WORLDWIDE PDB

PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report (i)

Mar 29, 2021 – 10:20 am BST

PDB ID	:	7NDV
Title	:	X-ray structure of acetylcholine-binding protein (AChBP) in complex with FL001888.
Authors	:	Cederfelt, D.; Boronat, P.; Dobritzsch, D.; Hennig, S.; Fitzgerald, E.A.; de Esch, I.J.P.; Danielson, U.H.
Deposited on	:	2021-02-02
Resolution	:	1.70 Å(reported)

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

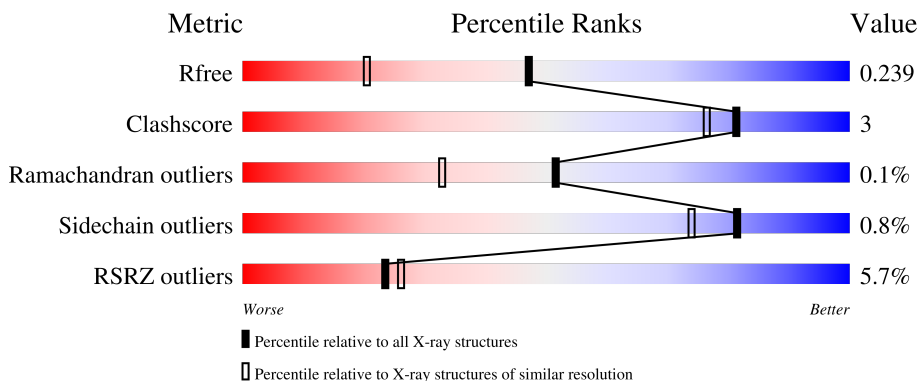|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.18
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.18

1　Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.70 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.
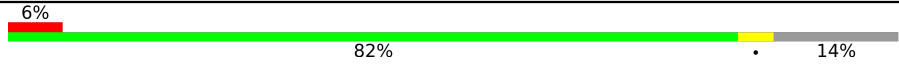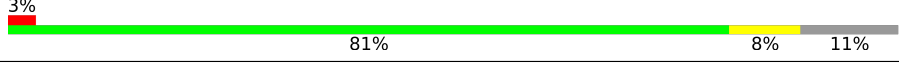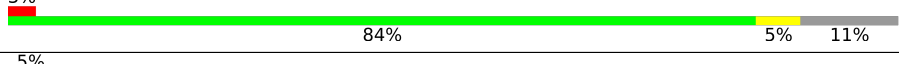

	Metric	Percentile Ranks	Value
	Rfree		0.239
	Clashscore		3
	Ramachandran outliers		0.1%
	Sidechain outliers		0.8%
	RSRZ outliers		5.7%

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}	130704	4298 (1.70-1.70)
Clashscore	141614	4695 (1.70-1.70)
Ramachandran outliers	138981	4610 (1.70-1.70)
Sidechain outliers	138945	4610 (1.70-1.70)
RSRZ outliers	127900	4222 (1.70-1.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	237	6%　80%　5%　15%
1	B	237	6%　81%　5%　14%
1	C	237	7%　77%　6% ·　15%
1	D	237	5%　81%　5%　14%
1	E	237	3%　78%　5%　16%

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Mol	Chain	Length	Quality of chain
1	F	237	6% · · · 82% · · · 14%
1	G	237	3% · · · 81% · · · 8% · 11%
1	H	237	3% · · · 84% · · · 5% · 11%
1	I	237	5% · · · 78% · · · 7% · 14%
1	J	237	4% · · · 80% · · · 5% · 15%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 17801 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 Acetylcholine-binding protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	202	Total 1631	C 1024	N 279	O 323	S 5	0	4	0
1	B	205	Total 1644	C 1031	N 282	O 326	S 5	0	1	0
1	C	201	Total 1606	C 1007	N 275	O 319	S 5	0	0	0
1	D	203	Total 1630	C 1021	N 280	O 324	S 5	0	2	0
1	E	200	Total 1618	C 1015	N 280	O 318	S 5	0	2	0
1	F	204	Total 1639	C 1027	N 279	O 328	S 5	0	2	0
1	G	210	Total 1703	C 1068	N 292	O 338	S 5	0	5	0
1	H	212	Total 1705	C 1068	N 290	O 342	S 5	0	4	0
1	I	203	Total 1645	C 1033	N 284	O 323	S 5	0	4	0
1	J	201	Total 1613	C 1013	N 275	O 320	S 5	0	1	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	230	GLY	-	expression tag	UNP P58154
A	231	SER	-	expression tag	UNP P58154
A	232	HIS	-	expression tag	UNP P58154
A	233	HIS	-	expression tag	UNP P58154
A	234	HIS	-	expression tag	UNP P58154
A	235	HIS	-	expression tag	UNP P58154
A	236	HIS	-	expression tag	UNP P58154
A	237	HIS	-	expression tag	UNP P58154
B	230	GLY	-	expression tag	UNP P58154

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Chain	Residue	Modelled	Actual	Comment	Reference
B	231	SER	-	expression tag	UNP P58154
B	232	HIS	-	expression tag	UNP P58154
B	233	HIS	-	expression tag	UNP P58154
B	234	HIS	-	expression tag	UNP P58154
B	235	HIS	-	expression tag	UNP P58154
B	236	HIS	-	expression tag	UNP P58154
B	237	HIS	-	expression tag	UNP P58154
C	230	GLY	-	expression tag	UNP P58154
C	231	SER	-	expression tag	UNP P58154
C	232	HIS	-	expression tag	UNP P58154
C	233	HIS	-	expression tag	UNP P58154
C	234	HIS	-	expression tag	UNP P58154
C	235	HIS	-	expression tag	UNP P58154
C	236	HIS	-	expression tag	UNP P58154
C	237	HIS	-	expression tag	UNP P58154
D	230	GLY	-	expression tag	UNP P58154
D	231	SER	-	expression tag	UNP P58154
D	232	HIS	-	expression tag	UNP P58154
D	233	HIS	-	expression tag	UNP P58154
D	234	HIS	-	expression tag	UNP P58154
D	235	HIS	-	expression tag	UNP P58154
D	236	HIS	-	expression tag	UNP P58154
D	237	HIS	-	expression tag	UNP P58154
E	230	GLY	-	expression tag	UNP P58154
E	231	SER	-	expression tag	UNP P58154
E	232	HIS	-	expression tag	UNP P58154
E	233	HIS	-	expression tag	UNP P58154
E	234	HIS	-	expression tag	UNP P58154
E	235	HIS	-	expression tag	UNP P58154
E	236	HIS	-	expression tag	UNP P58154
E	237	HIS	-	expression tag	UNP P58154
F	230	GLY	-	expression tag	UNP P58154
F	231	SER	-	expression tag	UNP P58154
F	232	HIS	-	expression tag	UNP P58154
F	233	HIS	-	expression tag	UNP P58154
F	234	HIS	-	expression tag	UNP P58154
F	235	HIS	-	expression tag	UNP P58154
F	236	HIS	-	expression tag	UNP P58154
F	237	HIS	-	expression tag	UNP P58154
G	230	GLY	-	expression tag	UNP P58154
G	231	SER	-	expression tag	UNP P58154
G	232	HIS	-	expression tag	UNP P58154

