



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 11, 2024 – 10:02 PM EDT

PDB ID : 1JII  
Title : Crystal structure of *S. aureus* TyrRS in complex with SB-219383  
Authors : Qiu, X.; Janson, C.A.; Smith, W.W.; Jarvest, R.L.  
Deposited on : 2001-07-02  
Resolution : 3.20 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.

The types of validation reports are described at

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

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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 : 2022.3.0, CSD as543be (2022)  
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) : 2.36.2

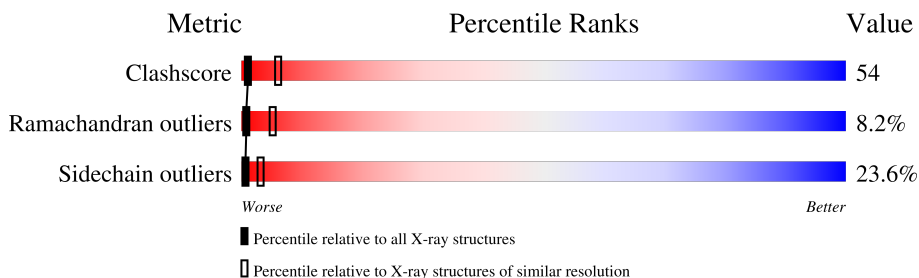
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.20 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	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)

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  $\geq 3$ , 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	420	

## 2 Entry composition [i](#)

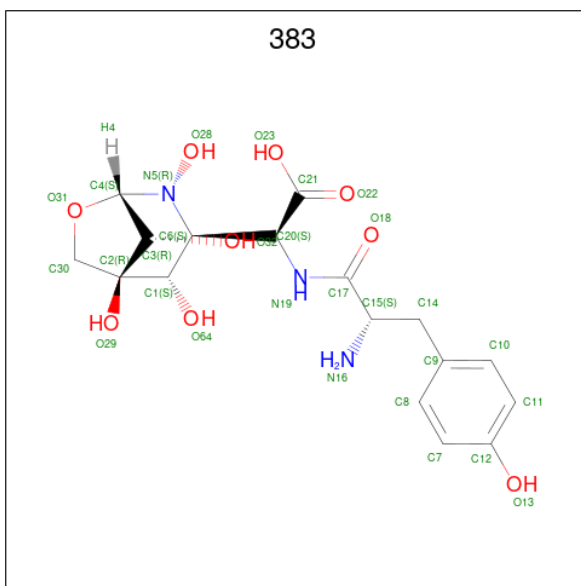
There are 2 unique types of molecules in this entry. The entry contains 2585 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 tyrosyl-tRNA synthetase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	319	2556	1617	438	494	7	0	0	0

- Molecule 2 is [2-AMINO-3-(4-HYDROXY-PHENYL)-PROPIONYLAMINO]- (2,4,5,8-TETRAHYDROXY-7-OXA-2-AZA-BICYCLO[3.2.1]OCT-3-YL)- ACETIC ACID (three-letter code: 383) (formula: C<sub>17</sub>H<sub>23</sub>N<sub>3</sub>O<sub>9</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	29	17	3	9	0	0



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	71.56Å 98.45Å 142.13Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 3.20	Depositor
% Data completeness (in resolution range)	(Not available) (8.00-3.20)	Depositor
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, $R_{free}$	0.269 , 0.335	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	2585	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	14.0	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: 383

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	0.78	1/2608 (0.0%)	0.94	2/3519 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	236	GLU	CG-CD	5.54	1.60	1.51

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	181	LEU	CA-CB-CG	5.28	127.44	115.30
1	A	271	PHE	N-CA-C	5.24	125.16	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	250	TYR	Sidechain

## 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	2556	0	2492	274	0
2	A	29	0	22	7	0
All	All	2585	0	2514	275	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 54.

