WORLDWIDE PDB

PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Feb 19, 2024 – 01:33 AM EST

PDB ID	:	4IDT
Title	:	Crystal Structure of NIK with 11-bromo-5,6,7,8-tetrahydropyrimido[4',5':3,4] cyclohepta[1,2-b]indol-2-amine (T28)
Authors	:	Liu, J.; Sudom, A.; Wang, Z.
Deposited on	:	2012-12-13
Resolution	:	2.40 Å(reported)

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

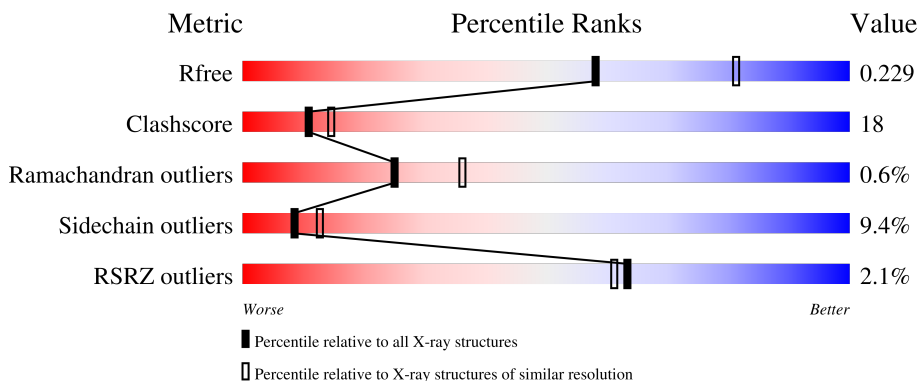|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.40 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		0.229
Clashscore		18
Ramachandran outliers		0.6%
Sidechain outliers		9.4%
RSRZ outliers		2.1%

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	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

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	356	2% / 70% 19% · 6%
1	B	356	2% / 67% 22% · 6%

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 10758 atoms, of which 5196 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.
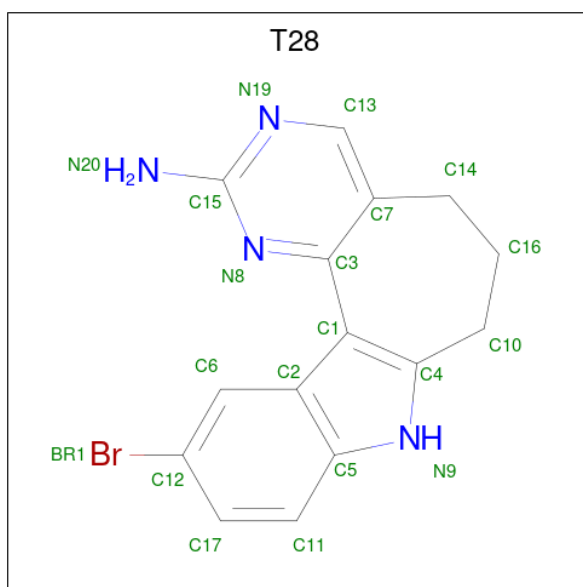
- Molecule 1 is a protein called Mitogen-activated protein kinase kinase kinase 14.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	334	Total	C	H	N	O	S	0	1	0
			5174	1630	2578	468	480	18			
1	B	335	Total	C	H	N	O	S	0	2	0
			5203	1638	2594	472	481	18			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	325	GLY	-	expression tag	UNP Q99558
A	326	ALA	-	expression tag	UNP Q99558
A	327	MET	-	expression tag	UNP Q99558
A	328	GLY	-	expression tag	UNP Q99558
A	329	SER	-	expression tag	UNP Q99558
A	549	ASP	SER	conflict	UNP Q99558
B	325	GLY	-	expression tag	UNP Q99558
B	326	ALA	-	expression tag	UNP Q99558
B	327	MET	-	expression tag	UNP Q99558
B	328	GLY	-	expression tag	UNP Q99558
B	329	SER	-	expression tag	UNP Q99558
B	549	ASP	SER	conflict	UNP Q99558

- Molecule 2 is 11-bromo-5,6,7,8-tetrahydropyrimido[4',5':3,4]cyclohepta[1,2-b]indol-2-amine (three-letter code: T28) (formula: $C_{15}H_{13}BrN_4$).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	Br	C	H	N	0	0
			32	1	15	12	4		
2	B	1	Total	Br	C	H	N	0	0
			32	1	15	12	4		

• Molecule 3 is water.

