



wwPDB X-ray Structure Validation Summary Report ⓘ

May 16, 2020 – 12:00 pm BST

PDB ID : 3N6V
Title : Structure of the GluA2 NTD-dimer interface mutant, T78A
Authors : Rossmann, M.; Sukumaran, M.; Greger, I.H.
Deposited on : 2010-05-26
Resolution : 3.20 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

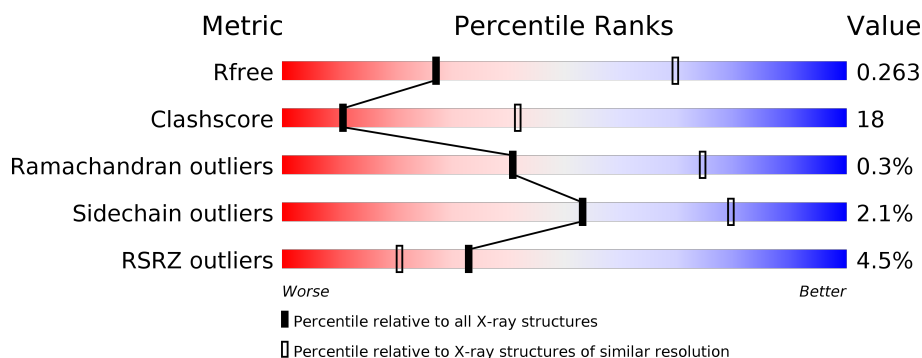
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 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	1133 (3.20-3.20)
Clashscore	141614	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)
RSRZ outliers	127900	1095 (3.20-3.20)

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	374	<div> <div>8%</div> <div>73%</div> <div>25%</div> <div>..</div> </div>
1	B	374	<div> <div>72%</div> <div>26%</div> <div>..</div> </div>
1	C	374	<div> <div>2%</div> <div>70%</div> <div>28%</div> <div>..</div> </div>
1	D	374	<div> <div>2%</div> <div>70%</div> <div>27%</div> <div>..</div> </div>
1	E	374	<div> <div>8%</div> <div>74%</div> <div>21%</div> <div>..</div> </div>
1	F	374	<div> <div>12%</div> <div>67%</div> <div>28%</div> <div>..</div> </div>

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 17102 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 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	370	Total	C	N	O	S	0	0	0
			2892	1846	487	551	8			
1	B	372	Total	C	N	O	S	0	0	0
			2923	1865	493	557	8			
1	C	369	Total	C	N	O	S	0	0	0
			2826	1810	461	547	8			
1	D	368	Total	C	N	O	S	0	0	0
			2854	1822	476	548	8			
1	E	366	Total	C	N	O	S	0	0	1
			2678	1713	429	527	9			
1	F	364	Total	C	N	O	S	0	0	0
			2791	1779	467	537	8			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	78	ALA	THR	ENGINEERED MUTATION	UNP P19491
B	78	ALA	THR	ENGINEERED MUTATION	UNP P19491
C	78	ALA	THR	ENGINEERED MUTATION	UNP P19491
D	78	ALA	THR	ENGINEERED MUTATION	UNP P19491
E	78	ALA	THR	ENGINEERED MUTATION	UNP P19491
F	78	ALA	THR	ENGINEERED MUTATION	UNP P19491

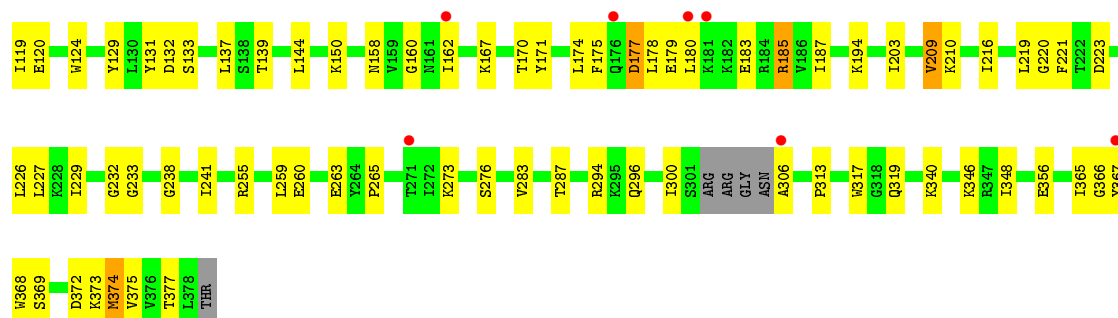
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	23	Total	O	0	0
			23	23		
2	B	41	Total	O	0	0
			41	41		
2	C	26	Total	O	0	0
			26	26		

