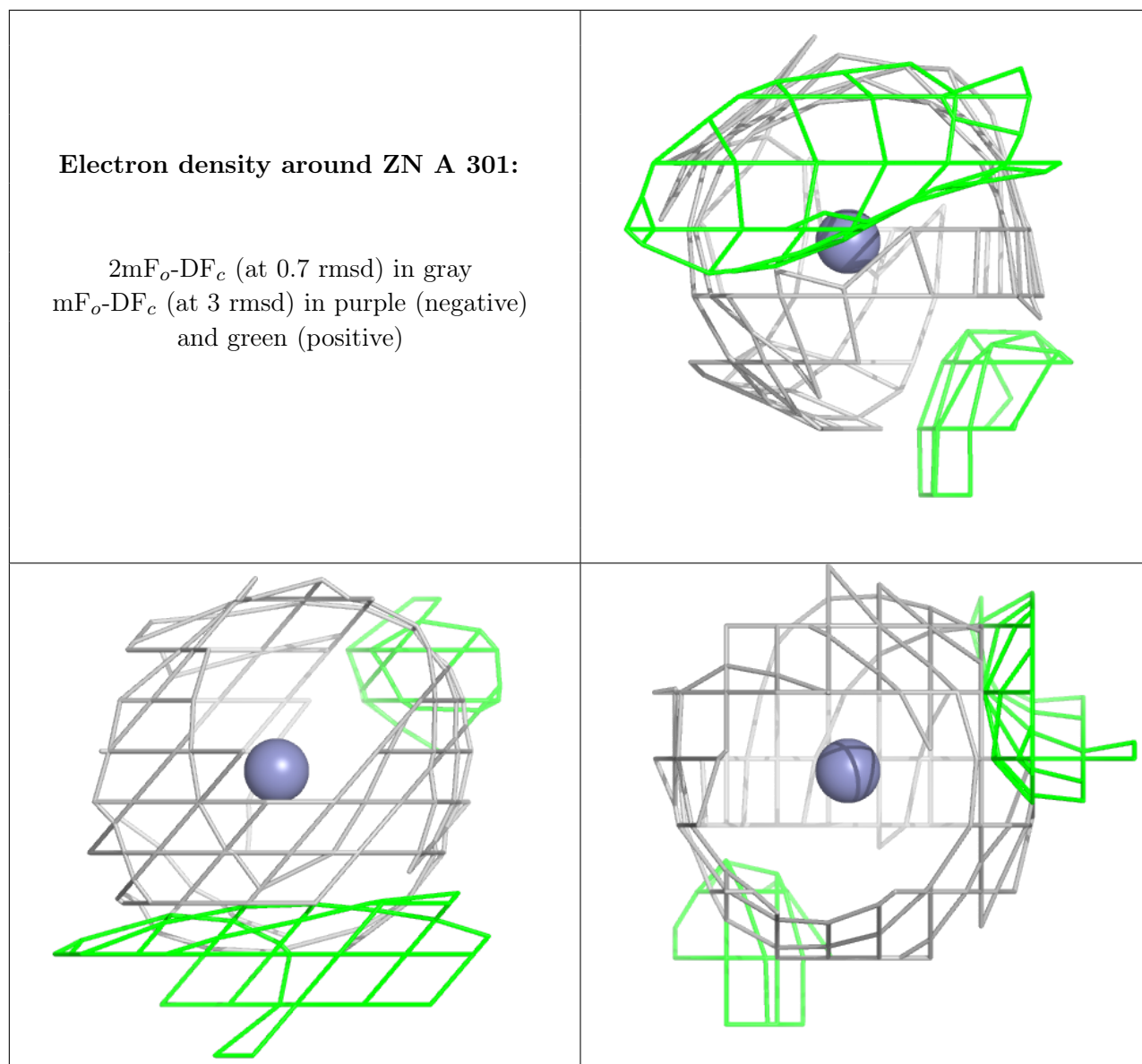
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around ZN E 301:

$2mF_o-DF_c$ (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.