



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 1, 2026 – 01:44 AM UTC

PDB ID : 1JIJ / pdb_00001jjj
Title : Crystal structure of S. aureus TyrRS in complex with SB-239629
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

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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

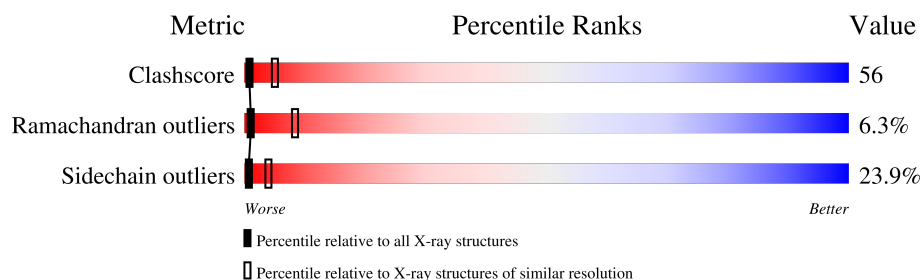
1 Overall quality at a glance

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	190562	1573 (3.20-3.20)
Ramachandran outliers	187476	1548 (3.20-3.20)
Sidechain outliers	187428	1547 (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 ≥ 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](#)

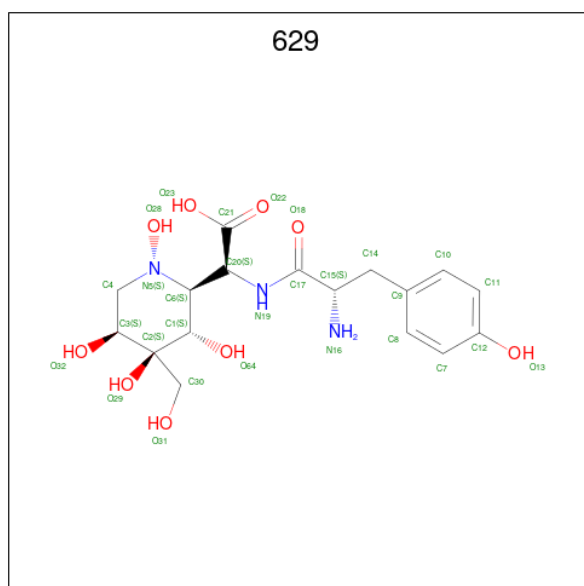
There are 2 unique types of molecules in this entry. The entry contains 2585 atoms, of which 0 are hydrogens and 0 are deuteriums.

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.

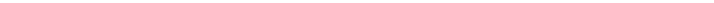
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	319	2556	1617	438	494	7	0	0	0

- Molecule 2 is [2-AMINO-3-(4-HYDROXY-PHENYL)-PROPIONYLAMINO]-(1,3,4,5-TETRAHYDROXY-4-HYDROXYMETHYL-PIPERIDIN-2-YL)- ACETIC ACID (CCD ID: 629) (formula: C₁₇H₂₅N₃O₉).



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

Note EDS was not executed.

- Chain A: 



4 Data and refinement statistics

Xtriage (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, α , β , γ	70.09Å 98.93Å 143.14Å 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}	0.11	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.257 , 0.305	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	2585	wwPDB-VP
Average B, all atoms (Å ²)	15.0	wwPDB-VP

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 629

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	0.92	2/2608 (0.1%)	1.33	27/3519 (0.8%)

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 (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	163	ILE	CA-CB	7.62	1.63	1.54
1	A	107	MET	SD-CE	-7.32	1.61	1.79

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	319	ILE	N-CA-C	-10.36	103.86	113.71
1	A	236	GLU	N-CA-C	-9.30	101.14	111.28
1	A	308	HIS	N-CA-C	8.54	123.83	113.41
1	A	155	ILE	N-CA-C	8.10	118.19	110.42
1	A	167	GLU	N-CA-C	-8.04	102.59	111.36
1	A	11	TRP	N-CA-C	-8.01	100.51	112.04
1	A	313	LEU	N-CA-C	-7.89	102.61	111.14
1	A	139	ASP	N-CA-C	7.49	120.32	111.71
1	A	161	HIS	N-CA-C	-7.12	101.76	110.88
1	A	237	SER	N-CA-C	-7.09	95.68	108.58
1	A	271	PHE	N-CA-C	6.90	121.87	113.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	160	GLU	N-CA-C	6.88	119.80	111.82
1	A	175	ALA	N-CA-C	-6.82	103.78	111.14
1	A	305	LYS	N-CA-C	-6.59	104.09	111.28
1	A	287	ASN	N-CA-C	6.57	120.76	112.87
1	A	283	GLU	N-CA-C	-6.01	105.03	112.90
1	A	234	LYS	N-CA-C	5.74	118.15	107.99
1	A	248	SER	N-CA-C	5.61	118.43	110.24
1	A	86	GLU	N-CA-C	-5.33	100.42	108.46
1	A	15	ILE	N-CA-C	5.30	115.15	106.72
1	A	125	ARG	N-CA-C	-5.29	106.66	113.01
1	A	18	GLN	N-CA-C	-5.26	101.30	109.72
1	A	91	GLN	N-CA-C	5.19	117.28	109.23
1	A	240	VAL	N-CA-C	-5.18	98.58	109.34
1	A	241	TRP	N-CA-C	5.17	117.99	109.76
1	A	258	ASN	N-CA-C	-5.10	106.74	113.17
1	A	63	HIS	CB-CA-C	-5.02	104.58	112.12

