



# Full wwPDB X-ray Structure Validation Report ⓘ

May 16, 2020 – 03:15 pm BST

PDB ID : 2QU3  
Title : BACE1 with Compound 2  
Authors : Chopra, R.  
Deposited on : 2007-08-03  
Resolution : 2.00 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](mailto: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.

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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) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

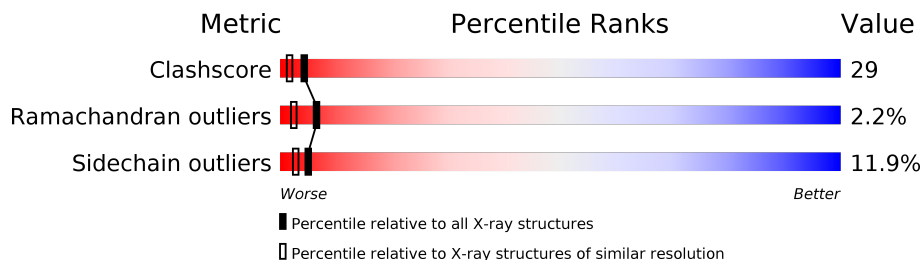
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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))
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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  $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	415	

## 2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 3035 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.

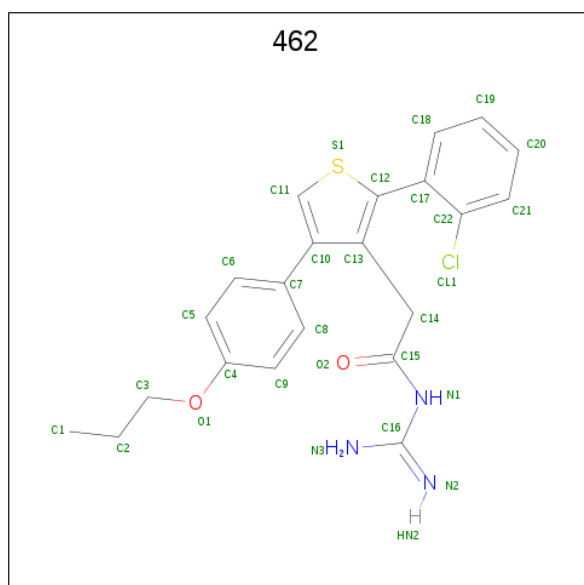
- Molecule 1 is a protein called Beta-secretase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	368	2891	1854	482	541	14	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	456	HIS	-	expression tag	UNP P56817
A	457	HIS	-	expression tag	UNP P56817
A	458	HIS	-	expression tag	UNP P56817
A	459	HIS	-	expression tag	UNP P56817
A	460	HIS	-	expression tag	UNP P56817
A	461	HIS	-	expression tag	UNP P56817

- Molecule 2 is N-[amino(imino)methyl]-2-[2-(2-chlorophenyl)-4-(4-propoxyphenyl)-3-thienyl]acetamide (three-letter code: 462) (formula: C<sub>22</sub>H<sub>22</sub>ClN<sub>3</sub>O<sub>2</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	Cl	N	O			S
2	A	1	29	22	1	3	2	1	0	0

- Molecule 3 is water.

