



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 05:27 PM UTC

PDB ID : 1Z6J / pdb_00001z6j
Title : Crystal Structure of a ternary complex of Factor VIIa/Tissue Factor/Pyrazinone Inhibitor
Authors : Schweitzer, B.A.; Neumann, W.L.; Rahman, H.K.; Kusturin, C.L.; Sample, K.R.; Poda, G.I.; Kurumbail, R.G.; Stevens, A.M.; Stegeman, R.A.; Stallings, W.C.
Deposited on : 2005-03-22
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

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](#) ①) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

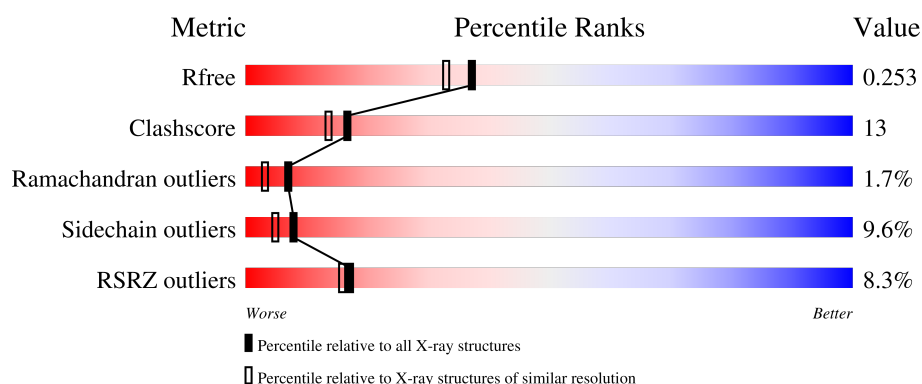
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 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))
R_{free}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (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 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	L	142	15% 64% 27% 8%
2	H	254	2% 79% 18%
3	T	211	11% 62% 25% 9%

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 5207 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 Coagulation factor VII.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	142	Total	C	N	O	S	0	0	0
			1135	683	189	248	15			

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	6	CGU	GLU	modified residue	UNP P08709
L	7	CGU	GLU	modified residue	UNP P08709
L	14	CGU	GLU	modified residue	UNP P08709
L	16	CGU	GLU	modified residue	UNP P08709
L	19	CGU	GLU	modified residue	UNP P08709
L	20	CGU	GLU	modified residue	UNP P08709
L	25	CGU	GLU	modified residue	UNP P08709
L	26	CGU	GLU	modified residue	UNP P08709
L	29	CGU	GLU	modified residue	UNP P08709
L	35	CGU	GLU	modified residue	UNP P08709

- Molecule 2 is a protein called Coagulation factor VII.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	254	Total	C	N	O	S	0	0	0
			1974	1253	351	357	13			

- Molecule 3 is a protein called Tissue factor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	T	207	Total	C	N	O	S	0	0	0
			1658	1047	269	337	5			

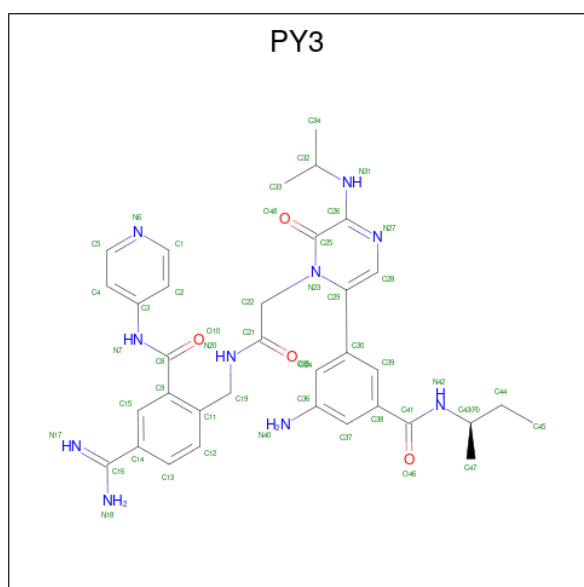
- Molecule 4 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	L	1	Total Ca 1 1	0	0
4	H	1	Total Ca 1 1	0	0

- Molecule 5 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	L	1	Total Mg 1 1	0	0

- Molecule 6 is 5-[AMINO(IMINO)METHYL]-2-[(6-[3-AMINO-5-({[(1R)-1-METHYLPROPYL]AMINO}CARBONYL)PHENYL]-3-(ISOPROPYLAMINO)-2- OXOPYRAZIN-1(2H)-YL]ACETYL}AMINO)METHYL]-N-PYRIDIN-4-YLBENZAMIDE (CCD ID: PY3) (formula: C₃₄H₄₀N₁₀O₄).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	H	1	Total C N O 48 34 10 4	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	L	91	Total O 91 91	0	0
7	H	181	Total O 181 181	0	0