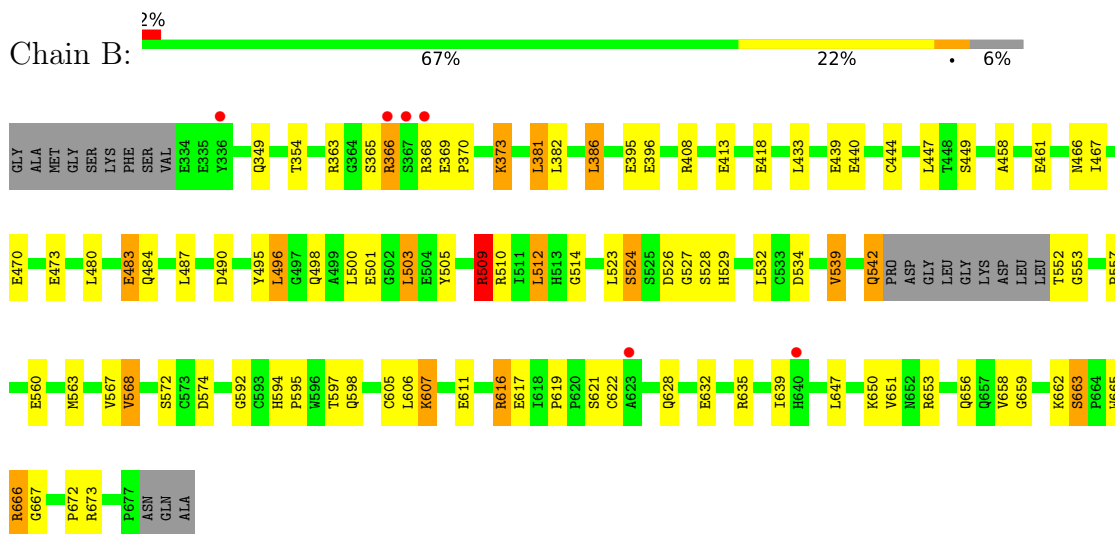| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	185	Total	O	0	0
			185	185		
3	B	132	Total	O	0	0
			132	132		

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: Mitogen-activated protein kinase kinase kinase 14

Chain A:

• Molecule 1: Mitogen-activated protein kinase kinase kinase 14

Chain B:

4   Data and refinement statistics   ⓘ

Property	Value	Source
Space group	P 41	Depositor
Cell constants a, b, c, α, β, γ	84.53Å 84.53Å 117.95Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	59.77 – 2.40 84.53 – 2.40	Depositor EDS
% Data completeness (in resolution range)	98.6 (59.77-2.40) 100.0 (84.53-2.40)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	0.09	Depositor
$< I/\sigma(I) >$ [1]	2.65 (at 2.40Å)	Xtriage
Refinement program	PHENIX 1.8.1_1168	Depositor
R, R_{free}	0.191 , 0.228 0.192 , 0.229	Depositor DCC
R_{free} test set	1644 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	32.2	Xtriage
Anisotropy	0.110	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.40 , 44.0	EDS
L-test for twinning[2]	$< \lvert L \rvert > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.037 for h,-k,-l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	10758	wwPDB-VP
Average B, all atoms (Å^2)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.42% 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 $< \lvert L \rvert >$, $< L^2 >$ 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: T28

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	0/2662	0.59	0/3604
1	B	0.36	0/2682	0.61	2/3632 (0.1%)
All	All	0.37	0/5344	0.60	2/7236 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	373	LYS	CD-CE-NZ	-9.53	89.77	111.70
1	B	509	ARG	NE-CZ-NH1	8.71	124.66	120.30

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	2596	2578	2562	105	0
1	B	2609	2594	2576	94	0
2	A	20	12	13	1	0
2	B	20	12	13	1	0
3	A	185	0	0	14	0
3	B	132	0	0	12	0
All	All	5562	5196	5164	190	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 18.

