



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:52 AM UTC

PDB ID : 6X1I / pdb_00006x1i
Title : Two-Component D3 Assembly Constructed by Fusing Symmetric Oligomers to Coiled Coils
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Deposited on : 2020-05-18
Resolution : 4.32 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
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

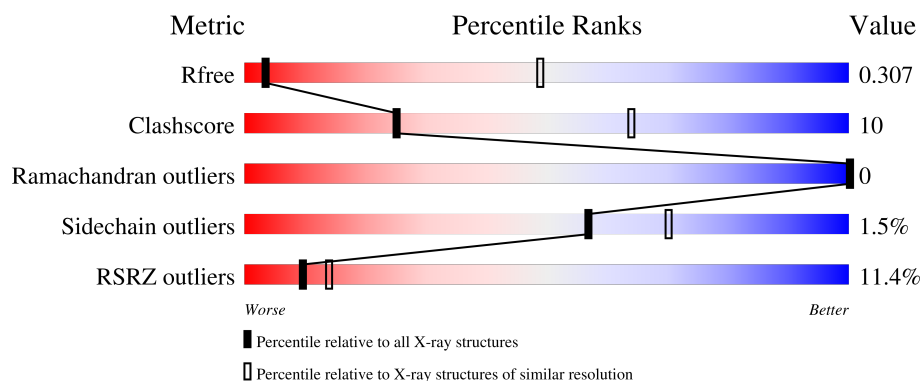
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.32 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	1056 (4.72-3.90)
Clashscore	190562	1101 (4.72-3.90)
Ramachandran outliers	187476	1003 (4.72-3.90)
Sidechain outliers	187428	1010 (4.76-3.88)
RSRZ outliers	180081	1053 (4.72-3.90)

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	172	10% 81% 19% .
2	B	157	12% 67% 25% 7%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2507 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 Cob_adeno_trans domain-containing protein PH0671 fused to a coiled coil.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	171	Total	C	N	O	S	0	0	0
			1354	861	226	263	4			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	24	MET	-	initiating methionine	UNP O58404

- Molecule 2 is a protein called SnoaL-like Protein fused to a coiled coil.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	146	Total	C	N	O	S	0	0	0
			1153	726	214	211	2			

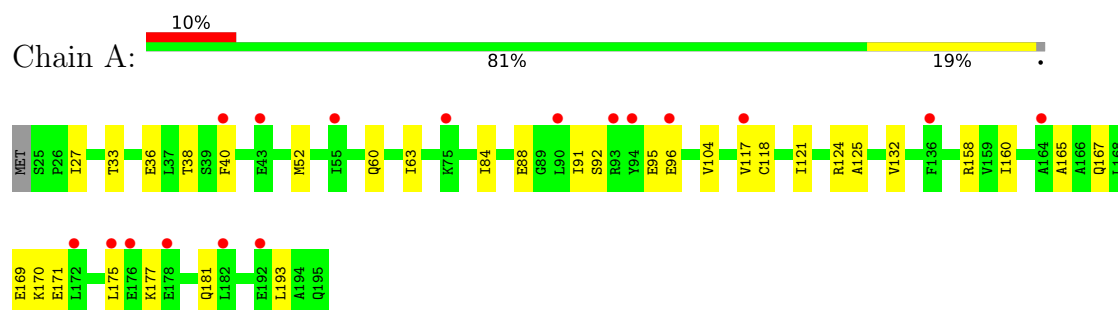
There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	221	HIS	-	expression tag	UNP Q7D0S4
B	222	HIS	-	expression tag	UNP Q7D0S4
B	223	HIS	-	expression tag	UNP Q7D0S4
B	224	HIS	-	expression tag	UNP Q7D0S4
B	225	HIS	-	expression tag	UNP Q7D0S4
B	226	HIS	-	expression tag	UNP Q7D0S4