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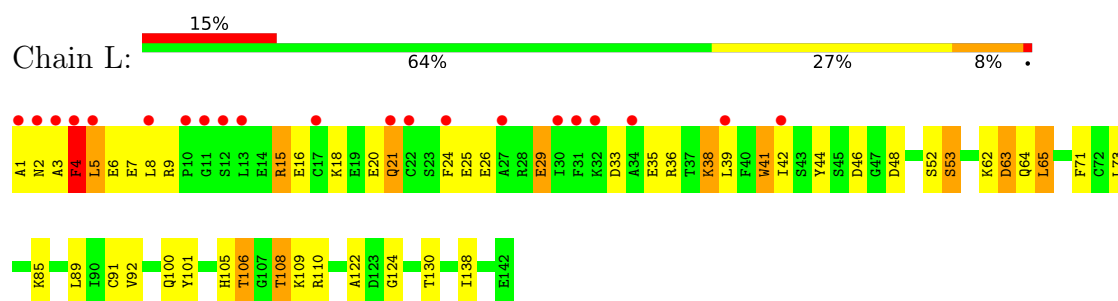
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	T	117	Total 117	O 117	0	0

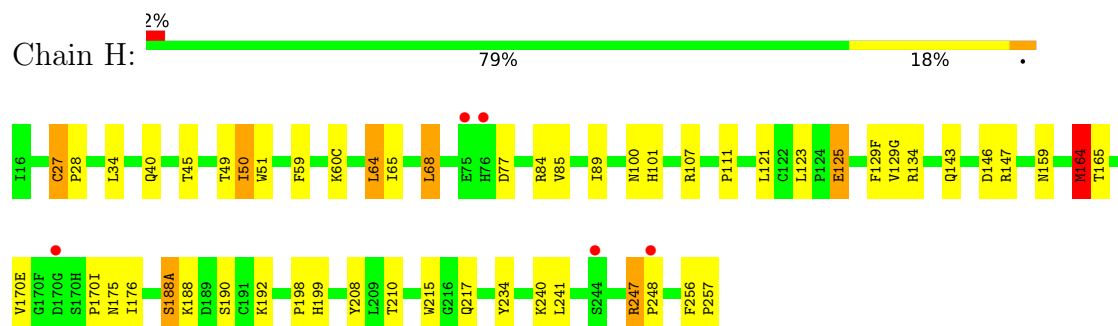
3 Residue-property plots [i](#)

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.

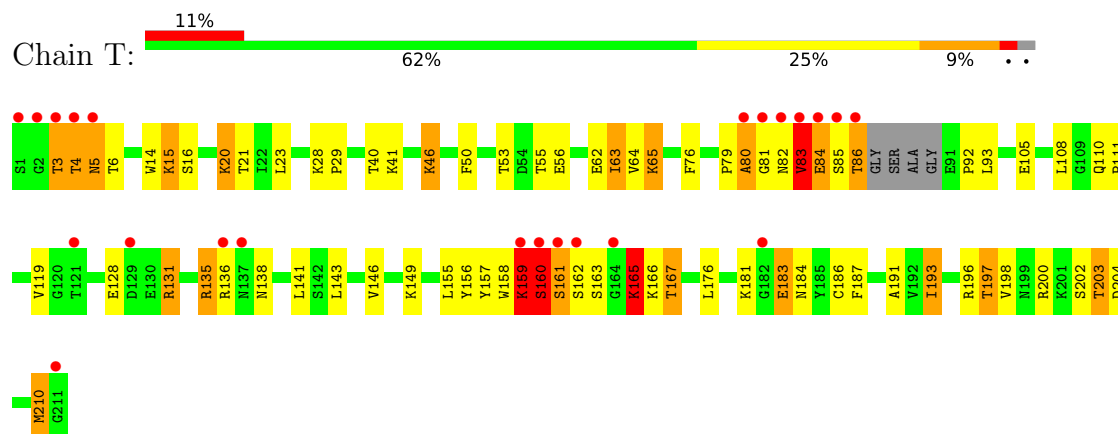
• Molecule 1: Coagulation factor VII



• Molecule 2: Coagulation factor VII



• Molecule 3: Tissue factor



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	69.65Å 81.14Å 125.58Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.00 20.00 – 2.00	Depositor EDS
% Data completeness (in resolution range)	90.1 (20.00-2.00) 90.6 (20.00-2.00)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.54 (at 2.01Å)	Xtriage
Refinement program	X-PLOR 98.1, CNS	Depositor
R, R_{free}	0.209 , 0.258 0.204 , 0.253	Depositor DCC
R_{free} test set	4402 reflections (9.96%)	wwPDB-VP
Wilson B-factor (Å ²)	19.0	Xtriage
Anisotropy	0.370	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 49.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	5207	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.85% 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: PY3, CGU, CA, MG

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	L	0.50	0/1029	1.01	8/1374 (0.6%)
2	H	0.66	0/2024	1.13	18/2755 (0.7%)
3	T	0.54	0/1693	1.10	13/2302 (0.6%)
All	All	0.59	0/4746	1.09	39/6431 (0.6%)

There are no bond length outliers.

