



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 9, 2020 – 08:48 AM BST

PDB ID : 6WP9  
Title : AvaR1 bound to Avenolide  
Authors : Kapoor, I.; Olivares, P.J.; Nair, S.K.  
Deposited on : 2020-04-26  
Resolution : 2.00 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 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 : 2.13.1  
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) : 2.13.1

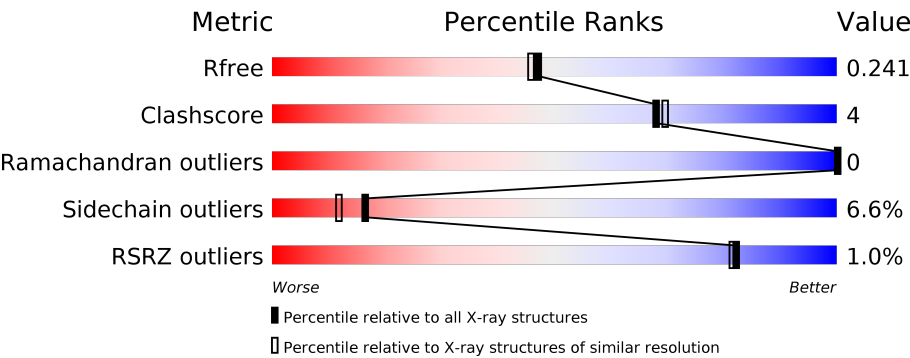
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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 on 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	245	<div><div></div><div>73%12%•14%</div></div>
1	B	245	<div><div></div><div>78%10%•12%</div></div>
1	C	245	<div><div>2%</div><div>77%9%13%</div></div>
1	D	245	<div><div>2%</div><div>76%12%•12%</div></div>
1	E	245	<div><div>2%</div><div>79%9%•11%</div></div>
1	F	245	<div><div></div><div>79%8%•12%</div></div>

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	G	245	<div><div><div>%</div><div><div></div><div></div><div></div></div><div>77%</div><div>9%</div><div>•</div><div>12%</div></div></div>
1	H	245	<div><div><div></div><div></div><div></div></div><div>78%</div><div>7%</div><div>•</div><div>13%</div></div>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 14748 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 AvaR1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	211	Total	C	N	O	S	0	0	0
			1637	1032	295	305	5			
1	B	216	Total	C	N	O	S	0	0	0
			1665	1050	300	310	5			
1	C	213	Total	C	N	O	S	0	0	0
			1654	1043	298	308	5			
1	D	216	Total	C	N	O	S	0	0	0
			1675	1055	304	311	5			
1	E	218	Total	C	N	O	S	0	0	0
			1697	1068	309	315	5			
1	F	215	Total	C	N	O	S	0	0	0
			1670	1052	303	310	5			
1	G	215	Total	C	N	O	S	0	0	0
			1664	1049	300	310	5			
1	H	212	Total	C	N	O	S	0	0	0
			1651	1041	299	306	5			

There are 96 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-10	GLY	-	expression tag	UNP Q82H41
A	-9	SER	-	expression tag	UNP Q82H41
A	-8	GLU	-	expression tag	UNP Q82H41
A	-7	ASN	-	expression tag	UNP Q82H41
A	-6	LEU	-	expression tag	UNP Q82H41
A	-5	TYR	-	expression tag	UNP Q82H41
A	-4	PHE	-	expression tag	UNP Q82H41
A	-3	GLN	-	expression tag	UNP Q82H41
A	-2	SER	-	expression tag	UNP Q82H41
A	-1	GLY	-	expression tag	UNP Q82H41
A	0	ALA	-	expression tag	UNP Q82H41
A	1	VAL	MET	conflict	UNP Q82H41
B	-10	GLY	-	expression tag	UNP Q82H41

*Continued on next page...*

*Continued from previous page...*

Chain	Residue	Modelled	Actual	Comment	Reference
B	-9	SER	-	expression tag	UNP Q82H41
B	-8	GLU	-	expression tag	UNP Q82H41
B	-7	ASN	-	expression tag	UNP Q82H41
B	-6	LEU	-	expression tag	UNP Q82H41
B	-5	TYR	-	expression tag	UNP Q82H41
B	-4	PHE	-	expression tag	UNP Q82H41
B	-3	GLN	-	expression tag	UNP Q82H41
B	-2	SER	-	expression tag	UNP Q82H41
B	-1	GLY	-	expression tag	UNP Q82H41
B	0	ALA	-	expression tag	UNP Q82H41
B	1	VAL	MET	conflict	UNP Q82H41
C	-10	GLY	-	expression tag	UNP Q82H41
C	-9	SER	-	expression tag	UNP Q82H41
C	-8	GLU	-	expression tag	UNP Q82H41
C	-7	ASN	-	expression tag	UNP Q82H41
C	-6	LEU	-	expression tag	UNP Q82H41
C	-5	TYR	-	expression tag	UNP Q82H41
C	-4	PHE	-	expression tag	UNP Q82H41
C	-3	GLN	-	expression tag	UNP Q82H41
C	-2	SER	-	expression tag	UNP Q82H41
C	-1	GLY	-	expression tag	UNP Q82H41
C	0	ALA	-	expression tag	UNP Q82H41
C	1	VAL	MET	conflict	UNP Q82H41
D	-10	GLY	-	expression tag	UNP Q82H41
D	-9	SER	-	expression tag	UNP Q82H41
D	-8	GLU	-	expression tag	UNP Q82H41
D	-7	ASN	-	expression tag	UNP Q82H41
D	-6	LEU	-	expression tag	UNP Q82H41
D	-5	TYR	-	expression tag	UNP Q82H41
D	-4	PHE	-	expression tag	UNP Q82H41
D	-3	GLN	-	expression tag	UNP Q82H41
D	-2	SER	-	expression tag	UNP Q82H41
D	-1	GLY	-	expression tag	UNP Q82H41
D	0	ALA	-	expression tag	UNP Q82H41
D	1	VAL	MET	conflict	UNP Q82H41
E	-10	GLY	-	expression tag	UNP Q82H41
E	-9	SER	-	expression tag	UNP Q82H41
E	-8	GLU	-	expression tag	UNP Q82H41
E	-7	ASN	-	expression tag	UNP Q82H41
E	-6	LEU	-	expression tag	UNP Q82H41
E	-5	TYR	-	expression tag	UNP Q82H41
E	-4	PHE	-	expression tag	UNP Q82H41

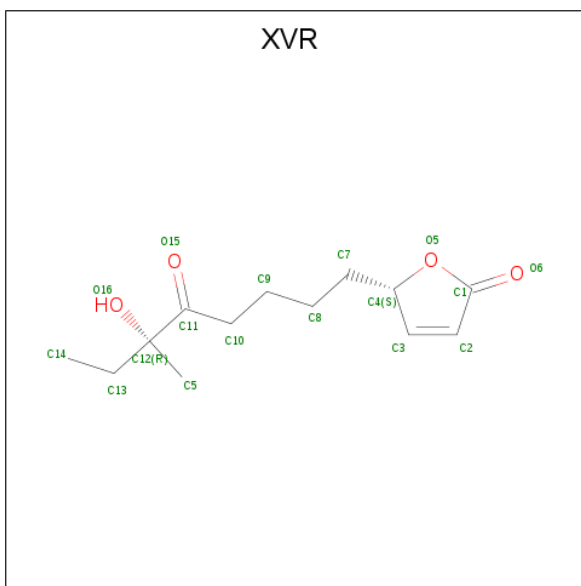
*Continued on next page...*

*Continued from previous page...*

Chain	Residue	Modelled	Actual	Comment	Reference
E	-3	GLN	-	expression tag	UNP Q82H41
E	-2	SER	-	expression tag	UNP Q82H41
E	-1	GLY	-	expression tag	UNP Q82H41
E	0	ALA	-	expression tag	UNP Q82H41
E	1	VAL	MET	conflict	UNP Q82H41
F	-10	GLY	-	expression tag	UNP Q82H41
F	-9	SER	-	expression tag	UNP Q82H41
F	-8	GLU	-	expression tag	UNP Q82H41
F	-7	ASN	-	expression tag	UNP Q82H41
F	-6	LEU	-	expression tag	UNP Q82H41
F	-5	TYR	-	expression tag	UNP Q82H41
F	-4	PHE	-	expression tag	UNP Q82H41
F	-3	GLN	-	expression tag	UNP Q82H41
F	-2	SER	-	expression tag	UNP Q82H41
F	-1	GLY	-	expression tag	UNP Q82H41
F	0	ALA	-	expression tag	UNP Q82H41
F	1	VAL	MET	conflict	UNP Q82H41
G	-10	GLY	-	expression tag	UNP Q82H41
G	-9	SER	-	expression tag	UNP Q82H41
G	-8	GLU	-	expression tag	UNP Q82H41
G	-7	ASN	-	expression tag	UNP Q82H41
G	-6	LEU	-	expression tag	UNP Q82H41
G	-5	TYR	-	expression tag	UNP Q82H41
G	-4	PHE	-	expression tag	UNP Q82H41
G	-3	GLN	-	expression tag	UNP Q82H41
G	-2	SER	-	expression tag	UNP Q82H41
G	-1	GLY	-	expression tag	UNP Q82H41
G	0	ALA	-	expression tag	UNP Q82H41
G	1	VAL	MET	conflict	UNP Q82H41
H	-10	GLY	-	expression tag	UNP Q82H41
H	-9	SER	-	expression tag	UNP Q82H41
H	-8	GLU	-	expression tag	UNP Q82H41
H	-7	ASN	-	expression tag	UNP Q82H41
H	-6	LEU	-	expression tag	UNP Q82H41
H	-5	TYR	-	expression tag	UNP Q82H41
H	-4	PHE	-	expression tag	UNP Q82H41
H	-3	GLN	-	expression tag	UNP Q82H41
H	-2	SER	-	expression tag	UNP Q82H41
H	-1	GLY	-	expression tag	UNP Q82H41
H	0	ALA	-	expression tag	UNP Q82H41
H	1	VAL	MET	conflict	UNP Q82H41

