



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 23, 2023 – 05:19 PM EDT

PDB ID : 8ESI  
Title : Bile Salt Hydrolase from *B. longum* with covalent inhibitor bound  
Authors : Walker, M.E.; Lim, L.; Redinbo, M.R.  
Deposited on : 2022-10-14  
Resolution : 2.35 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

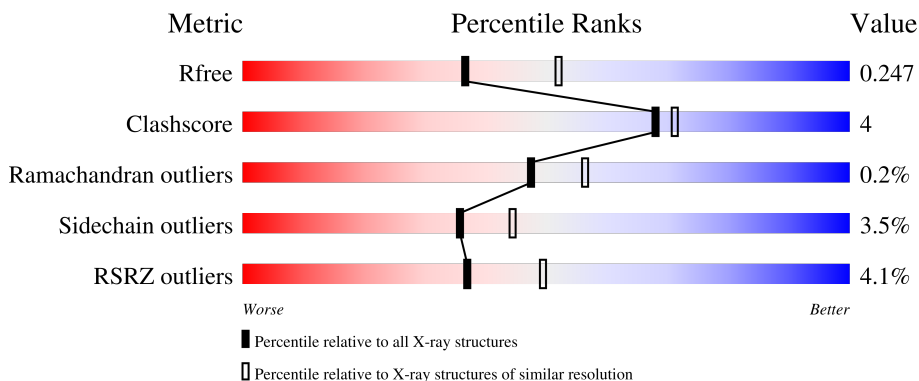
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.35 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.



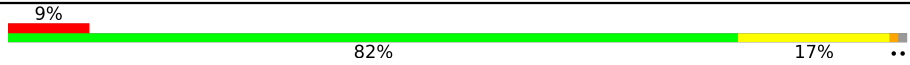


Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1164 (2.36-2.36)
Clashscore	141614	1232 (2.36-2.36)
Ramachandran outliers	138981	1211 (2.36-2.36)
Sidechain outliers	138945	1212 (2.36-2.36)
RSRZ outliers	127900	1150 (2.36-2.36)

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	
1	B	317	
1	C	317	
1	D	317	
1	E	317	

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Mol	Chain	Length	Quality of chain
1	F	317	 9% 82% 17% ..
1	G	317	 8% 84% 15% ..
1	H	317	 11% 86% 14% .

## 2 Entry composition

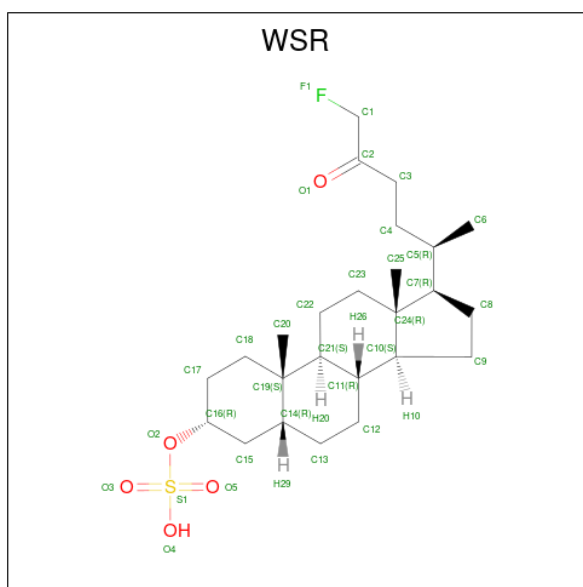
There are 3 unique types of molecules in this entry. The entry contains 19535 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Conjugated bile acid hydrolase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	316	Total 2427	C 1527	N 412	O 471	S 17	0	0	0
1	B	316	Total 2421	C 1525	N 412	O 468	S 16	0	0	0
1	C	316	Total 2430	C 1528	N 411	O 475	S 16	0	0	0
1	D	315	Total 2409	C 1518	N 404	O 471	S 16	0	0	0
1	E	314	Total 2397	C 1512	N 407	O 462	S 16	0	0	0
1	F	315	Total 2350	C 1486	N 395	O 455	S 14	0	0	0
1	G	315	Total 2358	C 1486	N 402	O 455	S 15	0	0	0
1	H	315	Total 2359	C 1486	N 399	O 458	S 16	0	0	0

- Molecule 2 is (1R,3aS,3bR,5aR,7R,9aS,9bS,11aR)-1-[(2R)-6-fluoro-5-oxohexan-2-yl]-9a,11a-dimethylhexadecahydro-1H-cyclopenta[a]phenanthren-7-yl hydrogen sulfate (non-preferred name) (three-letter code: WSR) (formula: C<sub>25</sub>H<sub>41</sub>FO<sub>5</sub>S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	O	S	0	0
			31	25	5	1		
2	B	1	Total	C	O	S	0	0
			31	25	5	1		
2	C	1	Total	C	O	S	0	0
			31	25	5	1		
2	D	1	Total	C	O	S	0	0
			31	25	5	1		
2	E	1	Total	C	O	S	0	0
			31	25	5	1		
2	F	1	Total	C	O	S	0	0
			31	25	5	1		
2	G	1	Total	C	O	S	0	0
			31	25	5	1		
2	H	1	Total	C	O	S	0	0
			31	25	5	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	23	Total	O	0	0
			23	23		
3	B	27	Total	O	0	0
			27	27		
3	C	25	Total	O	0	0
			25	25		
3	D	25	Total	O	0	0
			25	25		

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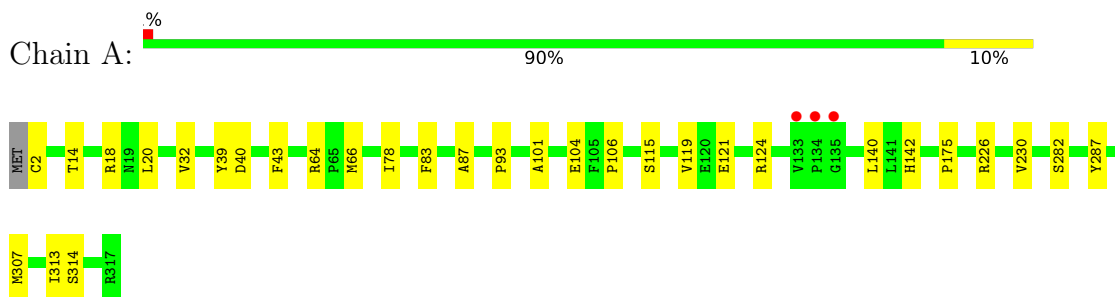
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
3	E	12	Total 12	O 12	0	0
3	F	8	Total 8	O 8	0	0
3	G	12	Total 12	O 12	0	0
3	H	4	Total 4	O 4	0	0

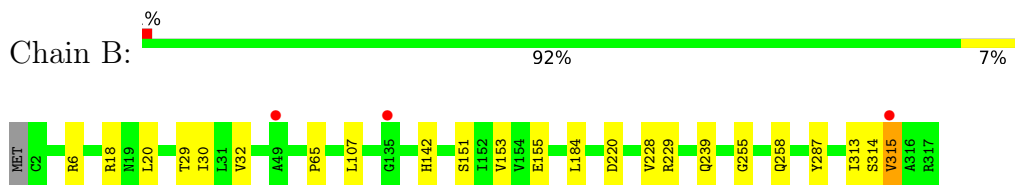
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

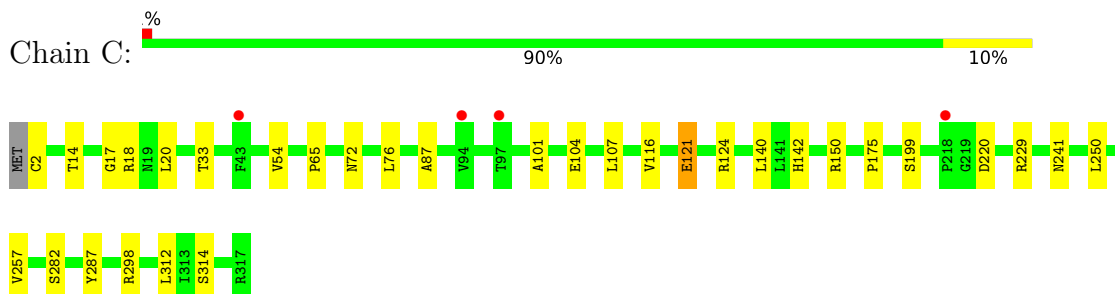
- Molecule 1: Conjugated bile acid hydrolase



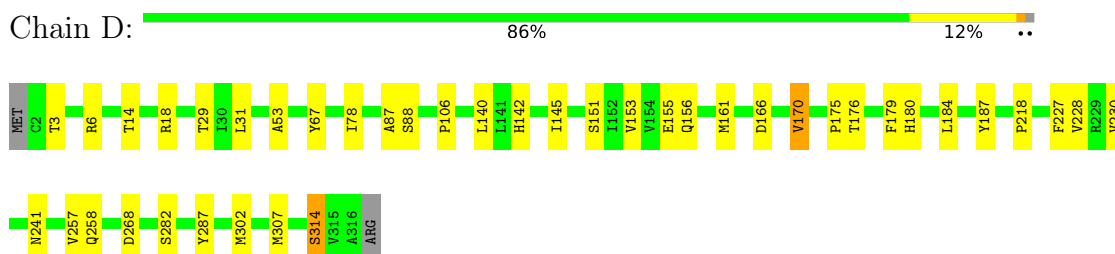
- Molecule 1: Conjugated bile acid hydrolase



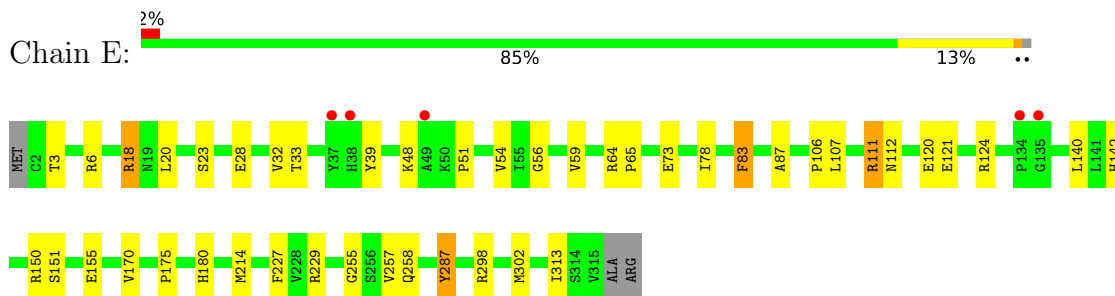
- Molecule 1: Conjugated bile acid hydrolase



