WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Mar 12, 2026 – 12:09 PM EDT

PDB ID	:	9MRS / pdb_00009mrs
Title	:	Crystal structure of human MMACHC in complex with MMADHC and B12
Authors	:	Mascarenhas, R.; Banerjee, R.
Deposited on	:	2025-01-08
Resolution	:	3.40 Å(reported)

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

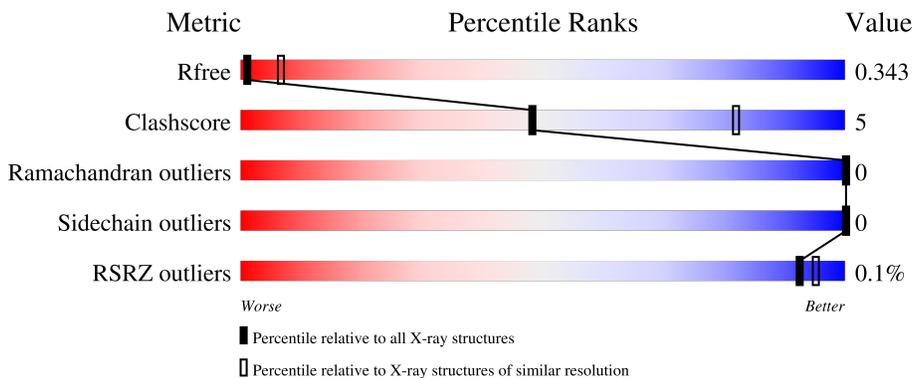|		
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.48.1

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 3.40 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.
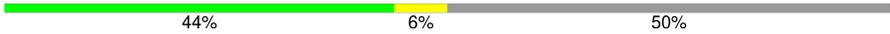
Metric	Percentile Ranks	Value
Rfree		0.343
Clashscore		5
Ramachandran outliers		0
Sidechain outliers		0
RSRZ outliers		0.1%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1140 (3.46-3.34)
Clashscore	180529	1172 (3.46-3.34)
Ramachandran outliers	177936	1172 (3.46-3.34)
Sidechain outliers	177891	1172 (3.46-3.34)
RSRZ outliers	164620	1140 (3.46-3.34)

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	223	79% 15% 6%
1	B	223	77% 18% 5%
1	E	223	80% 14% 6%
1	G	223	81% 13% 6%
2	C	296	44% • 51%

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Mol	Chain	Length	Quality of chain
2	D	296	44% 6% 50%
2	F	296	44% 5% 51%
2	H	296	44% 5% 51%

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 11661 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 Cyanocobalamin reductase / alkylcobalamin dealkylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	209	Total	C	N	O	S	0	1	0
			1653	1071	280	297	5			
1	B	211	Total	C	N	O	S	0	1	0
			1699	1109	287	298	5			
1	E	210	Total	C	N	O	S	0	1	0
			1669	1088	281	295	5			
1	G	210	Total	C	N	O	S	0	1	0
			1694	1099	293	296	6			

- Molecule 2 is a protein called Cobalamin trafficking protein CblD.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	148	Total	C	N	O	S	0	0	0
			1158	742	189	220	7			
2	F	144	Total	C	N	O	S	0	0	0
			1141	731	185	219	6			
2	C	144	Total	C	N	O	S	0	0	0
			1139	729	185	219	6			
2	H	144	Total	C	N	O	S	0	0	0
			1144	733	185	219	7			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	262	SER	CYS	conflict	UNP Q9H3L0
F	262	SER	CYS	conflict	UNP Q9H3L0
C	262	SER	CYS	conflict	UNP Q9H3L0
H	262	SER	CYS	conflict	UNP Q9H3L0

- Molecule 3 is COBALAMIN (CCD ID: B12) (formula: $C_{62}H_{89}CoN_{13}O_{14}P$) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	Co	N	O	P	0	0
			91	62	1	13	14	1		
3	B	1	Total	C	Co	N	O	P	0	0
			91	62	1	13	14	1		
3	E	1	Total	C	Co	N	O	P	0	0
			91	62	1	13	14	1		
3	G	1	Total	C	Co	N	O	P	0	0
			91	62	1	13	14	1		

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 summa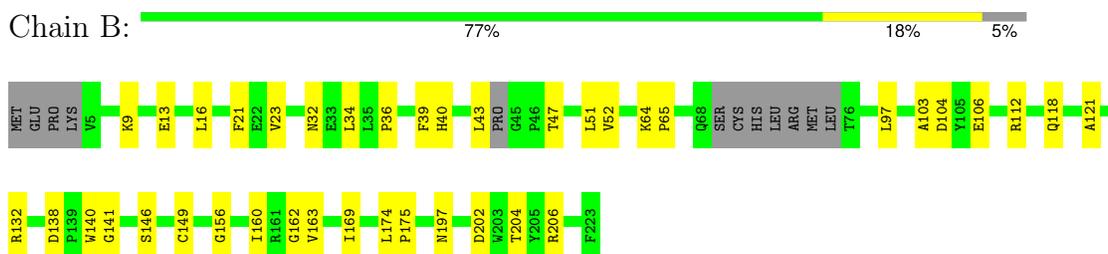rises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: 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: Cyanocobalamin reductase / alkylcobalamin dealkylase

Chain A:

- Molecule 1: Cyanocobalamin reductase / alkylcobalamin dealkylase

Chain B:

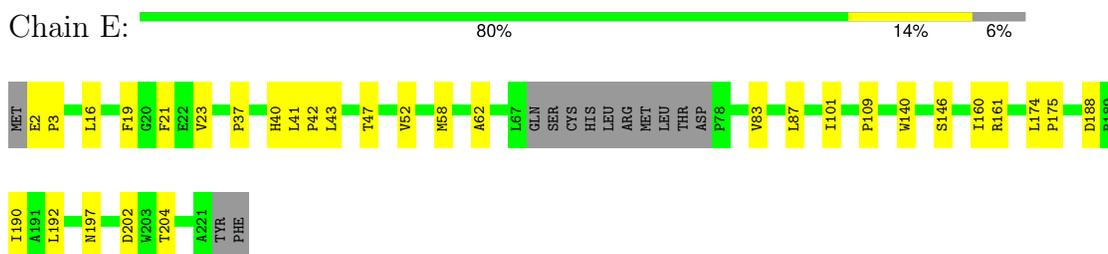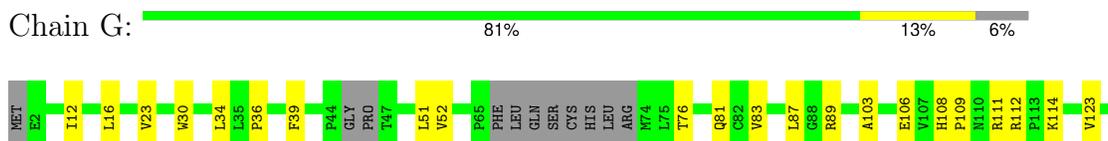
- Molecule 1: Cyanocobalamin reductase / alkylcobalamin dealkylase

Chain E:

- Molecule 1: Cyanocobalamin reductase / alkylcobalamin dealkylase

Chain G:

R132 A137 ASP PRO W140 I145 R161 G162 V163 L174 P175 L192 A208 F223

• Molecule 2: Cobalamin trafficking protein CblD

Chain D:

44%   6%   50%

MET ALA ASN VAL LEU CYS ASN ARG ALA ARG LEU VAL SER TYR LEU PRO GLY PHE CYS SER LEU VAL LYS ARG VAL ASN PRO LYS ALA PHE SER THR ALA GLY SER GLY SER ASP GLU SER HIS VAL ALA ALA PRO PRO ASP ILE CYS SER ARG THR VAL TRP PRO ASP GLU

THR MET GLY PHE GLY PRO GLN ASP ARG PHE GLN LEU PRO GLY ASN ILE GLY PHE ASP CYS HIS LEU ASN GLY THR ALA SER GLN LYS LYS SER LEU VAL HIS LYS THR LEU PRO ASP VAL LEU ALA GLU PRO LEU SER SER GLU ARG HIS GLU PHE VAL MET ALA GLN TYR VAL

ASN GLU PHE GLN GLY ASN ASP ALA PRO VAL GLU GLN GLN ILE ASN SER ALA GLU THR TYR F141 I150 F165 P166 GLU VAL ALA ASN GLY K172 L173 M174 I175 L176 M186 T187 R197 W221 D258 K263 V264 I265 R266 T272 H273 T281 M290 L293 SER