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	199	HIS	N-CA-C	-8.59	89.74	107.70
3	T	40	THR	N-CA-C	-8.38	98.11	110.52
3	T	20	LYS	N-CA-C	-7.86	96.48	108.67
3	T	203	THR	N-CA-C	-7.79	100.04	110.55
3	T	161	SER	N-CA-C	-7.64	103.55	113.17
2	H	164	MET	N-CA-C	-7.61	99.21	110.48
2	H	190	SER	N-CA-C	-7.37	99.56	110.46
2	H	129(G)	VAL	N-CA-C	-7.23	97.84	108.54
2	H	123	LEU	N-CA-C	-7.17	99.28	109.24
2	H	188(A)	SER	N-CA-C	6.81	121.72	113.41
3	T	146	VAL	N-CA-C	6.55	117.17	110.82
2	H	176	ILE	N-CA-C	-6.38	98.01	107.51
2	H	165	THR	N-CA-C	6.36	118.22	111.28
2	H	27	CYS	CA-C-N	6.32	126.01	119.56
2	H	27	CYS	C-N-CA	6.32	126.01	119.56
2	H	134	ARG	N-CA-C	6.25	118.64	111.02
3	T	53	THR	N-CA-C	-6.08	105.50	113.17
2	H	49	THR	N-CA-C	6.03	120.11	112.87
2	H	27	CYS	N-CA-C	-5.98	100.22	109.79
3	T	63	ILE	N-CA-C	5.76	118.29	111.09
1	L	53	SER	CA-C-N	5.73	125.26	119.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	53	SER	C-N-CA	5.73	125.26	119.19
3	T	105	GLU	N-CA-C	5.71	121.68	114.31
2	H	125	GLU	N-CA-C	-5.67	103.05	110.53
1	L	138	ILE	CA-C-N	5.60	125.07	119.24
1	L	138	ILE	C-N-CA	5.60	125.07	119.24
2	H	121	LEU	N-CA-C	-5.53	100.67	109.96
3	T	29	PRO	N-CA-C	5.45	119.77	111.15
3	T	50	PHE	N-CA-C	5.41	118.03	109.96
2	H	68	LEU	CA-CB-CG	-5.39	97.45	116.30
3	T	193	ILE	N-CA-C	-5.33	97.37	108.88
1	L	130	THR	N-CA-C	-5.29	106.84	113.72
1	L	91	CYS	N-CA-C	5.22	117.64	111.33
1	L	73	LEU	N-CA-C	-5.16	102.65	110.39
3	T	65	LYS	N-CA-C	-5.11	106.31	112.54
1	L	41	TRP	N-CA-C	5.09	117.56	111.71
2	H	59	PHE	N-CA-C	5.07	119.15	112.92
3	T	5	ASN	N-CA-C	5.06	117.21	110.53
2	H	60(C)	LYS	N-CA-C	-5.04	107.80	114.04

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	L	1135	0	989	45	0
2	H	1974	0	1950	29	0
3	T	1658	0	1609	51	0
4	H	1	0	0	0	0
4	L	1	0	0	0	0
5	L	1	0	0	0	0
6	H	48	0	40	0	0
7	H	181	0	0	3	0
7	L	91	0	0	3	0
7	T	117	0	0	0	0
All	All	5207	0	4588	120	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 13.

