



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 05:53 PM UTC

PDB ID : 5SGO / pdb_00005sgo
Title : CRYSTAL STRUCTURE OF HUMAN PHOSPHODIESTERASE 10 IN
COMPLEX WITH n1cnc(c2c1scc2c3ccc(cc3)F)OCCCOc4cc(ccc4)NC(=O)C, micromolar IC₅₀=0.012
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Deposited on : 2022-02-01
Resolution : 2.30 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

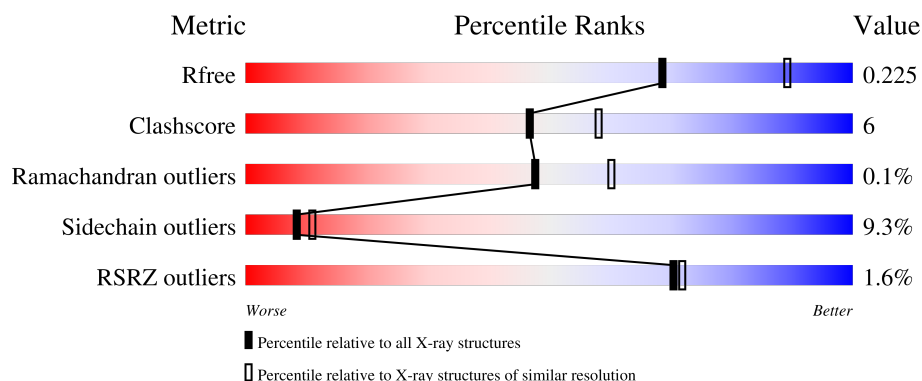
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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	 2% 73% 17% • 8%
1	B	343	 2% 77% 14% • 7%
1	D	343	 % 72% 17% • 9%
2	C	343	 % 71% 18% • 8%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 10736 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	316	Total	C	N	O	S	0	3	0
			2579	1648	441	467	23			
1	B	319	Total	C	N	O	S	0	0	0
			2584	1652	440	469	23			
1	D	312	Total	C	N	O	S	0	4	0
			2553	1633	439	457	24			

There are 6 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
D	447	GLY	-	expression tag	UNP Q9Y233
D	448	SER	-	expression tag	UNP Q9Y233

- Molecule 2 is a protein called cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	314	Total	C	N	O	S	0	4	0
			2563	1638	436	464	25			

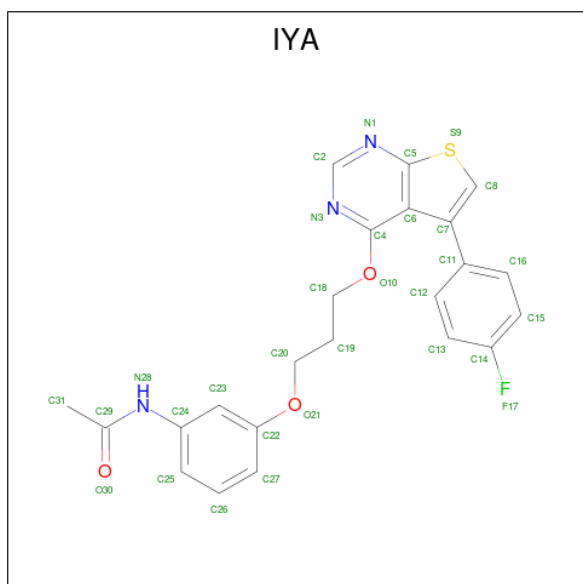
There are 2 discrepancies between the modelled and reference sequences:

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

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

- Molecule 4 is N-[3-(3-{[5-(4-fluorophenyl)thieno[2,3-d]pyrimidin-4-yl]oxy}propoxy)phenyl]acetamide (CCD ID: IYA) (formula: C₂₃H₂₀FN₃O₃S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C F N O S 31 23 1 3 3 1	0	0
4	B	1	Total C F N O S 31 23 1 3 3 1	0	0
4	C	1	Total C F N O S 31 23 1 3 3 1	0	0
4	D	1	Total C F N O S 31 23 1 3 3 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	95	Total O 95 95	0	0

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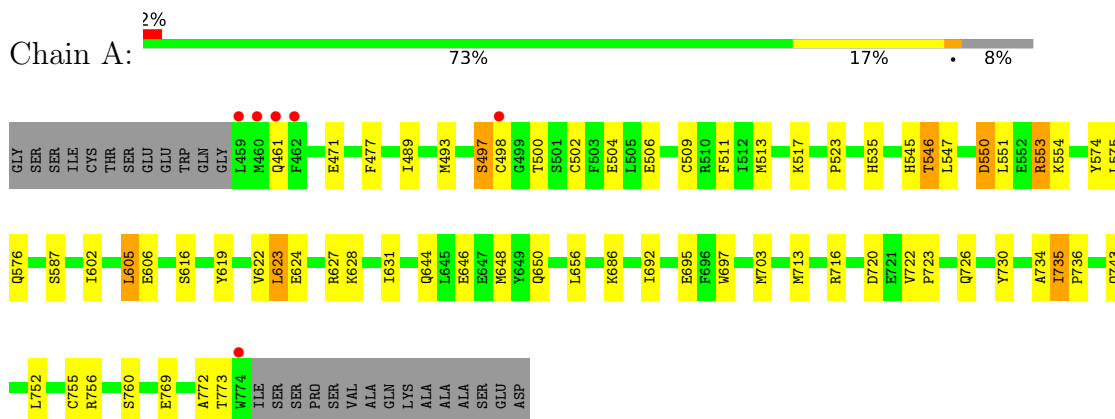
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	97	Total 97	O 97	0	0
5	C	91	Total 91	O 91	0	0
5	D	46	Total 46	O 46	0	0

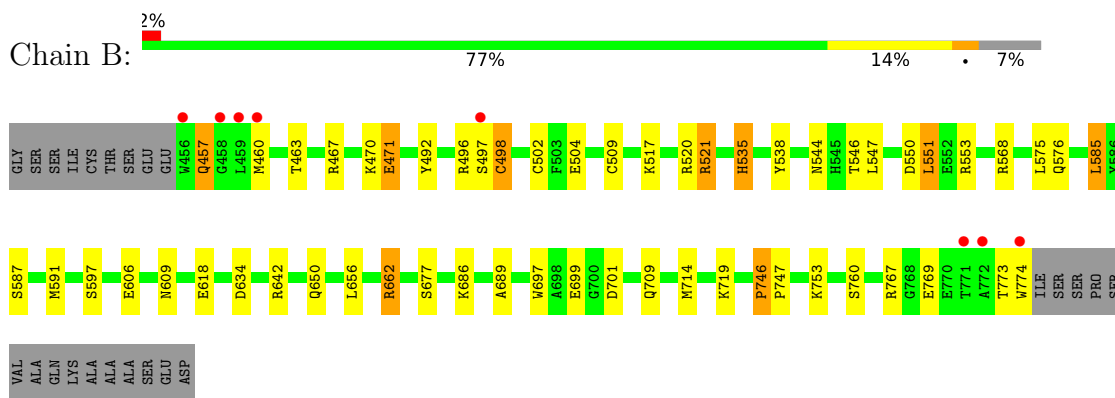
3 Residue-property plots [i](#)

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.