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 [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	2556	0	2492	283	0
2	A	29	0	24	7	0
All	All	2585	0	2516	286	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 56.

All (286) 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:48:ILE:HD11	1:A:233:GLY:HA2	1.41	0.99
1:A:284:GLN:HA	1:A:287:ASN:OD1	1.63	0.98
1:A:41:PRO:HG2	1:A:100:ILE:HG22	1.54	0.88
1:A:190:GLN:HG2	1:A:200:ILE:HG13	1.55	0.88
1:A:41:PRO:CG	1:A:100:ILE:HG22	2.03	0.87
1:A:305:LYS:HG3	1:A:313:LEU:HD22	1.58	0.85
1:A:18:GLN:HB3	1:A:24:ILE:HD12	1.58	0.85
1:A:54:PHE:CZ	1:A:107:MET:HE1	2.12	0.85
1:A:208:ARG:HA	1:A:213:GLN:H	1.41	0.84
1:A:48:ILE:HD11	1:A:233:GLY:CA	2.06	0.84
1:A:305:LYS:HG2	1:A:310:GLU:HA	1.60	0.84
1:A:6:ILE:HD11	1:A:28:LEU:HD13	1.58	0.84
1:A:265:ILE:O	1:A:268:LEU:HB2	1.75	0.84
1:A:221:ILE:HG23	1:A:222:PRO:HD2	1.60	0.83
1:A:52:LEU:HB3	1:A:53:PRO:HD3	1.60	0.81
1:A:310:GLU:O	1:A:313:LEU:HB3	1.82	0.80
1:A:158:ARG:HB3	1:A:163:ILE:HB	1.63	0.79
1:A:314:ASN:HA	1:A:317:ILE:HD12	1.65	0.78
1:A:156:GLN:HG2	1:A:157:SER:N	1.97	0.77
1:A:68:ILE:HG23	1:A:120:VAL:HG23	1.67	0.77
1:A:3:ASN:O	1:A:7:GLU:HG2	1.85	0.76
1:A:245:GLU:O	1:A:246:LYS:HG2	1.84	0.76
1:A:48:ILE:HD12	1:A:240:VAL:HB	1.68	0.75
1:A:84:LYS:H	1:A:84:LYS:HD2	1.51	0.75
1:A:78:ILE:HG23	1:A:166:THR:HG22	1.69	0.75
2:A:421:629:O31	2:A:421:629:H6	1.86	0.74
1:A:82:SER:O	1:A:84:LYS:HD2	1.87	0.74
1:A:4:VAL:O	1:A:7:GLU:HB2	1.88	0.74
1:A:261:ASP:O	1:A:264:VAL:HG12	1.88	0.73
1:A:59:ARG:NH1	1:A:273:PHE:CD1	2.58	0.72
1:A:51:LEU:HD11	1:A:307:ILE:HD11	1.72	0.72
1:A:313:LEU:HG	1:A:317:ILE:HD11	1.72	0.72
1:A:213:GLN:HG2	1:A:213:GLN:O	1.88	0.71
1:A:75:THR:HB	1:A:170:TYR:CE2	2.25	0.71
1:A:36:TYR:HB2	1:A:68:ILE:HB	1.72	0.71
1:A:51:LEU:HD13	1:A:242:LEU:HD11	1.73	0.70
1:A:190:GLN:NE2	1:A:200:ILE:HA	2.07	0.70
1:A:253:TYR:HE1	1:A:257:ILE:HD13	1.56	0.70
1:A:17:GLN:HG2	1:A:220:THR:OG1	1.92	0.69
1:A:46:LEU:H	1:A:106:GLN:HE22	1.40	0.69
1:A:69:VAL:CG1	1:A:107:MET:HE3	2.23	0.69
1:A:133:LEU:O	1:A:137:LEU:HG	1.93	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:313:LEU:O	1:A:317:ILE:HG13	1.91	0.69
1:A:94:GLU:HA	1:A:97:ASP:OD1	1.93	0.69
1:A:305:LYS:HG3	1:A:313:LEU:CD2	2.22	0.68
1:A:199:ASN:N	1:A:199:ASN:HD22	1.93	0.67
1:A:54:PHE:CE1	1:A:107:MET:HE1	2.29	0.67
1:A:11:TRP:CH2	1:A:276:LYS:HA	2.30	0.66
1:A:48:ILE:HG12	1:A:232:PHE:CE1	2.31	0.66
1:A:255:PHE:O	1:A:259:GLN:HG2	1.95	0.66
1:A:265:ILE:HA	1:A:268:LEU:HD12	1.75	0.66
1:A:241:TRP:O	1:A:247:THR:HB	1.96	0.65
1:A:254:GLN:NE2	1:A:257:ILE:HD11	2.11	0.65
1:A:46:LEU:HD12	1:A:106:GLN:CD	2.22	0.64
1:A:148:TYR:CZ	1:A:152:LYS:NZ	2.67	0.63
1:A:67:PRO:O	1:A:119:ALA:HA	1.98	0.63
1:A:6:ILE:HD11	1:A:28:LEU:CD1	2.26	0.63
1:A:55:LEU:CD2	1:A:306:PHE:HE2	2.10	0.63
1:A:39:ALA:HA	2:A:421:629:O23	1.99	0.63
1:A:201:THR:O	1:A:204:ILE:HG12	1.99	0.62
1:A:152:LYS:HE3	1:A:202:SER:OG	1.99	0.62
2:A:421:629:O31	2:A:421:629:C6	2.47	0.62
1:A:46:LEU:N	1:A:106:GLN:HE22	1.97	0.61
1:A:67:PRO:HG2	1:A:119:ALA:HB2	1.83	0.61
1:A:196:GLN:O	1:A:200:ILE:HD13	1.98	0.61
1:A:253:TYR:CE1	1:A:257:ILE:HG21	2.36	0.61
1:A:24:ILE:HG22	1:A:28:LEU:HD12	1.82	0.61