All (120) 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:L:35:CGU:HA	1:L:38:LYS:HD3	1.47	0.96
1:L:122:ALA:HA	7:L:469:HOH:O	1.70	0.91
3:T:159:LYS:HD3	3:T:183:GLU:CD	1.96	0.91
2:H:247:ARG:HG3	2:H:248:PRO:HD2	1.52	0.89
3:T:3:THR:HB	3:T:85:SER:HB2	1.53	0.89
3:T:184:ASN:HA	3:T:210:MET:HE2	1.57	0.87
3:T:197:THR:HG22	3:T:198:VAL:HG13	1.61	0.80
1:L:4:PHE:O	1:L:5:LEU:HB2	1.80	0.80
3:T:135:ARG:HH22	3:T:138:ASN:HA	1.48	0.78
3:T:3:THR:HB	3:T:85:SER:CB	2.13	0.78
3:T:136:ARG:HB2	3:T:141:LEU:HD21	1.69	0.75
3:T:4:THR:N	3:T:85:SER:HB3	2.02	0.74
2:H:50:ILE:HG22	2:H:111:PRO:HB3	1.70	0.74
1:L:33:ASP:HB3	1:L:36:ARG:HB2	1.72	0.71
1:L:21:GLN:HA	1:L:44:TYR:OH	1.91	0.70
3:T:155:LEU:HD11	3:T:187:PHE:HB3	1.75	0.68
2:H:247:ARG:HG3	2:H:248:PRO:CD	2.24	0.67
1:L:16:CGU:HG	1:L:26:CGU:OE22	1.95	0.66
3:T:108:LEU:HD11	3:T:193:ILE:HG12	1.77	0.66
1:L:24:PHE:O	1:L:25:CGU:HB3	1.95	0.65
2:H:50:ILE:HD12	2:H:50:ILE:O	1.97	0.65
2:H:129(F):PHE:HE1	2:H:164:MET:HE2	1.62	0.64
1:L:6:CGU:CD2	1:L:9:ARG:HH21	2.12	0.62
1:L:62:LYS:NZ	1:L:64:GLN:HE22	1.98	0.62
3:T:80:ALA:O	3:T:83:VAL:HG23	2.00	0.62
3:T:110:GLN:HG3	3:T:203:THR:HG23	1.82	0.61
2:H:170(I):PRO:HG2	2:H:215:TRP:CZ3	2.37	0.60
3:T:136:ARG:HB2	3:T:141:LEU:CD2	2.31	0.60
1:L:2:ASN:HA	1:L:7:CGU:OE22	2.03	0.59
3:T:135:ARG:HH22	3:T:138:ASN:CA	2.17	0.58
3:T:159:LYS:HB2	3:T:162:SER:HB2	1.85	0.58
2:H:34:LEU:HD23	2:H:40:GLN:HA	1.85	0.58
1:L:36:ARG:HD3	3:T:158:TRP:CD1	2.39	0.57
2:H:143:GLN:NE2	2:H:147:ARG:H	2.02	0.57
2:H:50:ILE:CD1	2:H:107:ARG:HG3	2.36	0.56
1:L:110:ARG:HD2	1:L:110:ARG:C	2.30	0.56
2:H:143:GLN:HE22	2:H:147:ARG:H	1.54	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:T:63:ILE:HD12	3:T:64:VAL:N	2.21	0.55
1:L:5:LEU:HA	1:L:8:LEU:HD13	1.88	0.55
3:T:136:ARG:CB	3:T:141:LEU:HD21	2.36	0.55
3:T:4:THR:HB	3:T:85:SER:HA	1.88	0.54
2:H:50:ILE:HG13	2:H:51:TRP:CD1	2.42	0.54
1:L:108:THR:HG23	1:L:109:LYS:N	2.23	0.53
3:T:4:THR:HG22	3:T:5:ASN:N	2.24	0.52
3:T:159:LYS:HD3	3:T:183:GLU:OE1	2.09	0.52
1:L:101:TYR:CZ	2:H:125:GLU:HG3	2.45	0.52
1:L:4:PHE:O	1:L:5:LEU:CB	2.56	0.51
1:L:105:HIS:O	1:L:108:THR:O	2.29	0.51
3:T:63:ILE:HD12	3:T:63:ILE:C	2.35	0.51
1:L:92:VAL:HG22	1:L:92:VAL:O	2.10	0.50
1:L:62:LYS:HD3	1:L:63:ASP:O	2.11	0.50
2:H:170(I):PRO:HG2	2:H:215:TRP:CH2	2.47	0.50
1:L:6:CGU:OE22	1:L:9:ARG:NH2	2.44	0.50
3:T:5:ASN:C	3:T:6:THR:HG23	2.37	0.49
1:L:1:ALA:HB3	1:L:20:CGU:OE22	2.13	0.49
2:H:129(F):PHE:HE1	2:H:164:MET:CE	2.26	0.49
2:H:247:ARG:CG	2:H:248:PRO:HD2	2.35	0.48
3:T:76:PHE:CD1	3:T:92:PRO:HG2	2.48	0.48
2:H:256:PHE:HA	2:H:257:PRO:C	2.39	0.48
1:L:48:ASP:OD2	1:L:63:ASP:OD1	2.31	0.48
2:H:64:LEU:HB3	2:H:85:VAL:HB	1.94	0.48
1:L:52:SER:O	1:L:53:SER:C	2.57	0.47
2:H:101:HIS:HA	2:H:234:TYR:OH	2.15	0.47
1:L:71:PHE:CE2	3:T:131:ARG:HB3	2.49	0.47
3:T:82:ASN:C	3:T:84:GLU:H	2.22	0.47
3:T:136:ARG:CG	3:T:141:LEU:HD21	2.44	0.47
3:T:157:TYR:HA	3:T:186:CYS:O	2.15	0.47
1:L:35:CGU:N	1:L:35:CGU:CD2	2.78	0.47
2:H:27:CYS:N	2:H:28:PRO:CD	2.77	0.47
3:T:155:LEU:O	3:T:167:THR:HA	2.15	0.47
1:L:100:GLN:HG2	2:H:208:TYR:OH	2.16	0.46
3:T:3:THR:HB	3:T:85:SER:HB3	1.96	0.46
2:H:170(E):VAL:HB	7:H:575:HOH:O	2.15	0.46
3:T:191:ALA:HB3	3:T:202:SER:HB3	1.97	0.45
7:L:417:HOH:O	3:T:20:LYS:HE2	2.15	0.45
1:L:46:ASP:OD2	1:L:65:LEU:HD22	2.16	0.45
1:L:16:CGU:OE21	1:L:26:CGU:OE11	2.35	0.45
2:H:89:ILE:HG21	2:H:241:LEU:HD13	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:T:165:LYS:HG2	3:T:165:LYS:O	2.17	0.45
2:H:188(A):SER:C	2:H:188:LYS:HG3	2.42	0.44
3:T:136:ARG:HG3	3:T:141:LEU:HD21	1.99	0.44
1:L:62:LYS:HD2	1:L:64:GLN:HE21	1.82	0.44
3:T:46:LYS:HD3	3:T:62:GLU:OE1	2.17	0.44
3:T:16:SER:HB2	3:T:21:THR:HG23	1.99	0.44
3:T:79:PRO:O	3:T:81:GLY:N	2.51	0.44
3:T:156:TYR:CD1	3:T:165:LYS:HE2	2.53	0.44
1:L:4:PHE:CD2	1:L:4:PHE:C	2.96	0.43
1:L:92:VAL:HG23	7:H:509:HOH:O	2.18	0.43
1:L:38:LYS:O	1:L:41:TRP:N	2.52	0.43
3:T:83:VAL:O	3:T:85:SER:N	2.51	0.43
3:T:110:GLN:HA	3:T:111:PRO:HD3	1.87	0.43
3:T:14:TRP:C	3:T:15:LYS:HD2	2.44	0.43
1:L:62:LYS:HZ3	1:L:64:GLN:HE22	1.64	0.43
1:L:101:TYR:CE2	2:H:125:GLU:HG3	2.54	0.43
3:T:15:LYS:HD2	3:T:15:LYS:N	2.29	0.43
1:L:38:LYS:O	1:L:39:LEU:C	2.61	0.43
1:L:29:CGU:OE11	1:L:29:CGU:OE21	2.37	0.42
2:H:77:ASP:C	2:H:77:ASP:OD1	2.62	0.42
3:T:183:GLU:H	3:T:183:GLU:HG2	1.42	0.42
3:T:3:THR:HG22	3:T:86:THR:O	2.20	0.42
3:T:3:THR:HG22	3:T:85:SER:O	2.19	0.42
1:L:25:CGU:O	1:L:29:CGU:HB3	2.20	0.42
1:L:106:THR:N	7:L:488:HOH:O	2.53	0.42
1:L:3:ALA:O	1:L:4:PHE:C	2.62	0.42
2:H:45:THR:OG1	2:H:198:PRO:HB3	2.20	0.42
3:T:28:LYS:HD3	3:T:55:THR:HG21	2.01	0.42
1:L:15:ARG:HB3	1:L:15:ARG:NH1	2.35	0.41
1:L:62:LYS:CD	1:L:64:GLN:NE2	2.84	0.41
3:T:62:GLU:OE1	3:T:65:LYS:NZ	2.44	0.41
3:T:196:ARG:HB2	3:T:200:ARG:HB3	2.02	0.41
1:L:25:CGU:O	1:L:29:CGU:N	2.54	0.41
1:L:122:ALA:C	1:L:124:GLY:H	2.29	0.41
2:H:175:ASN:ND2	7:H:529:HOH:O	2.54	0.41
3:T:135:ARG:NH2	3:T:138:ASN:H	2.19	0.41
3:T:159:LYS:HB3	3:T:160:SER:H	1.66	0.41
2:H:50:ILE:HD11	2:H:107:ARG:HG3	2.03	0.40
2:H:146:ASP:O	2:H:147:ARG:HB2	2.21	0.40
3:T:23:LEU:O	3:T:56:GLU:HA	2.21	0.40
1:L:21:GLN:O	1:L:21:GLN:HG3	2.19	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:38:LYS:HB3	1:L:38:LYS:HE2	1.96	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	L	130/142 (92%)	119 (92%)	8 (6%)	3 (2%)	5	2
2	H	252/254 (99%)	240 (95%)	12 (5%)	0	100	100
3	T	203/211 (96%)	179 (88%)	17 (8%)	7 (3%)	3	1
All	All	585/607 (96%)	538 (92%)	37 (6%)	10 (2%)	7	3