All (275) 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:253:TYR:HE1	1:A:257:ILE:HD12	1.12	1.06
1:A:40:ASP:HA	1:A:72:GLY:HA3	1.43	0.99
1:A:284:GLN:HA	1:A:287:ASN:OD1	1.66	0.96
1:A:70:LEU:HD12	1:A:122:VAL:HG23	1.47	0.95
1:A:253:TYR:CE1	1:A:257:ILE:HD12	2.03	0.92
1:A:18:GLN:HB3	1:A:24:ILE:HD12	1.54	0.90
1:A:40:ASP:HB3	1:A:76:GLY:HA2	1.53	0.90
1:A:208:ARG:HA	1:A:213:GLN:H	1.40	0.86
1:A:156:GLN:HE21	1:A:157:SER:H	1.22	0.85
1:A:185:LEU:O	1:A:186:ASN:HB2	1.76	0.84
1:A:318:ARG:O	1:A:319:ILE:HG12	1.78	0.83
1:A:18:GLN:OE1	1:A:21:GLU:HG3	1.80	0.82
1:A:287:ASN:HD22	1:A:288:GLU:N	1.76	0.82
1:A:240:VAL:HG13	1:A:247:THR:HG21	1.60	0.81
1:A:223:LEU:H	1:A:223:LEU:HD12	1.47	0.79
1:A:87:GLU:HA	1:A:158:ARG:NH2	1.98	0.79
1:A:68:ILE:HD13	1:A:185:LEU:HD13	1.66	0.78
1:A:261:ASP:HA	1:A:296:GLN:OE1	1.83	0.77
1:A:253:TYR:CE2	1:A:317:ILE:HG22	2.20	0.77
1:A:103:ILE:HA	1:A:106:GLN:HE21	1.49	0.76
1:A:70:LEU:HD12	1:A:122:VAL:CG2	2.15	0.76
1:A:228:ASP:O	1:A:230:LYS:HD2	1.86	0.74
1:A:265:ILE:O	1:A:268:LEU:HB2	1.87	0.74
1:A:56:THR:HG21	1:A:221:ILE:HD11	1.67	0.74
1:A:253:TYR:HE2	1:A:317:ILE:HG22	1.52	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:70:LEU:HD22	2:A:421:383:O13	1.88	0.72
1:A:183:ARG:NH2	1:A:183:ARG:HB3	2.05	0.72
1:A:3:ASN:O	1:A:7:GLU:HG2	1.90	0.71
1:A:17:GLN:HG2	1:A:220:THR:OG1	1.90	0.70
1:A:314:ASN:HD22	1:A:317:ILE:HD11	1.56	0.70
1:A:59:ARG:HG2	1:A:59:ARG:HH11	1.55	0.70
1:A:131:ILE:HD12	1:A:140:TYR:CE1	2.27	0.69
1:A:84:LYS:HE2	1:A:88:ARG:HH11	1.56	0.69
1:A:204:ILE:HA	1:A:207:MET:HE3	1.73	0.69
1:A:103:ILE:HA	1:A:106:GLN:NE2	2.07	0.69
1:A:221:ILE:HG23	1:A:222:PRO:HD2	1.72	0.69
1:A:240:VAL:CG1	1:A:247:THR:HG21	2.21	0.69
1:A:233:GLY:O	1:A:239:ALA:HA	1.93	0.68
1:A:156:GLN:NE2	1:A:157:SER:H	1.92	0.68
1:A:253:TYR:HE2	1:A:317:ILE:CG2	2.05	0.68
1:A:41:PRO:HG3	1:A:100:ILE:CG2	2.24	0.68
1:A:253:TYR:CE2	1:A:317:ILE:HA	2.29	0.67
1:A:68:ILE:HG23	1:A:120:VAL:HG23	1.76	0.67
1:A:182:ASN:HD21	1:A:214:THR:HG23	1.60	0.67
1:A:213:GLN:HG2	1:A:213:GLN:O	1.93	0.67
1:A:67:PRO:O	1:A:119:ALA:HA	1.94	0.67
1:A:11:TRP:CH2	1:A:276:LYS:HA	2.30	0.66
1:A:318:ARG:HH21	1:A:318:ARG:HG3	1.59	0.66
1:A:39:ALA:HA	2:A:421:383:O23	1.96	0.66
1:A:131:ILE:HD12	1:A:140:TYR:HE1	1.61	0.66
1:A:73:GLY:HA3	1:A:123:ASN:OD1	1.96	0.66
1:A:241:TRP:O	1:A:247:THR:HB	1.96	0.65
1:A:296:GLN:H	1:A:296:GLN:HE21	1.44	0.65
1:A:296:GLN:H	1:A:296:GLN:NE2	1.95	0.64
