



wwPDB X-ray Structure Validation Summary Report ⓘ

May 21, 2020 – 06:58 am BST

PDB ID : 3P3W
Title : Structure of a dimeric GluA3 N-terminal domain (NTD) at 4.2 Å resolution
Authors : Rossmann, M.; Sukumaran, M.; Greger, I.H.
Deposited on : 2010-10-05
Resolution : 4.20 Å (reported)

This is a wwPDB X-ray Structure Validation Summary 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.11
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

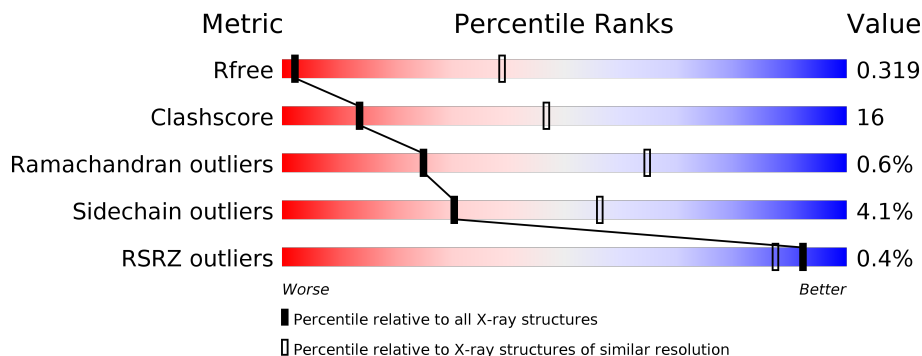
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.20 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}	130704	1005 (4.62-3.78)
Clashscore	141614	1044 (4.60-3.80)
Ramachandran outliers	138981	1000 (4.60-3.80)
Sidechain outliers	138945	1007 (4.62-3.78)
RSRZ outliers	127900	1063 (4.70-3.70)

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 on 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	389	
1	B	389	
1	C	389	
1	D	389	

2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 11484 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 Glutamate receptor 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	373	2906	1853	491	546	16	0	0	0
1	B	374	2914	1859	501	538	16	0	0	0
1	C	362	2790	1788	463	523	16	0	0	0
1	D	373	2874	1834	483	542	15	0	0	0

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	382	GLY	-	EXPRESSION TAG	UNP P19492
A	383	THR	-	EXPRESSION TAG	UNP P19492
A	384	HIS	-	EXPRESSION TAG	UNP P19492
A	385	HIS	-	EXPRESSION TAG	UNP P19492
A	386	HIS	-	EXPRESSION TAG	UNP P19492
A	387	HIS	-	EXPRESSION TAG	UNP P19492
A	388	HIS	-	EXPRESSION TAG	UNP P19492
A	389	HIS	-	EXPRESSION TAG	UNP P19492
B	382	GLY	-	EXPRESSION TAG	UNP P19492
B	383	THR	-	EXPRESSION TAG	UNP P19492
B	384	HIS	-	EXPRESSION TAG	UNP P19492
B	385	HIS	-	EXPRESSION TAG	UNP P19492
B	386	HIS	-	EXPRESSION TAG	UNP P19492
B	387	HIS	-	EXPRESSION TAG	UNP P19492
B	388	HIS	-	EXPRESSION TAG	UNP P19492
B	389	HIS	-	EXPRESSION TAG	UNP P19492
C	382	GLY	-	EXPRESSION TAG	UNP P19492
C	383	THR	-	EXPRESSION TAG	UNP P19492
C	384	HIS	-	EXPRESSION TAG	UNP P19492
C	385	HIS	-	EXPRESSION TAG	UNP P19492
C	386	HIS	-	EXPRESSION TAG	UNP P19492

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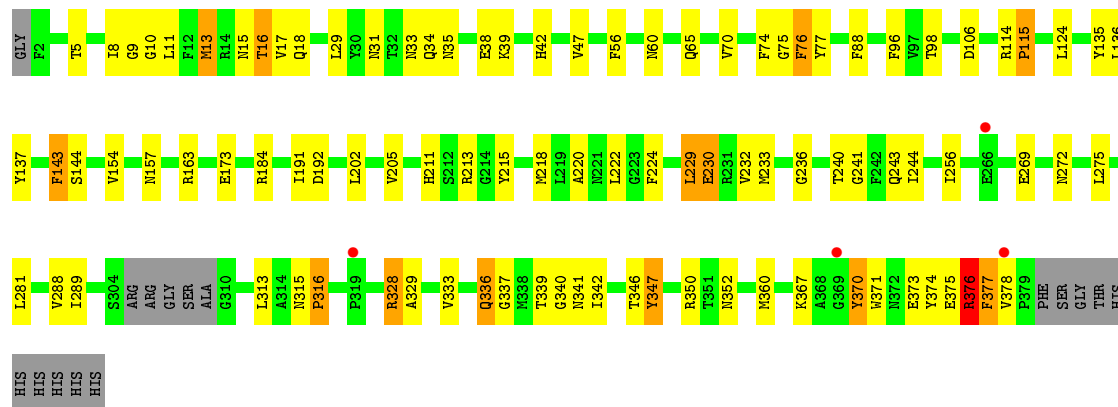
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Chain	Residue	Modelled	Actual	Comment	Reference
C	387	HIS	-	EXPRESSION TAG	UNP P19492
C	388	HIS	-	EXPRESSION TAG	UNP P19492
C	389	HIS	-	EXPRESSION TAG	UNP P19492
D	382	GLY	-	EXPRESSION TAG	UNP P19492
D	383	THR	-	EXPRESSION TAG	UNP P19492
D	384	HIS	-	EXPRESSION TAG	UNP P19492
D	385	HIS	-	EXPRESSION TAG	UNP P19492
D	386	HIS	-	EXPRESSION TAG	UNP P19492
D	387	HIS	-	EXPRESSION TAG	UNP P19492
D	388	HIS	-	EXPRESSION TAG	UNP P19492
D	389	HIS	-	EXPRESSION TAG	UNP P19492