GLY ASN

• Molecule 2: Cobalamin trafficking protein CblD

Chain F:

44%   5%   51%

MET ALA ASN VAL LEU CYS ASN ARG ALA ARG LEU VAL SER TYR LEU PRO GLY PHE CYS SER LEU VAL LYS ARG VAL ASN PRO LYS ALA PHE SER THR ALA GLY SER GLY SER ASP GLU SER HIS VAL ALA ALA PRO PRO ASP ILE CYS SER ARG THR VAL TRP PRO ASP GLU

THR MET GLY PHE GLY PRO GLN ASP ARG PHE GLN LEU PRO GLY ASN ILE GLY PHE ASP CYS HIS LEU ASN GLY THR ALA SER GLN LYS LYS SER LEU VAL HIS LYS THR LEU PRO ASP VAL LEU ALA GLU PRO LEU SER SER GLU ARG HIS GLU PHE VAL MET ALA GLN TYR VAL

ASN GLU PHE GLN GLY ASN ASP ALA PRO VAL GLU GLN GLN ILE ASN SER ALA GLU THR TYR PHE GLU SER ALA ARG V146 I150 F161 L164 F165 P166 E167 VAL ALA ASN GLY K172 L176 T187 D223 F224 I225 S228 G235 P236 L242 S255 V264 I265

R266 L293 SER GLY ASN

• Molecule 2: Cobalamin trafficking protein CblD

Chain C:

44%   ·   51%

MET ALA ASN VAL LEU CYS ASN ARG ALA ARG LEU VAL SER TYR LEU PRO GLY PHE CYS SER LEU VAL LYS ARG VAL ASN PRO LYS ALA PHE SER THR ALA GLY SER GLY SER ASP GLU SER HIS VAL ALA ALA PRO PRO ASP ILE CYS SER ARG THR VAL TRP PRO ASP GLU

THR MET GLY PHE GLY PRO GLN ASP ARG PHE GLN LEU PRO GLY ASN ILE GLY PHE ASP CYS HIS LEU ASN GLY THR ALA SER GLN LYS LYS SER LEU VAL HIS LYS THR LEU PRO ASP VAL LEU ALA GLU PRO LEU SER SER GLU ARG HIS GLU PHE VAL MET ALA GLN TYR VAL

ASN GLU PHE GLN GLY ASN ASP ALA PRO VAL GLU GLN GLN ILE ASN SER ALA GLU THR TYR PHE GLU SER ALA ARG V146 F161 L164 F165 P166 E167 VAL ALA ASN GLY K172 T187 E194 D223 F224 I225 G235 P236 L242 V264 I265 V276 L293 SER GLY

ASN

• Molecule 2: Cobalamin trafficking protein CblD

Chain H:

44%   5%   51%

MET ALA ASN VAL LEU CYS ASN ARG ALA ARG LEU VAL SER TYR LEU PRO GLY PHE CYS SER LEU VAL LYS ARG VAL VAL ASN PRO LYS ALA PHE SER THR ALA GLY SER SER GLY SER ASP GLU SER HIS VAL ALA ALA ALA PRO PRO ASP ILE CYS SER ARG THR VAL TRP PRO ASP GLU

THR MET GLY PRO PHE GLY PRO GLN ASP GLN ARG PHE GLU LEU PRO GLY ASN ILE GLY PHE ASP CYS HIS LEU ASN GLY THR ALA SER GLN LYS LYS SER LEU VAL HIS LYS THR LEU PRO ASP VAL LEU ALA GLU PRO LEU SER GLU SER GLU ARG HIS GLU PHE VAL MET ALA GLN TYR VAL

ASN GLU PHE GLN GLY ASN ASP ALA PRO VAL GLU GLN GLU ILE ASN SER ALA GLU THR TYR PHE GLU SER ALA ARG **V146** **I150** **P166** **E167** VAL ALA ASN GLY **K172** **L176** **M186** **T187** **R197** **R216** **I225** **S228** **F234** **G235** **P236** **L242** **R250** **V256**

V264 **L293** SER GLY ASN

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	72.76Å 67.98Å 192.66Å 90.00° 99.38° 90.00°	Depositor
Resolution (Å)	41.24 – 3.40 41.24 – 3.40	Depositor EDS
% Data completeness (in resolution range)	53.2 (41.24-3.40) 53.6 (41.24-3.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.69 (at 3.41Å)	Xtriage
Refinement program	PHENIX (1.15.2_3472: ???)	Depositor
R, R_{free}	0.300 , 0.357 0.306 , 0.343	Depositor DCC
R_{free} test set	673 reflections (2.60%)	wwPDB-VP
Wilson B-factor (Å^2)	81.5	Xtriage
Anisotropy	0.130	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 122.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.40, < L^2 > = 0.22$	Xtriage
Estimated twinning fraction	0.077 for h,-k,-h-l	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	11661	wwPDB-VP
Average B, all atoms (Å^2)	72.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.21% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1] Intensities estimated from amplitudes.
[2] Theoretical values of $< \|L\| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: B12

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	0.09	0/1709	0.24	0/2340
1	B	0.08	0/1759	0.24	0/2407
1	E	0.09	0/1729	0.25	0/2370
1	G	0.09	0/1750	0.26	0/2390
2	C	0.07	0/1163	0.20	0/1574
2	D	0.07	0/1182	0.21	0/1600
2	F	0.07	0/1165	0.21	0/1577
2	H	0.07	0/1168	0.21	0/1580
All	All	0.08	0/11625	0.23	0/15838

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	1653	0	1569	20	0
1	B	1699	0	1635	25	0
1	E	1669	0	1604	21	0
1	G	1694	0	1644	19	0
2	C	1139	0	1102	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	1158	0	1124	9	0
2	F	1141	0	1109	8	0
2	H	1144	0	1116	11	0
3	A	91	0	88	7	0
3	B	91	0	88	8	0
3	E	91	0	88	4	0
3	G	91	0	88	2	0
All	All	11661	0	11255	124	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 5.

