



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 13, 2023 – 12:51 pm GMT

PDB ID : 8AJ8
Title : Structure of p110 gamma bound to the p84 regulatory subunit
Authors : Burke, J.E.; Williams, R.L.; Zhang, X.
Deposited on : 2022-07-27
Resolution : 8.50 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 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 : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.32.1
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) : 2.32.1

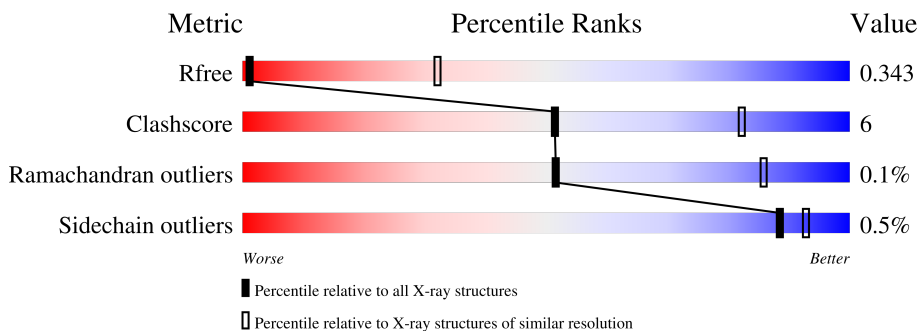
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 8.50 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 (11.50-3.90)
Clashscore	141614	1070 (11.50-3.90)
Ramachandran outliers	138981	1003 (11.50-3.90)
Sidechain outliers	138945	1003 (11.50-3.86)

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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	1102	80% 10% 10%
1	C	1102	80% 10% 10%
1	E	1102	81% 9% 10%
1	G	1102	81% 9% 10%
2	B	756	60% 14% 26%
2	D	756	59% 15% 26%
2	F	756	61% 13% 26%

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Mol	Chain	Length	Quality of chain
2	H	756	 59% 14% 26%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 50008 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 Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit gamma isoform.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	995	8066	5175	1380	1470	41	0	0	0
1	C	995	8066	5175	1380	1470	41	0	0	0
1	E	995	8066	5175	1380	1470	41	0	0	0
1	G	995	8066	5175	1380	1470	41	0	0	0

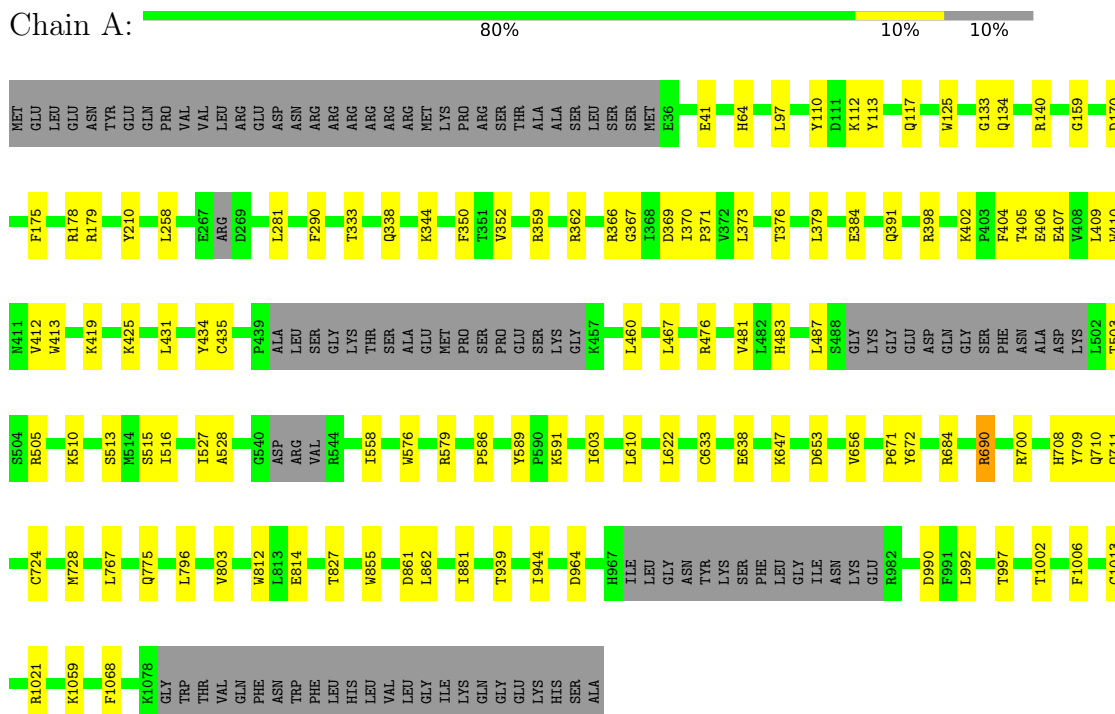
- Molecule 2 is a protein called Phosphoinositide 3-kinase regulatory subunit 6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	558	4436	2831	765	818	22	0	0	0
2	D	558	4436	2831	765	818	22	0	0	0
2	F	558	4436	2831	765	818	22	0	0	0
2	H	558	4436	2831	765	818	22	0	0	0