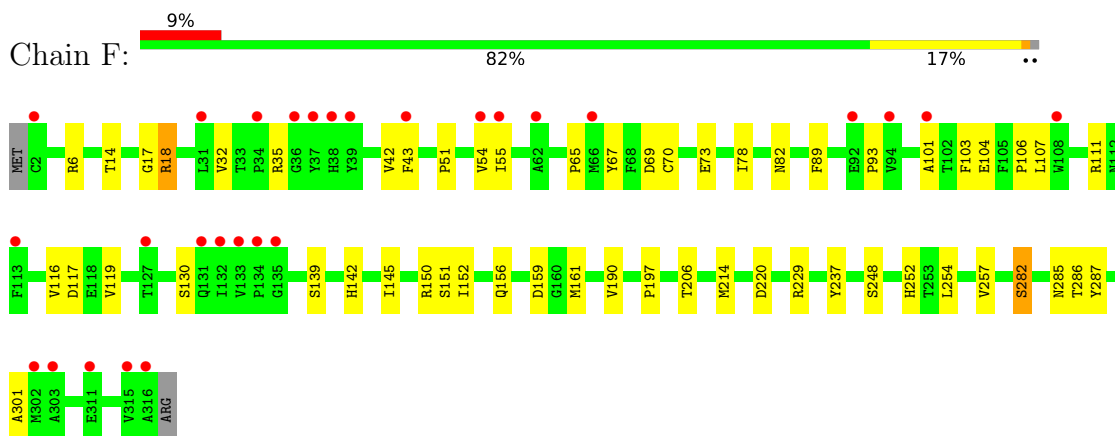
- Molecule 1: Conjugated bile acid hydrolase



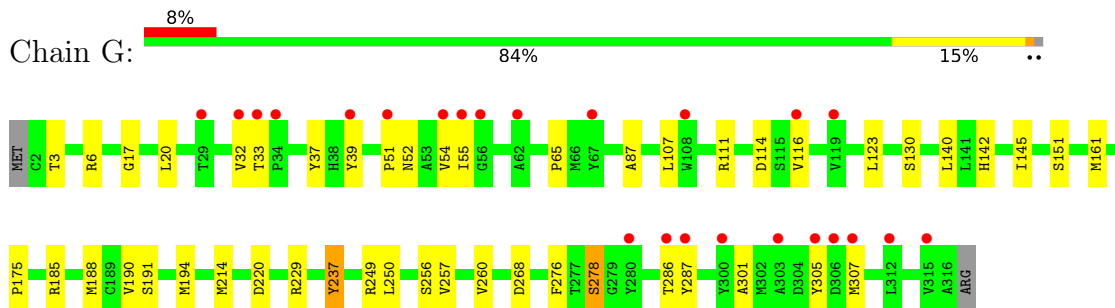
- Molecule 1: Conjugated bile acid hydrolase



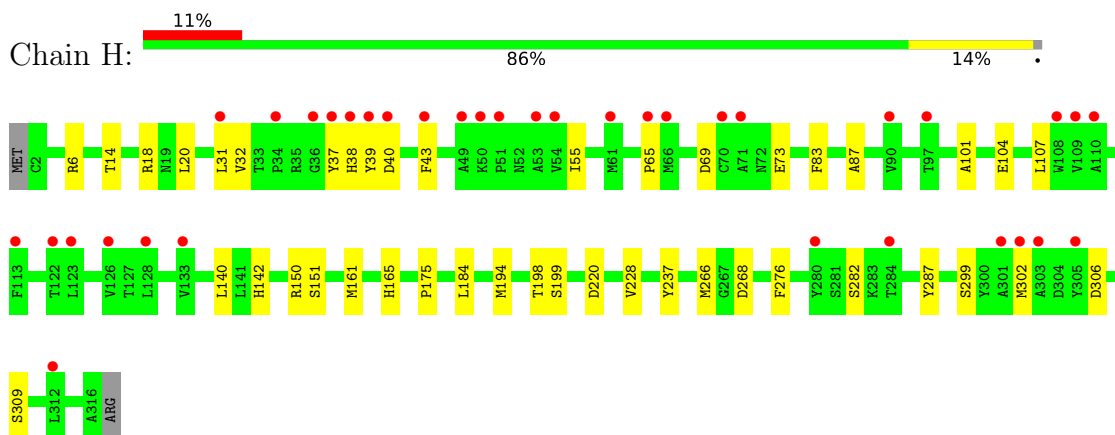
- Molecule 1: Conjugated bile acid hydrolase



- Molecule 1: Conjugated bile acid hydrolase



- Molecule 1: Conjugated bile acid hydrolase





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	93.07Å 166.80Å 103.08Å 90.00° 116.60° 90.00°	Depositor
Resolution (Å)	49.10 – 2.35 49.10 – 2.35	Depositor EDS
% Data completeness (in resolution range)	99.6 (49.10-2.35) 99.6 (49.10-2.35)	Depositor EDS
$R_{merge}$	0.18	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.23 (at 2.34Å)	Xtrriage
Refinement program	PHENIX 1.20_4459, PHENIX 1.20_4459	Depositor
R, $R_{free}$	0.210 , 0.244 0.208 , 0.247	Depositor DCC
$R_{free}$ test set	1996 reflections (1.72%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	47.5	Xtrriage
Anisotropy	0.283	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 45.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.015 for h,-k,-h-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	19535	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	55.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.39% 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 [i](#)

### 5.1 Standard geometry [i](#)

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

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	0.25	0/2492	0.49	0/3393
1	B	0.25	0/2486	0.49	0/3385
1	C	0.26	0/2495	0.49	0/3399
1	D	0.25	0/2474	0.48	0/3372
1	E	0.25	0/2462	0.48	0/3353
1	F	0.25	0/2415	0.47	0/3300
1	G	0.25	0/2423	0.47	0/3310
1	H	0.25	0/2424	0.48	0/3308
All	All	0.25	0/19671	0.48	0/26820