All (124) 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:149:CYS:H	3:B:301:B12:H332	1.40	0.67
2:F:255:SER:HB2	2:F:266:ARG:HB2	1.78	0.65
2:D:290:MET:HA	2:D:293:LEU:HD23	1.79	0.64
1:E:160:ILE:O	3:E:301:B12:N29	2.32	0.62
1:B:118:GLN:HE21	3:B:301:B12:H331	1.48	0.61
1:G:23:VAL:HG12	1:G:52:VAL:HG22	1.83	0.59
2:F:166:PRO:HG3	2:F:236:PRO:HD2	1.86	0.57
1:B:9:LYS:NZ	1:B:13:GLU:OE2	2.34	0.57
3:E:301:B12:H601	3:E:301:B12:H262	1.87	0.57
1:B:23:VAL:HG12	1:B:52:VAL:HG22	1.85	0.57
1:E:19:PHE:HB3	1:E:62:ALA:HB2	1.88	0.56
1:A:110:ASN:HA	2:D:197:ARG:HD2	1.87	0.55
1:B:32:ASN:O	1:B:40:HIS:NE2	2.39	0.55
1:G:109:PRO:HB3	2:H:228:SER:HA	1.87	0.55
1:G:192:LEU:HD13	1:G:208:ALA:HB2	1.87	0.55
1:A:32:ASN:O	1:A:40:HIS:NE2	2.39	0.55
1:E:202:ASP:OD2	1:E:204:THR:OG1	2.21	0.54
2:D:186:MET:HG2	2:D:273:HIS:HA	1.88	0.54
2:F:187:THR:HG22	2:F:264:VAL:HG21	1.90	0.54
1:B:43:LEU:HD22	1:B:47:THR:HG21	1.89	0.53
2:C:166:PRO:HG3	2:C:236:PRO:HD2	1.91	0.53
1:B:36:PRO:HG2	1:B:39:PHE:HD2	1.74	0.52
1:B:104:ASP:OD2	3:B:301:B12:N29	2.40	0.52
3:B:301:B12:H552	3:B:301:B12:H531	1.91	0.52
1:B:132:ARG:NH2	1:B:141:GLY:O	2.42	0.52
1:E:37:PRO:HA	1:E:40:HIS:CD2	2.45	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:225:ILE:HG13	2:F:242:LEU:HD23	1.92	0.52
1:E:174:LEU:HD12	1:E:175:PRO:HD2	1.90	0.52
1:E:42:PRO:HB3	2:H:216:ARG:HH22	1.75	0.51
3:A:401:B12:H531	3:A:401:B12:H552	1.91	0.51
1:B:174:LEU:HD12	1:B:175:PRO:HD2	1.91	0.51
2:H:166:PRO:HG3	2:H:236:PRO:HD2	1.93	0.51
1:E:58:MET:HG2	1:E:62:ALA:HB3	1.93	0.50
2:D:258:ASP:HA	2:D:263:LYS:HG2	1.93	0.50
1:A:41:LEU:O	1:A:43:LEU:N	2.45	0.50
1:B:146:SER:N	1:B:197:ASN:OD1	2.40	0.50
2:D:165:PHE:HB3	2:D:221:TRP:HH2	1.77	0.50
1:G:76:THR:OG1	1:G:81:GLN:OE1	2.27	0.50
1:E:87:LEU:HB3	1:E:101:ILE:HD13	1.93	0.50
1:E:109:PRO:HB3	2:F:228:SER:HA	1.94	0.50
2:C:225:ILE:HG13	2:C:242:LEU:HD23	1.94	0.49
1:A:19:PHE:HB3	1:A:62:ALA:HB2	1.94	0.49
1:G:16:LEU:HD23	1:G:52:VAL:HG11	1.93	0.49
1:G:83:VAL:HG11	1:G:161:ARG:HB3	1.95	0.49
2:H:187:THR:HG22	2:H:264:VAL:HG11	1.96	0.48
3:E:301:B12:H552	3:E:301:B12:H531	1.96	0.48
3:A:401:B12:H601	3:A:401:B12:H262	1.96	0.48
2:D:187:THR:HG22	2:D:264:VAL:HG21	1.96	0.48
1:E:21:PHE:HE1	1:E:161:ARG:HG3	1.79	0.48
1:A:23:VAL:HG12	1:A:52:VAL:HG22	1.95	0.47
1:E:43:LEU:HD13	1:E:47:THR:HG21	1.96	0.47
1:B:103:ALA:HB3	1:B:106:GLU:HG3	1.96	0.47
2:D:150:ILE:HG12	2:D:176:LEU:HG	1.96	0.47
2:H:250:ARG:HB3	2:H:256:VAL:HG23	1.97	0.47
1:E:23:VAL:HG12	1:E:52:VAL:HG22	1.96	0.47
1:G:51:LEU:HD23	1:G:163:VAL:HG22	1.94	0.47
1:G:108:HIS:HB2	1:G:112:ARG:HB2	1.95	0.47
1:A:138:ASP:HB2	1:A:140:TRP:CE3	2.48	0.47
1:G:34:LEU:HD13	3:G:301:B12:HM53	1.97	0.47
1:B:103:ALA:HA	1:B:162:GLY:HA3	1.97	0.47
1:A:2:GLU:HB3	1:A:3:PRO:HD3	1.97	0.47
2:H:187:THR:HG22	2:H:264:VAL:HG21	1.96	0.46
1:B:112:ARG:HG3	2:C:194:GLU:CD	2.41	0.46
1:E:41:LEU:O	1:E:43:LEU:N	2.46	0.46
2:C:187:THR:HG22	2:C:264:VAL:HG21	1.96	0.46
1:G:174:LEU:HD12	1:G:175:PRO:HD2	1.98	0.46
1:E:188:ASP:O	1:E:192:LEU:N	2.43	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:132:ARG:HD2	1:A:145:ILE:HB	1.99	0.45
2:C:161:PHE:HD1	2:C:164:LEU:HD12	1.82	0.45
2:C:223:ASP:OD2	2:C:235:GLY:N	2.49	0.44
1:A:43:LEU:HD13	1:A:47:THR:HG21	1.99	0.44
1:B:156:GLY:HA3	1:B:206:ARG:HA	1.99	0.44
1:G:103:ALA:HB3	1:G:106:GLU:HG3	1.98	0.44
1:G:12:ILE:HG22	1:G:23:VAL:HG11	1.99	0.44
1:G:36:PRO:HG2	1:G:39:PHE:HD2	1.81	0.44
1:A:156:GLY:HA3	1:A:206:ARG:HA	1.99	0.44
1:B:138:ASP:HB2	1:B:140:TRP:CE3	2.52	0.44
1:B:51:LEU:HG	1:B:121:ALA:HA	2.00	0.44
1:E:2:GLU:HB2	1:E:3:PRO:HD3	2.00	0.43
1:A:104:ASP:OD2	3:A:401:B12:N29	2.50	0.43
2:F:150:ILE:HG12	2:F:176:LEU:HG	1.99	0.43
2:F:161:PHE:HD1	2:F:164:LEU:HD12	1.83	0.43
3:A:401:B12:H473	3:A:401:B12:H482	1.92	0.43
1:E:87:LEU:HD13	1:E:101:ILE:HG21	2.00	0.43
1:A:107:VAL:HG12	1:A:113:PRO:HA	2.00	0.43
1:A:108:HIS:CE1	1:A:114:LYS:HG2	2.54	0.43
2:H:186:MET:HE3	2:H:197:ARG:CZ	2.49	0.43
1:B:34:LEU:HD13	3:B:301:B12:HM62	2.01	0.42
1:E:146:SER:N	1:E:197:ASN:OD1	2.51	0.42
3:B:301:B12:H601	3:B:301:B12:H262	2.01	0.42
1:A:76:THR:OG1	1:A:77:ASP:N	2.52	0.42
3:B:301:B12:H451	3:B:301:B12:H411	1.70	0.42
1:E:16:LEU:HB3	1:E:21:PHE:HB2	2.01	0.42
1:A:106:GLU:HB3	1:A:114:LYS:HD2	2.02	0.42
2:F:223:ASP:OD2	2:F:235:GLY:N	2.50	0.42
2:H:150:ILE:HG12	2:H:176:LEU:HG	2.01	0.42
2:H:225:ILE:HG13	2:H:242:LEU:HD23	2.02	0.42
1:B:16:LEU:HB3	1:B:21:PHE:HB2	2.01	0.42
1:B:64:LYS:HB3	1:B:65:PRO:HD3	2.02	0.41
1:B:202:ASP:OD2	1:B:204:THR:OG1	2.25	0.41
1:E:83:VAL:HG21	1:E:161:ARG:HD2	2.02	0.41
1:A:132:ARG:NH2	1:A:141:GLY:O	2.35	0.41
1:B:65:PRO:HG3	1:G:89:ARG:NH2	2.35	0.41
1:B:97:LEU:HD22	1:B:169:ILE:HD11	2.01	0.41
1:G:30:TRP:HB3	1:G:123:VAL:HG11	2.03	0.41
1:A:128:TYR:HB3	1:A:130:TYR:CE2	2.55	0.41
1:A:153:ARG:HD2	1:A:154:PHE:CE2	2.56	0.41
1:B:160:ILE:O	3:B:301:B12:N29	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:16:LEU:HD21	1:G:87:LEU:HD23	2.01	0.41
2:D:266:ARG:HG2	2:D:272:THR:HG22	2.03	0.41
2:C:265:ILE:HD13	2:C:276:VAL:HG21	2.03	0.41
1:A:117:ALA:H	3:A:401:B12:H622	1.68	0.41
2:D:174:MET:HB2	2:D:281:THR:HG23	2.03	0.41
3:A:401:B12:H621	3:A:401:B12:H18	1.48	0.41
1:G:106:GLU:HB3	1:G:114:LYS:HD2	2.01	0.41
2:C:187:THR:HG22	2:C:264:VAL:HG11	2.02	0.41
1:A:119:THR:HG23	3:A:401:B12:HM63	2.03	0.41
3:E:301:B12:H253	3:E:301:B12:H301	1.91	0.40
1:G:132:ARG:HB2	1:G:145:ILE:HB	2.03	0.40
1:B:51:LEU:HD23	1:B:163:VAL:HG22	2.04	0.40
1:E:42:PRO:HB3	2:H:234:PHE:HB3	2.03	0.40
1:E:140:TRP:CZ2	1:E:190:ILE:HG23	2.57	0.40
1:G:111:ARG:HD2	2:H:197:ARG:NH2	2.37	0.40
3:G:301:B12:H552	3:G:301:B12:H531	2.02	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	204/223 (92%)	195 (96%)	9 (4%)	0	100	100
1	B	206/223 (92%)	200 (97%)	6 (3%)	0	100	100
1	E	207/223 (93%)	197 (95%)	10 (5%)	0	100	100
1	G	203/223 (91%)	194 (96%)	9 (4%)	0	100	100
2	C	140/296 (47%)	138 (99%)	2 (1%)	0	100	100
2	D	144/296 (49%)	136 (94%)	8 (6%)	0	100	100
2	F	140/296 (47%)	134 (96%)	6 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	H	140/296 (47%)	136 (97%)	4 (3%)	0	100	100
All	All	1384/2076 (67%)	1330 (96%)	54 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	169/192 (88%)	169 (100%)	0	100	100
1	B	176/192 (92%)	176 (100%)	0	100	100
1	E	172/192 (90%)	172 (100%)	0	100	100
1	G	176/192 (92%)	176 (100%)	0	100	100
2	C	125/256 (49%)	125 (100%)	0	100	100
2	D	126/256 (49%)	126 (100%)	0	100	100
2	F	126/256 (49%)	126 (100%)	0	100	100
2	H	127/256 (50%)	127 (100%)	0	100	100
All	All	1197/1792 (67%)	1197 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
2	F	288	HIS
1	G	131	GLN
2	C	288	HIS
2	H	251	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

