



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 06:21 PM UTC

PDB ID : 5SGN / pdb_00005sgn
Title : CRYSTAL STRUCTURE OF HUMAN PHOSPHODIESTERASE 10 IN
COMPLEX WITH n1(nc(nc1CCc3nn2c(nc(c2C)C)c(c3)C(F)(F)F)N4C
CCC4)C, micromolar IC50=0.164550
Authors : Joseph, C.; Benz, J.; Flohr, A.; Groebke-Zbinden, K.; Rudolph, M.G.
Deposited on : 2022-02-01
Resolution : 2.07 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)	:	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

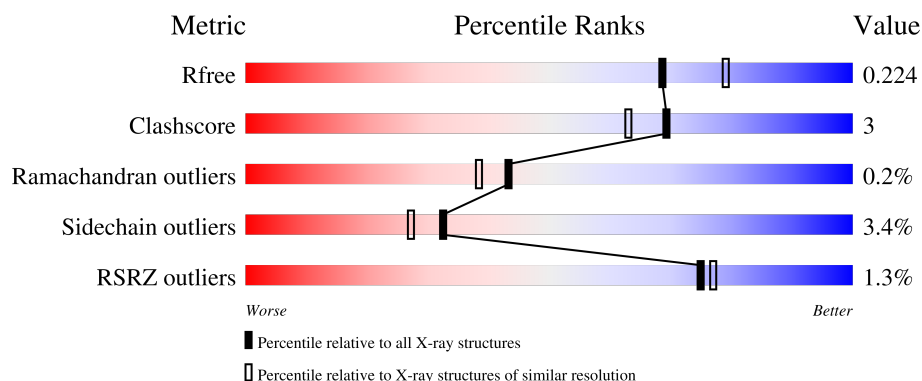
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.07 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	3774 (2.08-2.04)
Clashscore	190562	3883 (2.08-2.04)
Ramachandran outliers	187476	3860 (2.08-2.04)
Sidechain outliers	187428	3860 (2.08-2.04)
RSRZ outliers	180081	3775 (2.08-2.04)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	343	0.2% 75% 15% • 9%
1	B	343	2% 75% 15% • 8%
1	C	343	0.2% 78% 12% • 8%
1	D	343	0.2% 76% 14% • 9%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 10777 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 cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	312	Total	C	N	O	S	0	4	0
			2562	1638	437	463	24			
1	B	315	Total	C	N	O	S	0	2	0
			2559	1635	434	466	24			
1	C	315	Total	C	N	O	S	0	2	0
			2562	1637	437	464	24			
1	D	312	Total	C	N	O	S	0	1	0
			2531	1619	431	457	24			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	447	GLY	-	expression tag	UNP Q9Y233
A	448	SER	-	expression tag	UNP Q9Y233
B	447	GLY	-	expression tag	UNP Q9Y233
B	448	SER	-	expression tag	UNP Q9Y233
C	447	GLY	-	expression tag	UNP Q9Y233
C	448	SER	-	expression tag	UNP Q9Y233
D	447	GLY	-	expression tag	UNP Q9Y233
D	448	SER	-	expression tag	UNP Q9Y233

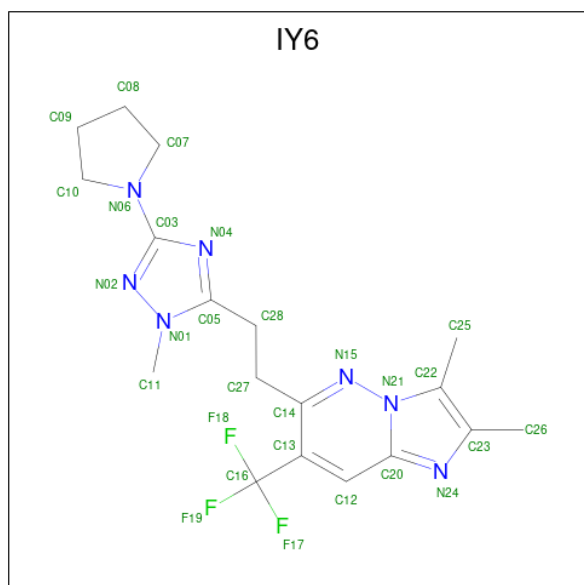
- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Zn	0	0
			1	1		
2	B	1	Total	Zn	0	0
			1	1		
2	C	1	Total	Zn	0	0
			1	1		
2	D	1	Total	Zn	0	0
			1	1		

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Mg	0	0
			1	1		
3	B	1	Total	Mg	0	0
			1	1		
3	C	1	Total	Mg	0	0
			1	1		
3	D	1	Total	Mg	0	0
			1	1		

- Molecule 4 is (4S)-2,3-dimethyl-6-{2-[1-methyl-3-(pyrrolidin-1-yl)-1H-1,2,4-triazol-5-yl]ethyl}-7-(trifluoromethyl)imidazo[1,2-b]pyridazine (CCD ID: IY6) (formula: C₁₈H₂₂F₃N₇) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	F	N	0	0
			28	18	3	7		
4	B	1	Total	C	F	N	0	0
			28	18	3	7		
4	C	1	Total	C	F	N	0	0
			28	18	3	7		
4	D	1	Total	C	F	N	0	0
			28	18	3	7		

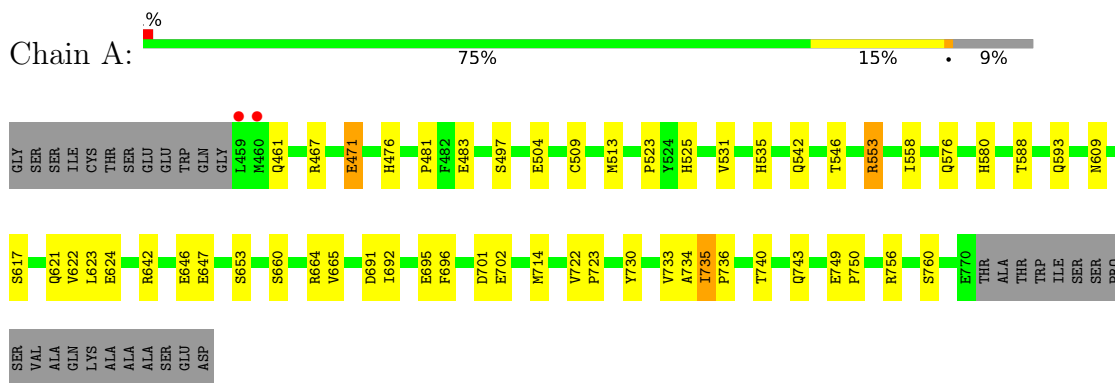
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	115	Total 115	O 115	0	0
5	B	132	Total 132	O 132	0	0
5	C	129	Total 129	O 129	0	0
5	D	67	Total 67	O 67	0	0

