Full wwPDB X-ray Structure Validation Report (i)

Dec 12, 2023 – 04:41 pm GMT

PDB ID	:	4CJN
Title	:	Crystal structure of PBP2a from MRSA in complex with quinazolinone ligand
Authors	:	Bouley, R.; Otero, L.H.; Rojas-Altuve, A.; Hermoso, J.A.
Deposited on	:	2013-12-21
Resolution	:	1.95 Å(reported)

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

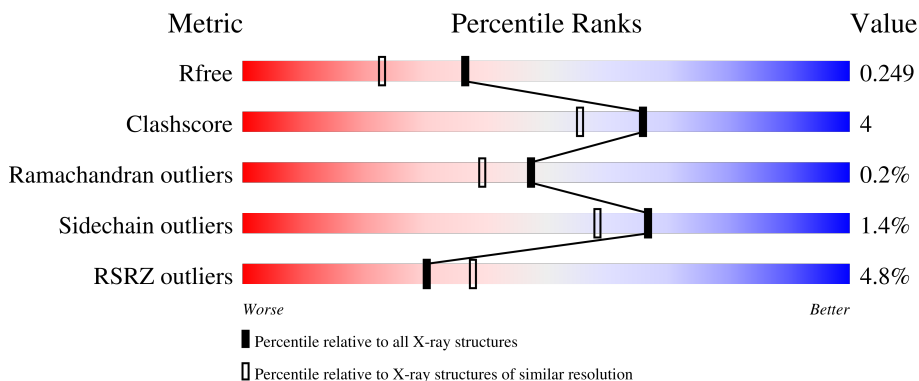|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 1.95 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		0.249
Clashscore		4
Ramachandran outliers		0.2%
Sidechain outliers		1.4%
RSRZ outliers		4.8%

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	4310 (1.96-1.92)
Clashscore	141614	1023 (1.94-1.94)
Ramachandran outliers	138981	1007 (1.94-1.94)
Sidechain outliers	138945	1007 (1.94-1.94)
RSRZ outliers	127900	4250 (1.96-1.92)

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	642	4% — 91% — 9% •
1	B	642	6% — 91% — 8%

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:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	MUR	A	1673	-	-	X	X
5	QNZ	B	1673	-	-	-	X

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 10669 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 PENICILLIN BINDING PROTEIN 2 PRIME.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	642	Total 5151	C 3246	N 870	O 1019	S 16	0	0	0
1	B	642	Total 5151	C 3246	N 870	O 1019	S 16	0	0	0

- Molecule 2 is CADMIUM ION (three-letter code: CD) (formula: Cd).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total 2	Cd 2	0	0
2	B	2	Total 2	Cd 2	0	0

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total 2	Cl 2	0	0
3	B	2	Total 2	Cl 2	0	0

- Molecule 4 is beta-muramic acid (three-letter code: MUR) (formula: $C_9H_{17}NO_7$).
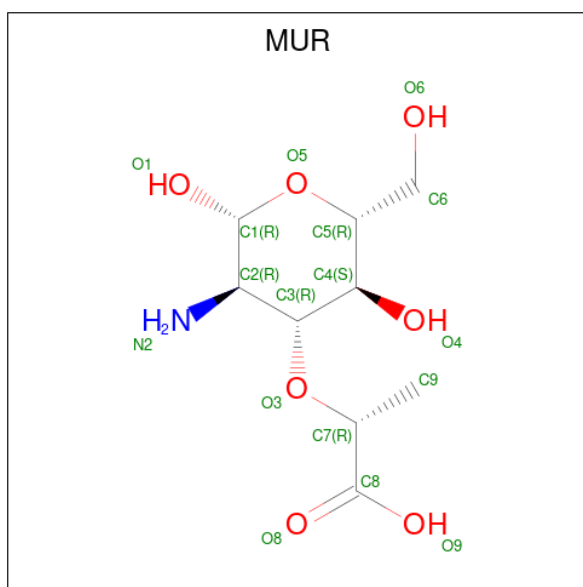
MUR

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			17	9	1	7		
4	B	1	Total	C	N	O	0	0
			17	9	1	7		

- Molecule 5 is (E)-3-(2-(4-cyanostyryl)-4-oxoquinazolin-3(4H)-yl)benzoic acid (three-letter code: QNZ) (formula: $C_{24}H_{15}N_3O_3$).

QNZ
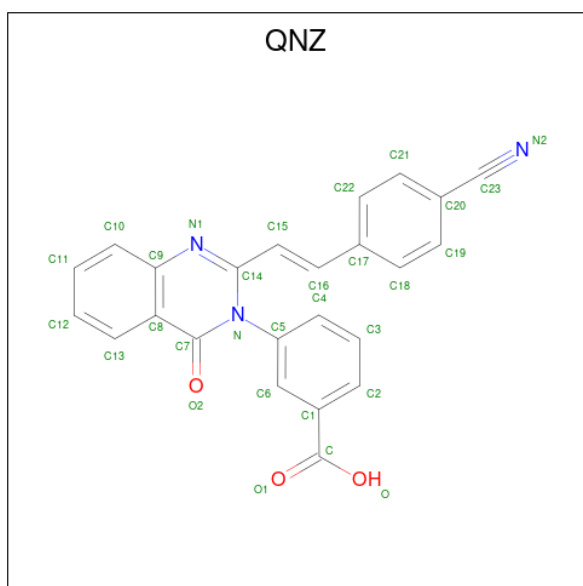
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	N	O	0	0
			30	24	3	3		

• Molecule 6 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	165	Total 165	O 165	0	0
6	B	130	Total 130	O 130	0	0