1:A:318:ARG:HG3	1:A:318:ARG:NH2	2.10	0.64
1:A:70:LEU:HD13	1:A:181:LEU:HD21	1.80	0.64
1:A:41:PRO:HG3	1:A:100:ILE:HG23	1.79	0.64
1:A:153:ASP:O	1:A:156:GLN:NE2	2.31	0.64
1:A:84:LYS:HE2	1:A:88:ARG:HE	1.62	0.63
1:A:208:ARG:CZ	1:A:209:ARG:HE	2.11	0.63
1:A:199:ASN:N	1:A:199:ASN:HD22	1.95	0.63
1:A:210:MET:HE2	1:A:211:TYR:CZ	2.33	0.63
1:A:18:GLN:HB3	1:A:24:ILE:CD1	2.27	0.63
1:A:189:ILE:HA	1:A:217:TYR:O	1.99	0.63
1:A:198:GLY:O	1:A:201:THR:HG22	1.98	0.63
1:A:318:ARG:HH21	1:A:318:ARG:CG	2.13	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:12:ARG:NH1	1:A:59:ARG:CZ	2.63	0.62
1:A:252:PHE:CD2	1:A:308:HIS:HD2	2.17	0.62
1:A:314:ASN:HA	1:A:317:ILE:HD11	1.80	0.62
1:A:48:ILE:HD11	1:A:233:GLY:HA2	1.80	0.62
1:A:36:TYR:HB2	1:A:68:ILE:HB	1.82	0.62
1:A:94:GLU:HA	1:A:97:ASP:OD1	2.00	0.61
1:A:41:PRO:HB2	1:A:99:ASN:HB3	1.83	0.61
1:A:82:SER:O	1:A:84:LYS:HD2	2.01	0.61
1:A:33:VAL:HG12	1:A:34:THR:N	2.16	0.60
1:A:70:LEU:HD23	2:A:421:383:H7	1.82	0.60
1:A:88:ARG:HG2	1:A:167:GLU:OE2	2.01	0.60
1:A:287:ASN:HD22	1:A:287:ASN:C	2.04	0.60
1:A:71:ILE:HD11	1:A:121:LEU:HD11	1.83	0.60
1:A:108:HIS:ND1	1:A:113:PHE:HD2	1.98	0.60
1:A:163:ILE:HD13	1:A:168:PHE:HB2	1.84	0.60
1:A:39:ALA:O	1:A:72:GLY:N	2.35	0.60
1:A:158:ARG:NH2	1:A:167:GLU:OE2	2.35	0.60
1:A:260:SER:O	1:A:262:GLU:N	2.35	0.59
1:A:47:HIS:CE1	1:A:50:HIS:NE2	2.70	0.59
1:A:277:GLU:OE2	1:A:277:GLU:HA	2.02	0.59
1:A:58:ARG:HG2	1:A:111:PHE:CE1	2.38	0.59
1:A:131:ILE:HD11	1:A:136:PHE:HD1	1.67	0.58
1:A:101:GLU:O	1:A:105:LYS:HB2	2.03	0.58
1:A:60:PHE:O	1:A:62:GLU:N	2.38	0.57
1:A:131:ILE:HD11	1:A:136:PHE:CD1	2.40	0.57
1:A:107:MET:O	1:A:109:ASN:N	2.37	0.56
1:A:314:ASN:O	1:A:317:ILE:HG12	2.05	0.56
1:A:287:ASN:HD22	1:A:288:GLU:HB3	1.70	0.56
1:A:208:ARG:HA	1:A:213:GLN:N	2.14	0.56
1:A:14:LEU:HD12	1:A:14:LEU:N	2.21	0.56
1:A:213:GLN:O	1:A:213:GLN:CG	2.53	0.56
1:A:35:LEU:HD23	1:A:66:ARG:O	2.06	0.55
1:A:314:ASN:HA	1:A:317:ILE:CD1	2.36	0.55
1:A:46:LEU:HG	1:A:106:GLN:NE2	2.21	0.55
1:A:264:VAL:HG21	1:A:296:GLN:OE1	2.06	0.55
1:A:12:ARG:HB2	1:A:14:LEU:HD13	1.88	0.55
1:A:84:LYS:HE2	1:A:88:ARG:NH1	2.22	0.55
1:A:157:SER:O	1:A:160:GLU:HB2	2.07	0.55
1:A:33:VAL:CG1	1:A:34:THR:N	2.69	0.55
1:A:35:LEU:O	1:A:67:PRO:HA	2.07	0.55
1:A:70:LEU:HD11	1:A:127:TRP:CZ2	2.42	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:305:LYS:O	1:A:309:GLY:N	2.40	0.54
1:A:158:ARG:HB3	1:A:163:ILE:HB	1.90	0.54