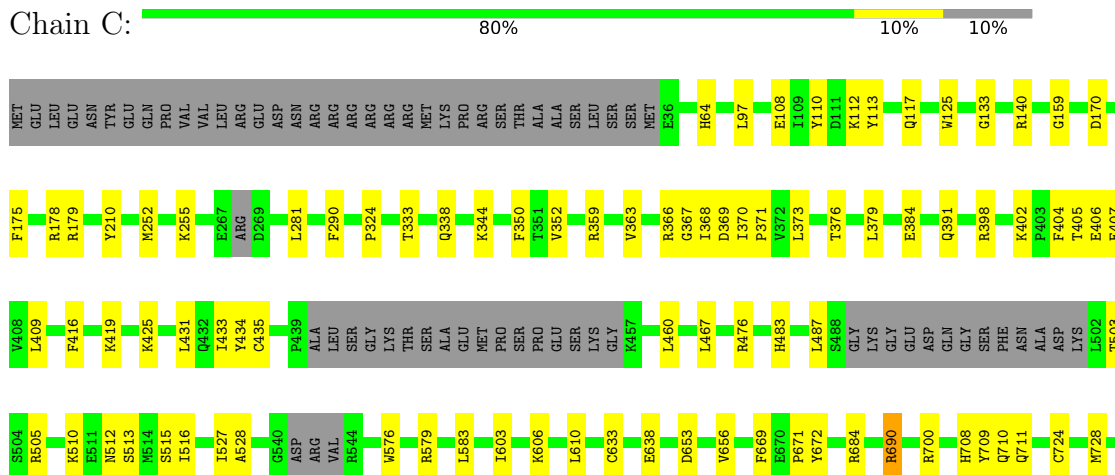
3 Residue-property plots [i](#)

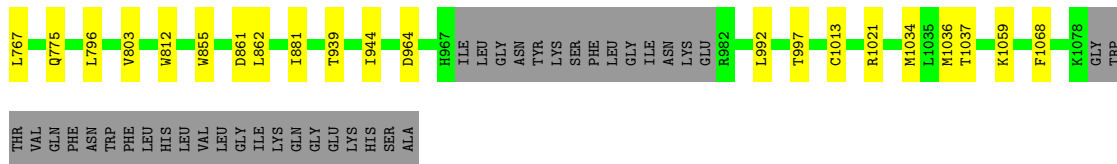
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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. 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: Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit gamma isoform



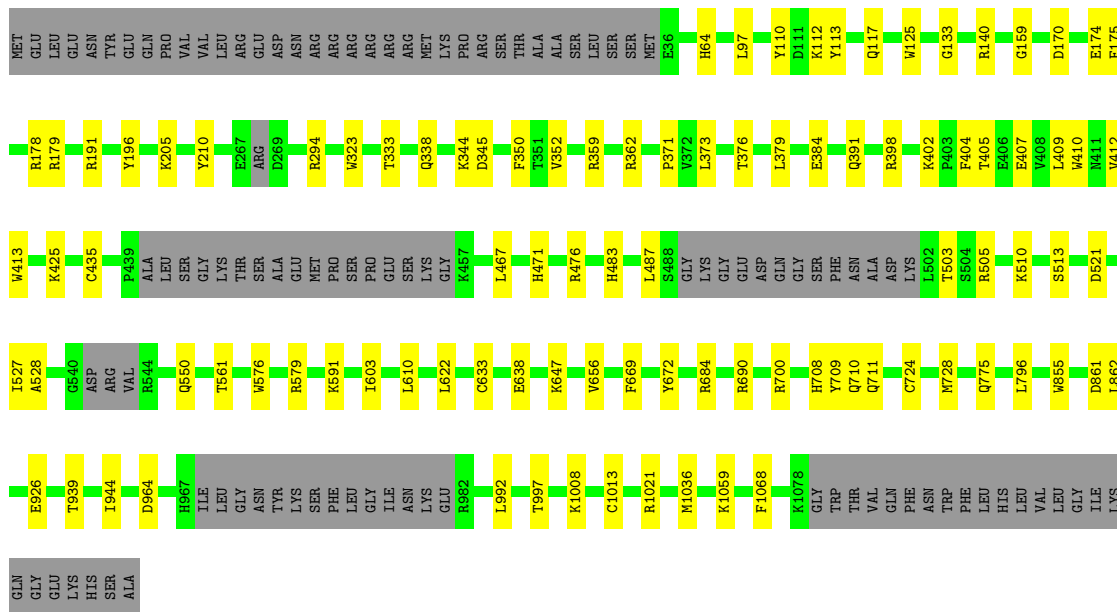
- Molecule 1: Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit gamma isoform





