



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 17, 2026 – 09:08 PM UTC

PDB ID : 7QU8 / pdb_00007qu8
Title : ADGRG3/GPR97 Extracellular Region
Authors : Zheng-Gerard, C.; Chu, T.Y.; El Omari, K.; Lin, H.H.; Seiradake, E.
Deposited on : 2022-01-17
Resolution : 3.37 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

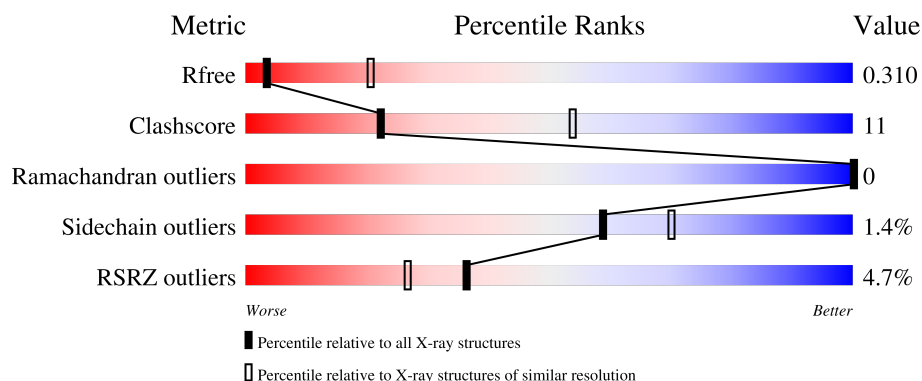
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.37 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	1047 (3.42-3.34)
Clashscore	190562	1067 (3.42-3.34)
Ramachandran outliers	187476	1056 (3.42-3.34)
Sidechain outliers	187428	1056 (3.42-3.34)
RSRZ outliers	180081	1047 (3.42-3.34)

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	272	3% 68% 13% • 18%
1	B	272	5% 68% 13% • 18%
1	C	272	• • 96%
1	D	272	• • 96%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 3640 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 Adhesion G protein-coupled receptor G3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	222	Total	C	N	O	S	0	0	0
			1729	1082	306	327	14			
1	B	222	Total	C	N	O	S	0	0	0
			1729	1082	306	327	14			
1	C	11	Total	C	N	O		0	0	0
			91	64	14	13				
1	D	11	Total	C	N	O		0	0	0
			91	64	14	13				

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	265	THR	-	expression tag	UNP Q86Y34
A	266	LYS	-	expression tag	UNP Q86Y34
A	267	HIS	-	expression tag	UNP Q86Y34
A	268	HIS	-	expression tag	UNP Q86Y34
A	269	HIS	-	expression tag	UNP Q86Y34
A	270	HIS	-	expression tag	UNP Q86Y34
A	271	HIS	-	expression tag	UNP Q86Y34
A	272	HIS	-	expression tag	UNP Q86Y34
B	265	THR	-	expression tag	UNP Q86Y34
B	266	LYS	-	expression tag	UNP Q86Y34
B	267	HIS	-	expression tag	UNP Q86Y34
B	268	HIS	-	expression tag	UNP Q86Y34
B	269	HIS	-	expression tag	UNP Q86Y34
B	270	HIS	-	expression tag	UNP Q86Y34
B	271	HIS	-	expression tag	UNP Q86Y34
B	272	HIS	-	expression tag	UNP Q86Y34
C	265	THR	-	expression tag	UNP Q86Y34
C	266	LYS	-	expression tag	UNP Q86Y34
C	267	HIS	-	expression tag	UNP Q86Y34
C	268	HIS	-	expression tag	UNP Q86Y34
C	269	HIS	-	expression tag	UNP Q86Y34

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Chain	Residue	Modelled	Actual	Comment	Reference
C	270	HIS	-	expression tag	UNP Q86Y34
C	271	HIS	-	expression tag	UNP Q86Y34
C	272	HIS	-	expression tag	UNP Q86Y34
D	265	THR	-	expression tag	UNP Q86Y34
D	266	LYS	-	expression tag	UNP Q86Y34
D	267	HIS	-	expression tag	UNP Q86Y34
D	268	HIS	-	expression tag	UNP Q86Y34
D	269	HIS	-	expression tag	UNP Q86Y34
D	270	HIS	-	expression tag	UNP Q86Y34
D	271	HIS	-	expression tag	UNP Q86Y34
D	272	HIS	-	expression tag	UNP Q86Y34