- Molecule 2 is (5S)-5-[(6R)-6-hydroxy-6-methyl-5-oxooctyl]furan-2(5H)-one (three-letter

code: XVR) (formula: C<sub>13</sub>H<sub>20</sub>O<sub>4</sub>) (labeled as "Ligand of Interest" by author).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 17 13 4	0	0
2	B	1	Total C O 17 13 4	0	0
2	C	1	Total C O 17 13 4	0	0
2	D	1	Total C O 17 13 4	0	0
2	E	1	Total C O 17 13 4	0	0
2	F	1	Total C O 17 13 4	0	0
2	G	1	Total C O 17 13 4	0	0
2	H	1	Total C O 17 13 4	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	168	Total O 168 168	0	0
3	B	155	Total O 155 155	0	0
3	C	164	Total O 164 164	0	0

*Continued on next page...*

*Continued from previous page...*

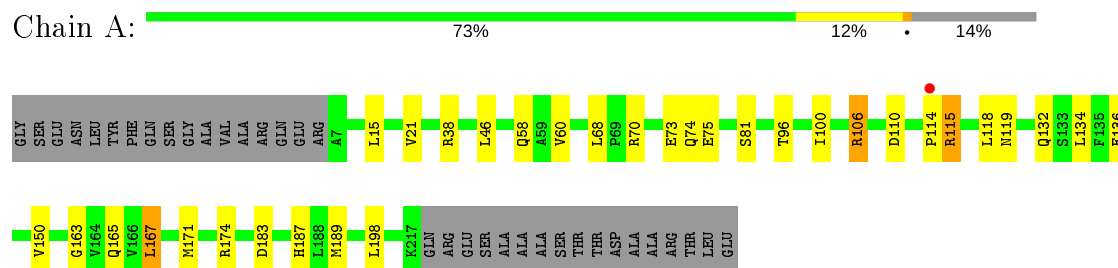
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	D	178	Total 178	O 178	0	0
3	E	154	Total 154	O 154	0	0
3	F	159	Total 159	O 159	0	0
3	G	155	Total 155	O 155	0	0
3	H	166	Total 166	O 166	0	0



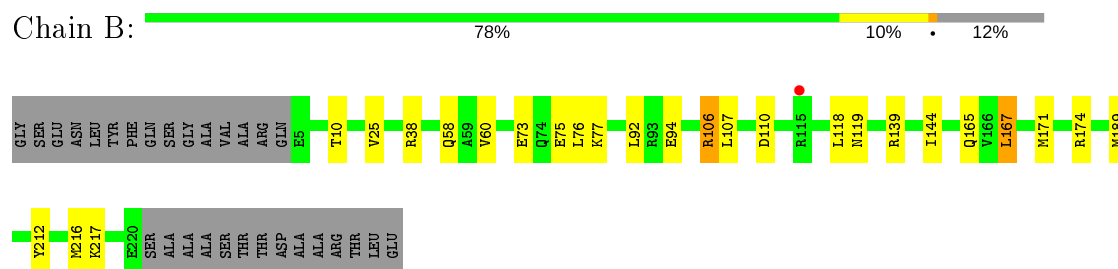
### 3 Residue-property plots [i](#)

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.

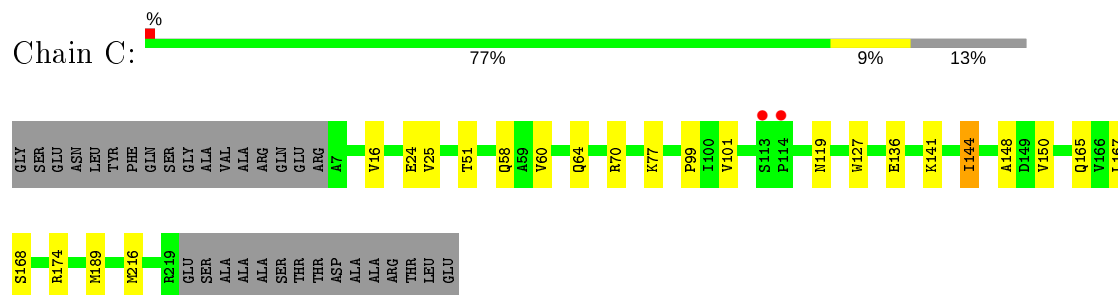
- Molecule 1: AvaR1



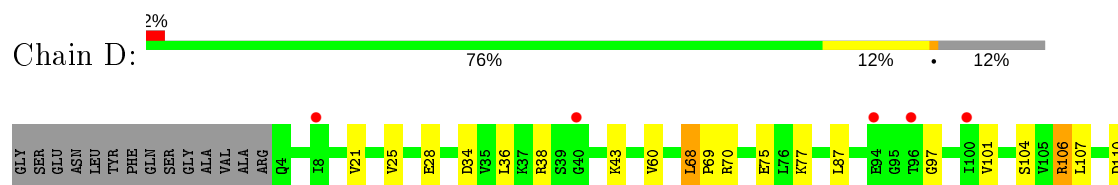
- Molecule 1: AvaR1



- Molecule 1: AvaR1

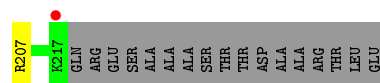
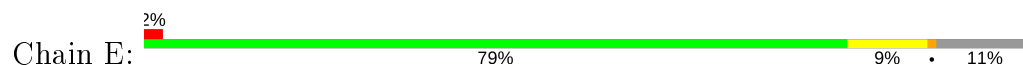


- Molecule 1: AvaR1

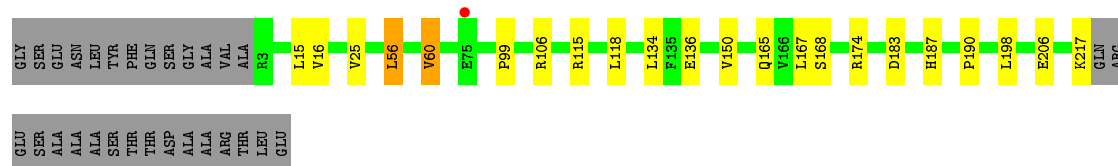




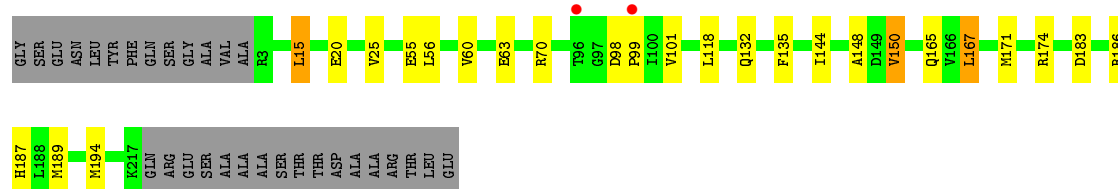
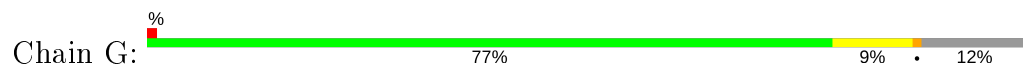
• Molecule 1: AvaR1



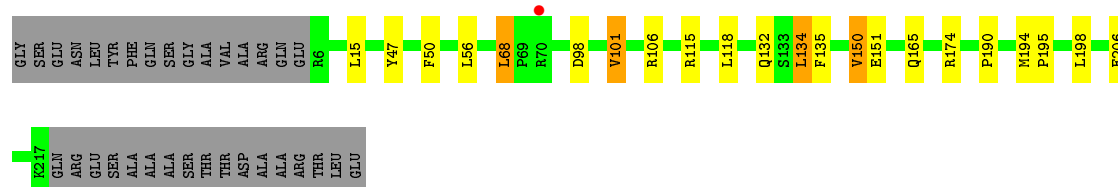
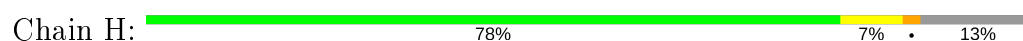
• Molecule 1: AvaR1



• Molecule 1: AvaR1



• Molecule 1: AvaR1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	44.44Å 232.53Å 87.65Å 90.00° 92.67° 90.00°	Depositor
Resolution (Å)	25.00 – 2.00 116.26 – 1.99	Depositor EDS
% Data completeness (in resolution range)	97.8 (25.00-2.00) 97.4 (116.26-1.99)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.14 (at 1.98Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, $R_{free}$	0.199 , 0.241 0.200 , 0.241	Depositor DCC
$R_{free}$ test set	5828 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	18.5	Xtriage
Anisotropy	0.588	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 49.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.056 for h,-k,-l	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	14748	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.80% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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

