



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 12:35 PM UTC

PDB ID : 6YCY / pdb_00006ycy
Title : Plasmodium falciparum Myosin A full-length, post-rigor state
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Deposited on : 2020-03-19
Resolution : 2.55 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

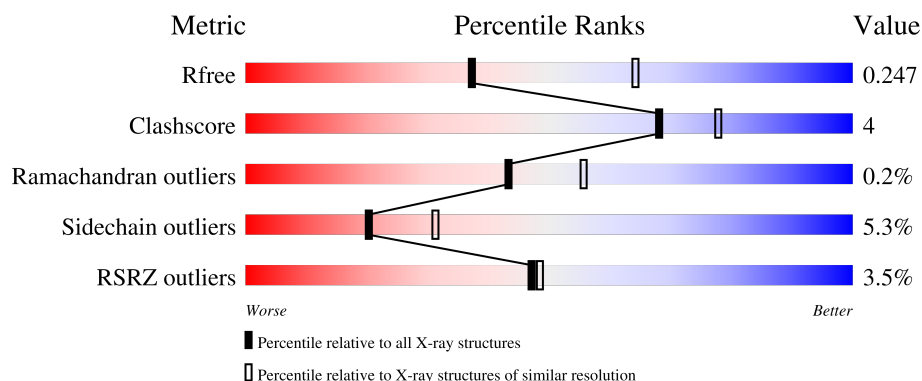
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.55 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	1091 (2.54-2.54)
Clashscore	190562	1120 (2.54-2.54)
Ramachandran outliers	187476	1106 (2.54-2.54)
Sidechain outliers	187428	1106 (2.54-2.54)
RSRZ outliers	180081	1091 (2.54-2.54)

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	818	<div> <div>3%</div> <div>82%</div> <div>15%</div> <div>..</div> </div>
2	B	204	<div> <div>%</div> <div>57%</div> <div>7%</div> <div>36%</div> </div>
3	E	134	<div> <div>8%</div> <div>84%</div> <div>10%</div> <div>..</div> </div>

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 8904 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 Myosin-A.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	808	Total	C	N	O	P	S	0	2	0
			6439	4099	1097	1209	1	33			

- Molecule 2 is a protein called Myosin A tail domain interacting protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	131	Total	C	N	O	S	0	0	0
			1051	661	167	218	5			

- Molecule 3 is a protein called Myosin essential light chain ELC.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	131	Total	C	N	O	S	0	0	0
			1077	687	175	209	6			

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	O	S	0	0
			5	4	1		
5	A	1	Total	O	S	0	0
			5	4	1		
5	E	1	Total	O	S	0	0
			5	4	1		

- Molecule 6 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total	Mg	0	0
			1	1		

- Molecule 7 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: C₁₀H₁₅N₅O₁₀P₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
7	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

