



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 12, 2023 – 07:37 PM EDT

PDB ID : 4O4G
Title : Crystal Structure of HIV-1 Reverse Transcriptase in complex with 4-((4-(methylamino)-1,3,5-triazin-2-yl)amino)benzotrile (JLJ527), a non-nucleoside inhibitor
Authors : Mislak, A.C.; Frey, K.M.
Deposited on : 2013-12-18
Resolution : 2.71 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : 2.35.1
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35.1

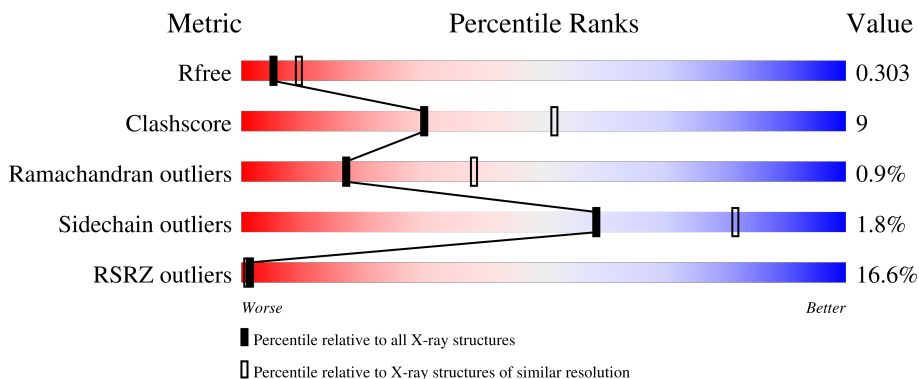
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.71 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3359 (2.74-2.70)
Clashscore	141614	3686 (2.74-2.70)
Ramachandran outliers	138981	3622 (2.74-2.70)
Sidechain outliers	138945	3623 (2.74-2.70)
RSRZ outliers	127900	3276 (2.74-2.70)

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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	557	
2	B	428	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 8104 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 HIV-1 reverse transcriptase, p66 subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	554	4505	2917	748	832	8	0	0	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	expression tag	UNP P03366
A	0	VAL	-	expression tag	UNP P03366
A	172	ALA	LYS	engineered mutation	UNP P03366
A	173	ALA	LYS	engineered mutation	UNP P03366
A	280	SER	CYS	engineered mutation	UNP P03366

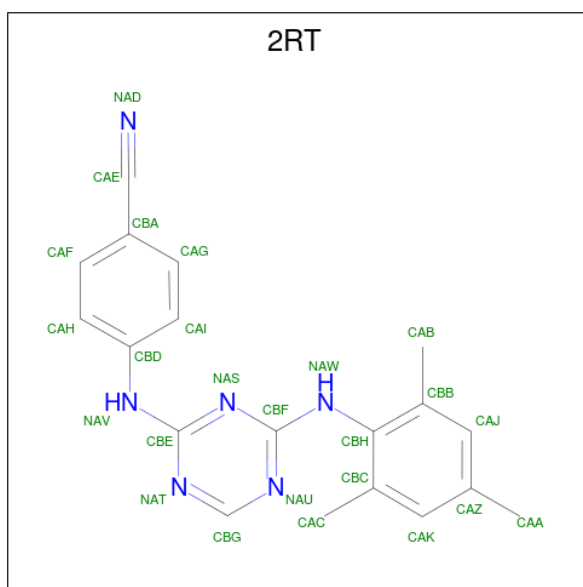
- Molecule 2 is a protein called HIV-1 reverse transcriptase, p51 subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	428	3539	2305	586	641	7	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	280	SER	CYS	engineered mutation	UNP P03366

- Molecule 3 is 4-({4-[(2,4,6-trimethylphenyl)amino]-1,3,5-triazin-2-yl}amino)benzotrile (three-letter code: 2RT) (formula: C₁₉H₁₈N₆).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	C N		
3	A	1	25	19 6	0	0