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	2427	0	2227	12	0
1	B	2421	0	2224	8	0
1	C	2430	0	2228	14	0
1	D	2409	0	2196	19	0
1	E	2397	0	2194	21	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	2350	0	2097	28	0
1	G	2358	0	2106	23	0
1	H	2359	0	2107	17	0
2	A	31	0	0	0	0
2	B	31	0	0	0	0
2	C	31	0	0	0	0
2	D	31	0	0	0	0
2	E	31	0	0	0	0
2	F	31	0	0	2	0
2	G	31	0	0	0	0
2	H	31	0	0	0	0
3	A	23	0	0	0	0
3	B	27	0	0	0	0
3	C	25	0	0	0	0
3	D	25	0	0	0	0
3	E	12	0	0	0	0
3	F	8	0	0	0	0
3	G	12	0	0	0	0
3	H	4	0	0	0	0
All	All	19535	0	17379	140	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 (140) 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:51:PRO:HB2	1:E:111:ARG:HG2	1.73	0.70
1:B:220:ASP:O	1:B:229:ARG:NH2	2.26	0.69
1:F:43:PHE:CE1	1:F:93:PRO:HG3	2.29	0.68
1:G:229:ARG:NH1	1:G:256:SER:O	2.28	0.67
1:A:101:ALA:HB3	1:A:104:GLU:HG2	1.77	0.66
1:F:78:ILE:HG13	1:F:145:ILE:HG12	1.77	0.65
1:C:220:ASP:O	1:C:229:ARG:NH2	2.26	0.65
1:E:255:GLY:HA2	1:E:258:GLN:HG3	1.79	0.64
1:A:121:GLU:HA	1:A:124:ARG:HH11	1.63	0.63
1:F:220:ASP:O	1:F:229:ARG:NH2	2.32	0.63
1:E:87:ALA:HB3	1:E:140:LEU:HB3	1.81	0.62
1:F:65:PRO:HG2	1:F:107:LEU:HD22	1.80	0.62
1:H:6:ARG:HD3	1:H:151:SER:HB3	1.83	0.61
1:G:65:PRO:HG2	1:G:107:LEU:HD22	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:51:PRO:HB2	1:G:111:ARG:HD2	1.82	0.60
1:H:87:ALA:HB3	1:H:140:LEU:HB3	1.84	0.60
1:F:78:ILE:HD13	1:F:106:PRO:HA	1.84	0.60
1:C:65:PRO:HG2	1:C:107:LEU:HD22	1.87	0.57
1:A:14:THR:HB	1:A:282:SER:HB3	1.85	0.57
1:E:120:GLU:OE1	1:E:150:ARG:NH2	2.32	0.56
1:C:33:THR:HG22	1:C:312:LEU:HD22	1.88	0.55
1:E:39:TYR:HE1	1:E:64:ARG:HD3	1.71	0.55
1:G:33:THR:HB	1:G:54:VAL:HG13	1.88	0.55
1:H:101:ALA:HB3	1:H:104:GLU:HG2	1.89	0.54
1:D:87:ALA:HB3	1:D:140:LEU:HB3	1.89	0.54
1:G:6:ARG:HD3	1:G:151:SER:HB3	1.88	0.54
1:H:14:THR:HB	1:H:282:SER:HB3	1.90	0.54
1:H:198:THR:OG1	1:H:199:SER:N	2.40	0.54
1:E:32:VAL:HB	1:E:313:ILE:HB	1.90	0.53
1:G:220:ASP:O	1:G:229:ARG:NH2	2.42	0.53
1:D:241:ASN:N	1:D:241:ASN:OD1	2.38	0.53
1:F:159:ASP:OD1	1:F:159:ASP:N	2.42	0.53
1:F:89:PHE:HB2	1:F:130:SER:HB2	1.91	0.53
1:E:73:GLU:HA	1:E:302:MET:HE1	1.90	0.52
1:C:241:ASN:OD1	1:C:241:ASN:N	2.42	0.52
1:B:153:VAL:HG12	1:B:155:GLU:HG3	1.92	0.52
1:F:190:VAL:HG13	1:F:214:MET:HA	1.91	0.52
1:A:87:ALA:HB3	1:A:140:LEU:HB3	1.90	0.52
1:F:116:VAL:HA	1:F:119:VAL:HG12	1.90	0.52
1:D:78:ILE:HD13	1:D:106:PRO:HA	1.91	0.51
1:F:252:HIS:HB3	1:G:260:VAL:HG13	1.92	0.51
1:F:286:THR:HG22	1:F:301:ALA:HA	1.91	0.51
1:G:276:PHE:HE1	1:G:278:SER:HB3	1.75	0.51
1:D:14:THR:HB	1:D:282:SER:HB3	1.93	0.51
1:C:17:GLY:HA3	1:C:250:LEU:HD11	1.92	0.50
1:D:6:ARG:HD3	1:D:151:SER:HB3	1.93	0.50
1:B:32:VAL:HB	1:B:313:ILE:HB	1.95	0.49
1:A:43:PHE:CD1	1:A:93:PRO:HG3	2.47	0.49
1:G:123:LEU:HB3	1:G:161:MET:HE1	1.93	0.49
1:E:48:LYS:HG2	1:E:112:ASN:HA	1.94	0.49
1:C:116:VAL:HG21	1:C:150:ARG:HG3	1.94	0.49
1:D:176:THR:HG23	1:D:179:PHE:H	1.77	0.48
1:E:6:ARG:HD3	1:E:151:SER:HB3	1.94	0.48
1:H:306:ASP:O	1:H:309:SER:OG	2.26	0.48
1:A:40:ASP:O	1:A:64:ARG:NH2	2.46	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:78:ILE:HD13	1:A:106:PRO:HA	1.95	0.48
1:H:32:VAL:HG22	1:H:55:ILE:HG13	1.95	0.48
1:F:32:VAL:HG22	1:F:55:ILE:HG13	1.96	0.48
1:D:29:THR:HG21	1:D:314:SER:HB2	1.94	0.47
1:F:42:VAL:HG21	1:F:103:PHE:CZ	2.48	0.47
1:F:197:PRO:HB3	1:F:206:THR:HG22	1.96	0.47
1:A:39:TYR:HE1	1:A:64:ARG:HE	1.61	0.47
1:G:3:THR:HG21	1:G:257:VAL:HG21	1.96	0.47
1:C:72:ASN:HD21	1:C:76:LEU:HB3	1.80	0.47
1:F:101:ALA:HB3	1:F:104:GLU:HG2	1.97	0.47
1:H:37:TYR:CE2	1:H:39:TYR:HB2	2.49	0.47
1:G:32:VAL:HG22	1:G:55:ILE:HG13	1.95	0.47
1:G:190:VAL:HG13	1:G:214:MET:HA	1.97	0.47
1:F:14:THR:HB	1:F:282:SER:HB3	1.96	0.47
1:E:3:THR:HG21	1:E:257:VAL:HG21	1.97	0.47
1:E:83:PHE:CE2	1:E:155:GLU:HG2	2.50	0.47
1:G:17:GLY:HA3	1:G:250:LEU:HD11	1.97	0.47
1:G:37:TYR:CE2	1:G:39:TYR:HB2	2.50	0.46
1:H:65:PRO:HG2	1:H:107:LEU:HD22	1.98	0.46
1:H:43:PHE:HE1	1:H:101:ALA:HB2	1.81	0.46
1:C:87:ALA:HB3	1:C:140:LEU:HB3	1.98	0.46
1:H:266:MET:HE2	1:H:268:ASP:H	1.81	0.46
1:B:65:PRO:HG2	1:B:107:LEU:HD22	1.96	0.46
1:C:33:THR:OG1	1:C:54:VAL:HB	2.15	0.46
1:F:67:TYR:CD1	1:F:70:CYS:HB3	2.51	0.46
1:F:156:GLN:OE1	1:F:161:MET:HB2	2.15	0.46
1:E:214:MET:HB3	1:H:220:ASP:HB2	1.97	0.45
1:E:229:ARG:HH21	1:E:257:VAL:HA	1.81	0.45
1:F:117:ASP:OD1	1:F:150:ARG:NH2	2.46	0.45
1:C:14:THR:HB	1:C:282:SER:HB3	1.97	0.45
1:G:185:ARG:O	1:G:188:MET:HG2	2.15	0.45
1:H:184:LEU:HD23	1:H:228:VAL:HG22	1.97	0.45
1:G:87:ALA:HB3	1:G:140:LEU:HB3	1.99	0.45
1:F:116:VAL:HG13	1:F:152:ILE:HG12	2.00	0.44
1:H:73:GLU:HA	1:H:302:MET:HE1	1.99	0.44
1:F:6:ARG:HD3	1:F:151:SER:HB3	1.98	0.44
1:D:156:GLN:OE1	1:D:161:MET:HB2	2.17	0.44
1:B:30:ILE:HB	1:B:315:VAL:HG13	2.00	0.44
1:A:2:CYS:SG	1:A:20:LEU:HA	2.58	0.44
1:C:101:ALA:HB3	1:C:104:GLU:HG2	2.00	0.44
1:G:305:TYR:HB2	1:G:307:MET:HE2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:38:HIS:NE2	1:H:40:ASP:OD2	2.51	0.43
1:B:255:GLY:HA2	1:B:258:GLN:HG3	2.00	0.43
1:E:78:ILE:HD13	1:E:106:PRO:HA	2.01	0.43
1:D:180:HIS:HB3	1:D:227:PHE:CE1	2.54	0.43
1:E:33:THR:HB	1:E:54:VAL:HB	2.01	0.43
1:G:20:LEU:HD22	1:G:276:PHE:CE2	2.54	0.43
1:A:115:SER:O	1:A:119:VAL:HG23	2.19	0.43
1:F:229:ARG:NH1	1:F:257:VAL:HA	2.34	0.43
1:A:32:VAL:HB	1:A:313:ILE:HB	2.01	0.42
1:C:2:CYS:SG	1:C:20:LEU:HA	2.59	0.42
1:C:121:GLU:O	1:C:124:ARG:HG3	2.18	0.42
1:D:187:TYR:CE1	1:D:218:PRO:HD3	2.54	0.42
1:H:31:LEU:HD23	1:H:31:LEU:HA	1.90	0.42
1:E:180:HIS:HB3	1:E:227:PHE:CD1	2.55	0.42
1:F:35:ARG:HG2	1:F:51:PRO:O	2.19	0.42
1:D:3:THR:HG21	1:D:257:VAL:HG21	2.02	0.41
1:E:65:PRO:HG2	1:E:107:LEU:HD22	2.02	0.41
1:F:82:ASN:HB2	2:F:401:WSR:C3	2.50	0.41
1:B:184:LEU:HD23	1:B:228:VAL:HG22	2.01	0.41
1:F:54:VAL:HG21	1:F:111:ARG:HG2	2.01	0.41
1:G:116:VAL:HG22	1:G:145:ILE:HG22	2.01	0.41
1:F:73:GLU:HA	1:F:285:ASN:HD21	1.85	0.41
1:G:286:THR:HA	1:G:301:ALA:HA	2.02	0.41
1:E:121:GLU:OE2	1:E:124:ARG:NH2	2.54	0.41
1:G:237:TYR:CD2	1:G:249:ARG:HG3	2.55	0.41
1:C:229:ARG:NH1	1:C:257:VAL:HG12	2.36	0.41
1:D:31:LEU:HB3	1:D:67:TYR:CE1	2.56	0.41
1:D:153:VAL:HG12	1:D:155:GLU:HG3	2.01	0.41
1:F:18:ARG:HH21	2:F:401:WSR:C1	2.34	0.41
1:D:78:ILE:HG13	1:D:145:ILE:HG12	2.01	0.41
1:E:56:GLY:HA2	1:E:287:TYR:CZ	2.55	0.41
1:G:229:ARG:NH1	1:G:257:VAL:HA	2.36	0.41
1:G:229:ARG:HH12	1:G:257:VAL:HA	1.84	0.41
1:D:53:ALA:HB1	1:D:307:MET:HE2	2.03	0.41
1:D:170:VAL:HG21	1:D:230:VAL:HG13	2.02	0.41
1:F:17:GLY:HA3	1:F:254:LEU:HD11	2.02	0.41
1:A:226:ARG:O	1:A:230:VAL:HG12	2.20	0.40
1:E:3:THR:O	1:E:18:ARG:HA	2.20	0.40
1:B:6:ARG:HD3	1:B:151:SER:HB3	2.04	0.40
1:D:151:SER:OG	1:D:166:ASP:HB3	2.21	0.40
1:E:28:GLU:HA	1:E:59:VAL:HG12	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:184:LEU:HD23	1:D:228:VAL:HG22	2.03	0.40
1:D:302:MET:HG2	1:D:307:MET:HE2	2.04	0.40
1:H:20:LEU:HD22	1:H:276:PHE:CE2	2.56	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	314/317 (99%)	301 (96%)	12 (4%)	1 (0%)	41	47
1	B	314/317 (99%)	302 (96%)	12 (4%)	0	100	100
1	C	314/317 (99%)	299 (95%)	14 (4%)	1 (0%)	41	47
1	D	313/317 (99%)	301 (96%)	11 (4%)	1 (0%)	41	47
1	E	312/317 (98%)	300 (96%)	11 (4%)	1 (0%)	41	47
1	F	313/317 (99%)	299 (96%)	14 (4%)	0	100	100
1	G	313/317 (99%)	297 (95%)	15 (5%)	1 (0%)	41	47
1	H	313/317 (99%)	300 (96%)	12 (4%)	1 (0%)	41	47
All	All	2506/2536 (99%)	2399 (96%)	101 (4%)	6 (0%)	47	56