LEU VAL GLY GLY GLN GLN MET HIS VAL VAL THR LYS LEU LEU ALA GLU PRO PRO LEU GLU ILE VAL PHE SER SER HIS GLN ARG PRO PRO PRO PRO ASN MET THR LEU LEU CYS VAL VAL PHE TRP ASP VAL VAL LYS THR GLY THR THR THR THR LYS TRP SER SER GLU GLU VAL VAL ARG PRO TRP

GLY
THR
VAL
CYS
CYS
ASP
HIS
LEU
T250
F251
L255
L256
R257
P258
T259
L260
ASP
GLN
SER
THR
THR
LYS
HIS
HIS
HIS
HIS
HIS
HIS

- Molecule 1: Adhesion G protein-coupled receptor G3

Chain D: 96%

[illegible]

SER	CYS	ASN	ASN	VAL	GLU	ASN	LEU	GLN	ARG	TYR	TRP	LEU	ASN	TYR	GLU	HIS	LEU	MET	LYS	GLY	GLY	LEU	THR	GLN	LYS	VAL	ASN	THR	PRO	PRO	LEU	LEU	LYS	ALA	ALA	LEU	VAL	GLN	ASN	ASN	LEU	THR	THR	ASN	THR	THR	ASP	PHE	THR	PHE	SER	LEU	LEU	GLU	PRO	SER	GLN	VAL	PRO	ARG	PRO	GLN	VAL
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MET	LYS	ASP	GLU	ASP	LYS	PRO	PRO	ASP	ARG	VAL	ARG	ARG	LEU	LEU	LYS	LEU	PHE	SER	ARG	SER	VAL	SER	ASN	GLY	PRO	PRO	LEU	LEU	THR	ILE	LEU	ASP	ILE	GLY	PRO	GLY	THR	THR	LEU	PHE	LYS	GLY	PRO	ARG	LEU	GLY	LEU	ASN	ASN	ARG
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LEU	VAL	GLY	GLY	SER	GLY	GLN	MET	HIS	VAL	THR	LYS	LEU	ALA	GLU	PRO	LEU	GLU	ILE	VAL	PHE	SER	HIS	GLN	ARG	PRO	PRO	PRO	ASN	MET	THR	LEU	THR	CYS	VAL	PHE	TRP	ASP	VAL	THR	VAL	LYS	GLY	THR	THR	GLY	ASP	THR	THR	SER	SER	GLU	GLY	CYS	SER	THR	GLU	VAL	ARG	PRO	THR
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GLY	THR	VAL	CYS	CYS	CYS	ASP	HIS	LEU	T250	F251	L256	R257	L260	ASP	GLN	SER	THR	THR	LYS	HIS	HIS	HIS	HIS	HIS	HIS	HIS
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4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	96.28Å 96.28Å 172.84Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	84.11 – 3.37 84.11 – 3.37	Depositor EDS
% Data completeness (in resolution range)	99.4 (84.11-3.37) 99.4 (84.11-3.37)	Depositor EDS
R_{merge}	0.03	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.94 (at 3.41Å)	Xtriage
Refinement program	BUSTER 2.10.3, REFMAC 5.8.0267	Depositor
R, R_{free}	0.266 , 0.313 0.269 , 0.310	Depositor DCC
R_{free} test set	1040 reflections (8.61%)	wwPDB-VP
Wilson B-factor (Å ²)	110.5	Xtriage
Anisotropy	0.159	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 101.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.42$, $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	3640	wwPDB-VP
Average B, all atoms (Å ²)	134.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.59% 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	0/1766	1.05	3/2396 (0.1%)
1	B	0.53	0/1766	1.06	4/2396 (0.2%)
1	C	0.49	0/93	1.00	0/126
1	D	0.49	0/93	1.03	0/126
All	All	0.53	0/3718	1.05	7/5044 (0.1%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	61	SER	CA-C-N	-6.52	114.10	122.77
1	B	61	SER	C-N-CA	-6.52	114.10	122.77
1	A	61	SER	CA-C-N	-6.03	114.75	122.77
1	A	61	SER	C-N-CA	-6.03	114.75	122.77
1	B	60	ASP	CA-CB-CG	5.92	118.52	112.60
1	B	62	CYS	N-CA-C	5.09	117.03	108.73
1	A	164	LYS	N-CA-C	-5.07	105.33	112.12

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	1729	0	1707	40	0
1	B	1729	0	1707	39	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	91	0	100	7	0
1	D	91	0	100	6	0
All	All	3640	0	3614	77	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 11.