All (190) 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:335:GLU:O	1:A:339:HIS:ND1	1.78	1.14
1:A:363:ARG:HD2	1:A:368:ARG:NH2	1.77	1.00
1:B:632:GLU:OE1	1:B:635[A]:ARG:NH2	1.95	1.00
1:B:368:ARG:NH2	3:B:922:HOH:O	1.95	0.97
1:B:396:GLU:OE2	3:B:822:HOH:O	1.83	0.96
1:A:562:HIS:CE1	1:A:594:HIS:CE1	2.55	0.95
1:A:563:MET:SD	3:A:902:HOH:O	2.22	0.94
1:B:552:THR:CG2	1:B:572:SER:HA	1.98	0.93
1:B:552:THR:HG21	1:B:572:SER:HA	1.48	0.93
1:B:563:MET:SD	3:B:859:HOH:O	2.29	0.91
1:B:560:GLU:OE1	3:B:894:HOH:O	1.91	0.89
1:A:562:HIS:HE1	1:A:594:HIS:CE1	1.88	0.88
1:A:404:LEU:HD12	1:A:404:LEU:O	1.75	0.87
1:A:625:LEU:HD23	1:A:628:GLN:NE2	1.91	0.85
1:B:619:PRO:HG2	1:B:622:CYS:SG	2.18	0.83
1:A:601:ARG:NE	3:A:954:HOH:O	1.99	0.82
1:A:646:GLU:OE1	3:A:933:HOH:O	1.96	0.82
1:A:510:ARG:NH1	1:A:542:GLN:O	2.14	0.81
1:B:439:GLU:OE1	3:B:912:HOH:O	1.99	0.80
1:B:616:ARG:NH1	3:B:877:HOH:O	2.14	0.80
1:A:563:MET:HE3	1:A:567:VAL:HG11	1.63	0.79
1:A:363:ARG:HD2	1:A:368:ARG:HH21	1.46	0.79
1:A:552:THR:OG1	1:A:553:GLY:N	2.14	0.78
1:B:647:LEU:O	1:B:651:VAL:HG23	1.85	0.77
1:A:368:ARG:HG2	1:A:369:GLU:H	1.47	0.76
1:B:542:GLN:O	3:B:930:HOH:O	2.04	0.74
1:A:333:VAL:C	1:A:335:GLU:H	1.90	0.74
1:A:342:GLN:O	3:A:939:HOH:O	2.05	0.74
1:A:557:PRO:HA	1:A:563:MET:HE1	1.70	0.74
1:A:363:ARG:CD	1:A:368:ARG:HH21	2.01	0.74
1:A:512:LEU:HD23	1:A:539:VAL:HG13	1.70	0.74
1:A:335:GLU:O	1:A:339:HIS:CE1	2.41	0.73
1:B:557:PRO:HB3	1:B:563:MET:HE2	1.71	0.73
1:A:368:ARG:HG2	1:A:369:GLU:N	2.03	0.73
1:B:607:LYS:N	1:B:607:LYS:HD3	2.04	0.72
1:B:505:TYR:CZ	1:B:509:ARG:NH2	2.58	0.71
1:A:368:ARG:CG	1:A:369:GLU:H	2.02	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:598:GLN:OE1	1:A:673:ARG:NH1	2.22	0.71
1:A:601:ARG:NH2	3:A:954:HOH:O	2.23	0.71
1:A:557:PRO:HB3	1:A:563:MET:CE	2.20	0.71
1:A:373:LYS:HD3	1:B:597:THR:HG21	1.73	0.70
1:A:542:GLN:O	3:A:979:HOH:O	2.10	0.70
1:B:563:MET:HE3	1:B:567:VAL:HG11	1.72	0.70
1:A:601:ARG:CZ	3:A:954:HOH:O	2.38	0.70
1:A:568:VAL:HG13	1:A:605:CYS:SG	2.33	0.69
1:B:509:ARG:HH11	1:B:509:ARG:CG	2.05	0.69
1:A:333:VAL:C	1:A:335:GLU:N	2.46	0.69
1:B:632:GLU:OE1	1:B:635[A]:ARG:CZ	2.41	0.68
1:A:369:GLU:CB	1:A:370:PRO:CD	2.72	0.67
1:B:365:SER:O	1:B:366:ARG:CB	2.42	0.67
1:B:470:GLU:OE2	3:B:925:HOH:O	2.12	0.67
1:A:461:GLU:OE1	3:A:907:HOH:O	2.12	0.67
1:A:512:LEU:HD13	1:A:575:ALA:HA	1.75	0.67
1:B:365:SER:O	1:B:366:ARG:HB2	1.95	0.67
1:A:624:PRO:O	1:A:628:GLN:HG2	1.94	0.66
1:A:601:ARG:NE	1:A:601:ARG:HA	2.10	0.66
1:A:404:LEU:O	3:A:815:HOH:O	2.13	0.65
1:B:611:GLU:OE1	3:B:869:HOH:O	2.14	0.65
1:B:557:PRO:HB3	1:B:563:MET:CE	2.27	0.65
1:A:363:ARG:HD2	1:A:368:ARG:HH22	1.61	0.65
1:A:557:PRO:HB3	1:A:563:MET:HE2	1.77	0.65
1:B:595:PRO:O	1:B:617:GLU:OE2	2.15	0.63
1:B:512:LEU:HG	1:B:539:VAL:HG13	1.79	0.63
1:A:363:ARG:CD	1:A:368:ARG:NH2	2.56	0.62
1:B:449:SER:HB2	1:B:505:TYR:CD1	2.35	0.62