HIS
HIS
HIS

● Molecule 1: Glutamate receptor 3

Chain D:  %



HIS
HIS
HIS
HIS
HIS

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	110.96Å 127.92Å 130.05Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	55.41 – 4.20 55.41 – 4.20	Depositor EDS
% Data completeness (in resolution range)	99.2 (55.41-4.20) 99.2 (55.41-4.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.32	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.64 (at 4.14Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.306 , 0.338 0.297 , 0.319	Depositor DCC
R_{free} test set	688 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å ²)	104.7	Xtrriage
Anisotropy	0.009	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.26 , 67.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.36$, $\langle L^2 \rangle = 0.19$	Xtrriage
Estimated twinning fraction	0.078 for -h,l,k	Xtrriage
F_o, F_c correlation	0.82	EDS
Total number of atoms	11484	wwPDB-VP
Average B, all atoms (Å ²)	116.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.01% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical 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 [i](#)

5.1 Standard geometry [i](#)

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	0.35	0/2973	0.61	7/4044 (0.2%)
1	B	0.33	0/2981	0.55	0/4054
1	C	0.33	0/2851	0.53	1/3869 (0.0%)
1	D	0.37	1/2938 (0.0%)	0.59	3/3999 (0.1%)
All	All	0.34	1/11743 (0.0%)	0.57	11/15966 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	115	PRO	N-CD	-6.64	1.38	1.47

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	213	ARG	N-CA-CB	-10.41	91.86	110.60
1	C	33	ASN	CB-CA-C	7.33	125.06	110.40
1	A	213	ARG	N-CA-C	7.24	130.54	111.00
1	D	230	GLU	N-CA-C	6.30	128.01	111.00
1	A	37	THR	N-CA-CB	-6.21	98.51	110.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	2906	0	2714	64	0
1	B	2914	0	2735	93	0
1	C	2790	0	2596	80	0
1	D	2874	0	2671	136	0
All	All	11484	0	10716	351	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 16.

The worst 5 of 351 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:236:GLY:CA	1:A:362:VAL:HG11	1.57	1.32
1:A:236:GLY:HA2	1:A:362:VAL:CG1	1.61	1.29
1:A:33:ASN:HA	1:A:34:GLN:CB	1.53	1.26
1:B:33:ASN:HA	1:B:34:GLN:CB	1.61	1.23
1:B:319:PRO:HG2	1:B:322:GLN:OE1	1.45	1.15

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	369/389 (95%)	353 (96%)	14 (4%)	2 (0%)	29	68
1	B	370/389 (95%)	356 (96%)	12 (3%)	2 (0%)	29	68
1	C	352/389 (90%)	329 (94%)	21 (6%)	2 (1%)	25	65
1	D	369/389 (95%)	351 (95%)	15 (4%)	3 (1%)	19	60
All	All	1460/1556 (94%)	1389 (95%)	62 (4%)	9 (1%)	25	65

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	17	VAL
1	D	316	PRO
1	A	317	ALA
1	B	34	GLN
1	B	317	ALA

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	300/340 (88%)	290 (97%)	10 (3%)	38	61
1	B	299/340 (88%)	287 (96%)	12 (4%)	31	57
1	C	285/340 (84%)	274 (96%)	11 (4%)	32	57
1	D	294/340 (86%)	279 (95%)	15 (5%)	24	51
All	All	1178/1360 (87%)	1130 (96%)	48 (4%)	30	56

5 of 48 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	335	VAL
1	C	315	ASN
1	D	370	TYR
1	C	104	ASP
1	C	229	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 10 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	15	ASN
1	D	65	GLN
1	D	112	GLN
1	C	343	GLN
1	D	79	GLN

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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	373/389 (95%)	-0.29	2 (0%) 91 86	79, 111, 180, 222	0
1	B	374/389 (96%)	-0.21	0 100 100	85, 119, 163, 211	0
1	C	362/389 (93%)	-0.17	0 100 100	76, 108, 161, 207	0
1	D	373/389 (95%)	-0.19	4 (1%) 80 72	79, 112, 150, 217	0
All	All	1482/1556 (95%)	-0.22	6 (0%) 92 87	76, 112, 165, 222	0

The worst 5 of 6 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	319	PRO	2.6
1	A	170	ASP	2.6
1	D	369	GLY	2.3
1	D	266	GLU	2.2
1	D	378	VAL	2.1

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 carbohydrates in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.