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	175	PRO
1	D	175	PRO
1	G	175	PRO
1	A	175	PRO
1	C	175	PRO
1	H	175	PRO

### 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	253/264 (96%)	246 (97%)	7 (3%)	43	53
1	B	251/264 (95%)	243 (97%)	8 (3%)	39	47
1	C	255/264 (97%)	248 (97%)	7 (3%)	44	55
1	D	250/264 (95%)	242 (97%)	8 (3%)	39	47
1	E	247/264 (94%)	238 (96%)	9 (4%)	35	43
1	F	233/264 (88%)	225 (97%)	8 (3%)	37	46
1	G	235/264 (89%)	225 (96%)	10 (4%)	29	35
1	H	236/264 (89%)	225 (95%)	11 (5%)	26	31
All	All	1960/2112 (93%)	1892 (96%)	68 (4%)	36	44

All (68) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	ARG
1	A	66	MET
1	A	83	PHE
1	A	142	HIS
1	A	287	TYR
1	A	307	MET
1	A	314	SER
1	B	18	ARG
1	B	20	LEU
1	B	29	THR
1	B	142	HIS
1	B	239	GLN
1	B	287	TYR
1	B	314	SER
1	B	315	VAL
1	C	18	ARG
1	C	121	GLU
1	C	142	HIS
1	C	199	SER

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	C	287	TYR
1	C	298	ARG
1	C	314	SER
1	D	18	ARG
1	D	88	SER
1	D	142	HIS
1	D	170	VAL
1	D	258	GLN
1	D	268	ASP
1	D	287	TYR
1	D	314	SER
1	E	18	ARG
1	E	20	LEU
1	E	23	SER
1	E	83	PHE
1	E	111	ARG
1	E	142	HIS
1	E	170	VAL
1	E	287	TYR
1	E	298	ARG
1	F	18	ARG
1	F	69	ASP
1	F	139	SER
1	F	142	HIS
1	F	237	TYR
1	F	248	SER
1	F	282	SER
1	F	287	TYR
1	G	52	ASN
1	G	114	ASP
1	G	130	SER
1	G	142	HIS
1	G	191	SER
1	G	194	MET
1	G	237	TYR
1	G	268	ASP
1	G	278	SER
1	G	287	TYR
1	H	18	ARG
1	H	69	ASP
1	H	83	PHE
1	H	142	HIS

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Mol	Chain	Res	Type
1	H	150	ARG
1	H	161	MET
1	H	165	HIS
1	H	194	MET
1	H	237	TYR
1	H	287	TYR
1	H	299	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	252	HIS
1	C	142	HIS
1	E	258	GLN
1	F	52	ASN
1	F	74	HIS
1	F	162	HIS

### 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](#)

8 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$
2	WSR	A	401	1	34,34,35	0.40	0	51,54,55	0.56	1 (1%)
2	WSR	D	401	1	34,34,35	0.38	0	51,54,55	0.82	2 (3%)
2	WSR	G	401	1	34,34,35	0.38	0	51,54,55	0.72	1 (1%)
2	WSR	E	401	1	34,34,35	0.36	0	51,54,55	0.56	0
2	WSR	F	401	1	34,34,35	0.35	0	51,54,55	0.71	1 (1%)
2	WSR	B	401	1	34,34,35	0.36	0	51,54,55	0.58	0
2	WSR	C	401	1	34,34,35	0.36	0	51,54,55	0.62	0
2	WSR	H	401	1	34,34,35	0.37	0	51,54,55	0.71	2 (3%)

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
2	WSR	A	401	1	-	6/14/72/74	0/4/4/4
2	WSR	D	401	1	-	7/14/72/74	0/4/4/4
2	WSR	G	401	1	-	4/14/72/74	0/4/4/4
2	WSR	E	401	1	-	3/14/72/74	0/4/4/4
2	WSR	F	401	1	-	8/14/72/74	0/4/4/4
2	WSR	B	401	1	-	6/14/72/74	0/4/4/4
2	WSR	C	401	1	-	4/14/72/74	0/4/4/4
2	WSR	H	401	1	-	5/14/72/74	0/4/4/4

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
2	G	401	WSR	C4-C3-C2	-3.17	111.31	114.57
2	H	401	WSR	C4-C3-C2	-3.00	111.49	114.57
2	D	401	WSR	C24-C7-C5	2.62	123.59	119.49
2	D	401	WSR	C16-O2-S1	2.36	120.27	117.64
2	F	401	WSR	C8-C7-C24	-2.14	101.27	103.84
2	A	401	WSR	C16-O2-S1	2.12	120.00	117.64
2	H	401	WSR	C16-O2-S1	2.09	119.96	117.64

There are no chirality outliers.

All (43) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	WSR	C15-C16-O2-S1
2	A	401	WSR	C17-C16-O2-S1
2	B	401	WSR	C16-O2-S1-O4
2	B	401	WSR	C16-O2-S1-O5
2	C	401	WSR	C15-C16-O2-S1
2	C	401	WSR	C17-C16-O2-S1
2	D	401	WSR	C6-C5-C7-C24
2	E	401	WSR	C16-O2-S1-O4
2	F	401	WSR	C15-C16-O2-S1
2	F	401	WSR	C17-C16-O2-S1
2	G	401	WSR	C15-C16-O2-S1
2	G	401	WSR	C17-C16-O2-S1
2	D	401	WSR	C6-C5-C7-C8
2	D	401	WSR	C4-C5-C7-C8
2	D	401	WSR	C4-C5-C7-C24
2	A	401	WSR	C3-C4-C5-C7
2	A	401	WSR	C3-C4-C5-C6
2	B	401	WSR	C1-C2-C3-C4
2	C	401	WSR	C1-C2-C3-C4
2	G	401	WSR	O1-C2-C3-C4
2	F	401	WSR	C4-C5-C7-C24
2	B	401	WSR	C16-O2-S1-O3
2	C	401	WSR	O1-C2-C3-C4
2	D	401	WSR	C1-C2-C3-C4
2	E	401	WSR	C1-C2-C3-C4
2	F	401	WSR	O1-C2-C3-C4
2	H	401	WSR	C1-C2-C3-C4
2	H	401	WSR	O1-C2-C3-C4
2	F	401	WSR	C6-C5-C7-C24
2	A	401	WSR	C1-C2-C3-C4
2	A	401	WSR	O1-C2-C3-C4
2	B	401	WSR	O1-C2-C3-C4
2	D	401	WSR	O1-C2-C3-C4
2	E	401	WSR	O1-C2-C3-C4
2	F	401	WSR	C1-C2-C3-C4
2	G	401	WSR	C1-C2-C3-C4
2	H	401	WSR	C17-C16-O2-S1
2	H	401	WSR	C2-C3-C4-C5
2	B	401	WSR	C3-C4-C5-C6
2	F	401	WSR	C4-C5-C7-C8

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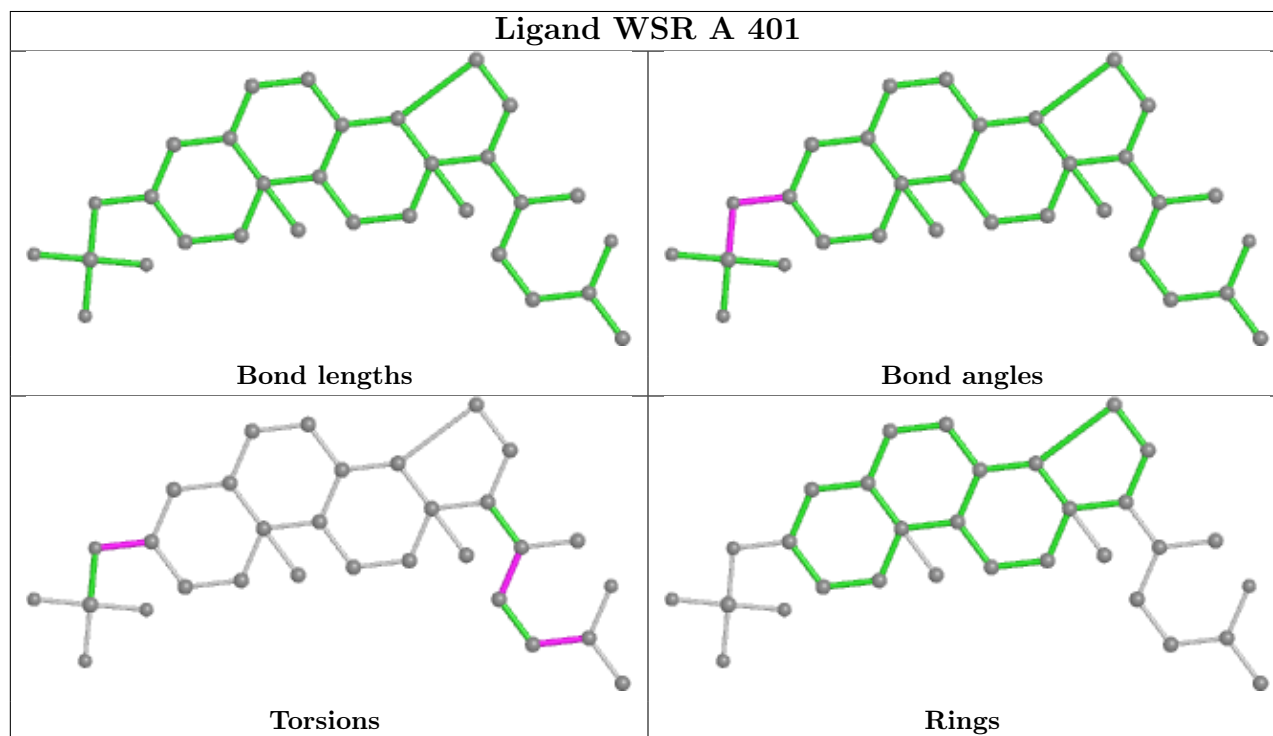
Mol	Chain	Res	Type	Atoms
2	F	401	WSR	C6-C5-C7-C8
2	H	401	WSR	C15-C16-O2-S1
2	D	401	WSR	C3-C4-C5-C6