1:A:69:VAL:HB	1:A:121:LEU:HD12	1.89	0.54
1:A:208:ARG:NH1	1:A:209:ARG:HH11	2.06	0.54
1:A:71:ILE:CD1	1:A:121:LEU:HD11	2.38	0.54
1:A:287:ASN:ND2	1:A:288:GLU:HB3	2.23	0.53
1:A:12:ARG:NH1	1:A:59:ARG:NH2	2.56	0.53
1:A:172:ILE:O	1:A:176:ILE:HG13	2.08	0.53
1:A:234:LYS:HG3	1:A:238:GLY:O	2.08	0.53
1:A:68:ILE:HG12	1:A:120:VAL:CG2	2.39	0.53
1:A:228:ASP:OD2	1:A:230:LYS:HB2	2.07	0.53
1:A:156:GLN:NE2	1:A:157:SER:N	2.57	0.53
1:A:250:TYR:O	1:A:254:GLN:HG2	2.09	0.53
1:A:156:GLN:NE2	1:A:157:SER:HB3	2.24	0.53
1:A:59:ARG:HG2	1:A:59:ARG:NH1	2.24	0.53
1:A:78:ILE:HD13	1:A:78:ILE:N	2.24	0.53
1:A:174:GLN:HG3	2:A:421:383:C11	2.39	0.53
1:A:183:ARG:HB3	1:A:183:ARG:HH21	1.72	0.53
1:A:265:ILE:HG13	1:A:283:GLU:HG3	1.91	0.52
1:A:252:PHE:O	1:A:255:PHE:HB3	2.09	0.52
1:A:70:LEU:HD23	2:A:421:383:C7	2.40	0.52
1:A:287:ASN:ND2	1:A:288:GLU:N	2.54	0.52
1:A:14:LEU:HA	1:A:222:PRO:HD3	1.91	0.52
1:A:284:GLN:HA	1:A:287:ASN:CG	2.30	0.51
1:A:80:ASP:HB2	1:A:170:TYR:CE1	2.46	0.51
1:A:108:HIS:CE1	1:A:113:PHE:HD2	2.28	0.51
1:A:178:PHE:HD1	1:A:178:PHE:O	1.94	0.51
1:A:40:ASP:O	1:A:42:THR:HG22	2.10	0.51
1:A:210:MET:HE2	1:A:211:TYR:CE1	2.45	0.51
1:A:98:LYS:O	1:A:101:GLU:HB3	2.11	0.51
1:A:181:LEU:HD12	1:A:185:LEU:HD12	1.93	0.51
1:A:252:PHE:CD2	1:A:308:HIS:CD2	2.97	0.51
1:A:48:ILE:HG21	1:A:255:PHE:HE1	1.76	0.50
1:A:278:GLU:O	1:A:282:LEU:HB2	2.12	0.50
1:A:152:LYS:HB2	1:A:155:ILE:HG12	1.94	0.50
1:A:190:GLN:NE2	1:A:200:ILE:HD12	2.27	0.50
1:A:70:LEU:HD11	1:A:127:TRP:HZ2	1.77	0.50
1:A:165:TYR:O	1:A:168:PHE:HB3	2.12	0.49
1:A:7:GLU:OE2	1:A:7:GLU:HA	2.12	0.49
1:A:107:MET:O	1:A:110:ILE:N	2.46	0.49
1:A:84:LYS:HD2	1:A:84:LYS:H	1.77	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:84:LYS:CE	1:A:88:ARG:HH11	2.24	0.49
1:A:68:ILE:HD13	1:A:185:LEU:CD1	2.39	0.49
1:A:77:MET:C	1:A:78:ILE:HD13	2.33	0.49
1:A:14:LEU:N	1:A:14:LEU:CD1	2.75	0.49
1:A:182:ASN:ND2	1:A:214:THR:HG23	2.25	0.49
1:A:182:ASN:C	1:A:182:ASN:HD22	2.17	0.48
1:A:196:GLN:O	1:A:200:ILE:HD13	2.13	0.48
1:A:51:LEU:HD12	1:A:307:ILE:HD11	1.96	0.48
1:A:84:LYS:HE2	1:A:88:ARG:NE	2.28	0.48
1:A:297:LYS:O	1:A:301:GLU:HG3	2.14	0.48
1:A:5:LEU:HD23	1:A:63:HIS:CE1	2.49	0.48
1:A:48:ILE:HD11	1:A:233:GLY:CA	2.44	0.48
1:A:182:ASN:ND2	1:A:182:ASN:O	2.46	0.48
1:A:37:CYS:SG	1:A:38:GLY:N	2.87	0.47
1:A:266:LYS:HD3	1:A:267:PHE:CE1	2.49	0.47
1:A:46:LEU:HD21	1:A:103:ILE:HG12	1.96	0.47
1:A:80:ASP:HB2	1:A:170:TYR:CZ	2.49	0.47