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Chain	Residue	Modelled	Actual	Comment	Reference
G	233	HIS	-	expression tag	UNP P58154
G	234	HIS	-	expression tag	UNP P58154
G	235	HIS	-	expression tag	UNP P58154
G	236	HIS	-	expression tag	UNP P58154
G	237	HIS	-	expression tag	UNP P58154
H	230	GLY	-	expression tag	UNP P58154
H	231	SER	-	expression tag	UNP P58154
H	232	HIS	-	expression tag	UNP P58154
H	233	HIS	-	expression tag	UNP P58154
H	234	HIS	-	expression tag	UNP P58154
H	235	HIS	-	expression tag	UNP P58154
H	236	HIS	-	expression tag	UNP P58154
H	237	HIS	-	expression tag	UNP P58154
I	230	GLY	-	expression tag	UNP P58154
I	231	SER	-	expression tag	UNP P58154
I	232	HIS	-	expression tag	UNP P58154
I	233	HIS	-	expression tag	UNP P58154
I	234	HIS	-	expression tag	UNP P58154
I	235	HIS	-	expression tag	UNP P58154
I	236	HIS	-	expression tag	UNP P58154
I	237	HIS	-	expression tag	UNP P58154
J	230	GLY	-	expression tag	UNP P58154
J	231	SER	-	expression tag	UNP P58154
J	232	HIS	-	expression tag	UNP P58154
J	233	HIS	-	expression tag	UNP P58154
J	234	HIS	-	expression tag	UNP P58154
J	235	HIS	-	expression tag	UNP P58154
J	236	HIS	-	expression tag	UNP P58154
J	237	HIS	-	expression tag	UNP P58154

- Molecule 2 is 4-[4-(trifluoromethyl)phenoxy]piperidine (three-letter code: U8Q) (formula: $C_{12}H_{14}F_3NO$) (labeled as "Ligand of Interest" by depositor).

U8Q
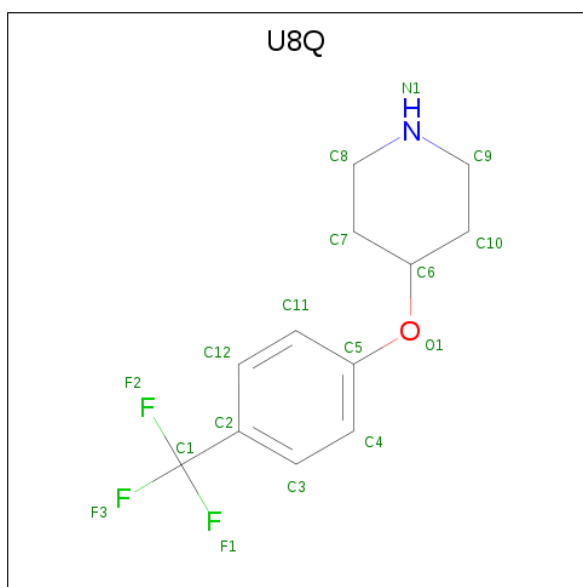
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	F	N	O	0	0
			17	12	3	1	1		
2	C	1	Total	C	F	N	O	0	0
			17	12	3	1	1		
2	D	1	Total	C	F	N	O	0	0
			17	12	3	1	1		
2	E	1	Total	C	F	N	O	0	0
			17	12	3	1	1		
2	F	1	Total	C	F	N	O	0	0
			17	12	3	1	1		
2	F	1	Total	C	F	N	O	0	0
			17	12	3	1	1		
2	G	1	Total	C	F	N	O	0	0
			17	12	3	1	1		
2	H	1	Total	C	F	N	O	0	0
			17	12	3	1	1		
2	I	1	Total	C	F	N	O	0	0
			17	12	3	1	1		

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total 14	C 8	N 1	O 5	0	0
3	B	1	Total 14	C 8	N 1	O 5	0	0
3	C	1	Total 14	C 8	N 1	O 5	0	0
3	F	1	Total 14	C 8	N 1	O 5	0	0
3	H	1	Total 14	C 8	N 1	O 5	0	0

• Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).
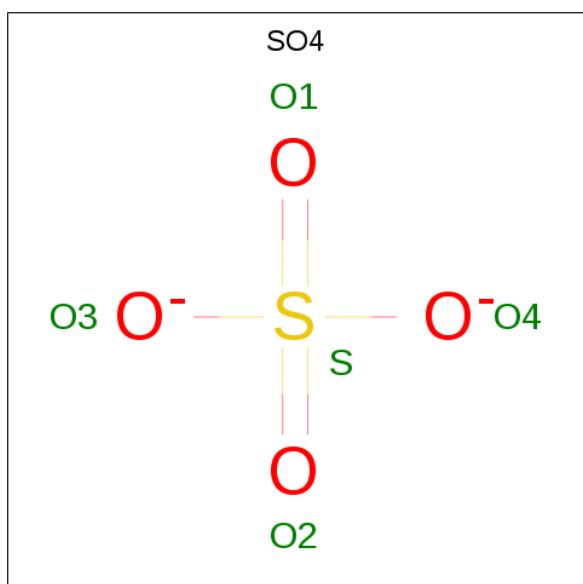
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	D	1	Total 5	O 4	S 1	0	0
4	G	1	Total 5	O 4	S 1	0	0
4	H	1	Total 5	O 4	S 1	0	0
4	J	1	Total 5	O 4	S 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	94	Total 94	O 94	0	0
5	B	79	Total 79	O 79	0	0
5	C	72	Total 73	O 73	0	1
5	D	97	Total 99	O 99	0	2
5	E	96	Total 96	O 96	0	0
5	F	131	Total 131	O 131	0	0
5	G	144	Total 146	O 146	0	2
5	H	169	Total 170	O 170	0	1
5	I	122	Total 124	O 124	0	2
5	J	111	Total 112	O 112	0	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 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.
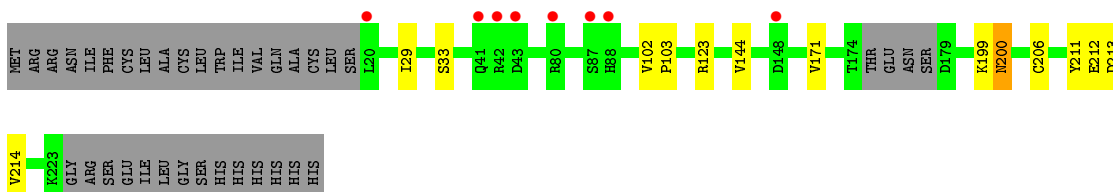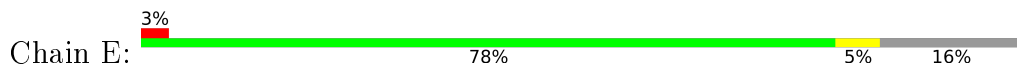
- Molecule 1: Acetylcholine-binding protein
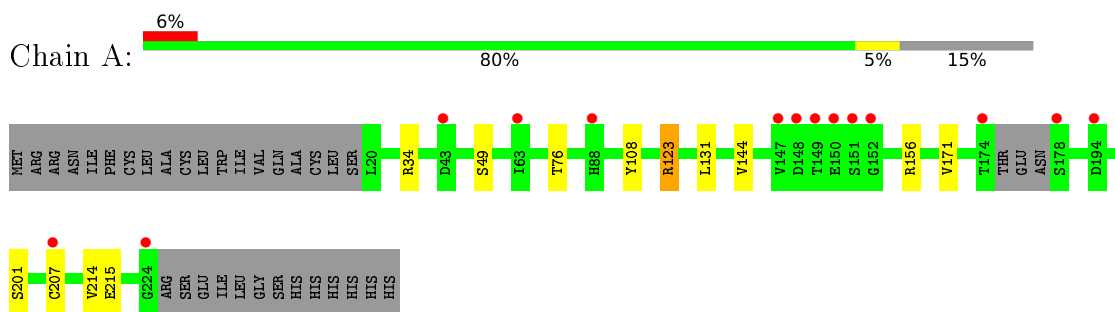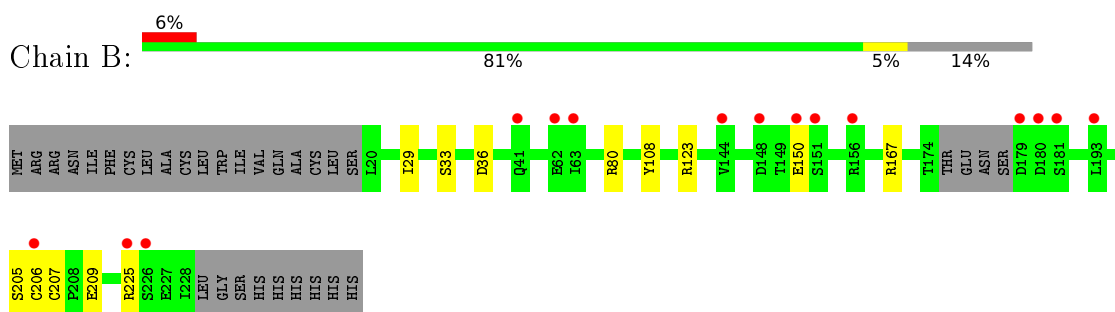
- Molecule 1: Acetylcholine-binding protein