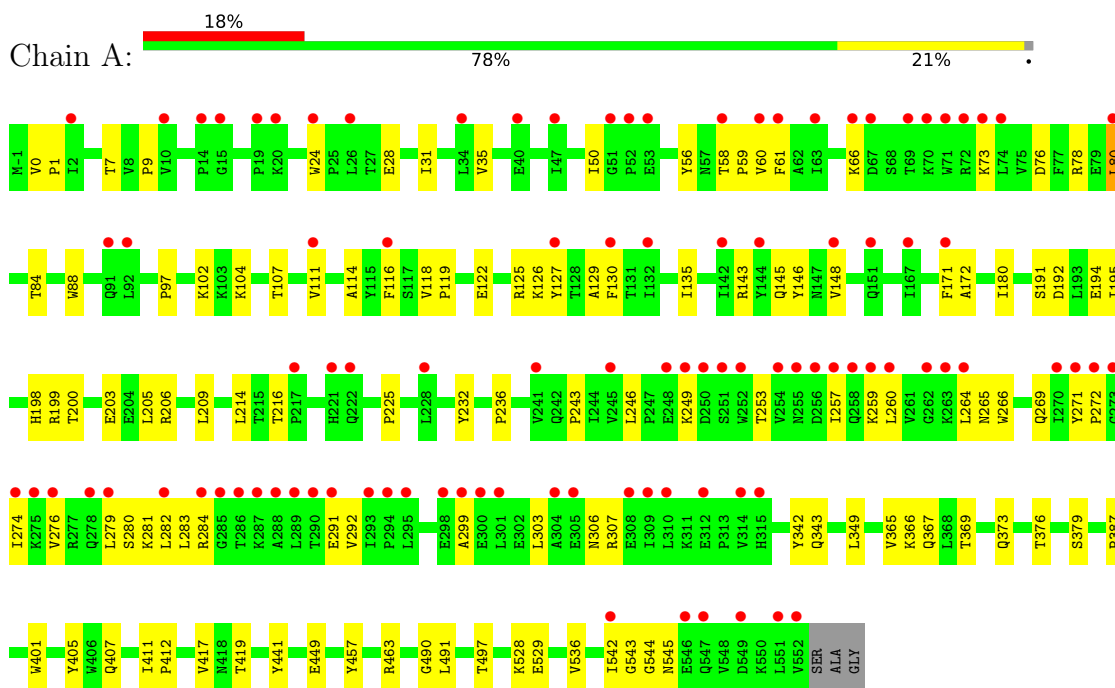
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	22	Total O 22 22	0	0
4	B	13	Total O 13 13	0	0

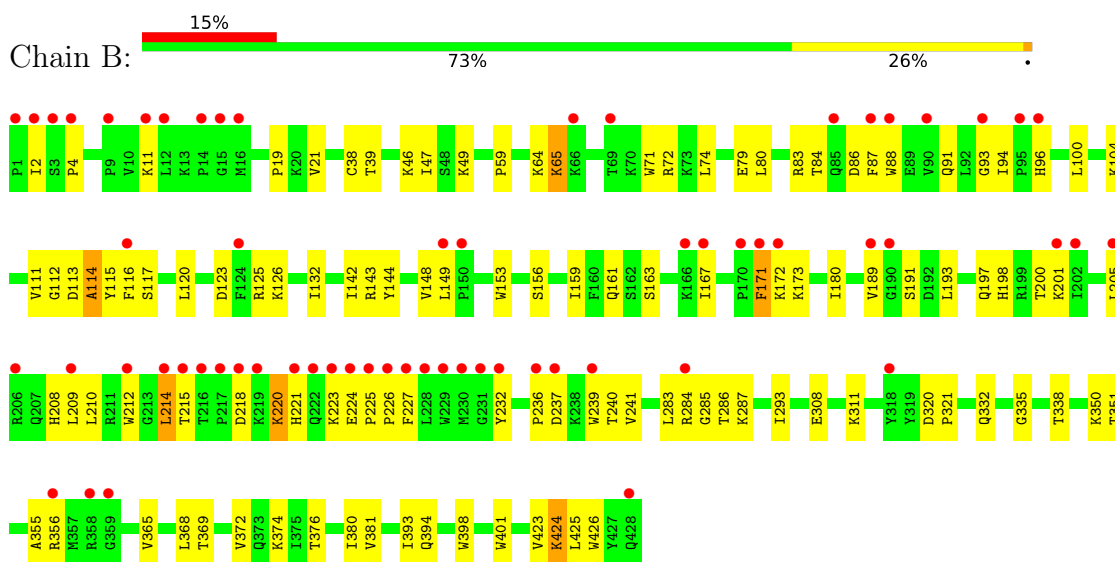
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: HIV-1 reverse transcriptase, p66 subunit



- Molecule 2: HIV-1 reverse transcriptase, p51 subunit



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	163.04Å 73.40Å 109.73Å 90.00° 100.06° 90.00°	Depositor
Resolution (Å)	43.24 – 2.71 43.24 – 2.71	Depositor EDS
% Data completeness (in resolution range)	98.5 (43.24-2.71) 95.8 (43.24-2.71)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	0.07	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.00 (at 2.73Å)	Xtrriage
Refinement program	PHENIX 1.8_1069	Depositor
R, R_{free}	0.236 , 0.299 0.239 , 0.303	Depositor DCC
R_{free} test set	2000 reflections (5.83%)	wwPDB-VP
Wilson B-factor (Å ²)	66.8	Xtrriage
Anisotropy	0.366	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 53.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	8104	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.14% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 2RT

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	0.27	0/4623	0.45	0/6284
2	B	0.27	0/3644	0.48	0/4952
All	All	0.27	0/8267	0.46	0/11236

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	4505	0	4562	80	0
2	B	3539	0	3576	80	0
3	A	25	0	18	2	0
4	A	22	0	0	1	0
4	B	13	0	0	3	0
All	All	8104	0	8156	151	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 9.