1:A:295:ALA:O	1:A:297:LYS:N	2.47	0.47
1:A:78:ILE:HG23	1:A:166:THR:CG2	2.45	0.47
1:A:6:ILE:O	1:A:10:LYS:HB2	2.14	0.47
1:A:19:THR:HG21	1:A:204:ILE:HD13	1.95	0.47
1:A:35:LEU:O	1:A:35:LEU:HG	2.15	0.47
1:A:4:VAL:O	1:A:7:GLU:HB2	2.15	0.47
1:A:48:ILE:HD12	1:A:240:VAL:HB	1.97	0.47
1:A:87:GLU:HA	1:A:158:ARG:CZ	2.43	0.47
1:A:235:SER:C	1:A:237:SER:N	2.67	0.47
1:A:36:TYR:CB	1:A:68:ILE:HB	2.45	0.47
1:A:55:LEU:CD2	1:A:306:PHE:HE2	2.27	0.47
1:A:2:THR:O	1:A:3:ASN:HB3	2.14	0.47
1:A:208:ARG:NH1	1:A:209:ARG:NH1	2.63	0.47
1:A:208:ARG:O	1:A:212:GLY:HA2	2.15	0.46
1:A:46:LEU:CD2	1:A:103:ILE:HG12	2.46	0.46
1:A:207:MET:HA	1:A:210:MET:HB2	1.98	0.46
1:A:36:TYR:HE1	1:A:190:GLN:HB2	1.80	0.46
1:A:284:GLN:O	1:A:287:ASN:N	2.48	0.46
1:A:47:HIS:O	1:A:49:GLY:N	2.48	0.46
1:A:291:HIS:CE1	1:A:292:LEU:HD23	2.50	0.46
1:A:48:ILE:N	1:A:48:ILE:HD13	2.31	0.46
1:A:174:GLN:OE1	1:A:199:ASN:HB3	2.16	0.46
1:A:190:GLN:HE21	1:A:200:ILE:HG13	1.80	0.46
1:A:68:ILE:HG12	1:A:120:VAL:HG22	1.96	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:149:MET:C	1:A:151:GLY:N	2.69	0.45
1:A:319:ILE:HG22	1:A:319:ILE:O	2.16	0.45
1:A:199:ASN:HD22	1:A:199:ASN:H	1.61	0.45
1:A:253:TYR:HE2	1:A:317:ILE:HA	1.78	0.45
1:A:55:LEU:O	1:A:58:ARG:N	2.49	0.45
1:A:107:MET:C	1:A:109:ASN:H	2.19	0.45
1:A:131:ILE:HD11	1:A:136:PHE:HB2	1.97	0.45
1:A:310:GLU:O	1:A:313:LEU:HB3	2.16	0.45
1:A:154:SER:O	1:A:157:SER:OG	2.29	0.45
1:A:90:LEU:CD2	1:A:90:LEU:H	2.30	0.45
1:A:230:LYS:O	1:A:232:PHE:N	2.50	0.45
2:A:421:383:N19	2:A:421:383:O28	2.50	0.45
1:A:264:VAL:HG12	1:A:265:ILE:N	2.31	0.45
1:A:132:SER:OG	1:A:133:LEU:N	2.50	0.45
1:A:46:LEU:HG	1:A:106:GLN:HE22	1.82	0.44
1:A:78:ILE:CG2	1:A:166:THR:HG22	2.47	0.44
1:A:178:PHE:CD1	1:A:178:PHE:C	2.90	0.44
1:A:157:SER:OG	1:A:158:ARG:N	2.48	0.44
1:A:248:SER:O	1:A:249:PRO:C	2.56	0.44
1:A:14:LEU:O	1:A:221:ILE:HA	2.17	0.44
1:A:33:VAL:H	1:A:65:HIS:CD2	2.35	0.44
1:A:60:PHE:C	1:A:62:GLU:N	2.71	0.44
1:A:221:ILE:HG22	1:A:222:PRO:O	2.18	0.44
1:A:47:HIS:CE1	1:A:50:HIS:CD2	3.05	0.43
1:A:18:GLN:HG2	1:A:219:LEU:HD23	2.00	0.43
1:A:259:GLN:O	1:A:261:ASP:N	2.51	0.43
1:A:156:GLN:HE21	1:A:157:SER:N	2.00	0.43
1:A:156:GLN:NE2	1:A:157:SER:CB	2.81	0.43
1:A:156:GLN:O	1:A:159:LEU:HB2	2.18	0.43
1:A:166:THR:HA	1:A:169:THR:HG23	2.01	0.43
1:A:197:TRP:HA	1:A:197:TRP:CE3	2.54	0.43
1:A:6:ILE:HD13	1:A:9:LEU:HD12	1.99	0.43
1:A:131:ILE:HD11	1:A:136:PHE:CB	2.48	0.43