## 5 Model quality

### 5.1 Standard geometry

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

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	0.46	0/1665	0.69	0/2254
1	B	0.46	0/1693	0.71	0/2293
1	C	0.46	0/1682	0.70	0/2277
1	D	0.47	0/1703	0.71	1/2305 (0.0%)
1	E	0.46	0/1725	0.73	1/2334 (0.0%)
1	F	0.47	0/1698	0.70	0/2298
1	G	0.47	0/1692	0.72	0/2291
1	H	0.46	0/1679	0.76	1/2272 (0.0%)
All	All	0.46	0/13537	0.71	3/18324 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	68	LEU	CA-CB-CG	8.78	135.49	115.30
1	H	68	LEU	CA-CB-CG	8.44	134.71	115.30
1	D	68	LEU	CA-CB-CG	7.92	133.53	115.30

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	1637	0	1654	16	0
1	B	1665	0	1673	12	0
1	C	1654	0	1673	16	0
1	D	1675	0	1690	16	0
1	E	1697	0	1725	13	0
1	F	1670	0	1688	8	0
1	G	1664	0	1677	13	0
1	H	1651	0	1676	14	0
2	A	17	0	0	0	0
2	B	17	0	0	0	0
2	C	17	0	0	0	0
2	D	17	0	0	0	0
2	E	17	0	0	0	0
2	F	17	0	0	0	0
2	G	17	0	0	0	0
2	H	17	0	0	0	0
3	A	168	0	0	1	0
3	B	155	0	0	0	0
3	C	164	0	0	1	0
3	D	178	0	0	2	0
3	E	154	0	0	0	0
3	F	159	0	0	0	0
3	G	155	0	0	2	0
3	H	166	0	0	4	0
All	All	14748	0	13456	101	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 (101) 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:G:165:GLN:HE21	1:G:174:ARG:HE	1.22	0.84
1:C:58:GLN:HE22	1:C:119:ASN:H	1.21	0.83
1:H:165:GLN:HE21	1:H:174:ARG:HE	1.26	0.82
1:C:64:GLN:HE21	1:C:127:TRP:HE1	1.21	0.82
1:E:64:GLN:HE21	1:E:127:TRP:HE1	1.25	0.80
1:D:136:GLU:HG3	1:D:150:VAL:HG11	1.64	0.80
1:G:98:ASP:HB3	1:G:101:VAL:HG22	1.66	0.78
1:A:165:GLN:HE21	1:A:174:ARG:HE	1.34	0.73
1:D:97:GLY:HA3	1:D:216:MET:HE3	1.71	0.72
1:C:58:GLN:NE2	1:C:119:ASN:H	1.88	0.71

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:24:GLU:HG3	3:C:432:HOH:O	1.88	0.71
1:F:165:GLN:HE21	1:F:174:ARG:HE	1.36	0.71
1:A:136:GLU:HG3	1:A:150:VAL:HG11	1.74	0.70
1:C:136:GLU:HG3	1:C:150:VAL:HG11	1.75	0.69
1:E:165:GLN:HE21	1:E:174:ARG:HE	1.42	0.65
1:B:58:GLN:HE22	1:B:119:ASN:H	1.45	0.63
1:G:165:GLN:NE2	1:G:174:ARG:HE	1.96	0.62
1:H:134:LEU:HD12	3:H:451:HOH:O	1.99	0.61
1:C:165:GLN:HE21	1:C:174:ARG:HE	1.51	0.59
1:C:144:ILE:CD1	1:C:148:ALA:HB3	2.33	0.58
1:G:144:ILE:HD12	1:G:148:ALA:HB3	1.85	0.57
1:F:183:ASP:O	1:F:187:HIS:HD2	1.87	0.57
1:B:60:VAL:HG22	1:B:107:LEU:HD12	1.87	0.55
1:A:58:GLN:HE22	1:A:119:ASN:H	1.53	0.55
1:D:165:GLN:HE21	1:D:174:ARG:HE	1.53	0.55
1:A:106:ARG:HD2	1:A:110:ASP:OD2	2.07	0.55
1:C:216:MET:CE	1:C:216:MET:HA	2.37	0.54
1:E:195:PRO:HB2	1:H:190:PRO:HB3	1.87	0.54
1:D:69:PRO:HG3	1:D:216:MET:CE	2.37	0.53
1:D:36:LEU:HD11	1:D:43:LYS:HG3	1.90	0.53
1:B:92:LEU:HD13	1:B:165:GLN:HG3	1.91	0.52
1:F:16:VAL:HG13	1:F:99:PRO:HB2	1.92	0.52
1:B:165:GLN:HE21	1:B:174:ARG:HE	1.58	0.52
1:G:63:GLU:HG2	3:G:456:HOH:O	2.09	0.51
1:A:114:PRO:HB2	1:B:217:LYS:HD2	1.92	0.51
1:G:165:GLN:NE2	1:G:174:ARG:HH21	2.09	0.51
1:D:165:GLN:NE2	1:D:174:ARG:HH21	2.09	0.51
1:D:132:GLN:HG3	1:D:150:VAL:HG12	1.93	0.50
1:C:216:MET:HE2	1:C:216:MET:HA	1.92	0.50
1:B:58:GLN:NE2	1:B:119:ASN:H	2.09	0.50
3:D:447:HOH:O	1:E:194:MET:HB3	2.12	0.50
1:C:144:ILE:HD12	1:C:148:ALA:HB3	1.92	0.49
1:C:165:GLN:NE2	1:C:174:ARG:HE	2.10	0.49
1:H:194:MET:HB3	3:H:530:HOH:O	2.13	0.49
1:A:132:GLN:HG3	1:A:150:VAL:HG12	1.95	0.48
1:F:136:GLU:HG3	1:F:150:VAL:HG11	1.95	0.48
1:H:165:GLN:NE2	1:H:174:ARG:HE	2.04	0.48
1:F:190:PRO:HA	1:F:198:LEU:HD11	1.95	0.47
1:G:183:ASP:O	1:G:187:HIS:HD2	1.97	0.47
1:E:69:PRO:HD2	1:E:91:LEU:HD11	1.96	0.47
1:A:183:ASP:O	1:A:187:HIS:HD2	1.98	0.47

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:168:SER:OG	1:C:174:ARG:HA	2.15	0.47
1:A:115:ARG:HD3	1:B:217:LYS:HE2	1.96	0.46
1:E:183:ASP:O	1:E:187:HIS:HD2	1.99	0.46
1:E:64:GLN:NE2	1:E:127:TRP:HE1	2.04	0.46
1:D:60:VAL:HG22	1:D:107:LEU:HD12	1.97	0.46
1:F:165:GLN:NE2	1:F:174:ARG:HE	2.09	0.46
1:D:69:PRO:HG3	1:D:216:MET:HE1	1.98	0.45
1:A:74:GLN:HG3	3:A:456:HOH:O	2.16	0.45
1:D:165:GLN:NE2	1:D:174:ARG:HE	2.14	0.45
1:H:98:ASP:HB3	1:H:101:VAL:HG22	1.98	0.45
1:H:151:GLU:HG3	3:H:462:HOH:O	2.17	0.45
1:E:190:PRO:HB3	1:H:195:PRO:HB2	1.98	0.45
1:D:69:PRO:HG3	1:D:216:MET:HE2	1.98	0.45
1:C:64:GLN:NE2	1:C:127:TRP:HE1	2.01	0.44
1:D:87:LEU:HD13	1:D:212:TYR:HA	2.00	0.44
1:C:16:VAL:HG13	1:C:99:PRO:HB2	1.99	0.43
1:H:98:ASP:HB3	1:H:101:VAL:CG2	2.48	0.43
1:A:81:SER:HB2	1:A:134:LEU:HD23	1.99	0.43
1:H:132:GLN:HG3	1:H:150:VAL:HG13	2.00	0.43
1:F:56:LEU:O	1:F:60:VAL:HG12	2.17	0.43
1:E:74:GLN:HE22	1:E:207:ARG:NH2	2.15	0.43
1:A:167:LEU:HD22	1:A:171:MET:HG2	2.00	0.43
1:H:135:PHE:HB3	1:H:150:VAL:HG22	2.00	0.43
1:A:115:ARG:HH11	1:B:217:LYS:HZ1	1.67	0.43
1:G:15:LEU:HD12	1:G:60:VAL:HG12	2.00	0.43
1:D:21:VAL:HG21	1:D:34:ASP:HB3	2.01	0.42
1:G:132:GLN:HG3	1:G:150:VAL:HG13	2.00	0.42
1:F:168:SER:OG	1:F:174:ARG:HA	2.19	0.42
1:H:47:TYR:HA	1:H:50:PHE:O	2.20	0.42
1:B:167:LEU:HD22	1:B:171:MET:HG2	2.01	0.42
1:G:20:GLU:HG3	1:G:99:PRO:HB3	2.01	0.42
1:A:165:GLN:NE2	1:A:174:ARG:HE	2.09	0.42
1:C:141:LYS:HD2	3:G:521:HOH:O	2.20	0.42
1:G:135:PHE:HB3	1:G:150:VAL:HG22	2.02	0.42
1:G:167:LEU:HD22	1:G:171:MET:HG2	2.01	0.42
1:A:21:VAL:HG23	1:A:38:ARG:HD3	2.02	0.42
1:B:139:ARG:HA	1:B:144:ILE:HG12	2.01	0.42
1:B:212:TYR:CE1	1:B:216:MET:HE3	2.54	0.42
1:D:106:ARG:HD2	1:D:110:ASP:OD2	2.19	0.41
1:A:163:GLY:HA3	1:E:159:GLY:O	2.20	0.41
1:B:106:ARG:HD2	1:B:110:ASP:OD2	2.20	0.41