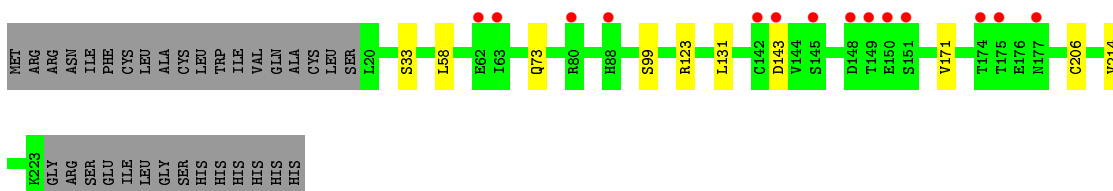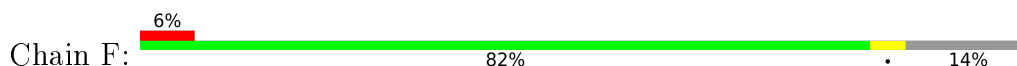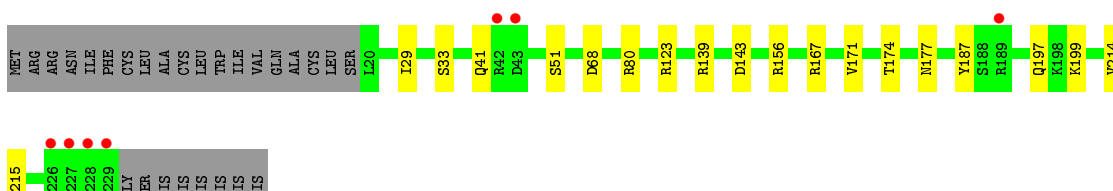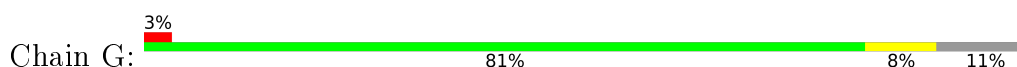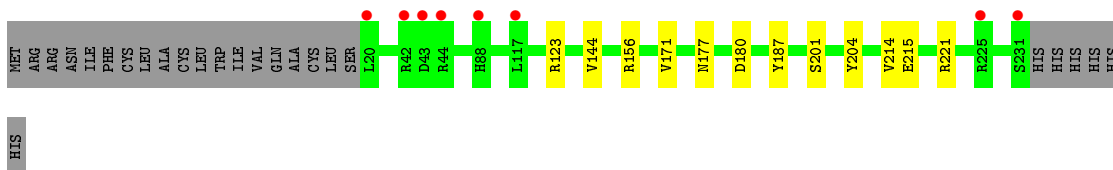- Molecule 1: Acetylcholine-binding protein

- Molecule 1: Acetylcholine-binding protein

• Molecule 1: Acetylcholine-binding protein

Chain E:

• Molecule 1: Acetylcholine-binding protein

Chain F:

• Molecule 1: Acetylcholine-binding protein

Chain G:

• Molecule 1: Acetylcholine-binding protein

Chain H:

• Molecule 1: Acetylcholine-binding protein

Chain I:

5%

78%   7%   ·   14%

MET ARG ARG ASN ILE PHE CYS LEU ALA CYS LEU TRP ILE VAL GLN ALA CYS LEU SER L20 S33 Q41 R42 D43 K53 E59 I63 V102 P103 Y108 R123 R139 D148 S151 R156 V171 D172 T175 GLU ASN S178 D179 D180 S181 E182

K199 N200 C206 E212 D213 V214 E215 G224 ARG SER GLU ILE LEU GLY SER HIS HIS HIS HIS HIS HIS
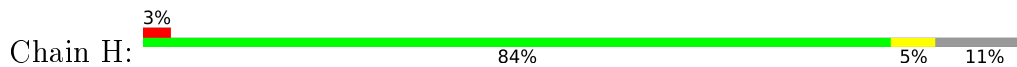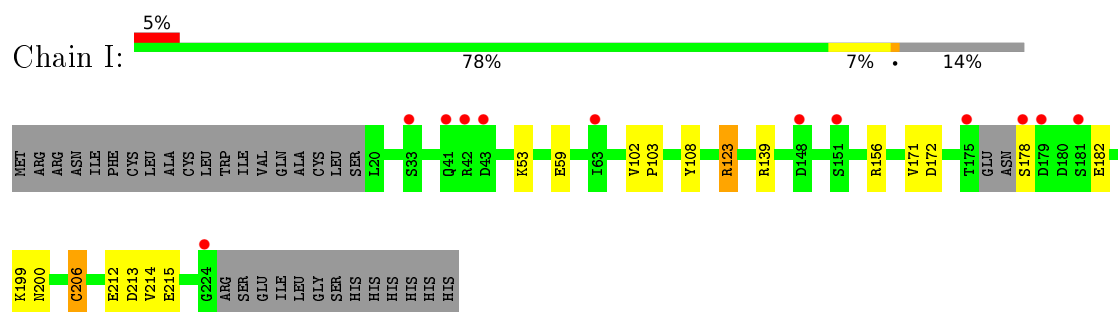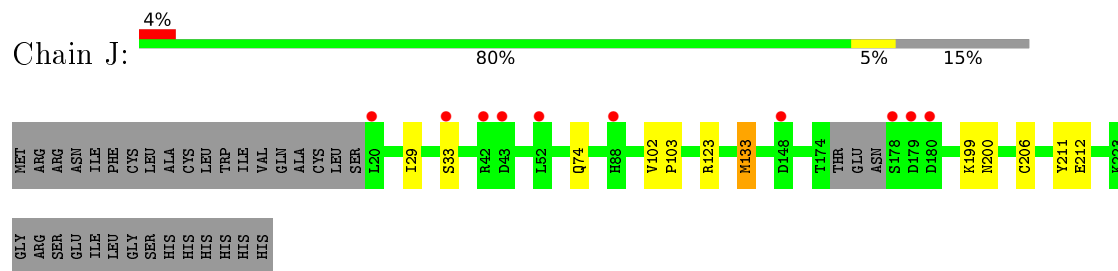
• Molecule 1: Acetylcholine-binding protein