All (151) 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:544:GLY:HA2	2:B:286:THR:HG22	1.57	0.86
1:A:281:LYS:HB2	1:A:284:ARG:HE	1.52	0.74
1:A:50:ILE:HD13	1:A:145:GLN:HG3	1.71	0.71
2:B:116:PHE:HB2	2:B:224:GLU:HG3	1.73	0.69
2:B:114:ALA:HB3	2:B:224:GLU:HB2	1.76	0.68
1:A:28:GLU:HG3	1:A:135:ILE:HD12	1.79	0.65
1:A:491:LEU:HB3	1:A:529:GLU:HG3	1.79	0.64
1:A:259:LYS:HZ2	1:A:265:ASN:HB2	1.65	0.62
2:B:380:ILE:HG12	4:B:509:HOH:O	2.01	0.61
1:A:543:GLY:H	2:B:283:LEU:HB3	1.66	0.61
1:A:249:LYS:NZ	4:A:712:HOH:O	2.33	0.61
2:B:241:VAL:HG22	2:B:350:LYS:HA	1.83	0.60
2:B:214:LEU:HD22	2:B:226:PRO:HB3	1.84	0.60
1:A:246:LEU:HD11	1:A:264:LEU:HD21	1.84	0.60
2:B:191:SER:OG	2:B:198:HIS:ND1	2.27	0.60
3:A:601:2RT:H5	3:A:601:2RT:NAS	2.18	0.59
1:A:542:ILE:HG23	2:B:283:LEU:HD13	1.85	0.59
1:A:343:GLN:HG3	1:A:349:LEU:HD11	1.84	0.59
2:B:424:LYS:HD3	2:B:425:LEU:HG	1.84	0.59
2:B:218:ASP:HB2	2:B:221:HIS:HB2	1.85	0.59
1:A:544:GLY:N	2:B:285:GLY:O	2.35	0.59
2:B:180:ILE:HG12	2:B:189:VAL:HG22	1.85	0.59
2:B:193:LEU:HD13	2:B:201:LYS:HE3	1.83	0.59
1:A:303:LEU:HD23	1:A:306:ASN:HD22	1.68	0.58
1:A:259:LYS:HA	1:A:260:LEU:HB2	1.86	0.57
1:A:417:VAL:HG22	1:A:419:THR:HG23	1.86	0.56
1:A:225:PRO:HB3	1:A:236:PRO:HD3	1.87	0.56
1:A:80:LEU:HD22	1:A:127:TYR:CZ	2.41	0.56
2:B:80:LEU:O	2:B:84:THR:N	2.39	0.56
1:A:536:VAL:HB	1:A:542:ILE:HD13	1.88	0.56
2:B:210:LEU:HD12	2:B:214:LEU:HD12	1.87	0.55
2:B:104:LYS:HA	2:B:237:ASP:HB2	1.88	0.55
1:A:236:PRO:HA	3:A:601:2RT:H3	1.89	0.54
1:A:88:TRP:CD1	2:B:143:ARG:HD2	2.43	0.54
2:B:79:GLU:OE2	2:B:83:ARG:NE	2.41	0.54
2:B:86:ASP:O	2:B:88:TRP:N	2.40	0.54
1:A:209:LEU:HB3	1:A:214:LEU:HB2	1.89	0.53
1:A:405:TYR:CE2	1:A:407:GLN:HB2	2.43	0.53
1:A:195:ILE:O	1:A:199:ARG:HB2	2.08	0.53
2:B:113:ASP:HB3	2:B:214:LEU:HD21	1.92	0.52
1:A:195:ILE:HG13	1:A:199:ARG:HD2	1.90	0.52
1:A:457:TYR:HE1	1:A:463:ARG:HG2	1.74	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:116:PHE:HB3	2:B:223:LYS:HA	1.91	0.52
2:B:241:VAL:HG13	2:B:351:THR:HG23	1.90	0.51
1:A:111:VAL:HB	1:A:114:ALA:HB3	1.91	0.51
2:B:91:GLN:HG3	2:B:161:GLN:HG3	1.93	0.51
1:A:191:SER:OG	1:A:198:HIS:ND1	2.38	0.51
1:A:56:TYR:O	1:A:143:ARG:NH2	2.26	0.50
1:A:73:LYS:NZ	1:A:146:TYR:OH	2.43	0.50
2:B:112:GLY:C	2:B:114:ALA:HB2	2.31	0.50
1:A:266:TRP:O	1:A:269:GLN:NE2	2.44	0.49
1:A:246:LEU:O	1:A:307:ARG:NH1	2.40	0.49
2:B:120:LEU:HD23	2:B:125:ARG:HG2	1.93	0.49
2:B:116:PHE:O	2:B:117:SER:OG	2.22	0.48
1:A:203:GLU:CD	1:A:206:ARG:HH12	2.15	0.48
1:A:209:LEU:HD12	1:A:216:THR:HG21	1.95	0.48
1:A:279:LEU:HD23	1:A:299:ALA:HB1	1.94	0.48
2:B:21:VAL:HB	2:B:59:PRO:HD3	1.95	0.48
2:B:356:ARG:HD2	2:B:374:LYS:HZ2	1.78	0.48
1:A:373:GLN:OE1	2:B:401:TRP:NE1	2.43	0.48
1:A:80:LEU:HD13	1:A:127:TYR:CE2	2.49	0.48
2:B:376:THR:O	2:B:380:ILE:HG13	2.14	0.48
1:A:104:LYS:HB2	1:A:192:ASP:HA	1.96	0.47
1:A:490:GLY:O	1:A:528:LYS:NZ	2.42	0.47
2:B:232:TYR:OH	2:B:356:ARG:NH1	2.47	0.47
1:A:60:VAL:HG11	1:A:130:PHE:HD1	1.80	0.47
1:A:543:GLY:H	2:B:283:LEU:CB	2.26	0.47
2:B:374:LYS:HB2	2:B:374:LYS:HE3	1.70	0.46
1:A:76:ASP:OD1	1:A:78:ARG:HG3	2.15	0.46
2:B:116:PHE:HD1	2:B:148:VAL:HG21	1.79	0.46
2:B:2:ILE:HG22	2:B:4:PRO:HD3	1.98	0.46
2:B:197:GLN:O	2:B:200:THR:OG1	2.31	0.46
2:B:212:TRP:HA	2:B:220:LYS:HG3	1.98	0.46
2:B:163:SER:O	2:B:167:ILE:HG13	2.16	0.46
1:A:58:THR:N	1:A:129:ALA:O	2.50	0.45
