



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 04:07 PM UTC

PDB ID : 5L3O / pdb_00005l3o
Title : Crystal Structure of Human Carbonic Anhydrase II in Complex with a Quinoline Oligoamide Foldamer
Authors : Jewginski, M.; Langlois d'Estaintot, B.; Granier, T.; Huc, Y.
Deposited on : 2016-05-24
Resolution : 1.98 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:

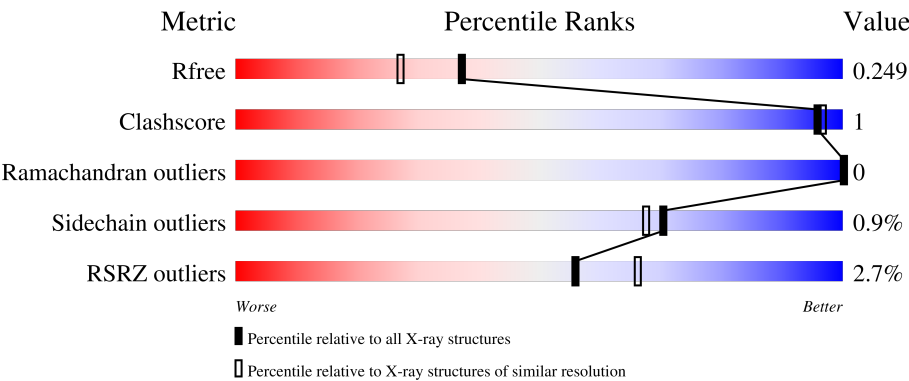
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry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

1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.98 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	1506 (1.98-1.98)
Clashscore	190562	1534 (1.98-1.98)
Ramachandran outliers	187476	1518 (1.98-1.98)
Sidechain outliers	187428	1518 (1.98-1.98)
RSRZ outliers	180081	1506 (1.98-1.98)

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	260	3% 98% .
1	B	260	2% 97% .
2	C	6	17% 67% 17%
2	D	6	17% 83%
2	E	6	17% 33% 33% 17%

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Mol	Chain	Length	Quality of chain
2	F	6	17%33%33%17%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 4761 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 Carbonic anhydrase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	259	Total	C	N	O	S	0	1	0
			2061	1323	353	383	2			
1	B	259	Total	C	N	O	S	0	1	0
			2070	1327	356	385	2			

- Molecule 2 is a protein called Aromatic foldamer.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	6	Total	C	N	O	S	0	0	0
			96	68	11	16	1			
2	D	6	Total	C	N	O	S	0	0	0
			96	68	11	16	1			
2	E	5	Total	C	N	O		0	4	0
			68	47	9	12				
2	F	5	Total	C	N	O		0	4	0
			60	41	9	10				

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

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

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	1
			12	6	6		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	121	Total	O	0	0
			121	121		
5	B	126	Total	O	0	0
			126	126		
5	C	6	Total	O	0	0
			6	6		
5	D	3	Total	O	0	0
			3	3		
5	E	3	Total	O	0	0
			3	3		

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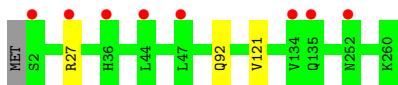
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	F	1	Total	O	0	0
			1	1		

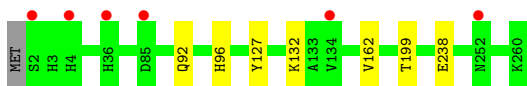
3 Residue-property plots [i](#)

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.

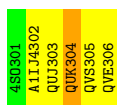
- Molecule 1: Carbonic anhydrase 2



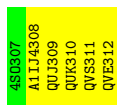
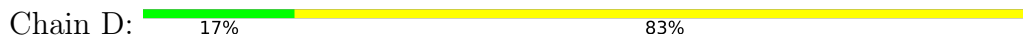
- Molecule 1: Carbonic anhydrase 2



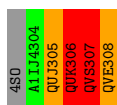
- Molecule 2: Aromatic foldamer



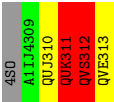
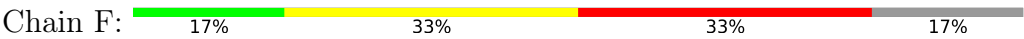
- Molecule 2: Aromatic foldamer