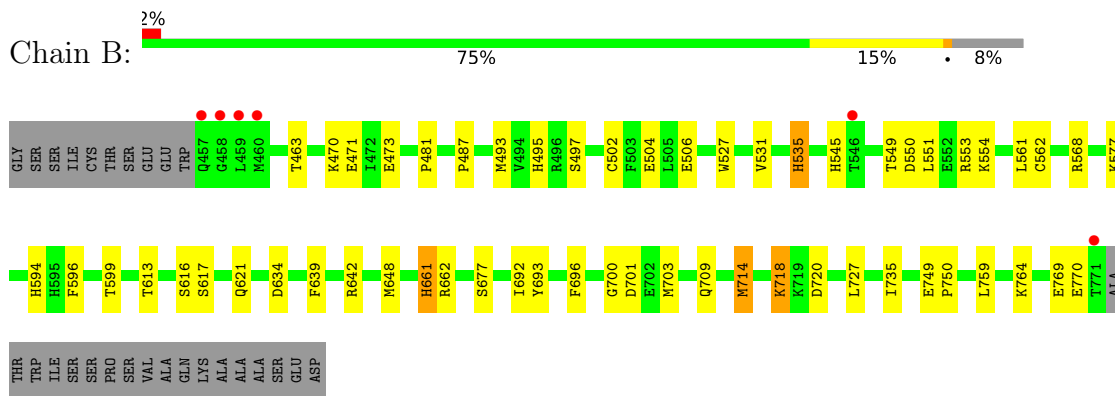
3 Residue-property plots [i](#)

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.

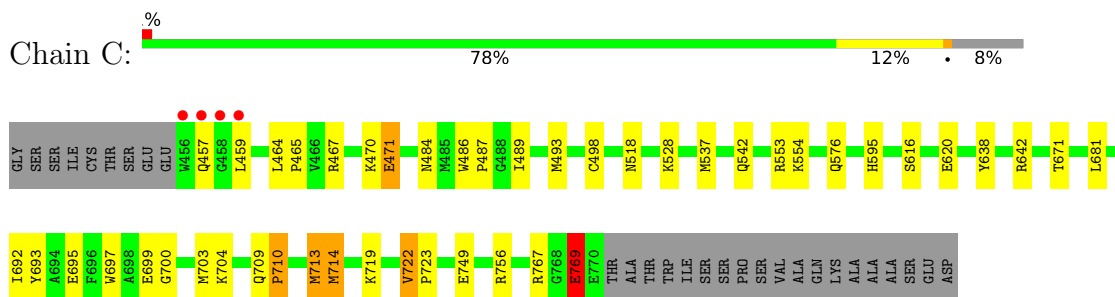
- Molecule 1: cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A



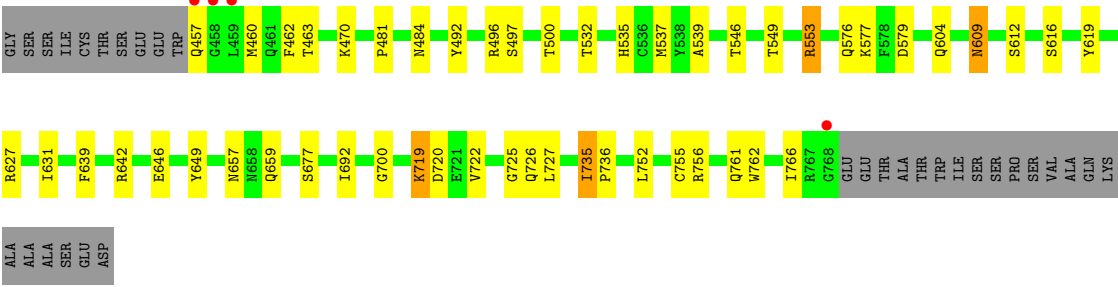
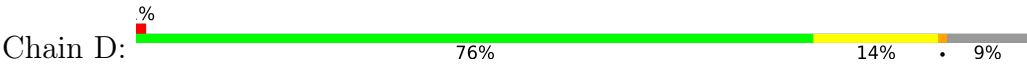
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- Molecule 1: cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A



- Molecule 1: cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A



4 Data and refinement statistics

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	135.42Å 135.42Å 235.18Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	43.56 – 2.07 43.56 – 2.07	Depositor EDS
% Data completeness (in resolution range)	96.3 (43.56-2.07) 96.3 (43.56-2.07)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.28 (at 2.06Å)	Xtriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.172 , 0.222 0.180 , 0.224	Depositor DCC
R_{free} test set	4901 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	35.1	Xtriage
Anisotropy	0.170	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 35.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.028 for h,-h-k,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	10777	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.52% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, IY6, MG, CME

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	1.33	11/2625 (0.4%)	1.46	14/3550 (0.4%)
1	B	1.28	10/2616 (0.4%)	1.51	21/3540 (0.6%)
1	C	1.26	5/2619 (0.2%)	1.48	10/3543 (0.3%)
1	D	1.24	5/2585 (0.2%)	1.50	24/3498 (0.7%)
All	All	1.28	31/10445 (0.3%)	1.49	69/14131 (0.5%)

All (31) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	481	PRO	C-O	-8.63	1.13	1.24
1	A	525	HIS	CE1-NE2	7.20	1.39	1.32
1	D	535	HIS	CE1-NE2	7.08	1.39	1.32
1	B	561	LEU	C-O	-7.02	1.15	1.24
1	A	580	HIS	CE1-NE2	6.47	1.39	1.32
1	A	691	ASP	C-O	6.41	1.31	1.24
1	D	481	PRO	C-O	-6.07	1.16	1.24
1	A	733	VAL	C-O	6.05	1.31	1.24
1	B	481	PRO	C-O	-6.02	1.16	1.24
1	B	594	HIS	CE1-NE2	5.96	1.38	1.32
1	C	553	ARG	C-O	5.96	1.30	1.24
1	D	726	GLN	C-O	5.90	1.30	1.24
1	A	702	GLU	C-O	5.86	1.31	1.24
1	C	710	PRO	C-O	-5.82	1.16	1.23
1	B	661	HIS	CE1-NE2	5.76	1.38	1.32
1	B	527	TRP	C-O	-5.76	1.17	1.24
1	A	558	ILE	C-O	5.67	1.30	1.24
1	C	518	ASN	C-O	-5.67	1.16	1.24
1	B	495	HIS	CE1-NE2	5.67	1.38	1.32
1	D	539	ALA	C-O	-5.61	1.17	1.24
1	A	665	VAL	C-O	5.33	1.30	1.24
1	C	595	HIS	CE1-NE2	5.31	1.37	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	476	HIS	CE1-NE2	5.30	1.37	1.32
1	C	554	LYS	C-O	5.25	1.30	1.24
1	A	647	GLU	C-O	-5.21	1.18	1.24
1	B	473	GLU	C-O	-5.17	1.17	1.24
1	B	487	PRO	C-O	-5.14	1.17	1.24
1	A	535	HIS	CE1-NE2	5.12	1.37	1.32
1	B	549	THR	C-O	5.08	1.30	1.23
1	D	755	CYS	C-O	5.03	1.30	1.24
1	B	568	ARG	C-O	-5.01	1.17	1.24