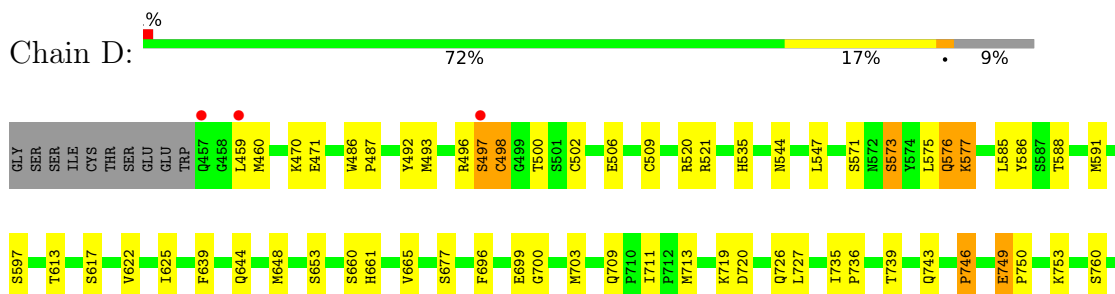
- Molecule 1: cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A

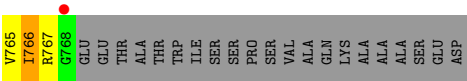


- Molecule 1: cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A

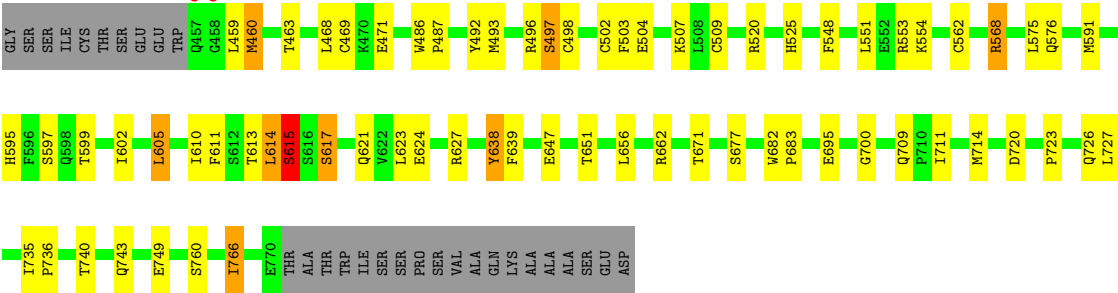


- Molecule 1: cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A





● Molecule 2: 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	135.96Å 135.96Å 235.68Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	39.28 – 2.30 39.28 – 2.30	Depositor EDS
% Data completeness (in resolution range)	98.2 (39.28-2.30) 98.2 (39.28-2.30)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	0.04	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.33 (at 2.29Å)	Xtriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.164 , 0.224 0.170 , 0.225	Depositor DCC
R_{free} test set	3569 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	41.3	Xtriage
Anisotropy	0.140	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 28.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.024 for h,-h-k,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	10736	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.87% 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: CME, ZN, IYA

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	1.11	0/2650	1.38	4/3587 (0.1%)
1	B	1.10	0/2648	1.39	6/3587 (0.2%)
1	D	1.10	0/2627	1.44	5/3554 (0.1%)
2	C	1.10	0/2626	1.41	5/3552 (0.1%)
All	All	1.10	0/10551	1.40	20/14280 (0.1%)

There are no bond length outliers.

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	535	HIS	CA-CB-CG	-6.11	107.69	113.80
1	B	609	ASN	CA-CB-CG	-6.08	106.52	112.60
1	A	511	PHE	CA-C-N	5.98	128.32	120.60
1	A	511	PHE	C-N-CA	5.98	128.32	120.60
1	A	546	THR	CA-CB-OG1	-5.90	100.75	109.60
1	D	639	PHE	CA-C-N	5.61	126.20	119.98
1	D	639	PHE	C-N-CA	5.61	126.20	119.98
2	C	617	SER	O-C-N	5.50	128.50	122.11
1	D	746	PRO	N-CA-C	5.38	117.26	110.70
1	B	746	PRO	N-CA-C	5.30	117.17	110.70
1	D	535	HIS	CA-CB-CG	-5.17	108.63	113.80
1	B	634	ASP	CA-CB-CG	5.11	117.71	112.60
2	C	639	PHE	CA-C-N	5.11	125.65	119.98
2	C	639	PHE	C-N-CA	5.11	125.65	119.98
1	B	504	GLU	CB-CA-C	5.09	117.90	110.26
1	A	735	ILE	CA-C-O	5.08	122.09	118.69
1	B	701	ASP	CA-CB-CG	5.06	117.66	112.60
1	D	765	VAL	CA-C-O	-5.04	115.81	121.05
2	C	617	SER	CA-C-N	5.00	127.30	120.54
2	C	617	SER	C-N-CA	5.00	127.30	120.54

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	2579	0	2559	29	0
1	B	2584	0	2548	32	0
1	D	2553	0	2544	25	0
2	C	2563	0	2543	31	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	31	0	0	2	0
4	B	31	0	0	1	0
4	C	31	0	0	2	0
4	D	31	0	0	2	0
5	A	95	0	0	0	0
5	B	97	0	0	1	0
5	C	91	0	0	2	0
5	D	46	0	0	2	0
All	All	10736	0	10194	118	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 6.