1:A:35:LEU:O	1:A:67:PRO:HA	2.00	0.61
1:A:46:LEU:HD23	1:A:50:HIS:ND1	2.15	0.61
1:A:69:VAL:HG11	1:A:107:MET:HE3	1.83	0.61
1:A:92:THR:OG1	1:A:95:GLN:NE2	2.34	0.61
1:A:18:GLN:OE1	1:A:21:GLU:HG3	2.00	0.61
1:A:84:LYS:HE2	1:A:88:ARG:HH11	1.66	0.61
1:A:268:LEU:O	1:A:272:THR:HG23	2.01	0.60
1:A:150:LEU:HD22	1:A:168:PHE:CZ	2.38	0.58
1:A:206:LEU:O	1:A:206:LEU:HG	2.01	0.58
1:A:75:THR:HB	1:A:170:TYR:HE2	1.68	0.58
1:A:33:VAL:HG12	1:A:34:THR:N	2.18	0.58
1:A:287:ASN:C	1:A:287:ASN:HD22	2.12	0.58
1:A:256:TRP:O	1:A:259:GLN:HB2	2.04	0.57
1:A:296:GLN:H	1:A:296:GLN:HE21	1.51	0.57
1:A:35:LEU:HD12	1:A:191:VAL:HG21	1.84	0.57
1:A:69:VAL:HG13	1:A:107:MET:HE3	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:224:VAL:HG21	1:A:232:PHE:CD1	2.40	0.56
1:A:257:ILE:HG22	1:A:300:ALA:HB2	1.88	0.56
1:A:35:LEU:HD12	1:A:191:VAL:CG2	2.35	0.56
1:A:248:SER:OG	1:A:251:GLU:HG3	2.05	0.56
1:A:199:ASN:HD22	1:A:199:ASN:H	1.54	0.56
1:A:55:LEU:HD21	1:A:306:PHE:CE2	2.40	0.56
1:A:165:TYR:O	1:A:169:THR:HG22	2.05	0.56
1:A:180:HIS:O	1:A:184:GLU:HB2	2.05	0.56
1:A:248:SER:HG	1:A:251:GLU:HG3	1.70	0.56
1:A:45:SER:HA	1:A:106:GLN:NE2	2.21	0.56
1:A:284:GLN:O	1:A:287:ASN:ND2	2.38	0.56
1:A:55:LEU:HD21	1:A:306:PHE:HE2	1.71	0.55
1:A:41:PRO:HG2	1:A:100:ILE:CG2	2.31	0.55
1:A:210:MET:HE2	1:A:211:TYR:CE2	2.41	0.55
1:A:213:GLN:O	1:A:213:GLN:CG	2.54	0.55
1:A:190:GLN:HE21	1:A:200:ILE:HA	1.71	0.55
1:A:33:VAL:HG11	1:A:189:ILE:HD12	1.88	0.55
1:A:292:LEU:HD13	1:A:292:LEU:O	2.07	0.55
1:A:17:GLN:HG2	1:A:220:THR:HG1	1.70	0.55
1:A:158:ARG:HA	1:A:158:ARG:NE	2.21	0.55
1:A:311:ASP:O	1:A:314:ASN:HB2	2.07	0.55
1:A:11:TRP:CZ2	1:A:276:LYS:HG3	2.42	0.54
1:A:58:ARG:HD2	1:A:111:PHE:CE1	2.43	0.54
1:A:257:ILE:HG13	1:A:258:ASN:ND2	2.23	0.54
1:A:78:ILE:CG2	1:A:166:THR:HG22	2.38	0.54
1:A:107:MET:O	1:A:110:ILE:N	2.40	0.54
1:A:48:ILE:HG12	1:A:232:PHE:HE1	1.72	0.54
1:A:85:SER:OG	1:A:157:SER:HB2	2.08	0.53
1:A:78:ILE:HG23	1:A:166:THR:CG2	2.38	0.53
1:A:52:LEU:HB3	1:A:53:PRO:CD	2.35	0.53
1:A:2:THR:O	1:A:3:ASN:HB3	2.09	0.53
1:A:296:GLN:H	1:A:296:GLN:NE2	2.07	0.53
1:A:150:LEU:HD22	1:A:168:PHE:HZ	1.72	0.52
1:A:182:ASN:C	1:A:182:ASN:HD22	2.16	0.52
1:A:190:GLN:CG	1:A:200:ILE:HG13	2.33	0.52
1:A:149:MET:C	1:A:151:GLY:H	2.17	0.52
1:A:281:ARG:O	1:A:284:GLN:HB3	2.10	0.52
1:A:163:ILE:HG13	1:A:167:GLU:HB2	1.90	0.52
1:A:257:ILE:HG22	1:A:300:ALA:CB	2.40	0.52
1:A:33:VAL:HG11	1:A:189:ILE:CD1	2.39	0.52
1:A:231:LYS:HD2	1:A:231:LYS:N	2.25	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:287:ASN:HD22	1:A:288:GLU:N	2.08	0.52
1:A:68:ILE:HD13	1:A:185:LEU:HD13	1.92	0.52
1:A:40:ASP:HB3	1:A:76:GLY:HA2	1.90	0.51
1:A:185:LEU:O	1:A:186:ASN:CB	2.58	0.51
1:A:55:LEU:CD2	1:A:306:PHE:CE2	2.92	0.51
1:A:20:ASP:OD2	1:A:23:GLY:HA3	2.10	0.51
1:A:245:GLU:C	1:A:246:LYS:HG2	2.35	0.51
1:A:96:VAL:HG12	1:A:125:ARG:HH12	1.74	0.51
1:A:68:ILE:HD13	1:A:120:VAL:CG2	2.41	0.51
1:A:158:ARG:CB	1:A:163:ILE:HB	2.37	0.51
1:A:236:GLU:O	1:A:238:GLY:N	2.43	0.51
1:A:3:ASN:HB3	1:A:29:ASN:ND2	2.25	0.51
1:A:107:MET:O	1:A:109:ASN:N	2.43	0.51
1:A:152:LYS:HB2	1:A:155:ILE:CG1	2.41	0.51
1:A:73:GLY:HA3	1:A:123:ASN:OD1	2.10	0.50