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	609	ASN	CA-CB-CG	-7.66	104.94	112.60
1	A	647	GLU	CA-C-O	-6.77	113.72	120.70
1	D	535	HIS	CA-CB-CG	-6.77	107.03	113.80
1	B	535	HIS	CA-CB-CG	-6.60	107.20	113.80
1	C	576	GLN	CB-CA-C	6.59	121.31	110.90
1	D	639	PHE	CA-C-N	6.37	127.16	120.03
1	D	639	PHE	C-N-CA	6.37	127.16	120.03
1	D	646	GLU	N-CA-C	-6.34	104.30	111.14
1	D	532	THR	CA-CB-OG1	-6.28	100.19	109.60
1	B	506	GLU	CA-C-O	-6.27	114.41	121.00
1	A	735	ILE	CA-C-O	6.26	122.88	118.69
1	A	553	ARG	CA-C-N	6.21	128.51	120.44
1	A	553	ARG	C-N-CA	6.21	128.51	120.44
1	D	649	TYR	CA-C-N	6.21	128.51	120.44
1	D	649	TYR	C-N-CA	6.21	128.51	120.44
1	D	462	PHE	CB-CA-C	6.19	119.95	109.80
1	B	545	HIS	CA-C-N	6.16	129.15	120.28
1	B	545	HIS	C-N-CA	6.16	129.15	120.28
1	B	701	ASP	CA-CB-CG	6.16	118.76	112.60
1	C	484	ASN	CA-CB-CG	-6.14	106.45	112.60
1	B	613	THR	CB-CA-C	-6.12	101.02	110.81
1	D	700	GLY	CA-C-O	-6.06	114.51	120.75
1	B	662	ARG	N-CA-C	-6.05	104.61	111.14
1	D	553	ARG	CA-C-N	6.01	128.66	120.54
1	D	553	ARG	C-N-CA	6.01	128.66	120.54
1	B	504	GLU	CB-CA-C	5.93	119.15	109.90
1	A	588	THR	CA-CB-OG1	-5.86	100.81	109.60
1	D	537	MET	N-CA-C	-5.78	105.06	111.36
1	B	735	ILE	N-CA-CB	5.77	114.95	110.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	621	GLN	CA-C-O	-5.74	114.33	120.42
1	B	634	ASP	CA-CB-CG	5.72	118.32	112.60
1	D	659	GLN	CA-C-N	5.66	128.13	120.38
1	D	659	GLN	C-N-CA	5.66	128.13	120.38
1	C	769	GLU	CB-CA-C	-5.66	101.91	111.02
1	C	470	LYS	N-CA-CB	-5.64	101.89	110.07
1	C	703	MET	N-CA-C	-5.60	105.26	111.36
1	D	657	ASN	N-CA-C	-5.58	106.32	113.23
1	D	484	ASN	CA-CB-CG	-5.54	107.06	112.60
1	B	596	PHE	N-CA-C	-5.51	105.35	111.36
1	B	473	GLU	N-CA-C	-5.49	106.09	112.89
1	C	695	GLU	CB-CG-CD	5.42	121.82	112.60
1	C	620	GLU	CB-CG-CD	5.42	121.81	112.60
1	B	531	VAL	N-CA-C	-5.32	105.35	110.72
1	B	718	LYS	CA-C-N	5.31	128.79	120.82
1	B	718	LYS	C-N-CA	5.31	128.79	120.82
1	B	639	PHE	CA-C-N	5.27	125.83	119.98
1	B	639	PHE	C-N-CA	5.27	125.83	119.98
1	D	546	THR	CA-CB-OG1	-5.27	101.69	109.60
1	D	727	LEU	CA-C-N	5.27	125.83	119.98
1	D	727	LEU	C-N-CA	5.27	125.83	119.98
1	C	498	CYS	N-CA-C	-5.27	105.93	112.93
1	B	661	HIS	N-CA-C	-5.26	105.62	111.36
1	A	624	GLU	CB-CG-CD	5.26	121.54	112.60
1	B	554	LYS	CA-C-N	5.25	125.81	119.98
1	B	554	LYS	C-N-CA	5.25	125.81	119.98
1	D	609	ASN	CA-CB-CG	-5.24	107.36	112.60
1	A	701	ASP	CA-CB-CG	5.20	117.80	112.60
1	D	735	ILE	N-CA-CB	5.14	114.46	110.45
1	A	623	LEU	N-CA-C	-5.13	105.87	111.82
1	A	531	VAL	N-CA-C	-5.12	105.42	111.00
1	A	546	THR	CA-CB-OG1	-5.12	101.92	109.60
1	A	609	ASN	N-CA-CB	5.12	117.72	110.46
1	C	537	MET	CA-C-O	-5.08	115.49	120.82
1	D	642	ARG	CA-C-O	-5.03	115.54	120.82
1	A	483	GLU	CA-C-O	-5.03	115.52	120.90
1	C	704	LYS	N-CA-C	-5.01	105.82	111.28
1	A	593	GLN	N-CA-C	-5.00	106.02	111.82
1	D	549	THR	CA-C-N	5.00	127.23	120.38
1	D	549	THR	C-N-CA	5.00	127.23	120.38

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	2562	0	2545	19	0
1	B	2559	0	2524	15	0
1	C	2562	0	2533	20	0
1	D	2531	0	2506	17	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	28	0	0	1	0
4	B	28	0	0	2	0
4	C	28	0	0	3	0
4	D	28	0	0	3	0
5	A	115	0	0	3	0
5	B	132	0	0	0	0
5	C	129	0	0	0	0
5	D	67	0	0	0	0
All	All	10777	0	10108	71	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 3.