- Molecule 2: Aromatic foldamer



- Molecule 2: Aromatic foldamer



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	158.88Å 54.48Å 84.92Å 90.00° 112.79° 90.00°	Depositor
Resolution (Å)	78.29 – 1.98 78.29 – 1.98	Depositor EDS
% Data completeness (in resolution range)	98.3 (78.29-1.98) 98.3 (78.29-1.98)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.18 (at 1.98Å)	Xtriage
Refinement program	REFMAC 5.8.0135	Depositor
R, R_{free}	0.207 , 0.236 0.218 , 0.249	Depositor DCC
R_{free} test set	2271 reflections (4.84%)	wwPDB-VP
Wilson B-factor (Å ²)	36.7	Xtriage
Anisotropy	0.325	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 47.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	4761	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.09% 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: GOL, A1IJ4, QVE, QUK, 4SO, QVS, QUJ, ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.83	1/2126 (0.0%)	0.87	0/2885
1	B	0.86	1/2135 (0.0%)	0.87	0/2896
All	All	0.85	2/4261 (0.0%)	0.87	0/5781

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	C	0	1
2	E	0	2
2	F	0	3
All	All	0	6

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	121	VAL	CA-C	-6.39	1.44	1.52
1	B	162	VAL	CA-C	5.20	1.59	1.52

There are no bond angle outliers.

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	C	304	QUK	Peptide
2	E	306[B]	QUK	Peptide
2	E	307[B]	QVS	Peptide

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Mol	Chain	Res	Type	Group
2	F	311[A]	QUK	Peptide,Mainchain
2	F	312[A]	QVS	Peptide

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	2061	0	2005	0	0
1	B	2070	0	2018	4	0
2	C	96	0	5	0	0
2	D	96	0	5	0	0
2	E	68	0	0	4	0
2	F	60	0	0	1	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	18	0	24	0	0
4	B	30	0	40	3	0
5	A	121	0	0	0	0
5	B	126	0	0	0	0
5	C	6	0	0	0	0
5	D	3	0	0	0	0
5	E	3	0	0	0	0
5	F	1	0	0	0	0
All	All	4761	0	4097	9	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 1.

All (9) 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)
2:E:306[B]:QUK:C10	2:E:308[B]:QVE:O	2.41	0.68
1:B:127:TYR:O	1:B:132:LYS:HE2	2.10	0.52
2:E:306[B]:QUK:N11	2:E:308[B]:QVE:O	2.47	0.47
1:B:96:HIS:CE1	4:B:302[B]:GOL:H32	2.54	0.43
1:B:96:HIS:HE1	4:B:302[B]:GOL:H32	1.84	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:306[B]:QUK:O	2:E:307[B]:QVS:C3	2.68	0.42
2:F:311[A]:QUK:O	2:F:312[A]:QVS:C3	2.68	0.41
1:B:199:THR:HG21	4:B:302[A]:GOL:O3	2.19	0.41
2:E:305[B]:QUJ:O	2:E:306[B]:QUK:C3	2.69	0.41

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	258/260 (99%)	246 (95%)	12 (5%)	0	100	100
1	B	258/260 (99%)	245 (95%)	13 (5%)	0	100	100
All	All	516/520 (99%)	491 (95%)	25 (5%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	223/225 (99%)	221 (99%)	2 (1%)	70	67
1	B	225/225 (100%)	223 (99%)	2 (1%)	70	67
All	All	448/450 (100%)	444 (99%)	4 (1%)	70	67

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	27	ARG
1	A	92	GLN
1	B	92	GLN
1	B	238	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	4	HIS
1	A	36	HIS
1	B	36	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