1:A:174:GLN:HG3	2:A:421:629:C11	2.42	0.50
1:A:284:GLN:HA	1:A:287:ASN:CG	2.36	0.50
1:A:18:GLN:HB3	1:A:24:ILE:CD1	2.36	0.50
1:A:52:LEU:HG	1:A:221:ILE:HG21	1.93	0.50
1:A:205:GLU:O	1:A:208:ARG:HG3	2.12	0.50
1:A:33:VAL:N	1:A:65:HIS:HD2	2.10	0.49
1:A:46:LEU:H	1:A:106:GLN:NE2	2.06	0.49
1:A:253:TYR:HE2	1:A:317:ILE:HG12	1.76	0.49
1:A:156:GLN:O	1:A:157:SER:C	2.55	0.49
1:A:48:ILE:CG1	1:A:232:PHE:CE1	2.96	0.49
1:A:84:LYS:HE2	1:A:88:ARG:NH1	2.28	0.49
1:A:96:VAL:CG1	1:A:125:ARG:NH1	2.76	0.49
1:A:144:VAL:HG11	1:A:172:ILE:CD1	2.42	0.49
1:A:191:VAL:HG13	1:A:221:ILE:HD13	1.93	0.49
1:A:54:PHE:CE2	1:A:107:MET:HE1	2.46	0.49
1:A:293:ARG:O	1:A:297:LYS:HB2	2.14	0.48
1:A:144:VAL:HG12	1:A:144:VAL:O	2.12	0.48
1:A:228:ASP:OD1	1:A:230:LYS:HB2	2.13	0.48
1:A:289:ALA:N	1:A:290:PRO:CD	2.76	0.48
1:A:69:VAL:HG12	1:A:121:LEU:HD12	1.95	0.48
1:A:90:LEU:HD23	1:A:90:LEU:H	1.78	0.48
1:A:182:ASN:C	1:A:182:ASN:ND2	2.71	0.48
1:A:224:VAL:HG23	1:A:224:VAL:O	2.13	0.48
1:A:201:THR:HG22	1:A:202:SER:N	2.27	0.48
1:A:24:ILE:HG22	1:A:28:LEU:CD1	2.42	0.48
1:A:297:LYS:O	1:A:300:ALA:HB3	2.14	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:305:LYS:HA	1:A:309:GLY:O	2.13	0.48
1:A:155:ILE:HG23	1:A:163:ILE:HD13	1.94	0.47
1:A:318:ARG:CG	1:A:318:ARG:O	2.62	0.47
1:A:254:GLN:HE22	1:A:257:ILE:HD11	1.77	0.47
1:A:96:VAL:HG12	1:A:125:ARG:NH1	2.30	0.47
1:A:235:SER:N	1:A:238:GLY:O	2.47	0.47
1:A:158:ARG:HG3	1:A:158:ARG:HH11	1.78	0.47
1:A:59:ARG:NH1	1:A:273:PHE:CE1	2.82	0.47
1:A:70:LEU:C	1:A:70:LEU:HD23	2.40	0.47
1:A:196:GLN:HB3	1:A:200:ILE:HD13	1.96	0.47
1:A:90:LEU:HD23	1:A:90:LEU:N	2.29	0.47
1:A:115:THR:OG1	1:A:118:GLY:N	2.48	0.46
2:A:421:629:O28	2:A:421:629:N19	2.48	0.46
1:A:36:TYR:CB	1:A:68:ILE:HB	2.41	0.46
1:A:149:MET:HE2	1:A:149:MET:HB3	1.76	0.46
1:A:80:ASP:HA	1:A:81:PRO:HD2	1.80	0.46
1:A:252:PHE:CD2	1:A:308:HIS:CD2	3.03	0.46
1:A:283:GLU:O	1:A:286:LYS:HB3	2.15	0.46
1:A:94:GLU:O	1:A:98:LYS:N	2.49	0.46
1:A:159:LEU:HD12	1:A:163:ILE:HG21	1.96	0.46
1:A:314:ASN:O	1:A:315:ASP:C	2.59	0.46
1:A:33:VAL:H	1:A:65:HIS:CD2	2.34	0.46
1:A:237:SER:O	1:A:239:ALA:O	2.33	0.46
1:A:302:GLU:OE2	1:A:302:GLU:HA	2.16	0.46
1:A:214:THR:O	1:A:215:ASP:HB2	2.15	0.46
1:A:60:PHE:O	1:A:61:GLN:C	2.59	0.46
1:A:144:VAL:HG11	1:A:172:ILE:HG12	1.97	0.46
1:A:318:ARG:O	1:A:318:ARG:HD3	2.15	0.46
1:A:6:ILE:O	1:A:10:LYS:HG2	2.16	0.46
1:A:50:HIS:HA	2:A:421:629:H302	1.97	0.46
1:A:57:LEU:CB	1:A:111:PHE:HZ	2.29	0.46
1:A:242:LEU:HD13	1:A:307:ILE:HD12	1.99	0.45
1:A:47:HIS:NE2	1:A:50:HIS:CD2	2.85	0.45
1:A:276:LYS:HE2	1:A:276:LYS:HB3	1.79	0.45
1:A:60:PHE:O	1:A:62:GLU:N	2.50	0.45
1:A:94:GLU:O	1:A:98:LYS:HB2	2.16	0.45
1:A:174:GLN:HA	1:A:177:ASP:OD1	2.16	0.45
1:A:55:LEU:O	1:A:58:ARG:N	2.49	0.45
1:A:69:VAL:HG12	1:A:121:LEU:CD1	2.46	0.45
1:A:83:GLY:O	1:A:84:LYS:C	2.59	0.45
1:A:51:LEU:HD12	1:A:51:LEU:HA	1.75	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:197:TRP:HA	1:A:197:TRP:CE3	2.52	0.45
1:A:277:GLU:OE2	1:A:277:GLU:HA	2.17	0.45
1:A:237:SER:O	1:A:238:GLY:C	2.59	0.45
1:A:261:ASP:OD2	1:A:296:GLN:OE1	2.35	0.45
1:A:174:GLN:CD	1:A:199:ASN:HB3	2.42	0.45
1:A:265:ILE:CD1	1:A:268:LEU:HD12	2.47	0.44