All (71) 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:646:GLU:HG3	5:A:909:HOH:O	1.75	0.86
1:D:761:GLN:HE21	1:D:761:GLN:HA	1.60	0.66
1:B:696:PHE:HB3	1:B:714:MET:HE2	1.78	0.65
1:A:461:GLN:HA	1:A:461:GLN:OE1	1.98	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:457:GLN:HA	1:D:460:MET:HE2	1.80	0.63
1:B:727:LEU:HD12	1:B:759:LEU:CD1	2.30	0.61
1:C:699:GLU:OE2	1:C:714:MET:HE1	2.01	0.60
1:C:638:TYR:OH	1:C:642:ARG:HD3	2.05	0.57
1:D:497:SER:O	1:D:553:ARG:HD2	2.05	0.56
1:D:762:TRP:O	1:D:766:ILE:HG13	2.05	0.56
1:C:756[B]:ARG:HG2	1:C:756[B]:ARG:HH11	1.71	0.55
1:D:492:TYR:CZ	1:D:496:ARG:HD2	2.42	0.55
1:C:486:TRP:CH2	1:C:528:LYS:HB2	2.41	0.55
1:A:756[B]:ARG:NH2	5:A:904:HOH:O	2.39	0.55
1:D:457:GLN:HA	1:D:460:MET:CE	2.37	0.54
1:C:542:GLN:NE2	1:C:542:GLN:HA	2.23	0.53
1:D:677[A]:SER:OG	4:D:803:IY6:C26	2.58	0.52
1:A:642[B]:ARG:NE	1:A:740:THR:OG1	2.41	0.52
1:C:699:GLU:CD	1:C:714:MET:HE1	2.35	0.52
1:B:692:ILE:HD13	4:B:803:IY6:C22	2.41	0.51
1:D:761:GLN:HA	1:D:761:GLN:NE2	2.26	0.50
1:D:627:ARG:O	1:D:631:ILE:HG12	2.11	0.50
1:C:709:GLN:HE21	1:C:710:PRO:HD2	1.77	0.49
1:A:735:ILE:HB	1:A:736:PRO:HD3	1.94	0.49
1:B:727:LEU:HD12	1:B:759:LEU:HD11	1.93	0.49
1:C:693:TYR:OH	4:C:803:IY6:N04	2.46	0.49
1:C:692:ILE:HD13	4:C:803:IY6:C22	2.43	0.48
1:C:713:MET:HE2	4:C:803:IY6:C11	2.43	0.48
1:B:749:GLU:N	1:B:750:PRO:CD	2.77	0.48
1:B:700:GLY:HA3	1:B:714:MET:O	2.13	0.48
1:B:550:ASP:N	1:B:550:ASP:OD1	2.47	0.48
1:A:735:ILE:HB	1:A:736:PRO:CD	2.44	0.47
1:C:638:TYR:CD1	1:C:671:THR:HG21	2.49	0.47
1:B:577:LYS:HD3	1:B:703:MET:HE1	1.96	0.47
1:D:609:ASN:HD22	1:D:612:SER:N	2.11	0.47
1:C:700:GLY:HA3	1:C:714:MET:O	2.15	0.47
1:A:542:GLN:NE2	1:A:542:GLN:HA	2.30	0.46
1:B:497:SER:O	1:B:553:ARG:HD2	2.16	0.46
1:B:562:CYS:HB3	1:B:599:THR:OG1	2.15	0.46
1:C:486:TRP:N	1:C:487:PRO:CD	2.79	0.45
1:D:609:ASN:ND2	1:D:612:SER:N	2.65	0.45
1:C:697:TRP:CH2	1:C:719:LYS:HG2	2.51	0.45
1:B:648:MET:HE2	1:B:661:HIS:NE2	2.31	0.45
1:C:467:ARG:O	1:C:471:GLU:HB2	2.17	0.45
1:A:497:SER:O	1:A:553:ARG:HD2	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:660:SER:O	1:A:664:ARG:HG3	2.17	0.44
1:A:692:ILE:HD13	4:A:803:IY6:C22	2.48	0.44
1:A:730:TYR:HA	1:A:734:ALA:HB3	2.00	0.44
1:C:756[B]:ARG:HG2	1:C:756[B]:ARG:NH1	2.33	0.44
1:A:509:CME:O	1:A:513:MET:HG2	2.18	0.43
1:C:464:LEU:O	1:C:465:PRO:C	2.61	0.43
1:A:617:SER:O	1:A:621:GLN:HG3	2.17	0.43
1:A:743:GLN:NE2	5:A:909:HOH:O	2.45	0.43
1:D:497:SER:O	1:D:553:ARG:CD	2.67	0.43
1:A:722:VAL:N	1:A:723:PRO:CD	2.82	0.43
1:A:467:ARG:NH1	1:A:471[B]:GLU:OE1	2.52	0.42
1:B:551:LEU:HD23	1:B:551:LEU:HA	1.74	0.42
1:D:752:LEU:HD21	1:D:756:ARG:NH2	2.34	0.42
1:C:722:VAL:N	1:C:723:PRO:CD	2.82	0.42
1:D:692:ILE:HD13	4:D:803:IY6:C22	2.49	0.41
1:A:749:GLU:N	1:A:750:PRO:CD	2.83	0.41
1:A:696:PHE:HB3	1:A:714:MET:HG2	2.02	0.41
1:C:489:ILE:O	1:C:493:MET:HG3	2.21	0.41
1:C:767:ARG:NH2	1:C:769:GLU:OE2	2.48	0.41
1:D:735:ILE:HB	1:D:736:PRO:HD3	2.03	0.41
1:B:470:LYS:HG3	1:B:471:GLU:N	2.36	0.41
1:D:725:GLY:HA3	4:D:803:IY6:C03	2.50	0.41
1:B:693:TYR:OH	4:B:803:IY6:N04	2.55	0.40
1:D:619:TYR:CD1	1:D:619:TYR:C	2.99	0.40
1:A:523:PRO:HD2	1:A:695:GLU:HG2	2.03	0.40
1:B:493:MET:SD	1:B:535:HIS:HA	2.62	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	313/343 (91%)	308 (98%)	5 (2%)	0	100	100
1	B	314/343 (92%)	306 (98%)	8 (2%)	0	100	100
1	C	314/343 (92%)	305 (97%)	8 (2%)	1 (0%)	36	30
1	D	310/343 (90%)	301 (97%)	7 (2%)	2 (1%)	21	13
All	All	1251/1372 (91%)	1220 (98%)	28 (2%)	3 (0%)	43	38

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	579	ASP
1	C	457	GLN
1	D	719	LYS

5.3.2 Protein sidechains ⓘ

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	285/305 (93%)	278 (98%)	7 (2%)	42	38
1	B	283/305 (93%)	269 (95%)	14 (5%)	22	15
1	C	283/305 (93%)	274 (97%)	9 (3%)	34	29
1	D	280/305 (92%)	270 (96%)	10 (4%)	31	25
All	All	1131/1220 (93%)	1091 (96%)	40 (4%)	32	26

All (40) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	471[A]	GLU
1	A	471[B]	GLU
1	A	504	GLU
1	A	576	GLN
1	A	622	VAL
1	A	653	SER
1	A	760	SER
1	B	463	THR