1:A:190:GLN:NE2	1:A:200:ILE:HA	2.33	0.43
1:A:192:GLY:O	1:A:220:THR:HA	2.19	0.43
1:A:12:ARG:CB	1:A:14:LEU:HD13	2.48	0.43
1:A:152:LYS:HB2	1:A:155:ILE:CG1	2.49	0.43
1:A:158:ARG:HH11	1:A:158:ARG:CG	2.32	0.43
1:A:287:ASN:C	1:A:287:ASN:ND2	2.72	0.43
1:A:70:LEU:CD2	2:A:421:383:O13	2.63	0.42
1:A:41:PRO:HB3	1:A:100:ILE:HG22	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:52:LEU:HG	1:A:221:ILE:HG21	2.00	0.42
1:A:305:LYS:HZ3	1:A:305:LYS:HB2	1.84	0.42
1:A:4:VAL:HA	1:A:7:GLU:HB2	2.01	0.42
1:A:140:TYR:O	1:A:144:VAL:HG23	2.19	0.42
1:A:54:PHE:CD2	1:A:107:MET:HE1	2.54	0.42
1:A:88:ARG:HA	1:A:88:ARG:HD2	1.84	0.42
1:A:206:LEU:HG	1:A:210:MET:HG3	2.00	0.42
1:A:14:LEU:HA	1:A:222:PRO:CD	2.49	0.42
1:A:14:LEU:C	1:A:222:PRO:HD3	2.40	0.42
1:A:295:ALA:C	1:A:297:LYS:H	2.21	0.42
1:A:199:ASN:N	1:A:199:ASN:ND2	2.65	0.42
1:A:36:TYR:CE1	1:A:190:GLN:HB2	2.55	0.42
1:A:155:ILE:CG2	1:A:163:ILE:HD12	2.50	0.42
1:A:314:ASN:O	1:A:316:ALA:N	2.53	0.42
1:A:208:ARG:HH12	1:A:209:ARG:HH11	1.67	0.42
1:A:261:ASP:HA	1:A:264:VAL:HG21	2.02	0.42
1:A:156:GLN:CG	1:A:157:SER:N	2.82	0.42
1:A:250:TYR:CD2	1:A:319:ILE:HB	2.55	0.42
1:A:51:LEU:CD2	1:A:271:PHE:CD1	3.03	0.41
1:A:68:ILE:CD1	1:A:185:LEU:HD13	2.42	0.41
1:A:234:LYS:HA	1:A:238:GLY:O	2.20	0.41
1:A:180:HIS:O	1:A:184:GLU:HB2	2.20	0.41
1:A:190:GLN:NE2	1:A:200:ILE:CD1	2.83	0.41
1:A:233:GLY:O	1:A:239:ALA:CA	2.65	0.41
1:A:52:LEU:O	1:A:55:LEU:HB2	2.20	0.41
1:A:252:PHE:O	1:A:253:TYR:C	2.59	0.41
1:A:318:ARG:O	1:A:319:ILE:CG1	2.60	0.41
1:A:18:GLN:HG2	1:A:219:LEU:CD2	2.50	0.41
1:A:155:ILE:HG22	1:A:163:ILE:HD12	2.02	0.41
1:A:181:LEU:HB3	1:A:187:CYS:HB2	2.02	0.41
1:A:266:LYS:HG2	1:A:267:PHE:N	2.34	0.41
1:A:8:ASP:O	1:A:11:TRP:N	2.53	0.41
1:A:40:ASP:O	1:A:42:THR:N	2.52	0.41
1:A:81:PRO:HG3	1:A:167:GLU:HB3	2.01	0.41
1:A:106:GLN:O	1:A:107:MET:C	2.59	0.41
1:A:15:ILE:HG22	1:A:15:ILE:O	2.19	0.41
1:A:154:SER:O	1:A:156:GLN:NE2	2.53	0.41
1:A:23:GLY:O	1:A:27:LEU:HD23	2.21	0.40
1:A:47:HIS:O	1:A:48:ILE:C	2.60	0.40
1:A:149:MET:C	1:A:151:GLY:H	2.23	0.40
1:A:174:GLN:NE2	1:A:199:ASN:OD1	2.55	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:305:LYS:HG3	1:A:310:GLU:HA	2.04	0.40
1:A:272:THR:HG22	1:A:302:GLU:CB	2.52	0.40
1:A:86:GLU:H	1:A:158:ARG:NH1	2.19	0.40
1:A:20:ASP:O	1:A:21:GLU:C	2.59	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	317/420 (76%)	238 (75%)	53 (17%)	26 (8%)	<b>1</b> <b>5</b>