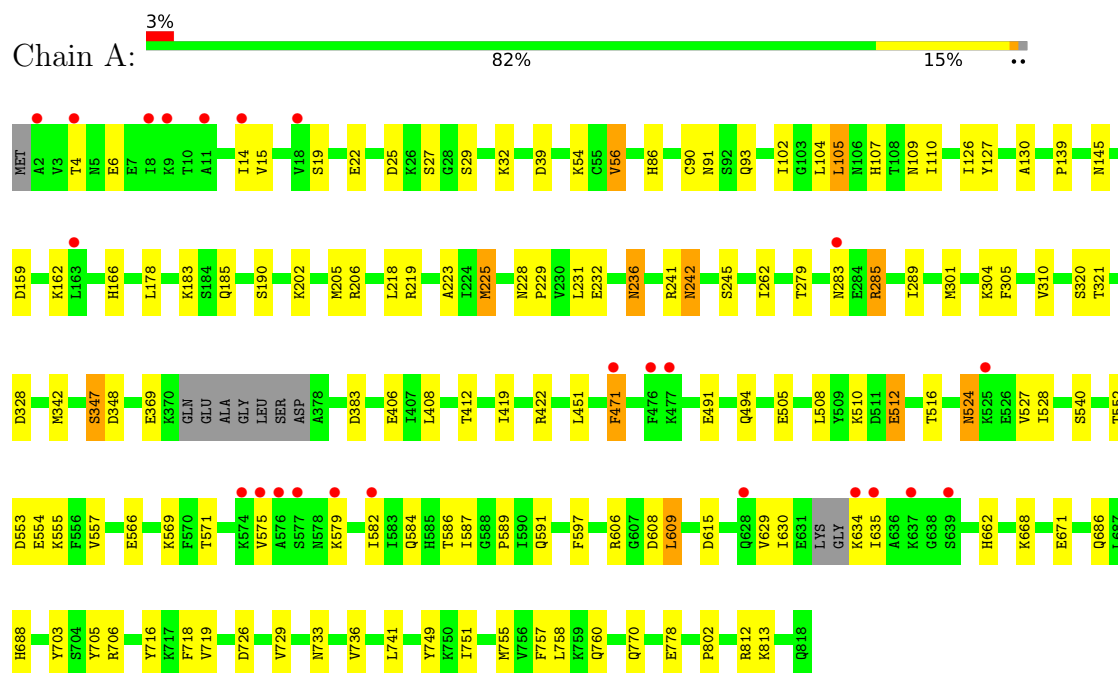
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	240	Total	O	0	0
			240	240		
8	B	16	Total	O	0	0
			16	16		
8	E	34	Total	O	0	0
			34	34		

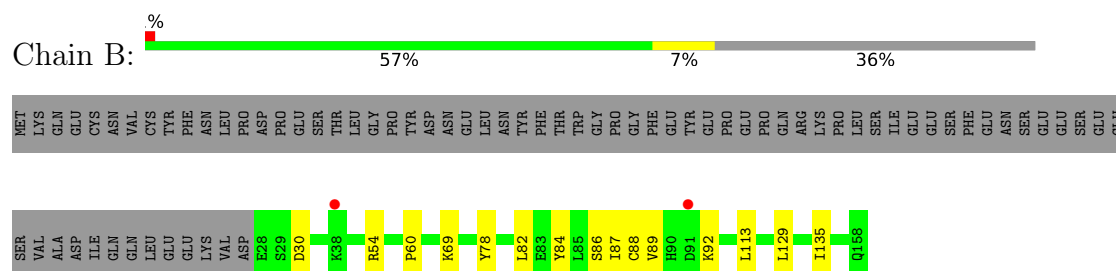
3 Residue-property plots [i](#)

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.

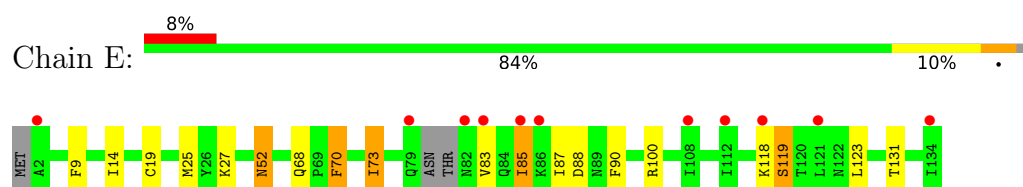
• Molecule 1: Myosin-A



• Molecule 2: Myosin A tail domain interacting protein



• Molecule 3: Myosin essential light chain ELC



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	89.67Å 114.69Å 169.46Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	25.70 – 2.55 25.70 – 2.55	Depositor EDS
% Data completeness (in resolution range)	99.8 (25.70-2.55) 99.7 (25.70-2.55)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.33 (at 2.54Å)	Xtriage
Refinement program	BUSTER 2.10.2	Depositor
R, R_{free}	0.195 , 0.243 0.196 , 0.247	Depositor DCC
R_{free} test set	2795 reflections (4.86%)	wwPDB-VP
Wilson B-factor (Å ²)	67.7	Xtriage
Anisotropy	0.314	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 72.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	8904	wwPDB-VP
Average B, all atoms (Å ²)	79.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.08% 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: SEP, EDO, ADP, MG, SO4