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Mol	Chain	Res	Type
1	B	502	CYS
1	B	616	SER
1	B	617	SER
1	B	642	ARG
1	B	677	SER
1	B	709	GLN
1	B	714	MET
1	B	718	LYS
1	B	720[A]	ASP
1	B	720[B]	ASP
1	B	764	LYS
1	B	769	GLU
1	B	770	GLU
1	C	459	LEU
1	C	471	GLU
1	C	616	SER
1	C	681	LEU
1	C	713	MET
1	C	714	MET
1	C	722	VAL
1	C	749	GLU
1	C	769	GLU
1	D	463	THR
1	D	470	LYS
1	D	500	THR
1	D	576	GLN
1	D	577	LYS
1	D	604	GLN
1	D	616	SER
1	D	719	LYS
1	D	720	ASP
1	D	722	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	542	GLN
1	A	545	HIS
1	A	576	GLN
1	A	604	GLN
1	A	609	ASN
1	A	644	GLN

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Mol	Chain	Res	Type
1	A	709	GLN
1	A	743	GLN
1	A	761	GLN
1	B	484	ASN
1	B	542	GLN
1	B	604	GLN
1	B	650	GLN
1	B	659	GLN
1	B	709	GLN
1	B	726	GLN
1	B	761	GLN
1	C	542	GLN
1	C	604	GLN
1	C	659	GLN
1	C	709	GLN
1	C	724	GLN
1	C	743	GLN
1	D	476	HIS
1	D	484	ASN
1	D	604	GLN
1	D	650	GLN
1	D	709	GLN
1	D	726	GLN
1	D	743	GLN
1	D	761	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

4 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	CME	C	509	1	8,9,10	0.63	0	6,9,11	0.89	0
1	CME	B	509	1	8,9,10	0.63	0	6,9,11	0.67	0
1	CME	D	509	1	8,9,10	0.79	0	6,9,11	0.91	0
1	CME	A	509	1	8,9,10	0.75	0	6,9,11	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	CME	C	509	1	-	1/5/8/10	-
1	CME	B	509	1	-	0/5/8/10	-
1	CME	D	509	1	-	1/5/8/10	-
1	CME	A	509	1	-	1/5/8/10	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	509	CME	SD-CE-CZ-OH
1	C	509	CME	SD-CE-CZ-OH
1	D	509	CME	CZ-CE-SD-SG

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	509	CME	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 8 are monoatomic - leaving 4 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$
4	IY6	D	803	-	30,31,31	1.65	5 (16%)	33,47,47	1.91	6 (18%)
4	IY6	B	803	-	30,31,31	1.96	8 (26%)	33,47,47	2.23	10 (30%)
4	IY6	C	803	-	30,31,31	2.34	8 (26%)	33,47,47	2.08	11 (33%)
4	IY6	A	803	-	30,31,31	1.93	6 (20%)	33,47,47	1.94	6 (18%)

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
4	IY6	D	803	-	-	1/15/22/22	0/4/4/4
4	IY6	B	803	-	-	2/15/22/22	0/4/4/4
4	IY6	C	803	-	-	2/15/22/22	0/4/4/4
4	IY6	A	803	-	-	3/15/22/22	0/4/4/4

All (27) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	803	IY6	C05-N01	9.56	1.43	1.34
4	A	803	IY6	C05-N01	6.75	1.40	1.34
4	B	803	IY6	C05-N01	6.26	1.40	1.34
4	D	803	IY6	C05-N01	5.57	1.39	1.34
4	C	803	IY6	C28-C05	3.59	1.54	1.49
4	C	803	IY6	C03-N06	3.40	1.41	1.35
4	A	803	IY6	C03-N02	-3.33	1.27	1.32
4	A	803	IY6	C16-C13	3.31	1.55	1.49
4	D	803	IY6	C03-N06	3.27	1.41	1.35
4	C	803	IY6	C23-N24	-3.00	1.32	1.38
4	A	803	IY6	C23-N24	-2.92	1.32	1.38
4	B	803	IY6	C03-N06	2.68	1.40	1.35
4	B	803	IY6	C23-N24	-2.65	1.32	1.38
4	C	803	IY6	C22-C23	2.58	1.42	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	803	IY6	C20-N24	-2.56	1.29	1.33
4	B	803	IY6	C11-N01	2.50	1.50	1.46
4	B	803	IY6	C22-N21	2.48	1.42	1.38
4	A	803	IY6	C25-C22	2.43	1.53	1.49
4	A	803	IY6	C11-N01	2.42	1.50	1.46
4	C	803	IY6	C11-N01	2.42	1.50	1.46
4	B	803	IY6	C28-C05	2.40	1.52	1.49
4	D	803	IY6	C16-C13	2.32	1.53	1.49
4	D	803	IY6	C25-C22	2.27	1.53	1.49
4	B	803	IY6	C03-N02	-2.14	1.29	1.32
4	C	803	IY6	C05-N04	2.09	1.36	1.32
4	C	803	IY6	C20-N21	2.09	1.42	1.39
4	D	803	IY6	C22-N21	2.06	1.42	1.38

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	803	IY6	N06-C03-N02	-6.97	116.33	123.51
4	A	803	IY6	C27-C28-C05	-6.94	105.06	111.62
4	B	803	IY6	N06-C03-N02	-6.78	116.52	123.51
4	B	803	IY6	C27-C28-C05	-5.66	106.27	111.62
4	D	803	IY6	C27-C28-C05	-5.10	106.79	111.62
4	A	803	IY6	N06-C03-N02	-4.46	118.92	123.51
4	D	803	IY6	C11-N01-N02	4.12	125.45	119.29
4	C	803	IY6	C27-C28-C05	-4.06	107.79	111.62
4	B	803	IY6	C11-N01-N02	3.89	125.11	119.29
4	A	803	IY6	C11-N01-N02	3.50	124.52	119.29
4	D	803	IY6	N06-C03-N02	-3.50	119.91	123.51
4	B	803	IY6	C28-C05-N01	-3.27	118.95	123.74
4	D	803	IY6	C25-C22-N21	-3.17	117.94	123.44
4	B	803	IY6	F19-C16-C13	-3.13	106.66	112.68
4	D	803	IY6	C25-C22-C23	3.05	137.38	131.23
4	B	803	IY6	C20-N21-N15	-3.04	123.73	126.75
4	D	803	IY6	C20-N24-C23	-2.82	104.37	106.20
4	C	803	IY6	C28-C05-N01	-2.80	119.64	123.74
4	C	803	IY6	C11-N01-N02	2.79	123.47	119.29
4	C	803	IY6	C26-C23-C22	-2.72	125.16	128.58
4	C	803	IY6	C25-C22-C23	2.55	136.37	131.23
4	A	803	IY6	C25-C22-C23	2.41	136.09	131.23
4	B	803	IY6	C28-C05-N04	2.34	129.37	125.36
4	B	803	IY6	C22-C23-N24	2.28	114.33	110.24
4	C	803	IY6	C08-C07-N06	2.27	107.26	103.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	803	IY6	C09-C10-N06	-2.18	99.77	103.44
4	B	803	IY6	C10-N06-C07	2.17	114.24	111.37
4	B	803	IY6	N06-C03-N04	2.15	125.32	119.34
4	C	803	IY6	C10-N06-C07	-2.11	108.58	111.37
4	C	803	IY6	F18-C16-C13	-2.08	108.68	112.68
4	C	803	IY6	C16-C13-C14	2.03	123.74	118.18
4	A	803	IY6	C25-C22-N21	-2.02	119.94	123.44
4	C	803	IY6	C22-C23-N24	2.01	113.85	110.24

