Full wwPDB X-ray Structure Validation Report ⓘ

Oct 26, 2024 – 09:21 AM EDT

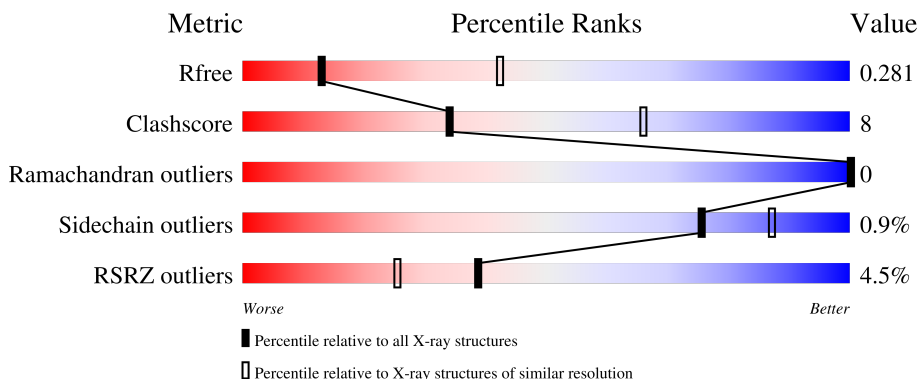|		
PDB ID	:	5I71
Title	:	X-ray structure of the ts3 human serotonin transporter complexed with s-citalopram at the central site
Authors	:	Coleman, J.A.; Green, E.M.; Gouaux, E.
Deposited on	:	2016-02-16
Resolution	:	3.15 Å(reported)

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 3.15 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		0.281
Clashscore		8
Ramachandran outliers		0
Sidechain outliers		0.9%
RSRZ outliers		4.5%

Worse — *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	164625	2168 (3.20-3.12)
Clashscore	180529	2333 (3.20-3.12)
Ramachandran outliers	177936	2266 (3.20-3.12)
Sidechain outliers	177891	2265 (3.20-3.12)
RSRZ outliers	164620	2169 (3.20-3.12)

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	549	5% / 79% / 19% / •
2	B	221	4% / 86% / 13% / •
3	C	214	4% / 88% / 12%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

WORLDWIDE PDB
PROTEIN DATA BANK

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
8	HEX	A	705	-	-	-	X

2 Entry composition ⓘ

There are 10 unique types of molecules in this entry. The entry contains 7616 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 Sodium-dependent serotonin transporter.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	542	Total 4210	C 2810	N 652	O 724	S 24	0	0	0

There are 10 discrepancies between the modelled and reference sequences:

| Chain	Residue	Modelled	Actual	Comment	Reference
A	74	GLY	-	cloning artifact	UNP P31645
A	75	SER	-	cloning artifact	UNP P31645
A	291	ALA	ILE	engineered mutation	UNP P31645
A	439	SER	THR	engineered mutation	UNP P31645
A	554	ALA	CYS	engineered mutation	UNP P31645
A	580	ALA	CYS	engineered mutation	UNP P31645
A	619	LEU	-	cloning artifact	UNP P31645
A	620	VAL	-	cloning artifact	UNP P31645
A	621	PRO	-	cloning artifact	UNP P31645
A	622	ARG	-	cloning artifact	UNP P31645

- Molecule 2 is a protein called 8B6 antibody, heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	218	Total 1643	C 1038	N 266	O 331	S 8	0	0	0

- Molecule 3 is a protein called 8B6 antibody, light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	214	Total 1662	C 1037	N 280	O 337	S 8	0	0	0

- Molecule 4 is (1S)-1-[3-(dimethylamino)propyl]-1-(4-fluorophenyl)-1,3-dihydro-2-benzofuran-5-carbonitrile (three-letter code: 68P) (formula: $C_{20}H_{21}FN_2O$).

68P
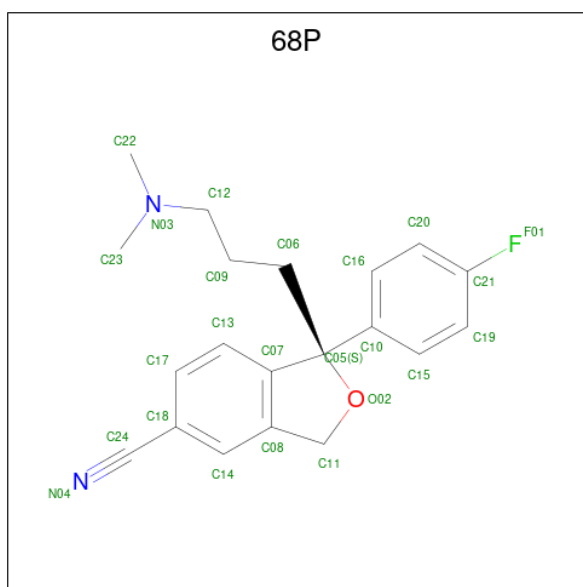
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	F	N	O	0	0
			24	20	1	2	1		