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	T	4	THR
3	T	160	SER
1	L	4	PHE
1	L	5	LEU
3	T	80	ALA
3	T	83	VAL
3	T	84	GLU
1	L	21	GLN
3	T	165	LYS
3	T	159	LYS

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	L	114/114 (100%)	103 (90%)	11 (10%)	8	5
2	H	216/216 (100%)	203 (94%)	13 (6%)	17	14
3	T	192/193 (100%)	166 (86%)	26 (14%)	4	2
All	All	522/523 (100%)	472 (90%)	50 (10%)	8	5

All (50) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	4	PHE
1	L	15	ARG
1	L	18	LYS
1	L	38	LYS
1	L	42	ILE
1	L	63	ASP
1	L	65	LEU
1	L	85	LYS
1	L	89	LEU
1	L	106	THR
1	L	108	THR
2	H	50	ILE
2	H	64	LEU
2	H	65	ILE
2	H	68	LEU
2	H	84	ARG
2	H	100	ASN
2	H	159	ASN
2	H	164	MET
2	H	192	LYS
2	H	210	THR
2	H	217	GLN
2	H	240	LYS
2	H	247	ARG
3	T	3	THR
3	T	15	LYS
3	T	41	LYS
3	T	46	LYS
3	T	83	VAL
3	T	86	THR

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Mol	Chain	Res	Type
3	T	93	LEU
3	T	119	VAL
3	T	128	GLU
3	T	131	ARG
3	T	135	ARG
3	T	143	LEU
3	T	149	LYS
3	T	159	LYS
3	T	160	SER
3	T	161	SER
3	T	163	SER
3	T	165	LYS
3	T	166	LYS
3	T	167	THR
3	T	176	LEU
3	T	181	LYS
3	T	183	GLU
3	T	197	THR
3	T	204	ASP
3	T	210	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	L	64	GLN
1	L	115	HIS
2	H	63	ASN
2	H	100	ASN
2	H	110	GLN
2	H	143	GLN
2	H	159	ASN
2	H	166	GLN
3	T	31	ASN
3	T	110	GLN
3	T	124	ASN
3	T	137	ASN
3	T	138	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

10 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	CGU	L	14	5,1	9,11,12	1.08	0	10,14,16	0.97	0
1	CGU	L	20	1	9,11,12	1.08	0	10,14,16	0.91	0
1	CGU	L	26	1	9,11,12	1.20	0	10,14,16	0.66	0
1	CGU	L	16	1	9,11,12	1.03	0	10,14,16	0.83	0
1	CGU	L	7	1	9,11,12	1.09	0	10,14,16	0.79	0
1	CGU	L	25	1	9,11,12	1.12	0	10,14,16	0.68	0
1	CGU	L	29	1	9,11,12	1.22	0	10,14,16	0.82	1 (10%)
1	CGU	L	6	1	9,11,12	1.13	0	10,14,16	0.86	0
1	CGU	L	19	5,1	9,11,12	1.12	0	10,14,16	0.91	0
1	CGU	L	35	1	9,11,12	1.16	0	10,14,16	0.80	0