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: PENICILLIN BINDING PROTEIN 2 PRIME

Chain A:

- Molecule 1: PENICILLIN BINDING PROTEIN 2 PRIME

Chain B:
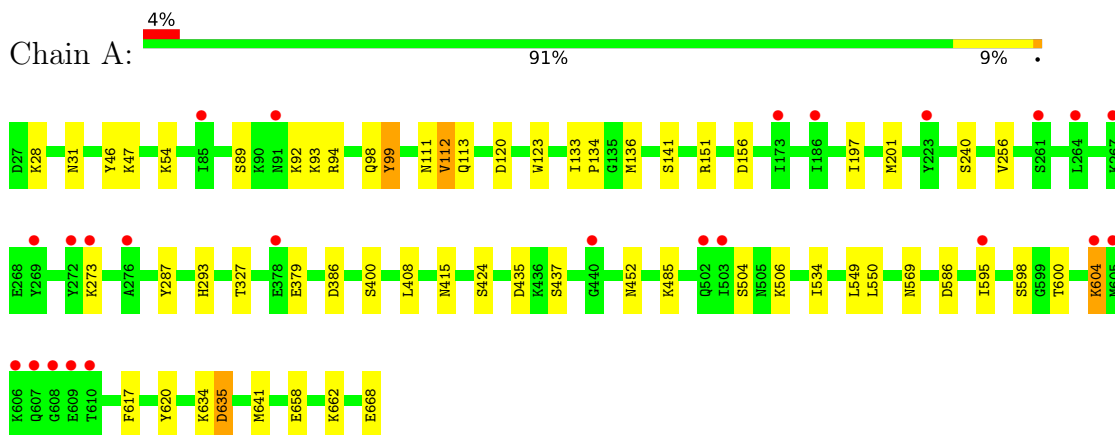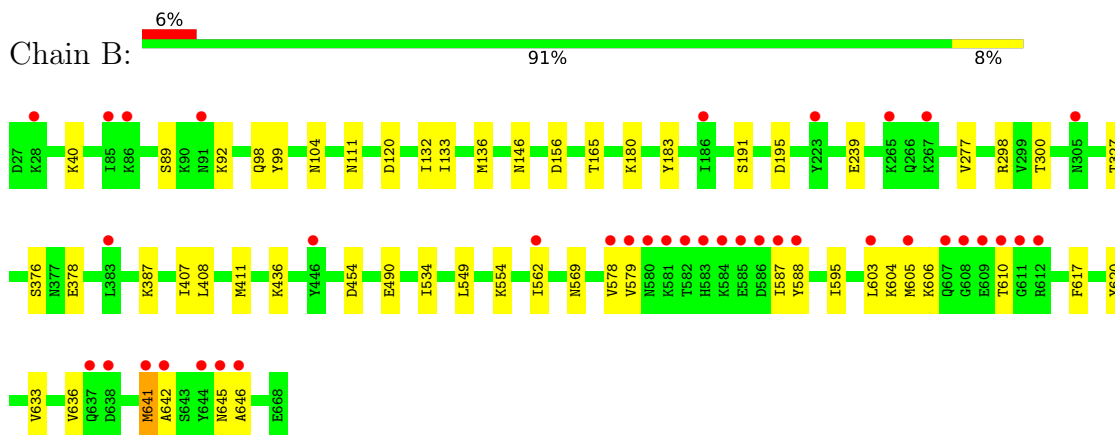
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	81.05Å 103.77Å 186.43Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	63.88 – 1.95 63.88 – 1.95	Depositor EDS
% Data completeness (in resolution range)	99.5 (63.88-1.95) 89.7 (63.88-1.95)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.32 (at 1.95Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE: 1.9_1692)	Depositor
R, R_{free}	0.199 , 0.247 0.202 , 0.249	Depositor DCC
R_{free} test set	5792 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	34.8	Xtriage
Anisotropy	0.882	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 52.2	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	10669	wwPDB-VP
Average B, all atoms (Å^2)	71.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.14% of the height of the origin peak. No significant pseudotranslation is detected.*

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

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: MUR, CD, QNZ, CL

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	0.38	0/5237	0.53	0/7041
1	B	0.36	0/5237	0.53	0/7041
All	All	0.37	0/10474	0.53	0/14082