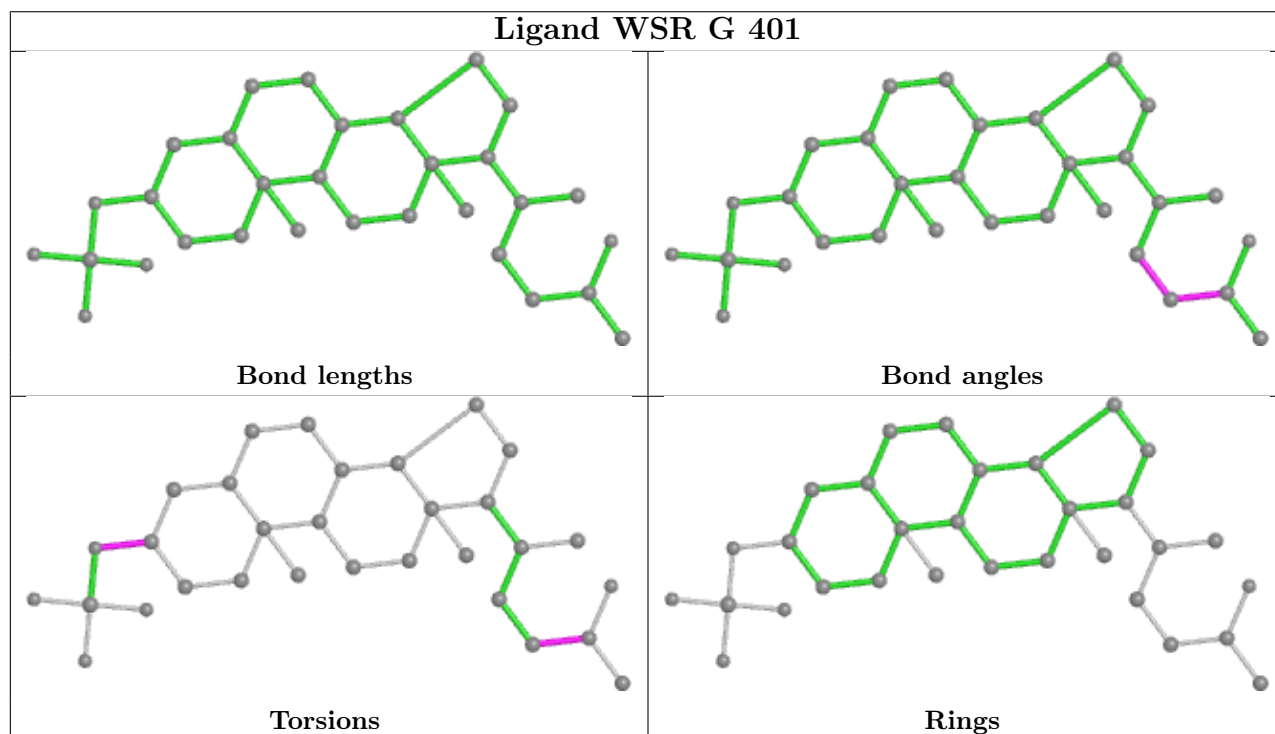
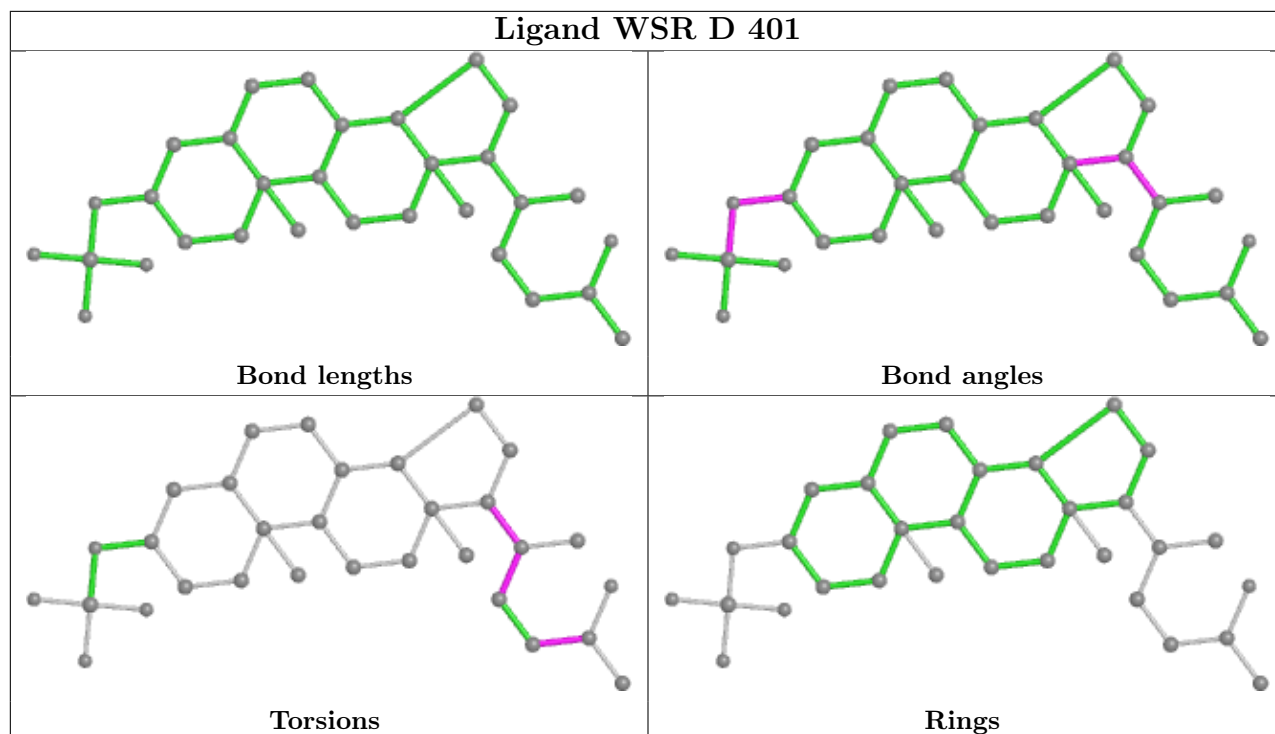
There are no ring outliers.

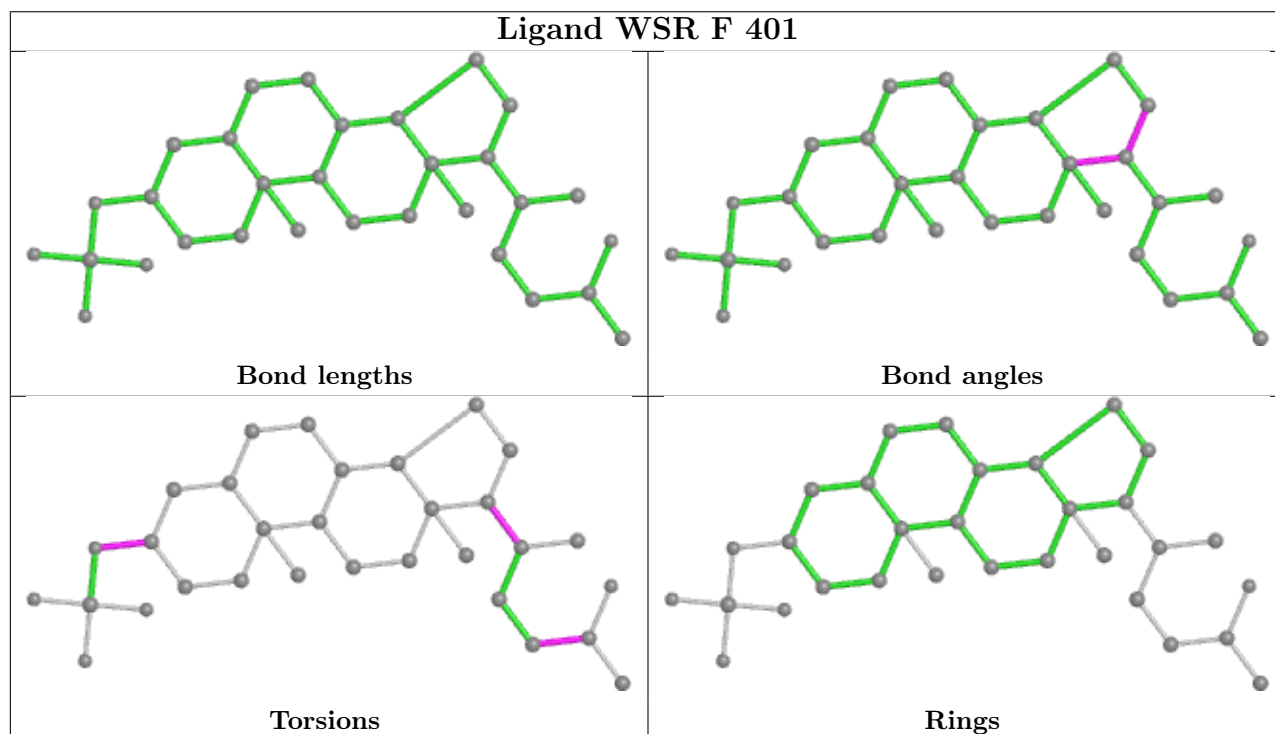
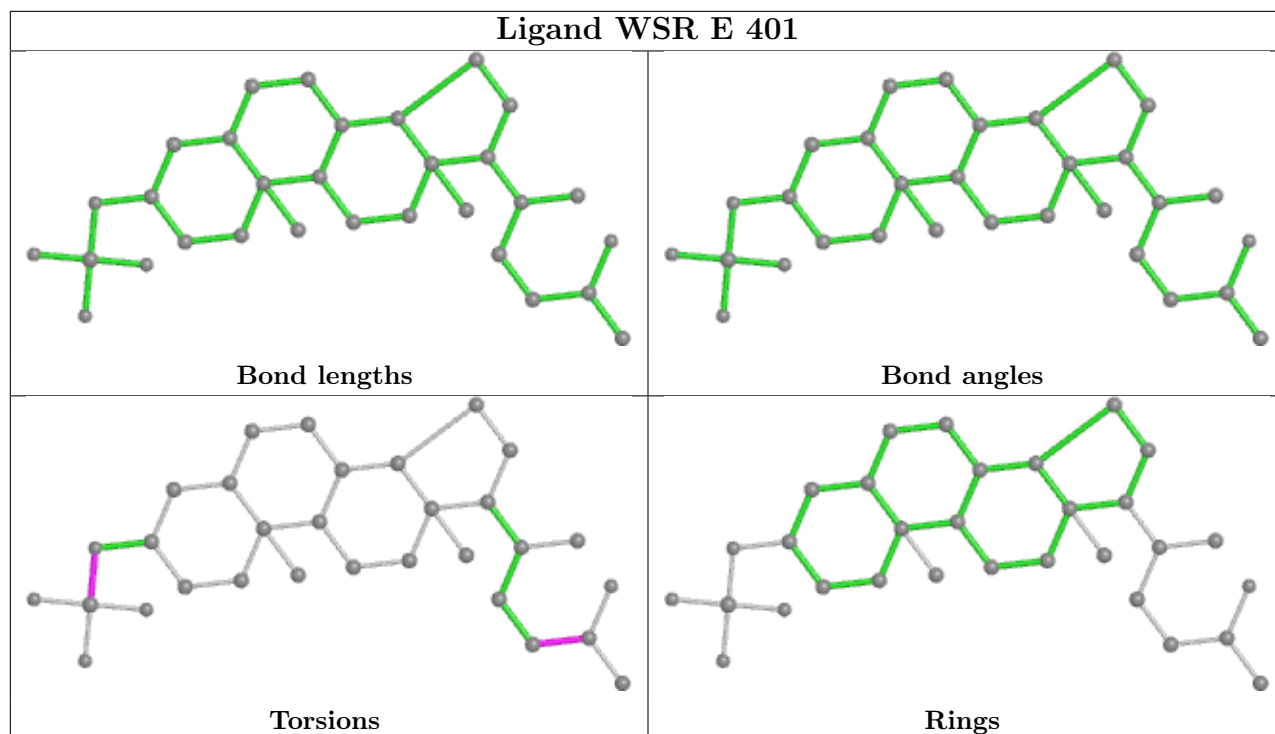
1 monomer is involved in 2 short contacts:

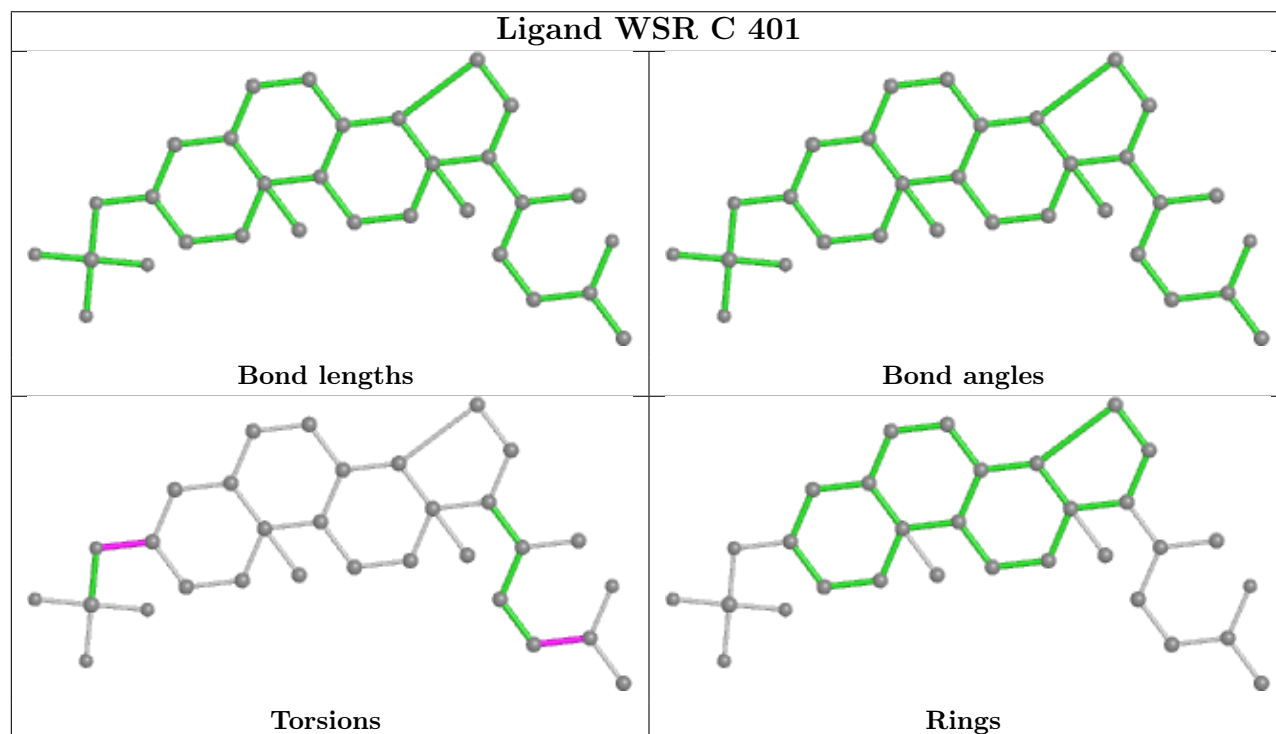
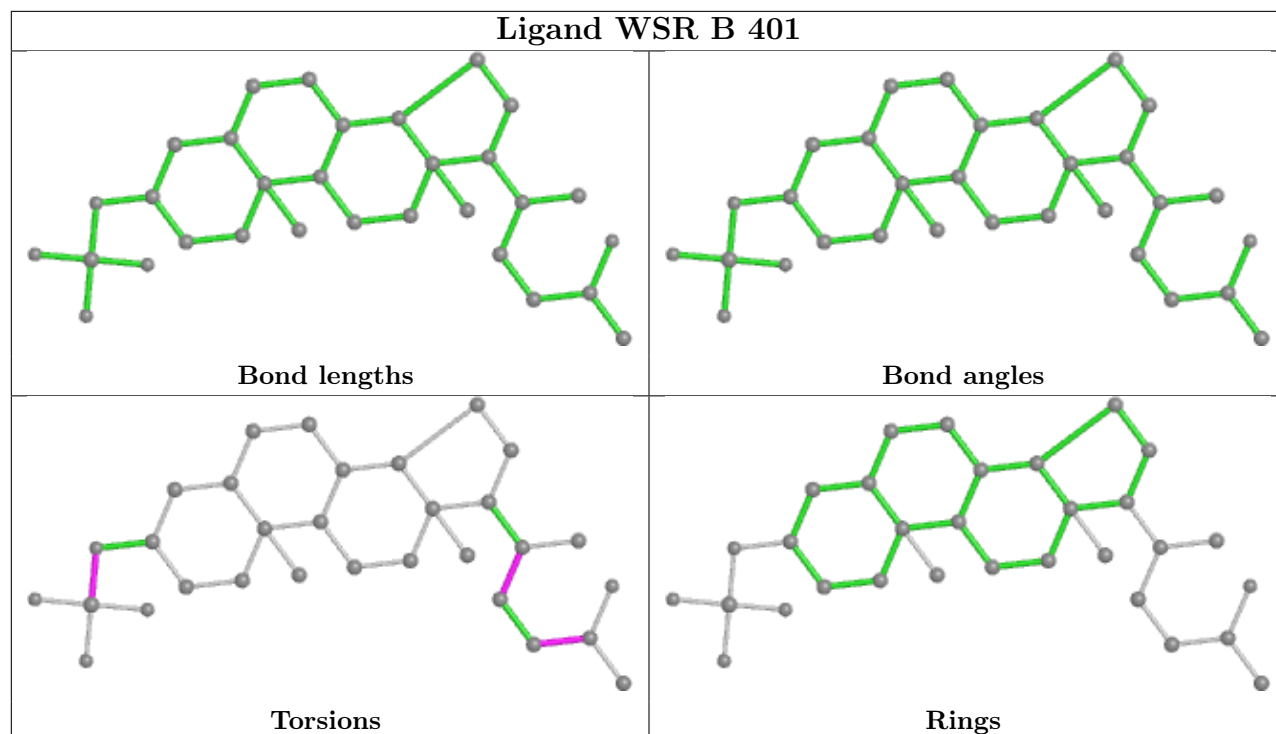
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	F	401	WSR	2	0