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
1	CGU	L	14	5,1	-	9/13/14/16	-
1	CGU	L	20	1	-	2/13/14/16	-
1	CGU	L	26	1	-	2/13/14/16	-
1	CGU	L	16	1	-	3/13/14/16	-
1	CGU	L	7	1	-	1/13/14/16	-
1	CGU	L	25	1	-	8/13/14/16	-
1	CGU	L	29	1	-	8/13/14/16	-
1	CGU	L	6	1	-	2/13/14/16	-
1	CGU	L	19	5,1	-	4/13/14/16	-
1	CGU	L	35	1	-	6/13/14/16	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	29	CGU	CB-CG-CD2	-2.42	108.20	113.11

There are no chirality outliers.

All (45) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	L	6	CGU	OE11-CD1-CG-CD2
1	L	6	CGU	OE12-CD1-CG-CD2
1	L	7	CGU	N-CA-CB-CG
1	L	14	CGU	C-CA-CB-CG
1	L	14	CGU	CA-CB-CG-CD2
1	L	14	CGU	OE11-CD1-CG-CD2
1	L	14	CGU	OE12-CD1-CG-CD2
1	L	16	CGU	C-CA-CB-CG
1	L	16	CGU	CA-CB-CG-CD1
1	L	25	CGU	C-CA-CB-CG
1	L	25	CGU	CA-CB-CG-CD1
1	L	25	CGU	CA-CB-CG-CD2
1	L	29	CGU	N-CA-CB-CG
1	L	29	CGU	C-CA-CB-CG
1	L	29	CGU	CA-CB-CG-CD1
1	L	29	CGU	CA-CB-CG-CD2
1	L	35	CGU	O-C-CA-CB
1	L	35	CGU	N-CA-CB-CG
1	L	35	CGU	C-CA-CB-CG
1	L	35	CGU	CA-CB-CG-CD2
1	L	16	CGU	N-CA-CB-CG
1	L	14	CGU	OE21-CD2-CG-CB
1	L	14	CGU	OE22-CD2-CG-CB
1	L	20	CGU	OE11-CD1-CG-CB
1	L	25	CGU	OE21-CD2-CG-CB
1	L	25	CGU	OE22-CD2-CG-CB
1	L	29	CGU	OE21-CD2-CG-CB
1	L	19	CGU	OE21-CD2-CG-CD1
1	L	19	CGU	OE22-CD2-CG-CD1
1	L	25	CGU	OE11-CD1-CG-CD2
1	L	25	CGU	OE12-CD1-CG-CD2
1	L	29	CGU	OE21-CD2-CG-CD1
1	L	29	CGU	OE22-CD2-CG-CD1
1	L	14	CGU	CA-CB-CG-CD1
1	L	14	CGU	N-CA-CB-CG

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Mol	Chain	Res	Type	Atoms
1	L	25	CGU	N-CA-CB-CG
1	L	19	CGU	OE11-CD1-CG-CB
1	L	19	CGU	OE12-CD1-CG-CB
1	L	20	CGU	OE12-CD1-CG-CB
1	L	26	CGU	OE21-CD2-CG-CB
1	L	26	CGU	OE22-CD2-CG-CB
1	L	29	CGU	OE22-CD2-CG-CB
1	L	14	CGU	OE22-CD2-CG-CD1
1	L	35	CGU	OE11-CD1-CG-CD2
1	L	35	CGU	OE12-CD1-CG-CD2

There are no ring outliers.

8 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	L	20	CGU	1	0
1	L	26	CGU	2	0
1	L	16	CGU	2	0
1	L	7	CGU	1	0
1	L	25	CGU	3	0
1	L	29	CGU	3	0
1	L	6	CGU	2	0
1	L	35	CGU	2	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 3 are monoatomic - leaving 1 for Mogul analysis.

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
6	PY3	H	403	-	51,51,51	1.38	10 (19%)	64,71,71	2.15	15 (23%)

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
6	PY3	H	403	-	-	7/39/39/39	0/4/4/4

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	H	403	PY3	C39-C30	2.83	1.43	1.39
6	H	403	PY3	C13-C12	2.74	1.43	1.38
6	H	403	PY3	C12-C11	2.64	1.43	1.39
6	H	403	PY3	C35-C30	2.52	1.43	1.39
6	H	403	PY3	C39-C38	2.48	1.43	1.39
6	H	403	PY3	C19-N20	2.33	1.50	1.46
6	H	403	PY3	C15-C9	2.25	1.43	1.39
6	H	403	PY3	C16-N17	2.10	1.36	1.27
6	H	403	PY3	C35-C36	2.02	1.43	1.39
6	H	403	PY3	C13-C14	2.02	1.42	1.39

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	H	403	PY3	C25-C26-N27	-8.26	118.02	125.01
6	H	403	PY3	C25-C26-N31	7.35	121.08	111.96
6	H	403	PY3	C19-C11-C9	5.07	127.11	121.99
6	H	403	PY3	O48-C25-C26	-4.59	117.13	122.19
6	H	403	PY3	C28-N27-C26	4.22	123.03	117.46
6	H	403	PY3	O10-C8-C9	-4.03	113.64	121.03
6	H	403	PY3	C26-C25-N23	3.72	119.56	114.54
6	H	403	PY3	C9-C8-N7	2.56	121.34	116.03
6	H	403	PY3	C11-C19-N20	-2.53	108.05	113.15
6	H	403	PY3	C19-C11-C12	-2.52	115.41	120.98
6	H	403	PY3	C1-N6-C5	2.37	122.29	116.86
6	H	403	PY3	C21-C22-N23	2.33	116.42	111.52
6	H	403	PY3	C2-C1-N6	-2.23	119.80	123.60
6	H	403	PY3	C38-C41-N42	2.17	121.06	117.04
6	H	403	PY3	O48-C25-N23	2.03	123.29	119.99

There are no chirality outliers.