1:A:200:THR:HA	1:A:203:GLU:HG2	1.98	0.45
1:A:271:TYR:CD1	1:A:274:ILE:HG13	2.51	0.45
2:B:115:TYR:HB3	2:B:149:LEU:HB2	1.99	0.45
1:A:24:TRP:HB2	1:A:61:PHE:CZ	2.52	0.45
1:A:257:ILE:HG21	1:A:282:LEU:HD12	1.99	0.45
2:B:49:LYS:HE3	2:B:142:ILE:HG23	1.99	0.45
2:B:47:ILE:HD12	2:B:144:TYR:CG	2.52	0.44
2:B:224:GLU:HB3	2:B:225:PRO:HD2	1.98	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:80:LEU:O	1:A:84:THR:OG1	2.26	0.44
1:A:369:THR:O	1:A:373:GLN:HG2	2.17	0.44
1:A:281:LYS:HD2	1:A:284:ARG:HH21	1.82	0.44
2:B:236:PRO:HA	2:B:239:TRP:HD1	1.83	0.44
1:A:379:SER:CB	1:A:387:PRO:HD3	2.47	0.44
2:B:100:LEU:HG	2:B:381:VAL:HG13	2.00	0.44
1:A:441:TYR:CG	1:A:544:GLY:HA3	2.53	0.43
1:A:107:THR:OG1	1:A:198:HIS:NE2	2.41	0.43
1:A:407:GLN:OE1	2:B:394:GLN:HG2	2.18	0.43
1:A:411:ILE:HG22	1:A:412:PRO:O	2.18	0.43
1:A:543:GLY:HA2	2:B:284:ARG:HA	1.98	0.43
1:A:172:ALA:HB2	1:A:180:ILE:HD12	2.00	0.43
2:B:172:LYS:N	4:B:505:HOH:O	2.51	0.43
2:B:369:THR:HG22	2:B:398:TRP:CZ3	2.53	0.43
2:B:11:LYS:HE3	2:B:11:LYS:HB2	1.85	0.43
2:B:308:GLU:HA	2:B:311:LYS:HE2	2.00	0.43
1:A:126:LYS:HA	1:A:145:GLN:NE2	2.33	0.43
1:A:59:PRO:HB2	1:A:61:PHE:CE2	2.53	0.43
1:A:376:THR:HG21	2:B:401:TRP:CZ2	2.54	0.43
2:B:393:ILE:HD13	2:B:398:TRP:HB2	1.99	0.43
1:A:366:LYS:HE2	1:A:405:TYR:OH	2.18	0.43
2:B:116:PHE:CD1	2:B:148:VAL:HG11	2.52	0.43
1:A:114:ALA:HB2	1:A:214:LEU:HB3	2.01	0.43
2:B:123:ASP:O	2:B:126:LYS:NZ	2.51	0.43
2:B:332:GLN:HG3	2:B:338:THR:HG23	2.01	0.43
1:A:199:ARG:O	1:A:203:GLU:HG2	2.20	0.42
2:B:65:LYS:HG3	2:B:72:ARG:HH11	1.85	0.42
2:B:311:LYS:HB2	2:B:311:LYS:HE3	1.84	0.42
2:B:225:PRO:HA	2:B:226:PRO:HD3	1.65	0.42
2:B:74:LEU:HD12	4:B:502:HOH:O	2.19	0.42
2:B:320:ASP:HA	2:B:321:PRO:HD3	1.79	0.42
1:A:342:TYR:HA	1:A:349:LEU:HD13	2.01	0.42
2:B:38:CYS:SG	2:B:132:ILE:HD11	2.60	0.42
1:A:0:VAL:HA	1:A:1:PRO:HD3	1.85	0.42
2:B:287:LYS:HD3	2:B:293:ILE:HD11	2.01	0.41
1:A:80:LEU:O	1:A:127:TYR:OH	2.34	0.41
2:B:19:PRO:HG3	2:B:80:LEU:HB2	2.02	0.41
2:B:208:HIS:HD1	2:B:209:LEU:HD23	1.85	0.41
2:B:365:VAL:O	2:B:369:THR:HG23	2.20	0.41
1:A:118:VAL:HA	1:A:119:PRO:HD3	1.91	0.41
1:A:122:GLU:HA	1:A:125:ARG:HG3	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:72:ARG:HD2	2:B:227:PHE:CE2	2.55	0.41
2:B:224:GLU:CB	2:B:225:PRO:HD2	2.51	0.41
2:B:335:GLY:O	2:B:355:ALA:HA	2.20	0.41
1:A:114:ALA:HA	1:A:214:LEU:HD22	2.01	0.41
1:A:171:PHE:CD2	1:A:205:LEU:HD13	2.56	0.41
1:A:271:TYR:HA	1:A:272:PRO:HD3	1.75	0.41
1:A:276:VAL:O	1:A:280:SER:OG	2.23	0.41
2:B:113:ASP:N	2:B:114:ALA:HA	2.35	0.41
2:B:218:ASP:HA	2:B:220:LYS:N	2.35	0.41
1:A:7:THR:HG22	1:A:119:PRO:HB2	2.03	0.41
2:B:64:LYS:HE3	2:B:71:TRP:CE2	2.56	0.41
1:A:116:PHE:HD2	1:A:148:VAL:HG21	1.84	0.41
2:B:46:LYS:HZ1	2:B:224:GLU:HA	1.86	0.41
1:A:31:ILE:O	1:A:35:VAL:HG23	2.21	0.41
1:A:253:THR:HG22	1:A:292:VAL:HG22	2.03	0.41
1:A:303:LEU:HA	1:A:306:ASN:HB2	2.02	0.41
1:A:365:VAL:HG11	1:A:401:TRP:CG	2.56	0.41
1:A:441:TYR:CD2	1:A:544:GLY:HA3	2.56	0.41
2:B:149:LEU:HD21	2:B:159:ILE:HD12	2.02	0.41
1:A:97:PRO:HG2	1:A:232:TYR:CD2	2.55	0.41
2:B:171:PHE:C	2:B:173:LYS:H	2.25	0.41
2:B:153:TRP:HB3	2:B:156:SER:OG	2.20	0.40
1:A:401:TRP:O	1:A:405:TYR:HB2	2.22	0.40
2:B:240:THR:OG1	2:B:241:VAL:N	2.55	0.40
2:B:368:LEU:O	2:B:372:VAL:HG23	2.21	0.40
2:B:423:VAL:HG12	2:B:426:TRP:CE3	2.56	0.40
2:B:205:LEU:O	2:B:209:LEU:HG	2.21	0.40