All (118) 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:B:498:CYS:HB2	1:B:502:CYS:SG	1.81	1.19
1:B:498:CYS:HB2	1:B:502:CYS:HG	1.43	0.84
1:B:457:GLN:HG3	1:B:460:MET:HE2	1.59	0.82
1:A:498:CYS:HB2	1:A:502:CYS:SG	2.23	0.79
1:D:509:CYS:SG	5:D:945:HOH:O	2.45	0.74
1:B:457:GLN:HG3	1:B:460:MET:CE	2.19	0.72
2:C:624:GLU:OE2	2:C:627:ARG:NH1	2.21	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:521:ARG:HH11	1:B:521:ARG:HG3	1.60	0.65
1:B:544:ASN:HB3	1:B:547:LEU:HD13	1.78	0.65
2:C:493:MET:O	2:C:497:SER:HB2	1.97	0.64
1:A:624:GLU:CD	1:A:627:ARG:HH11	2.06	0.64
1:A:644:GLN:O	1:A:648:MET:HG3	2.00	0.62
2:C:647:GLU:O	2:C:651:THR:HG23	1.98	0.62
1:D:493:MET:O	1:D:497:SER:HB2	1.99	0.62
1:B:492:TYR:CZ	1:B:496:ARG:HD2	2.35	0.61
1:A:498:CYS:CB	1:A:502:CYS:SG	2.89	0.61
1:B:520:ARG:CD	1:B:568:ARG:HD3	2.30	0.61
2:C:502:CYS:HB2	2:C:554:LYS:HE2	1.82	0.60
4:B:802:IYA:O30	4:B:802:IYA:C25	2.45	0.60
1:A:627:ARG:O	1:A:631:ILE:HG12	2.03	0.59
1:B:496:ARG:HH11	1:B:496:ARG:HB3	1.67	0.58
1:B:498:CYS:CB	1:B:502:CYS:SG	2.75	0.57
1:D:573:SER:O	1:D:577:LYS:HD2	2.04	0.57
1:B:520:ARG:HD2	1:B:568:ARG:HD3	1.87	0.57
2:C:525:HIS:ND1	2:C:695:GLU:OE1	2.31	0.57
1:D:644:GLN:HE21	1:D:648:MET:HE3	1.69	0.56
1:A:619:TYR:CE2	1:A:623:LEU:HD13	2.41	0.56
1:B:546:THR:HG21	1:D:767:ARG:HH11	1.71	0.56
1:A:735:ILE:HB	1:A:736:PRO:HD3	1.89	0.55
2:C:575:LEU:HD11	2:C:591:MET:SD	2.47	0.54
1:A:497:SER:O	1:A:553:ARG:HD2	2.07	0.54
1:A:502:CYS:HB2	1:A:554:LYS:HD3	1.89	0.54
1:A:752:LEU:O	1:A:756[B]:ARG:HG3	2.08	0.54
1:B:656:LEU:O	1:B:662:ARG:HG3	2.08	0.54
1:B:496:ARG:HB3	1:B:496:ARG:NH1	2.23	0.53
2:C:611:PHE:HB3	2:C:614:LEU:HD22	1.91	0.53
1:A:646[A]:GLU:OE1	1:A:743:GLN:NE2	2.41	0.53
4:A:802:IYA:C25	4:A:802:IYA:O30	2.56	0.52
2:C:498:CYS:CB	2:C:502:CYS:SG	2.97	0.52
1:D:492:TYR:CZ	1:D:496:ARG:HD2	2.45	0.51
1:A:574:TYR:HD1	1:A:703:MET:HE2	1.75	0.51
1:B:575:LEU:HD11	1:B:591:MET:SD	2.51	0.51
2:C:492:TYR:CZ	2:C:496:ARG:HD2	2.46	0.51
2:C:498:CYS:HB3	2:C:502:CYS:SG	2.51	0.51
1:D:498:CYS:HB2	1:D:502[B]:CYS:SG	2.51	0.50
1:A:735:ILE:HD13	1:A:755:CYS:SG	2.52	0.50
1:D:700:GLY:O	1:D:703:MET:HB2	2.11	0.50
1:A:602:ILE:HA	1:A:605:LEU:HD22	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:713:MET:SD	4:D:802:IYA:C19	3.00	0.50
1:A:523:PRO:HD2	1:A:695:GLU:HG2	1.94	0.50
1:D:766:ILE:HG22	1:D:766:ILE:O	2.12	0.49
1:B:521:ARG:HH11	1:B:521:ARG:CG	2.24	0.49
1:D:696:PHE:HE2	4:D:802:IYA:C19	2.26	0.49
1:A:644:GLN:HE21	1:A:644:GLN:HA	1.76	0.49
1:A:489:ILE:O	1:A:493:MET:HG3	2.13	0.49
2:C:568:ARG:NH1	5:C:905:HOH:O	2.43	0.48
2:C:498:CYS:HB2	2:C:502:CYS:SG	2.53	0.48
4:C:802:IYA:O30	4:C:802:IYA:C25	2.61	0.48
2:C:562:CYS:HB3	2:C:599:THR:OG1	2.13	0.47
2:C:700:GLY:HA3	2:C:714:MET:O	2.13	0.47
1:B:497:SER:O	1:B:553:ARG:HD2	2.15	0.47
1:B:697:TRP:CZ2	1:B:719:LYS:HG2	2.48	0.47
1:D:726:GLN:NE2	5:D:901:HOH:O	2.46	0.47
1:A:726:GLN:O	1:A:730:TYR:HD1	1.97	0.47
1:D:585:LEU:HD23	1:D:586:TYR:CE1	2.50	0.47
1:B:585:LEU:HD12	1:B:585:LEU:HA	1.79	0.47
1:A:550:ASP:N	1:A:550:ASP:OD2	2.46	0.47
1:A:722:VAL:HB	1:A:723:PRO:HD3	1.96	0.46
2:C:735:ILE:HB	2:C:736:PRO:HD3	1.97	0.46
2:C:486:TRP:N	2:C:487:PRO:CD	2.79	0.46
1:D:544:ASN:HB3	1:D:547:LEU:HD12	1.98	0.46
1:B:509:CYS:SG	5:B:993:HOH:O	2.60	0.45
1:A:686:LYS:HE3	1:A:772:ALA:HA	1.97	0.45
1:B:699:GLU:HG2	1:B:714:MET:CE	2.46	0.45
2:C:520:ARG:NH1	5:C:908:HOH:O	2.50	0.45
1:B:535:HIS:O	1:B:538:TYR:HB3	2.16	0.45
2:C:551:LEU:HD23	2:C:551:LEU:HA	1.86	0.44
2:C:548:PHE:O	2:C:553:ARG:NH1	2.50	0.44
1:D:498:CYS:O	1:D:502[B]:CYS:SG	2.76	0.44
2:C:503:PHE:CE2	2:C:610:ILE:HD12	2.52	0.44
1:B:551:LEU:HD11	1:B:618:GLU:HB3	1.99	0.44
2:C:468:LEU:N	2:C:468:LEU:HD12	2.32	0.44
2:C:656:LEU:O	2:C:662:ARG:HG3	2.17	0.44
1:B:470:LYS:HE2	1:D:746:PRO:HG3	2.00	0.43
1:D:486:TRP:N	1:D:487:PRO:CD	2.81	0.43
1:A:509:CYS:O	1:A:513:MET:HG2	2.18	0.43
2:C:740:THR:HA	2:C:743:GLN:HE21	1.84	0.43
1:A:477:PHE:HB3	1:A:535:HIS:CE1	2.54	0.43
1:A:692:ILE:HD13	4:A:802:IYA:C5	2.49	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:730:TYR:O	1:A:735:ILE:HG12	2.19	0.43
1:B:689:ALA:HB3	1:B:774:TRP:HZ2	1.84	0.43
2:C:460:MET:HE2	2:C:460:MET:HB2	1.76	0.43
2:C:682:TRP:N	2:C:683:PRO:CD	2.81	0.43
1:D:661:HIS:O	1:D:665:VAL:HG23	2.18	0.43
1:B:746:PRO:N	1:B:747:PRO:CD	2.81	0.43
1:D:576:GLN:HE21	1:D:576:GLN:HB3	1.65	0.43
1:D:739:THR:O	1:D:743[B]:GLN:HG2	2.19	0.43
2:C:638:TYR:CD1	2:C:671:THR:HG21	2.54	0.42
1:A:624:GLU:HG3	1:A:628:LYS:HE3	2.01	0.42
1:D:622:VAL:HA	1:D:625:ILE:HD12	2.02	0.42
1:B:551:LEU:HD23	1:B:551:LEU:HA	1.86	0.42
1:B:699:GLU:HG2	1:B:714:MET:HE1	2.01	0.42
2:C:614:LEU:C	2:C:615:SER:O	2.62	0.42
1:D:575:LEU:HD11	1:D:591:MET:SD	2.59	0.42
1:A:730:TYR:HA	1:A:734:ALA:HB3	2.02	0.42
2:C:726:GLN:HE22	4:C:802:IYA:C2	2.33	0.41
1:D:571:SER:OG	1:D:699:GLU:OE2	2.36	0.41
1:B:467:ARG:O	1:B:471:GLU:HB2	2.20	0.41
1:D:735:ILE:HB	1:D:736:PRO:HD3	2.02	0.41
1:D:749:GLU:N	1:D:750:PRO:CD	2.83	0.41
1:B:767:ARG:NE	1:B:769:GLU:OE2	2.41	0.41
1:B:767:ARG:HB2	1:B:769:GLU:OE2	2.21	0.40
2:C:602:ILE:O	2:C:605:LEU:HB2	2.21	0.40
2:C:723:PRO:CB	2:C:766:ILE:HG13	2.52	0.40
1:A:574:TYR:CD1	1:A:703:MET:HE2	2.56	0.40
1:A:697:TRP:HB3	1:A:716:ARG:HB3	2.02	0.40
1:B:773:THR:C	1:B:774:TRP:HE3	2.30	0.40
2:C:591:MET:HE3	2:C:595:HIS:CE1	2.57	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	317/343 (92%)	306 (96%)	11 (4%)	0	100	100
1	B	317/343 (92%)	309 (98%)	8 (2%)	0	100	100
1	D	314/343 (92%)	299 (95%)	15 (5%)	0	100	100
2	C	315/343 (92%)	309 (98%)	5 (2%)	1 (0%)	36	46
All	All	1263/1372 (92%)	1223 (97%)	39 (3%)	1 (0%)	48	60