20 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	$\# Z > 2$
2	A1IJ4	C	302	2	16,16,17	0.90	1 (6%)	17,18,20	0.85	1 (5%)
2	QUJ	E	305[B]	2	19,19,20	2.15	3 (15%)	25,26,28	1.30	3 (12%)
2	QVS	F	312[A]	2	15,15,16	2.31	1 (6%)	20,21,23	1.94	6 (30%)
2	QVS	D	311	2	15,15,16	2.14	3 (20%)	20,21,23	2.79	8 (40%)
2	QUK	D	310	2	18,18,20	2.38	2 (11%)	23,24,27	2.25	7 (30%)
2	A1IJ4	E	304	2	2,2,17	0.57	0	1,1,20	0.49	0
2	QUJ	D	309	2	19,19,20	1.96	2 (10%)	25,26,28	2.53	9 (36%)
2	A1IJ4	D	308	2	16,16,17	1.00	1 (6%)	17,18,20	1.00	1 (5%)
2	QUJ	C	303	2	19,19,20	2.00	2 (10%)	25,26,28	2.36	6 (24%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	QVE	D	312	2	20,20,20	1.49	2 (10%)	28,28,28	1.51	6 (21%)
2	QUK	C	304	2	18,18,20	1.86	2 (11%)	23,24,27	2.63	8 (34%)
2	QVS	E	307[B]	2	15,15,16	2.34	2 (13%)	20,21,23	2.02	4 (20%)
2	A1IJ4	F	309	2	2,2,17	0.50	0	1,1,20	0.57	0
2	QVS	C	305	2	15,15,16	2.27	2 (13%)	20,21,23	2.73	8 (40%)
2	QUK	F	311[A]	2	15,15,20	2.51	3 (20%)	20,21,27	1.89	8 (40%)
2	QUJ	F	310[A]	2	15,15,20	2.25	2 (13%)	20,21,28	1.82	3 (15%)
2	QVE	E	308[B]	2	20,20,20	1.81	3 (15%)	28,28,28	1.59	6 (21%)
2	QUK	E	306[B]	2	15,15,20	2.44	3 (20%)	20,21,27	1.99	5 (25%)
2	QVE	F	313[A]	2	16,16,20	1.89	3 (18%)	22,23,28	1.41	2 (9%)
2	QVE	C	306	2	20,20,20	1.63	2 (10%)	28,28,28	1.37	5 (17%)

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	QUK	E	306[B]	2	-	2/2/2/9	0/2/2/2
2	QVE	F	313[A]	2	-	0/4/4/9	0/2/2/2
2	QUJ	C	303	2	-	0/7/7/9	0/2/2/2
2	A1IJ4	C	302	2	-	0/10/10/11	0/1/1/1
2	QVS	E	307[B]	2	-	0/2/2/4	0/2/2/2
2	QUK	F	311[A]	2	-	2/2/2/9	0/2/2/2
2	QVS	F	312[A]	2	-	0/2/2/4	0/2/2/2
2	QVE	D	312	2	-	5/9/9/9	0/2/2/2
2	QUJ	E	305[B]	2	-	4/7/7/9	0/2/2/2
2	QUJ	F	310[A]	2	-	2/2/2/9	0/2/2/2
2	QUK	C	304	2	-	0/6/6/9	0/2/2/2
2	QVS	D	311	2	-	2/2/2/4	0/2/2/2
2	QUK	D	310	2	-	3/6/6/9	0/2/2/2
2	QUJ	D	309	2	-	0/7/7/9	0/2/2/2
2	QVS	C	305	2	-	2/2/2/4	0/2/2/2
2	A1IJ4	D	308	2	-	2/10/10/11	0/1/1/1
2	QVE	E	308[B]	2	-	9/9/9/9	0/2/2/2
2	QVE	C	306	2	-	5/9/9/9	0/2/2/2