1:A:135:SER:O	1:A:138:ARG:N	2.51	0.44
1:A:231:LYS:O	1:A:232:PHE:C	2.58	0.44
1:A:35:LEU:HD23	1:A:66:ARG:O	2.16	0.44
1:A:41:PRO:CB	1:A:100:ILE:HG22	2.46	0.44
1:A:155:ILE:H	1:A:155:ILE:HG12	1.57	0.44
1:A:144:VAL:HG11	1:A:172:ILE:HD11	2.00	0.44
1:A:152:LYS:HB2	1:A:155:ILE:HG13	1.98	0.44
1:A:229:GLY:O	1:A:230:LYS:CG	2.65	0.44
1:A:241:TRP:C	1:A:243:ASP:H	2.25	0.44
1:A:265:ILE:HD12	1:A:268:LEU:HD12	1.99	0.44
1:A:317:ILE:C	1:A:319:ILE:H	2.24	0.44
1:A:135:SER:O	1:A:136:PHE:C	2.60	0.44
1:A:239:ALA:HB3	1:A:241:TRP:NE1	2.32	0.44
1:A:69:VAL:O	1:A:121:LEU:HD12	2.18	0.44
1:A:182:ASN:ND2	1:A:182:ASN:O	2.49	0.44
1:A:46:LEU:HD12	1:A:106:GLN:NE2	2.33	0.44
1:A:67:PRO:HD2	1:A:119:ALA:HA	1.99	0.44
1:A:155:ILE:O	1:A:158:ARG:HB2	2.17	0.44
1:A:72:GLY:O	1:A:74:GLY:N	2.51	0.43
1:A:264:VAL:HG13	1:A:265:ILE:N	2.33	0.43
1:A:182:ASN:HD21	1:A:214:THR:HB	1.82	0.43
1:A:239:ALA:HB3	1:A:241:TRP:CE2	2.52	0.43
1:A:149:MET:HE1	1:A:172:ILE:HG13	2.00	0.43
1:A:277:GLU:O	1:A:280:ASP:HB2	2.17	0.43
1:A:39:ALA:CA	2:A:421:629:O23	2.66	0.43
1:A:82:SER:O	1:A:84:LYS:CD	2.63	0.43
1:A:110:ILE:O	1:A:110:ILE:HG22	2.18	0.43
1:A:254:GLN:HG3	1:A:258:ASN:OD1	2.18	0.43
1:A:314:ASN:O	1:A:317:ILE:N	2.52	0.43
1:A:20:ASP:O	1:A:24:ILE:HG13	2.18	0.43
1:A:67:PRO:HD2	1:A:119:ALA:CA	2.48	0.43
1:A:77:MET:C	1:A:78:ILE:HD13	2.43	0.43
1:A:249:PRO:O	1:A:253:TYR:HB2	2.19	0.43
1:A:33:VAL:HG12	1:A:34:THR:H	1.82	0.43
1:A:87:GLU:HG2	1:A:167:GLU:OE2	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:201:THR:CG2	1:A:202:SER:N	2.82	0.43
1:A:279:ILE:O	1:A:280:ASP:C	2.59	0.43
1:A:67:PRO:HG2	1:A:119:ALA:CB	2.47	0.43
1:A:80:ASP:O	1:A:84:LYS:HD3	2.19	0.43
1:A:266:LYS:O	1:A:269:LYS:N	2.51	0.43
1:A:23:GLY:O	1:A:27:LEU:CD2	2.68	0.42
1:A:284:GLN:O	1:A:285:SER:C	2.62	0.42
1:A:73:GLY:C	1:A:125:ARG:HB2	2.45	0.42
1:A:107:MET:C	1:A:109:ASN:N	2.78	0.42
1:A:156:GLN:CG	1:A:157:SER:N	2.76	0.42
1:A:170:TYR:O	1:A:173:LEU:HB2	2.20	0.42
1:A:298:THR:HA	1:A:301:GLU:HG2	2.02	0.42
1:A:40:ASP:OD2	1:A:72:GLY:HA3	2.20	0.42
1:A:68:ILE:HD13	1:A:120:VAL:HG21	2.00	0.41
1:A:67:PRO:HD2	1:A:119:ALA:HB2	2.02	0.41
1:A:261:ASP:HA	1:A:296:GLN:OE1	2.20	0.41
1:A:47:HIS:NE2	1:A:50:HIS:NE2	2.68	0.41
1:A:318:ARG:O	1:A:318:ARG:HG2	2.20	0.41
1:A:185:LEU:O	1:A:186:ASN:HB2	2.20	0.41
1:A:175:ALA:O	1:A:176:ILE:C	2.61	0.41
1:A:210:MET:C	1:A:211:TYR:CG	2.99	0.41
1:A:33:VAL:CG1	1:A:34:THR:N	2.83	0.41
1:A:279:ILE:O	1:A:283:GLU:N	2.54	0.41
1:A:51:LEU:HD13	1:A:242:LEU:CD1	2.48	0.41
1:A:127:TRP:O	1:A:131:ILE:HG22	2.21	0.41
1:A:152:LYS:HA	1:A:152:LYS:HD3	1.93	0.41
1:A:194:SER:C	1:A:196:GLN:H	2.30	0.40
1:A:233:GLY:O	1:A:239:ALA:HA	2.22	0.40
1:A:248:SER:O	1:A:252:PHE:N	2.44	0.40
1:A:58:ARG:O	1:A:59:ARG:C	2.64	0.40
1:A:149:MET:C	1:A:151:GLY:N	2.79	0.40
1:A:45:SER:HA	1:A:106:GLN:HE22	1.85	0.40
1:A:74:GLY:C	1:A:76:GLY:N	2.80	0.40
1:A:205:GLU:OE1	1:A:208:ARG:NH2	2.51	0.40
1:A:287:ASN:C	1:A:287:ASN:ND2	2.78	0.40
1:A:287:ASN:HD22	1:A:288:GLU:HB3	1.86	0.40
1:A:209:ARG:H	1:A:209:ARG:HG2	1.68	0.40
1:A:235:SER:HB2	1:A:237:SER:O	2.22	0.40
1:A:305:LYS:CG	1:A:313:LEU:HD22	2.40	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%)	59 (19%)	20 (6%)	1 8