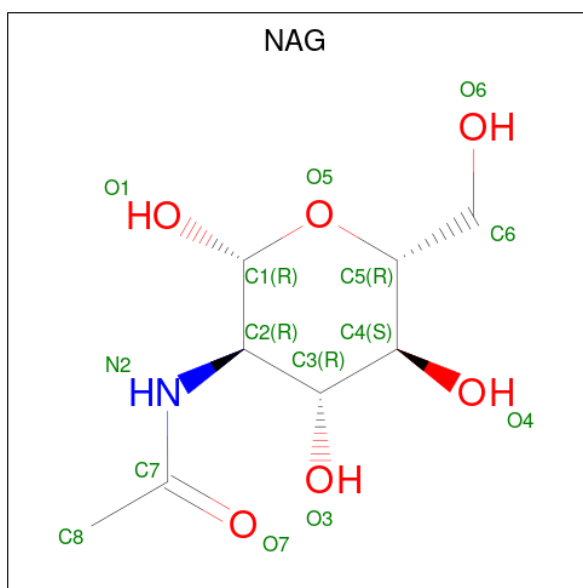- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).
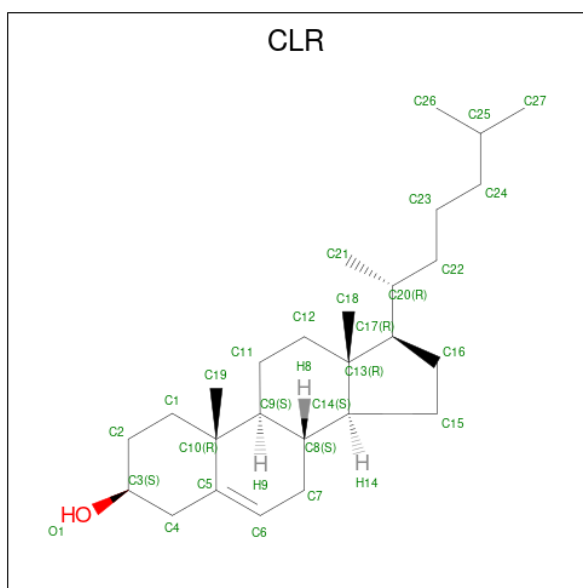

NAG

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

- Molecule 6 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
6	A	1	28	27	1	0	0

- Molecule 7 is DODECANE (three-letter code: D12) (formula: $C_{12}H_{26}$).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	C		
7	A	1	12	12	0	0

- Molecule 8 is HEXANE (three-letter code: HEX) (formula: C_6H_{14}).

HEX

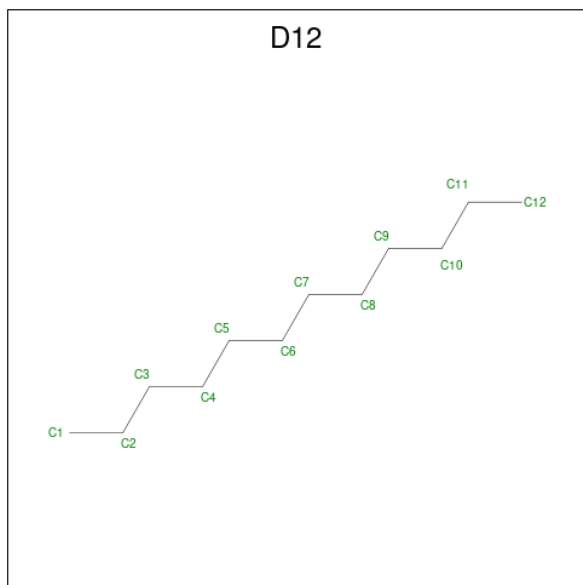| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	1	Total C		0	0
			6	6		

- Molecule 9 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	2	Total Na		0	0
			2	2		

- Molecule 10 is water.
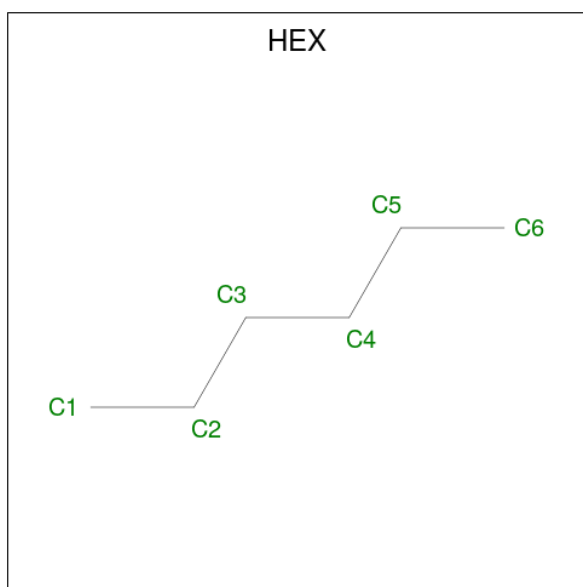
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	1	Total O		0	0
			1	1		

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: Sodium-dependent serotonin transporter
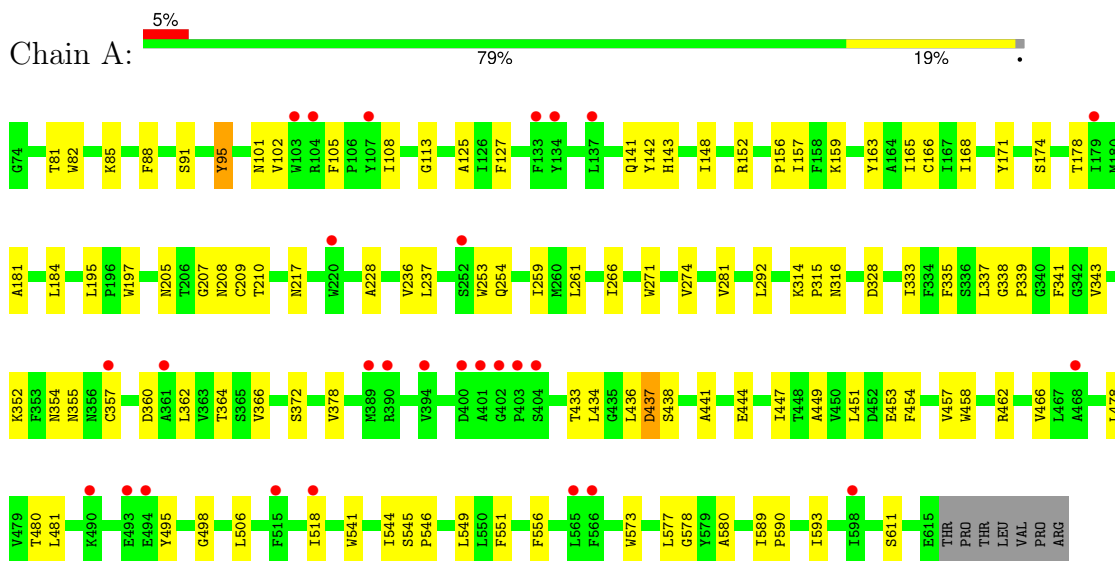
Chain A:

• Molecule 2: 8B6 antibody, heavy chain
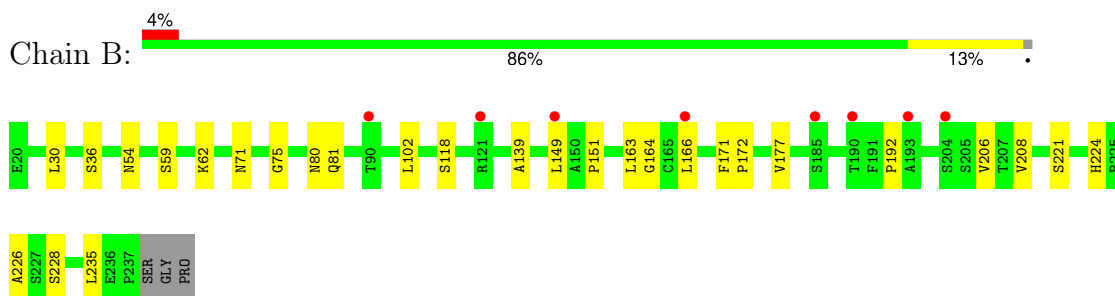
Chain B:

• Molecule 3: 8B6 antibody, light chain

Chain C:

4 Data and refinement statistics (i)

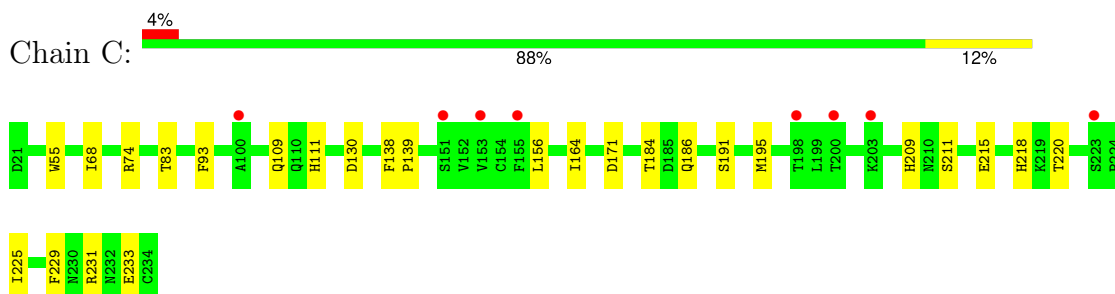| Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	129.72Å 163.74Å 140.56Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	53.33 – 3.15 53.33 – 3.15	Depositor EDS
% Data completeness (in resolution range)	97.0 (53.33-3.15) 96.8 (53.33-3.15)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.23 (at 3.13Å)	Xtriage
Refinement program	PHENIX (DEV_2000: ???)	Depositor
R, R_{free}	0.240 , 0.276 0.243 , 0.281	Depositor DCC
R_{free} test set	1277 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	115.5	Xtriage
Anisotropy	0.125	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 132.3	EDS
L-test for twinning[2]	$< |L| > = 0.45$, $< L^2 > = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	7616	wwPDB-VP
Average B, all atoms (Å^2)	159.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.37% of the height of the origin peak. No significant pseudotranslation is detected.*

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

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, 68P, NA, CLR, D12, HEX

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	0.31	0/4343	0.43	0/5938
2	B	0.21	0/1688	0.36	0/2309
3	C	0.21	0/1700	0.36	0/2307
All	All	0.27	0/7731	0.40	0/10554

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	4210	0	4101	82	0
2	B	1643	0	1589	16	0
3	C	1662	0	1585	15	0
4	A	24	0	0	2	0
5	A	28	0	26	1	0
6	A	28	0	46	5	0
7	A	12	0	26	2	0
8	A	6	0	14	0	0
9	A	2	0	0	0	0
10	A	1	0	0	0	0
All	All	7616	0	7387	113	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 8.