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:165:GLN:NE2	1:H:174:ARG:HH21	2.18	0.41
1:E:165:GLN:NE2	1:E:174:ARG:HE	2.13	0.41
1:C:165:GLN:HE22	1:C:174:ARG:HH21	1.69	0.41
1:E:165:GLN:NE2	1:E:174:ARG:HH21	2.19	0.41
1:A:58:GLN:NE2	1:A:119:ASN:H	2.18	0.41
1:D:28:GLU:HG3	3:D:570:HOH:O	2.20	0.41
1:E:199:VAL:HG13	1:H:198:LEU:HD22	2.04	0.40
1:D:187:HIS:HE1	3:H:509:HOH:O	2.04	0.40
1:G:165:GLN:HE22	1:G:174:ARG:HH21	1.68	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	209/245 (85%)	208 (100%)	1 (0%)	0	100	100
1	B	214/245 (87%)	210 (98%)	4 (2%)	0	100	100
1	C	211/245 (86%)	209 (99%)	2 (1%)	0	100	100
1	D	214/245 (87%)	212 (99%)	2 (1%)	0	100	100
1	E	216/245 (88%)	212 (98%)	4 (2%)	0	100	100
1	F	213/245 (87%)	211 (99%)	2 (1%)	0	100	100
1	G	213/245 (87%)	211 (99%)	2 (1%)	0	100	100
1	H	210/245 (86%)	206 (98%)	4 (2%)	0	100	100
All	All	1700/1960 (87%)	1679 (99%)	21 (1%)	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	171/197 (87%)	156 (91%)	15 (9%)	10	6
1	B	172/197 (87%)	160 (93%)	12 (7%)	15	10
1	C	173/197 (88%)	164 (95%)	9 (5%)	23	19
1	D	174/197 (88%)	162 (93%)	12 (7%)	15	11
1	E	177/197 (90%)	166 (94%)	11 (6%)	18	13
1	F	174/197 (88%)	163 (94%)	11 (6%)	18	13
1	G	173/197 (88%)	162 (94%)	11 (6%)	17	13
1	H	173/197 (88%)	163 (94%)	10 (6%)	20	15
All	All	1387/1576 (88%)	1296 (93%)	91 (7%)	16	12

All (91) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	15	LEU
1	A	46	LEU
1	A	60	VAL
1	A	68	LEU
1	A	70	ARG
1	A	73	GLU
1	A	75	GLU
1	A	96	THR
1	A	100	ILE
1	A	106	ARG
1	A	115	ARG
1	A	118	LEU
1	A	167	LEU
1	A	189	MET
1	A	198	LEU
1	B	10	THR
1	B	25	VAL
1	B	38	ARG
1	B	73	GLU

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	B	75	GLU
1	B	76	LEU
1	B	77	LYS
1	B	94	GLU
1	B	106	ARG
1	B	118	LEU
1	B	167	LEU
1	B	189	MET
1	C	25	VAL
1	C	51	THR
1	C	60	VAL
1	C	70	ARG
1	C	77	LYS
1	C	101	VAL
1	C	144	ILE
1	C	167	LEU
1	C	189	MET
1	D	25	VAL
1	D	38	ARG
1	D	68	LEU
1	D	70	ARG
1	D	75	GLU
1	D	77	LYS
1	D	101	VAL
1	D	104	SER
1	D	106	ARG
1	D	118	LEU
1	D	189	MET
1	D	198	LEU
1	E	15	LEU
1	E	21	VAL
1	E	56	LEU
1	E	60	VAL
1	E	68	LEU
1	E	70	ARG
1	E	75	GLU
1	E	101	VAL
1	E	118	LEU
1	E	167	LEU
1	E	199	VAL
1	F	15	LEU
1	F	25	VAL

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	F	56	LEU
1	F	60	VAL
1	F	106	ARG
1	F	115	ARG
1	F	118	LEU
1	F	134	LEU
1	F	167	LEU
1	F	206	GLU
1	F	217	LYS
1	G	15	LEU
1	G	25	VAL
1	G	55	GLU
1	G	56	LEU
1	G	70	ARG
1	G	118	LEU
1	G	150	VAL
1	G	167	LEU
1	G	186	ARG
1	G	189	MET
1	G	194	MET
1	H	15	LEU
1	H	56	LEU
1	H	68	LEU
1	H	101	VAL
1	H	106	ARG
1	H	115	ARG
1	H	118	LEU
1	H	134	LEU
1	H	150	VAL
1	H	206	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	58	GLN
1	A	165	GLN
1	A	187	HIS
1	B	58	GLN
1	B	165	GLN
1	C	58	GLN
1	C	64	GLN
1	C	90	HIS

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	C	165	GLN
1	C	187	HIS
1	D	74	GLN
1	D	90	HIS
1	D	165	GLN
1	D	187	HIS
1	E	49	HIS
1	E	64	GLN
1	E	74	GLN
1	E	165	GLN
1	E	187	HIS
1	F	49	HIS
1	F	111	GLN
1	F	165	GLN
1	F	187	HIS
1	G	12	GLN
1	G	49	HIS
1	G	80	GLN
1	G	165	GLN
1	G	187	HIS
1	H	165	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](#)

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	XVR	F	301	-	16,17,17	1.19	1 (6%)	17,23,23	2.47	7 (41%)
2	XVR	D	301	-	16,17,17	1.30	1 (6%)	17,23,23	2.68	7 (41%)
2	XVR	B	301	-	16,17,17	1.24	1 (6%)	17,23,23	2.46	6 (35%)
2	XVR	C	301	-	16,17,17	1.30	1 (6%)	17,23,23	2.72	6 (35%)
2	XVR	A	301	-	16,17,17	1.25	1 (6%)	17,23,23	2.69	6 (35%)
2	XVR	G	301	-	16,17,17	1.34	1 (6%)	17,23,23	2.66	7 (41%)
2	XVR	E	301	-	16,17,17	1.11	1 (6%)	17,23,23	2.67	6 (35%)
2	XVR	H	301	-	16,17,17	1.29	1 (6%)	17,23,23	2.94	7 (41%)

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	XVR	F	301	-	-	1/16/25/25	0/1/1/1
2	XVR	D	301	-	-	0/16/25/25	0/1/1/1
2	XVR	B	301	-	-	1/16/25/25	0/1/1/1
2	XVR	C	301	-	-	0/16/25/25	0/1/1/1
2	XVR	A	301	-	-	1/16/25/25	0/1/1/1
2	XVR	G	301	-	-	0/16/25/25	0/1/1/1
2	XVR	E	301	-	-	0/16/25/25	0/1/1/1
2	XVR	H	301	-	-	0/16/25/25	0/1/1/1

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	301	XVR	O5-C1	5.00	1.45	1.36
2	C	301	XVR	O5-C1	4.79	1.45	1.36
2	G	301	XVR	O5-C1	4.73	1.44	1.36
2	H	301	XVR	O5-C1	4.45	1.44	1.36
2	B	301	XVR	O5-C1	4.41	1.44	1.36
2	F	301	XVR	O5-C1	4.35	1.44	1.36
2	A	301	XVR	O5-C1	4.33	1.44	1.36
2	E	301	XVR	O5-C1	3.92	1.43	1.36

All (52) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	301	XVR	O5-C1-C2	6.41	112.42	108.16
2	E	301	XVR	C3-C2-C1	-5.93	105.36	108.63
2	E	301	XVR	O5-C1-C2	5.93	112.10	108.16
2	A	301	XVR	C3-C2-C1	-5.87	105.39	108.63
2	A	301	XVR	O5-C1-C2	5.79	112.01	108.16
2	B	301	XVR	C3-C2-C1	-5.75	105.46	108.63
2	C	301	XVR	C3-C2-C1	-5.53	105.58	108.63
2	G	301	XVR	C3-C2-C1	-5.52	105.58	108.63
2	H	301	XVR	C3-C2-C1	-5.45	105.62	108.63
2	H	301	XVR	C4-O5-C1	-5.41	103.93	109.14
2	G	301	XVR	O5-C1-C2	5.32	111.70	108.16
2	D	301	XVR	O5-C1-C2	5.10	111.56	108.16
2	C	301	XVR	O5-C1-C2	5.07	111.53	108.16
2	B	301	XVR	O5-C1-C2	4.96	111.46	108.16
2	F	301	XVR	O5-C1-C2	4.83	111.38	108.16
2	D	301	XVR	C4-O5-C1	-4.72	104.59	109.14
2	F	301	XVR	C4-O5-C1	-4.66	104.65	109.14
2	D	301	XVR	C8-C7-C4	-4.59	108.42	114.31
2	C	301	XVR	C8-C7-C4	-4.59	108.42	114.31
2	A	301	XVR	C4-O5-C1	-4.50	104.80	109.14
2	D	301	XVR	C3-C2-C1	-4.49	106.15	108.63
2	E	301	XVR	C4-O5-C1	-4.39	104.91	109.14
2	G	301	XVR	C4-O5-C1	-4.31	104.98	109.14
2	C	301	XVR	C4-O5-C1	-4.24	105.06	109.14
2	F	301	XVR	C8-C7-C4	-4.04	109.12	114.31
2	F	301	XVR	C3-C2-C1	-3.95	106.45	108.63
2	H	301	XVR	C8-C7-C4	-3.87	109.33	114.31
2	G	301	XVR	C8-C7-C4	-3.84	109.38	114.31
2	B	301	XVR	C4-O5-C1	-3.58	105.69	109.14
2	D	301	XVR	O6-C1-C2	-3.39	125.47	130.91
2	A	301	XVR	C8-C7-C4	-3.38	109.96	114.31
2	H	301	XVR	O6-C1-C2	-3.36	125.51	130.91
2	G	301	XVR	O6-C1-C2	-3.29	125.62	130.91
2	C	301	XVR	O6-C1-C2	-3.21	125.75	130.91
2	B	301	XVR	O6-C1-C2	-3.13	125.88	130.91
2	F	301	XVR	O6-C1-C2	-3.01	126.08	130.91
2	E	301	XVR	O6-C1-C2	-2.93	126.20	130.91
2	A	301	XVR	O6-C1-C2	-2.93	126.21	130.91
2	E	301	XVR	C7-C4-C3	-2.69	110.14	116.21
2	C	301	XVR	C7-C4-C3	-2.67	110.18	116.21
2	B	301	XVR	C7-C4-C3	-2.66	110.21	116.21
2	E	301	XVR	C8-C7-C4	-2.62	110.95	114.31