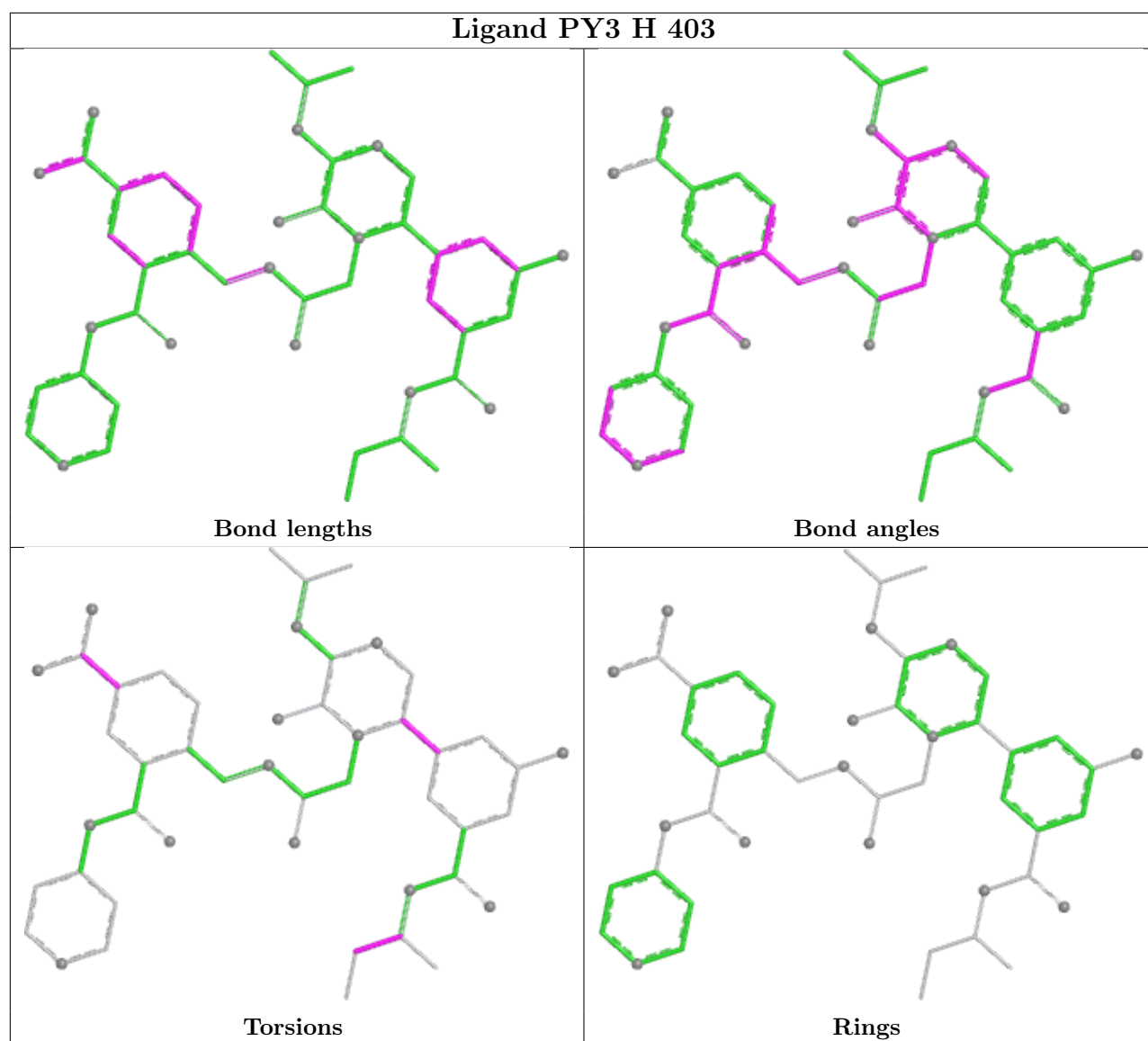
All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	H	403	PY3	N42-C43-C44-C45
6	H	403	PY3	C47-C43-C44-C45
6	H	403	PY3	C28-C29-C30-C35
6	H	403	PY3	C13-C14-C16-N18
6	H	403	PY3	C15-C14-C16-N18
6	H	403	PY3	C13-C14-C16-N17
6	H	403	PY3	C15-C14-C16-N17

There are no ring outliers.

No monomer is involved in short contacts.