All (113) 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:A:362:LEU:O	1:A:366:VAL:HG23	1.41	1.16
1:A:360:ASP:O	1:A:364:THR:HG23	1.60	0.99
1:A:338:GLY:N	1:A:339:PRO:HD2	1.80	0.96
1:A:266:ILE:HG22	1:A:436:LEU:HD22	1.55	0.88
1:A:338:GLY:N	1:A:339:PRO:CD	2.37	0.86
1:A:141:GLN:NE2	1:A:357:CYS:SG	2.59	0.74
1:A:266:ILE:HG22	1:A:436:LEU:CD2	2.18	0.73
1:A:95:TYR:CE2	1:A:343:VAL:HG11	2.25	0.71
1:A:113:GLY:HA2	1:A:316:ASN:HB3	1.74	0.69
1:A:142:TYR:HD2	1:A:143:HIS:CE1	2.11	0.69
1:A:266:ILE:CG2	1:A:436:LEU:CD2	2.70	0.69
1:A:108:ILE:HD11	1:A:328:ASP:HB3	1.76	0.68
2:B:30:LEU:HD22	2:B:172:PRO:HD3	1.74	0.68
1:A:205:ASN:ND2	1:A:209:CYS:SG	2.66	0.68
1:A:337:LEU:C	1:A:339:PRO:CD	2.61	0.68
1:A:447:ILE:HD13	1:A:466:VAL:HG22	1.77	0.67
1:A:352:LYS:HB2	1:A:355:ASN:HB2	1.78	0.66
1:A:362:LEU:O	1:A:366:VAL:CG2	2.33	0.66
1:A:337:LEU:C	1:A:339:PRO:HD3	2.16	0.65
1:A:444:GLU:OE1	1:A:462:ARG:NH2	2.30	0.65
1:A:573:TRP:CE3	6:A:703:CLR:H71	2.32	0.65
1:A:253:TRP:CE2	1:A:254:GLN:NE2	2.66	0.64
1:A:437:ASP:OD1	1:A:437:ASP:N	2.28	0.64
1:A:101:ASN:ND2	1:A:372:SER:OG	2.30	0.63
1:A:142:TYR:HD2	1:A:143:HIS:ND1	1.98	0.62
2:B:192:PRO:HD3	3:C:184:THR:HG22	1.82	0.62
1:A:589:ILE:HG23	1:A:590:PRO:HD3	1.82	0.61
1:A:95:TYR:HD2	1:A:441:ALA:HB3	1.65	0.61
1:A:335:PHE:HE2	4:A:701:68P:N04	1.99	0.60
1:A:152:ARG:HE	1:A:159:LYS:HZ2	1.50	0.60
1:A:95:TYR:CD2	1:A:343:VAL:HG11	2.36	0.60
2:B:54:ASN:ND2	2:B:118:SER:OG	2.34	0.59
1:A:184:LEU:HD21	1:A:261:LEU:HD23	1.84	0.58
1:A:142:TYR:CD2	1:A:143:HIS:CE1	2.91	0.58
1:A:163:TYR:O	1:A:166:CYS:HB2	2.04	0.57
1:A:253:TRP:CZ2	1:A:254:GLN:NE2	2.72	0.57
1:A:266:ILE:CG2	1:A:436:LEU:HD22	2.31	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:157:ILE:HB	1:A:593:ILE:HG12	1.87	0.57
1:A:102:VAL:HG21	1:A:434:LEU:HD13	1.85	0.57
1:A:259:ILE:HG21	1:A:481:LEU:HD11	1.87	0.56
1:A:178:THR:O	1:A:181:ALA:HB3	2.06	0.56
3:C:186:GLN:HE21	3:C:191:SER:HB3	1.72	0.55
1:A:197:TRP:HB2	1:A:228:ALA:HA	1.87	0.55
1:A:95:TYR:CD2	1:A:441:ALA:HB3	2.42	0.54
1:A:178:THR:HG21	1:A:480:THR:HB	1.88	0.54
1:A:573:TRP:CZ3	6:A:703:CLR:H71	2.42	0.54
1:A:236:VAL:HG13	1:A:237:LEU:N	2.24	0.53
1:A:95:TYR:HA	1:A:438:SER:HA	1.91	0.53
1:A:498:GLY:HA2	4:A:701:68P:N04	2.23	0.53
1:A:454:PHE:HB3	1:A:457:VAL:CG1	2.38	0.52
2:B:59:SER:HB2	2:B:62:LYS:HB2	1.92	0.52
1:A:478:LEU:HD23	1:A:481:LEU:HD12	1.90	0.52
1:A:171:TYR:O	1:A:174:SER:HB2	2.09	0.52
1:A:207:GLY:HA3	5:A:702:NAG:H82	1.92	0.51
1:A:152:ARG:HH21	1:A:159:LYS:HZ1	1.59	0.51
1:A:81:THR:OG1	1:A:82:TRP:N	2.43	0.51
3:C:171:ASP:OD2	3:C:209:HIS:ND1	2.38	0.51
1:A:102:VAL:HG21	1:A:434:LEU:CD1	2.41	0.50
1:A:95:TYR:C	1:A:95:TYR:CD1	2.85	0.50
1:A:208:ASN:O	1:A:210:THR:HG23	2.12	0.50
3:C:74:ARG:HH21	3:C:83:THR:HG22	1.76	0.49
1:A:91:SER:HA	1:A:281:VAL:HG11	1.94	0.49
1:A:195:LEU:HD12	1:A:195:LEU:H	1.76	0.49
3:C:156:LEU:HD13	3:C:195:MET:HG3	1.96	0.48
1:A:580:ALA:HB1	6:A:703:CLR:H241	1.94	0.48
1:A:454:PHE:HB3	1:A:457:VAL:HG13	1.94	0.47
1:A:506:LEU:HD23	1:A:549:LEU:HB2	1.96	0.47
2:B:71:ASN:O	2:B:75:GLY:N	2.46	0.47
3:C:211:SER:HA	3:C:229:PHE:O	2.15	0.47
1:A:156:PRO:HG2	1:A:611:SER:HA	1.96	0.46
1:A:127:PHE:HB3	1:A:544:ILE:HG21	1.97	0.46
1:A:556:PHE:HB2	7:A:704:D12:H112	1.98	0.45
1:A:314:LYS:HA	1:A:315:PRO:HD3	1.84	0.45
2:B:163:LEU:HB3	2:B:235:LEU:HD22	1.99	0.45
3:C:130:ASP:HB3	3:C:220:THR:HG22	1.99	0.45
3:C:231:ARG:O	3:C:233:GLU:N	2.47	0.44
3:C:164:ILE:HB	3:C:218:HIS:HD2	1.82	0.44
1:A:148:ILE:HG13	1:A:449:ALA:HB1	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:495:TYR:HB3	1:A:578:GLY:HA3	1.99	0.44
2:B:151:PRO:HG3	3:C:138:PHE:HE2	1.82	0.44
1:A:165:ILE:O	1:A:168:ILE:HB	2.18	0.44
2:B:206:VAL:HG22	2:B:208:VAL:HG13	1.99	0.44
1:A:451:LEU:CD2	1:A:458:TRP:HB3	2.48	0.44
2:B:80:ASN:OD1	2:B:81:GLN:N	2.51	0.44
1:A:156:PRO:O	1:A:159:LYS:HB2	2.17	0.44
3:C:139:PRO:HB3	3:C:229:PHE:CE2	2.53	0.44
1:A:453:GLU:HG3	1:A:454:PHE:CD1	2.53	0.43
1:A:577:LEU:HD13	6:A:703:CLR:H151	2.00	0.43
3:C:55:TRP:HB2	3:C:68:ILE:HB	2.00	0.43
2:B:224:HIS:CE1	2:B:226:ALA:HB3	2.53	0.43
6:A:703:CLR:H162	6:A:703:CLR:H231	2.00	0.43
7:A:704:D12:H21	7:A:704:D12:H52	1.77	0.43
1:A:341:PHE:HD2	1:A:343:VAL:HG23	1.84	0.43
1:A:178:THR:HG22	1:A:259:ILE:HD12	2.00	0.42
2:B:139:ALA:HB3	2:B:171:PHE:CE2	2.55	0.42
1:A:338:GLY:H	1:A:339:PRO:HD2	1.77	0.42
3:C:215:GLU:HA	3:C:225:ILE:O	2.20	0.42
1:A:292:LEU:HD22	1:A:378:VAL:HG21	2.01	0.41
2:B:177:VAL:HA	2:B:221:SER:O	2.20	0.41
1:A:125:ALA:HB2	1:A:333:ILE:HG12	2.01	0.41
2:B:149:LEU:HD11	2:B:166:LEU:HB2	2.02	0.41
2:B:224:HIS:O	2:B:228:SER:N	2.53	0.41
3:C:55:TRP:CD2	3:C:93:PHE:HB2	2.55	0.41
1:A:518:ILE:HD11	1:A:541:TRP:CE3	2.55	0.41
1:A:433:THR:O	1:A:437:ASP:OD1	2.39	0.41
2:B:36:SER:HA	2:B:102:LEU:O	2.21	0.41
3:C:111:HIS:O	3:C:111:HIS:ND1	2.52	0.41
1:A:88:PHE:HZ	1:A:274:VAL:HB	1.85	0.41
1:A:545:SER:HB2	1:A:546:PRO:HD3	2.03	0.41
1:A:105:PHE:HA	1:A:108:ILE:HG22	2.03	0.40
1:A:85:LYS:NZ	1:A:360:ASP:OD2	2.47	0.40
1:A:343:VAL:HG13	1:A:441:ALA:HB1	2.04	0.40
2:B:149:LEU:HB2	2:B:164:GLY:O	2.22	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	540/549 (98%)	522 (97%)	18 (3%)	0	100	100
2	B	216/221 (98%)	204 (94%)	12 (6%)	0	100	100
3	C	212/214 (99%)	199 (94%)	13 (6%)	0	100	100
All	All	968/984 (98%)	925 (96%)	43 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	429/462 (93%)	423 (99%)	6 (1%)	62	80
2	B	190/193 (98%)	190 (100%)	0	100	100
3	C	189/190 (100%)	188 (100%)	1 (0%)	86	92
All	All	808/845 (96%)	801 (99%)	7 (1%)	75	87