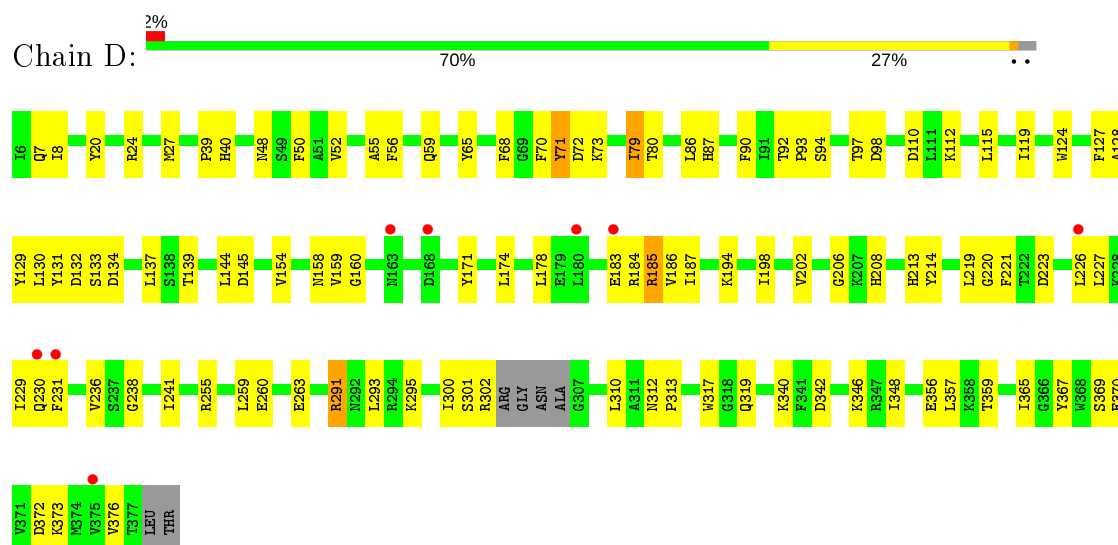
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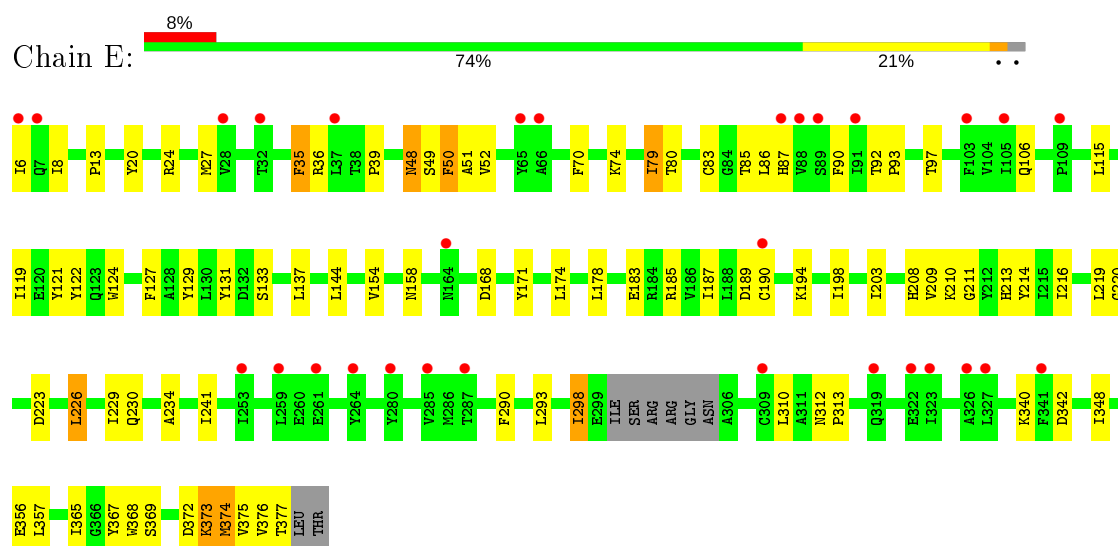
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	D	26	Total 26	O 26	0	0
2	E	11	Total 11	O 11	0	0
2	F	11	Total 11	O 11	0	0