All (39) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	310	QUK	C10-C	-8.88	1.39	1.48
2	F	311[A]	QUK	C10-C	-8.47	1.39	1.48
2	E	306[B]	QUK	C10-C	-8.17	1.39	1.48
2	E	305[B]	QUJ	CA-C	-8.15	1.39	1.48
2	C	305	QVS	CA-C	-7.96	1.40	1.48
2	F	312[A]	QVS	CA-C	-7.73	1.40	1.48
2	E	307[B]	QVS	CA-C	-7.66	1.40	1.48
2	C	303	QUJ	CA-C	-7.57	1.40	1.48
2	F	310[A]	QUJ	CA-C	-7.32	1.40	1.48
2	D	309	QUJ	CA-C	-7.28	1.40	1.48
2	D	311	QVS	CA-C	-7.13	1.41	1.48
2	C	304	QUK	C10-C	-6.64	1.41	1.48
2	E	308[B]	QVE	CA-C	-6.26	1.39	1.50
2	F	313[A]	QVE	CA-C	-5.79	1.40	1.50
2	C	306	QVE	CA-C	-5.75	1.40	1.50
2	D	312	QVE	CA-C	-5.09	1.41	1.50
2	D	310	QUK	C10-N11	3.90	1.37	1.33
2	D	309	QUJ	CA-N11	3.50	1.36	1.33
2	E	307[B]	QVS	CA-N11	3.01	1.36	1.33
2	F	310[A]	QUJ	CA-N11	2.97	1.36	1.33
2	D	311	QVS	CA-N11	2.93	1.36	1.33
2	D	308	A1IJ4	C128-C127	-2.92	1.41	1.51
2	C	306	QVE	OXT-C	-2.88	1.22	1.30
2	E	308[B]	QVE	C2-C7	-2.86	1.37	1.42
2	C	304	QUK	C10-N11	2.79	1.36	1.33
2	C	303	QUJ	CA-N11	2.78	1.36	1.33
2	C	302	A1IJ4	C128-C127	-2.70	1.41	1.51
2	F	313[A]	QVE	C2-C7	-2.59	1.38	1.42
2	F	311[A]	QUK	CA-C7	-2.57	1.38	1.42
2	E	306[B]	QUK	CA-C7	-2.44	1.38	1.42
2	D	312	QVE	OXT-C	-2.35	1.23	1.30
2	E	308[B]	QVE	OXT-C	-2.34	1.23	1.30
2	E	305[B]	QUJ	CA-N11	2.34	1.35	1.33
2	F	313[A]	QVE	OXT-C	-2.33	1.23	1.30
2	F	311[A]	QUK	C10-N11	2.23	1.35	1.33
2	C	305	QVS	CA-N11	2.16	1.35	1.33
2	D	311	QVS	C4-C5	2.12	1.41	1.36
2	E	305[B]	QUJ	C2-C7	-2.11	1.39	1.42
2	E	306[B]	QUK	C10-N11	2.07	1.35	1.33