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2   Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5151	0	5150	42	0
1	B	5151	0	5150	37	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
4	A	17	0	16	8	0
4	B	17	0	15	5	0
5	B	30	0	14	4	0
6	A	165	0	0	6	0
6	B	130	0	0	8	0
All	All	10669	0	10345	82	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 (82) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:277:VAL:HG11	4:B:1674:MUR:H91	1.53	0.90
1:B:490:GLU:OE1	6:B:2106:HOH:O	1.89	0.89
1:A:586:ASP:OD2	6:A:2136:HOH:O	1.91	0.89
1:B:387:LYS:O	6:B:2083:HOH:O	1.90	0.88
1:A:98:GLN:NE2	1:A:111:ASN:OD1	2.18	0.76
1:B:40:LYS:O	6:B:2002:HOH:O	2.04	0.73
1:B:588:TYR:OH	1:B:646:ALA:O	2.08	0.71
1:A:141:SER:OG	6:A:2019:HOH:O	2.09	0.70
1:B:641:MET:HB2	6:B:2129:HOH:O	1.92	0.69
1:B:277:VAL:CG1	4:B:1674:MUR:H91	2.23	0.69
1:B:239:GLU:OE2	6:B:2047:HOH:O	2.12	0.67
1:A:112:VAL:HG13	1:A:134:PRO:HB3	1.78	0.64
1:A:379:GLU:OE2	6:A:2103:HOH:O	2.15	0.64
1:A:89:SER:HB2	1:A:92:LYS:HB2	1.81	0.62
1:A:293:HIS:NE2	4:A:1673:MUR:O9	2.33	0.61
1:A:99:TYR:HD2	1:A:112:VAL:HG11	1.66	0.59
1:A:240:SER:HA	4:A:1673:MUR:H5	1.85	0.58
1:B:603:LEU:HG	1:B:605:MET:HG2	1.84	0.58
1:B:120:ASP:N	6:B:2023:HOH:O	2.37	0.57
1:A:120:ASP:N	6:A:2013:HOH:O	2.38	0.56
1:A:400:SER:HB2	1:A:604:LYS:HE2	1.87	0.56
1:B:633:VAL:HB	1:B:645:ASN:HD21	1.70	0.56
4:B:1674:MUR:H2	4:B:1674:MUR:H93	1.89	0.53
1:B:191:SER:HB3	1:B:376:SER:HB3	1.91	0.53
1:A:598:SER:HB3	1:A:617:PHE:CD2	2.44	0.53
1:A:327:THR:OG1	1:A:549:LEU:HA	2.10	0.52
1:A:47:LYS:NZ	6:A:2002:HOH:O	2.43	0.52
1:A:133:ILE:HB	1:A:136:MET:HE2	1.92	0.51
1:A:28:LYS:HG2	1:A:31:ASN:HD22	1.75	0.51
1:A:386:ASP:O	6:A:2106:HOH:O	2.19	0.51
1:A:595:ILE:HD11	1:A:620:TYR:OH	2.10	0.50
5:B:1673:QNZ:C15	5:B:1673:QNZ:H4	2.40	0.50
1:B:298:ARG:HG2	1:B:300:THR:HG23	1.94	0.50
1:B:454:ASP:HB2	6:B:2095:HOH:O	2.12	0.50
1:B:327:THR:OG1	1:B:549:LEU:HA	2.12	0.49
1:A:151:ARG:HD2	4:A:1673:MUR:C8	2.42	0.49
1:A:668:GLU:HB2	1:B:554:LYS:HE2	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:600:THR:HG21	1:A:641:MET:HB3	1.94	0.48
1:B:165:THR:HA	4:B:1674:MUR:H61	1.94	0.48
1:A:151:ARG:H	4:A:1673:MUR:HN22	1.61	0.48
1:B:595:ILE:HD11	1:B:620:TYR:OH	2.13	0.48
1:A:408:LEU:HD22	1:A:534:ILE:HG21	1.96	0.47
1:B:98:GLN:NE2	1:B:111:ASN:OD1	2.46	0.47
1:A:415:ASN:OD1	1:A:485:LYS:HE2	2.14	0.47
1:B:641:MET:N	6:B:2129:HOH:O	2.33	0.46
1:A:256:VAL:HG21	4:A:1673:MUR:C9	2.45	0.46
4:A:1673:MUR:H3	4:A:1673:MUR:H92	1.46	0.46
1:B:645:ASN:HD22	1:B:645:ASN:N	2.12	0.46
1:B:132:ILE:HB	1:B:136:MET:CE	2.45	0.46
1:A:94:ARG:HD2	1:A:113:GLN:NE2	2.31	0.46
1:B:387:LYS:HD3	1:B:636:VAL:HB	1.97	0.46
1:A:658:GLU:HB2	1:A:662:LYS:HG2	1.99	0.45
1:B:146:ASN:HB2	5:B:1673:QNZ:C20	2.47	0.45
1:A:151:ARG:HB2	4:A:1673:MUR:H7	1.98	0.45
1:A:287:TYR:CZ	1:A:550:LEU:HD11	2.52	0.44
1:A:435:ASP:OD1	1:A:437:SER:HB3	2.16	0.44
1:B:89:SER:HB2	1:B:92:LYS:HB2	1.99	0.44
1:A:595:ILE:HD11	1:A:620:TYR:CZ	2.52	0.44
1:A:634:LYS:O	1:A:635:ASP:HB2	2.18	0.44
1:B:578:VAL:HG12	1:B:579:VAL:N	2.33	0.44
1:B:120:ASP:N	1:B:120:ASP:OD1	2.51	0.44
1:A:240:SER:CA	4:A:1673:MUR:H5	2.47	0.43
1:A:604:LYS:H	1:A:604:LYS:HG2	1.66	0.43
1:B:104:ASN:HB3	5:B:1673:QNZ:C12	2.49	0.43
1:B:133:ILE:HB	1:B:136:MET:HE2	2.00	0.43
1:B:180:LYS:HG2	1:B:183:TYR:CZ	2.54	0.43
1:B:277:VAL:HB	4:B:1674:MUR:O9	2.19	0.42
1:A:197:ILE:O	1:A:201:MET:HG2	2.19	0.42
1:A:273:LYS:HB3	1:A:273:LYS:HE2	1.86	0.42
1:B:578:VAL:HG12	1:B:579:VAL:H	1.85	0.42
1:A:93:LYS:HE3	1:A:123:TRP:CZ2	2.54	0.42
1:B:408:LEU:HD22	1:B:534:ILE:HG21	2.02	0.42
1:B:606:LYS:HB3	1:B:606:LYS:HE2	1.87	0.42
1:A:120:ASP:N	1:A:120:ASP:OD1	2.53	0.42
1:A:46:TYR:O	1:A:54:LYS:HD3	2.20	0.41
5:B:1673:QNZ:C15	5:B:1673:QNZ:C4	2.97	0.41
1:A:93:LYS:HG3	1:A:123:TRP:CH2	2.55	0.41
1:A:424:SER:OG	1:A:452:ASN:HB3	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:407:ILE:O	1:B:411:MET:HG3	2.21	0.40
1:B:578:VAL:HG23	1:B:587:ILE:HD13	2.02	0.40
1:B:562:ILE:HD13	1:B:562:ILE:HA	1.88	0.40
1:A:28:LYS:HG2	1:A:31:ASN:ND2	2.36	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	640/642 (100%)	625 (98%)	13 (2%)	2 (0%)	41	32
1	B	640/642 (100%)	620 (97%)	19 (3%)	1 (0%)	47	39
All	All	1280/1284 (100%)	1245 (97%)	32 (2%)	3 (0%)	47	39