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	301	XVR	C7-C4-C3	-2.59	110.37	116.21
2	A	301	XVR	C7-C4-C3	-2.52	110.52	116.21
2	H	301	XVR	O5-C4-C3	2.51	106.89	103.31
2	D	301	XVR	C7-C4-C3	-2.49	110.60	116.21
2	H	301	XVR	C7-C4-C3	-2.42	110.74	116.21
2	B	301	XVR	C8-C7-C4	-2.41	111.22	114.31
2	G	301	XVR	C7-C4-C3	-2.36	110.88	116.21
2	F	301	XVR	O5-C4-C3	2.26	106.52	103.31
2	D	301	XVR	O5-C4-C3	2.15	106.38	103.31
2	G	301	XVR	O5-C4-C3	2.07	106.26	103.31

There are no chirality outliers.

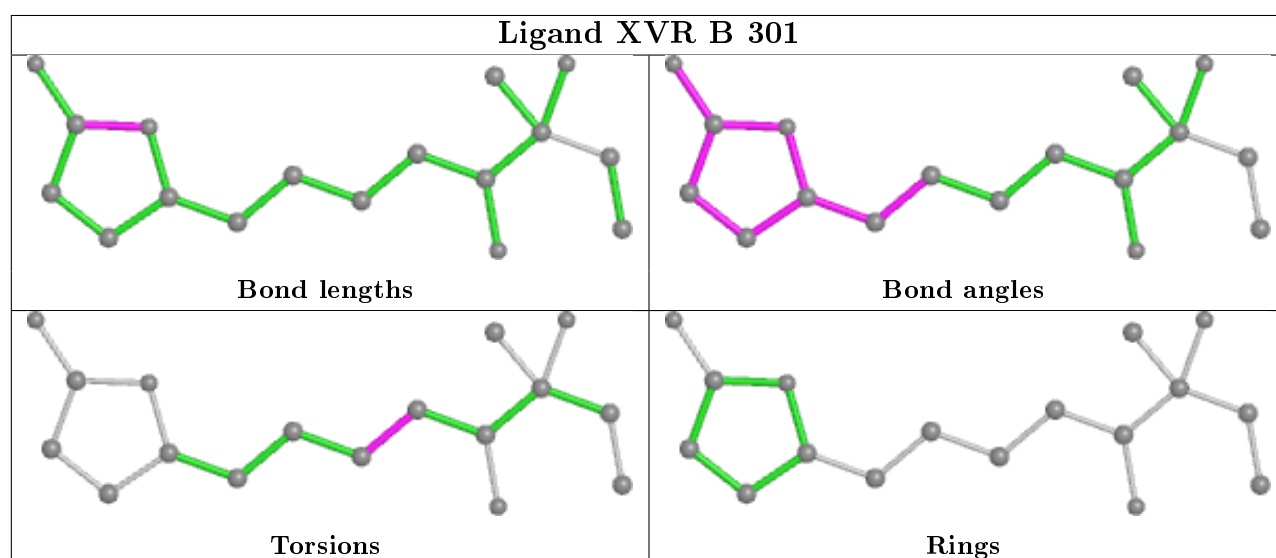
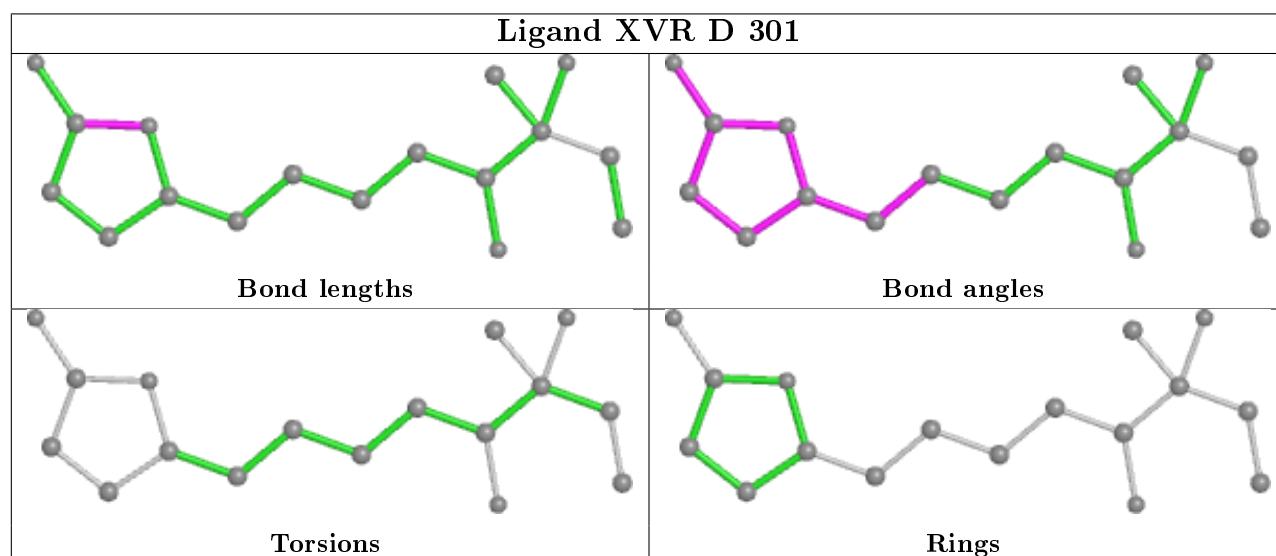
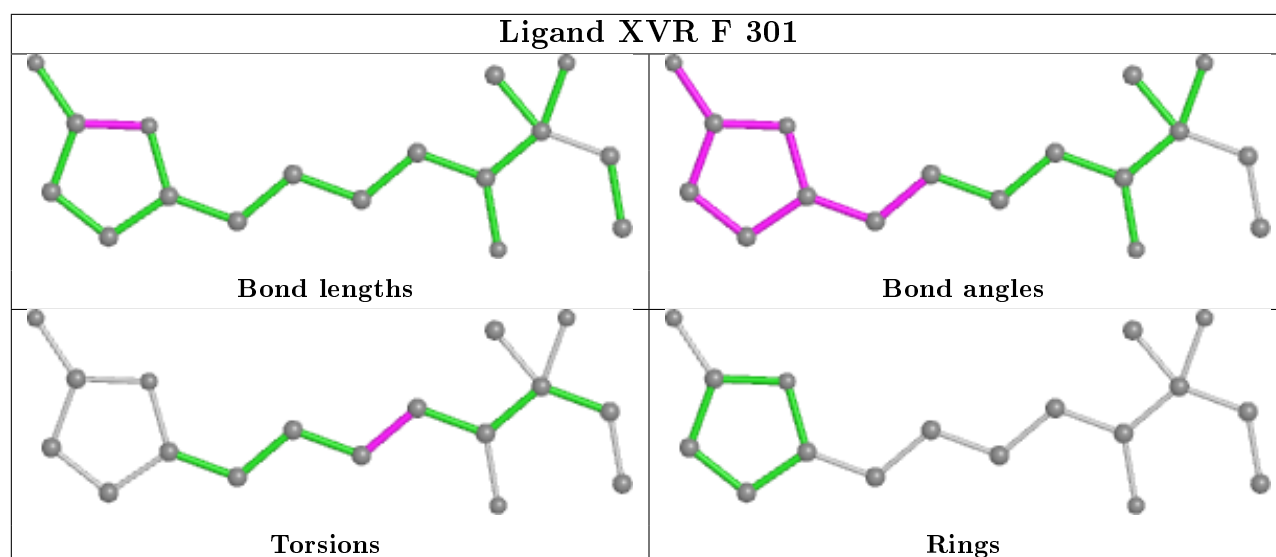
All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	301	XVR	C11-C10-C9-C8
2	F	301	XVR	C11-C10-C9-C8
2	A	301	XVR	C11-C10-C9-C8