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	0.87	1/6539 (0.0%)	1.44	39/8813 (0.4%)
2	B	0.83	0/1068	1.44	4/1440 (0.3%)
3	E	0.87	0/1096	1.46	5/1476 (0.3%)
All	All	0.87	1/8703 (0.0%)	1.44	48/11729 (0.4%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	225	MET	SD-CE	-7.49	1.60	1.79

All (48) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	73	ILE	N-CA-C	-8.17	104.79	111.81
1	A	703	TYR	CA-C-N	7.72	130.48	120.44
1	A	703	TYR	C-N-CA	7.72	130.48	120.44
1	A	320	SER	CA-C-N	7.59	130.78	120.38
1	A	320	SER	C-N-CA	7.59	130.78	120.38
1	A	634	LYS	CA-C-N	6.41	129.34	120.49
1	A	634	LYS	C-N-CA	6.41	129.34	120.49
1	A	719	VAL	N-CA-C	-6.38	104.30	110.42
1	A	56	VAL	N-CA-CB	6.31	119.83	111.25
3	E	9	PHE	CA-CB-CG	6.12	119.92	113.80
1	A	716	TYR	CA-C-N	6.03	128.28	120.44
1	A	716	TYR	C-N-CA	6.03	128.28	120.44
1	A	471	PHE	CA-CB-CG	5.95	119.75	113.80
1	A	218	LEU	CA-C-N	5.87	128.15	120.28
1	A	218	LEU	C-N-CA	5.87	128.15	120.28
1	A	524	ASN	CA-C-N	5.68	128.16	120.38
1	A	524	ASN	C-N-CA	5.68	128.16	120.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	236	ASN	CA-CB-CG	5.67	118.27	112.60
2	B	69	LYS	CA-C-N	5.64	128.40	120.28
2	B	69	LYS	C-N-CA	5.64	128.40	120.28
1	A	802	PRO	CA-C-N	5.53	127.69	120.28
1	A	802	PRO	C-N-CA	5.53	127.69	120.28
1	A	104	LEU	CA-C-N	5.50	129.29	121.42
1	A	104	LEU	C-N-CA	5.50	129.29	121.42
1	A	223	ALA	CA-C-N	5.36	127.32	120.56
1	A	223	ALA	C-N-CA	5.36	127.32	120.56
2	B	54	ARG	CA-C-N	5.33	127.96	120.28
2	B	54	ARG	C-N-CA	5.33	127.96	120.28
1	A	347	SER	CA-C-N	5.33	127.42	120.28
1	A	347	SER	C-N-CA	5.33	127.42	120.28
1	A	242	ASN	CA-CB-CG	5.32	117.92	112.60
1	A	726	ASP	CA-C-N	5.24	128.03	120.38
1	A	726	ASP	C-N-CA	5.24	128.03	120.38
1	A	505	GLU	CA-C-N	5.18	127.47	120.38
1	A	505	GLU	C-N-CA	5.18	127.47	120.38
3	E	52	ASN	CA-CB-CG	5.17	117.77	112.60
1	A	145	ASN	CA-CB-CG	5.16	117.76	112.60
3	E	70	PHE	CA-C-N	5.13	128.82	120.60
3	E	70	PHE	C-N-CA	5.13	128.82	120.60
1	A	130	ALA	N-CA-C	-5.12	97.88	108.18
1	A	597	PHE	CA-CB-CG	5.12	118.92	113.80
1	A	348	ASP	CA-CB-CG	5.11	117.71	112.60
1	A	109	ASN	CA-C-N	5.08	124.40	120.33
1	A	109	ASN	C-N-CA	5.08	124.40	120.33
1	A	285	ARG	CB-CG-CD	-5.08	99.61	111.30
1	A	383	ASP	CA-C-N	5.06	127.56	120.28
1	A	383	ASP	C-N-CA	5.06	127.56	120.28
1	A	25	ASP	CA-CB-CG	5.02	117.62	112.60