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3	ASN
1	A	119	ALA
1	A	231	LYS
1	A	260	SER
1	A	261	ASP
1	A	319	ILE
1	A	88	ARG
1	A	89	VAL
1	A	108	HIS
1	A	138	ARG
1	A	186	ASN
1	A	213	GLN
1	A	214	THR
1	A	238	GLY
1	A	253	TYR
1	A	48	ILE
1	A	61	GLN

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Mol	Chain	Res	Type
1	A	77	MET
1	A	154	SER
1	A	215	ASP
1	A	296	GLN
1	A	246	LYS
1	A	262	GLU
1	A	299	LEU
1	A	240	VAL
1	A	242	LEU

### 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	276/364 (76%)	211 (76%)	65 (24%)	<b>1</b> <b>3</b>

All (65) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	VAL
1	A	8	ASP
1	A	17	GLN
1	A	25	GLU
1	A	26	ASP
1	A	31	GLU
1	A	36	TYR
1	A	42	THR
1	A	48	ILE
1	A	51	LEU
1	A	57	LEU
1	A	67	PRO
1	A	70	LEU
1	A	75	THR
1	A	87	GLU
1	A	88	ARG
1	A	89	VAL

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	90	LEU
1	A	91	GLN
1	A	97	ASP
1	A	99	ASN
1	A	101	GLU
1	A	103	ILE
1	A	107	MET
1	A	120	VAL
1	A	131	ILE
1	A	133	LEU
1	A	147	ASN
1	A	150	LEU
1	A	155	ILE
1	A	156	GLN
1	A	158	ARG
1	A	161	HIS
1	A	163	ILE
1	A	169	THR
1	A	178	PHE
1	A	181	LEU
1	A	182	ASN
1	A	187	CYS
1	A	196	GLN
1	A	199	ASN
1	A	201	THR
1	A	207	MET
1	A	208	ARG
1	A	209	ARG
1	A	210	MET
1	A	211	TYR
1	A	213	GLN
1	A	223	LEU
1	A	225	THR
1	A	226	LYS
1	A	231	LYS
1	A	235	SER
1	A	253	TYR
1	A	257	ILE
1	A	266	LYS
1	A	287	ASN
1	A	288	GLU
1	A	292	LEU

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Mol	Chain	Res	Type
1	A	296	GLN
1	A	298	THR
1	A	311	ASP
1	A	315	ASP
1	A	317	ILE
1	A	318	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	47	HIS
1	A	65	HIS
1	A	99	ASN
1	A	156	GLN
1	A	174	GLN
1	A	182	ASN
1	A	199	ASN
1	A	287	ASN
1	A	296	GLN
1	A	308	HIS
1	A	314	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
2	383	A	421	-	26,31,31	1.67	8 (30%)	29,47,47	1.44	4 (13%)

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	383	A	421	-	-	11/20/54/54	0/3/3/3

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	421	383	C14-C9	3.31	1.59	1.51
2	A	421	383	C17-N19	-3.09	1.27	1.34
2	A	421	383	C20-C6	-2.85	1.51	1.54
2	A	421	383	O23-C21	2.76	1.39	1.30
2	A	421	383	C8-C9	2.54	1.43	1.38
2	A	421	383	O31-C4	2.23	1.45	1.42
2	A	421	383	O28-N5	-2.13	1.41	1.45
2	A	421	383	C10-C9	2.10	1.43	1.38

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	421	383	C30-C2-C3	5.01	106.68	101.06
2	A	421	383	O31-C30-C2	-2.82	102.54	105.72
2	A	421	383	C14-C15-C17	2.76	115.44	108.97
2	A	421	383	O29-C2-C1	2.02	114.09	109.48

There are no chirality outliers.