Chain J:

4%

80%   5%   15%

MET ARG ARG ASN ILE PHE CYS LEU ALA CYS LEU TRP ILE VAL GLN ALA CYS LEU SER L20 I29 S33 R42 D43 L52 Q74 H88 V102 P103 R123 M133 D148 T174 THR GLU ASN S178 D179 D180 K199 N200 C206 Y211 E212 K223

GLY ARG SER GLU ILE LEU GLY SER HIS HIS HIS HIS HIS HIS
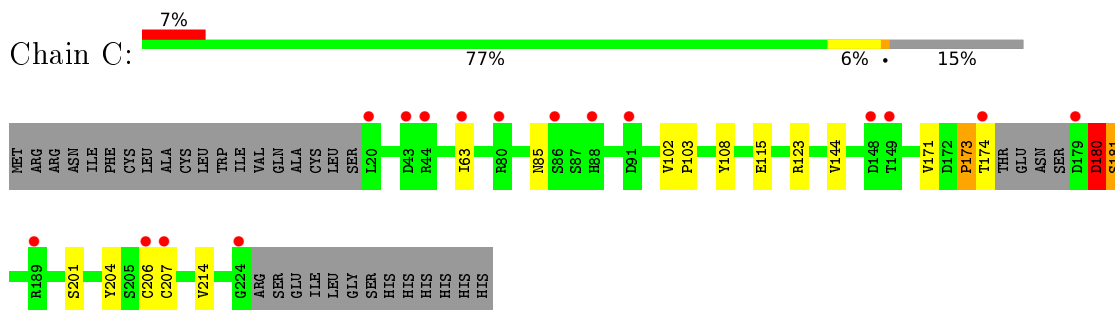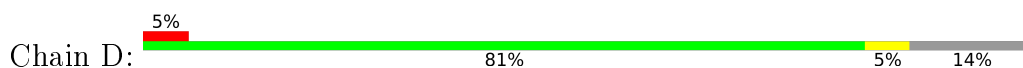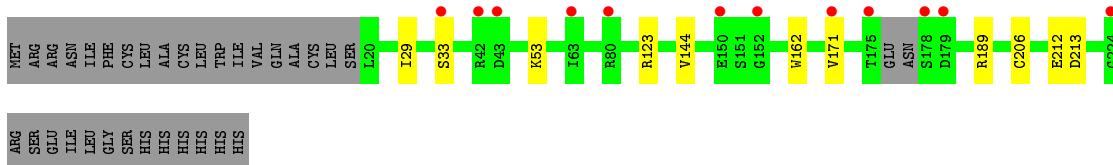
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	76.68Å 121.27Å 239.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.27 – 1.70 48.27 – 1.70	Depositor EDS
% Data completeness (in resolution range)	100.0 (48.27-1.70) 100.0 (48.27-1.70)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	1.17 (at 1.70Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.205 , 0.233 0.213 , 0.239	Depositor DCC
R_{free} test set	12236 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	32.8	Xtriage
Anisotropy	0.107	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 44.3	EDS
L-test for twinning[2]	$<|L|> = 0.50, <L^2> = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	17801	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 35.19 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 6.0682e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: U8Q, NAG, SO4

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	0.68	0/1678	0.83	1/2289 (0.0%)
1	B	0.68	0/1682	0.86	2/2293 (0.1%)
1	C	0.69	0/1641	0.84	2/2238 (0.1%)
1	D	0.68	0/1671	0.82	0/2278
1	E	0.71	0/1659	0.89	3/2261 (0.1%)
1	F	0.74	0/1681	0.89	1/2296 (0.0%)
1	G	0.74	0/1754	0.87	1/2393 (0.0%)
1	H	0.73	0/1753	0.90	2/2392 (0.1%)
1	I	0.69	0/1692	0.85	0/2306
1	J	0.71	0/1651	0.86	3/2252 (0.1%)
All	All	0.71	0/16862	0.86	15/22998 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1
1	C	0	1
1	D	0	1
1	E	0	1
1	F	0	1
1	I	0	1
1	J	0	1
All	All	0	7

There are no bond length outliers.

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	F	123	ARG	CG-CD-NE	-9.14	92.61	111.80
1	E	123	ARG	CG-CD-NE	-9.10	92.69	111.80
1	H	123	ARG	CG-CD-NE	-8.88	93.14	111.80
1	B	123	ARG	CG-CD-NE	-8.76	93.40	111.80
1	G	123	ARG	CG-CD-NE	-7.64	95.76	111.80

There are no chirality outliers.

5 of 7 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	206	CYS	Peptide
1	C	206	CYS	Peptide
1	D	206	CYS	Peptide
1	E	206	CYS	Peptide
1	F	206	CYS	Peptide

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	1631	0	1591	12	0
1	B	1644	0	1596	5	0
1	C	1606	0	1552	10	1
1	D	1630	0	1583	8	0
1	E	1618	0	1576	8	0
1	F	1639	0	1588	5	0
1	G	1703	0	1668	15	0
1	H	1705	0	1660	6	0
1	I	1645	0	1613	13	0
1	J	1613	0	1566	6	0
2	A	17	0	0	0	0
2	C	17	0	0	1	0
2	D	17	0	0	1	0
2	E	17	0	0	0	0
2	F	34	0	0	0	0
2	G	17	0	0	0	0
2	H	17	0	0	0	0
2	I	17	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	14	0	13	0	0
3	B	14	0	13	0	0
3	C	14	0	13	1	0
3	F	14	0	13	0	0
3	H	14	0	13	1	1
4	D	5	0	0	0	0
4	G	5	0	0	1	0
4	H	5	0	0	0	0
4	J	5	0	0	0	0
5	A	94	0	0	3	0
5	B	79	0	0	1	0
5	C	73	0	0	2	0
5	D	99	0	0	0	0
5	E	96	0	0	0	0
5	F	131	0	0	2	0
5	G	146	0	0	3	0
5	H	170	0	0	0	0
5	I	124	0	0	1	0
5	J	112	0	0	0	0
All	All	17801	0	16058	84	1

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 3.