1:A:616:ARG:HB3	3:A:895:HOH:O	1.99	0.61
1:B:650:LYS:HD3	1:B:653:ARG:NH1	2.15	0.61
1:B:557:PRO:HA	1:B:563:MET:HE1	1.81	0.61
1:B:632:GLU:CD	1:B:635[A]:ARG:NH2	2.54	0.61
1:A:366:ARG:NH1	1:A:367:SER:O	2.34	0.60
1:B:557:PRO:CB	1:B:563:MET:HE2	2.31	0.60
1:A:594:HIS:CG	1:B:373:LYS:HE3	2.37	0.60
1:B:483:GLU:OE2	1:B:666:ARG:HD2	2.01	0.60
1:B:490:ASP:OD1	1:B:663:SER:OG	2.19	0.60
1:B:512:LEU:C	1:B:512:LEU:HD12	2.22	0.59
1:A:671:GLU:OE1	3:A:959:HOH:O	2.17	0.58
1:A:557:PRO:CB	1:A:563:MET:HE2	2.33	0.58
1:A:333:VAL:O	1:A:335:GLU:N	2.33	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:628:GLN:O	1:B:632:GLU:HG2	2.04	0.58
1:B:496:LEU:HD22	1:B:500:LEU:CD1	2.33	0.57
1:B:552:THR:HG23	1:B:553:GLY:N	2.18	0.57
1:A:368:ARG:CG	1:A:369:GLU:N	2.65	0.57
1:A:574:ASP:OD1	3:A:845:HOH:O	2.17	0.57
1:A:369:GLU:CB	1:A:370:PRO:HD2	2.35	0.56
1:A:375:GLU:OE1	1:B:408:ARG:NH2	2.38	0.56
1:B:509:ARG:HH11	1:B:509:ARG:HG3	1.70	0.56
1:B:552:THR:HG22	1:B:572:SER:HA	1.84	0.56
1:B:526:ASP:OD1	1:B:528:SER:OG	2.17	0.55
1:B:595:PRO:O	1:B:617:GLU:OE1	2.24	0.55
1:A:522:LEU:HD22	1:A:533:CYS:HB3	1.88	0.55
1:A:369:GLU:HB3	1:A:370:PRO:CD	2.35	0.55
1:B:639:ILE:HD12	1:B:639:ILE:H	1.71	0.55
1:A:594:HIS:CE1	1:B:373:LYS:HZ1	2.26	0.54
1:B:440:GLU:HG2	1:B:467:ILE:CD1	2.37	0.54
1:A:594:HIS:CG	1:B:373:LYS:CE	2.91	0.54
1:B:368:ARG:HG2	1:B:369:GLU:H	1.73	0.54
1:B:413:GLU:OE1	3:B:897:HOH:O	2.19	0.54
1:B:449:SER:HB2	1:B:505:TYR:CE1	2.43	0.53
1:A:477:LEU:HB2	1:A:521:VAL:HG22	1.89	0.53
1:B:365:SER:O	1:B:366:ARG:CG	2.56	0.53
1:B:568:VAL:HG21	1:B:605:CYS:HA	1.91	0.53
1:A:639:ILE:HD12	1:A:639:ILE:H	1.74	0.53
1:A:373:LYS:CD	1:B:597:THR:HG21	2.37	0.53
1:B:369:GLU:HB3	1:B:370:PRO:HD2	1.91	0.53
1:A:447:LEU:HG	1:A:505:TYR:HE2	1.73	0.53
1:A:557:PRO:HA	1:A:563:MET:CE	2.38	0.52
1:A:625:LEU:CD2	1:A:628:GLN:NE2	2.69	0.52
1:B:595:PRO:O	1:B:617:GLU:CD	2.48	0.52
1:A:557:PRO:CA	1:A:563:MET:CE	2.88	0.52
1:A:381:LEU:HG	1:A:386:LEU:HB3	1.92	0.52
2:A:701:T28:H6	2:A:701:T28:N8	2.25	0.51
1:B:557:PRO:HA	1:B:563:MET:CE	2.39	0.51
1:B:503:LEU:HD13	1:B:532:LEU:HD11	1.92	0.51
1:B:509:ARG:O	1:B:510:ARG:HB2	2.11	0.51
1:A:594:HIS:ND1	1:B:373:LYS:CE	2.74	0.51
1:A:594:HIS:CD2	1:B:373:LYS:HZ1	2.30	0.50
1:B:509:ARG:HH11	1:B:509:ARG:HG2	1.77	0.50
1:B:447:LEU:HG	1:B:505:TYR:HE2	1.77	0.49
2:B:701:T28:N8	2:B:701:T28:H6	2.26	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:369:GLU:HB3	1:B:370:PRO:CD	2.42	0.49
1:A:625:LEU:HD23	1:A:628:GLN:HE21	1.74	0.49
1:A:522:LEU:HD22	1:A:533:CYS:CB	2.43	0.49
1:B:598:GLN:OE1	1:B:673:ARG:NH1	2.38	0.49
1:A:562:HIS:CE1	1:A:594:HIS:ND1	2.81	0.49
1:A:373:LYS:HG3	1:A:374:THR:N	2.28	0.49
1:A:439:GLU:HA	1:A:442:MET:HB2	1.94	0.49
1:A:389:VAL:HG22	1:A:398:HIS:CE1	2.47	0.49
1:A:594:HIS:CD2	1:B:373:LYS:NZ	2.81	0.49
1:B:552:THR:OG1	1:B:553:GLY:N	2.33	0.49