All (77) 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:181:LEU:HD11	1:D:251:PHE:HB3	1.25	1.19
1:A:164:LYS:HB3	1:A:168:LEU:HD11	1.24	1.16
1:B:164:LYS:HB3	1:B:168:LEU:HD11	1.17	1.10
1:A:33:LEU:HD21	1:A:60:ASP:O	1.53	1.07
1:A:181:LEU:HD11	1:C:251:PHE:HB3	1.36	1.07
1:B:164:LYS:HB3	1:B:168:LEU:CD1	1.88	1.04
1:B:164:LYS:CB	1:B:168:LEU:HD11	1.88	1.03
1:B:33:LEU:HD21	1:B:60:ASP:O	1.59	1.01
1:A:164:LYS:HB3	1:A:168:LEU:CD1	1.89	1.01
1:A:164:LYS:CB	1:A:168:LEU:HD11	1.91	1.00
1:B:157:ILE:HD13	1:B:163:PHE:HB2	1.52	0.89
1:A:157:ILE:HD13	1:A:163:PHE:HB2	1.55	0.89
1:B:181:LEU:HD11	1:D:251:PHE:CB	2.03	0.88
1:A:104:ALA:H	1:A:135:LYS:HE2	1.43	0.84
1:B:104:ALA:H	1:B:135:LYS:HE2	1.43	0.82
1:A:214:THR:HG21	1:C:257:ARG:HH21	1.47	0.78
1:B:181:LEU:CD1	1:D:251:PHE:HB3	2.13	0.75
1:A:174:SER:HB2	1:C:256:LEU:O	1.87	0.74
1:B:174:SER:HB2	1:D:256:LEU:O	1.89	0.72
1:A:127:PRO:HG2	1:A:130:ARG:HB3	1.75	0.69
1:B:127:PRO:HG2	1:B:130:ARG:HB3	1.75	0.68
1:A:181:LEU:HD11	1:C:251:PHE:CB	2.20	0.68
1:A:157:ILE:HD13	1:A:163:PHE:CB	2.25	0.66
1:B:157:ILE:HD13	1:B:163:PHE:CB	2.25	0.66
1:B:157:ILE:CD1	1:B:163:PHE:HB2	2.26	0.64
1:A:157:ILE:CD1	1:A:163:PHE:HB2	2.28	0.60
1:A:104:ALA:H	1:A:135:LYS:CE	2.13	0.60
1:A:173:GLY:O	1:C:258:PRO:HD3	2.02	0.59
1:A:104:ALA:HA	1:A:135:LYS:HD2	1.85	0.59
1:A:164:LYS:HD2	1:A:168:LEU:HD11	1.86	0.58
1:B:104:ALA:HA	1:B:135:LYS:HD2	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:104:ALA:H	1:B:135:LYS:CE	2.14	0.56
1:A:164:LYS:CD	1:A:168:LEU:HD11	2.36	0.55
1:B:213:LEU:CD1	1:D:256:LEU:HG	2.37	0.55
1:A:231:GLU:HA	1:B:231:GLU:HA	1.90	0.54
1:B:164:LYS:HD2	1:B:168:LEU:HD11	1.92	0.51
1:A:164:LYS:HD2	1:A:168:LEU:CD1	2.42	0.49
1:B:164:LYS:HA	1:B:168:LEU:HD21	1.94	0.49
1:B:164:LYS:CD	1:B:168:LEU:HD11	2.42	0.49
1:A:181:LEU:CD1	1:C:251:PHE:HB3	2.26	0.48
1:A:157:ILE:CD1	1:A:163:PHE:CB	2.89	0.47
1:A:164:LYS:CG	1:A:168:LEU:HD11	2.44	0.47
1:A:164:LYS:HA	1:A:168:LEU:HD21	1.96	0.47
1:A:214:THR:O	1:C:255:LEU:HB3	2.15	0.46
1:B:67:LEU:O	1:B:70:TYR:HB3	2.14	0.46
1:B:157:ILE:CD1	1:B:163:PHE:CB	2.90	0.45
1:B:214:THR:HG21	1:D:257:ARG:HH21	1.81	0.45
1:B:221:THR:O	1:B:221:THR:OG1	2.31	0.45
1:A:55:ARG:HG3	1:A:56:GLN:N	2.31	0.45
1:B:55:ARG:HG3	1:B:56:GLN:N	2.32	0.45
1:B:99:LEU:HD11	1:B:150:LEU:HD22	1.98	0.44
1:A:99:LEU:HD11	1:A:150:LEU:HD22	1.99	0.44
1:A:67:LEU:O	1:A:70:TYR:HB3	2.17	0.44
1:B:164:LYS:CG	1:B:168:LEU:HD11	2.45	0.44
1:B:164:LYS:HD2	1:B:168:LEU:CD1	2.47	0.44
1:A:168:LEU:C	1:A:168:LEU:HD12	2.43	0.44
1:B:33:LEU:HG	1:B:61:SER:O	2.18	0.43
1:B:111:LEU:HD11	1:B:131:VAL:HB	2.01	0.43
1:A:33:LEU:HG	1:A:61:SER:O	2.19	0.42
1:A:164:LYS:CA	1:A:168:LEU:HD11	2.48	0.42
1:B:224:THR:HG22	1:B:225:THR:HG23	2.02	0.42
1:A:93:LYS:HB2	1:A:154:ILE:HG23	2.02	0.42
1:A:193:LYS:NZ	1:B:214:THR:HG22	2.35	0.42
1:B:73:ASN:O	1:B:76:ALA:HB3	2.19	0.42
1:B:33:LEU:HD11	1:B:60:ASP:O	2.20	0.42
1:A:73:ASN:O	1:A:76:ALA:HB3	2.20	0.42
1:A:103:THR:HG21	1:A:107:PHE:CE2	2.55	0.42
1:B:93:LYS:HB2	1:B:154:ILE:HG23	2.02	0.41
1:A:111:LEU:HD11	1:A:131:VAL:HB	2.01	0.41
1:B:237:VAL:HA	1:B:242:THR:HG22	2.01	0.41
1:A:237:VAL:HA	1:A:242:THR:HG22	2.02	0.41
1:B:103:THR:HG21	1:B:107:PHE:CE2	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:33:LEU:CD2	1:A:60:ASP:O	2.44	0.41
1:B:168:LEU:C	1:B:170:LEU:N	2.80	0.40
1:A:33:LEU:HD11	1:A:60:ASP:O	2.22	0.40
1:A:224:THR:HG22	1:A:225:THR:HG23	2.02	0.40
1:B:168:LEU:C	1:B:168:LEU:HD12	2.46	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	220/272 (81%)	209 (95%)	11 (5%)	0	100	100
1	B	220/272 (81%)	207 (94%)	13 (6%)	0	100	100
1	C	9/272 (3%)	8 (89%)	1 (11%)	0	100	100
1	D	9/272 (3%)	8 (89%)	1 (11%)	0	100	100
All	All	458/1088 (42%)	432 (94%)	26 (6%)	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	199/242 (82%)	197 (99%)	2 (1%)	68	75