The worst 5 of 84 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:I:200:ASN:HB3	1:I:213:ASP:OD1	1.57	1.05
1:E:171:VAL:HG12	1:E:214:VAL:HG23	1.44	0.96
1:I:171:VAL:HG12	1:I:214:VAL:HG23	1.50	0.93
1:E:200:ASN:HB2	1:E:213:ASP:OD1	1.69	0.91
1:C:171:VAL:HG12	1:C:214:VAL:HG23	1.58	0.84

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:180:ASP:O	3:H:302:NAG:O3[4_455]	2.17	0.03

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	202/237 (85%)	200 (99%)	2 (1%)	0	100	100
1	B	202/237 (85%)	200 (99%)	2 (1%)	0	100	100
1	C	197/237 (83%)	194 (98%)	1 (0%)	2 (1%)	15	4
1	D	201/237 (85%)	200 (100%)	1 (0%)	0	100	100
1	E	198/237 (84%)	197 (100%)	1 (0%)	0	100	100
1	F	204/237 (86%)	200 (98%)	4 (2%)	0	100	100
1	G	213/237 (90%)	211 (99%)	2 (1%)	0	100	100
1	H	214/237 (90%)	211 (99%)	3 (1%)	0	100	100
1	I	203/237 (86%)	201 (99%)	2 (1%)	0	100	100
1	J	198/237 (84%)	197 (100%)	1 (0%)	0	100	100
All	All	2032/2370 (86%)	2011 (99%)	19 (1%)	2 (0%)	51	33

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	181	SER
1	C	173	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	192/220 (87%)	188 (98%)	4 (2%)	53	36

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	192/220 (87%)	190 (99%)	2 (1%)	76	67
1	C	187/220 (85%)	183 (98%)	4 (2%)	53	36
1	D	191/220 (87%)	190 (100%)	1 (0%)	88	83
1	E	189/220 (86%)	189 (100%)	0	100	100
1	F	193/220 (88%)	192 (100%)	1 (0%)	88	83
1	G	201/220 (91%)	200 (100%)	1 (0%)	88	83
1	H	201/220 (91%)	200 (100%)	1 (0%)	88	83
1	I	193/220 (88%)	192 (100%)	1 (0%)	88	83
1	J	189/220 (86%)	188 (100%)	1 (0%)	88	83
All	All	1928/2200 (88%)	1912 (99%)	16 (1%)	81	74

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	I	123	ARG
1	H	201	SER
1	C	201	SER
1	G	177	ASN
1	C	180	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 6 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	41	GLN
1	G	177	ASN
1	J	74	GLN
1	B	74	GLN
1	B	41	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)

18 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	U8Q	E	301	-	18,18,18	0.33	0	23,25,25	0.35	0
2	U8Q	I	301	-	18,18,18	0.36	0	23,25,25	0.84	1 (4%)
2	U8Q	D	301	-	18,18,18	0.44	0	23,25,25	0.86	1 (4%)
4	SO4	J	301	-	4,4,4	0.31	0	6,6,6	0.06	0
4	SO4	D	302	-	4,4,4	0.29	0	6,6,6	0.12	0
2	U8Q	G	301	-	18,18,18	0.41	0	23,25,25	2.55	4 (17%)
2	U8Q	C	301	-	18,18,18	0.34	0	23,25,25	0.77	1 (4%)
3	NAG	C	302	1	14,14,15	0.69	0	17,19,21	1.67	2 (11%)
3	NAG	B	301	1	14,14,15	0.65	0	17,19,21	1.69	3 (17%)
3	NAG	H	302	1	14,14,15	0.78	0	17,19,21	1.80	3 (17%)
2	U8Q	H	301	-	18,18,18	0.43	0	23,25,25	2.45	3 (13%)
4	SO4	H	303	-	4,4,4	0.19	0	6,6,6	0.21	0
2	U8Q	A	301	-	18,18,18	0.37	0	23,25,25	0.86	1 (4%)
3	NAG	F	302	1	14,14,15	0.50	0	17,19,21	1.29	3 (17%)
4	SO4	G	302	-	4,4,4	0.29	0	6,6,6	0.23	0
2	U8Q	F	303	-	18,18,18	0.46	0	23,25,25	1.36	4 (17%)
2	U8Q	F	301	-	18,18,18	0.29	0	23,25,25	2.60	3 (13%)
3	NAG	A	302	1	14,14,15	0.67	0	17,19,21	1.48	2 (11%)

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	U8Q	E	301	-	-	0/10/18/18	0/2/2/2
2	U8Q	I	301	-	-	0/10/18/18	1/2/2/2
2	U8Q	D	301	-	-	1/10/18/18	1/2/2/2
2	U8Q	G	301	-	-	4/10/18/18	0/2/2/2
2	U8Q	C	301	-	-	2/10/18/18	0/2/2/2
3	NAG	C	302	1	-	0/6/23/26	0/1/1/1
3	NAG	B	301	1	-	0/6/23/26	0/1/1/1
3	NAG	H	302	1	-	0/6/23/26	0/1/1/1
2	U8Q	H	301	-	-	2/10/18/18	1/2/2/2
2	U8Q	A	301	-	-	2/10/18/18	0/2/2/2
3	NAG	F	302	1	-	0/6/23/26	0/1/1/1
2	U8Q	F	303	-	-	2/10/18/18	0/2/2/2
2	U8Q	F	301	-	-	0/10/18/18	1/2/2/2
3	NAG	A	302	1	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 31 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	F	301	U8Q	C5-O1-C6	11.22	141.65	119.13
2	G	301	U8Q	C5-O1-C6	10.62	140.45	119.13
2	H	301	U8Q	C5-O1-C6	10.44	140.09	119.13
3	H	302	NAG	C1-O5-C5	5.19	119.23	112.19
3	C	302	NAG	C1-O5-C5	5.03	119.01	112.19

There are no chirality outliers.

5 of 14 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	G	301	U8Q	C10-C6-O1-C5
2	H	301	U8Q	C10-C6-O1-C5
2	F	303	U8Q	C11-C5-O1-C6
2	F	303	U8Q	C4-C5-O1-C6
2	A	301	U8Q	C10-C6-O1-C5

All (4) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	301	U8Q	C10-C6-C7-C8-C9-N1
2	F	301	U8Q	C10-C6-C7-C8-C9-N1
2	H	301	U8Q	C10-C6-C7-C8-C9-N1

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Mol	Chain	Res	Type	Atoms
2	I	301	U8Q	C10-C6-C7-C8-C9-N1

6 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	I	301	U8Q	3	0
2	D	301	U8Q	1	0
2	C	301	U8Q	1	0
3	C	302	NAG	1	0
3	H	302	NAG	1	1
4	G	302	SO4	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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 U8Q E 301

Bond lengths

Bond angles

Torsions

Rings

Ligand U8Q I 301

Bond lengths

Bond angles

Torsions

Rings

Ligand U8Q D 301

Bond lengths

Bond angles

Torsions

Rings

Ligand U8Q G 301

Bond lengths

Bond angles

Torsions

Rings

Ligand U8Q C 301

Bond lengths

Bond angles

Torsions

Rings

Ligand U8Q H 301

Bond lengths

Bond angles

Torsions

Rings

Ligand U8Q A 301

Bond lengths

Bond angles

Torsions

Rings

Ligand U8Q F 303

Bond lengths

Bond angles

Torsions

Rings

Ligand U8Q F 301

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	202/237 (85%)	0.40	14 (6%)	16	19	29, 41, 67, 85	0
1	B	205/237 (86%)	0.61	15 (7%)	15	17	31, 46, 75, 99	0
1	C	201/237 (84%)	0.48	16 (7%)	12	14	30, 42, 70, 117	0
1	D	203/237 (85%)	0.35	12 (5%)	22	24	27, 39, 67, 113	0
1	E	200/237 (84%)	0.35	8 (4%)	38	42	26, 38, 65, 87	0
1	F	204/237 (86%)	0.39	14 (6%)	16	19	25, 37, 64, 90	0
1	G	210/237 (88%)	0.23	7 (3%)	46	51	24, 32, 59, 86	0
1	H	212/237 (89%)	0.16	8 (3%)	40	45	24, 33, 62, 86	0
1	I	203/237 (85%)	0.39	12 (5%)	22	24	26, 38, 69, 106	0
1	J	201/237 (84%)	0.38	10 (4%)	28	32	27, 37, 68, 107	0
All	All	2041/2370 (86%)	0.37	116 (5%)	23	26	24, 38, 69, 117	0