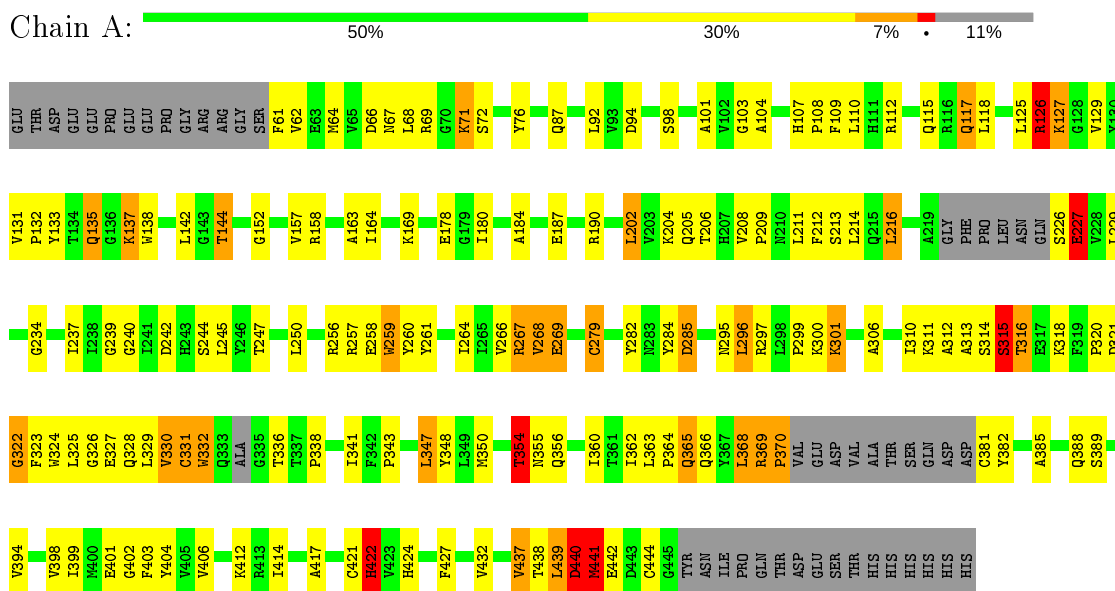
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	115	Total	O	0	0
			115	115		

### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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. 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. 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.

Note EDS was not executed.

- Molecule 1: Beta-secretase 1



## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	72.09Å 103.84Å 50.02Å 90.00° 95.29° 90.00°	Depositor
Resolution (Å)	19.95 – 2.00	Depositor
% Data completeness (in resolution range)	90.0 (19.95-2.00)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.235 , 0.258	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	3035	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

## 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: 462

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	0.56	3/2963 (0.1%)	0.95	17/4022 (0.4%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	440	ASP	CA-CB	-9.09	1.33	1.53
1	A	227	GLU	CB-CG	-7.03	1.38	1.52
1	A	226	SER	CA-CB	-5.55	1.44	1.52

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	227	GLU	N-CA-CB	-14.12	85.19	110.60
1	A	226	SER	N-CA-CB	9.44	124.66	110.50
1	A	226	SER	CB-CA-C	-9.20	92.63	110.10
1	A	226	SER	CA-C-N	-8.21	99.14	117.20
1	A	332	TRP	N-CA-C	-7.45	90.88	111.00
1	A	226	SER	N-CA-C	7.25	130.59	111.00
1	A	440	ASP	CB-CA-C	6.93	124.27	110.40
1	A	442	GLU	N-CA-C	-6.65	93.05	111.00
1	A	226	SER	O-C-N	6.00	132.30	122.70
1	A	227	GLU	CA-CB-CG	5.97	126.53	113.40
1	A	296	LEU	N-CA-C	-5.84	95.24	111.00
1	A	437	VAL	CB-CA-C	5.64	122.13	111.40
1	A	441	MET	CA-CB-CG	5.43	122.54	113.30
1	A	441	MET	N-CA-CB	-5.37	100.94	110.60
1	A	322	GLY	N-CA-C	-5.35	99.72	113.10
1	A	315	SER	C-N-CA	-5.16	108.81	121.70
1	A	326	GLY	C-N-CA	-5.13	108.88	121.70

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	2891	0	2807	168	3
2	A	29	0	21	1	0
3	A	115	0	0	12	0
All	All	3035	0	2828	168	3

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 29.