All (96) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	311	QVS	CA-N11-C7	8.37	124.95	118.06
2	D	309	QUJ	CA-N11-C7	8.31	124.90	118.06
2	C	305	QVS	CA-N11-C7	8.18	124.80	118.06
2	C	304	QUK	C10-N11-C7	7.70	124.40	118.06
2	C	303	QUJ	CA-N11-C7	7.18	123.97	118.06
2	E	307[B]	QVS	CA-N11-C7	6.06	123.05	118.06
2	E	306[B]	QUK	C10-N11-C7	5.61	122.68	118.06
2	F	312[A]	QVS	CA-N11-C7	5.58	122.66	118.06
2	D	310	QUK	C10-N11-C7	5.55	122.63	118.06
2	F	310[A]	QUJ	CA-N11-C7	5.50	122.58	118.06
2	C	303	QUJ	O-C-CA	-5.29	119.34	124.22
2	D	310	QUK	O-C-C10	-4.93	119.67	124.22
2	C	304	QUK	O-C-C10	-4.83	119.77	124.22
2	D	310	QUK	C-C10-N11	4.56	119.13	114.66
2	D	309	QUJ	O-C-CA	-4.54	120.03	124.22
2	D	309	QUJ	C9-CA-N11	-4.39	118.12	123.18
2	C	304	QUK	C9-C10-N11	-4.38	118.14	123.18
2	C	305	QVS	O-C-CA	-4.35	120.20	124.22
2	D	311	QVS	O-C-CA	-4.32	120.23	124.22
2	F	311[A]	QUK	C10-N11-C7	4.30	121.60	118.06
2	C	304	QUK	C-C10-N11	4.17	118.74	114.66
2	C	305	QVS	C3-C2-N	4.10	128.52	120.39
2	C	303	QUJ	C9-CA-N11	-3.99	118.58	123.18
2	D	311	QVS	C9-CA-N11	-3.96	118.62	123.18
2	E	305[B]	QUJ	CA-N11-C7	3.85	121.23	118.06
2	E	308[B]	QVE	C2-C7-C6	3.78	122.53	119.02
2	D	311	QVS	C3-C2-N	3.68	127.69	120.39
2	D	311	QVS	C-CA-N11	3.67	118.26	114.66
2	C	305	QVS	C9-CA-N11	-3.64	118.98	123.18
2	F	310[A]	QUJ	C9-CA-N11	-3.60	119.03	123.18
2	D	309	QUJ	C-CA-N11	3.45	118.04	114.66
2	C	305	QVS	C2-C7-C6	3.44	122.22	119.02
2	C	304	QUK	CA-C7-C6	3.39	122.17	119.02
2	E	307[B]	QVS	C9-CA-N11	-3.39	119.28	123.18
2	E	306[B]	QUK	CA-C7-C6	3.37	122.15	119.02
2	F	312[A]	QVS	C9-CA-N11	-3.33	119.34	123.18
2	C	303	QUJ	C-CA-N11	3.29	117.89	114.66
2	E	307[B]	QVS	C-CA-N11	3.21	117.80	114.66
2	E	308[B]	QVE	OB-C8-C6	3.20	123.97	115.11
2	C	304	QUK	CG-OB-C8	3.18	127.11	117.74
2	E	306[B]	QUK	C9-C10-N11	-3.15	119.55	123.18
2	C	303	QUJ	C2-C7-C6	3.11	121.91	119.02
2	F	311[A]	QUK	CA-C7-C6	3.10	121.90	119.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	307[B]	QVS	C2-C7-N11	3.09	121.80	118.55
2	F	312[A]	QVS	C-CA-N11	3.05	117.65	114.66
2	E	308[B]	QVE	C3-C2-N	3.03	126.40	120.39
2	D	310	QUK	C9-C10-N11	-2.97	119.76	123.18
2	F	313[A]	QVE	C2-C7-C6	2.95	121.76	119.02
2	F	311[A]	QUK	C3-CA-N	2.90	126.15	120.39
2	F	311[A]	QUK	O-C-C10	-2.88	121.57	124.22
2	E	306[B]	QUK	C9-C10-C	2.84	126.20	121.11
2	D	312	QVE	CA-N11-C7	2.80	123.35	117.41
2	D	312	QVE	C3-C2-N	2.76	125.87	120.39
2	D	309	QUJ	CG-OB-C8	2.76	127.09	118.17
2	E	308[B]	QVE	C2-C7-N11	-2.73	115.68	118.55
2	F	313[A]	QVE	OB-C8-C6	2.69	121.03	116.42
2	D	311	QVS	C2-C7-C6	2.67	121.50	119.02
2	C	306	QVE	OB-C8-C6	2.63	122.41	115.11
2	F	311[A]	QUK	C9-C10-N11	-2.62	120.16	123.18
2	C	306	QVE	CG-OB-C8	2.61	122.24	116.68
2	D	310	QUK	C3-CA-N	2.60	125.55	120.39
2	C	303	QUJ	C3-C2-N	2.59	125.53	120.39
2	D	310	QUK	CA-C7-C6	2.58	121.42	119.02
2	D	309	QUJ	C2-C7-C6	2.56	121.40	119.02
2	D	309	QUJ	C3-C2-N	2.53	125.41	120.39
2	D	310	QUK	CG-OB-C8	2.46	124.98	117.74
2	F	312[A]	QVS	C3-C2-N	2.45	125.25	120.39
2	F	310[A]	QUJ	C-CA-N11	2.43	117.04	114.66
2	D	308	A1IJ4	O-C-N31	-2.42	122.09	125.03
2	C	304	QUK	C3-CA-N	2.41	125.17	120.39
2	D	309	QUJ	C6-C7-N11	-2.37	117.82	122.66
2	C	306	QVE	C3-C2-N	2.35	125.06	120.39
2	D	312	QVE	C9-CA-N11	-2.33	118.54	124.31
2	F	312[A]	QVS	C7-C2-N	-2.32	113.85	118.16
2	E	308[B]	QVE	OB-C8-C9	-2.30	117.27	124.63
2	D	312	QVE	OXT-C-CA	2.29	120.15	114.71
2	E	305[B]	QUJ	C9-CA-N11	-2.29	120.55	123.18
2	E	308[B]	QVE	C7-C2-N	-2.24	114.00	118.16
2	E	305[B]	QUJ	O-C-CA	-2.21	122.18	124.22
2	F	311[A]	QUK	C9-C10-C	2.20	125.06	121.11
2	D	311	QVS	C7-C2-N	-2.19	114.09	118.16
2	D	312	QVE	CG-OB-C8	2.18	121.33	116.68
2	C	305	QVS	C7-C2-N	-2.18	114.12	118.16
2	C	306	QVE	CA-N11-C7	2.17	122.01	117.41
2	F	312[A]	QVS	O-C-CA	-2.17	122.22	124.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	306[B]	QUK	C3-CA-N	2.14	124.63	120.39
2	F	311[A]	QUK	OB-C8-C6	2.13	120.06	116.42
2	D	309	QUJ	C2-C7-N11	2.11	120.77	118.55
2	D	311	QVS	C6-C7-N11	-2.11	118.36	122.66
2	C	304	QUK	C6-C7-N11	-2.06	118.45	122.66
2	C	306	QVE	OB-C8-C9	-2.06	118.05	124.63
2	C	305	QVS	C-CA-N11	2.05	116.67	114.66
2	F	311[A]	QUK	C7-CA-N	-2.04	114.37	118.16
2	C	305	QVS	C6-C7-N11	-2.03	118.51	122.66
2	D	312	QVE	OB-C8-C6	2.01	120.69	115.11
2	C	302	A1IJ4	O-C-N31	-2.01	122.59	125.03

There are no chirality outliers.