4 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	B12	G	301	-	91,101,101	1.04	5 (5%)	140,166,166	1.75	26 (18%)
3	B12	B	301	-	91,101,101	1.05	4 (4%)	140,166,166	1.74	26 (18%)
3	B12	A	401	-	91,101,101	1.04	3 (3%)	140,166,166	1.80	26 (18%)
3	B12	E	301	-	91,101,101	1.05	4 (4%)	140,166,166	1.80	27 (19%)

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	B12	G	301	-	-	24/52/223/223	0/3/11/11
3	B12	B	301	-	-	25/52/223/223	0/3/11/11
3	B12	A	401	-	-	16/52/223/223	0/3/11/11
3	B12	E	301	-	-	17/52/223/223	0/3/11/11

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	301	B12	C54-C17	2.78	1.59	1.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	G	301	B12	C54-C17	2.75	1.59	1.54
3	E	301	B12	C14-N23	2.73	1.38	1.35
3	E	301	B12	C54-C17	2.72	1.59	1.54
3	A	401	B12	C54-C17	2.69	1.59	1.54
3	A	401	B12	C14-N23	2.67	1.38	1.35
3	B	301	B12	C14-N23	2.65	1.38	1.35
3	G	301	B12	C35-C5	2.62	1.56	1.50
3	A	401	B12	C35-C5	2.60	1.56	1.50
3	B	301	B12	C35-C5	2.59	1.56	1.50
3	E	301	B12	C35-C5	2.57	1.56	1.50
3	G	301	B12	C14-N23	2.33	1.38	1.35
3	E	301	B12	C6B-C5B	2.07	1.45	1.40
3	G	301	B12	C6B-C5B	2.04	1.45	1.40
3	G	301	B12	C30-C3	2.03	1.59	1.54
3	B	301	B12	C6B-C5B	2.02	1.45	1.40

All (105) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	401	B12	C19-N24-C16	7.71	115.72	107.29
3	E	301	B12	C19-N24-C16	7.32	115.29	107.29
3	B	301	B12	C19-N24-C16	7.13	115.08	107.29
3	G	301	B12	C19-N24-C16	6.63	114.54	107.29
3	B	301	B12	C9-N22-C6	5.36	111.73	105.28
3	E	301	B12	C9-N22-C6	5.34	111.71	105.28
3	A	401	B12	C9-N22-C6	5.34	111.70	105.28
3	E	301	B12	C7B-C8B-C9B	5.31	125.79	120.54
3	B	301	B12	C7B-C8B-C9B	5.30	125.78	120.54
3	G	301	B12	C16-C15-C14	-5.20	113.33	121.26
3	G	301	B12	C9-N22-C6	5.13	111.45	105.28
3	A	401	B12	C7B-C8B-C9B	5.02	125.51	120.54
3	A	401	B12	C55-C17-C16	5.01	126.38	116.59
3	B	301	B12	C18-C17-C16	4.87	106.56	100.69
3	G	301	B12	C7B-C8B-C9B	4.80	125.29	120.54
3	E	301	B12	C55-C17-C16	4.70	125.78	116.59
3	E	301	B12	C18-C17-C16	4.64	106.29	100.69
3	G	301	B12	C18-C17-C16	4.52	106.14	100.69
3	B	301	B12	C54-C17-C18	-4.48	106.56	112.99
3	A	401	B12	C18-C17-C16	4.46	106.07	100.69
3	B	301	B12	C16-C15-C14	-4.28	114.74	121.26
3	G	301	B12	C54-C17-C18	-4.16	107.02	112.99
3	E	301	B12	C16-C15-C14	-4.15	114.94	121.26

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	401	B12	C16-C15-C14	-4.11	115.00	121.26
3	A	401	B12	C1P-N59-C57	-4.06	113.97	122.69
3	E	301	B12	C54-C17-C18	-4.02	107.22	112.99
3	B	301	B12	C55-C17-C16	4.02	124.45	116.59
3	A	401	B12	C54-C17-C16	-3.96	91.91	112.41
3	G	301	B12	C54-C17-C16	-3.93	92.04	112.41
3	E	301	B12	C54-C17-C16	-3.92	92.09	112.41
3	E	301	B12	C1P-N59-C57	-3.86	114.42	122.69
3	B	301	B12	C54-C17-C16	-3.79	92.75	112.41
3	B	301	B12	C1P-N59-C57	-3.78	114.57	122.69
3	E	301	B12	C53-C15-C16	3.78	126.78	120.36
3	A	401	B12	C54-C17-C18	-3.63	107.77	112.99
3	G	301	B12	C1P-N59-C57	-3.61	114.95	122.69
3	A	401	B12	C53-C15-C16	3.58	126.44	120.36
3	G	301	B12	C55-C17-C16	3.52	123.47	116.59
3	A	401	B12	O6R-C1R-N1B	-3.49	104.12	108.75
3	A	401	B12	C17-C16-N24	-3.48	105.86	111.17
3	G	301	B12	C15-C16-N24	3.37	127.22	122.42
3	B	301	B12	C53-C15-C16	3.30	125.97	120.36
3	E	301	B12	C17-C16-N24	-3.24	106.22	111.17
3	E	301	B12	C18-C19-N24	3.24	107.20	102.33
3	B	301	B12	C15-C16-N24	3.24	127.03	122.42
3	E	301	B12	C5B-C4B-C9B	-3.23	116.89	121.30
3	A	401	B12	C5B-C4B-C9B	-3.21	116.92	121.30
3	B	301	B12	C13-C14-C15	-3.21	119.44	124.32
3	B	301	B12	C5B-C4B-C9B	-3.18	116.96	121.30
3	G	301	B12	C5B-C4B-C9B	-3.15	116.99	121.30
3	B	301	B12	C17-C16-N24	-3.06	106.49	111.17
3	A	401	B12	C55-C56-C57	-3.04	104.48	111.25
3	E	301	B12	C15-C16-N24	3.01	126.71	122.42
3	E	301	B12	C4R-O6R-C1R	2.97	112.65	109.92
3	G	301	B12	C17-C16-N24	-2.97	106.63	111.17
3	B	301	B12	C18-C19-N24	2.97	106.80	102.33
3	G	301	B12	C55-C17-C18	2.97	116.79	111.12
3	G	301	B12	C53-C15-C16	2.95	125.37	120.36
3	G	301	B12	C18-C19-N24	2.94	106.75	102.33
3	E	301	B12	C55-C56-C57	-2.91	104.76	111.25
3	A	401	B12	C18-C19-N24	2.87	106.65	102.33
3	B	301	B12	C5M-C5B-C6B	-2.82	114.99	120.76
3	A	401	B12	C1-C19-N24	-2.79	103.14	106.25
3	A	401	B12	C15-C16-N24	2.79	126.39	122.42
3	E	301	B12	C5M-C5B-C6B	-2.78	115.07	120.76