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	C	615	SER

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	287/306 (94%)	259 (90%)	28 (10%)	7	10
1	B	286/306 (94%)	265 (93%)	21 (7%)	13	18
1	D	285/306 (93%)	255 (90%)	30 (10%)	6	8
2	C	285/305 (93%)	257 (90%)	28 (10%)	7	10
All	All	1143/1223 (94%)	1036 (91%)	107 (9%)	8	11

All (107) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	461	GLN
1	A	471	GLU
1	A	497	SER
1	A	500	THR
1	A	504	GLU
1	A	506	GLU
1	A	517	LYS
1	A	545	HIS
1	A	546	THR
1	A	547	LEU

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Mol	Chain	Res	Type
1	A	550	ASP
1	A	551	LEU
1	A	553	ARG
1	A	575	LEU
1	A	576	GLN
1	A	587	SER
1	A	605	LEU
1	A	606	GLU
1	A	616	SER
1	A	622	VAL
1	A	623	LEU
1	A	650	GLN
1	A	656	LEU
1	A	713	MET
1	A	720	ASP
1	A	760	SER
1	A	769	GLU
1	A	773	THR
1	B	457	GLN
1	B	463	THR
1	B	471	GLU
1	B	498	CYS
1	B	517	LYS
1	B	521	ARG
1	B	550	ASP
1	B	551	LEU
1	B	576	GLN
1	B	585	LEU
1	B	587	SER
1	B	597	SER
1	B	606	GLU
1	B	642	ARG
1	B	650	GLN
1	B	662	ARG
1	B	677	SER
1	B	686	LYS
1	B	709	GLN
1	B	753	LYS
1	B	760	SER
2	C	459	LEU
2	C	460	MET
2	C	463	THR

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Mol	Chain	Res	Type
2	C	469[A]	CYS
2	C	469[B]	CYS
2	C	471	GLU
2	C	497	SER
2	C	504	GLU
2	C	507	LYS
2	C	568	ARG
2	C	576	GLN
2	C	597	SER
2	C	605	LEU
2	C	613	THR
2	C	614	LEU
2	C	615	SER
2	C	617	SER
2	C	621	GLN
2	C	623	LEU
2	C	638	TYR
2	C	677	SER
2	C	709	GLN
2	C	711	ILE
2	C	720	ASP
2	C	727	LEU
2	C	749	GLU
2	C	760	SER
2	C	766	ILE
1	D	459	LEU
1	D	460	MET
1	D	470	LYS
1	D	471	GLU
1	D	497	SER
1	D	498	CYS
1	D	500	THR
1	D	506	GLU
1	D	520[A]	ARG
1	D	520[B]	ARG
1	D	521	ARG
1	D	573	SER
1	D	576	GLN
1	D	577	LYS
1	D	588	THR
1	D	597	SER
1	D	613	THR

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Mol	Chain	Res	Type
1	D	617	SER
1	D	653	SER
1	D	660	SER
1	D	677	SER
1	D	709	GLN
1	D	711	ILE
1	D	719	LYS
1	D	720	ASP
1	D	727	LEU
1	D	749	GLU
1	D	753	LYS
1	D	760	SER
1	D	766	ILE

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	576	GLN
1	A	593	GLN
1	A	604	GLN
1	A	644	GLN
1	A	650	GLN
1	B	604	GLN
1	B	621	GLN
1	B	690	ASN
2	C	576	GLN
2	C	595	HIS
2	C	598	GLN
2	C	604	GLN
2	C	726	GLN
2	C	743	GLN
1	D	576	GLN
1	D	604	GLN
1	D	644	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue 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	CME	C	509	2	8,9,10	0.54	0	6,9,11	3.67	2 (33%)