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	95	TYR
1	A	217	ASN
1	A	271	TRP
1	A	354	ASN
1	A	437	ASP

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Mol	Chain	Res	Type
1	A	551	PHE
3	C	109	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
3	C	26	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 8 ligands modelled in this entry, 2 are monoatomic - leaving 6 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
5	NAG	A	702	1	14,14,15	0.21	0	17,19,21	0.57	0
5	NAG	A	706	1	14,14,15	0.23	0	17,19,21	0.41	0
4	68P	A	701	-	26,26,26	6.07	15 (57%)	29,37,37	1.43	4 (13%)
6	CLR	A	703	-	31,31,31	0.86	1 (3%)	48,48,48	1.36	5 (10%)
8	HEX	A	705	-	5,5,5	0.31	0	4,4,4	0.61	0
7	D12	A	704	-	11,11,11	0.30	0	10,10,10	0.85	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	A	702	1	-	2/6/23/26	0/1/1/1
5	NAG	A	706	1	-	1/6/23/26	0/1/1/1
4	68P	A	701	-	-	3/15/27/27	0/3/3/3
6	CLR	A	703	-	-	6/10/68/68	0/4/4/4
8	HEX	A	705	-	-	0/3/3/3	-
7	D12	A	704	-	-	4/9/9/9	-