All (168) 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:135:GLN:NE2	1:A:169:LYS:HD3	1.58	1.19
1:A:402:GLY:HA2	1:A:422:HIS:HB2	1.22	1.14
1:A:301:LYS:HD2	1:A:301:LYS:H	1.17	1.10
1:A:441:MET:HA	1:A:444:CYS:SG	1.94	1.07
1:A:144:THR:HG22	1:A:158:ARG:HH11	1.17	1.04
1:A:135:GLN:HE22	1:A:169:LYS:HD3	1.27	1.00
1:A:440:ASP:O	1:A:441:MET:HB3	1.61	0.99
1:A:402:GLY:HA2	1:A:422:HIS:CB	1.93	0.99
1:A:71:LYS:HE3	1:A:229:LEU:HB2	1.45	0.98
1:A:301:LYS:CD	1:A:301:LYS:H	1.70	0.98
1:A:301:LYS:N	1:A:301:LYS:HD2	1.75	0.96
1:A:314:SER:O	1:A:316:THR:N	2.00	0.94
1:A:158:ARG:H	1:A:205:GLN:HE22	1.14	0.91
1:A:144:THR:CG2	1:A:158:ARG:HH11	1.84	0.91
1:A:144:THR:HG22	1:A:158:ARG:NH1	1.86	0.90
1:A:402:GLY:CA	1:A:422:HIS:HB2	2.03	0.88
1:A:421:CYS:O	1:A:422:HIS:HB3	1.74	0.85
1:A:87:GLN:HE22	1:A:115:GLN:H	1.21	0.85
1:A:300:LYS:N	1:A:301:LYS:HZ2	1.75	0.85
1:A:354:THR:O	1:A:441:MET:SD	2.37	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:127:LYS:HG2	1:A:142:LEU:HD12	1.59	0.82
1:A:71:LYS:CE	1:A:229:LEU:HB2	2.11	0.80
1:A:296:LEU:HD22	1:A:399:ILE:HD11	1.63	0.80
1:A:320:PRO:O	1:A:323:PHE:HB3	1.82	0.80
1:A:266:VAL:HG11	1:A:441:MET:HG3	1.65	0.79
1:A:301:LYS:HD3	3:A:549:HOH:O	1.84	0.78
1:A:135:GLN:HE21	1:A:169:LYS:HD3	1.48	0.78
1:A:365:GLN:HE21	1:A:365:GLN:H	1.34	0.75
1:A:126:ARG:HH11	1:A:126:ARG:CB	2.00	0.74
1:A:157:VAL:HG13	1:A:205:GLN:NE2	2.02	0.74
1:A:64:MET:HG2	1:A:152:GLY:HA2	1.73	0.70
1:A:132:PRO:HA	1:A:137:LYS:HB2	1.72	0.70
1:A:360:ILE:HG23	1:A:403:PHE:CZ	2.26	0.70
1:A:300:LYS:N	1:A:301:LYS:NZ	2.41	0.68
1:A:300:LYS:H	1:A:301:LYS:NZ	1.93	0.67
1:A:117:GLN:H	1:A:117:GLN:NE2	1.93	0.67
1:A:268:VAL:HB	1:A:347:LEU:HD12	1.76	0.67
1:A:439:LEU:HA	3:A:551:HOH:O	1.94	0.66
1:A:242:ASP:HB3	1:A:245:LEU:HD22	1.76	0.66
1:A:421:CYS:O	1:A:422:HIS:CB	2.44	0.66
1:A:107:HIS:HB3	1:A:110:LEU:HG	1.79	0.65
1:A:250:LEU:HD23	1:A:417:ALA:HB2	1.79	0.64
1:A:137:LYS:HG2	1:A:138:TRP:N	2.12	0.64
1:A:267:ARG:HG3	1:A:348:TYR:HB2	1.80	0.63
1:A:363:LEU:H	1:A:366:GLN:NE2	1.97	0.62
1:A:370:PRO:HA	1:A:381:CYS:O	1.99	0.62
1:A:422:HIS:CE1	1:A:424:HIS:HB3	2.34	0.62
1:A:209:PRO:HG2	1:A:239:GLY:O	2.00	0.61
1:A:115:GLN:HB3	1:A:118:LEU:HD13	1.80	0.61
1:A:267:ARG:HA	1:A:282:TYR:CE2	2.35	0.61
1:A:187:GLU:OE2	1:A:257:ARG:NH2	2.32	0.60
1:A:126:ARG:HH11	1:A:126:ARG:CG	2.14	0.60
1:A:369:ARG:HB2	1:A:370:PRO:HD2	1.82	0.60
1:A:107:HIS:CG	1:A:108:PRO:HD2	2.38	0.59
1:A:312:ALA:O	1:A:315:SER:HB3	2.02	0.58
1:A:237:ILE:CD1	1:A:242:ASP:HB2	2.33	0.58
1:A:332:TRP:CE2	1:A:338:PRO:HD2	2.38	0.58