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

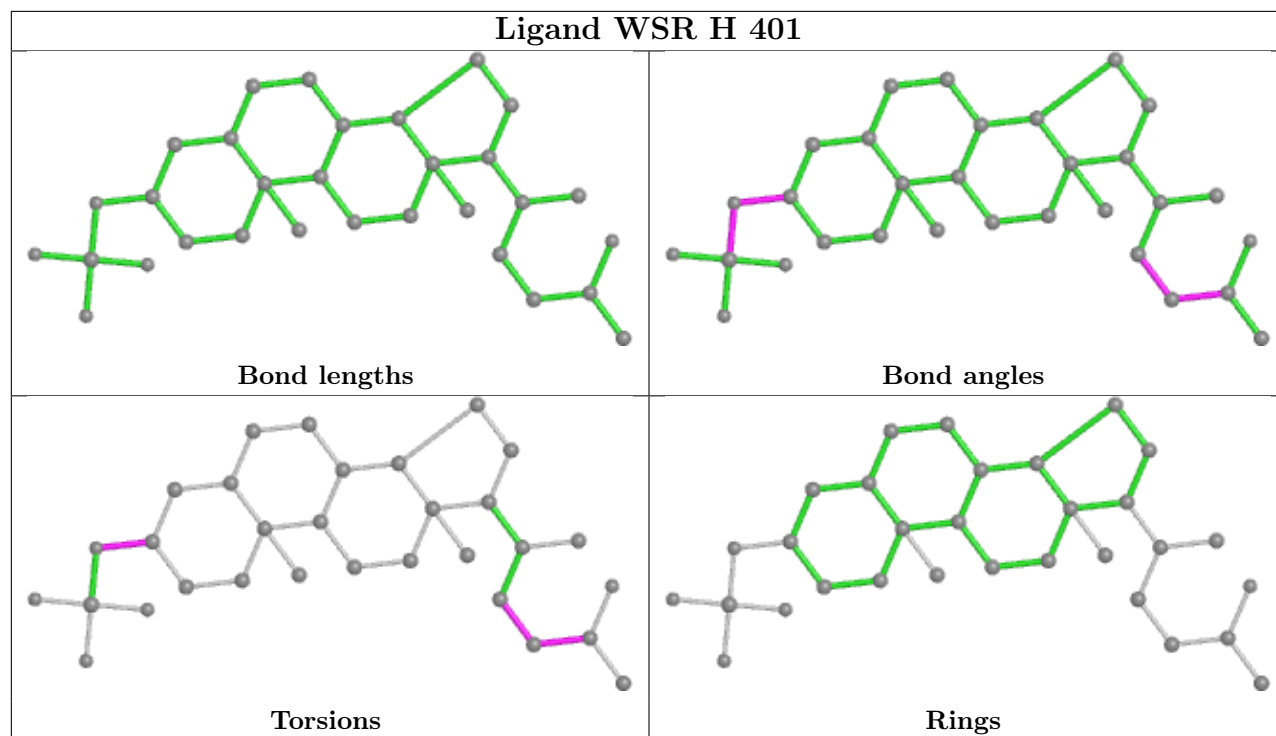












## 5.7 Other polymers [i](#)

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, 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	316/317 (99%)	0.23	3 (0%) 84 90	28, 43, 60, 92	0
1	B	316/317 (99%)	0.25	3 (0%) 84 90	33, 44, 61, 92	0
1	C	316/317 (99%)	0.29	4 (1%) 77 84	36, 51, 73, 91	0
1	D	315/317 (99%)	0.17	0 100 100	33, 49, 72, 81	0
1	E	314/317 (99%)	0.29	5 (1%) 72 80	36, 54, 73, 91	0
1	F	315/317 (99%)	0.64	28 (8%) 9 14	41, 64, 89, 114	0
1	G	315/317 (99%)	0.56	24 (7%) 13 21	42, 62, 81, 86	0
1	H	315/317 (99%)	0.68	36 (11%) 5 7	40, 63, 85, 95	0
All	All	2522/2536 (99%)	0.39	103 (4%) 37 49	28, 53, 81, 114	0

All (103) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	133	VAL	6.6
1	H	39	TYR	6.2
1	F	134	PRO	5.6
1	F	36	GLY	5.3
1	G	307	MET	4.7
1	G	55	ILE	4.6
1	H	53	ALA	4.2
1	F	94	VAL	4.2
1	H	123	LEU	4.2
1	H	49	ALA	3.9
1	G	51	PRO	3.8
1	F	315	VAL	3.8
1	F	66	MET	3.7
1	F	62	ALA	3.6
1	H	133	VAL	3.5
1	G	315	VAL	3.5

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	135	GLY	3.4
1	G	305	TYR	3.4
1	F	34	PRO	3.3
1	H	54	VAL	3.3
1	F	39	TYR	3.3
1	H	301	ALA	3.3
1	G	33	THR	3.3
1	G	306	ASP	3.2
1	G	108	TRP	3.2
1	H	312	LEU	3.2
1	F	38	HIS	3.1
1	H	109	VAL	3.1
1	C	94	VAL	3.0
1	H	305	TYR	2.9
1	H	108	TRP	2.9
1	F	108	TRP	2.9
1	G	287	TYR	2.9
1	F	43	PHE	2.9
1	F	101	ALA	2.8
1	G	116	VAL	2.8
1	H	34	PRO	2.8
1	F	132	ILE	2.8
1	G	29	THR	2.8
1	H	38	HIS	2.7
1	H	113	PHE	2.7
1	G	303	ALA	2.7
1	H	303	ALA	2.7
1	G	34	PRO	2.6
1	H	37	TYR	2.6
1	A	134	PRO	2.6
1	H	71	ALA	2.6
1	F	302	MET	2.6
1	G	39	TYR	2.6
1	H	280	TYR	2.6
1	E	135	GLY	2.6
1	F	131	GLN	2.6
1	H	31	LEU	2.5
1	H	302	MET	2.5
1	G	54	VAL	2.5
1	H	97	THR	2.5
1	G	32	VAL	2.4
1	F	135	GLY	2.4

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	H	126	VAL	2.4
1	H	61	MET	2.4
1	H	51	PRO	2.4
1	C	97	THR	2.4
1	C	218	PRO	2.4
1	E	134	PRO	2.4
1	F	37	TYR	2.4
1	B	49	ALA	2.4
1	H	50	LYS	2.3
1	F	92	GLU	2.3
1	G	312	LEU	2.3
1	G	300	TYR	2.3
1	H	66	MET	2.3
1	H	43	PHE	2.3
1	F	31	LEU	2.3
1	H	36	GLY	2.3
1	F	2	CYS	2.2
1	E	38	HIS	2.2
1	H	40	ASP	2.2
1	A	133	VAL	2.2
1	F	113	PHE	2.2
1	F	316	ALA	2.2
1	H	128	LEU	2.2
1	H	70	CYS	2.2
1	G	62	ALA	2.2
1	F	55	ILE	2.2
1	H	122	THR	2.2
1	F	303	ALA	2.2
1	B	135	GLY	2.2
1	E	49	ALA	2.1
1	F	54	VAL	2.1
1	F	127	THR	2.1
1	G	280	TYR	2.1
1	H	90	VAL	2.1
1	H	284	THR	2.1
1	H	65	PRO	2.1
1	H	110	ALA	2.1
1	F	311	GLU	2.1
1	G	56	GLY	2.1
1	G	286	THR	2.0
1	G	119	VAL	2.0
1	E	37	TYR	2.0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	B	315	VAL	2.0
1	C	43	PHE	2.0
1	G	67	TYR	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 [i](#)

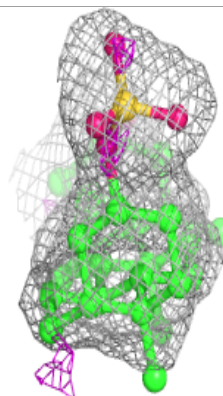
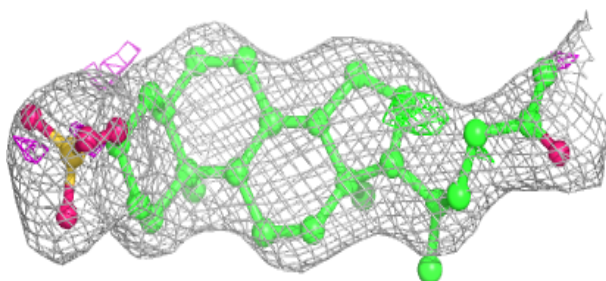
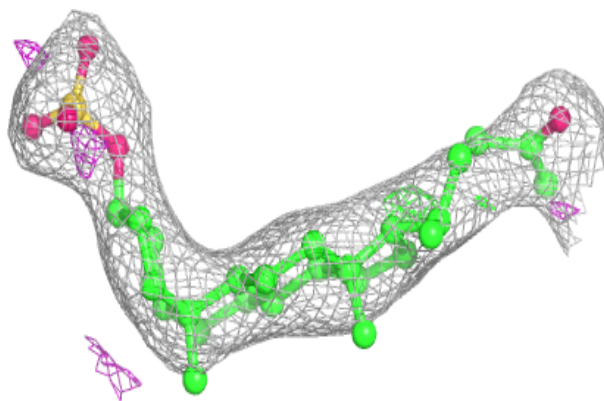
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	WSR	D	401	31/32	0.89	0.19	47,60,74,83	0
2	WSR	F	401	31/32	0.91	0.16	65,75,85,90	0
2	WSR	H	401	31/32	0.91	0.16	58,64,82,86	0
2	WSR	B	401	31/32	0.93	0.15	44,49,73,74	0
2	WSR	A	401	31/32	0.94	0.14	43,50,66,80	0
2	WSR	G	401	31/32	0.94	0.14	52,60,74,82	0
2	WSR	E	401	31/32	0.94	0.16	49,63,74,82	0
2	WSR	C	401	31/32	0.95	0.14	46,54,64,77	0

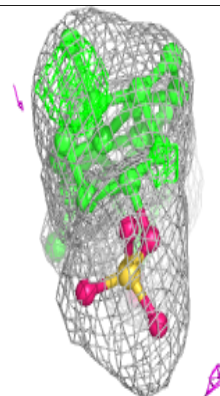
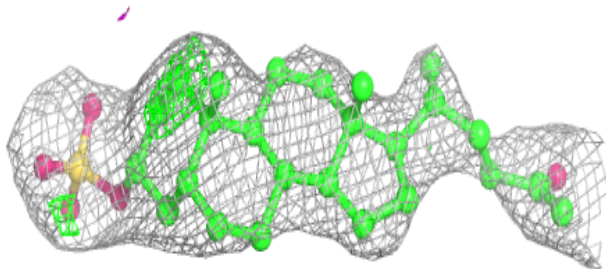
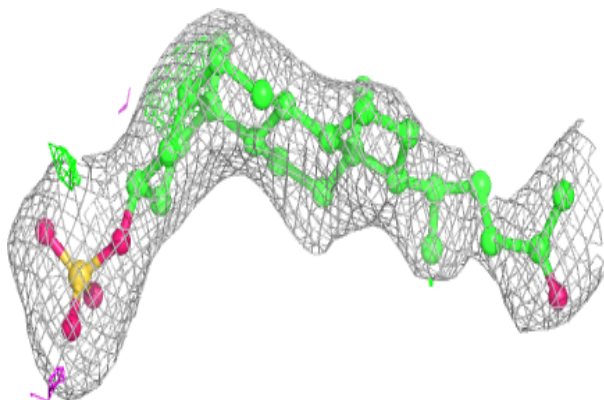
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around WSR D 401:**