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	CME	C	509	2	-	0/5/8/10	-

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	509	CME	CE-SD-SG	6.57	132.30	103.46
2	C	509	CME	CB-SG-SD	-5.96	88.44	103.86

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 8 ligands modelled in this entry, 4 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	IYA	A	802	-	34,34,34	1.58	4 (11%)	40,46,46	4.12	16 (40%)
4	IYA	C	802	-	34,34,34	1.53	8 (23%)	40,46,46	4.13	23 (57%)
4	IYA	B	802	-	34,34,34	1.50	7 (20%)	40,46,46	3.40	20 (50%)
4	IYA	D	802	-	34,34,34	1.19	4 (11%)	40,46,46	2.59	16 (40%)

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	IYA	A	802	-	-	1/16/16/16	0/4/4/4
4	IYA	C	802	-	-	3/16/16/16	0/4/4/4
4	IYA	B	802	-	-	2/16/16/16	0/4/4/4
4	IYA	D	802	-	-	2/16/16/16	0/4/4/4

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	802	IYA	C8-C7	-4.41	1.29	1.35
4	A	802	IYA	C11-C7	-4.32	1.42	1.49
4	B	802	IYA	C25-C24	4.02	1.46	1.39
4	C	802	IYA	C6-C5	-3.50	1.36	1.40
4	A	802	IYA	C2-N1	-3.48	1.27	1.33
4	A	802	IYA	C8-C7	-3.11	1.31	1.35
4	B	802	IYA	C27-C22	3.04	1.44	1.38
4	B	802	IYA	C26-C25	3.02	1.44	1.38
4	B	802	IYA	C8-C7	-2.90	1.31	1.35
4	A	802	IYA	C6-C5	-2.88	1.37	1.40
4	B	802	IYA	C2-N1	-2.67	1.29	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	802	IYA	C11-C7	-2.51	1.45	1.49
4	D	802	IYA	C11-C7	-2.49	1.45	1.49
4	D	802	IYA	C27-C22	2.43	1.43	1.38
4	C	802	IYA	C25-C24	2.38	1.43	1.39
4	C	802	IYA	C15-C14	2.35	1.41	1.37
4	C	802	IYA	O10-C4	-2.32	1.31	1.34
4	C	802	IYA	C2-N1	-2.30	1.29	1.33
4	C	802	IYA	C27-C22	2.24	1.42	1.38
4	B	802	IYA	C15-C14	2.21	1.41	1.37
4	B	802	IYA	C6-C5	-2.19	1.38	1.40
4	D	802	IYA	C26-C25	2.16	1.42	1.38
4	D	802	IYA	C8-C7	-2.09	1.32	1.35

All (75) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	802	IYA	C5-S9-C8	19.85	96.69	90.67
4	A	802	IYA	C5-S9-C8	19.05	96.45	90.67
4	B	802	IYA	C5-S9-C8	14.04	94.93	90.67
4	D	802	IYA	C5-S9-C8	7.74	93.01	90.67
4	A	802	IYA	C7-C8-S9	-7.58	105.91	114.27
4	A	802	IYA	C6-C7-C8	6.35	118.78	111.38
4	D	802	IYA	C31-C29-N28	5.92	123.85	114.95
4	C	802	IYA	N3-C2-N1	-5.73	119.91	128.58
4	A	802	IYA	C12-C11-C7	-5.71	113.82	120.98
4	C	802	IYA	C7-C8-S9	-5.71	107.97	114.27
4	B	802	IYA	O30-C29-N28	-5.57	115.42	123.06
4	C	802	IYA	C12-C11-C7	-5.17	114.50	120.98
4	A	802	IYA	N3-C2-N1	-5.17	120.76	128.58
4	A	802	IYA	C31-C29-N28	5.05	122.54	114.95
4	D	802	IYA	N3-C2-N1	-5.02	120.98	128.58
4	C	802	IYA	C6-C5-S9	-4.77	106.59	112.39
4	C	802	IYA	C31-C29-N28	4.61	121.88	114.95
4	B	802	IYA	N3-C2-N1	-4.59	121.64	128.58
4	B	802	IYA	C31-C29-N28	4.58	121.84	114.95
4	B	802	IYA	C24-N28-C29	-4.45	119.68	127.98
4	B	802	IYA	C27-C26-C25	-4.44	114.54	120.24
4	B	802	IYA	C7-C8-S9	-4.43	109.37	114.27
4	A	802	IYA	O30-C29-N28	-4.37	117.08	123.06
4	C	802	IYA	C6-C7-C8	4.36	116.46	111.38
4	D	802	IYA	C6-C7-C8	4.23	116.31	111.38
4	C	802	IYA	C18-O10-C4	-4.00	110.70	117.66

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	802	IYA	O10-C4-N3	-3.95	113.44	119.20
4	D	802	IYA	C7-C8-S9	-3.94	109.92	114.27
4	B	802	IYA	C6-C7-C8	3.71	115.70	111.38
4	B	802	IYA	C27-C22-C23	3.68	125.45	120.50
4	D	802	IYA	C18-O10-C4	-3.43	111.69	117.66
4	B	802	IYA	O10-C4-N3	-3.35	114.33	119.20
4	D	802	IYA	O30-C29-C31	-3.32	116.14	122.05
4	A	802	IYA	C16-C11-C12	3.32	122.79	118.57
4	A	802	IYA	C2-N3-C4	3.30	122.43	115.63
4	C	802	IYA	C26-C25-C24	3.16	123.37	119.73
4	D	802	IYA	C12-C11-C7	-3.09	117.11	120.98
4	C	802	IYA	O30-C29-N28	-3.08	118.84	123.06
4	A	802	IYA	C6-C5-S9	-3.06	108.66	112.39
4	B	802	IYA	C6-C5-S9	-3.06	108.67	112.39
4	C	802	IYA	C11-C7-C8	-2.94	115.28	123.60
4	C	802	IYA	C24-N28-C29	-2.93	122.50	127.98
4	B	802	IYA	C26-C25-C24	2.87	123.04	119.73
4	D	802	IYA	C2-N3-C4	2.85	121.50	115.63
4	C	802	IYA	C27-C26-C25	-2.83	116.61	120.24
4	A	802	IYA	F17-C14-C15	2.82	123.06	118.55
4	B	802	IYA	C24-C23-C22	-2.81	115.03	119.18
4	C	802	IYA	C2-N3-C4	2.81	121.41	115.63
4	A	802	IYA	C15-C16-C11	-2.76	117.85	120.80
4	A	802	IYA	C24-N28-C29	-2.76	122.83	127.98
4	B	802	IYA	F17-C14-C15	2.68	122.85	118.55
4	A	802	IYA	C11-C7-C8	-2.66	116.08	123.60
4	C	802	IYA	C15-C16-C11	-2.65	117.97	120.80
4	B	802	IYA	C12-C11-C7	-2.63	117.69	120.98
4	B	802	IYA	C18-O10-C4	-2.53	113.26	117.66
4	D	802	IYA	C16-C11-C12	2.52	121.77	118.57
4	C	802	IYA	C18-C19-C20	-2.50	105.59	113.67
4	B	802	IYA	C15-C14-C13	-2.48	119.55	122.80
4	D	802	IYA	C15-C16-C11	-2.47	118.17	120.80
4	C	802	IYA	O10-C4-N3	-2.45	115.64	119.20
4	C	802	IYA	C27-C22-C23	2.43	123.77	120.50
4	C	802	IYA	F17-C14-C15	2.35	122.31	118.55
4	C	802	IYA	C16-C11-C7	2.33	123.90	120.98
4	B	802	IYA	C2-N3-C4	2.31	120.38	115.63
4	C	802	IYA	C16-C11-C12	2.25	121.43	118.57
4	C	802	IYA	C16-C15-C14	2.23	120.67	118.38
4	D	802	IYA	O30-C29-N28	-2.23	120.00	123.06
4	D	802	IYA	F17-C14-C15	2.20	122.07	118.55