1:A:360:ILE:CD1	1:A:432:VAL:HG22	2.32	0.58
1:A:202:LEU:HD22	1:A:208:VAL:HG21	1.84	0.58
1:A:267:ARG:NH1	1:A:269:GLU:OE1	2.37	0.58
1:A:266:VAL:CG1	1:A:441:MET:HG3	2.34	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:284:TYR:O	1:A:285:ASP:CB	2.51	0.58
1:A:126:ARG:HH11	1:A:126:ARG:HB2	1.70	0.57
1:A:158:ARG:N	1:A:205:GLN:HE22	1.94	0.57
1:A:131:VAL:HG21	1:A:138:TRP:CZ2	2.41	0.56
1:A:385:ALA:HB1	1:A:398:VAL:HG11	1.87	0.56
1:A:133:TYR:CE2	1:A:137:LYS:HA	2.40	0.55
1:A:329:LEU:HD12	1:A:329:LEU:C	2.27	0.55
1:A:213:SER:HB3	1:A:404:TYR:CE1	2.41	0.55
1:A:107:HIS:CE1	1:A:108:PRO:HG2	2.41	0.55
1:A:284:TYR:O	1:A:285:ASP:HB3	2.06	0.55
1:A:313:ALA:CB	1:A:343:PRO:HD3	2.37	0.55
1:A:127:LYS:CE	3:A:547:HOH:O	2.55	0.55
1:A:216:LEU:O	1:A:401:GLU:HA	2.07	0.55
1:A:127:LYS:HE2	3:A:547:HOH:O	2.07	0.54
1:A:103:GLY:HA2	1:A:164:ILE:HB	1.88	0.54
1:A:115:GLN:CB	1:A:118:LEU:HD13	2.36	0.54
1:A:362:ILE:HD13	1:A:399:ILE:HD13	1.90	0.54
1:A:211:LEU:HD23	1:A:212:PHE:N	2.23	0.54
1:A:300:LYS:H	1:A:301:LYS:HZ2	1.46	0.53
1:A:112:ARG:O	1:A:178:GLU:HG2	2.08	0.53
1:A:266:VAL:HG11	1:A:441:MET:CG	2.37	0.53
1:A:313:ALA:HB3	1:A:343:PRO:HD3	1.91	0.53
1:A:64:MET:CG	1:A:152:GLY:HA2	2.37	0.53
1:A:385:ALA:CB	1:A:398:VAL:HG11	2.39	0.52
1:A:311:LYS:HE2	1:A:324:TRP:CD1	2.44	0.52
1:A:129:VAL:CG2	1:A:142:LEU:HG	2.40	0.52
1:A:330:VAL:O	1:A:382:TYR:N	2.41	0.52
1:A:256:ARG:NH2	3:A:532:HOH:O	2.38	0.52
1:A:237:ILE:HD12	1:A:242:ASP:CB	2.41	0.51
1:A:331:CYS:HA	3:A:505:HOH:O	2.09	0.51
1:A:330:VAL:O	1:A:381:CYS:HA	2.10	0.51
1:A:365:GLN:NE2	1:A:365:GLN:H	2.03	0.51
1:A:306:ALA:O	1:A:310:ILE:HG13	2.11	0.51
1:A:300:LYS:HA	1:A:388:GLN:HG3	1.93	0.50
1:A:332:TRP:HB3	1:A:336:THR:OG1	2.12	0.50
1:A:256:ARG:NH1	3:A:532:HOH:O	2.40	0.49
1:A:68:LEU:HB2	1:A:234:GLY:O	2.12	0.49
1:A:261:TYR:HB3	1:A:414:ILE:HD11	1.94	0.49
1:A:211:LEU:HD23	1:A:211:LEU:C	2.33	0.49
1:A:61:PHE:CZ	1:A:240:GLY:HA3	2.48	0.49
1:A:314:SER:HA	1:A:341:ILE:HG22	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:321:ASP:HB3	3:A:573:HOH:O	2.12	0.49
1:A:332:TRP:HZ3	1:A:382:TYR:HD2	1.61	0.49
1:A:237:ILE:HD12	1:A:242:ASP:HB2	1.94	0.48
1:A:381:CYS:N	3:A:505:HOH:O	2.45	0.48
1:A:329:LEU:O	1:A:330:VAL:HG12	2.14	0.48
1:A:157:VAL:HG13	1:A:205:GLN:CD	2.33	0.47
1:A:300:LYS:HB3	1:A:301:LYS:HE3	1.96	0.47
1:A:94:ASP:OD2	1:A:180:ILE:HD11	2.14	0.47
1:A:297:ARG:HB3	1:A:389:SER:HB2	1.95	0.47
1:A:126:ARG:O	1:A:127:LYS:HB2	2.15	0.47
1:A:169:LYS:HA	1:A:169:LYS:HE2	1.96	0.47
1:A:315:SER:O	1:A:316:THR:C	2.51	0.46