All (20) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3	ASN
1	A	131	ILE
1	A	212	GLY
1	A	214	THR
1	A	108	HIS
1	A	162	GLY
1	A	213	GLN
1	A	231	LYS
1	A	238	GLY
1	A	67	PRO
1	A	211	TYR
1	A	84	LYS
1	A	135	SER
1	A	136	PHE
1	A	318	ARG
1	A	295	ALA
1	A	300	ALA
1	A	290	PRO
1	A	144	VAL
1	A	52	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%)	210 (76%)	66 (24%)	1 4

All (66) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	ASN
1	A	4	VAL
1	A	25	GLU
1	A	26	ASP
1	A	36	TYR
1	A	42	THR
1	A	48	ILE
1	A	57	LEU
1	A	68	ILE
1	A	85	SER
1	A	87	GLU
1	A	90	LEU
1	A	92	THR
1	A	96	VAL
1	A	97	ASP
1	A	98	LYS
1	A	100	ILE
1	A	101	GLU
1	A	103	ILE
1	A	104	SER
1	A	105	LYS
1	A	110	ILE
1	A	120	VAL
1	A	131	ILE
1	A	132	SER
1	A	133	LEU
1	A	143	HIS
1	A	149	MET
1	A	150	LEU
1	A	154	SER
1	A	155	ILE
1	A	156	GLN
1	A	159	LEU
1	A	160	GLU
1	A	163	ILE
1	A	169	THR