There are no symmetry-related clashes.

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	552/557 (99%)	516 (94%)	33 (6%)	3 (0%)	29	53
2	B	426/428 (100%)	381 (89%)	39 (9%)	6 (1%)	11	26
All	All	978/985 (99%)	897 (92%)	72 (7%)	9 (1%)	17	38

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	87	PHE
1	A	243	PRO
2	B	93	GLY
2	B	214	LEU
2	B	114	ALA
1	A	9	PRO
1	A	545	ASN
2	B	111	VAL
2	B	94	ILE

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	494/495 (100%)	485 (98%)	9 (2%)	59	82
2	B	390/390 (100%)	383 (98%)	7 (2%)	59	82
All	All	884/885 (100%)	868 (98%)	16 (2%)	59	82

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

Mol	Chain	Res	Type
1	A	66	LYS
1	A	80	LEU
1	A	102	LYS
1	A	194	GLU
1	A	283	LEU
1	A	291	GLU
1	A	367	GLN

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Mol	Chain	Res	Type
1	A	449	GLU
1	A	497	THR
2	B	39	THR
2	B	65	LYS
2	B	96	HIS
2	B	171	PHE
2	B	215	THR
2	B	220	LYS
2	B	424	LYS

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

Mol	Chain	Res	Type
1	A	54	ASN

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](#)

1 ligand is 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
3	2RT	A	601	-	27,27,27	1.47	5 (18%)	35,37,37	2.04	5 (14%)