1:A:332:TRP:CE2	1:A:338:PRO:CD	2.98	0.46
1:A:422:HIS:HE1	1:A:424:HIS:HB3	1.80	0.46
1:A:369:ARG:HG2	1:A:385:ALA:HB2	1.98	0.46
1:A:295:ASN:HD22	1:A:295:ASN:N	2.13	0.46
1:A:202:LEU:HD22	1:A:208:VAL:CG2	2.44	0.46
1:A:206:THR:OG1	1:A:208:VAL:HG13	2.16	0.46
1:A:213:SER:HB3	1:A:404:TYR:CZ	2.51	0.45
1:A:135:GLN:HB3	1:A:135:GLN:HE21	1.55	0.45
1:A:314:SER:O	1:A:315:SER:C	2.53	0.45
1:A:356:GLN:HB3	3:A:522:HOH:O	2.15	0.45
1:A:369:ARG:HH11	1:A:369:ARG:CG	2.29	0.45
1:A:237:ILE:CD1	1:A:242:ASP:CB	2.96	0.44
1:A:127:LYS:CG	1:A:142:LEU:HD12	2.41	0.44
1:A:381:CYS:HA	3:A:505:HOH:O	2.18	0.44
1:A:258:GLU:HG3	1:A:412:LYS:HE3	1.98	0.44
1:A:321:ASP:O	1:A:325:LEU:HD12	2.17	0.44
1:A:76:TYR:O	1:A:92:LEU:HD12	2.18	0.44
1:A:266:VAL:HA	1:A:279:CYS:SG	2.58	0.44
1:A:299:PRO:C	1:A:301:LYS:HZ2	2.19	0.43
1:A:412:LYS:HE2	1:A:412:LYS:HB3	1.81	0.43
1:A:157:VAL:HG21	1:A:202:LEU:HA	2.00	0.43
1:A:267:ARG:HG3	1:A:348:TYR:CG	2.54	0.43
1:A:355:ASN:ND2	1:A:439:LEU:O	2.51	0.43
1:A:322:GLY:HA3	1:A:328:GLN:HE21	1.84	0.43
1:A:98:SER:OG	1:A:184:ALA:HB3	2.17	0.43
1:A:369:ARG:NH1	1:A:369:ARG:HG3	2.33	0.43
1:A:360:ILE:HD13	1:A:432:VAL:HG22	2.00	0.43
1:A:67:ASN:OD1	1:A:68:LEU:HD13	2.19	0.43
1:A:406:VAL:O	1:A:414:ILE:HA	2.18	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:66:ASP:CG	1:A:69:ARG:HH12	2.23	0.42
1:A:76:TYR:CE1	1:A:216:LEU:HG	2.54	0.42
1:A:259:TRP:CG	1:A:260:TYR:N	2.86	0.42
1:A:68:LEU:HB2	1:A:234:GLY:C	2.40	0.42
1:A:256:ARG:HD2	1:A:264:ILE:HD11	2.02	0.42
1:A:329:LEU:HD12	1:A:329:LEU:O	2.19	0.42
1:A:137:LYS:CG	1:A:138:TRP:N	2.81	0.42
1:A:314:SER:HA	1:A:341:ILE:CG2	2.50	0.42
1:A:360:ILE:HG23	1:A:403:PHE:CE1	2.55	0.42
1:A:250:LEU:CD2	1:A:417:ALA:HB2	2.47	0.41
1:A:104:ALA:CB	1:A:163:ALA:HB1	2.50	0.41
1:A:364:PRO:O	1:A:368:LEU:HB2	2.21	0.41
1:A:126:ARG:NH1	1:A:126:ARG:CG	2.75	0.41
1:A:190:ARG:HD2	3:A:574:HOH:O	2.21	0.41
1:A:370:PRO:O	1:A:370:PRO:HG2	2.21	0.41
1:A:117:GLN:CD	1:A:117:GLN:H	2.20	0.41
1:A:297:ARG:HB2	1:A:394:VAL:HB	2.03	0.41
1:A:133:TYR:CE2	2:A:1462:S1	3.14	0.41
1:A:125:LEU:HD12	1:A:142:LEU:HB3	2.03	0.41
1:A:101:ALA:HB3	1:A:180:ILE:HG22	2.03	0.40
1:A:144:THR:HG23	1:A:158:ARG:CG	2.51	0.40
1:A:264:ILE:HG21	1:A:350:MET:HE3	2.04	0.40
1:A:369:ARG:NH1	1:A:369:ARG:CG	2.84	0.40
1:A:109:PHE:CD1	1:A:109:PHE:N	2.85	0.40
1:A:369:ARG:CB	1:A:370:PRO:HD2	2.50	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:356:GLN:OE1	1:A:356:GLN:NE2[2_655]	2.11	0.09
1:A:356:GLN:NE2	1:A:356:GLN:NE2[2_655]	2.11	0.09
1:A:227:GLU:OE2	1:A:244:SER:OG[2_555]	2.18	0.02