All (38) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	305[B]	QUJ	O-C-CA-C9
2	E	305[B]	QUJ	O-C-CA-N11
2	F	310[A]	QUJ	O-C-CA-C9
2	D	310	QUK	O-C-C10-N11
2	D	310	QUK	O-C-C10-C9
2	E	306[B]	QUK	O-C-C10-N11
2	E	306[B]	QUK	O-C-C10-C9
2	F	311[A]	QUK	O-C-C10-N11
2	F	311[A]	QUK	O-C-C10-C9
2	C	305	QVS	O-C-CA-C9
2	C	305	QVS	O-C-CA-N11
2	D	311	QVS	O-C-CA-C9
2	D	311	QVS	O-C-CA-N11
2	E	308[B]	QVE	O-C-CA-N11
2	E	308[B]	QVE	O-C-CA-C9
2	E	308[B]	QVE	OXT-C-CA-N11
2	E	308[B]	QVE	OXT-C-CA-C9
2	D	312	QVE	OE2-CD-CG-OB
2	D	312	QVE	OE1-CD-CG-OB
2	E	305[B]	QUJ	CE1-CD-CG-OB
2	D	312	QVE	C6-C8-OB-CG
2	E	305[B]	QUJ	CE2-CD-CG-OB
2	D	310	QUK	CE-CD-CG-OB
2	D	312	QVE	C9-C8-OB-CG
2	C	306	QVE	C6-C8-OB-CG
2	C	306	QVE	C9-C8-OB-CG

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Mol	Chain	Res	Type	Atoms
2	C	306	QVE	OE2-CD-CG-OB
2	E	308[B]	QVE	OE1-CD-CG-OB
2	C	306	QVE	OE1-CD-CG-OB
2	D	308	A1IJ4	C118-C119-C120-C121
2	F	310[A]	QUJ	O-C-CA-N11
2	E	308[B]	QVE	OE2-CD-CG-OB
2	E	308[B]	QVE	C6-C8-OB-CG
2	E	308[B]	QVE	C9-C8-OB-CG
2	D	308	A1IJ4	N31-C118-C119-C120
2	C	306	QVE	CD-CG-OB-C8
2	D	312	QVE	CD-CG-OB-C8
2	E	308[B]	QVE	CD-CG-OB-C8

There are no ring outliers.

6 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	305[B]	QUJ	1	0
2	F	312[A]	QVS	1	0
2	E	307[B]	QVS	1	0
2	F	311[A]	QUK	1	0
2	E	308[B]	QVE	2	0
2	E	306[B]	QUK	4	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 10 ligands modelled in this entry, 2 are monoatomic - leaving 8 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	GOL	B	302[A]	-	5,5,5	0.51	0	5,5,5	1.02	0
4	GOL	B	302[B]	-	5,5,5	0.31	0	5,5,5	0.88	0
4	GOL	A	302	-	5,5,5	0.50	0	5,5,5	0.58	0
4	GOL	B	304	-	5,5,5	0.25	0	5,5,5	0.18	0
4	GOL	B	305	-	5,5,5	0.48	0	5,5,5	0.52	0
4	GOL	B	303	-	5,5,5	0.23	0	5,5,5	0.39	0
4	GOL	A	304	-	5,5,5	0.25	0	5,5,5	0.42	0
4	GOL	A	303	-	5,5,5	0.33	0	5,5,5	0.37	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
4	GOL	B	302[A]	-	-	2/4/4/4	-
4	GOL	B	302[B]	-	-	2/4/4/4	-
4	GOL	A	302	-	-	1/4/4/4	-
4	GOL	B	304	-	-	4/4/4/4	-
4	GOL	B	305	-	-	4/4/4/4	-
4	GOL	B	303	-	-	1/4/4/4	-
4	GOL	A	304	-	-	0/4/4/4	-
4	GOL	A	303	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	302[B]	GOL	O1-C1-C2-O2
4	B	302[B]	GOL	O1-C1-C2-C3
4	B	304	GOL	C1-C2-C3-O3
4	B	305	GOL	C1-C2-C3-O3
4	B	304	GOL	O2-C2-C3-O3
4	B	303	GOL	O1-C1-C2-C3
4	B	305	GOL	O1-C1-C2-C3
4	B	305	GOL	O1-C1-C2-O2
4	B	305	GOL	O2-C2-C3-O3
4	B	304	GOL	O1-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
4	B	302[A]	GOL	C1-C2-C3-O3
4	B	304	GOL	O1-C1-C2-O2
4	A	302	GOL	O2-C2-C3-O3
4	B	302[A]	GOL	O1-C1-C2-O2