The worst 5 of 116 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	224	GLY	6.5
1	J	179	ASP	6.4
1	G	228	ILE	6.1
1	A	224	GLY	5.7
1	G	226	SER	5.6

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
3	NAG	A	302	14/15	0.52	0.34	81,89,97,108	0
3	NAG	B	301	14/15	0.60	0.28	80,95,96,97	0
3	NAG	F	302	14/15	0.74	0.24	77,84,92,99	0
3	NAG	C	302	14/15	0.75	0.28	79,90,97,99	0
2	U8Q	C	301	17/17	0.79	0.17	49,54,63,66	0
2	U8Q	I	301	17/17	0.79	0.14	48,61,85,86	0
4	SO4	H	303	5/5	0.79	0.17	58,64,72,77	0
3	NAG	H	302	14/15	0.81	0.20	58,64,68,71	0
2	U8Q	A	301	17/17	0.81	0.17	36,53,64,65	0
2	U8Q	F	303	17/17	0.82	0.16	36,49,63,68	0
2	U8Q	D	301	17/17	0.82	0.13	45,55,63,66	0
2	U8Q	H	301	17/17	0.87	0.12	33,41,53,57	0
2	U8Q	F	301	17/17	0.90	0.09	30,38,51,58	0
4	SO4	G	302	5/5	0.93	0.14	64,66,76,78	0
2	U8Q	G	301	17/17	0.93	0.07	28,32,45,45	0
2	U8Q	E	301	17/17	0.94	0.10	35,45,69,71	0
4	SO4	J	301	5/5	0.95	0.23	84,89,96,98	0
4	SO4	D	302	5/5	0.98	0.13	60,64,66,71	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.
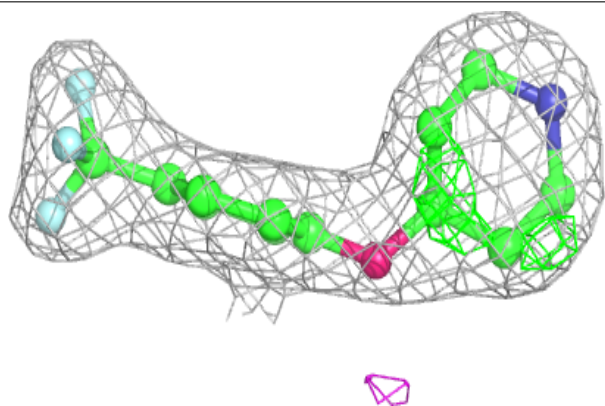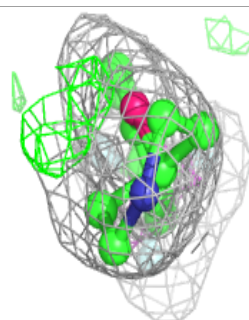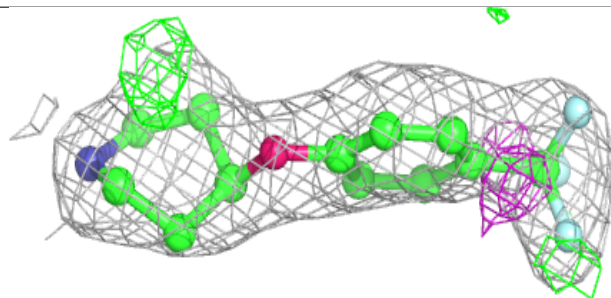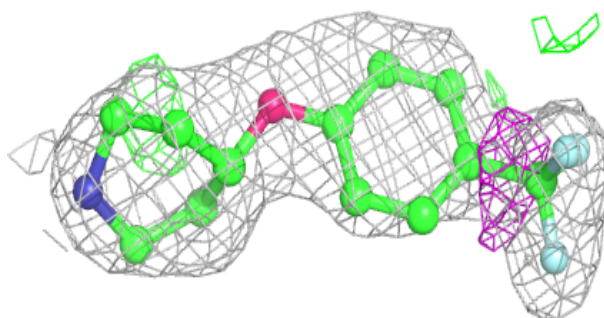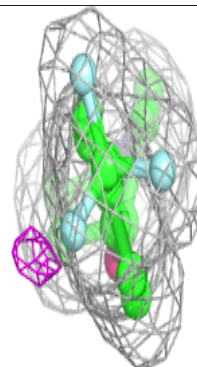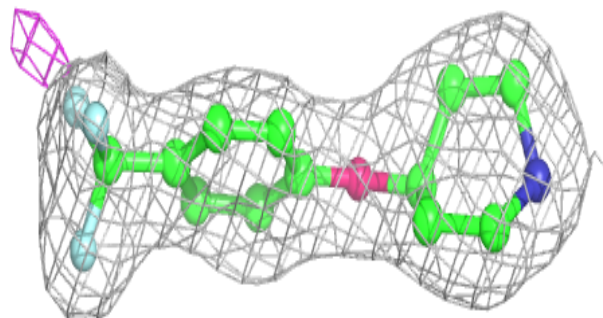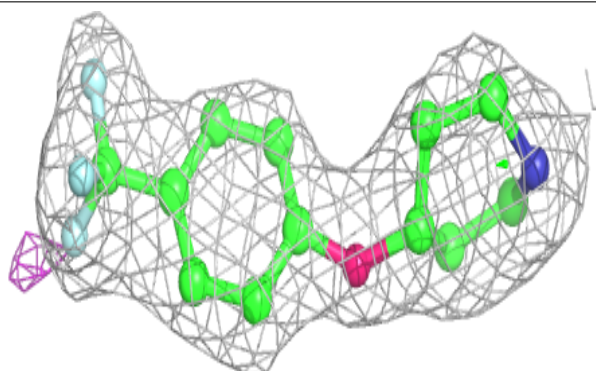
Electron density around U8Q C 301:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
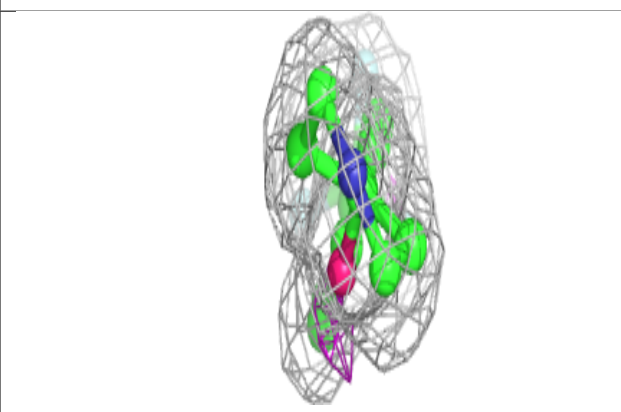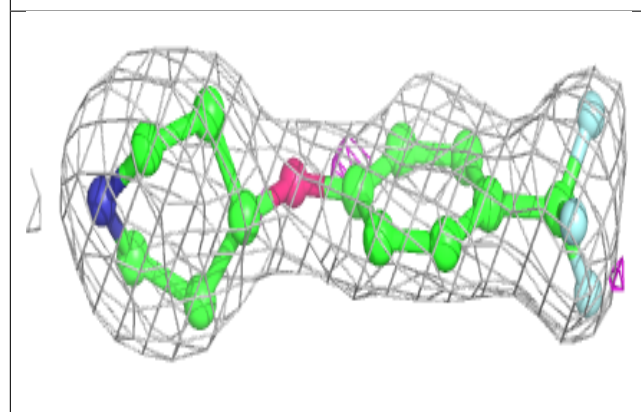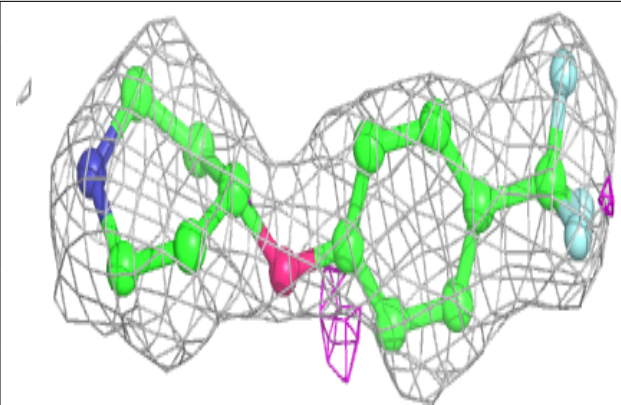
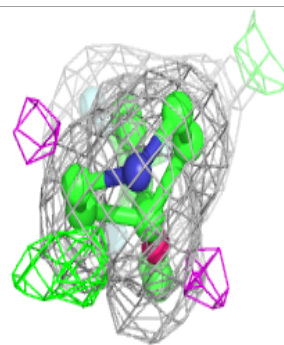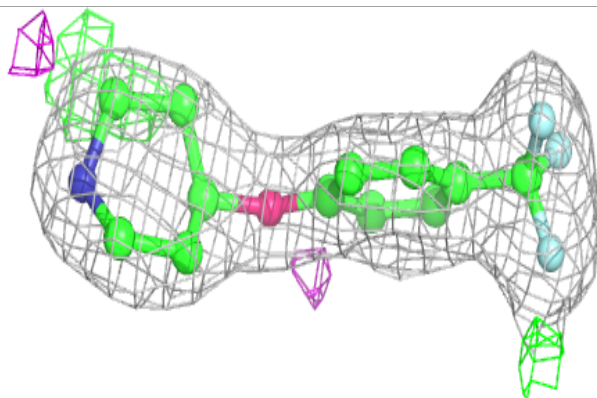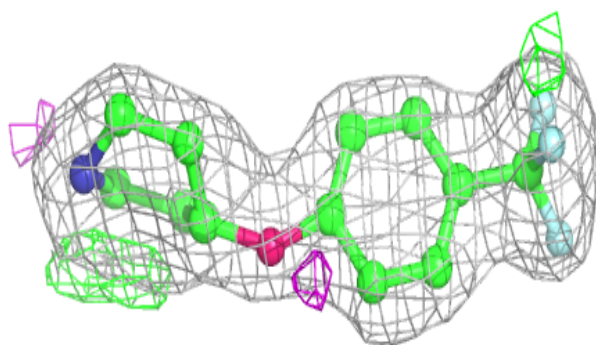**Electron density around U8Q I 301:**