• Molecule 1: Glutamate receptor 2

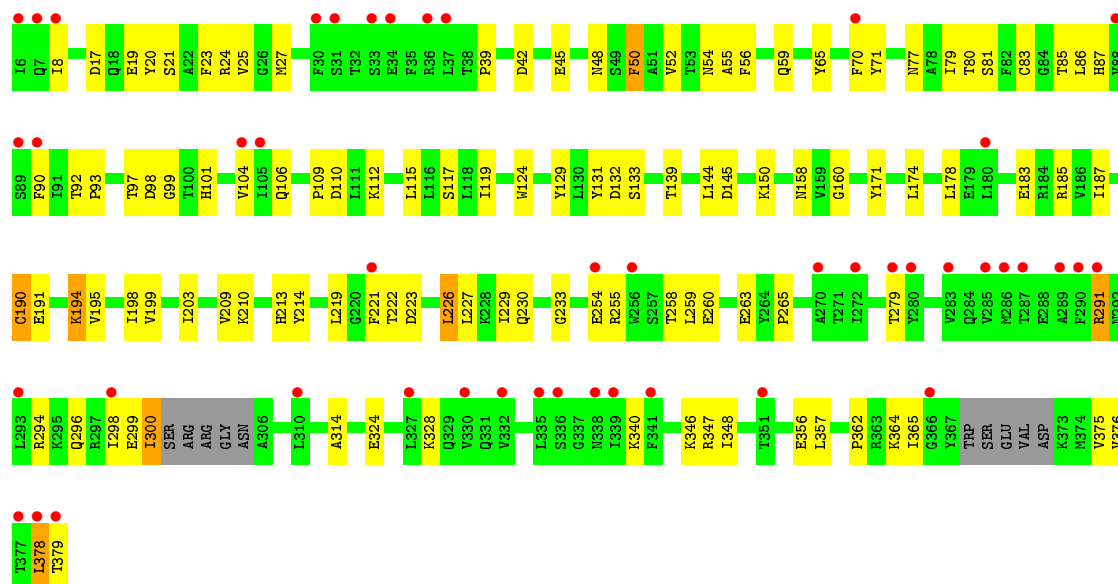


• Molecule 1: Glutamate receptor 2



• Molecule 1: Glutamate receptor 2





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	64.21Å 120.15Å 360.81Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	53.78 – 3.20 53.78 – 3.20	Depositor EDS
% Data completeness (in resolution range)	99.8 (53.78-3.20) 99.9 (53.78-3.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.16	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.11 (at 3.19Å)	Xtriage
Refinement program	PHENIX 1.6.1 _357	Depositor
R, R_{free}	0.235 , 0.265 0.231 , 0.263	Depositor DCC
R_{free} test set	1890 reflections (4.00%)	wwPDB-VP
Wilson B-factor (Å ²)	63.8	Xtriage
Anisotropy	0.410	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 64.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	17102	wwPDB-VP
Average B, all atoms (Å ²)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.88% 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 [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	0.53	0/2953	0.63	1/4009 (0.0%)
1	B	0.56	0/2985	0.67	2/4047 (0.0%)
1	C	0.57	0/2887	0.62	0/3931
1	D	0.52	0/2914	0.62	0/3960
1	E	0.54	0/2734	0.58	0/3745
1	F	0.56	0/2843	0.62	1/3856 (0.0%)
All	All	0.55	0/17316	0.62	4/23548 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	307	GLY	N-CA-C	7.82	132.64	113.10
1	F	222	THR	N-CA-C	7.14	130.28	111.00
1	B	309	CYS	N-CA-CB	-6.83	98.31	110.60
1	A	305	ASN	CB-CA-C	6.08	122.56	110.40