1:A:557:PRO:CB	1:A:563:MET:CE	2.87	0.48
1:B:368:ARG:NH1	3:B:861:HOH:O	2.45	0.48
1:B:496:LEU:HD22	1:B:500:LEU:HD11	1.94	0.48
1:B:444:CYS:HA	1:B:447:LEU:HD22	1.95	0.48
1:A:444:CYS:HA	1:A:447:LEU:HD22	1.96	0.48
1:A:394:ARG:H	1:A:398:HIS:HD2	1.63	0.47
1:B:490:ASP:OD2	1:B:663:SER:OG	2.31	0.47
1:A:353:LEU:HD11	1:A:458:ALA:HB3	1.97	0.47
1:B:365:SER:O	1:B:366:ARG:HG2	2.14	0.47
1:B:395:GLU:O	1:B:396:GLU:HB2	2.15	0.47
1:B:484:GLN:OE1	1:B:487:LEU:HD22	2.15	0.47
1:B:512:LEU:HD12	1:B:514:GLY:N	2.29	0.47
1:A:373:LYS:HE2	1:A:374:THR:CG2	2.46	0.46
1:B:592:GLY:HA3	1:B:672:PRO:HB3	1.97	0.46
1:A:665:TRP:CE3	1:A:665:TRP:C	2.89	0.46
1:A:557:PRO:CA	1:A:563:MET:HE1	2.45	0.46
1:A:510:ARG:NH1	3:A:979:HOH:O	2.44	0.45
1:A:440:GLU:HG2	1:A:467:ILE:CD1	2.46	0.45
1:B:461:GLU:OE1	3:B:855:HOH:O	2.21	0.45
1:B:557:PRO:CA	1:B:563:MET:CE	2.93	0.45
1:A:395:GLU:O	1:A:396:GLU:HB2	2.16	0.45
1:B:527:GLY:HA3	1:B:665:TRP:CE3	2.51	0.45
1:B:552:THR:CG2	1:B:553:GLY:N	2.78	0.45
1:A:480:LEU:HD13	1:A:487:LEU:HD21	1.99	0.45
1:A:373:LYS:HG3	1:A:374:THR:CG2	2.46	0.45
1:A:406:LEU:HD11	1:A:471:LEU:CD1	2.47	0.45
1:A:369:GLU:HB2	1:A:370:PRO:HD2	1.99	0.44
1:B:498:GLN:O	1:B:501:GLU:HB2	2.16	0.44
1:B:658:VAL:HG12	1:B:658:VAL:O	2.17	0.44
1:A:568:VAL:HG22	1:A:605:CYS:SG	2.58	0.44
1:A:568:VAL:HG11	1:A:605:CYS:O	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:598:GLN:OE1	1:A:673:ARG:HD2	2.17	0.44
1:B:505:TYR:CE1	1:B:509:ARG:NH2	2.86	0.44
1:A:369:GLU:HB3	1:A:370:PRO:HD2	1.98	0.43
1:A:601:ARG:HD3	1:A:602:GLY:H	1.83	0.43
1:B:490:ASP:CG	1:B:663:SER:OG	2.55	0.43
1:A:602:GLY:HA2	1:A:603:PRO:C	2.39	0.43
1:B:509:ARG:CG	1:B:509:ARG:NH1	2.71	0.43
1:A:562:HIS:HE1	1:A:594:HIS:ND1	2.12	0.43
1:A:637:GLU:HA	1:A:638:PRO:HD2	1.89	0.43
1:B:574:ASP:C	1:B:574:ASP:OD1	2.57	0.42
1:B:458:ALA:HA	1:B:466:ASN:O	2.19	0.42
1:A:607:LYS:N	1:A:607:LYS:HD2	2.35	0.42
1:A:605:CYS:HB2	3:A:898:HOH:O	2.19	0.42
1:A:628:GLN:HG2	1:A:628:GLN:H	1.70	0.42
1:A:628:GLN:O	1:A:632:GLU:HG3	2.20	0.42
1:B:632:GLU:OE2	1:B:635[A]:ARG:NH2	2.53	0.41
1:A:594:HIS:CG	1:B:373:LYS:NZ	2.88	0.41
1:A:333:VAL:O	1:A:334:GLU:HB3	2.19	0.41
1:A:512:LEU:HD12	1:A:578:ASP:OD2	2.21	0.41
1:A:607:LYS:HD2	1:A:607:LYS:H	1.85	0.41
1:B:381:LEU:HG	1:B:386:LEU:HB3	2.02	0.41
1:A:373:LYS:CG	1:A:374:THR:N	2.83	0.41
1:A:430:LYS:HB2	1:A:430:LYS:HE2	1.95	0.41
1:B:594:HIS:HB3	1:B:595:PRO:HD2	2.03	0.41
1:B:659:GLY:O	1:B:662:LYS:NZ	2.46	0.41
1:A:594:HIS:ND1	1:B:373:LYS:HE3	2.36	0.41
1:B:524:SER:HG	1:B:529:HIS:H	1.68	0.41
1:B:495:TYR:OH	1:B:665:TRP:CZ3	2.74	0.41
1:A:385:LYS:HD2	1:A:385:LYS:HA	1.87	0.40
1:A:333:VAL:O	1:A:333:VAL:HG13	2.21	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	331/356 (93%)	319 (96%)	11 (3%)	1 (0%)	41	55
1	B	333/356 (94%)	321 (96%)	9 (3%)	3 (1%)	17	25
All	All	664/712 (93%)	640 (96%)	20 (3%)	4 (1%)	25	36