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Mol	Chain	Res	Type
1	A	182	ASN
1	A	196	GLN
1	A	199	ASN
1	A	201	THR
1	A	204	ILE
1	A	206	LEU
1	A	207	MET
1	A	209	ARG
1	A	211	TYR
1	A	213	GLN
1	A	214	THR
1	A	215	ASP
1	A	219	LEU
1	A	225	THR
1	A	231	LYS
1	A	254	GLN
1	A	261	ASP
1	A	272	THR
1	A	287	ASN
1	A	288	GLU
1	A	292	LEU
1	A	293	ARG
1	A	296	GLN
1	A	297	LYS
1	A	298	THR
1	A	299	LEU
1	A	302	GLU
1	A	305	LYS
1	A	311	ASP
1	A	315	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3	ASN
1	A	17	GLN
1	A	29	ASN
1	A	32	GLN
1	A	65	HIS
1	A	95	GLN
1	A	99	ASN
1	A	106	GLN

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Mol	Chain	Res	Type
1	A	161	HIS
1	A	174	GLN
1	A	182	ASN
1	A	196	GLN
1	A	199	ASN
1	A	284	GLN
1	A	287	ASN
1	A	296	GLN
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 oligosaccharides 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	629	A	421	-	25,30,30	1.42	5 (20%)	31,44,44	0.95	2 (6%)