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	G	301	B12	O6R-C1R-N1B	-2.78	105.06	108.75
3	A	401	B12	C5M-C5B-C6B	-2.74	115.17	120.76
3	E	301	B12	C19-C1-N21	-2.72	99.34	102.14
3	E	301	B12	C13-C14-C15	-2.69	120.22	124.32
3	G	301	B12	C5M-C5B-C6B	-2.69	115.27	120.76
3	E	301	B12	O6R-C1R-N1B	-2.66	105.22	108.75
3	A	401	B12	C3R-C2R-C1R	2.63	105.68	99.89
3	B	301	B12	C55-C56-C57	-2.63	105.39	111.25
3	B	301	B12	O28-C27-N29	-2.58	115.65	122.53
3	A	401	B12	O28-C27-N29	-2.54	115.74	122.53
3	G	301	B12	O28-C27-N29	-2.53	115.77	122.53
3	G	301	B12	C55-C56-C57	-2.53	105.61	111.25
3	E	301	B12	O28-C27-N29	-2.52	115.79	122.53
3	E	301	B12	C1-C19-N24	-2.43	103.55	106.25
3	A	401	B12	C13-C14-C15	-2.42	120.64	124.32
3	B	301	B12	C1-C19-C18	-2.35	118.09	121.90
3	G	301	B12	C4R-O6R-C1R	2.28	112.02	109.92
3	B	301	B12	C55-C17-C18	2.28	115.48	111.12
3	A	401	B12	C4B-C5B-C6B	2.26	123.53	119.85
3	E	301	B12	C4B-C5B-C6B	2.26	123.53	119.85
3	A	401	B12	C19-C1-N21	-2.24	99.84	102.14
3	B	301	B12	C4B-C5B-C6B	2.23	123.48	119.85
3	G	301	B12	C4B-C5B-C6B	2.23	123.47	119.85
3	G	301	B12	C37-C7-C8	-2.22	102.50	108.37
3	B	301	B12	O2-C3R-C2R	2.21	119.62	111.68
3	G	301	B12	O2-C3R-C2R	2.18	119.49	111.68
3	G	301	B12	C13-C14-C15	-2.15	121.05	124.32
3	B	301	B12	C37-C7-C8	-2.15	102.70	108.37
3	E	301	B12	O28-C27-C26	2.11	128.53	121.98
3	B	301	B12	O28-C27-C26	2.11	128.52	121.98
3	A	401	B12	O28-C27-C26	2.09	128.47	121.98
3	A	401	B12	C4R-O6R-C1R	2.09	111.84	109.92
3	G	301	B12	O28-C27-C26	2.09	128.46	121.98
3	A	401	B12	C37-C7-C8	-2.07	102.91	108.37
3	G	301	B12	C2P-C1P-N59	-2.05	109.90	112.92
3	E	301	B12	C2-C3-C4	2.04	103.94	101.64
3	E	301	B12	O2-C3R-C2R	2.04	118.98	111.68
3	B	301	B12	C35-C5-C4	-2.03	112.69	116.79
3	B	301	B12	C13-C14-N23	2.01	111.81	109.09
3	E	301	B12	C31-C32-N33	2.00	122.90	116.49

There are no chirality outliers.

All (82) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	401	B12	C38-C37-C7-C6
3	A	401	B12	C38-C37-C7-C36
3	A	401	B12	C38-C37-C7-C8
3	A	401	B12	C42-C41-C8-C9
3	A	401	B12	C14-C13-C48-C49
3	A	401	B12	C18-C60-C61-O63
3	A	401	B12	C18-C60-C61-N62
3	B	301	B12	C38-C37-C7-C6
3	B	301	B12	C38-C37-C7-C36
3	B	301	B12	C38-C37-C7-C8
3	B	301	B12	C42-C41-C8-C9
3	B	301	B12	C3R-O2-P-O3
3	B	301	B12	C3R-O2-P-O5
3	E	301	B12	C38-C37-C7-C6
3	E	301	B12	C38-C37-C7-C36
3	E	301	B12	C38-C37-C7-C8
3	E	301	B12	C42-C41-C8-C9
3	E	301	B12	C14-C13-C48-C49
3	G	301	B12	C4-C3-C30-C31
3	G	301	B12	C38-C37-C7-C6
3	G	301	B12	C38-C37-C7-C36
3	G	301	B12	C38-C37-C7-C8
3	G	301	B12	C42-C41-C8-C9
3	G	301	B12	C16-C17-C55-C56
3	G	301	B12	N59-C1P-C2P-O3
3	G	301	B12	C2P-O3-P-O4
3	G	301	B12	C2P-O3-P-O2
3	G	301	B12	C3R-O2-P-O3
3	G	301	B12	C3R-O2-P-O5
3	B	301	B12	C8-C41-C42-C43
3	G	301	B12	C8-C41-C42-C43
3	A	401	B12	C4-C3-C30-C31
3	E	301	B12	C4-C3-C30-C31
3	E	301	B12	C8-C41-C42-C43
3	G	301	B12	C2-C3-C30-C31
3	A	401	B12	C13-C48-C49-C50
3	E	301	B12	C13-C48-C49-C50
3	B	301	B12	C3R-C4R-C5R-O8R
3	A	401	B12	C3R-C4R-C5R-O8R
3	G	301	B12	C2R-C3R-O2-P
3	B	301	B12	O6R-C4R-C5R-O8R
3	B	301	B12	C16-C17-C55-C56

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Mol	Chain	Res	Type	Atoms
3	G	301	B12	N59-C1P-C2P-C3P
3	B	301	B12	C13-C48-C49-C50
3	A	401	B12	O6R-C4R-C5R-O8R
3	A	401	B12	C2-C3-C30-C31
3	G	301	B12	C4R-C3R-O2-P
3	E	301	B12	C2-C3-C30-C31
3	G	301	B12	C18-C17-C55-C56
3	E	301	B12	C30-C31-C32-N33
3	B	301	B12	C2R-C3R-O2-P
3	E	301	B12	C30-C31-C32-O34
3	B	301	B12	C41-C42-C43-N45
3	B	301	B12	C3R-O2-P-O4
3	G	301	B12	C3-C30-C31-C32
3	G	301	B12	C17-C18-C60-C61
3	E	301	B12	C2P-C1P-N59-C57
3	B	301	B12	C41-C42-C43-O44
3	B	301	B12	C4-C3-C30-C31
3	E	301	B12	C41-C42-C43-N45
3	B	301	B12	C4R-C3R-O2-P
3	E	301	B12	C3-C30-C31-C32
3	B	301	B12	C2P-C1P-N59-C57
3	B	301	B12	C1P-C2P-O3-P
3	B	301	B12	C3P-C2P-O3-P
3	E	301	B12	C41-C42-C43-O44
3	G	301	B12	C30-C31-C32-N33
3	A	401	B12	C17-C18-C60-C61
3	A	401	B12	C19-C18-C60-C61
3	A	401	B12	C2P-C1P-N59-C57
3	B	301	B12	C2-C26-C27-N29
3	B	301	B12	C2P-O3-P-O4
3	B	301	B12	C2P-O3-P-O5
3	E	301	B12	C2P-O3-P-O4
3	E	301	B12	C2P-O3-P-O5
3	G	301	B12	C2P-O3-P-O5
3	G	301	B12	C3R-O2-P-O4
3	B	301	B12	C2-C3-C30-C31
3	A	401	B12	C1P-C2P-O3-P
3	G	301	B12	C30-C31-C32-O34
3	B	301	B12	C30-C31-C32-N33
3	G	301	B12	C2P-C1P-N59-C57

There are no ring outliers.