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	6439	0	6553	52	0
2	B	1051	0	1005	5	0
3	E	1077	0	1057	8	0
4	A	4	0	6	0	0
5	A	10	0	0	1	0
5	E	5	0	0	0	0
6	A	1	0	0	0	0
7	A	27	0	12	0	0
8	A	240	0	0	1	0
8	B	16	0	0	0	0
8	E	34	0	0	0	0
All	All	8904	0	8633	62	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 4.

All (62) 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:93:GLN:HB3	3:E:100:ARG:HD2	1.65	0.79
1:A:91:ASN:HD21	1:A:107:HIS:H	1.31	0.77
1:A:185:GLN:NE2	1:A:662:HIS:HE1	1.89	0.71
1:A:508:LEU:HD11	1:A:755:MET:HE1	1.76	0.68
1:A:668:LYS:H	1:A:686:GLN:HE22	1.39	0.68
3:E:85:ILE:HD13	3:E:90:PHE:HB2	1.77	0.67
1:A:705:TYR:HB3	1:A:758:LEU:HB2	1.79	0.64
1:A:91:ASN:HD21	1:A:107:HIS:N	1.98	0.62
1:A:185:GLN:HE21	1:A:662:HIS:HE1	1.47	0.62
1:A:582:ILE:HD11	1:A:589:PRO:HB2	1.82	0.62
1:A:185:GLN:HE21	1:A:662:HIS:CE1	2.18	0.61
1:A:571:THR:HB	1:A:582:ILE:HG23	1.85	0.59
1:A:39:ASP:OD1	1:A:86:HIS:HD2	1.86	0.57
1:A:32:LYS:HE3	3:E:25:MET:HE3	1.86	0.57
3:E:70:PHE:HD2	3:E:131:THR:HG23	1.71	0.56
1:A:718:PHE:H	1:A:770:GLN:HE21	1.52	0.56
3:E:83:VAL:HG23	3:E:123:LEU:HB2	1.87	0.55
1:A:205:MET:HB3	1:A:225:MET:HE1	1.88	0.55
1:A:301:MET:HE2	1:A:305:PHE:HE2	1.73	0.54
3:E:70:PHE:HB3	3:E:73:ILE:HD12	1.88	0.54
1:A:241:ARG:HD2	5:A:902:SO4:O4	2.06	0.54
2:B:60:PRO:HB3	2:B:88:CYS:SG	2.48	0.54
1:A:569:LYS:HA	1:A:584:GLN:HB2	1.90	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:408:LEU:HB3	1:A:422:ARG:HH12	1.72	0.53
1:A:342:MET:HE3	1:A:451:LEU:HB2	1.91	0.53
1:A:494:GLN:HG2	1:A:586:THR:HG21	1.91	0.52
1:A:159:ASP:O	1:A:162:LYS:HG2	2.10	0.52
1:A:225:MET:HE3	1:A:262:ILE:HD12	1.92	0.51
1:A:512:GLU:HG2	1:A:757:PHE:HE1	1.75	0.51
1:A:102:ILE:O	1:A:105:LEU:HB2	2.11	0.50
1:A:285:ARG:HD3	8:A:1003:HOH:O	2.11	0.50
1:A:527:VAL:HB	1:A:569:LYS:HD2	1.93	0.50
1:A:232:GLU:O	1:A:236:ASN:HB2	2.12	0.49
1:A:202:LYS:O	1:A:206[A]:ARG:HG3	2.13	0.49
1:A:159:ASP:HB3	1:A:162:LYS:HD3	1.95	0.48
1:A:4:THR:HG22	1:A:6:GLU:H	1.79	0.48
1:A:242:ASN:HB3	1:A:245:SER:HB2	1.96	0.48
1:A:512:GLU:HG2	1:A:757:PHE:CE1	2.49	0.47
3:E:14:ILE:HB	3:E:19:CYS:HA	1.97	0.47
1:A:15:VAL:HA	1:A:110:ILE:HD13	1.98	0.46
1:A:185:GLN:NE2	1:A:662:HIS:CE1	2.75	0.46
1:A:228:ASN:HB2	1:A:229:PRO:HD3	1.97	0.46
1:A:285:ARG:HH22	1:A:328:ASP:CG	2.23	0.45
1:A:178:LEU:HA	1:A:183:LYS:O	2.17	0.45
2:B:84:TYR:HA	2:B:87:ILE:HD12	2.00	0.43
2:B:86:SER:O	2:B:89:VAL:HG12	2.18	0.43
1:A:733:ASN:O	1:A:736:VAL:HG22	2.18	0.43
1:A:553:ASP:O	1:A:557:VAL:HG23	2.18	0.43
1:A:491:GLU:HB3	1:A:528:ILE:HD13	2.01	0.43
1:A:749:TYR:HB3	1:A:758:LEU:HD23	2.01	0.43
3:E:87:ILE:HD11	3:E:118:LYS:O	2.18	0.43
1:A:127:TYR:CD2	1:A:166:HIS:HA	2.54	0.43
1:A:126:ILE:HD13	1:A:139:PRO:HD3	2.01	0.42
1:A:524:ASN:O	1:A:528:ILE:HG12	2.19	0.42
1:A:582:ILE:HD12	1:A:591:GLN:HB2	2.01	0.42
1:A:552:THR:HG23	1:A:555:LYS:H	1.85	0.41
1:A:14:ILE:HG21	1:A:688:HIS:HB2	2.02	0.41
1:A:406:GLU:HB3	1:A:609:LEU:HG	2.03	0.41
2:B:78:TYR:O	2:B:82:LEU:HG	2.21	0.41
1:A:510:LYS:HE3	1:A:516:THR:HG21	2.03	0.41
1:A:812:ARG:CZ	2:B:129:LEU:HD23	2.51	0.40
1:A:289:ILE:HD12	1:A:289:ILE:HA	1.97	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	803/818 (98%)	776 (97%)	26 (3%)	1 (0%)	48	61
2	B	129/204 (63%)	127 (98%)	2 (2%)	0	100	100
3	E	127/134 (95%)	118 (93%)	8 (6%)	1 (1%)	16	22
All	All	1059/1156 (92%)	1021 (96%)	36 (3%)	2 (0%)	43	56