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
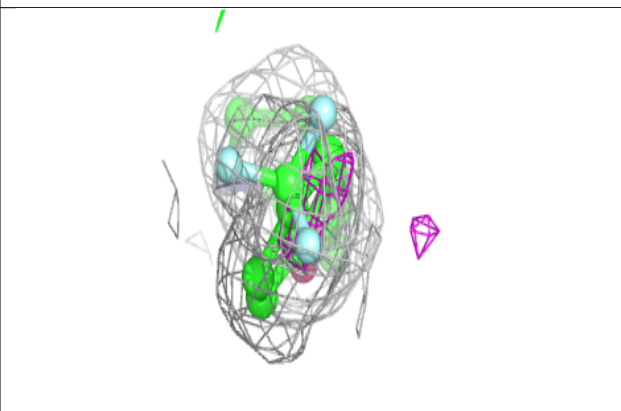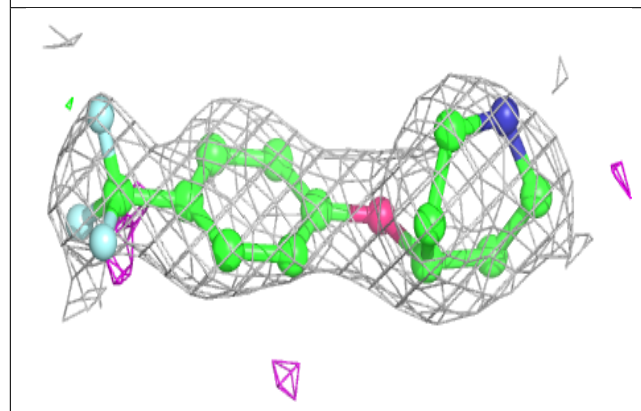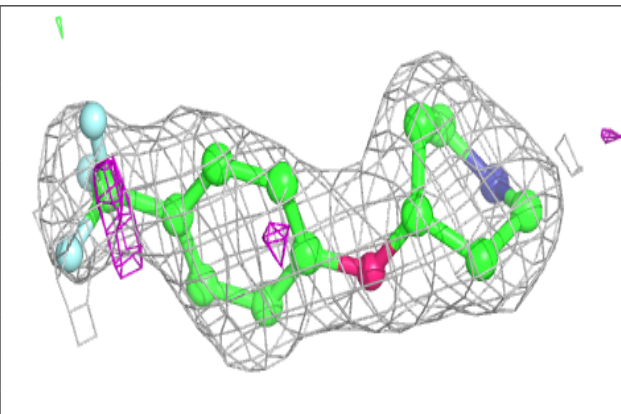
Electron density around U8Q A 301:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
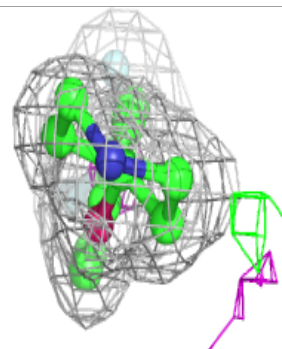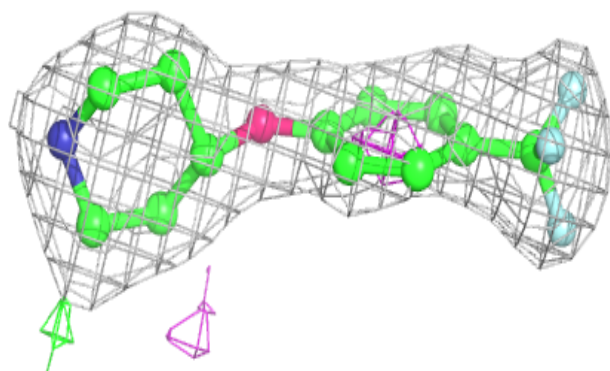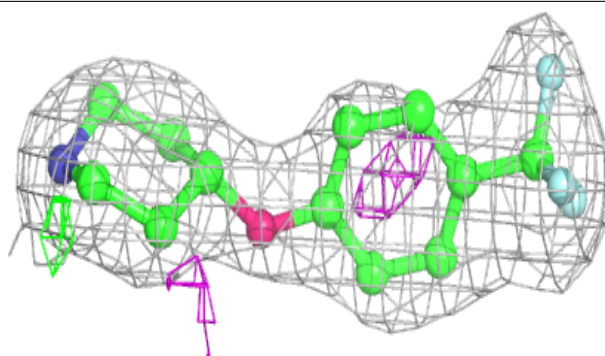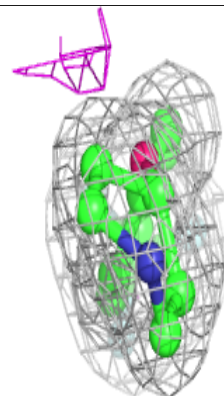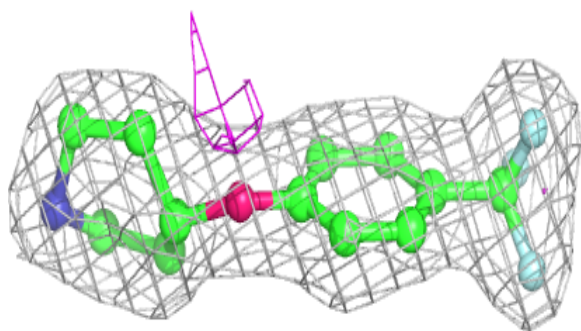
Electron density around U8Q F 303:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
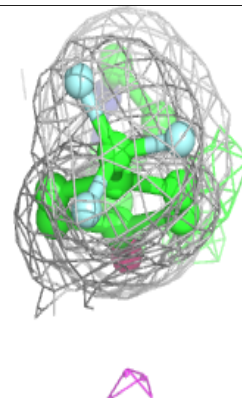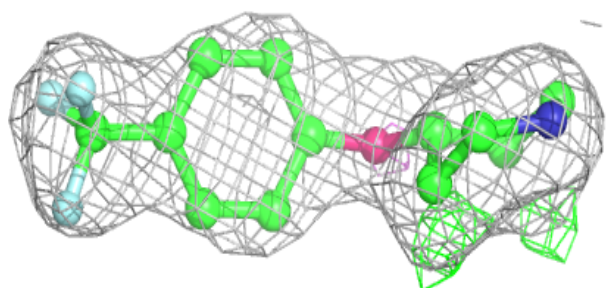
Electron density around U8Q D 301:

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

Electron density around U8Q H 301:

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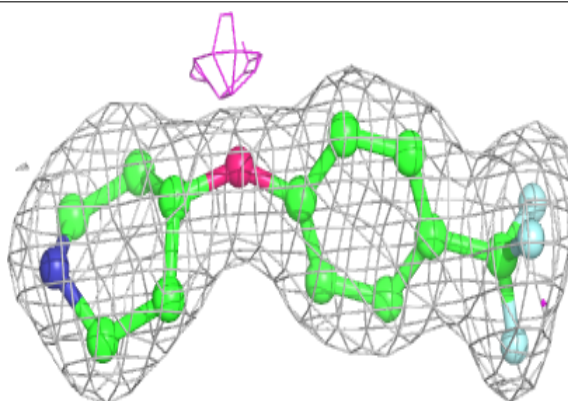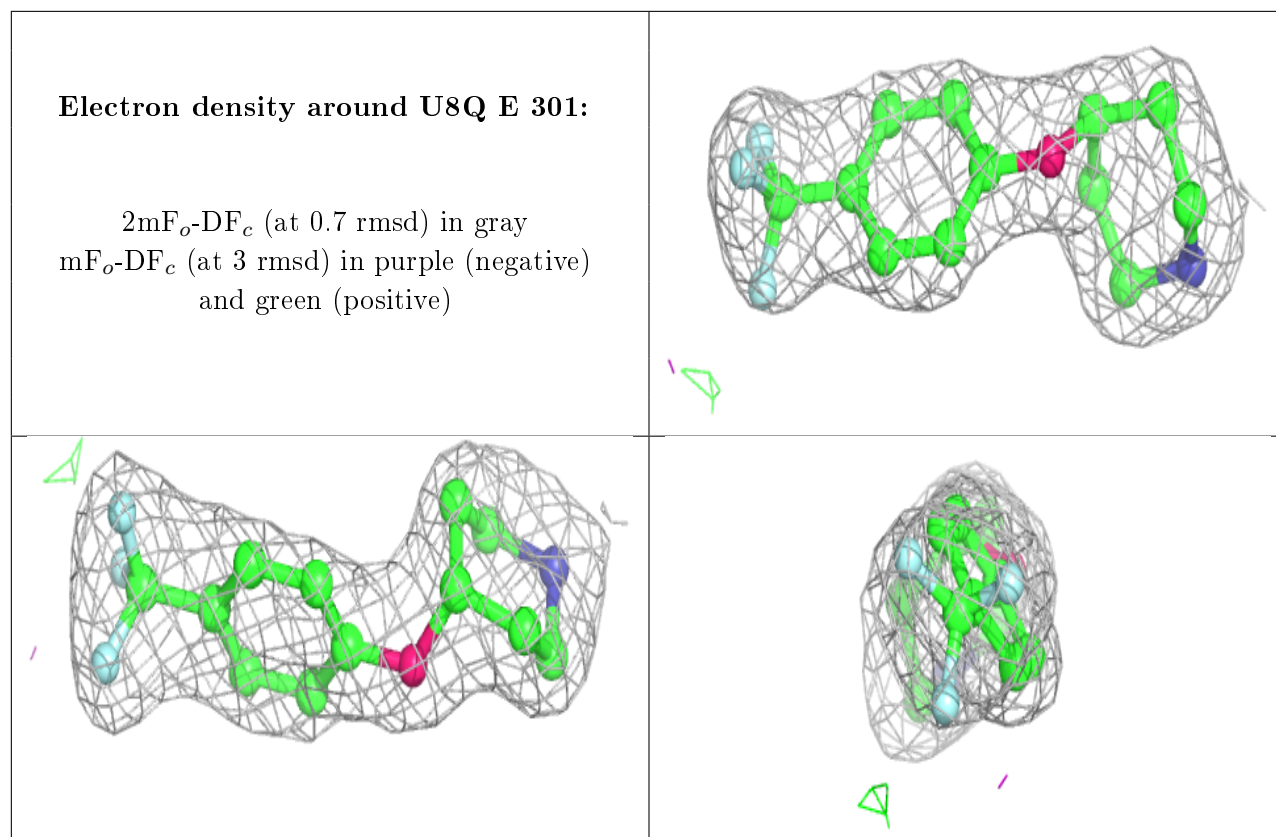$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around U8Q 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 U8Q 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 U8Q E 301:

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

6.5   Other polymers ⓘ

There are no such residues in this entry.