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	302[A]	GOL	1	0
4	B	302[B]	GOL	2	0

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 [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	259/260 (99%)	0.59	8 (3%)	51	61	24, 42, 67, 89	1 (0%)
1	B	259/260 (99%)	0.49	6 (2%)	61	70	26, 41, 62, 79	1 (0%)
2	C	0/6	-	-	-	-	-	-
2	D	0/6	-	-	-	-	-	-
2	E	0/6	-	-	-	-	-	-
2	F	0/6	-	-	-	-	-	-
All	All	518/544 (95%)	0.54	14 (2%)	56	66	24, 42, 66, 89	2 (0%)

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	85	ASP	3.0
1	A	44	LEU	2.6
1	A	135	GLN	2.5
1	A	2	SER	2.4
1	A	252	ASN	2.4
1	B	134	VAL	2.3
1	A	36	HIS	2.3
1	B	4	HIS	2.3
1	B	36	HIS	2.3
1	A	27	ARG	2.2
1	A	134	VAL	2.2
1	B	252	ASN	2.1
1	A	47	LEU	2.0
1	B	2	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($\text{\AA}^2$)	Q<0.9
2	A1IJ4	E	304	3/17	0.75	0.13	34,34,37,38	3
2	QUJ	E	305[B]	18/19	0.84	0.14	25,30,35,36	18
2	A1IJ4	F	309	3/17	0.86	0.14	34,34,36,37	3
2	QVE	E	308[B]	19/19	0.89	0.11	27,34,49,50	19
2	QUK	D	310	17/19	0.90	0.12	32,37,50,52	0
2	QUK	C	304	17/19	0.90	0.11	31,40,52,55	0
2	QUJ	C	303	18/19	0.91	0.12	31,35,63,66	0
2	QVE	F	313[A]	15/19	0.91	0.10	38,41,47,49	15
2	QVS	C	305	14/15	0.92	0.09	38,45,49,51	0
2	A1IJ4	D	308	16/17	0.93	0.10	30,41,49,49	0
2	QVS	F	312[A]	14/15	0.93	0.11	39,44,54,55	14
2	QUK	E	306[B]	14/19	0.93	0.09	29,33,42,44	14
2	QUK	F	311[A]	14/19	0.93	0.09	33,39,47,48	14
2	QVS	D	311	14/15	0.94	0.08	29,35,41,41	0
2	QVS	E	307[B]	14/15	0.94	0.08	26,36,44,45	14
2	QUJ	F	310[A]	14/19	0.94	0.08	37,42,45,52	14
2	QVE	C	306	19/19	0.94	0.08	34,39,68,80	0
2	QVE	D	312	19/19	0.94	0.09	31,36,69,89	0
2	QUJ	D	309	18/19	0.94	0.11	30,36,76,80	0
2	A1IJ4	C	302	16/17	0.94	0.09	32,39,44,44	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	GOL	A	304	6/6	0.77	0.21	50,65,70,72	0
4	GOL	B	302[A]	6/6	0.82	0.15	18,23,28,28	6
4	GOL	B	302[B]	6/6	0.82	0.15	25,28,31,39	6
4	GOL	B	304	6/6	0.83	0.19	44,52,66,68	0
4	GOL	B	303	6/6	0.85	0.17	53,58,70,73	0
4	GOL	B	305	6/6	0.87	0.18	50,55,67,72	0
4	GOL	A	303	6/6	0.88	0.15	50,61,64,66	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	GOL	A	302	6/6	0.90	0.13	22,28,32,53	0
3	ZN	A	301	1/1	1.00	0.02	29,29,29,29	0
3	ZN	B	301	1/1	1.00	0.02	32,32,32,32	0

6.5 Other polymers [i](#)

There are no such residues in this entry.