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	629	VAL
3	E	119	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	720/725 (99%)	679 (94%)	41 (6%)	18	28
2	B	117/186 (63%)	113 (97%)	4 (3%)	32	48
3	E	123/126 (98%)	117 (95%)	6 (5%)	22	34
All	All	960/1037 (93%)	909 (95%)	51 (5%)	20	31

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	GLU

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Mol	Chain	Res	Type
1	A	27	SER
1	A	29	SER
1	A	54	LYS
1	A	56	VAL
1	A	90	CYS
1	A	105	LEU
1	A	190	SER
1	A	219	ARG
1	A	231	LEU
1	A	279	THR
1	A	283	ASN
1	A	304	LYS
1	A	310	VAL
1	A	321	THR
1	A	347	SER
1	A	369	GLU
1	A	412	THR
1	A	419	ILE
1	A	471	PHE
1	A	512	GLU
1	A	540	SER
1	A	554	GLU
1	A	566	GLU
1	A	575	VAL
1	A	579	LYS
1	A	587	ILE
1	A	606	ARG
1	A	608	ASP
1	A	609	LEU
1	A	615	ASP
1	A	630	ILE
1	A	635	ILE
1	A	671	GLU
1	A	706	ARG
1	A	729	VAL
1	A	741	LEU
1	A	751	ILE
1	A	760	GLN
1	A	778	GLU
1	A	813	LYS
2	B	30	ASP
2	B	92	LYS