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	504	SER
1	B	642	ALA
1	A	635	ASP

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	572/572 (100%)	566 (99%)	6 (1%)	76	71
1	B	572/572 (100%)	562 (98%)	10 (2%)	60	49
All	All	1144/1144 (100%)	1128 (99%)	16 (1%)	67	58

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	99	TYR
1	A	112	VAL
1	A	156	ASP
1	A	506	LYS
1	A	569	ASN
1	A	604	LYS
1	B	99	TYR
1	B	156	ASP
1	B	195	ASP
1	B	378	GLU
1	B	436	LYS
1	B	569	ASN
1	B	604	LYS
1	B	610	THR
1	B	617	PHE
1	B	641	MET

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

Mol	Chain	Res	Type
1	B	645	ASN

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 11 ligands modelled in this entry, 8 are monoatomic - leaving 3 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	$\#|Z| > 2$
4	MUR	A	1673	-	17,17,17	1.59	3 (17%)	21,24,24	2.69	12 (57%)
4	MUR	B	1674	-	17,17,17	1.58	3 (17%)	21,24,24	2.12	6 (28%)
5	QNZ	B	1673	-	32,33,33	0.30	0	42,46,46	0.98	2 (4%)

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
4	MUR	A	1673	-	-	7/10/30/30	0/1/1/1
4	MUR	B	1674	-	-	6/10/30/30	0/1/1/1
5	QNZ	B	1673	-	-	6/15/15/15	0/4/4/4

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1673	MUR	O5-C1	3.59	1.51	1.42
4	B	1674	MUR	O5-C1	3.34	1.51	1.42
4	B	1674	MUR	C2-N2	2.87	1.51	1.47
4	A	1673	MUR	C3-C2	-2.80	1.47	1.53
4	B	1674	MUR	O5-C5	2.71	1.50	1.44
4	A	1673	MUR	O5-C5	2.61	1.50	1.44

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	1673	MUR	C1-C2-C3	-6.49	98.32	110.14
4	A	1673	MUR	O5-C1-C2	-5.96	102.55	109.51
4	B	1674	MUR	O5-C5-C4	5.62	119.90	109.69
5	B	1673	QNZ	C16-C15-C14	4.25	129.60	122.90
4	A	1673	MUR	O5-C5-C4	4.10	117.14	109.69
4	B	1674	MUR	C6-C5-C4	-4.06	103.50	113.00
4	B	1674	MUR	O5-C1-C2	3.93	114.10	109.51
5	B	1673	QNZ	C5-N-C14	3.84	125.00	119.88
4	A	1673	MUR	C3-C2-N2	2.95	117.04	110.92
4	A	1673	MUR	O3-C3-C4	2.72	114.52	107.28
4	A	1673	MUR	O1-C1-C2	2.68	114.48	108.96
4	B	1674	MUR	O5-C5-C6	2.43	112.47	106.44
4	B	1674	MUR	O9-C8-O8	-2.35	118.75	124.09
4	A	1673	MUR	O9-C8-C7	2.28	122.25	113.89
4	B	1674	MUR	O3-C3-C2	2.28	114.47	108.89
4	A	1673	MUR	O1-C1-O5	2.25	117.14	110.38
4	A	1673	MUR	O9-C8-O8	-2.23	119.03	124.09
4	A	1673	MUR	O5-C5-C6	2.15	111.78	106.44
4	A	1673	MUR	C3-C4-C5	2.04	114.00	109.66
4	A	1673	MUR	O3-C3-C2	2.02	113.85	108.89

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1673	MUR	C9-C7-O3-C3
4	A	1673	MUR	O3-C7-C8-O8
4	A	1673	MUR	O3-C7-C8-O9
4	A	1673	MUR	C9-C7-C8-O8
4	A	1673	MUR	C9-C7-C8-O9
4	B	1674	MUR	C8-C7-O3-C3
4	B	1674	MUR	O3-C7-C8-O8
4	B	1674	MUR	O3-C7-C8-O9
4	B	1674	MUR	C9-C7-C8-O8
5	B	1673	QNZ	N-C14-C15-C16
5	B	1673	QNZ	N1-C14-C15-C16
5	B	1673	QNZ	C6-C5-N-C7
5	B	1673	QNZ	C4-C5-N-C7
4	A	1673	MUR	C4-C5-C6-O6
5	B	1673	QNZ	C4-C5-N-C14
5	B	1673	QNZ	C6-C5-N-C14
4	A	1673	MUR	O5-C5-C6-O6
4	B	1674	MUR	C9-C7-C8-O9