4 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	G	301	B12	2	0
3	B	301	B12	8	0
3	A	401	B12	7	0
3	E	301	B12	4	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 B12 G 301

Bond lengths

Bond angles

Torsions

Rings

Ligand B12 B 301

Bond lengths

Bond angles

Torsions

Rings

Ligand B12 A 401

Bond lengths

Bond angles

Torsions

Rings

Ligand B12 E 301

Bond lengths

Bond angles

Torsions

Rings
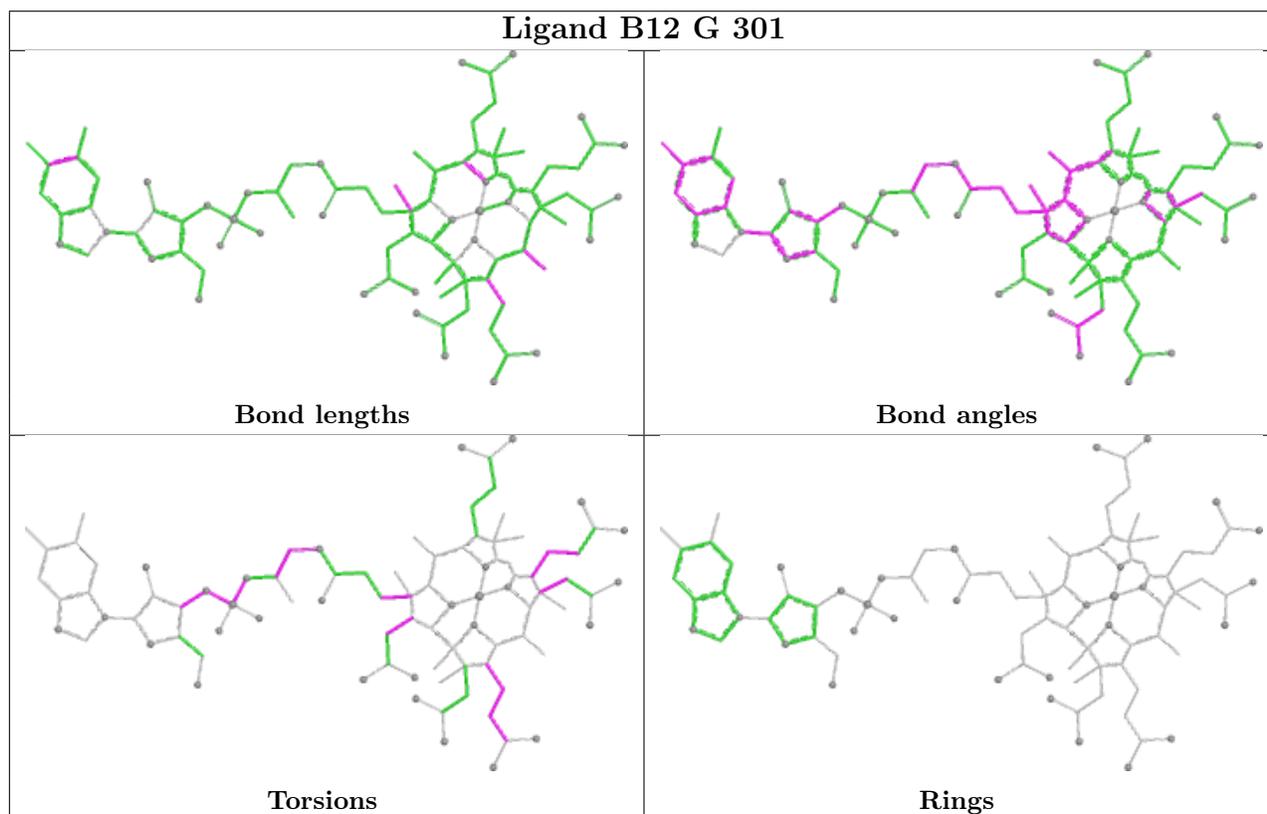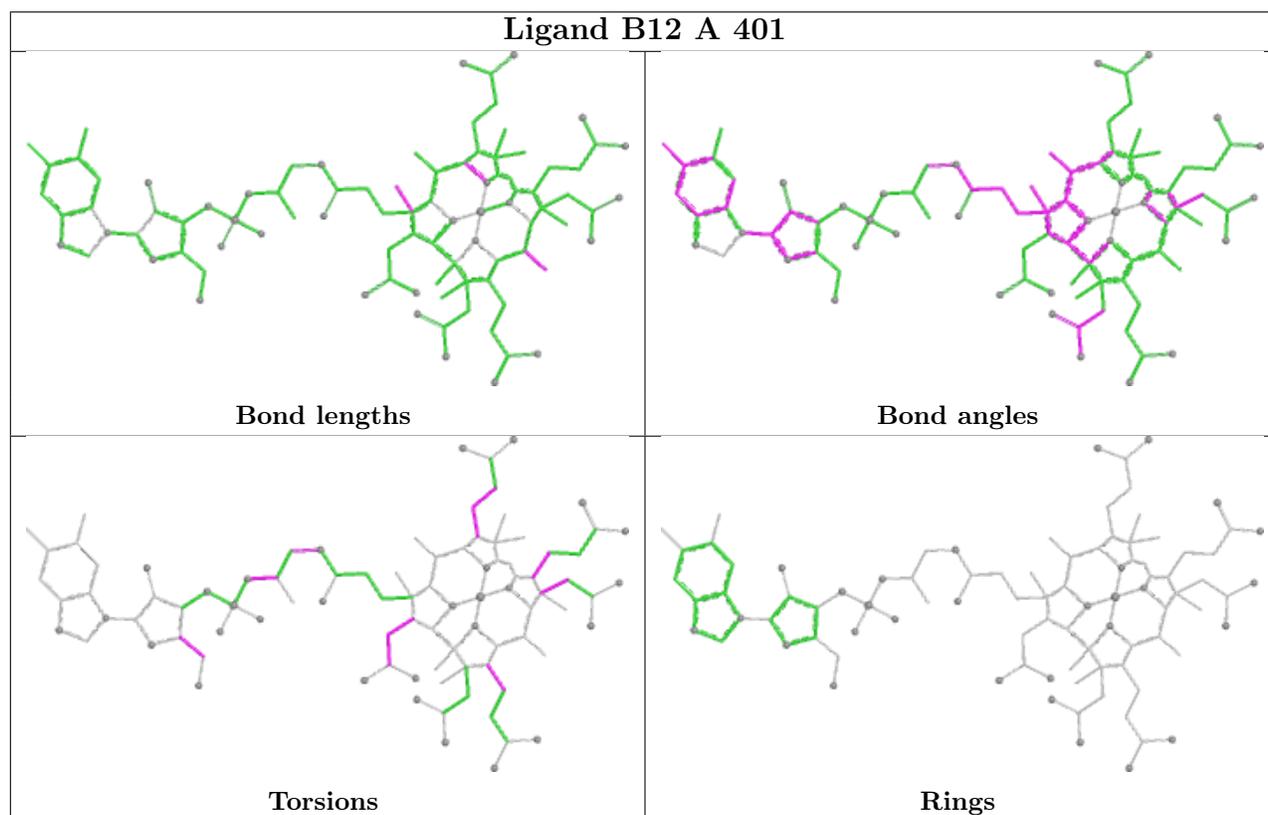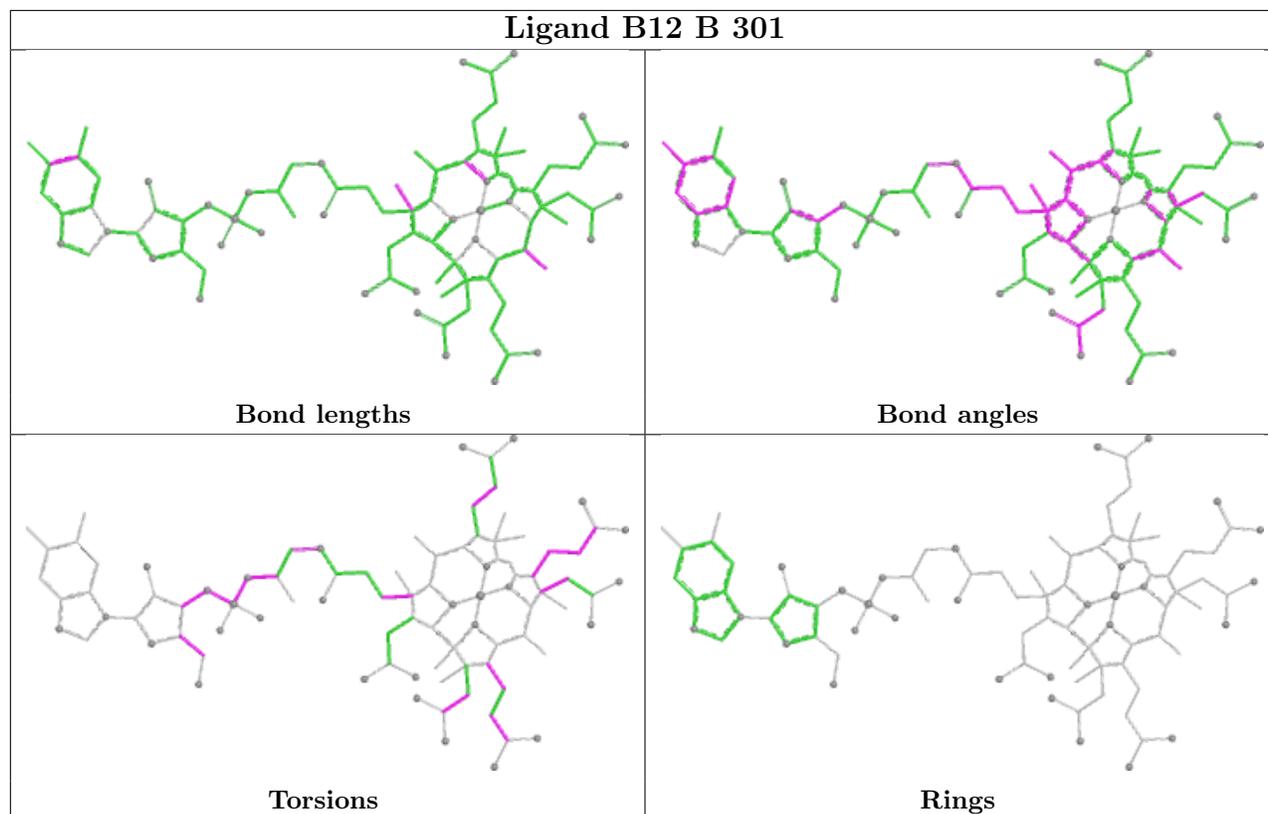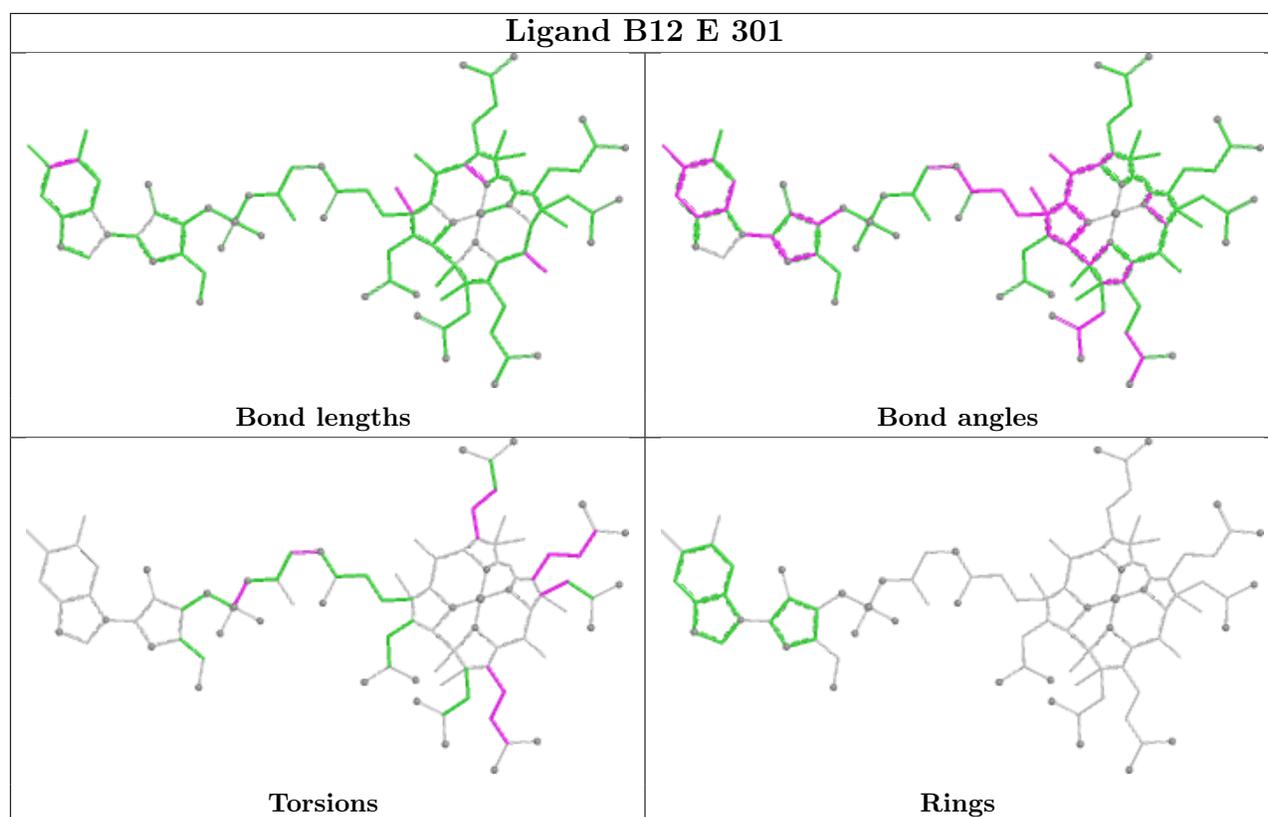
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data (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	209/223 (93%)	-1.38	1 (0%)	87	83	43, 60, 63, 64	1 (0%)
1	B	211/223 (94%)	-1.38	0	100	100	47, 64, 69, 74	1 (0%)
1	E	210/223 (94%)	-1.28	0	100	100	40, 71, 79, 83	1 (0%)
1	G	210/223 (94%)	-1.21	0	100	100	53, 86, 94, 100	1 (0%)
2	C	144/296 (48%)	-1.38	0	100	100	61, 68, 74, 78	0
2	D	148/296 (50%)	-1.38	0	100	100	58, 62, 68, 71	0
2	F	144/296 (48%)	-1.34	0	100	100	72, 76, 83, 86	0
2	H	144/296 (48%)	-1.21	0	100	100	79, 88, 93, 94	0
All	All	1420/2076 (68%)	-1.32	1 (0%)	92	95	40, 69, 92, 100	4 (0%)