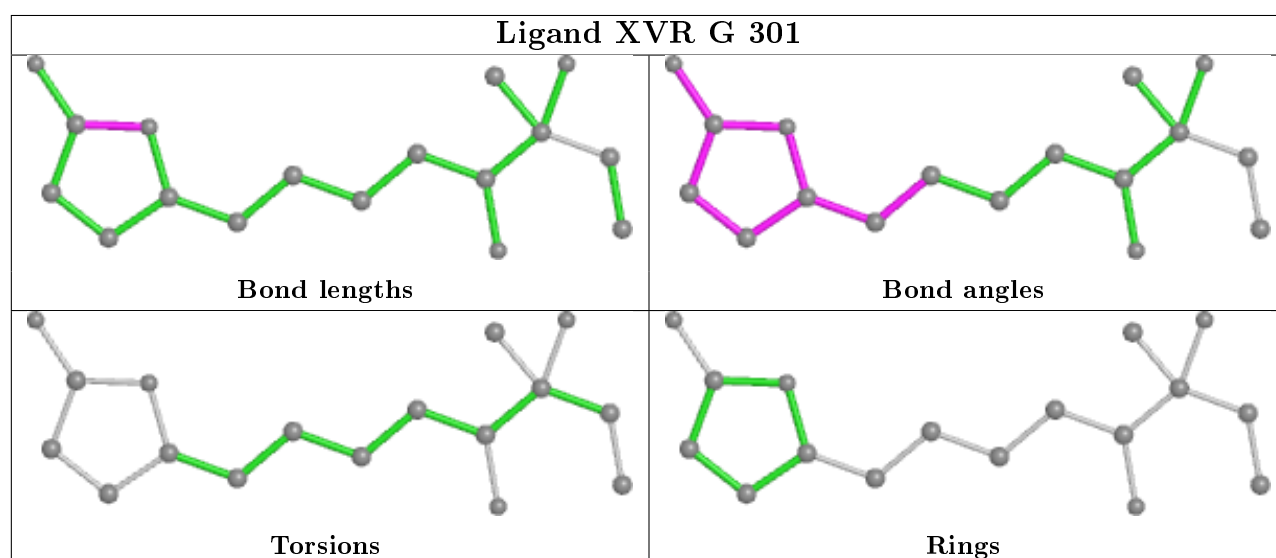
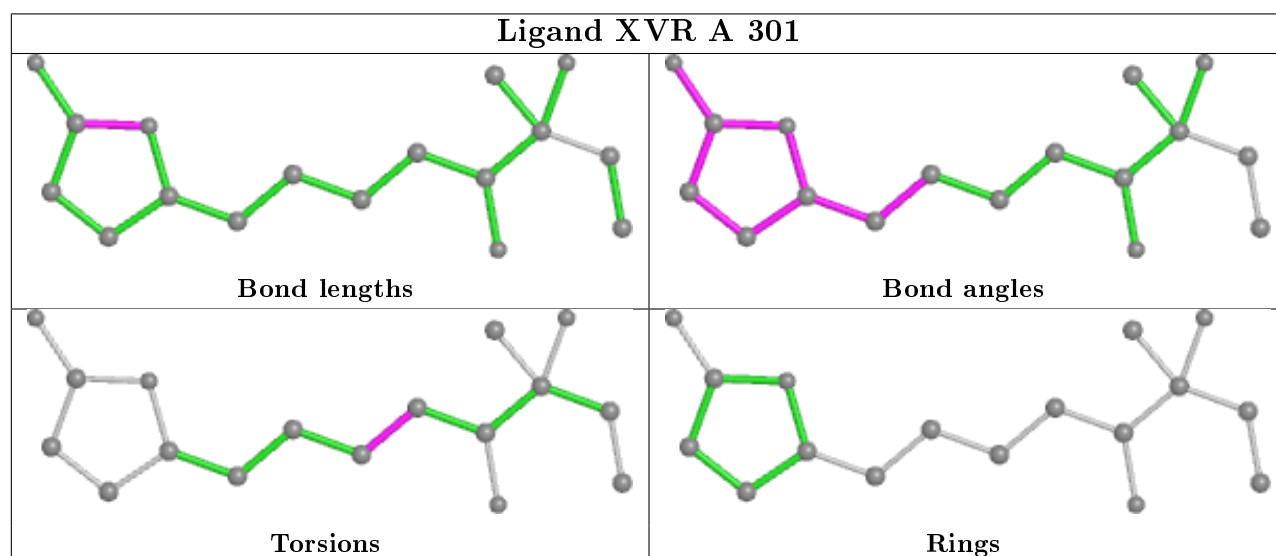
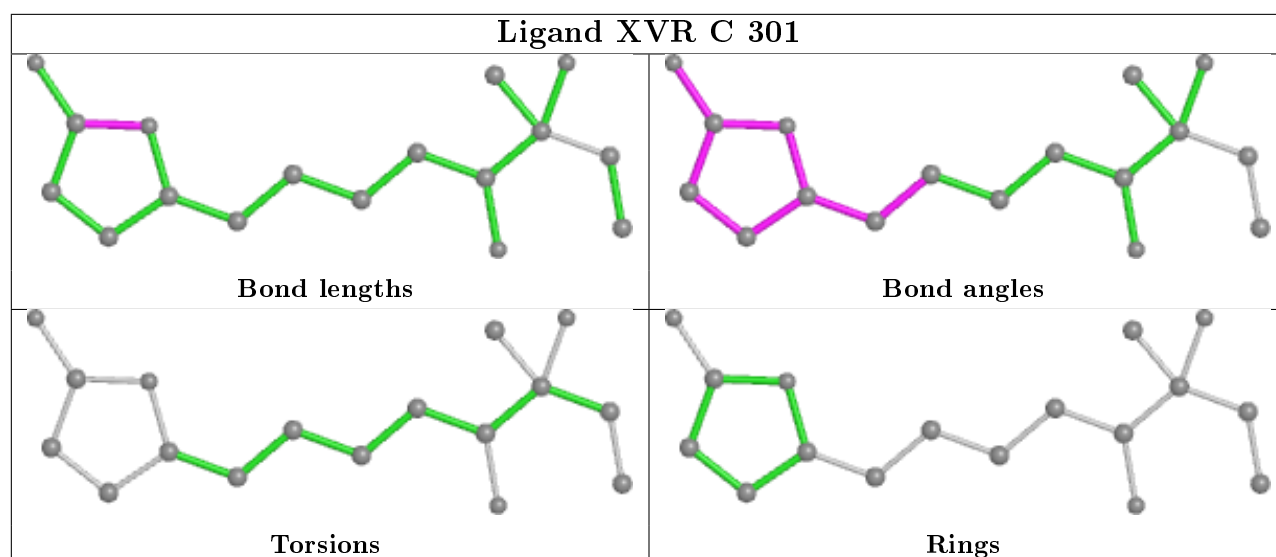
There are no ring outliers.

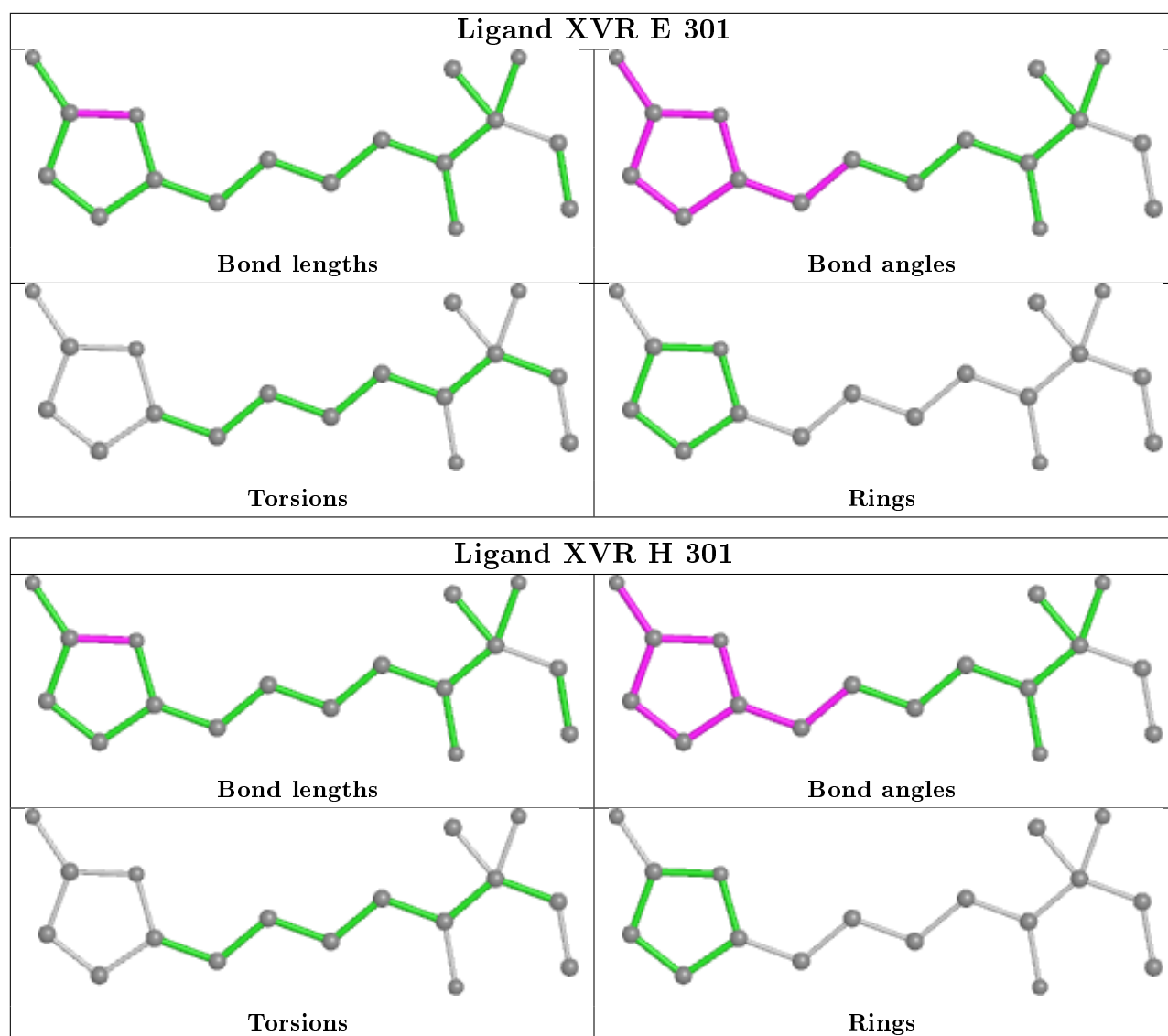
No monomer is involved in short contacts.