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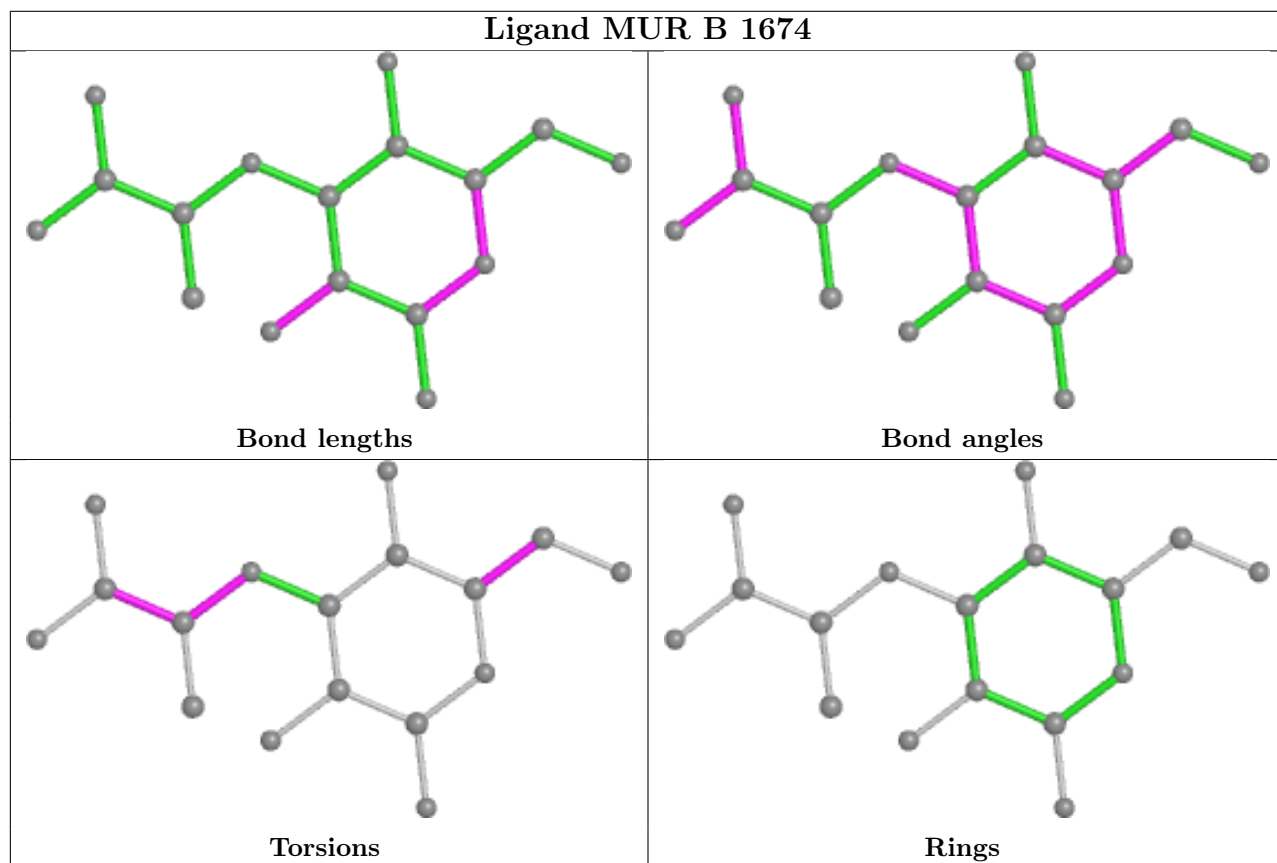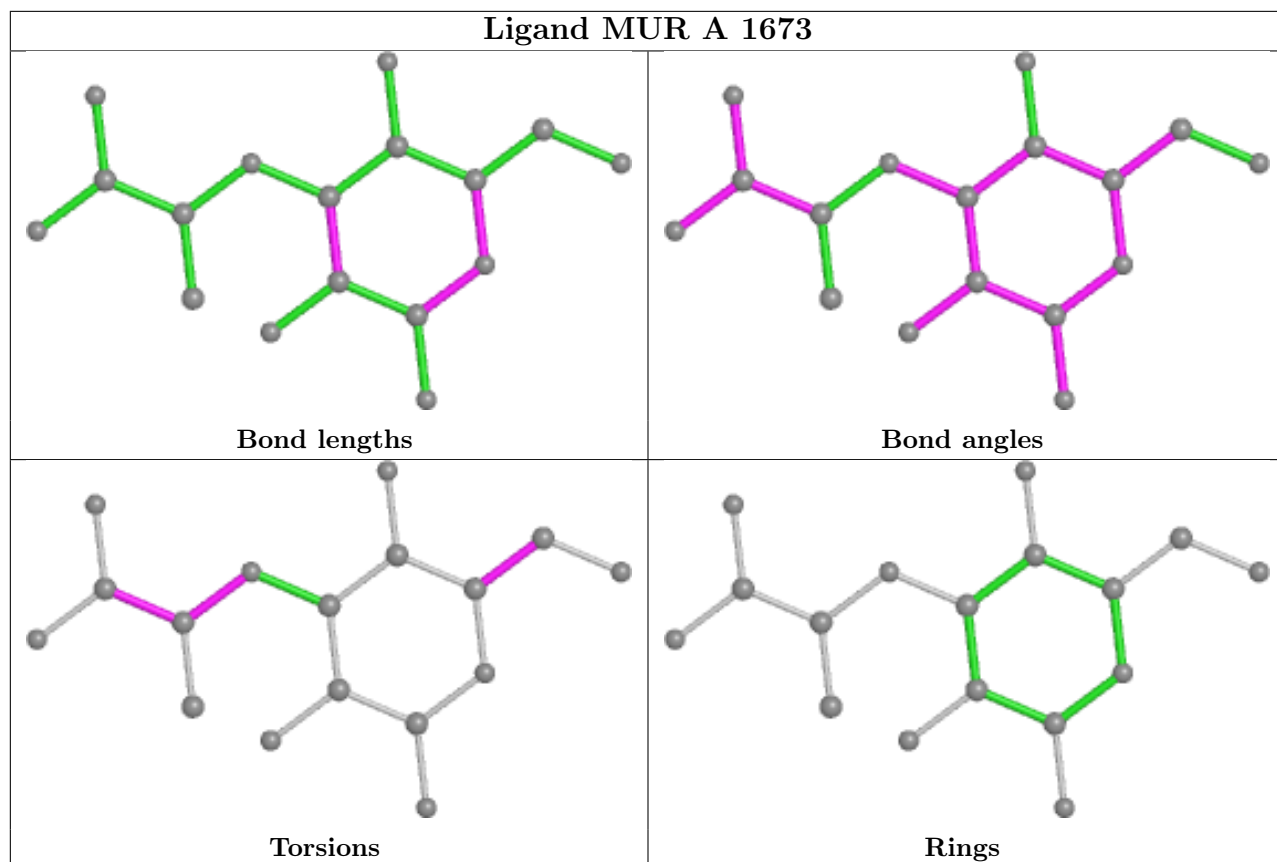| Mol	Chain	Res	Type	Atoms
4	B	1674	MUR	O5-C5-C6-O6