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	802	IYA	C5-C6-C7	-2.17	110.19	112.16
4	D	802	IYA	C2-N1-C5	2.16	121.09	116.23
4	B	802	IYA	C2-N1-C5	2.16	121.08	116.23
4	B	802	IYA	C23-C24-N28	-2.14	113.19	120.13
4	C	802	IYA	C2-N1-C5	2.08	120.92	116.23
4	D	802	IYA	C26-C25-C24	2.03	122.07	119.73
4	D	802	IYA	C6-C5-S9	-2.00	109.95	112.39

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	802	IYA	C18-C19-C20-O21
4	B	802	IYA	C18-C19-C20-O21
4	C	802	IYA	C18-C19-C20-O21
4	D	802	IYA	O10-C18-C19-C20
4	C	802	IYA	O10-C18-C19-C20
4	D	802	IYA	C18-C19-C20-O21
4	B	802	IYA	C12-C11-C7-C8
4	C	802	IYA	C12-C11-C7-C8

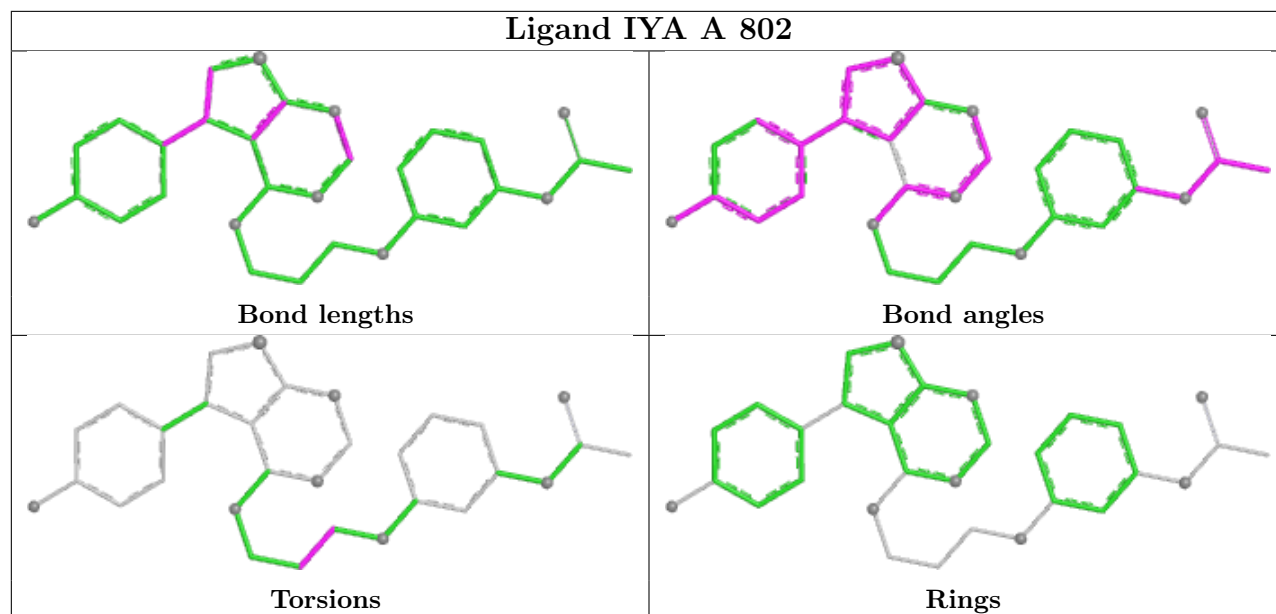
There are no ring outliers.

4 monomers are involved in 7 short contacts:

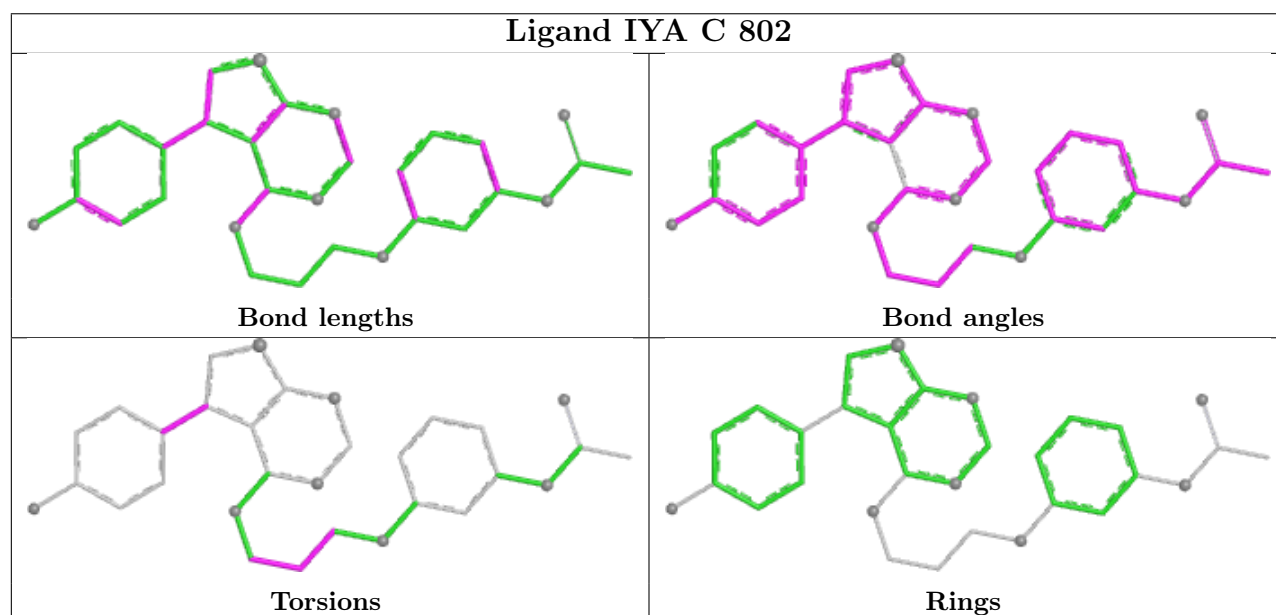
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	802	IYA	2	0
4	C	802	IYA	2	0
4	B	802	IYA	1	0
4	D	802	IYA	2	0