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	803	IY6	N04-C05-C28-C27
4	C	803	IY6	N01-C05-C28-C27
4	D	803	IY6	C13-C14-C27-C28
4	B	803	IY6	N04-C05-C28-C27
4	A	803	IY6	N02-C03-N06-C10
4	B	803	IY6	N01-C05-C28-C27
4	A	803	IY6	N01-C05-C28-C27
4	A	803	IY6	N04-C03-N06-C10

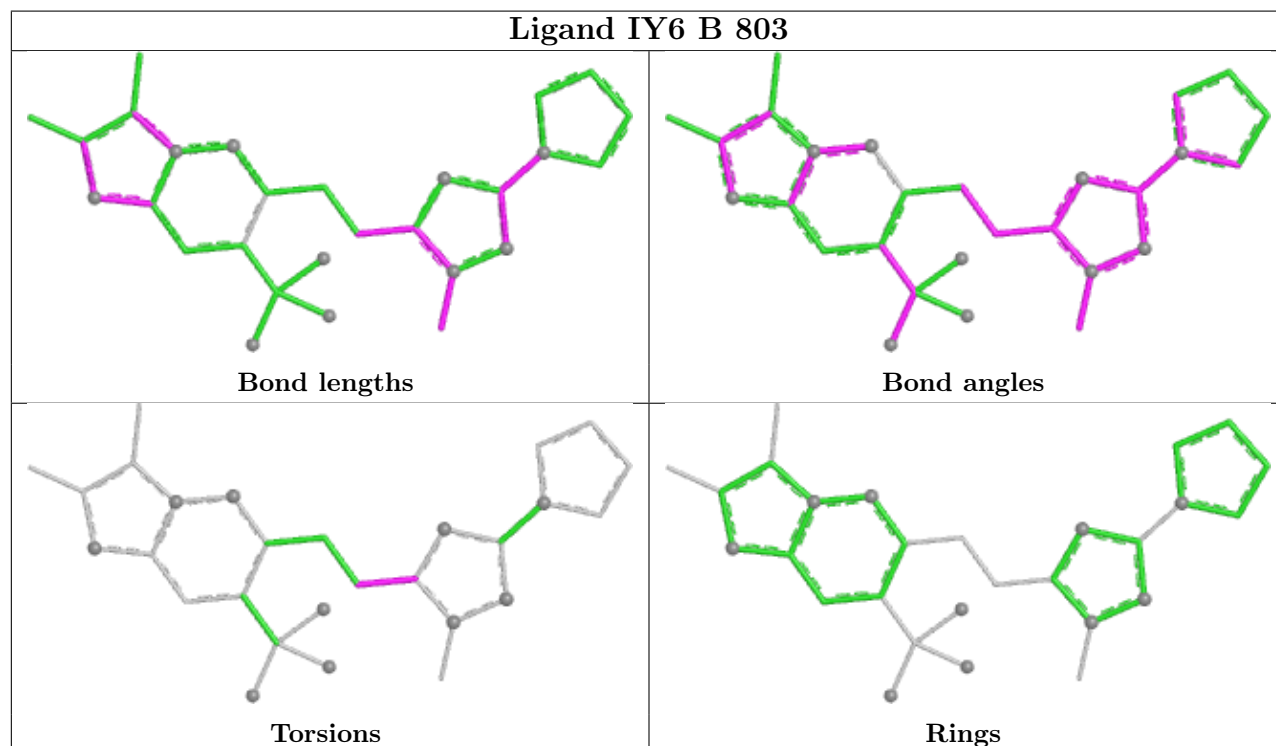
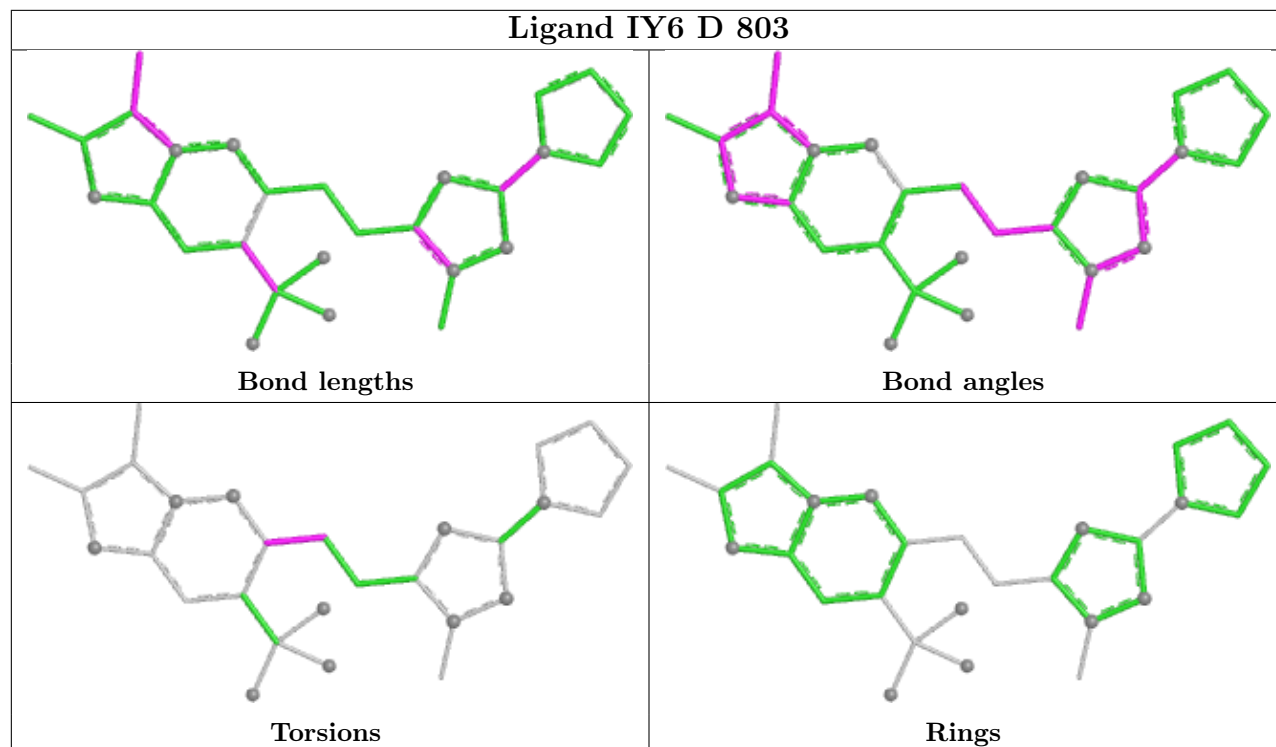
There are no ring outliers.