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
3	2RT	A	601	-	-	2/10/10/10	0/3/3/3

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	601	2RT	CAH-CBD	2.77	1.43	1.39
3	A	601	2RT	CBH-CBC	2.46	1.43	1.40
3	A	601	2RT	CBE-NAV	2.27	1.41	1.36
3	A	601	2RT	CAI-CBD	2.16	1.42	1.39
3	A	601	2RT	CBH-CBB	2.15	1.43	1.40

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	601	2RT	NAT-CBE-NAS	-6.83	120.08	126.55
3	A	601	2RT	NAU-CBF-NAS	-5.40	121.43	126.55
3	A	601	2RT	CBE-NAS-CBF	4.27	121.14	113.89
3	A	601	2RT	NAT-CBG-NAU	-3.11	123.73	128.60
3	A	601	2RT	CBH-NAW-CBF	-2.39	118.98	128.29

There are no chirality outliers.

All (2) torsion outliers are listed below:

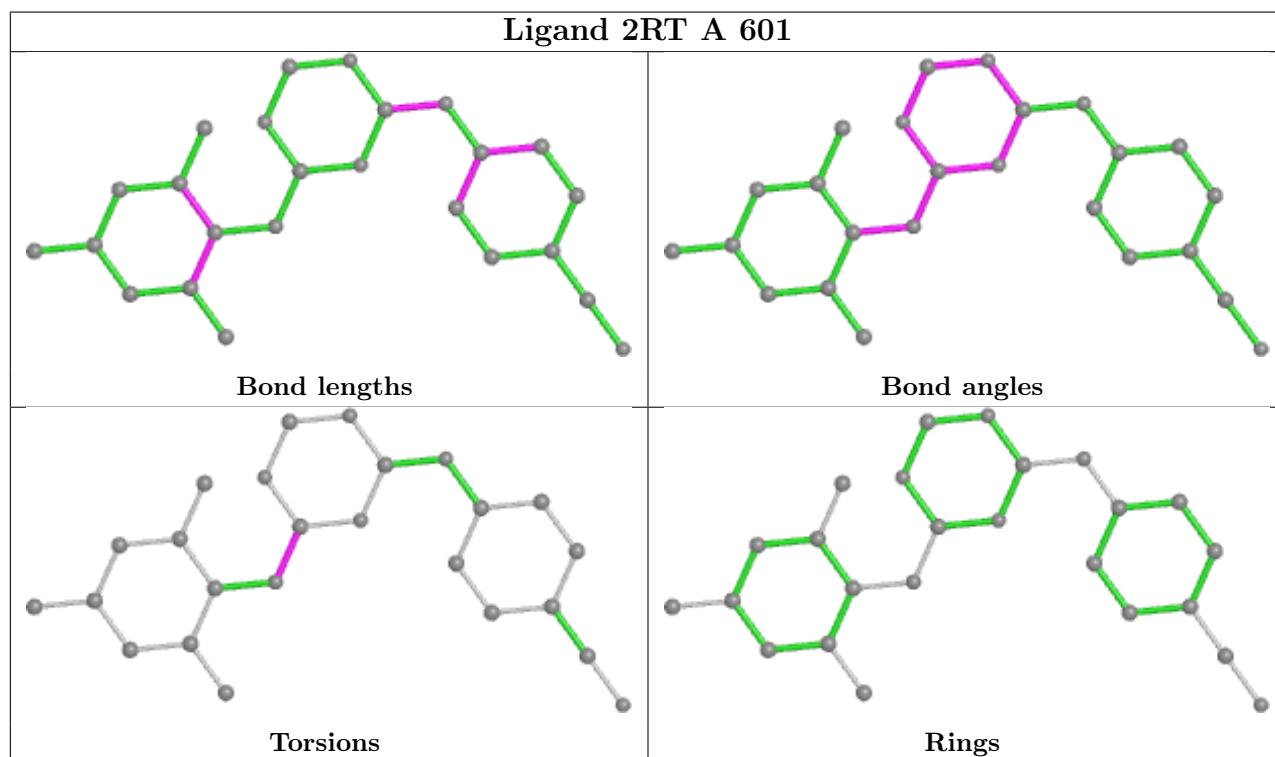
Mol	Chain	Res	Type	Atoms
3	A	601	2RT	NAU-CBF-NAW-CBH
3	A	601	2RT	NAS-CBF-NAW-CBH

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	601	2RT	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 than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	554/557 (99%)	0.90	100 (18%) 1 1	9, 66, 126, 145	0
2	B	428/428 (100%)	0.92	63 (14%) 2 1	13, 54, 120, 162	0
All	All	982/985 (99%)	0.91	163 (16%) 1 1	9, 61, 124, 162	0