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	199/242 (82%)	197 (99%)	2 (1%)	68	75
1	C	10/242 (4%)	9 (90%)	1 (10%)	7	26
1	D	10/242 (4%)	9 (90%)	1 (10%)	7	26
All	All	418/968 (43%)	412 (99%)	6 (1%)	59	70

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	62	CYS
1	A	120	VAL
1	B	62	CYS
1	B	120	VAL
1	C	250	THR
1	D	250	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	45	ASN
1	A	97	GLN
1	A	119	GLN
1	A	179	ASN
1	B	45	ASN
1	B	119	GLN
1	B	179	ASN

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	222/272 (81%)	0.43	9 (4%) 41 29	77, 121, 212, 270	0
1	B	222/272 (81%)	0.49	13 (5%) 28 21	86, 124, 216, 256	0
1	C	11/272 (4%)	0.25	0 100 100	81, 95, 137, 157	0
1	D	11/272 (4%)	0.39	0 100 100	85, 94, 176, 182	0
All	All	466/1088 (42%)	0.45	22 (4%) 36 27	77, 123, 213, 270	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	28	PRO	4.4
1	B	110	SER	4.2
1	A	28	PRO	3.9
1	B	140	SER	3.2
1	B	191	VAL	3.2
1	A	170	LEU	2.8
1	A	41	ILE	2.8
1	B	53	LYS	2.7
1	B	190	HIS	2.7
1	A	110	SER	2.5
1	A	189	MET	2.5
1	A	173	GLY	2.4
1	A	137	LEU	2.4
1	B	167	ARG	2.3
1	A	138	PHE	2.3
1	A	63	ASN	2.2
1	B	192	THR	2.2
1	B	115	GLN	2.2
1	B	45	ASN	2.1
1	B	75	GLU	2.1
1	B	173	GLY	2.1
1	B	138	PHE	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 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.