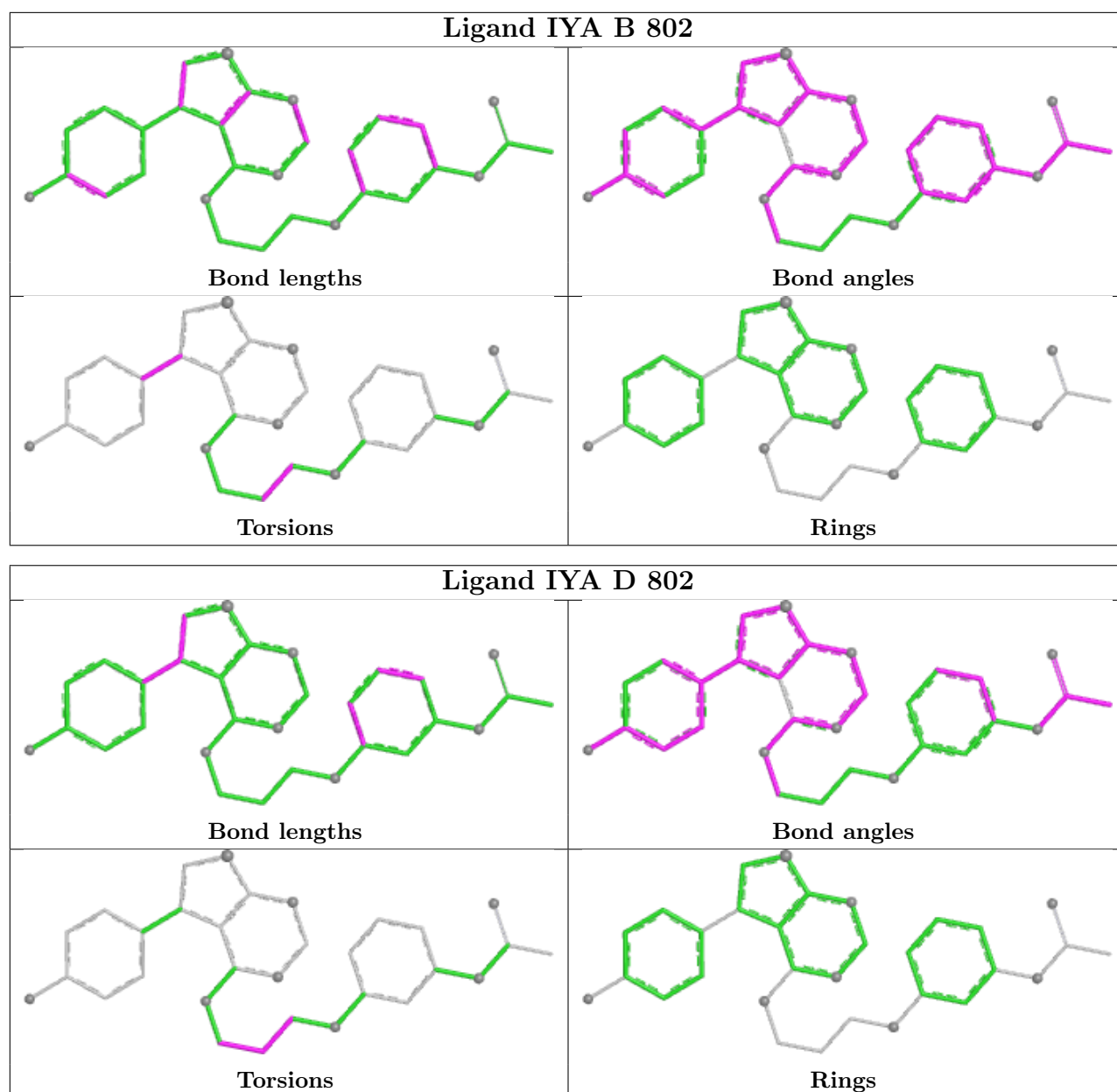
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

Ligand IYA A 802



Ligand IYA C 802





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	A	316/343 (92%)	-0.22	6 (1%) 66 68	21, 42, 76, 106	3 (0%)
1	B	319/343 (93%)	-0.17	8 (2%) 58 60	28, 42, 76, 115	0
1	D	312/343 (90%)	-0.01	4 (1%) 75 76	26, 51, 79, 125	4 (1%)
2	C	313/343 (91%)	-0.25	2 (0%) 85 86	23, 42, 73, 108	4 (1%)
All	All	1260/1372 (91%)	-0.16	20 (1%) 70 72	21, 45, 76, 125	11 (0%)

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	456	TRP	5.6
2	C	457	GLN	5.2
1	A	459	LEU	4.0
1	D	768	GLY	3.8
1	A	774	TRP	3.5
1	B	774	TRP	3.2
1	A	462	PHE	2.9
1	A	460	MET	2.9
2	C	458	GLY	2.9
1	B	458	GLY	2.6
1	D	459	LEU	2.5
1	B	459	LEU	2.4
1	A	498	CYS	2.2
1	B	460	MET	2.2
1	D	457	GLN	2.2
1	D	497	SER	2.2
1	B	772	ALA	2.1
1	B	771	THR	2.1
1	A	461	GLN	2.0
1	B	497	SER	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
2	CME	C	509	10/11	0.90	0.13	42,47,87,90	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