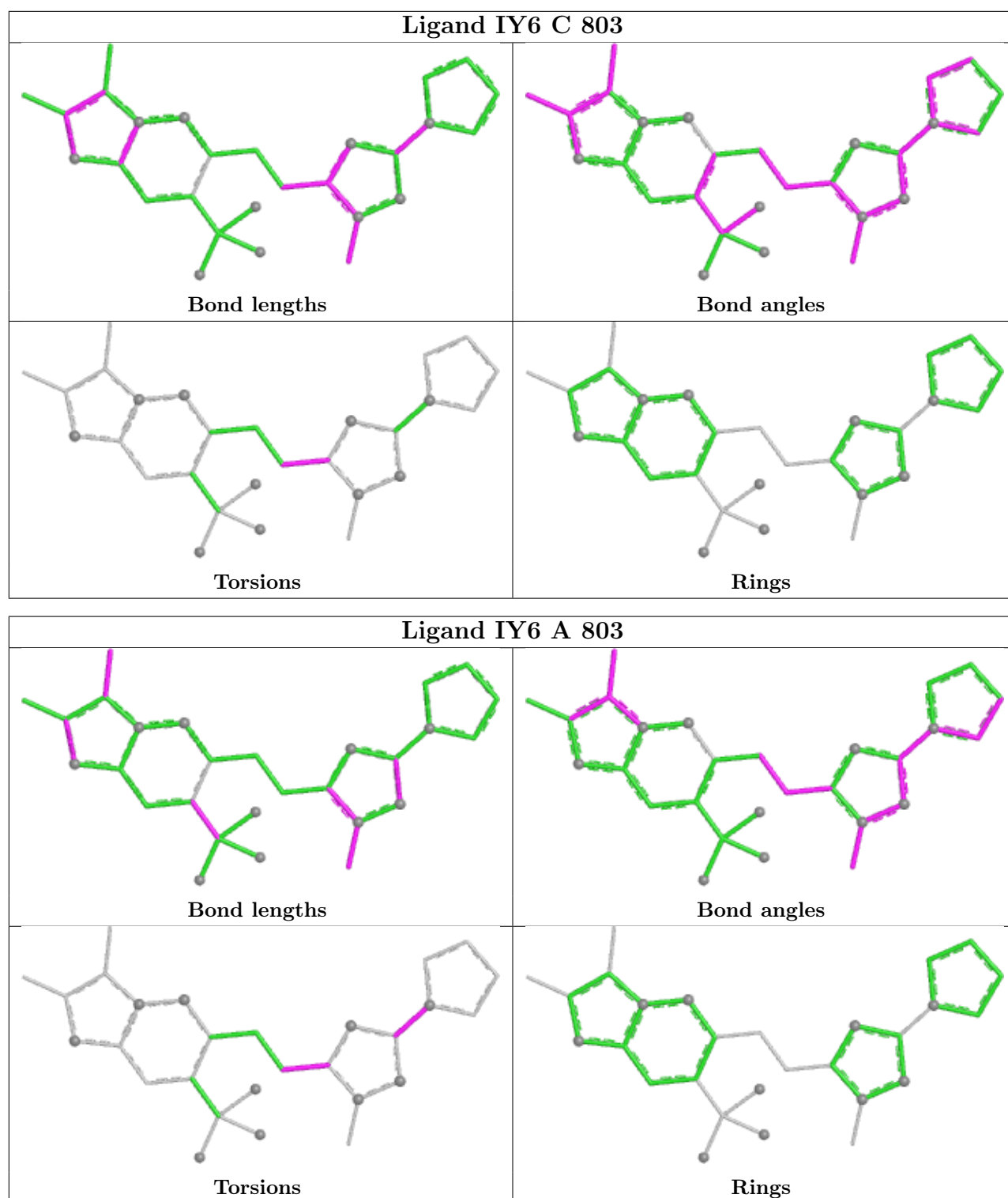
4 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	803	IY6	3	0
4	B	803	IY6	2	0
4	C	803	IY6	3	0
4	A	803	IY6	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 ⓘ

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	311/343 (90%)	-0.19	2 (0%) 85 88	20, 38, 66, 95	4 (1%)
1	B	314/343 (91%)	-0.15	6 (1%) 66 68	26, 37, 64, 94	2 (0%)
1	C	314/343 (91%)	-0.19	4 (1%) 75 77	22, 38, 63, 101	2 (0%)
1	D	311/343 (90%)	0.09	4 (1%) 75 77	28, 48, 70, 85	1 (0%)
All	All	1250/1372 (91%)	-0.11	16 (1%) 75 77	20, 41, 67, 101	9 (0%)

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	459	LEU	5.2
1	C	456	TRP	5.0
1	B	771	THR	4.6
1	B	459	LEU	4.3
1	C	457	GLN	4.3
1	D	459	LEU	4.1
1	B	458	GLY	3.6
1	C	459	LEU	3.4
1	B	457	GLN	3.2
1	C	458	GLY	3.1
1	D	768	GLY	3.1
1	A	460	MET	3.0
1	D	457	GLN	2.9
1	D	458	GLY	2.3
1	B	460	MET	2.2
1	B	546	THR	2.1

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	CME	D	509	10/11	0.87	0.14	42,59,95,100	0
1	CME	B	509	10/11	0.88	0.15	37,48,93,101	0
1	CME	C	509	10/11	0.90	0.12	37,42,81,82	0
1	CME	A	509	10/11	0.91	0.12	42,57,87,98	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