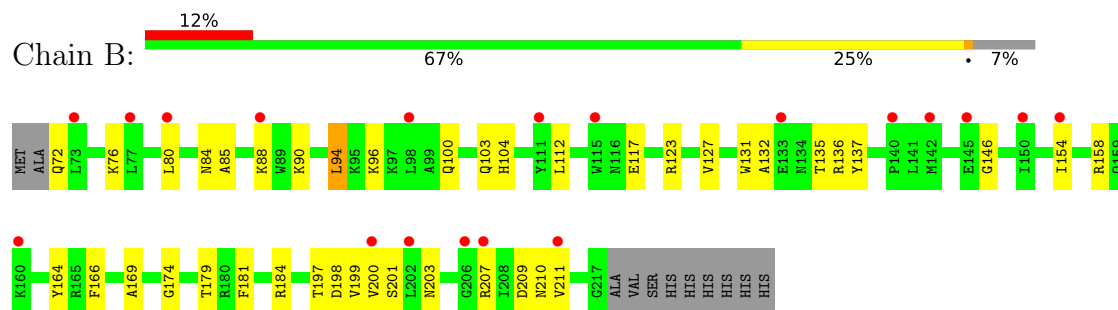
3 Residue-property plots [i](#)

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: Cob_adeno_trans domain-containing protein PH0671 fused to a coiled coil



- Molecule 2: SnoaL-like Protein fused to a coiled coil



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 3 2	Depositor
Cell constants a, b, c, α , β , γ	146.34Å 146.34Å 146.34Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	84.49 – 4.32 84.49 – 4.32	Depositor EDS
% Data completeness (in resolution range)	99.5 (84.49-4.32) 90.8 (84.49-4.32)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.07 (at 4.30Å)	Xtriage
Refinement program	PHENIX dev 3724	Depositor
R, R_{free}	0.278 , 0.293 0.279 , 0.307	Depositor DCC
R_{free} test set	392 reflections (9.97%)	wwPDB-VP
Wilson B-factor (Å ²)	217.9	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 346.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.85	EDS
Total number of atoms	2507	wwPDB-VP
Average B, all atoms (Å ²)	267.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.10% 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

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	0.26	0/1368	0.63	0/1837
2	B	0.21	0/1175	0.55	0/1584
All	All	0.24	0/2543	0.60	0/3421

There are no bond length outliers.

There are no bond angle outliers.

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	1354	0	1393	18	0
2	B	1153	0	1152	31	0
All	All	2507	0	2545	49	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 10.