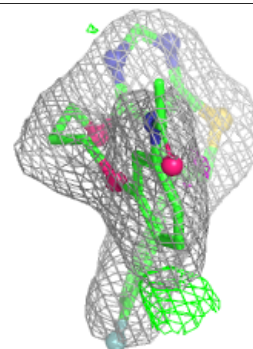
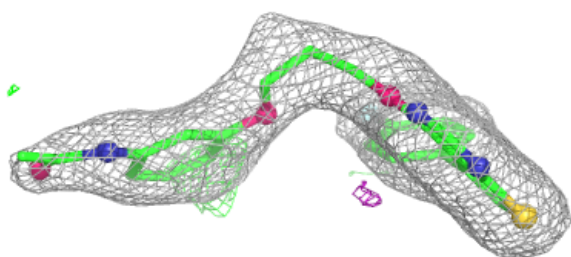
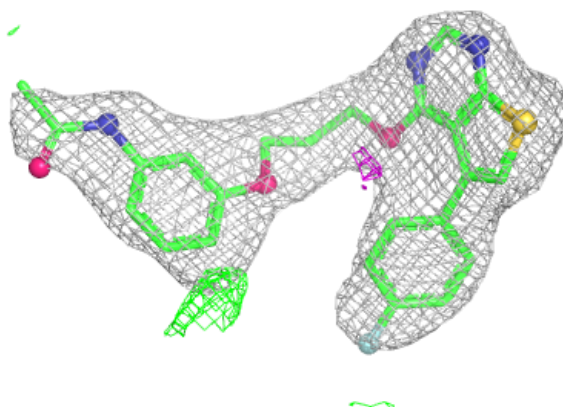
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	IYA	D	802	31/31	0.92	0.10	54,65,86,96	0
4	IYA	B	802	31/31	0.94	0.09	39,51,73,81	0
4	IYA	C	802	31/31	0.94	0.10	37,60,80,90	0
4	IYA	A	802	31/31	0.94	0.09	43,54,72,80	0
3	ZN	A	801	1/1	1.00	0.02	32,32,32,32	0
3	ZN	B	801	1/1	1.00	0.02	31,31,31,31	0
3	ZN	C	801	1/1	1.00	0.02	31,31,31,31	0
3	ZN	D	801	1/1	1.00	0.02	41,41,41,41	0

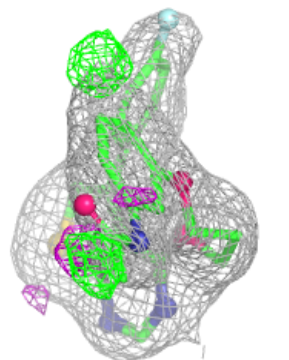
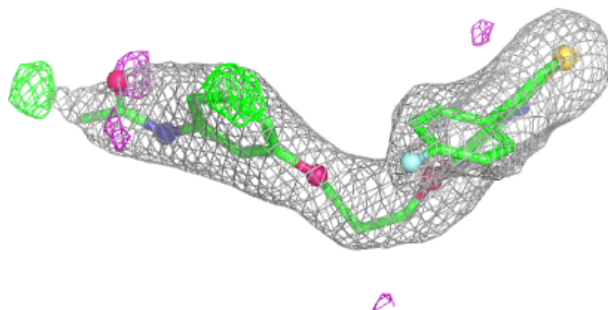
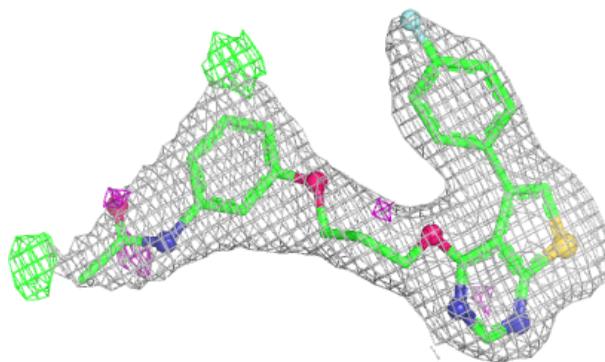
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around IYA D 802:

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

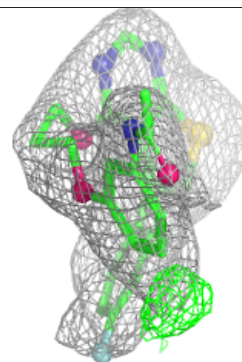
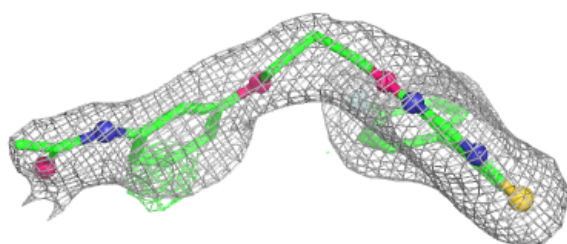
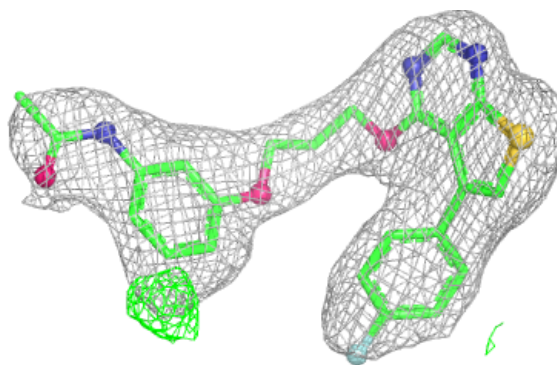
**Electron density around IYA B 802:**

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

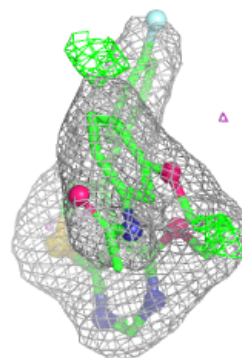
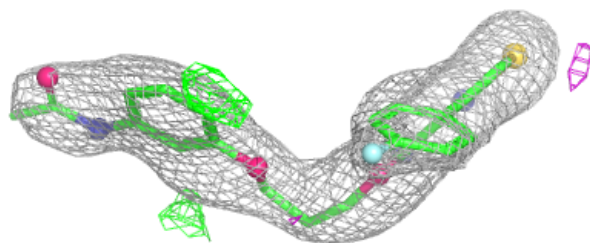
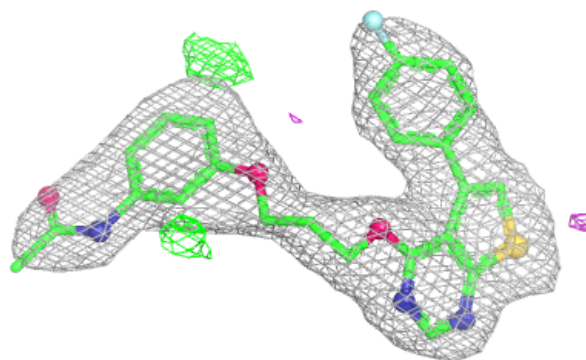


Electron density around IYA C 802:

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

**Electron density around IYA A 802:**

$2mF_o-DF_c$ (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.