All (163) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	257	ILE	11.3
1	A	263	LYS	10.6
1	A	309	ILE	8.8
1	A	74	LEU	8.6
1	A	286	THR	8.3
2	B	227	PHE	8.3
1	A	69	THR	8.2
2	B	217	PRO	8.0
2	B	216	THR	7.9
1	A	271	TYR	7.7
2	B	202	ILE	7.5
1	A	273	GLY	7.5
2	B	88	TRP	7.1
1	A	275	LYS	7.0
1	A	24	TRP	6.6
2	B	85	GLN	6.4
1	A	151	GLN	6.4
2	B	95	PRO	6.1
2	B	225	PRO	6.0
2	B	96	HIS	6.0
1	A	290	THR	5.9
1	A	221	HIS	5.8
2	B	209	LEU	5.7
1	A	256	ASP	5.5

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Mol	Chain	Res	Type	RSRZ
2	B	215	THR	5.5
1	A	289	LEU	5.4
2	B	3	SER	5.4
1	A	258	GLN	5.4
2	B	212	TRP	5.2
1	A	285	GLY	5.2
2	B	231	GLY	5.1
2	B	2	ILE	5.0
2	B	149	LEU	4.9
1	A	250	ASP	4.9
2	B	226	PRO	4.7
1	A	254	VAL	4.6
1	A	252	TRP	4.6
2	B	90	VAL	4.5
1	A	308	GLU	4.4
1	A	248	GLU	4.2
1	A	262	GLY	4.2
1	A	270	ILE	4.2
2	B	150	PRO	4.1
2	B	219	LYS	4.1
2	B	237	ASP	4.1
1	A	551	LEU	4.1
2	B	239	TRP	4.1
1	A	301	LEU	4.1
1	A	284	ARG	4.0
2	B	15	GLY	4.0
1	A	314	VAL	4.0
2	B	189	VAL	4.0
2	B	232	TYR	4.0
1	A	217	PRO	4.0
1	A	279	LEU	4.0
1	A	295	LEU	3.9
1	A	274	ILE	3.9
1	A	291	GLU	3.9
1	A	70	LYS	3.8
1	A	305	GLU	3.8
1	A	63	ILE	3.8
1	A	259	LYS	3.8
1	A	19	PRO	3.8
2	B	12	LEU	3.7
2	B	223	LYS	3.7
1	A	241	VAL	3.7

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Mol	Chain	Res	Type	RSRZ
1	A	260	LEU	3.7
1	A	71	TRP	3.7
1	A	255	ASN	3.7
2	B	14	PRO	3.7
1	A	67	ASP	3.7
1	A	142	ILE	3.6
2	B	221	HIS	3.6
1	A	130	PHE	3.6
2	B	201	LYS	3.6
1	A	288	ALA	3.5
1	A	298	GLU	3.5
1	A	127	TYR	3.4
2	B	1	PRO	3.3
1	A	547	GLN	3.3
2	B	206	ARG	3.3
1	A	293	ILE	3.2
2	B	116	PHE	3.2
2	B	9	PRO	3.1
1	A	51	GLY	3.1
1	A	72	ARG	3.1
1	A	264	LEU	3.1
1	A	14	PRO	3.1
1	A	52	PRO	3.1
2	B	11	LYS	3.1
1	A	272	PRO	3.1
1	A	47	ILE	3.1
2	B	228	LEU	3.1
2	B	190	GLY	3.0
1	A	249	LYS	3.0
1	A	282	LEU	3.0
2	B	4	PRO	3.0
1	A	73	LYS	3.0
1	A	287	LYS	3.0
1	A	245	VAL	3.0
1	A	222	GLN	3.0
2	B	222	GLN	3.0
1	A	167	ILE	3.0
2	B	16	MET	2.9
2	B	205	LEU	2.9
1	A	20	LYS	2.9
2	B	172	LYS	2.9
1	A	26	LEU	2.9

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Mol	Chain	Res	Type	RSRZ
1	A	132	ILE	2.9
1	A	40	GLU	2.8
1	A	116	PHE	2.8
2	B	284	ARG	2.8
1	A	552	VAL	2.8
1	A	61	PHE	2.8
1	A	310	LEU	2.8
2	B	214	LEU	2.8
2	B	171	PHE	2.7
1	A	304	ALA	2.7
1	A	299	ALA	2.7
2	B	356	ARG	2.7
2	B	93	GLY	2.7
1	A	58	THR	2.7
2	B	170	PRO	2.6
2	B	230	MET	2.6
1	A	148	VAL	2.6
1	A	144	TYR	2.6
1	A	2	ILE	2.6
2	B	358	ARG	2.5
2	B	66	LYS	2.5
2	B	87	PHE	2.5
2	B	218	ASP	2.5
1	A	251	SER	2.5
1	A	312	GLU	2.4
1	A	542	ILE	2.4
1	A	546	GLU	2.4
2	B	167	ILE	2.4
1	A	53	GLU	2.4
2	B	166	LYS	2.3
1	A	10	VAL	2.3
1	A	91	GLN	2.3
1	A	278	GLN	2.3
2	B	229	TRP	2.3
1	A	171	PHE	2.3
2	B	359	GLY	2.2
2	B	236	PRO	2.2
2	B	224	GLU	2.2
1	A	300	GLU	2.2
1	A	228	LEU	2.2
1	A	549	ASP	2.2
1	A	34	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
2	B	428	GLN	2.2
1	A	294	PRO	2.2
1	A	66	LYS	2.1
1	A	80	LEU	2.1
1	A	60	VAL	2.1
1	A	92	LEU	2.1
1	A	111	VAL	2.1
1	A	315	HIS	2.1
2	B	69	THR	2.1
2	B	124	PHE	2.1
2	B	318	TYR	2.0
1	A	276	VAL	2.0
1	A	15	GLY	2.0