## 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	360/415 (87%)	336 (93%)	16 (4%)	8 (2%)	6 2

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	227	GLU
1	A	285	ASP
1	A	315	SER
1	A	422	HIS
1	A	439	LEU
1	A	354	THR
1	A	440	ASP
1	A	126	ARG

### 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	312/356 (88%)	275 (88%)	37 (12%)	5 3

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	62	VAL
1	A	71	LYS
1	A	72	SER
1	A	117	GLN
1	A	126	ARG
1	A	127	LYS
1	A	135	GLN
1	A	137	LYS
1	A	144	THR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	202	LEU
1	A	204	LYS
1	A	214	LEU
1	A	216	LEU
1	A	247	THR
1	A	259	TRP
1	A	267	ARG
1	A	268	VAL
1	A	269	GLU
1	A	279	CYS
1	A	301	LYS
1	A	315	SER
1	A	316	THR
1	A	318	LYS
1	A	327	GLU
1	A	330	VAL
1	A	331	CYS
1	A	347	LEU
1	A	354	THR
1	A	365	GLN
1	A	368	LEU
1	A	369	ARG
1	A	370	PRO
1	A	422	HIS
1	A	427	PHE
1	A	437	VAL
1	A	438	THR
1	A	441	MET

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	87	GLN
1	A	117	GLN
1	A	135	GLN
1	A	205	GLN
1	A	215	GLN
1	A	295	ASN
1	A	328	GLN
1	A	355	ASN
1	A	365	GLN
1	A	366	GLN

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Mol	Chain	Res	Type
1	A	388	GLN
1	A	422	HIS

### 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 carbohydrates 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
2	462	A	1	-	29,31,31	2.80	7 (24%)	36,42,42	2.32	9 (25%)

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	462	A	1	-	-	1/19/20/20	0/3/3/3

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1	462	C11-C10	11.04	1.43	1.37
2	A	1	462	C16-N1	-6.55	1.28	1.37
2	A	1	462	C10-C13	4.06	1.44	1.40
2	A	1	462	C18-C17	3.48	1.45	1.40
2	A	1	462	C17-C12	-2.34	1.44	1.48
2	A	1	462	C8-C7	2.25	1.44	1.39
2	A	1	462	C17-C22	2.17	1.43	1.39