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	701	68P	C13-C07	11.69	1.54	1.39
4	A	701	68P	C14-C08	10.41	1.55	1.39
4	A	701	68P	C19-C15	9.70	1.54	1.38
4	A	701	68P	C16-C20	9.64	1.54	1.38
4	A	701	68P	C15-C10	8.72	1.53	1.39
4	A	701	68P	C17-C13	8.57	1.52	1.38
4	A	701	68P	C20-C21	8.40	1.53	1.37
4	A	701	68P	C16-C10	7.84	1.52	1.39
4	A	701	68P	C14-C18	7.82	1.53	1.39
4	A	701	68P	C19-C21	7.72	1.52	1.37
4	A	701	68P	C08-C07	7.28	1.48	1.39
4	A	701	68P	C17-C18	5.17	1.50	1.39
4	A	701	68P	C18-C24	4.24	1.53	1.44
4	A	701	68P	O02-C11	3.29	1.50	1.44
4	A	701	68P	C11-C08	-2.13	1.47	1.50
6	A	703	CLR	C13-C14	-2.08	1.51	1.55

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	701	68P	C11-C08-C07	-3.95	106.76	108.83
6	A	703	CLR	C8-C7-C6	-3.22	108.31	112.76
6	A	703	CLR	C9-C10-C5	3.12	114.21	109.65
6	A	703	CLR	C13-C14-C8	-2.76	110.49	114.41
4	A	701	68P	O02-C11-C08	2.70	108.00	105.01
4	A	701	68P	C19-C21-C20	-2.53	119.48	122.80
4	A	701	68P	C11-C08-C14	2.41	133.66	129.35
6	A	703	CLR	C4-C5-C10	2.40	119.49	116.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	A	703	CLR	C16-C17-C20	-2.03	109.10	112.18

There are no chirality outliers.

All (16) torsion outliers are listed below:

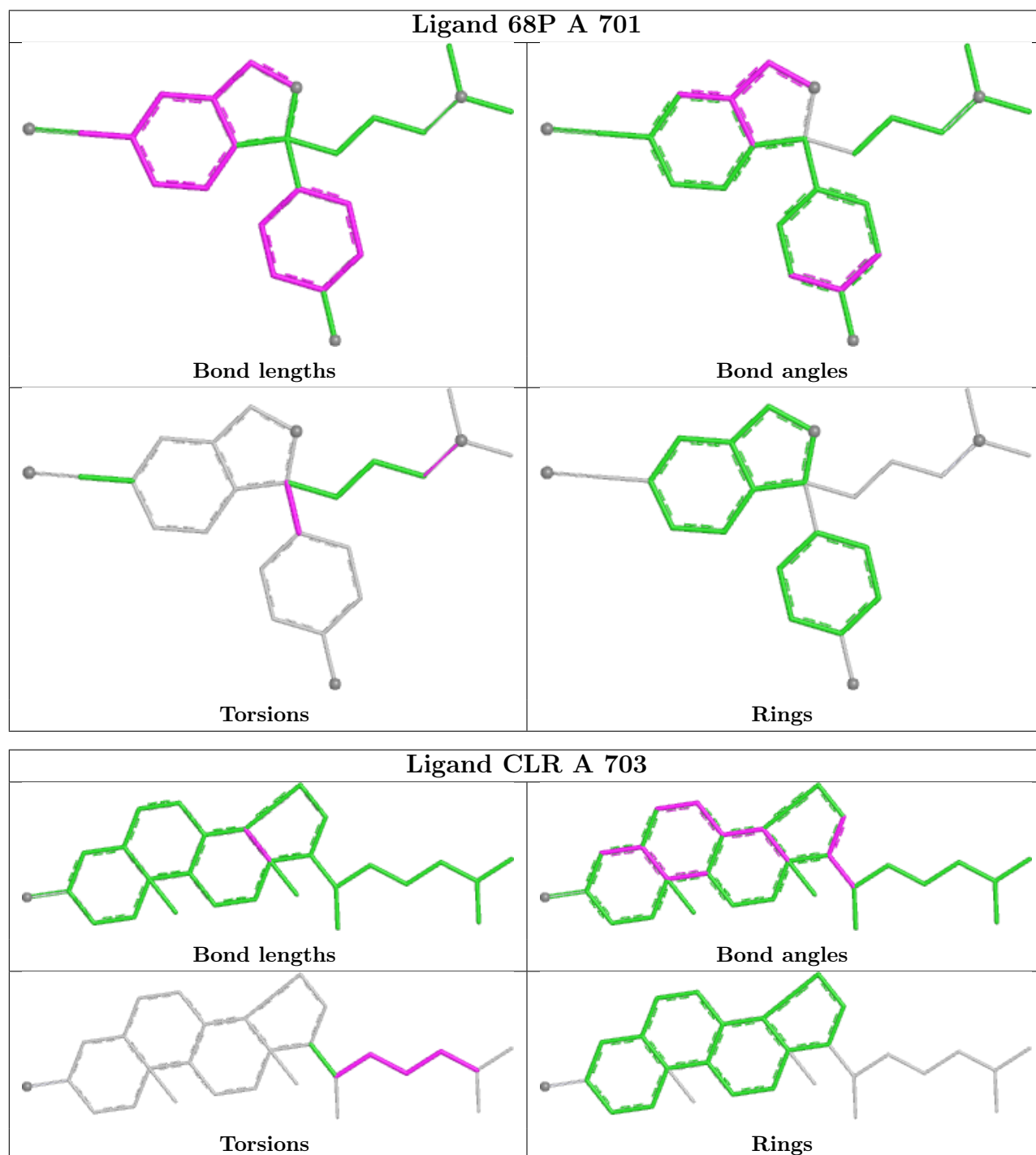| Mol	Chain	Res	Type	Atoms
5	A	702	NAG	O5-C5-C6-O6
5	A	702	NAG	C4-C5-C6-O6
6	A	703	CLR	C17-C20-C22-C23
6	A	703	CLR	C21-C20-C22-C23
7	A	704	D12	C5-C6-C7-C8
5	A	706	NAG	O5-C5-C6-O6
7	A	704	D12	C7-C8-C9-C10
6	A	703	CLR	C20-C22-C23-C24
7	A	704	D12	C4-C5-C6-C7
6	A	703	CLR	C23-C24-C25-C26
4	A	701	68P	C06-C05-C10-C15
4	A	701	68P	C09-C12-N03-C23
4	A	701	68P	C06-C05-C10-C16
6	A	703	CLR	C23-C24-C25-C27
6	A	703	CLR	C22-C23-C24-C25
7	A	704	D12	C6-C7-C8-C9