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Mol	Chain	Res	Type
2	B	113	LEU
2	B	135	ILE
3	E	27	LYS
3	E	52	ASN
3	E	68	GLN
3	E	85	ILE
3	E	88	ASP
3	E	119	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	20	ASN
1	A	35	GLN
1	A	58	GLN
1	A	59	GLN
1	A	86	HIS
1	A	89	ASN
1	A	91	ASN
1	A	185	GLN
1	A	236	ASN
1	A	288	HIS
1	A	478	ASN
1	A	580	ASN
1	A	584	GLN
1	A	654	ASN
1	A	662	HIS
1	A	686	GLN
1	A	688	HIS
1	A	760	GLN
1	A	770	GLN
1	A	795	GLN
1	A	810	HIS
2	B	104	HIS
3	E	33	ASN
3	E	49	ASN
3	E	72	HIS
3	E	74	ASN
3	E	114	ASN

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	$\# Z > 2$
1	SEP	A	19	1	8,9,10	1.81	2 (25%)	7,12,14	3.61	2 (28%)

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	SEP	A	19	1	-	1/6/8/10	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	19	SEP	P-OG	-3.34	1.49	1.60
1	A	19	SEP	P-O1P	2.91	1.59	1.50

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	19	SEP	OG-CB-CA	8.00	115.93	108.14
1	A	19	SEP	O2P-P-OG	4.41	118.17	106.67

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	19	SEP	N-CA-CB-OG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 1 is monoatomic - leaving 5 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	$\# Z > 2$
5	SO4	A	902	-	4,4,4	0.46	0	6,6,6	0.53	0
5	SO4	A	903	-	4,4,4	0.40	0	6,6,6	0.28	0
7	ADP	A	905	6	28,29,29	0.41	0	43,45,45	0.70	2 (4%)
4	EDO	A	901	-	3,3,3	0.58	0	2,2,2	0.27	0
5	SO4	E	201	-	4,4,4	0.50	0	6,6,6	0.48	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	EDO	A	901	-	-	0/1/1/1	-
7	ADP	A	905	6	-	0/16/32/32	0/3/3/3

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	905	ADP	O5'-PA-O1A	2.18	117.59	108.94
7	A	905	ADP	O3'-C3'-C2'	2.04	118.34	111.82

There are no chirality outliers.