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

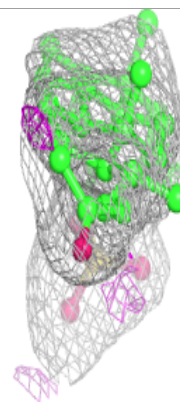
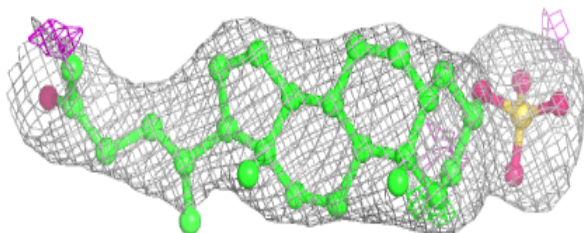
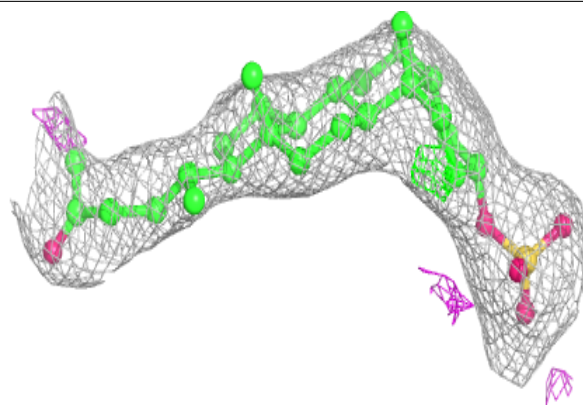
**Electron density around WSR F 401:**

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

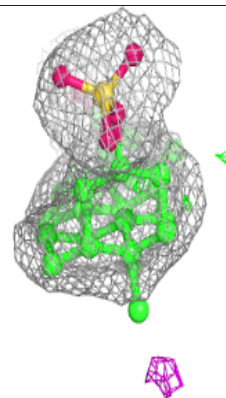
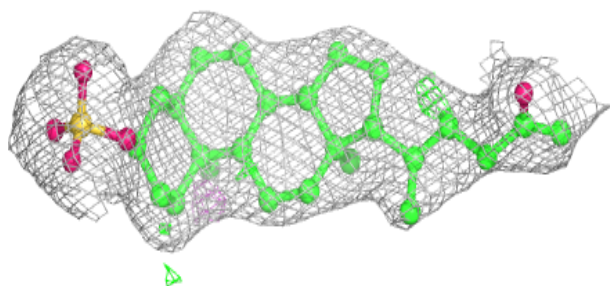
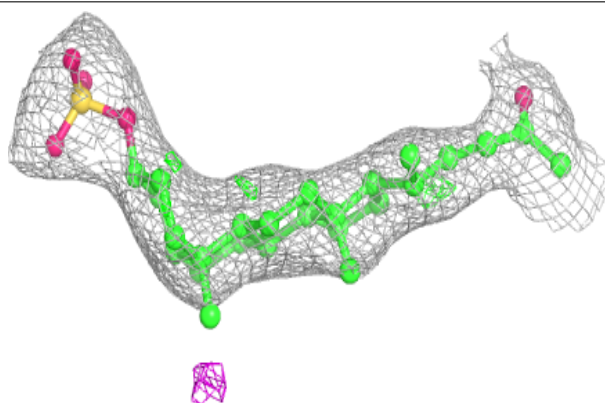


**Electron density around WSR H 401:**

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

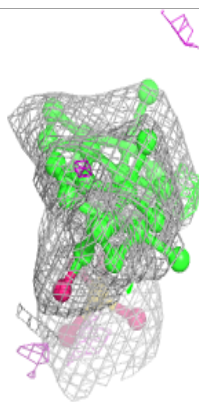
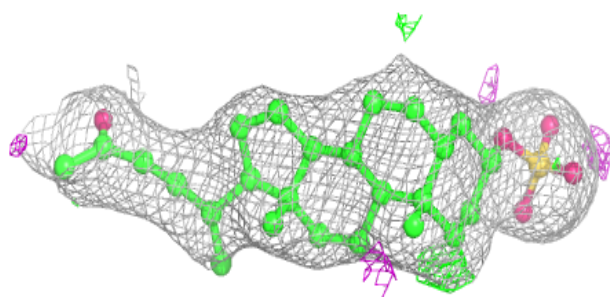
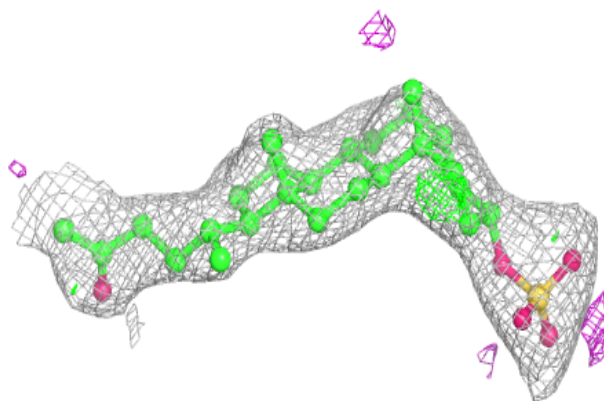
**Electron density around WSR B 401:**

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

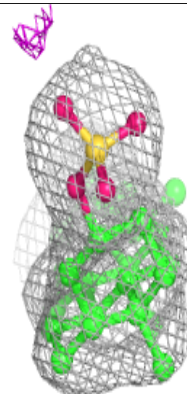
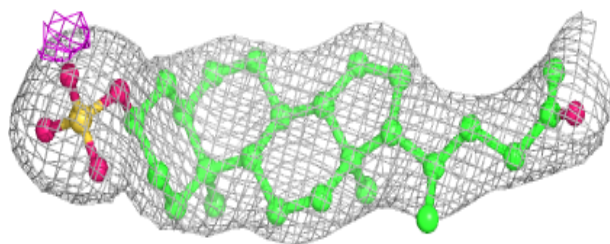
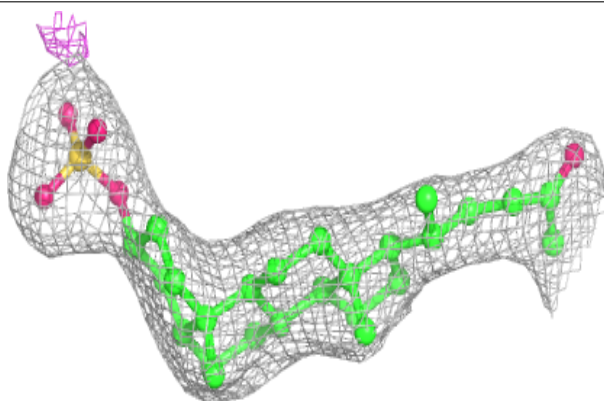


**Electron density around WSR A 401:**

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

**Electron density around WSR G 401:**

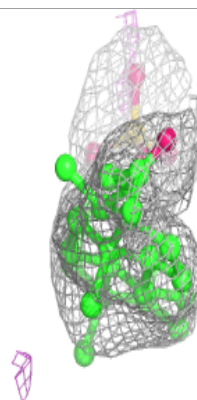
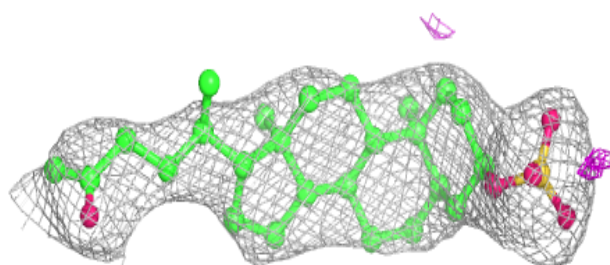
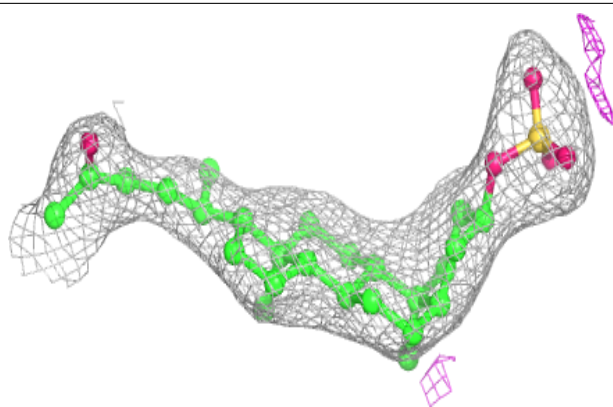
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



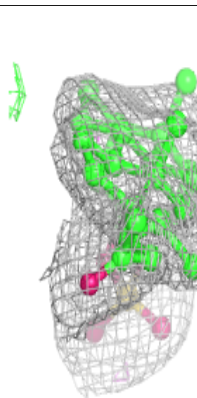
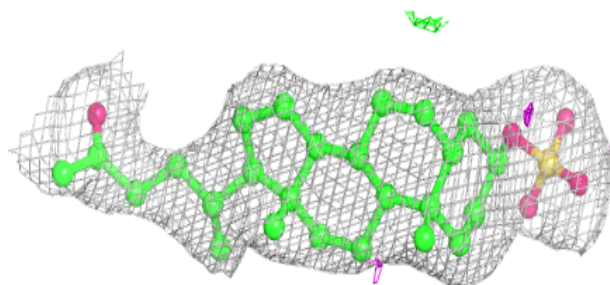
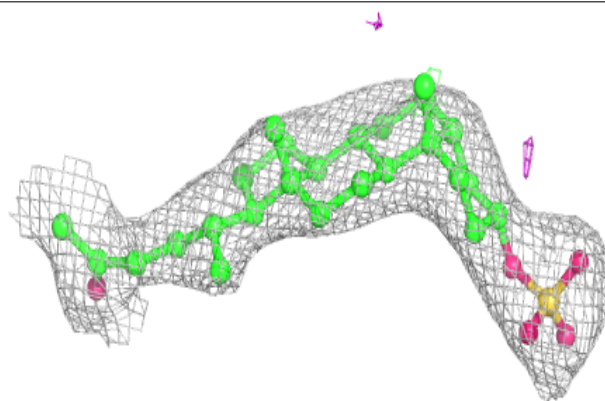


**Electron density around WSR E 401:**

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

**Electron density around WSR 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)



## 6.5 Other polymers [i](#)

There are no such residues in this entry.