There are no ring outliers.

3 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1673	MUR	8	0
4	B	1674	MUR	5	0
5	B	1673	QNZ	4	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand MUR A 1673

Bond lengths

Bond angles

Torsions

Rings

Ligand MUR B 1674

Bond lengths

Bond angles

Torsions

Rings

Ligand QNZ B 1673

Bond lengths

Bond angles

Torsions

Rings
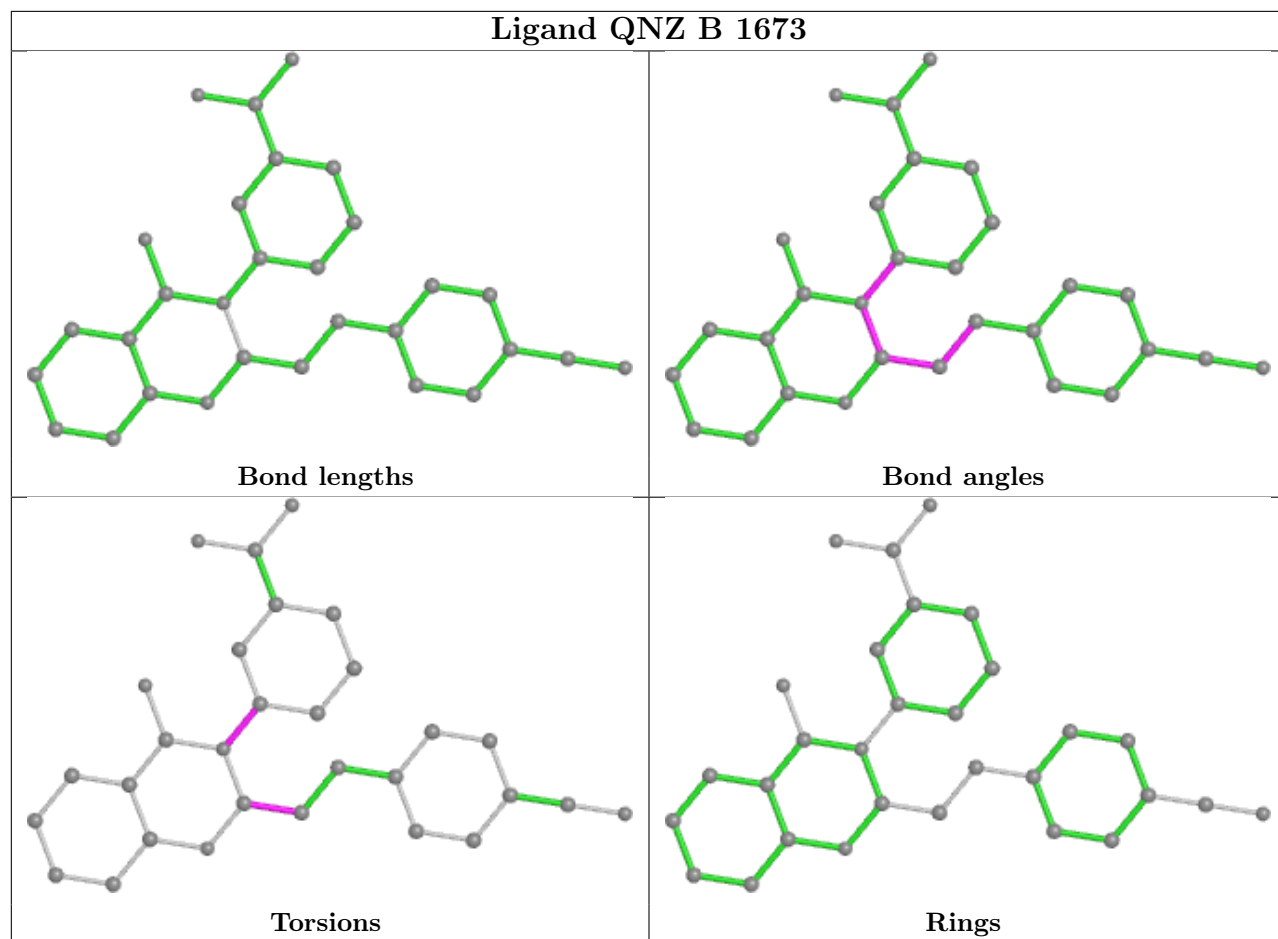
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