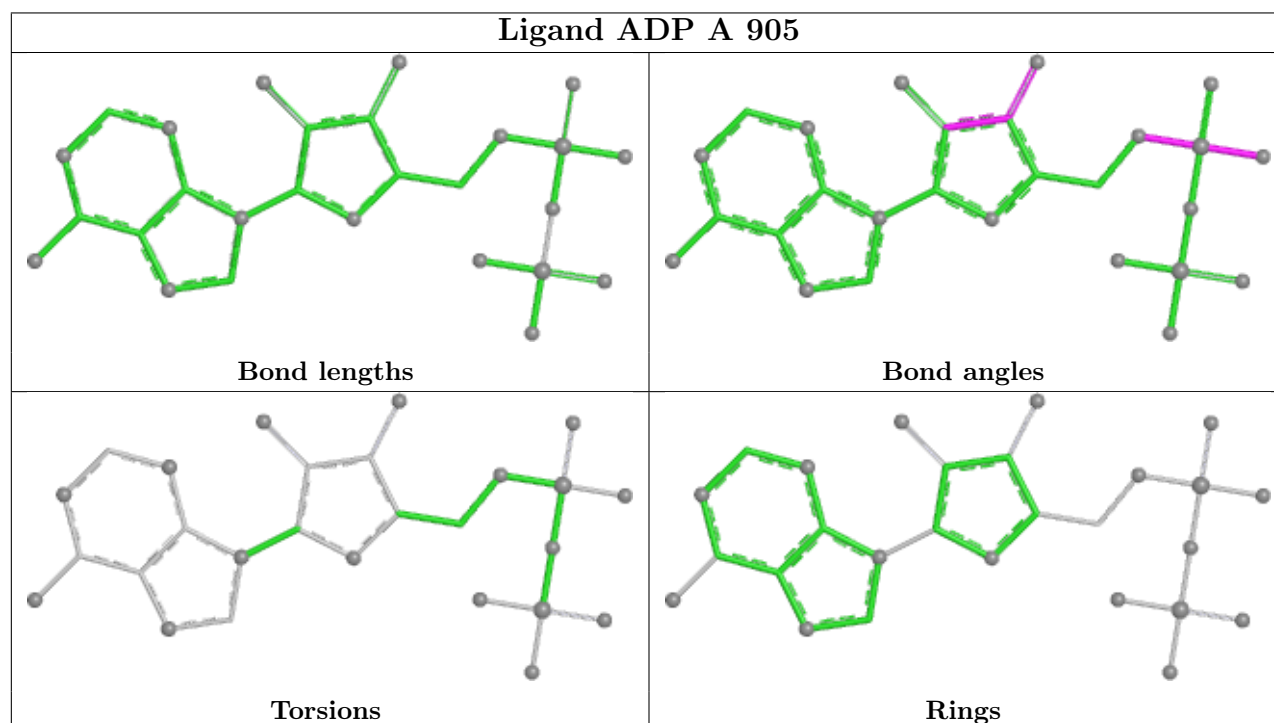
There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	902	SO4	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 [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	807/818 (98%)	0.09	24 (2%) 52 54	26, 73, 115, 153	2 (0%)
2	B	131/204 (64%)	0.17	2 (1%) 72 73	57, 86, 116, 138	0
3	E	131/134 (97%)	0.40	11 (8%) 17 16	55, 84, 139, 161	0
All	All	1069/1156 (92%)	0.14	37 (3%) 47 48	26, 75, 120, 161	2 (0%)

All (37) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	E	85	ILE	3.9
3	E	2	ALA	3.7
1	A	579	LYS	3.7
1	A	575	VAL	3.6
1	A	576	ALA	3.4
1	A	2	ALA	3.2
3	E	79	GLN	3.2
1	A	18	VAL	3.2
3	E	112	ILE	3.0
1	A	471	PHE	2.9
1	A	283	ASN	2.8
3	E	82	ASN	2.7
3	E	86	LYS	2.7
1	A	637	LYS	2.6
1	A	639	SER	2.6
1	A	4	THR	2.5
1	A	11	ALA	2.4
1	A	525	LYS	2.4
3	E	118	LYS	2.4
1	A	634	LYS	2.3
2	B	91	ASP	2.3
1	A	628	GLN	2.3
1	A	8	ILE	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	574	LYS	2.3
3	E	121	LEU	2.2
1	A	9	LYS	2.2
1	A	477	LYS	2.2
2	B	38	LYS	2.2
1	A	577	SER	2.1
1	A	476	PHE	2.1
3	E	83	VAL	2.1
1	A	582	ILE	2.1
1	A	635	ILE	2.1
3	E	108	ILE	2.0
1	A	163	LEU	2.0
1	A	14	ILE	2.0
3	E	134	ILE	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
1	SEP	A	19	10/11	0.84	0.14	96,99,105,106	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.