There are no ring outliers.

4 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	702	NAG	1	0
4	A	701	68P	2	0
6	A	703	CLR	5	0
7	A	704	D12	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 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 68P A 701

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 703

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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	542/549 (98%)	-0.06	28 (5%)	34	22	77, 133, 204, 309	0
2	B	218/221 (98%)	-0.12	8 (3%)	45	30	81, 164, 318, 362	0
3	C	214/214 (100%)	-0.10	8 (3%)	45	30	92, 186, 333, 444	0
All	All	974/984 (98%)	-0.08	44 (4%)	39	25	77, 144, 297, 444	0

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	401	ALA	7.1
1	A	403	PRO	6.1
1	A	134	TYR	5.7
2	B	190	THR	5.7
1	A	490	LYS	5.1
1	A	400	ASP	4.5
3	C	200	THR	4.5
1	A	104	ARG	4.5
2	B	121	ARG	4.0
1	A	494	GLU	3.9
1	A	493	GLU	3.7
1	A	394	VAL	3.7
1	A	390	ARG	3.4
1	A	103	TRP	3.4
1	A	389	MET	3.4
3	C	153	VAL	3.3
1	A	133	PHE	3.3
2	B	193	ALA	3.3
1	A	565	LEU	3.3
2	B	204	SER	3.2
1	A	357	CYS	3.1
3	C	198	THR	3.0
1	A	179	ILE	2.9