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1	462	C11-C10-C13	-9.29	109.12	111.69
2	A	1	462	C10-C11-S1	4.36	113.75	112.53
2	A	1	462	O2-C15-N1	3.87	130.01	122.48
2	A	1	462	C14-C13-C12	-3.52	122.02	127.36
2	A	1	462	C14-C15-N1	-2.97	110.55	114.35
2	A	1	462	N3-C16-N2	-2.88	111.41	120.26
2	A	1	462	C17-C12-C13	-2.66	125.05	129.36
2	A	1	462	C15-N1-C16	-2.31	124.55	127.25
2	A	1	462	C17-C22-CL1	2.09	123.75	120.75

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1	462	S1-C12-C17-C18

There are no ring outliers.

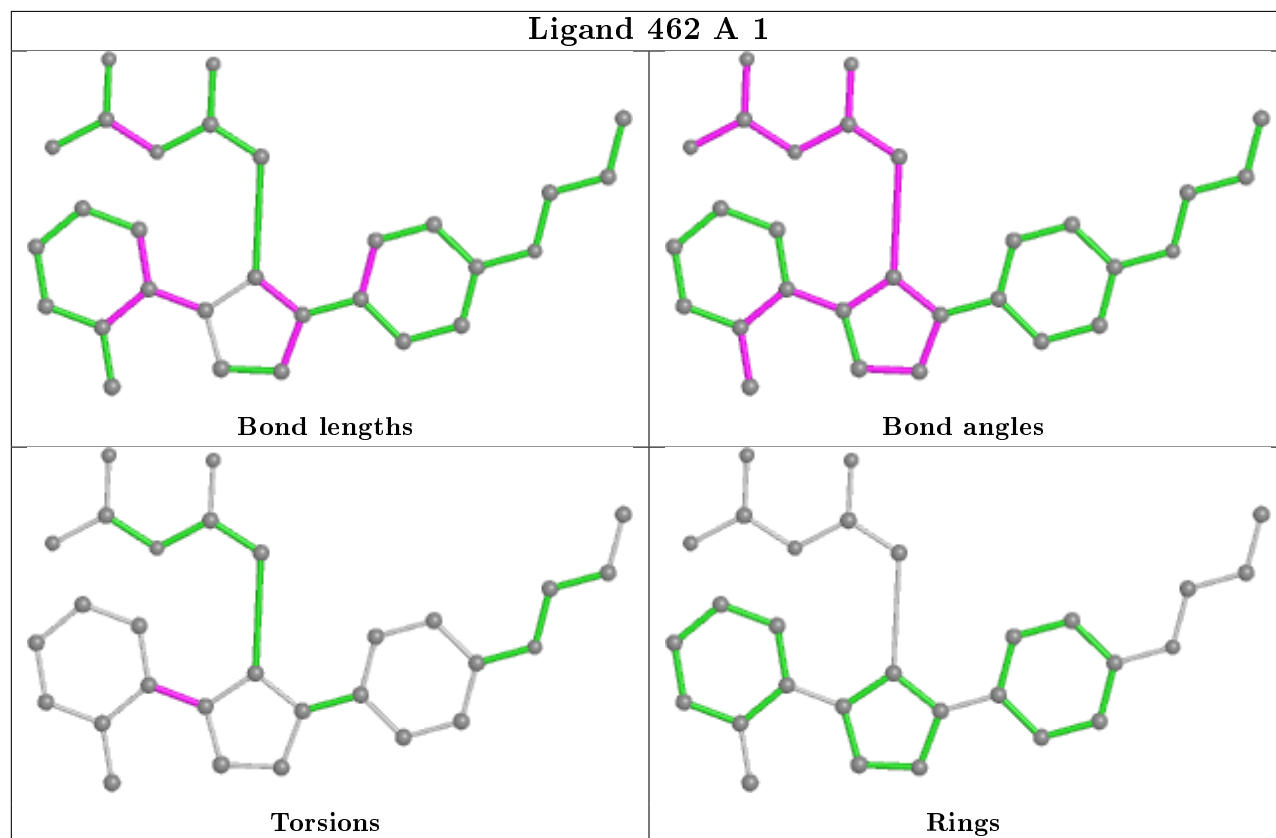
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1	462	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 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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.