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	2892	0	2783	97	0
1	B	2923	0	2836	92	3
1	C	2826	0	2657	97	3

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2854	0	2720	96	0
1	E	2678	0	2401	130	0
1	F	2791	0	2666	118	0
2	A	23	0	0	3	0
2	B	41	0	0	4	0
2	C	26	0	0	3	0
2	D	26	0	0	4	0
2	E	11	0	0	7	0
2	F	11	0	0	3	0
All	All	17102	0	16063	603	3

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 18.

The worst 5 of 603 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:E:124:TRP:CZ3	1:E:185:ARG:HB3	1.53	1.41
1:C:62:ARG:HD2	2:C:401:HOH:O	1.37	1.23
1:F:112:LYS:HG2	1:F:139:THR:HG22	1.27	1.14
1:B:57:CYS:CB	1:B:309:CYS:SG	2.38	1.10
1:F:50:PHE:O	1:F:54:ASN:ND2	1.83	1.10

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:29:GLN:OE1	1:C:313:PRO:CB[1_455]	1.39	0.81
1:B:29:GLN:OE1	1:C:313:PRO:CA[1_455]	1.57	0.63
1:B:204:THR:O	1:C:14:ARG:NH2[4_455]	1.80	0.40

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	366/374 (98%)	337 (92%)	28 (8%)	1 (0%)	41	74
1	B	370/374 (99%)	342 (92%)	27 (7%)	1 (0%)	41	74
1	C	365/374 (98%)	335 (92%)	28 (8%)	2 (0%)	29	67
1	D	364/374 (97%)	333 (92%)	31 (8%)	0	100	100
1	E	360/374 (96%)	332 (92%)	26 (7%)	2 (1%)	25	64
1	F	356/374 (95%)	327 (92%)	28 (8%)	1 (0%)	41	74
All	All	2181/2244 (97%)	2006 (92%)	168 (8%)	7 (0%)	41	74

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	374	MET
1	E	374	MET
1	B	295	LYS
1	A	376	VAL
1	E	373	LYS

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	305/322 (95%)	301 (99%)	4 (1%)	69	87
1	B	310/322 (96%)	306 (99%)	4 (1%)	69	87
1	C	292/322 (91%)	288 (99%)	4 (1%)	67	86
1	D	298/322 (92%)	293 (98%)	5 (2%)	60	83
1	E	263/322 (82%)	256 (97%)	7 (3%)	44	75
1	F	290/322 (90%)	277 (96%)	13 (4%)	27	63
All	All	1758/1932 (91%)	1721 (98%)	37 (2%)	53	79

5 of 37 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	291	ARG
1	E	79	ILE
1	F	300	ILE
1	E	35	PHE
1	E	48	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	235	ASN
1	E	331	GLN
1	E	338	ASN
1	F	349	ASN

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 ⓘ

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	370/374 (98%)	0.00	2 (0%) 91 86	27, 62, 104, 137	0
1	B	372/374 (99%)	-0.02	5 (1%) 77 65	24, 45, 94, 153	0
1	C	369/374 (98%)	0.09	8 (2%) 62 48	26, 65, 102, 129	0
1	D	368/374 (98%)	0.07	8 (2%) 62 48	23, 50, 112, 155	0
1	E	366/374 (97%)	0.61	30 (8%) 11 6	42, 87, 121, 142	0
1	F	364/374 (97%)	0.63	46 (12%) 3 2	47, 99, 126, 160	0
All	All	2209/2244 (98%)	0.23	99 (4%) 33 21	23, 68, 119, 160	0

The worst 5 of 99 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	287	THR	5.3
1	B	168	ASP	5.2
1	E	65	TYR	5.1
1	F	89	SER	4.7
1	F	6	ILE	4.7

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

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

6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.