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	642/642 (100%)	0.45	24 (3%)	41	49	35, 63, 107, 316	0
1	B	642/642 (100%)	0.47	38 (5%)	22	28	40, 66, 134, 231	0
All	All	1284/1284 (100%)	0.46	62 (4%)	30	38	35, 65, 121, 316	0

All (62) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	608	GLY	9.8
1	B	579	VAL	9.0
1	B	610	THR	8.4
1	B	605	MET	8.3
1	A	607	GLN	6.7
1	B	608	GLY	6.6
1	B	607	GLN	5.7
1	B	587	ILE	5.0
1	A	609	GLU	4.8
1	B	638	ASP	4.7
1	A	605	MET	4.5
1	B	642	ALA	4.3
1	A	91	ASN	4.3
1	B	223	TYR	4.2
1	B	644	TYR	4.0
1	B	588	TYR	3.9
1	B	91	ASN	3.9
1	B	609	GLU	3.9
1	A	606	LYS	3.8
1	B	585	GLU	3.7
1	B	645	ASN	3.7
1	B	446	TYR	3.5
1	B	581	LYS	3.4
1	B	586	ASP	3.4

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Mol	Chain	Res	Type	RSRZ
1	B	637	GLN	3.2
1	A	223	TYR	3.2
1	A	272	TYR	3.1
1	A	440	GLY	3.1
1	B	186	ILE	3.0
1	A	273	LYS	3.0
1	B	584	LYS	2.9
1	B	603	LEU	2.9
1	B	582	THR	2.9
1	B	265	LYS	2.9
1	B	578	VAL	2.8
1	B	267	LYS	2.8
1	B	305	ASN	2.8
1	A	85	ILE	2.7
1	A	186	ILE	2.7
1	B	611	GLY	2.7
1	B	583	HIS	2.6
1	B	641	MET	2.6
1	B	580	ASN	2.5
1	B	85	ILE	2.5
1	B	383	LEU	2.5
1	A	173	ILE	2.4
1	A	503	ILE	2.4
1	B	562	ILE	2.4
1	A	276	ALA	2.3
1	A	264	LEU	2.3
1	B	28	LYS	2.3
1	A	267	LYS	2.3
1	A	269	TYR	2.3
1	B	646	ALA	2.2
1	B	612	ARG	2.2