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	366	ARG
1	B	534	ASP
1	A	665	TRP
1	B	667	GLY

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	278/293 (95%)	252 (91%)	26 (9%)	8	13
1	B	280/293 (96%)	252 (90%)	28 (10%)	7	11
All	All	558/586 (95%)	504 (90%)	54 (10%)	8	12

All (54) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	337	LEU
1	A	363	ARG
1	A	369	GLU
1	A	374	THR
1	A	381	LEU
1	A	382	LEU
1	A	386	LEU
1	A	389	VAL
1	A	433	LEU

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Mol	Chain	Res	Type
1	A	473[A]	GLU
1	A	473[B]	GLU
1	A	480	LEU
1	A	486	CYS
1	A	496	LEU
1	A	503	LEU
1	A	521	VAL
1	A	522	LEU
1	A	523	LEU
1	A	539	VAL
1	A	541	LEU
1	A	542	GLN
1	A	552	THR
1	A	607	LYS
1	A	616	ARG
1	A	639	ILE
1	A	665	TRP
1	B	349	GLN
1	B	354	THR
1	B	363	ARG
1	B	381	LEU
1	B	382	LEU
1	B	386	LEU
1	B	418	GLU
1	B	433	LEU
1	B	473[A]	GLU
1	B	473[B]	GLU
1	B	480	LEU
1	B	483	GLU
1	B	496	LEU
1	B	503	LEU
1	B	509	ARG
1	B	512	LEU
1	B	523	LEU
1	B	524	SER
1	B	539	VAL
1	B	542	GLN
1	B	568	VAL
1	B	606	LEU
1	B	607	LYS
1	B	616	ARG
1	B	621	SER

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Mol	Chain	Res	Type
1	B	656	GLN
1	B	663	SER
1	B	666	ARG

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

Mol	Chain	Res	Type
1	A	398	HIS
1	A	529	HIS
1	A	562	HIS
1	A	628	GLN
1	B	398	HIS
1	B	529	HIS

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 ⓘ

2 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	T28	B	701	-	21,23,23	1.11	2 (9%)	24,34,34	2.77	6 (25%)
2	T28	A	701	-	21,23,23	1.12	2 (9%)	24,34,34	2.96	7 (29%)

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	T28	B	701	-	-	-	0/4/4/4
2	T28	A	701	-	-	-	0/4/4/4

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	T28	C1-C2	-2.97	1.40	1.47
2	B	701	T28	C1-C2	-2.62	1.41	1.47
2	B	701	T28	C6-C12	2.35	1.40	1.36
2	A	701	T28	C6-C12	2.02	1.39	1.36

All (13) bond angle outliers are listed below:

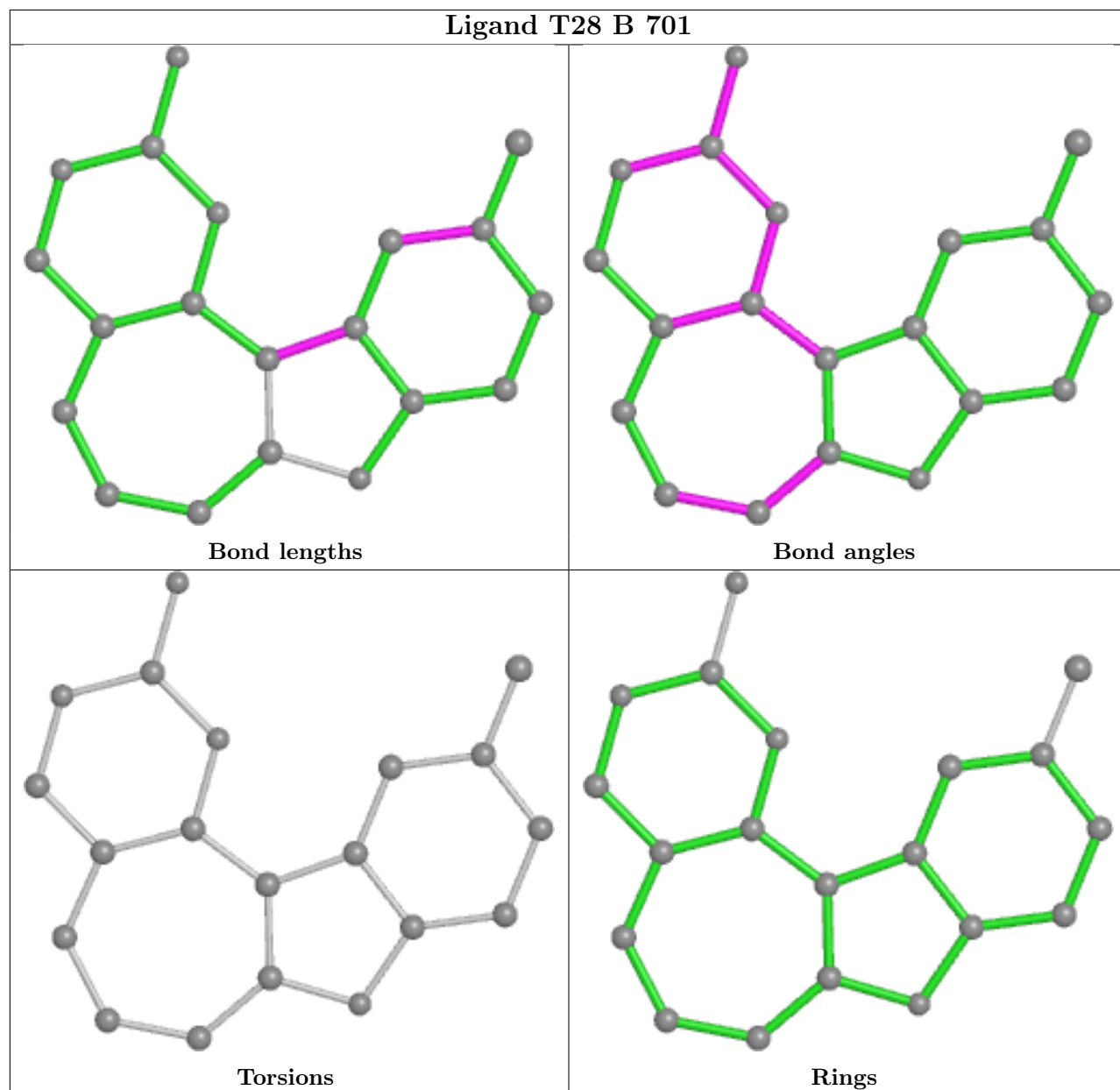| Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	701	T28	C16-C10-C4	-9.00	105.67	114.08
2	B	701	T28	C16-C10-C4	-6.83	107.69	114.08
2	B	701	T28	C3-N8-C15	5.81	123.06	117.22
2	B	701	T28	C1-C3-C7	5.66	127.27	120.77
2	A	701	T28	C3-N8-C15	5.35	122.60	117.22
2	A	701	T28	C1-C3-C7	5.26	126.81	120.77
2	A	701	T28	N19-C15-N8	-4.65	120.04	125.70
2	B	701	T28	N19-C15-N8	-4.57	120.14	125.70
2	B	701	T28	C7-C3-N8	-4.48	117.20	122.67
2	A	701	T28	C7-C3-N8	-3.77	118.07	122.67
2	A	701	T28	N20-C15-N19	2.89	120.37	117.44
2	B	701	T28	N20-C15-N19	2.74	120.22	117.44
2	A	701	T28	C14-C7-C13	-2.01	114.98	119.43

