



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 25, 2026 – 02:06 PM EDT

PDB ID : 5CBY / pdb_00005cby
Title : AncGR2 DNA Binding Domain - (+)GRE Complex
Authors : Hudson, W.H.; Ortlund, E.A.
Deposited on : 2015-07-01
Resolution : 2.00 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

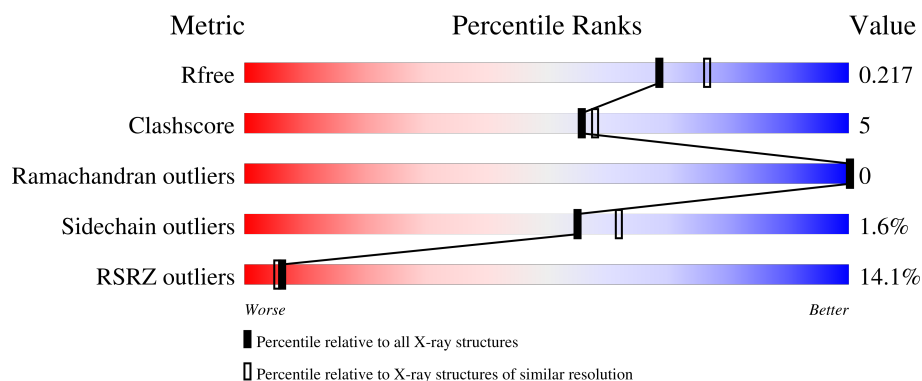
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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	105	5% 69% 28%
1	B	105	16% 58% 8% 31%
2	C	18	11% 100%
3	D	18	11% 89% 11%

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 2020 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 AncGR2 DNA Binding Domain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	76	Total	C	N	O	S	0	0	0
			586	361	114	100	11			
1	B	72	Total	C	N	O	S	0	1	0
			562	345	107	99	11			

- Molecule 2 is a DNA chain called DNA (5'-D(*CP*CP*AP*GP*AP*AP*CP*AP*GP*AP*GP*TP*GP*TP*TP*CP*TP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	18	Total	C	N	O	P	0	0	0
			368	176	70	105	17			

- Molecule 3 is a DNA chain called DNA (5'-D(*TP*CP*AP*GP*AP*AP*CP*AP*CP*TP*CP*TP*GP*TP*TP*CP*TP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	18	Total	C	N	O	P	0	0	0
			362	175	62	108	17			

- Molecule 4 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Zn	0	0
			2	2		
4	B	2	Total	Zn	0	0
			2	2		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	63	Total	O	0	0
			63	63		

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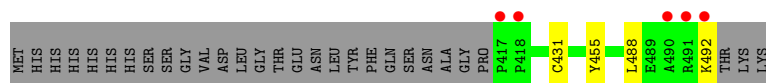
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	33	Total 33	O 33	0	0
5	C	16	Total 16	O 16	0	0
5	D	26	Total 26	O 26	0	0

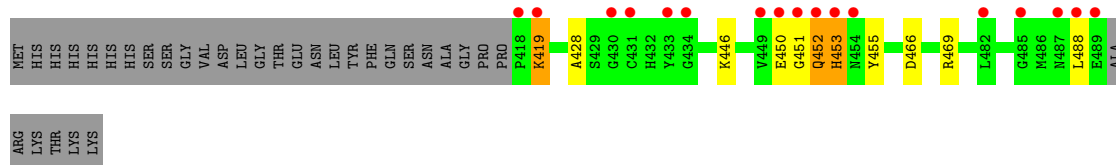
3 Residue-property plots [i](#)

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: AncGR2 DNA Binding Domain



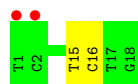
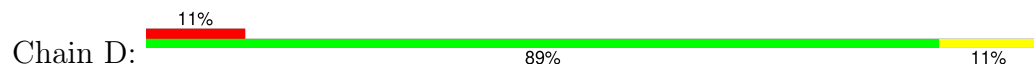
- Molecule 1: AncGR2 DNA Binding Domain



- Molecule 2: DNA (5'-D(*CP*CP*AP*GP*AP*AP*CP*AP*GP*AP*GP*TP*GP*TP*TP*CP*TP*G)-3')



- Molecule 3: DNA (5'-D(*TP*CP*AP*GP*AP*AP*CP*AP*CP*TP*CP*TP*GP*TP*TP*CP*TP*G)-3')