All (49) 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:167:GLN:HA	1:A:170:LYS:HE3	1.70	0.74
1:A:104:VAL:HG21	1:A:158:ARG:HD2	1.76	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:203:ASN:HB2	2:B:209:ASP:HB3	1.78	0.64
1:A:33:THR:HG21	1:A:124:ARG:HG3	1.80	0.63
2:B:76:LYS:O	2:B:80:LEU:HD23	2.03	0.58
1:A:27:ILE:HD13	1:A:132:VAL:HG22	1.88	0.56
2:B:200:VAL:HG22	2:B:211:VAL:HG22	1.88	0.55
2:B:123:ARG:HH11	2:B:154:ILE:HG22	1.70	0.55
2:B:136:ARG:HG3	2:B:210:ASN:OD1	2.08	0.53
2:B:158:ARG:NH1	2:B:164:TYR:O	2.42	0.52
2:B:132:ALA:HA	2:B:207:ARG:NE	2.25	0.52
1:A:165:ALA:O	1:A:169:GLU:HG3	2.09	0.51
2:B:90:LYS:O	2:B:94:LEU:HB2	2.11	0.51
2:B:72:GLN:O	2:B:76:LYS:HG2	2.11	0.51
2:B:123:ARG:HH12	2:B:158:ARG:HB2	1.74	0.50
1:A:33:THR:HG22	1:A:125:ALA:HB2	1.93	0.49
2:B:127:VAL:HA	2:B:131:TRP:CE3	2.46	0.49
1:A:92:SER:O	1:A:96:GLU:HG3	2.13	0.49
2:B:169:ALA:HB2	2:B:184:ARG:HG2	1.95	0.49
1:A:40:PHE:HB3	1:A:118:CYS:SG	2.53	0.49
2:B:117:GLU:O	2:B:123:ARG:NH2	2.46	0.49
2:B:117:GLU:O	2:B:123:ARG:NE	2.47	0.48
2:B:127:VAL:O	2:B:131:TRP:HB2	2.13	0.48
2:B:179:THR:O	2:B:199:VAL:HA	2.14	0.48
1:A:38:THR:HB	1:A:63:ILE:HG21	1.95	0.48
2:B:117:GLU:HB3	2:B:123:ARG:HE	1.79	0.47
2:B:135:THR:O	2:B:146:GLY:N	2.44	0.47
1:A:38:THR:OG1	1:A:60:GLN:HG3	2.15	0.46
2:B:123:ARG:HH22	2:B:158:ARG:HD3	1.82	0.45
2:B:85:ALA:HA	2:B:88:LYS:HE3	1.98	0.44
2:B:136:ARG:O	2:B:210:ASN:HA	2.18	0.44
1:A:84:ILE:O	1:A:88:GLU:HG3	2.18	0.43
1:A:117:VAL:O	1:A:121:ILE:HG12	2.19	0.43
2:B:132:ALA:HA	2:B:207:ARG:HE	1.83	0.43
2:B:137:TYR:HD1	2:B:211:VAL:HB	1.82	0.42
1:A:52:MET:HE1	1:A:160:ILE:HG13	2.01	0.42
1:A:177:LYS:HE2	1:A:181:GLN:HE21	1.85	0.42
2:B:181:PHE:CZ	2:B:198:ASP:HB2	2.55	0.41
2:B:201:SER:HB2	2:B:210:ASN:HB3	2.02	0.41
2:B:112:LEU:HD22	2:B:166:PHE:HB3	2.02	0.41
2:B:72:GLN:HB2	2:B:76:LYS:HE2	2.02	0.41
1:A:36:GLU:OE1	1:A:124:ARG:NH2	2.54	0.41
1:A:177:LYS:HE2	1:A:181:GLN:NE2	2.36	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:96:LYS:O	2:B:100:GLN:HG3	2.21	0.41
2:B:104:HIS:CE1	2:B:174:GLY:HA3	2.56	0.41
2:B:123:ARG:NH1	2:B:154:ILE:HG22	2.33	0.41
2:B:181:PHE:O	2:B:197:THR:HG23	2.21	0.40
1:A:91:ILE:O	1:A:95:GLU:HB2	2.22	0.40
1:A:171:GLU:O	1:A:175:LEU:HD23	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	169/172 (98%)	166 (98%)	3 (2%)	0	100	100
2	B	144/157 (92%)	140 (97%)	4 (3%)	0	100	100
All	All	313/329 (95%)	306 (98%)	7 (2%)	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	143/144 (99%)	142 (99%)	1 (1%)	76	79
2	B	116/125 (93%)	113 (97%)	3 (3%)	40	60

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	259/269 (96%)	255 (98%)	4 (2%)	57 70

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

Mol	Chain	Res	Type
1	A	193	LEU
2	B	84	ASN
2	B	94	LEU
2	B	103	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	60	GLN
1	A	179	ASN
1	A	181	GLN
2	B	92	GLN
2	B	120	ASN
2	B	159	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

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	171/172 (99%)	0.81	17 (9%) 13 17	221, 257, 291, 315	0
2	B	146/157 (92%)	0.70	19 (13%) 7 11	222, 279, 318, 328	0
All	All	317/329 (96%)	0.76	36 (11%) 10 14	221, 265, 313, 328	0

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	96	GLU	9.1
1	A	90	LEU	7.6
2	B	206	GLY	7.3
1	A	176	GLU	5.6
1	A	94	TYR	5.3
2	B	77	LEU	4.9
2	B	88	LYS	4.2
1	A	175	LEU	4.2
1	A	172	LEU	4.1
2	B	115	TRP	4.0
1	A	40	PHE	3.8
1	A	93	ARG	3.7
2	B	111	TYR	3.7
2	B	98	LEU	3.5
1	A	136	PHE	3.4
1	A	178	GLU	3.2
1	A	117	VAL	2.7
2	B	133	GLU	2.7
2	B	80	LEU	2.7
1	A	55	ILE	2.6
2	B	145	GLU	2.6
2	B	207	ARG	2.5
1	A	43	GLU	2.5
2	B	150	ILE	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	182	LEU	2.4
2	B	200	VAL	2.3
2	B	160	LYS	2.3
2	B	73	LEU	2.2
1	A	75	LYS	2.2
2	B	154	ILE	2.2
1	A	164	ALA	2.1
2	B	140	PRO	2.1
2	B	202	LEU	2.1
2	B	142	MET	2.0
2	B	211	VAL	2.0
1	A	192	GLU	2.0

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.