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	629	A	421	-	-	10/23/47/47	0/2/2/2

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	421	629	O28-N5	-4.31	1.34	1.45
2	A	421	629	C20-C6	-2.43	1.51	1.54
2	A	421	629	C30-C2	2.29	1.58	1.52
2	A	421	629	O23-C21	2.13	1.37	1.30
2	A	421	629	C2-C1	2.05	1.58	1.53

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	421	629	C20-N19-C17	2.43	127.92	121.90
2	A	421	629	C14-C15-C17	2.15	114.00	108.97

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	421	629	C14-C15-C17-N19
2	A	421	629	C14-C15-C17-O18
2	A	421	629	N19-C20-C6-N5
2	A	421	629	N19-C20-C6-C1
2	A	421	629	C21-C20-C6-N5
2	A	421	629	C1-C2-C30-O31
2	A	421	629	C15-C14-C9-C10
2	A	421	629	C15-C14-C9-C8
2	A	421	629	O29-C2-C30-O31
2	A	421	629	C21-C20-C6-C1

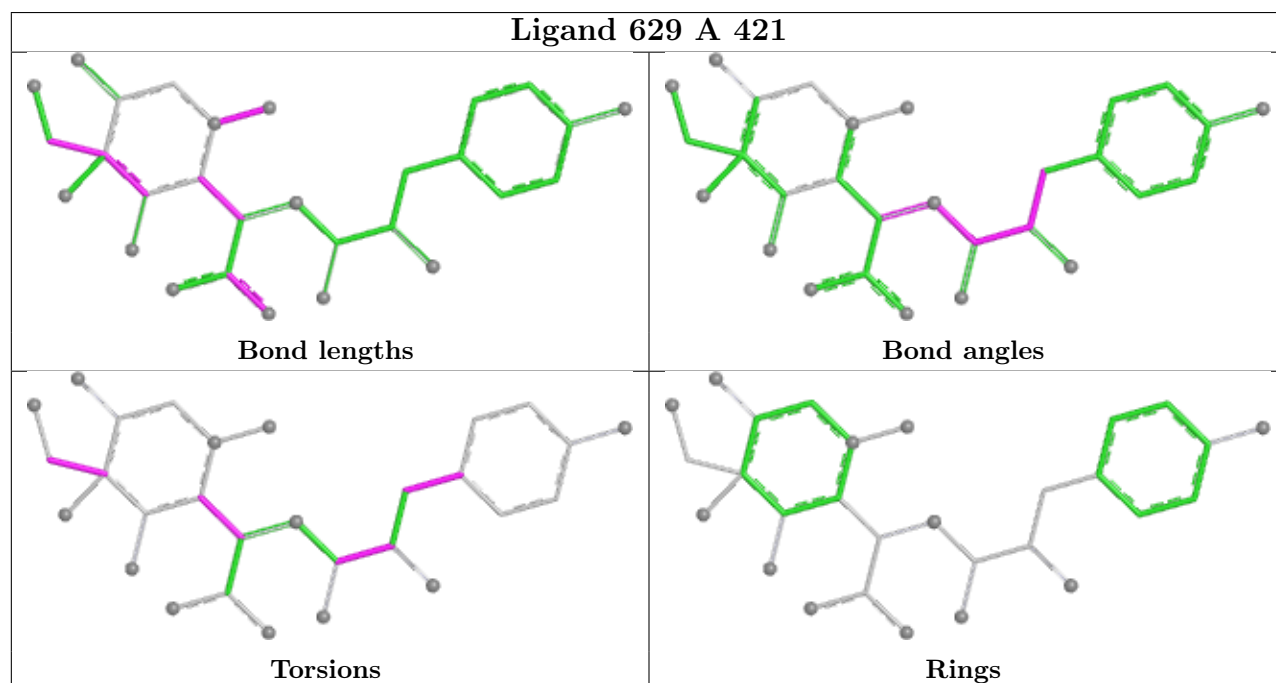
There are no ring outliers.

1 monomer is involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	421	629	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.