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	162	GLY	2.2

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)
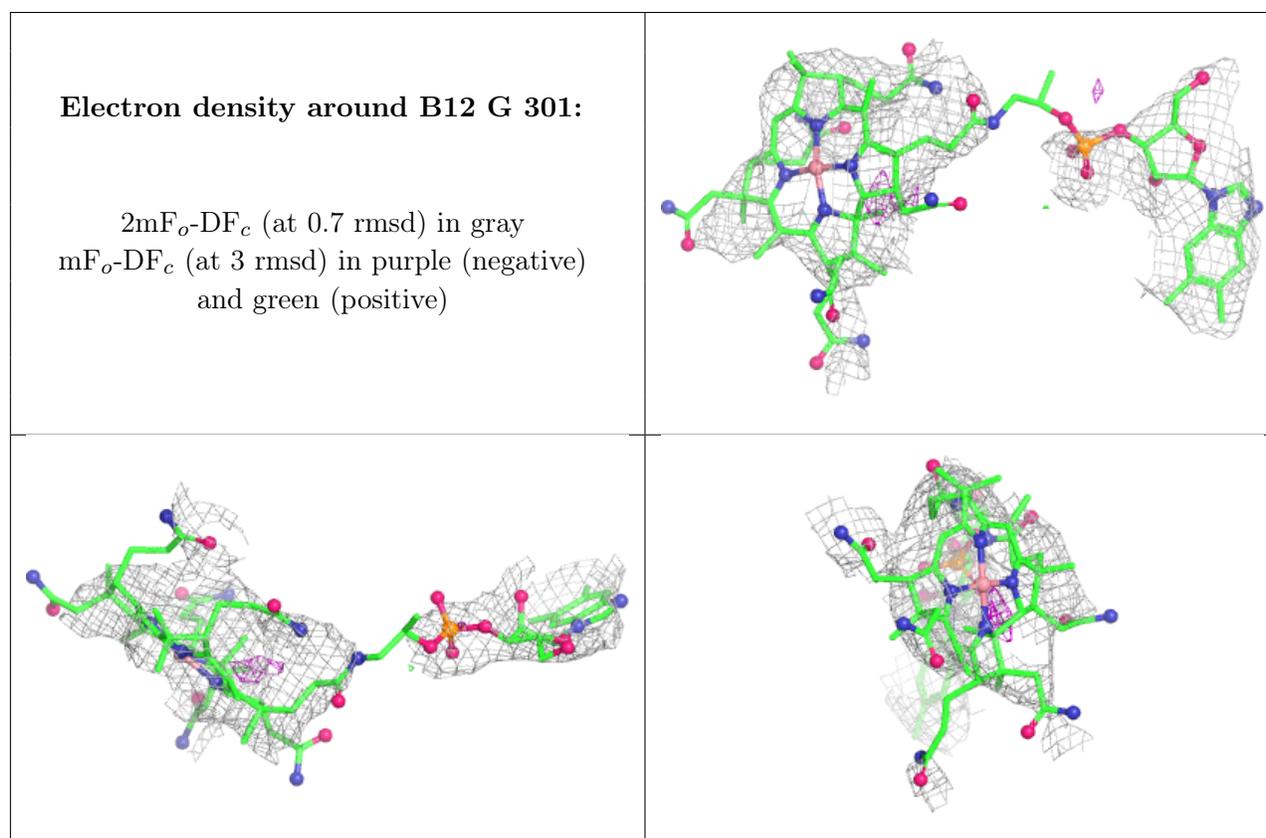
There are no oligosaccharides in this entry.