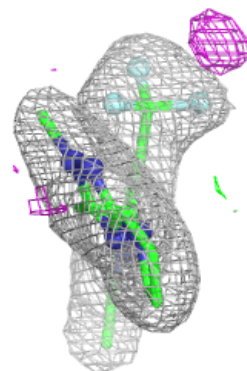
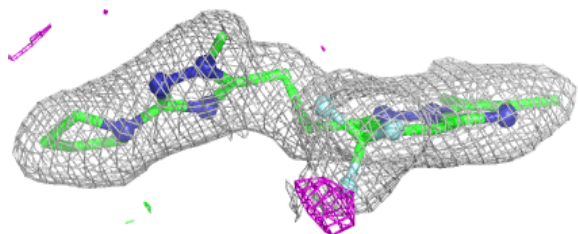
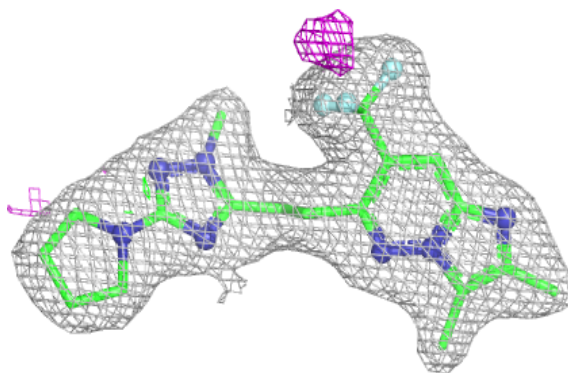
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	IY6	A	803	28/28	0.96	0.06	29,34,44,49	0
4	IY6	D	803	28/28	0.96	0.07	35,43,55,62	0
4	IY6	C	803	28/28	0.97	0.06	31,37,43,49	0
4	IY6	B	803	28/28	0.97	0.05	26,35,46,50	0
3	MG	A	802	1/1	0.99	0.02	31,31,31,31	0
3	MG	B	802	1/1	0.99	0.02	26,26,26,26	0
3	MG	C	802	1/1	0.99	0.02	29,29,29,29	0
3	MG	D	802	1/1	0.99	0.04	37,37,37,37	0
2	ZN	A	801	1/1	1.00	0.01	33,33,33,33	0
2	ZN	B	801	1/1	1.00	0.01	31,31,31,31	0
2	ZN	C	801	1/1	1.00	0.02	32,32,32,32	0
2	ZN	D	801	1/1	1.00	0.02	40,40,40,40	0

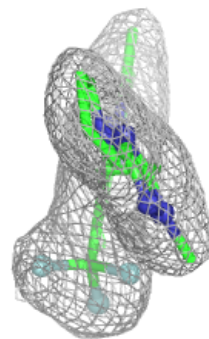
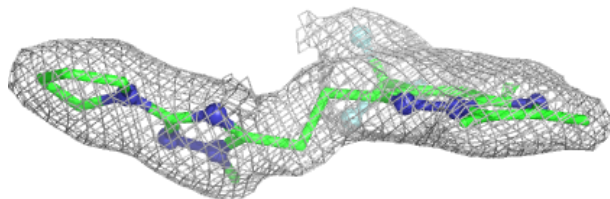
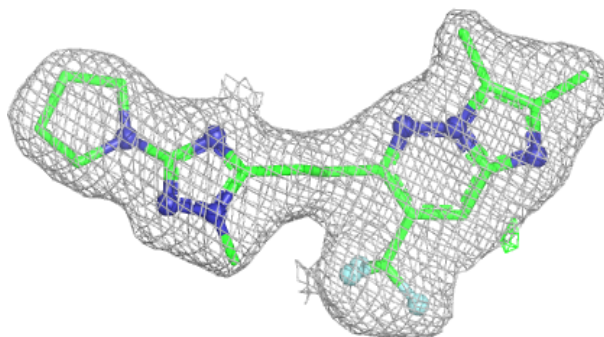
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around IY6 A 803:

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

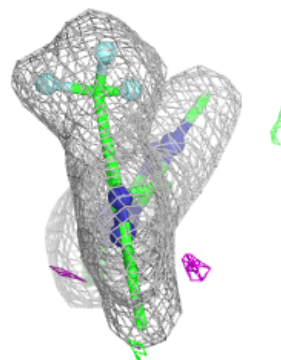
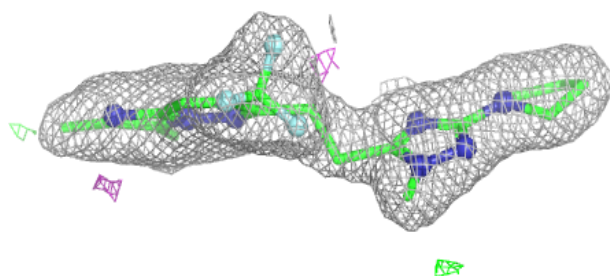
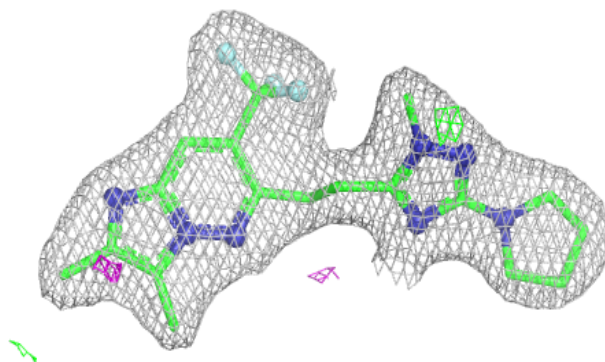
**Electron density around IY6 D 803:**

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

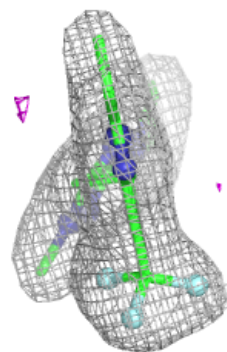
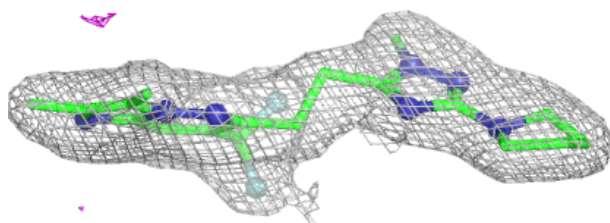
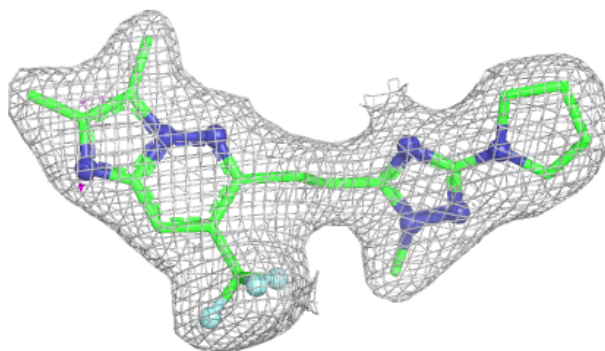


Electron density around IY6 C 803:

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

**Electron density around IY6 B 803:**

$2mF_o-DF_c$ (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.