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	131.64Å 38.80Å 98.25Å 90.00° 119.65° 90.00°	Depositor
Resolution (Å)	36.74 – 2.00 36.74 – 2.00	Depositor EDS
% Data completeness (in resolution range)	91.0 (36.74-2.00) 91.0 (36.74-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.48 (at 2.00Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.182 , 0.217 0.185 , 0.217	Depositor DCC
R_{free} test set	2000 reflections (6.71%)	wwPDB-VP
Wilson B-factor (Å ²)	25.4	Xtriage
Anisotropy	0.215	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 44.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	2020	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.16% 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: 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	0.66	0/595	0.86	1/793 (0.1%)
1	B	0.61	0/570	0.94	0/760
2	C	0.31	0/413	0.52	0/636
3	D	0.36	0/404	0.56	0/621
All	All	0.53	0/1982	0.76	1/2810 (0.0%)

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
1	B	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	455	TYR	N-CA-C	5.79	118.41	110.24

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	452	GLN	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	586	0	588	2	0
1	B	562	0	553	12	0
2	C	368	0	204	0	0
3	D	362	0	206	2	0
4	A	2	0	0	0	0
4	B	2	0	0	0	0
5	A	63	0	0	0	0
5	B	33	0	0	0	0
5	C	16	0	0	0	0
5	D	26	0	0	0	0
All	All	2020	0	1551	16	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 5.

All (16) 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:451:GLY:O	1:B:453:HIS:ND1	2.15	0.80
1:B:451:GLY:O	1:B:452:GLN:HG2	1.84	0.76
1:A:431:CYS:SG	1:A:492:LYS:HE2	2.38	0.64
1:B:453:HIS:CD2	1:B:455:TYR:OH	2.53	0.61
1:B:453:HIS:CD2	1:B:455:TYR:CZ	2.94	0.56
1:B:453:HIS:HD2	1:B:455:TYR:CE1	2.26	0.54
3:D:16:DC:H6	3:D:16:DC:H5'	1.76	0.50
1:B:419:LYS:HG2	1:B:428:ALA:O	2.14	0.48
1:B:446:LYS:HE2	1:B:450:GLU:CD	2.38	0.48
3:D:15:DT:H1'	3:D:16:DC:H5''	1.97	0.45
1:B:451:GLY:O	1:B:452:GLN:CG	2.62	0.44
1:B:453:HIS:CD2	1:B:455:TYR:CE1	3.05	0.44
1:A:488:LEU:HA	1:A:488:LEU:HD23	1.71	0.44
1:B:488:LEU:HD23	1:B:488:LEU:HA	1.64	0.42
1:B:453:HIS:HD2	1:B:455:TYR:CZ	2.37	0.41
1:B:466:ASP:OD2	1:B:469:ARG:HD2	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	74/105 (70%)	74 (100%)	0	0	100	100
1	B	71/105 (68%)	68 (96%)	3 (4%)	0	100	100
All	All	145/210 (69%)	142 (98%)	3 (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	64/89 (72%)	64 (100%)	0	100	100
1	B	62/89 (70%)	60 (97%)	2 (3%)	34	35
All	All	126/178 (71%)	124 (98%)	2 (2%)	55	62

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	419	LYS
1	B	453	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 4 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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	76/105 (72%)	0.18	5 (6%) 24 23	13, 22, 54, 71	0
1	B	72/105 (68%)	1.25	17 (23%) 2 2	12, 38, 65, 78	1 (1%)
2	C	18/18 (100%)	0.81	2 (11%) 10 9	26, 46, 61, 62	0
3	D	18/18 (100%)	0.98	2 (11%) 10 9	26, 46, 65, 68	0
All	All	184/246 (74%)	0.74	26 (14%) 6 5	12, 32, 63, 78	1 (0%)

All (26) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	417	PRO	6.2
1	B	452	GLN	4.8
1	B	451	GLY	4.2
1	B	453	HIS	4.2
1	B	488	LEU	4.2
1	A	418	PRO	4.0
1	B	418	PRO	4.0
1	B	431	CYS	4.0
1	A	491	ARG	3.4
1	B	454	ASN	3.4
1	B	419	LYS	3.3
1	B	434	GLY	3.2
1	A	492	LYS	2.9
3	D	1	DT	2.9
1	A	490	ALA	2.7
1	B	482	LEU	2.5
3	D	2	DC	2.4
1	B	450	GLU	2.3
1	B	485	GLY	2.3
2	C	18	DG	2.2
1	B	489	GLU	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	430	GLY	2.1
1	B	487	ASN	2.1
1	B	433	TYR	2.1
1	B	449	VAL	2.0
2	C	17	DT	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](#)

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	ZN	A	501	1/1	0.99	0.02	17,17,17,17	0
4	ZN	A	502	1/1	0.99	0.03	16,16,16,16	0
4	ZN	B	501	1/1	0.99	0.02	32,32,32,32	0
4	ZN	B	502	1/1	0.99	0.02	17,17,17,17	0

6.5 Other polymers [i](#)

There are no such residues in this entry.