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, 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	211/245 (86%)	-0.13	1 (0%) 91 90	12, 21, 38, 51	0
1	B	216/245 (88%)	-0.13	1 (0%) 91 90	11, 20, 38, 49	0
1	C	213/245 (86%)	-0.15	2 (0%) 84 83	12, 20, 37, 56	0
1	D	216/245 (88%)	-0.05	6 (2%) 53 51	11, 21, 39, 53	0
1	E	218/245 (88%)	-0.03	4 (1%) 68 66	12, 22, 48, 61	0
1	F	215/245 (87%)	-0.17	1 (0%) 91 90	11, 20, 41, 56	0
1	G	215/245 (87%)	-0.11	2 (0%) 84 83	12, 19, 42, 58	0
1	H	212/245 (86%)	-0.18	1 (0%) 91 90	11, 20, 39, 55	0
All	All	1716/1960 (87%)	-0.12	18 (1%) 82 81	11, 20, 41, 61	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	114	PRO	3.6
1	E	96	THR	3.3
1	B	115	ARG	3.3
1	D	96	THR	2.9
1	H	70	ARG	2.9
1	C	113	SER	2.7
1	G	99	PRO	2.6
1	F	75	GLU	2.5
1	D	8	ILE	2.5
1	D	114	PRO	2.3
1	C	114	PRO	2.3
1	E	217	LYS	2.2
1	D	94	GLU	2.2
1	D	100	ILE	2.1
1	E	75	GLU	2.1
1	E	146	PRO	2.1

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	D	40	GLY	2.1
1	G	96	THR	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](#)

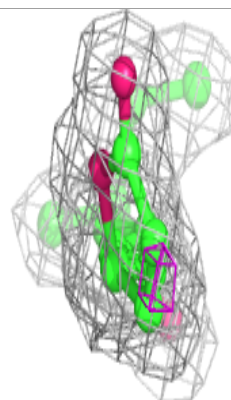
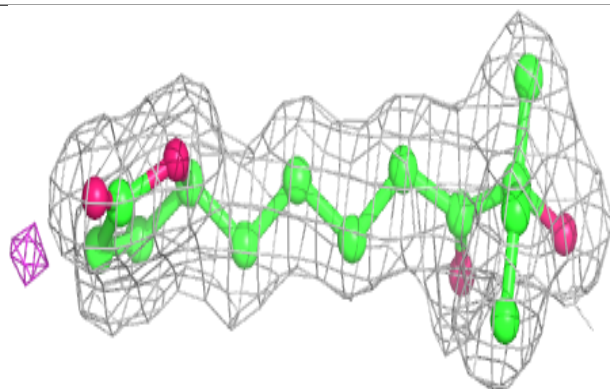
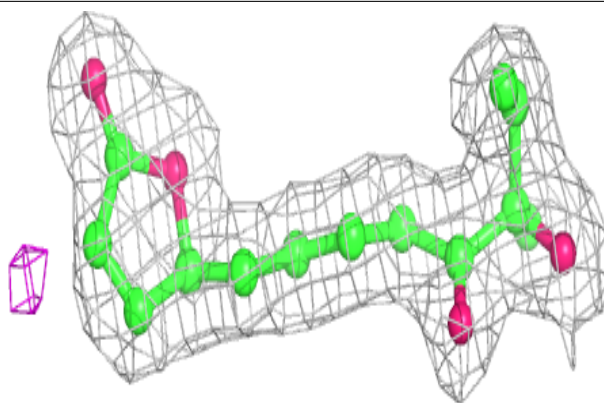
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	XVR	F	301	17/17	0.94	0.12	15,16,17,17	0
2	XVR	B	301	17/17	0.95	0.10	16,17,18,18	0
2	XVR	H	301	17/17	0.95	0.11	12,12,14,14	0
2	XVR	G	301	17/17	0.96	0.10	12,12,14,14	0
2	XVR	E	301	17/17	0.96	0.10	15,16,17,17	0
2	XVR	A	301	17/17	0.96	0.09	15,16,18,18	0
2	XVR	D	301	17/17	0.97	0.11	17,17,18,19	0
2	XVR	C	301	17/17	0.97	0.09	13,14,15,15	0

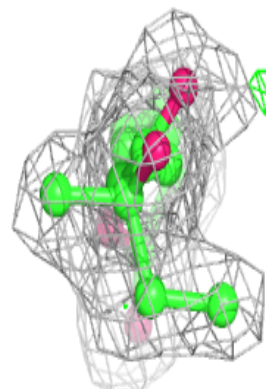
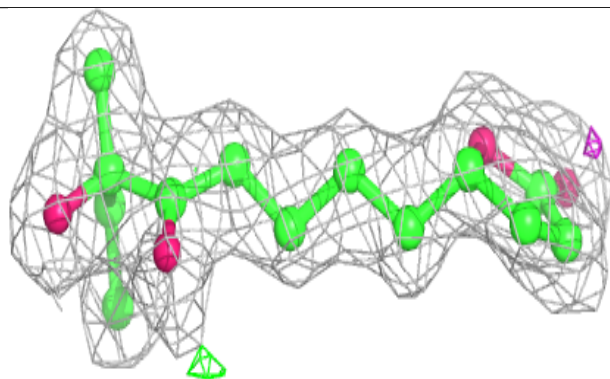
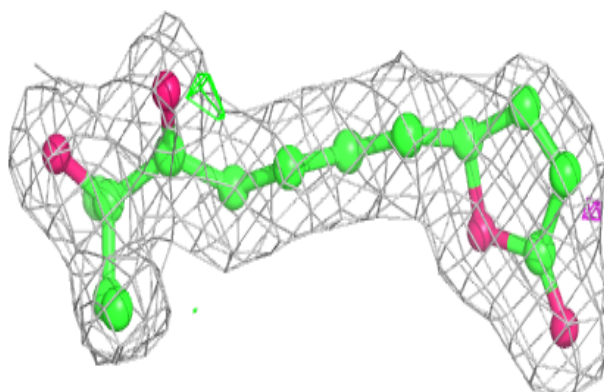
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around XVR F 301:**

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

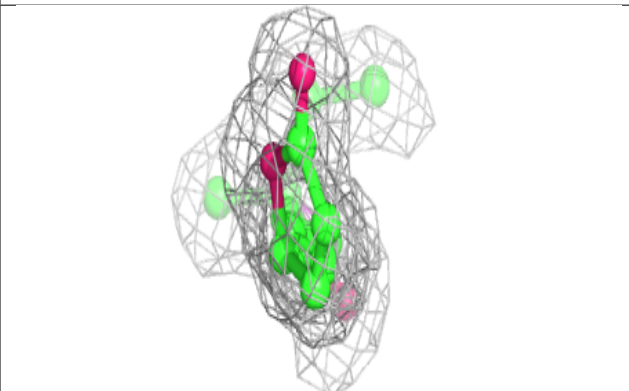
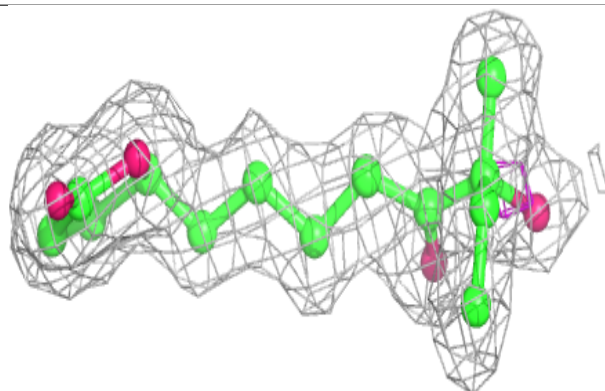
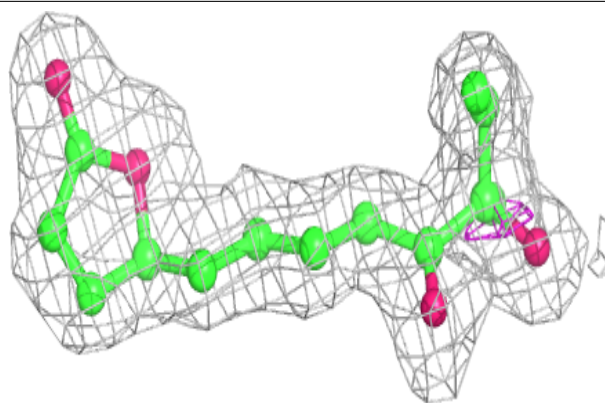
**Electron density around XVR B 301:**