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	701	T28	1	0
2	A	701	T28	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 T28 B 701

Bond lengths

Bond angles

Torsions

Rings

Ligand T28 A 701

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	334/356 (93%)	-0.04	8 (2%)	59	57	12, 26, 58, 107	0
1	B	335/356 (94%)	0.02	6 (1%)	68	66	16, 33, 60, 110	0
All	All	669/712 (93%)	-0.01	14 (2%)	63	61	12, 29, 60, 110	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	367	SER	4.7
1	A	404	LEU	3.6
1	A	552	THR	3.5
1	A	336	TYR	3.4
1	B	368	ARG	3.1
1	B	336	TYR	2.8
1	B	640	HIS	2.7
1	A	337	LEU	2.5
1	A	368	ARG	2.4
1	A	403	GLN	2.4
1	B	623	ALA	2.4
1	B	366	ARG	2.2
1	A	601	ARG	2.2
1	A	594	HIS	2.1

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

There are no non-standard protein/DNA/RNA residues in this entry.
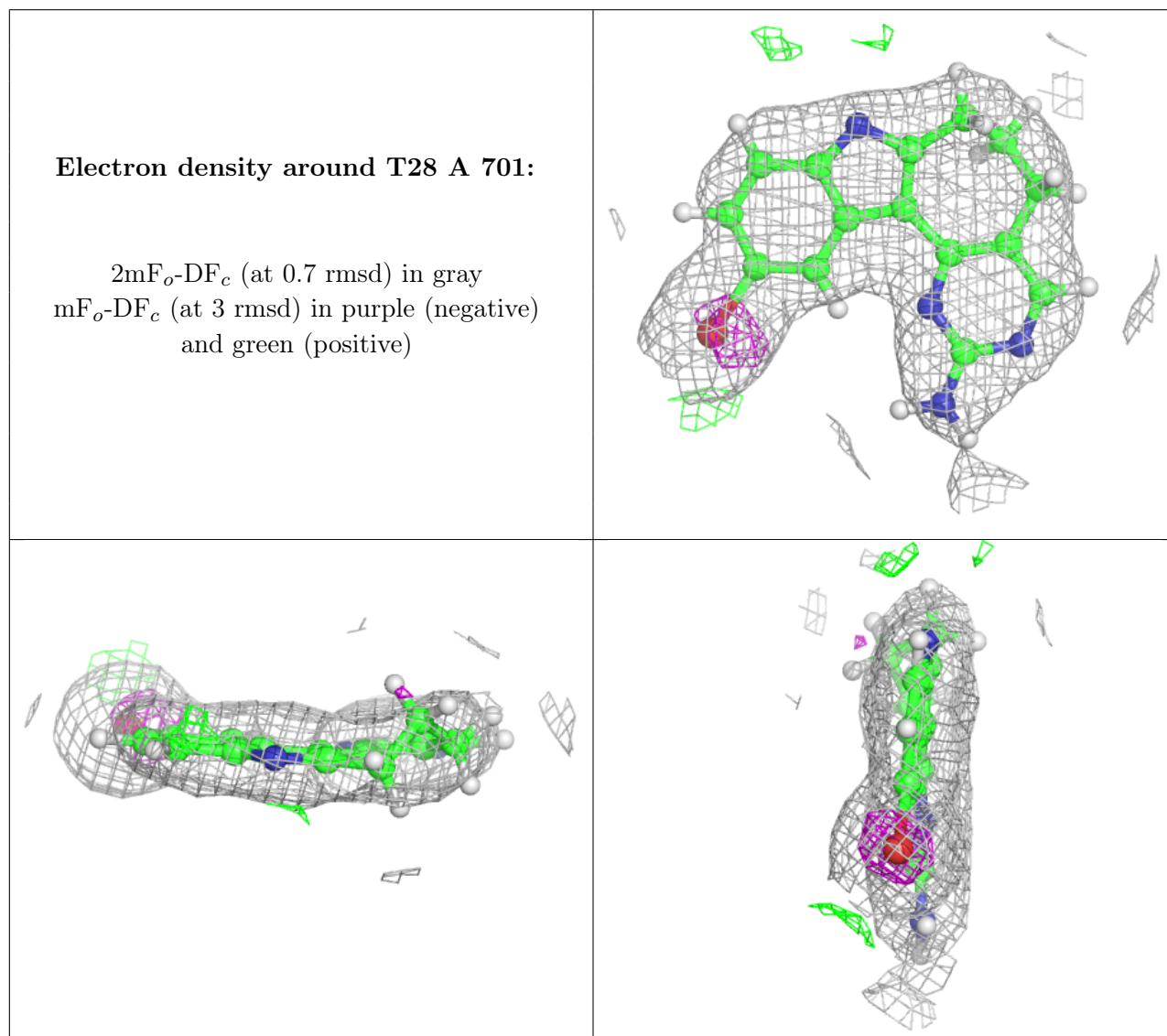
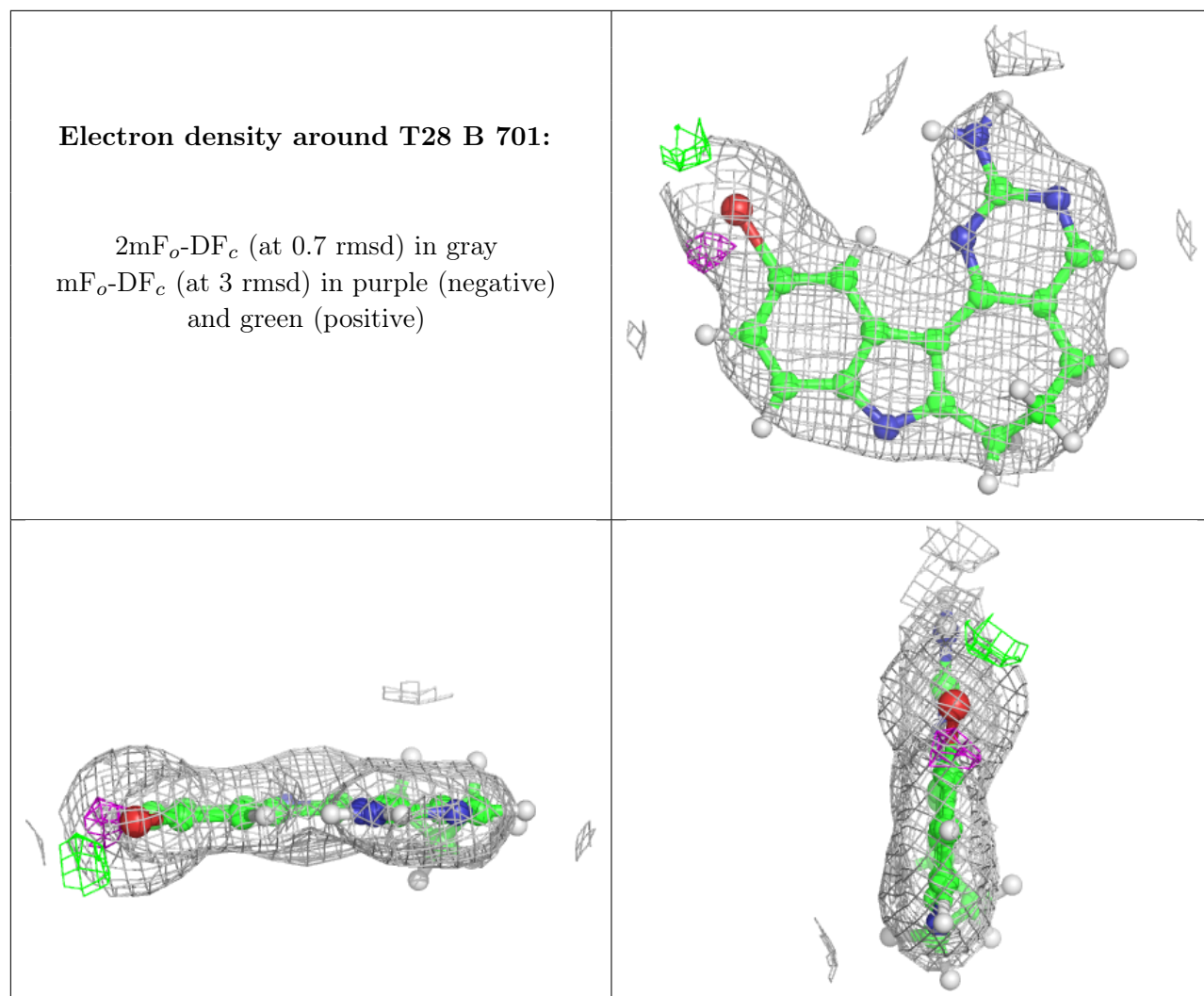## 6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands (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
2	T28	A	701	20/20	0.98	0.15	13,20,26,31	0
2	T28	B	701	20/20	0.99	0.13	20,27,37,39	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 T28 A 701:

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

Electron density around T28 B 701:

$2mF_o$-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.