1	A	604	LYS	2.2
1	A	610	THR	2.2
1	B	86	LYS	2.2
1	A	378	GLU	2.1
1	A	261	SER	2.1
1	A	502	GLN	2.0
1	A	595	ILE	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
5	QNZ	B	1673	30/30	0.42	0.45	105,106,109,109	30
4	MUR	A	1673	17/17	0.56	0.44	83,84,86,87	17
4	MUR	B	1674	17/17	0.69	0.31	50,52,56,57	17
3	CL	A	1671	1/1	0.96	0.16	51,51,51,51	0
3	CL	B	1671	1/1	0.98	0.10	47,47,47,47	0
3	CL	A	1672	1/1	0.99	0.08	59,59,59,59	0
2	CD	A	1669	1/1	0.99	0.23	51,51,51,51	0
3	CL	B	1672	1/1	0.99	0.06	52,52,52,52	0
2	CD	B	1669	1/1	1.00	0.20	53,53,53,53	0
2	CD	B	1670	1/1	1.00	0.23	50,50,50,50	0
2	CD	A	1670	1/1	1.00	0.17	60,60,60,60	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.
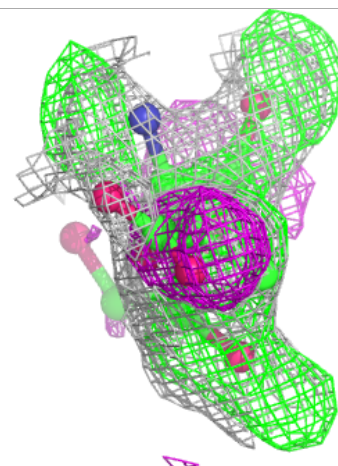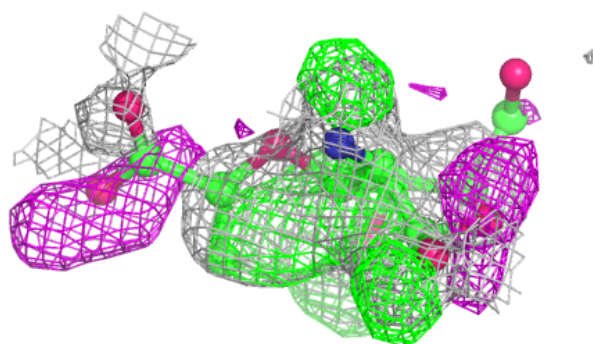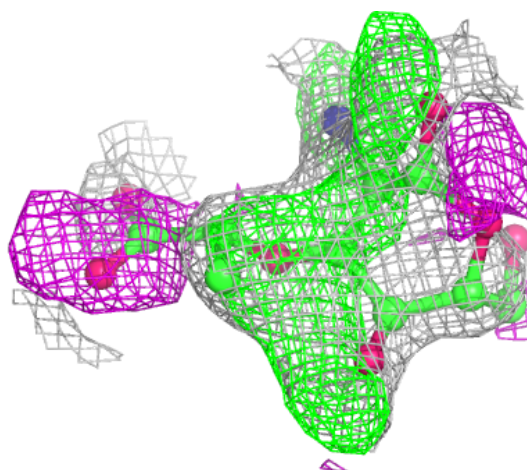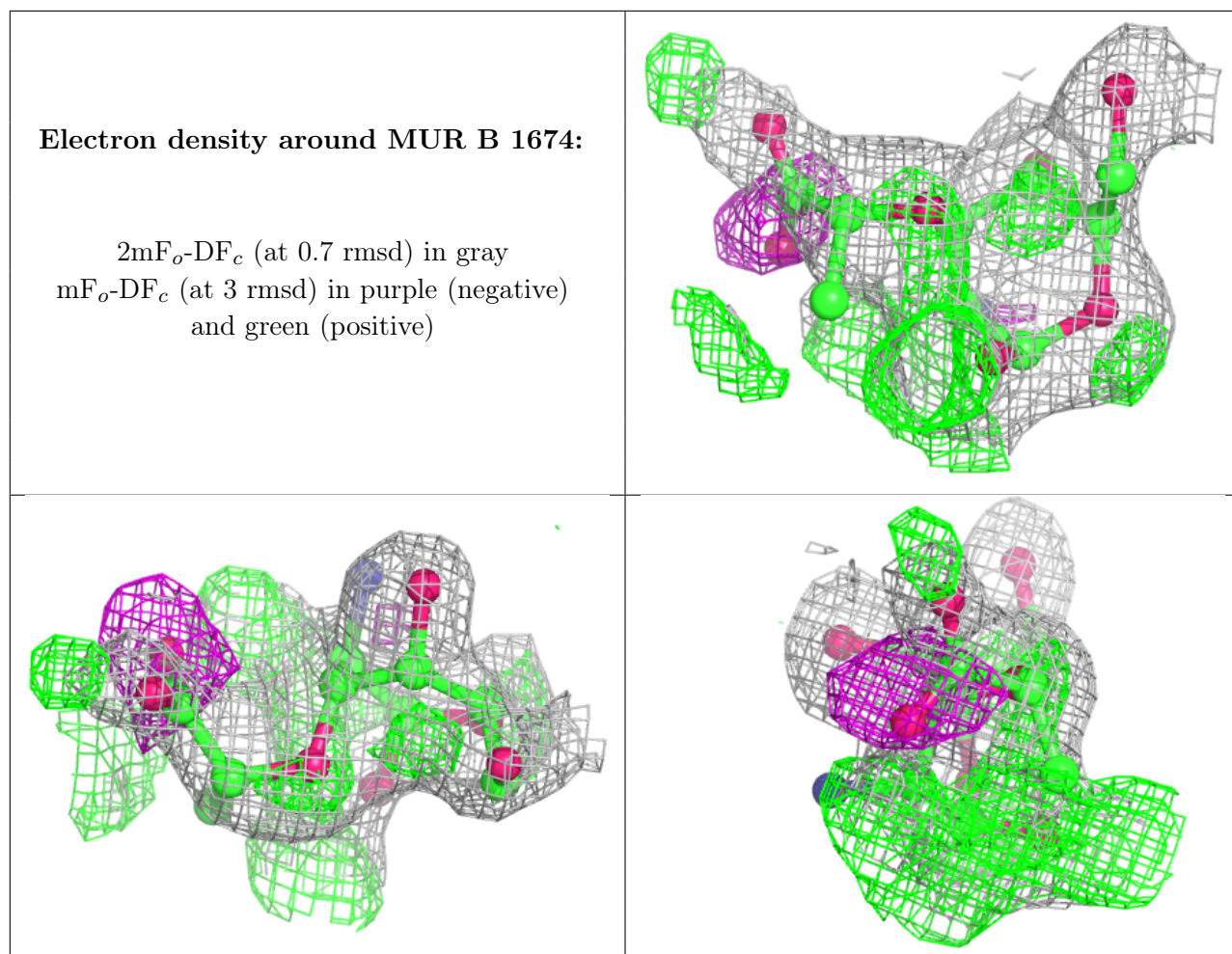
Electron density around QNZ B 1673:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
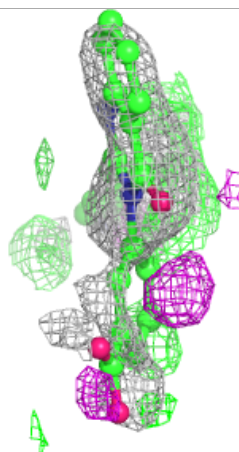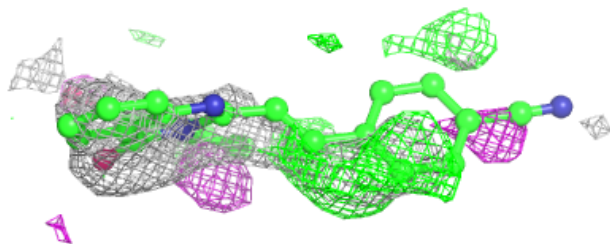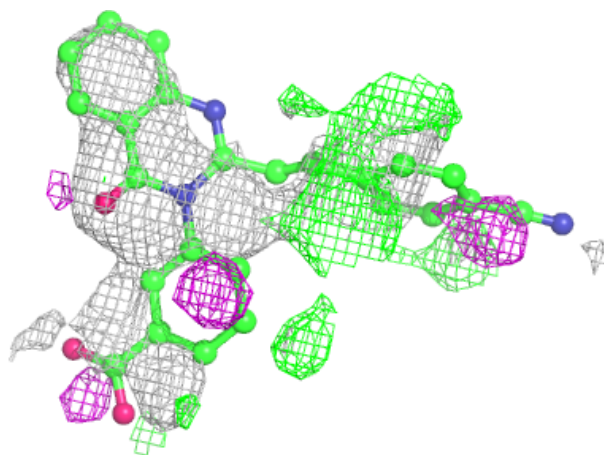
Electron density around MUR A 1673:

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

Electron density around MUR B 1674:

$2mF_o\text{-}DF_c$ (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.