All (11) torsion outliers are listed below:

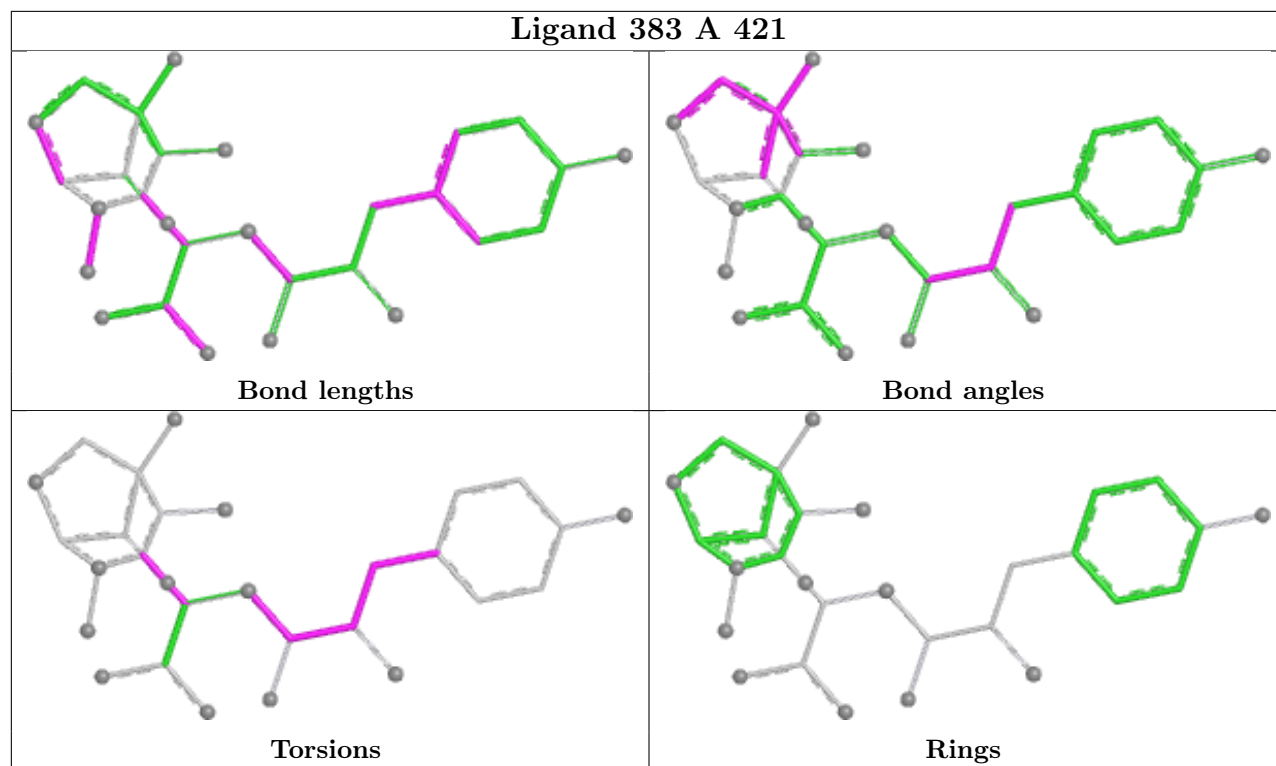
Mol	Chain	Res	Type	Atoms
2	A	421	383	C14-C15-C17-N19
2	A	421	383	C14-C15-C17-O18
2	A	421	383	N19-C20-C6-N5
2	A	421	383	N19-C20-C6-C1
2	A	421	383	C21-C20-C6-C1
2	A	421	383	C9-C14-C15-N16
2	A	421	383	C15-C14-C9-C8
2	A	421	383	C15-C14-C9-C10
2	A	421	383	C9-C14-C15-C17
2	A	421	383	C21-C20-C6-N5
2	A	421	383	O18-C17-N19-C20

There are no ring outliers.

1 monomer is involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	421	383	7	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.