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

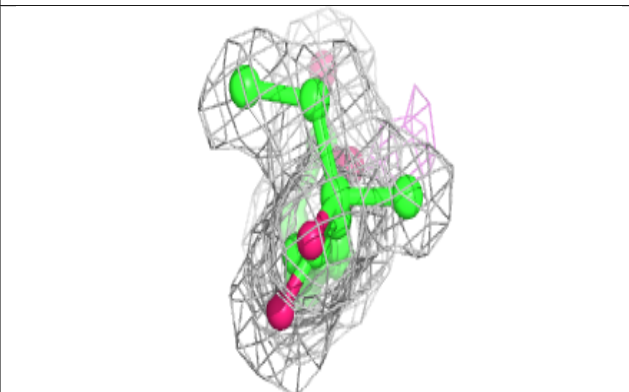
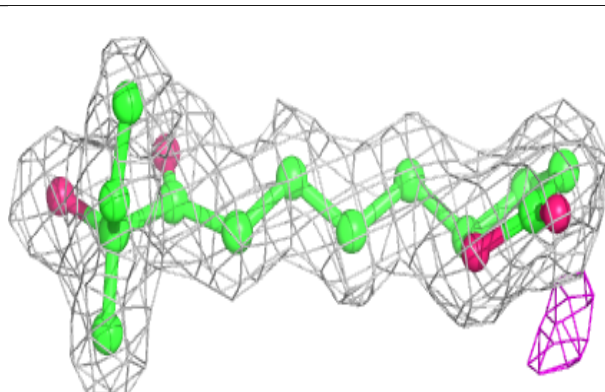
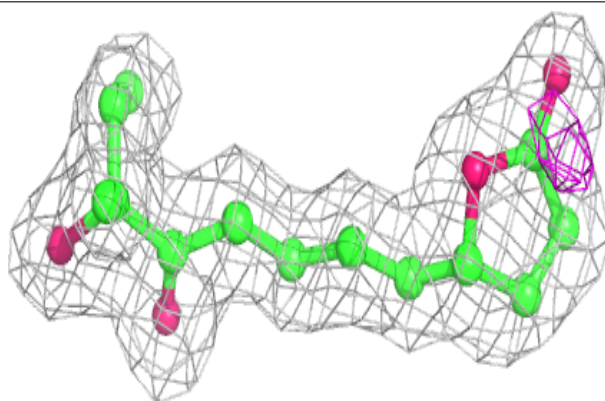


**Electron density around XVR H 301:**

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

**Electron density around XVR G 301:**

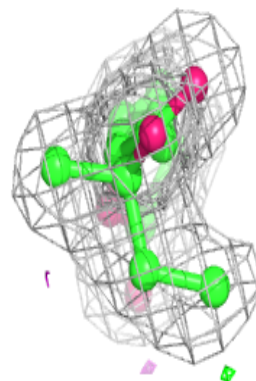
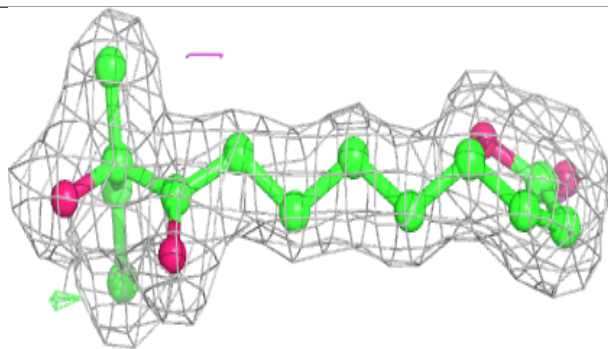
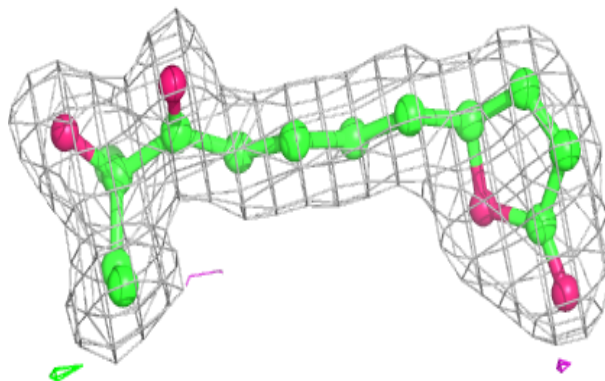
$2mF_o - DF_c$  (at 0.7 rmsd) in gray  
 $mF_o - DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



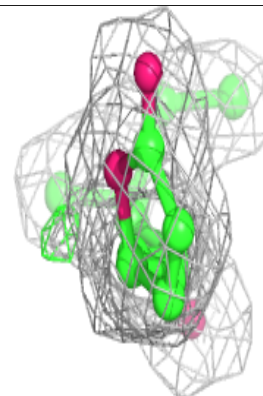
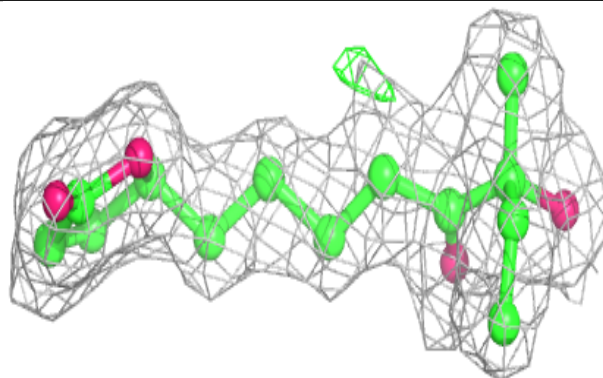
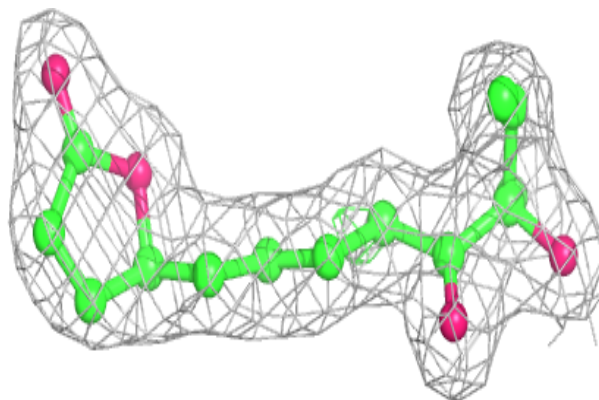


**Electron density around XVR E 301:**

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

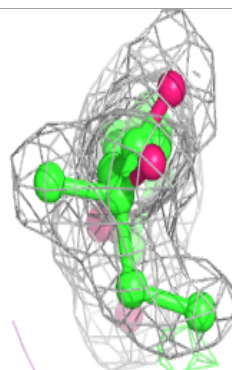
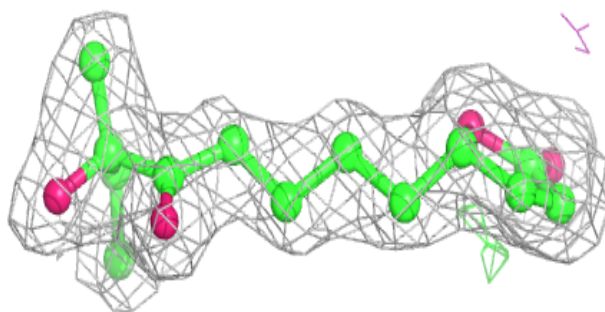
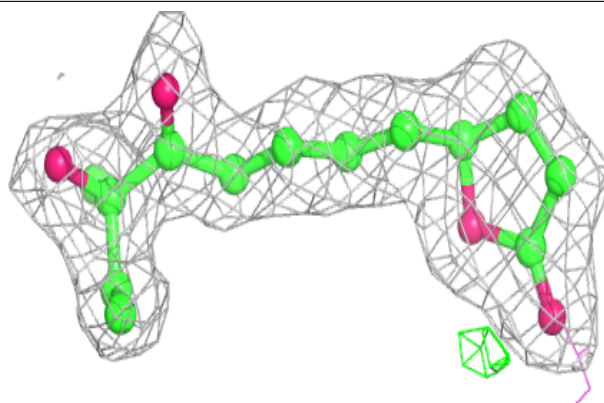
**Electron density around XVR A 301:**

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

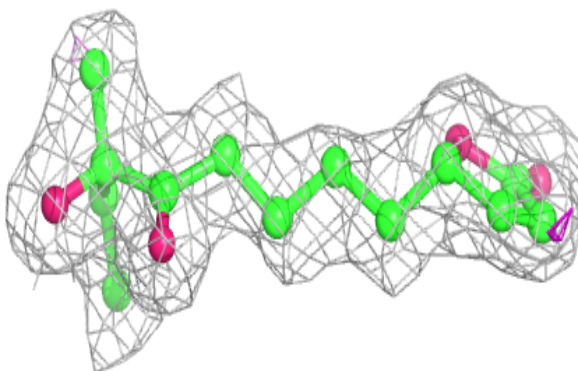
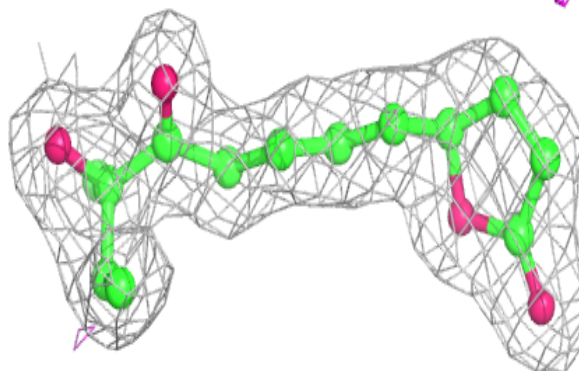


**Electron density around XVR D 301:**

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

**Electron density around XVR 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)





## 6.5 Other polymers [i](#)

There are no such residues in this entry.