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	L	132/142 (92%)	0.69	21 (15%) 5 4	13, 26, 61, 67	0
2	H	254/254 (100%)	-0.39	5 (1%) 65 64	6, 14, 34, 51	0
3	T	207/211 (98%)	0.47	23 (11%) 10 9	11, 25, 65, 82	0
All	All	593/607 (97%)	0.15	49 (8%) 17 16	6, 20, 58, 82	0

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	T	83	VAL	7.5
3	T	86	THR	7.3
1	L	1	ALA	7.2
3	T	85	SER	6.9
3	T	2	GLY	5.8
3	T	3	THR	4.3
3	T	5	ASN	4.2
1	L	5	LEU	4.2
1	L	2	ASN	4.2
3	T	82	ASN	4.0
3	T	1	SER	3.8
3	T	4	THR	3.7
1	L	3	ALA	3.6
3	T	81	GLY	3.5
3	T	164	GLY	3.4
1	L	12	SER	3.4
3	T	161	SER	3.4
3	T	159	LYS	3.4
3	T	136	ARG	3.3
1	L	10	PRO	3.1
1	L	13	LEU	3.1
1	L	42	ILE	3.0
3	T	84	GLU	3.0

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Mol	Chain	Res	Type	RSRZ
1	L	4	PHE	3.0
1	L	8	LEU	2.9
3	T	162	SER	2.9
1	L	32	LYS	2.7
1	L	24	PHE	2.6
3	T	182	GLY	2.6
1	L	31	PHE	2.5
3	T	137	ASN	2.5
1	L	34	ALA	2.4
2	H	244	SER	2.4
3	T	80	ALA	2.3
1	L	39	LEU	2.3
1	L	17	CYS	2.3
2	H	75	GLU	2.3
3	T	160	SER	2.3
3	T	121	THR	2.3
1	L	30	ILE	2.2
1	L	21	GLN	2.2
3	T	129	ASP	2.2
1	L	27	ALA	2.1
2	H	170(G)	ASP	2.1
2	H	248	PRO	2.1
2	H	76	HIS	2.0
1	L	22	CYS	2.0
1	L	11	GLY	2.0
3	T	211	GLY	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	CGU	L	35	12/13	0.61	0.16	57,61,63,63	0
1	CGU	L	19	12/13	0.64	0.16	65,66,68,69	0
1	CGU	L	20	12/13	0.66	0.18	61,63,64,64	0
1	CGU	L	14	12/13	0.71	0.15	57,58,59,59	0
1	CGU	L	25	12/13	0.73	0.14	49,51,52,53	0
1	CGU	L	7	12/13	0.77	0.15	58,58,59,60	0
1	CGU	L	6	12/13	0.77	0.15	57,59,60,60	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
1	CGU	L	16	12/13	0.79	0.15	52,53,56,57	0
1	CGU	L	26	12/13	0.80	0.12	48,50,51,51	0
1	CGU	L	29	12/13	0.82	0.12	39,42,45,45	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

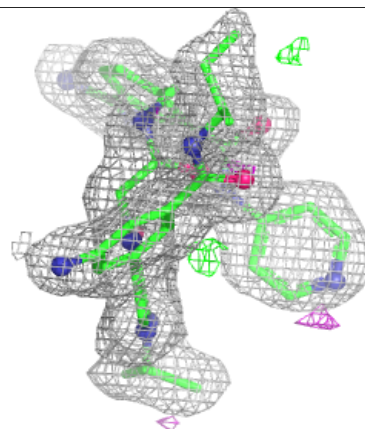
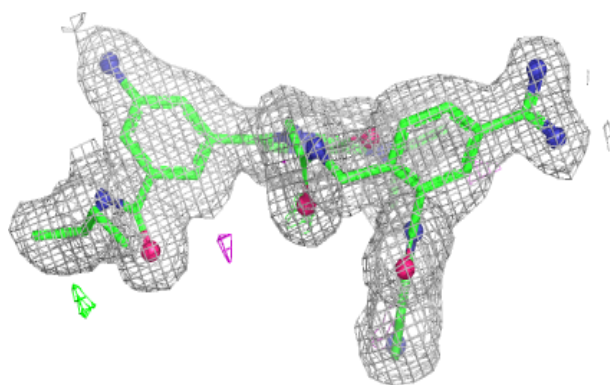
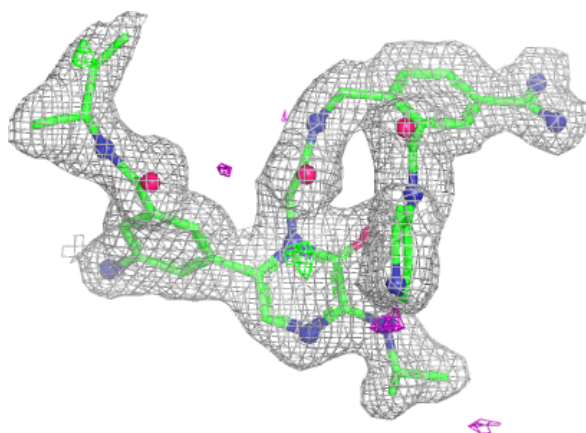
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	CA	L	401	1/1	0.85	0.09	92,92,92,92	0
5	MG	L	402	1/1	0.89	0.10	59,59,59,59	0
6	PY3	H	403	48/48	0.94	0.07	11,17,23,28	0
4	CA	H	400	1/1	0.97	0.07	46,46,46,46	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around PY3 H 403:

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



6.5 Other polymers [i](#)

There are no such residues in this entry.