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
3	B12	G	301	91/91	0.98	0.06	84,91,93,94	0
3	B12	B	301	91/91	0.99	0.05	58,63,64,65	0
3	B12	E	301	91/91	0.99	0.05	70,74,75,75	0
3	B12	A	401	91/91	0.99	0.04	56,59,59,60	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 B12 G 301:

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

Electron density around B12 B 301:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
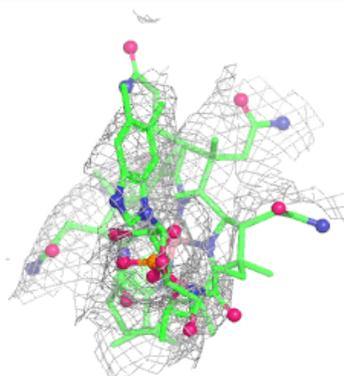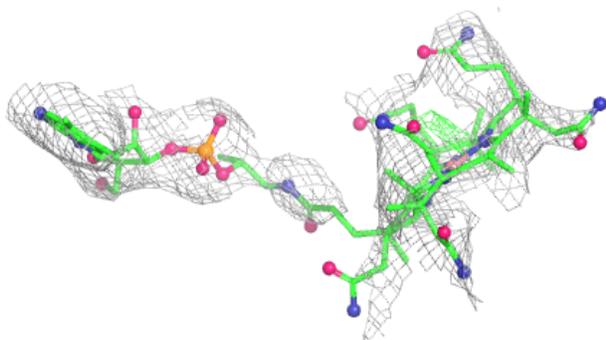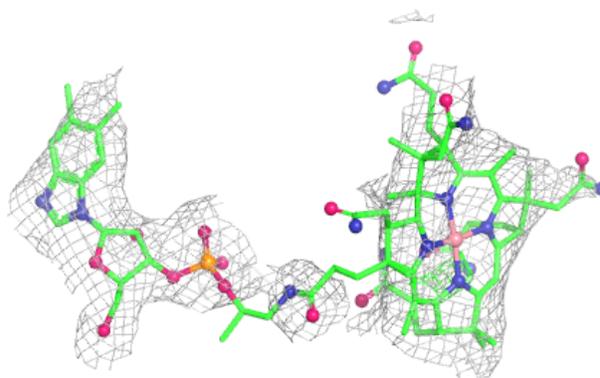
Electron density around B12 E 301:

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

Electron density around B12 A 401:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
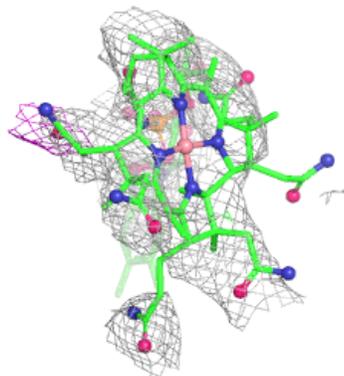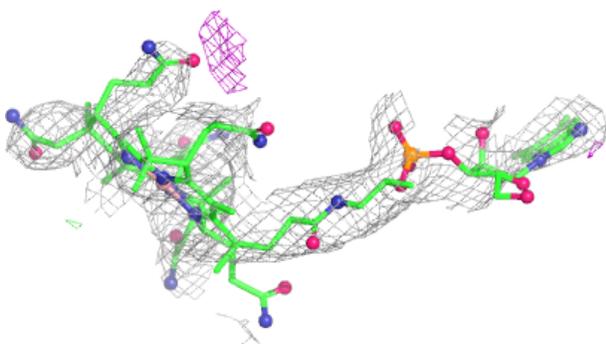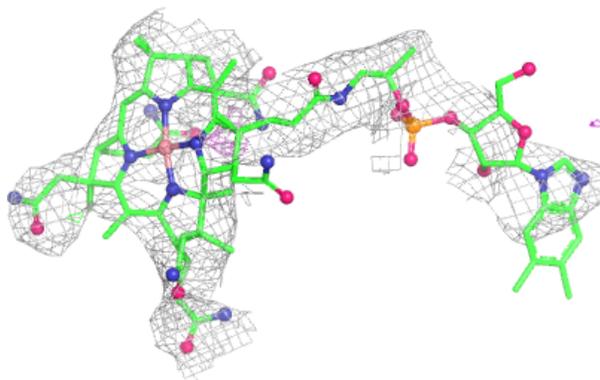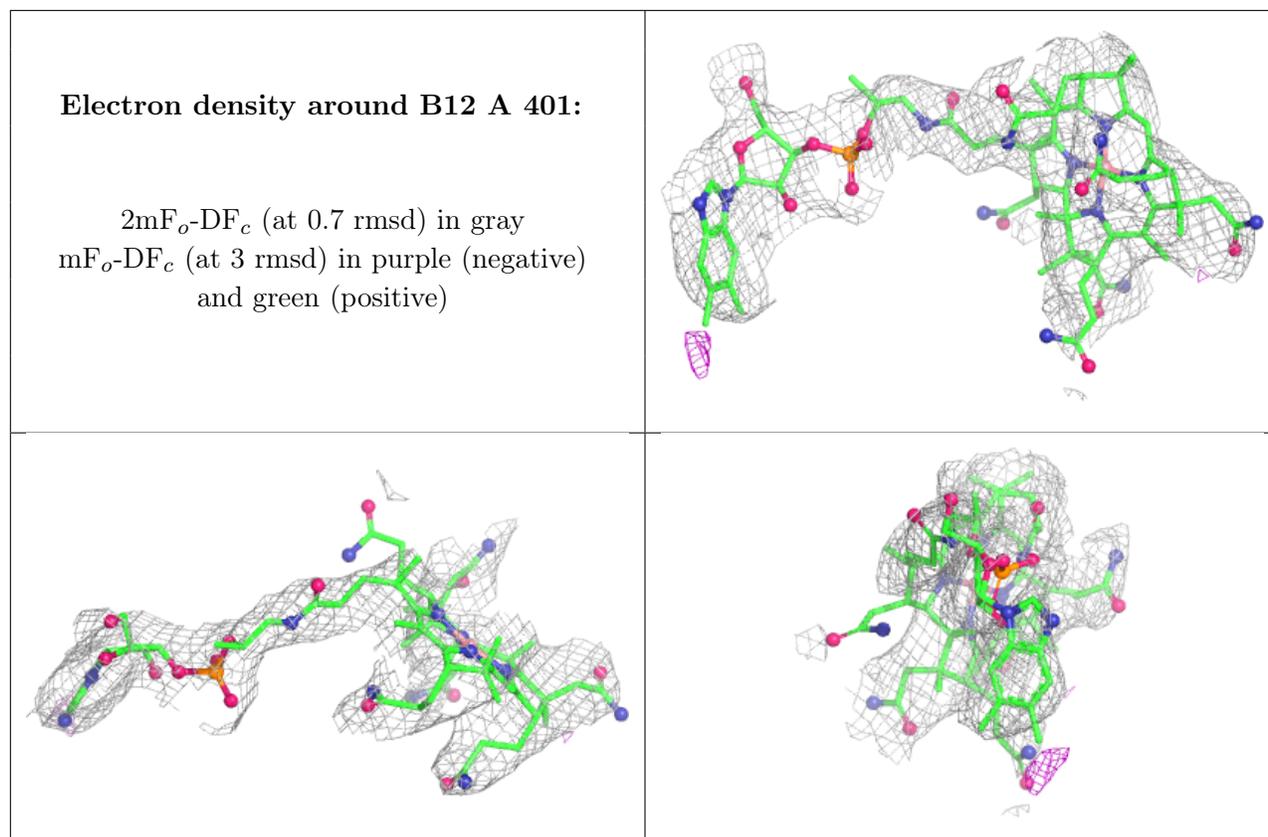
6.5 Other polymers (i)

There are no such residues in this entry.