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Mol	Chain	Res	Type	RSRZ
1	A	566	PHE	2.9
1	A	137	LEU	2.9
1	A	220	TRP	2.8
1	A	361	ALA	2.7
1	A	107	TYR	2.6
1	A	468	ALA	2.6
3	C	151	SER	2.4
1	A	518	ILE	2.4
1	A	598	ILE	2.4
2	B	185	SER	2.4
2	B	149	LEU	2.3
2	B	166	LEU	2.3
2	B	90	THR	2.3
1	A	515	PHE	2.3
3	C	155	PHE	2.3
3	C	203	LYS	2.2
1	A	404	SER	2.2
3	C	223	SER	2.2
1	A	402	GLY	2.1
3	C	100	ALA	2.1
1	A	252	SER	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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.
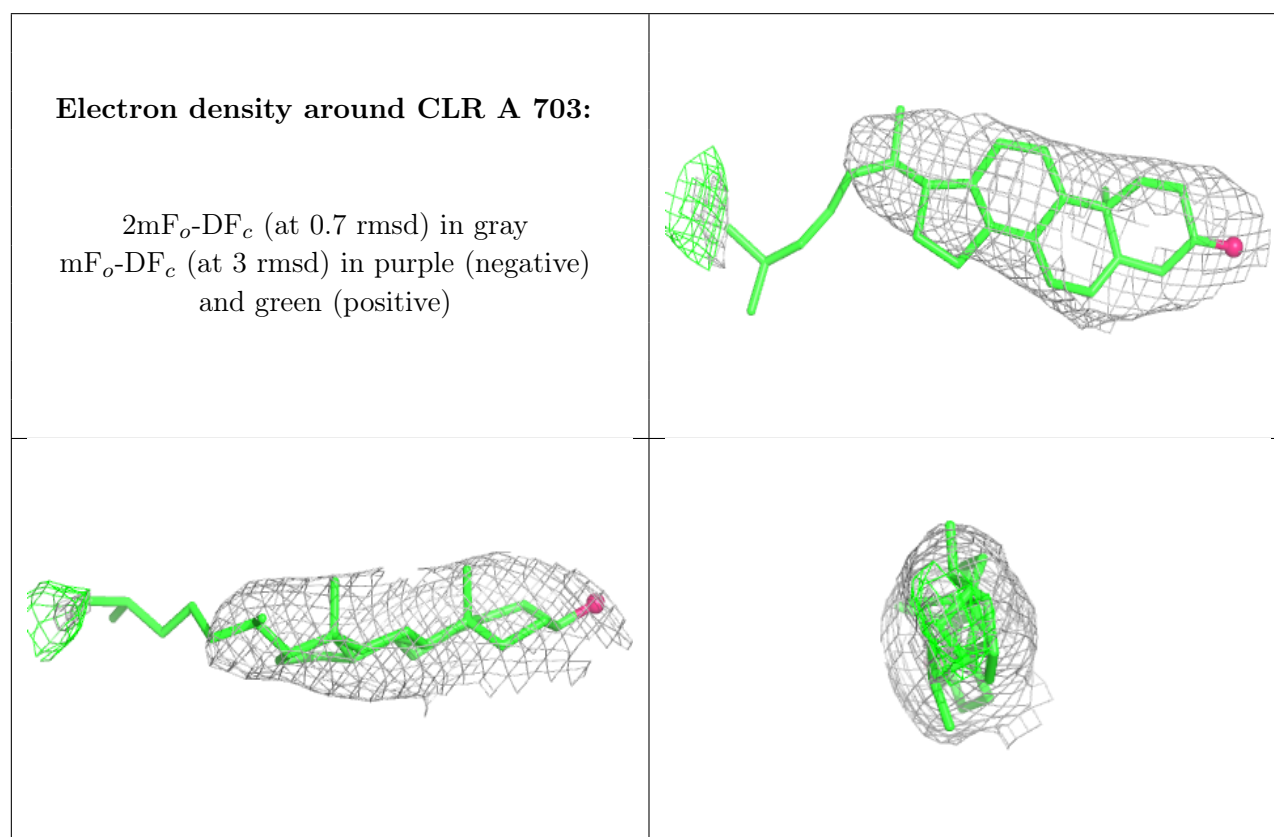
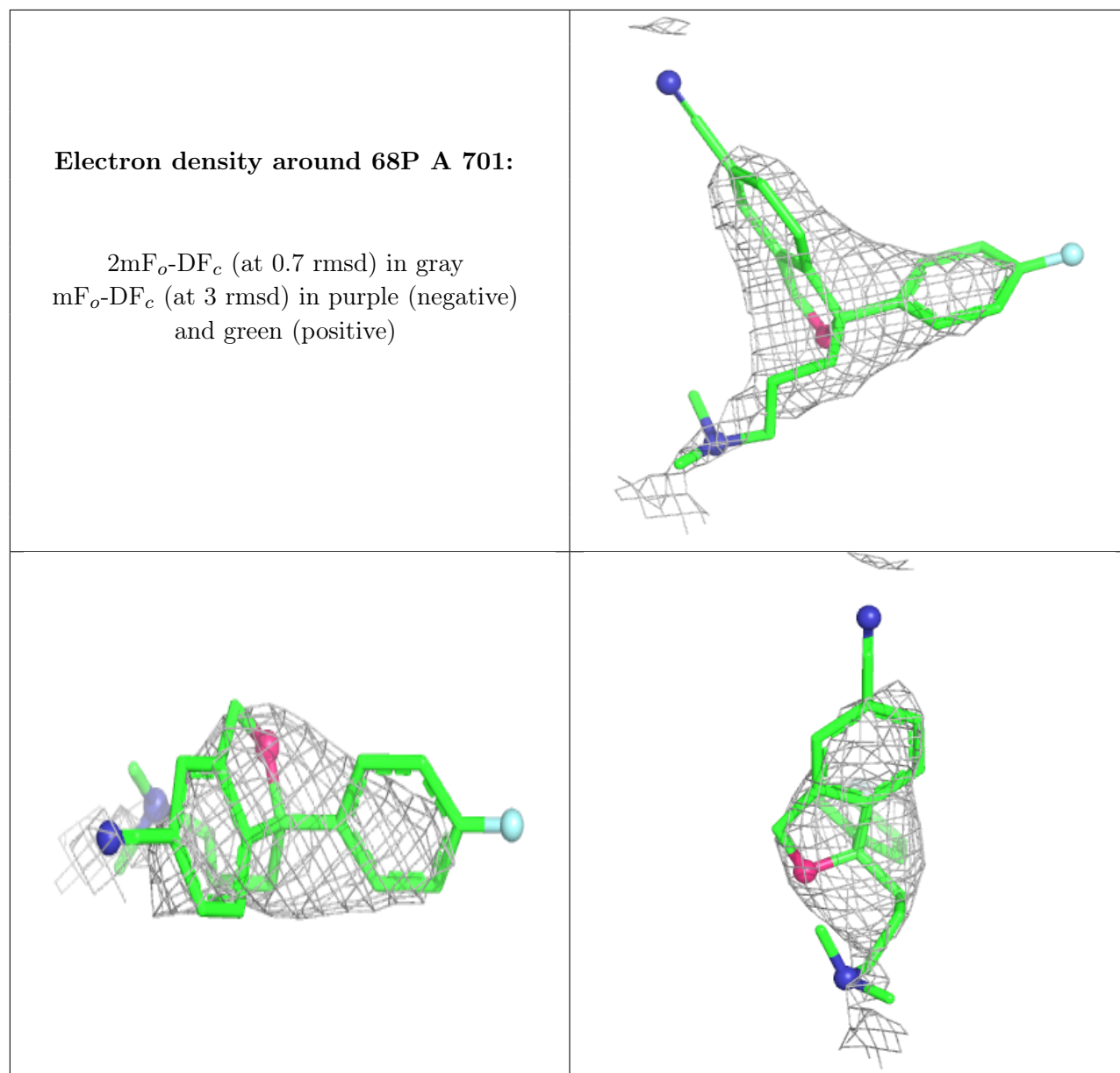| Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
8	HEX	A	705	6/6	0.75	0.68	87,100,105,108	0
5	NAG	A	706	14/15	0.82	0.16	302,304,306,307	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å²)	Q<0.9
6	CLR	A	703	28/28	0.86	0.21	159,175,199,210	0
7	D12	A	704	12/12	0.88	0.26	85,97,104,105	0
5	NAG	A	702	14/15	0.93	0.09	66,85,156,158	0
4	68P	A	701	24/24	0.96	0.13	95,123,143,154	0
9	NA	A	707	1/1	0.97	0.06	123,123,123,123	0
9	NA	A	708	1/1	0.99	0.03	115,115,115,115	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 CLR A 703:

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

Electron density around 68P A 701:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.