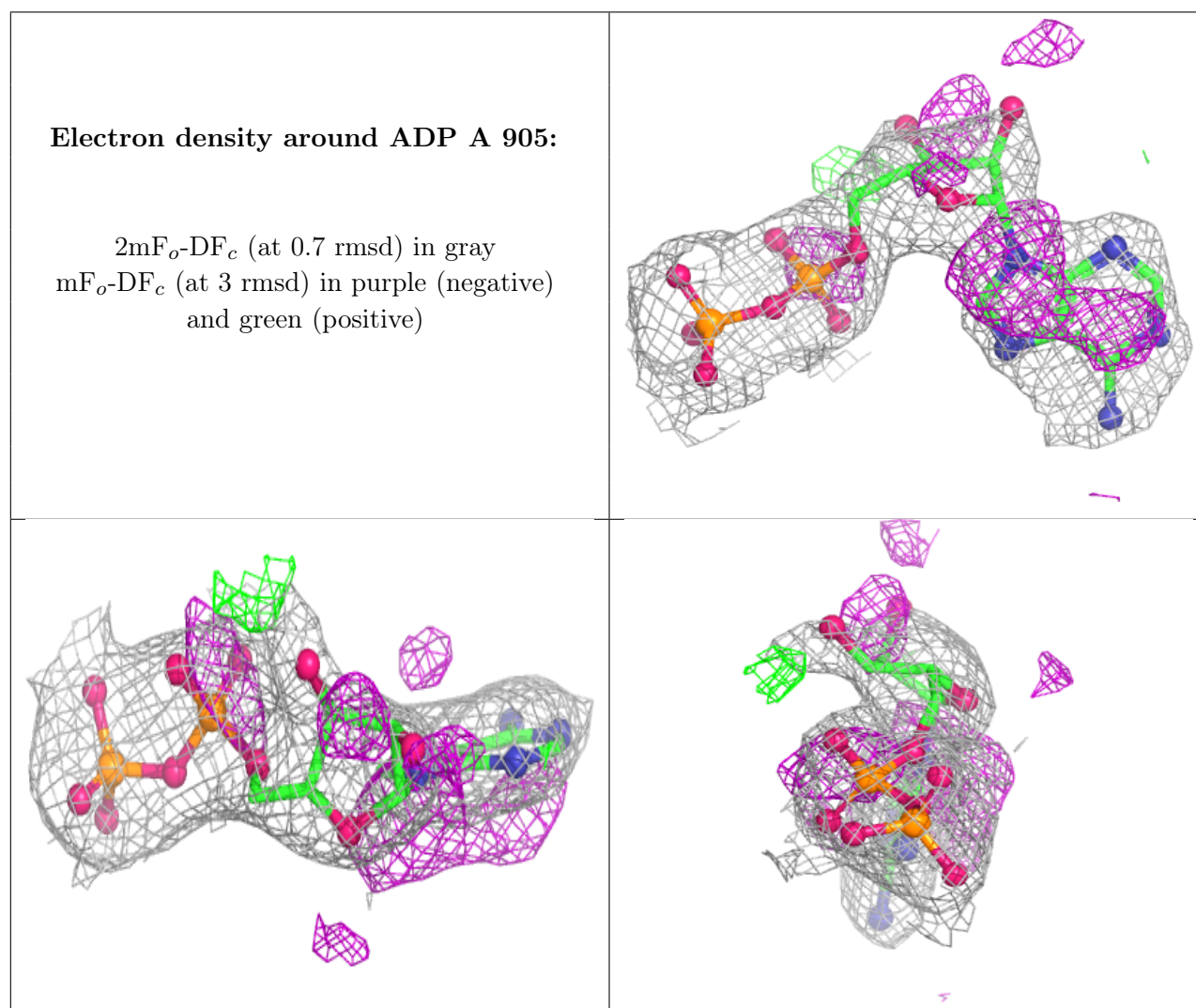
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	EDO	A	901	4/4	0.90	0.12	75,76,76,76	0
5	SO4	E	201	5/5	0.90	0.08	85,88,90,90	0
5	SO4	A	902	5/5	0.91	0.11	81,83,88,90	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	SO4	A	903	5/5	0.94	0.20	101,103,105,106	0
7	ADP	A	905	27/27	0.95	0.09	61,81,88,91	0
6	MG	A	904	1/1	0.97	0.05	68,68,68,68	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.



6.5 Other polymers ⓘ

There are no such residues in this entry.