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

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

6.3 Carbohydrates [i](#)

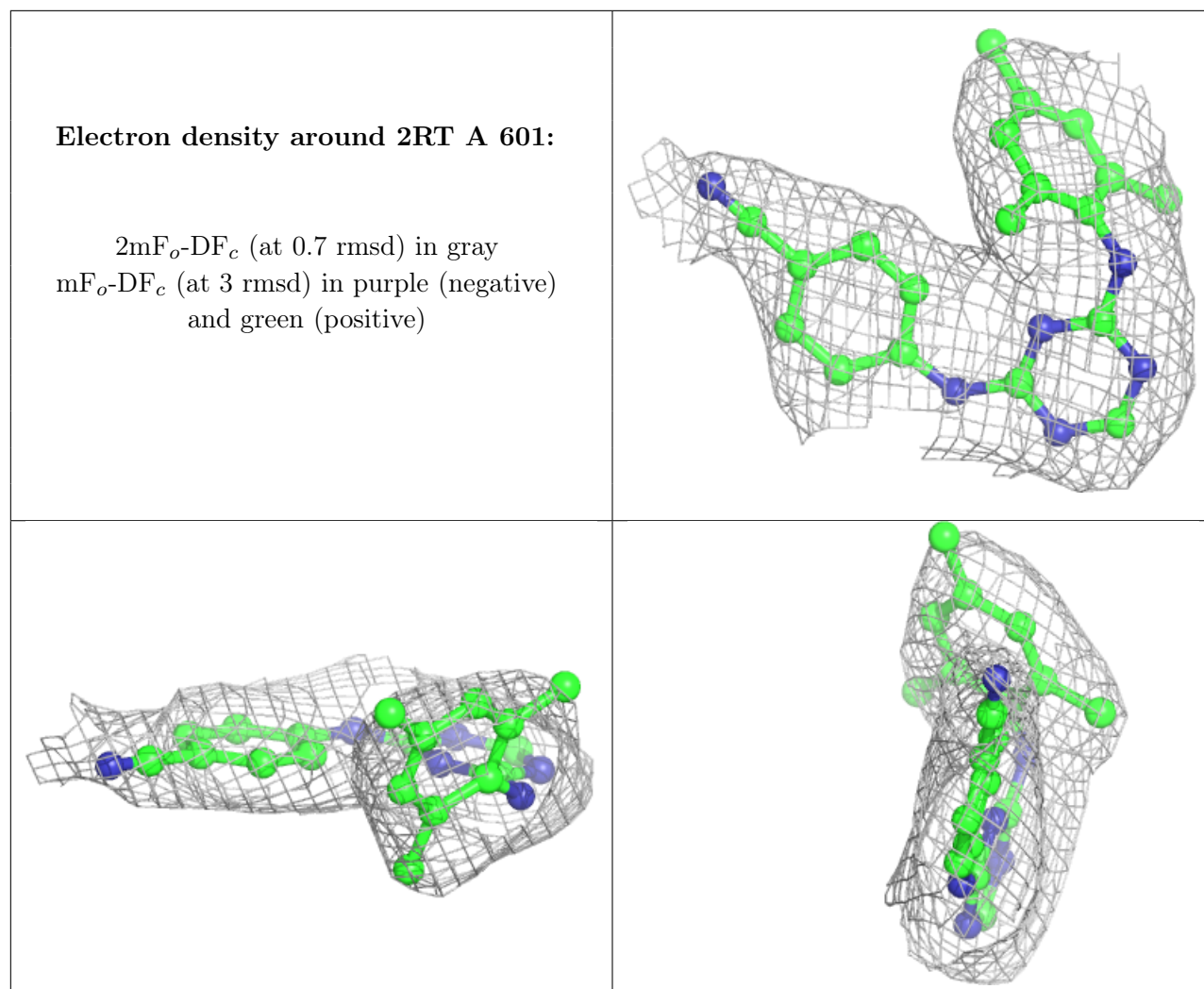
There are no monosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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	2RT	A	601	25/25	0.97	0.18	37,48,63,72	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.



6.5 Other polymers [i](#)

There are no such residues in this entry.