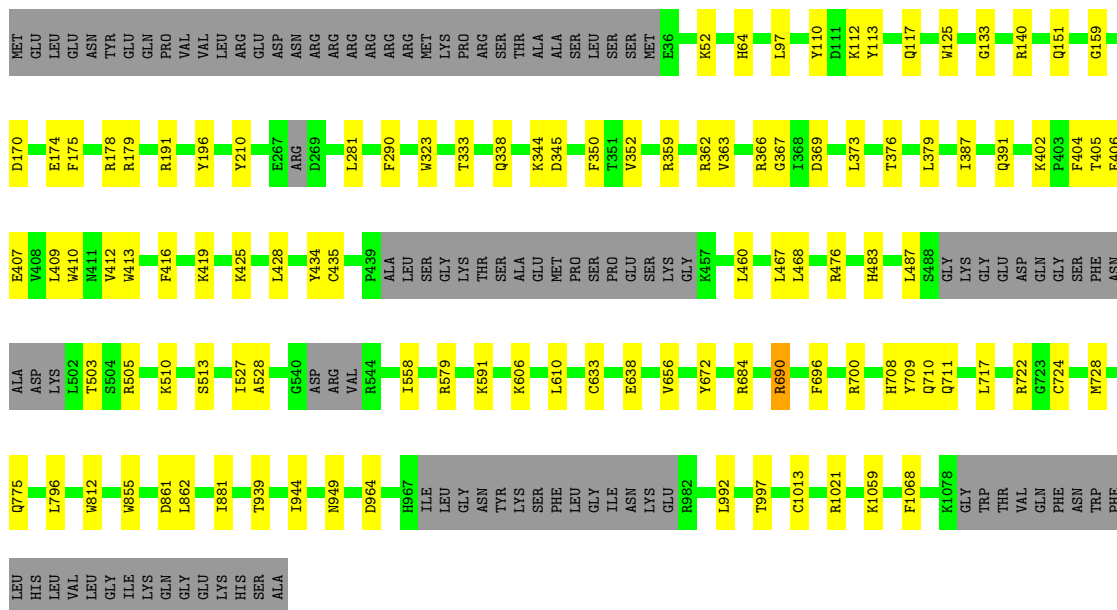
● Molecule 1: Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit gamma isoform

Chain E: 81% 9% 10%

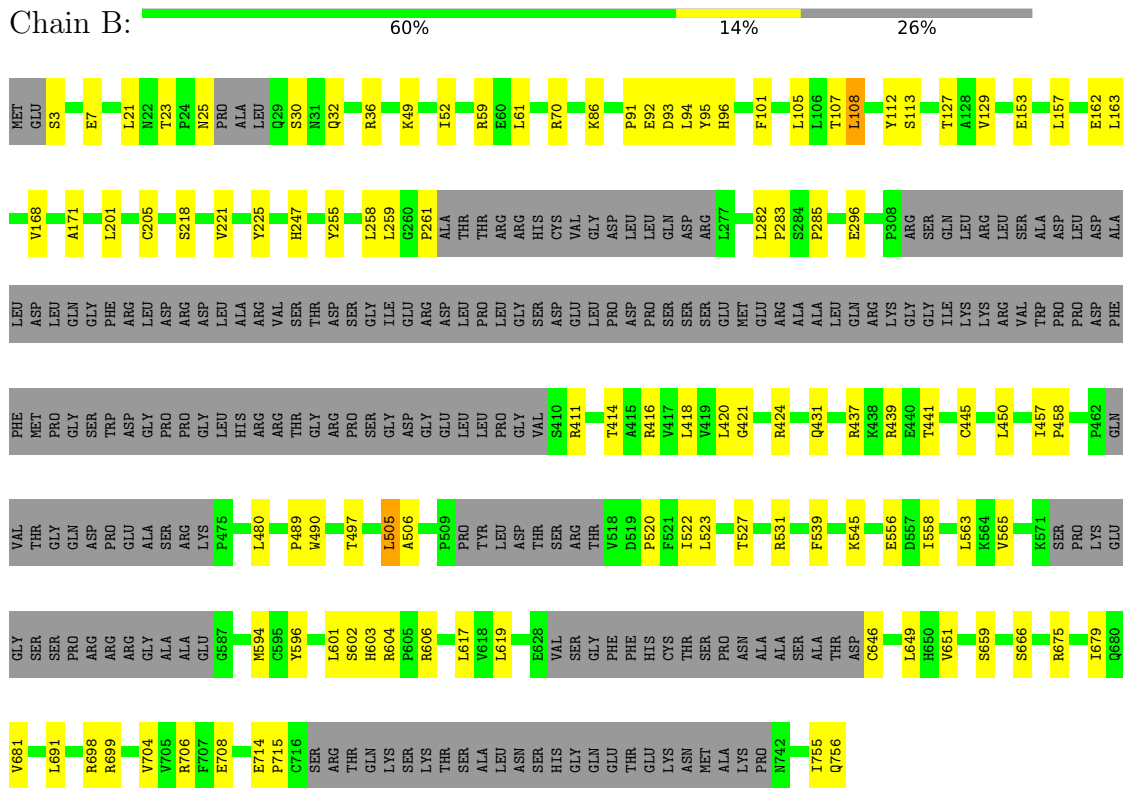


● Molecule 1: Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit gamma isoform

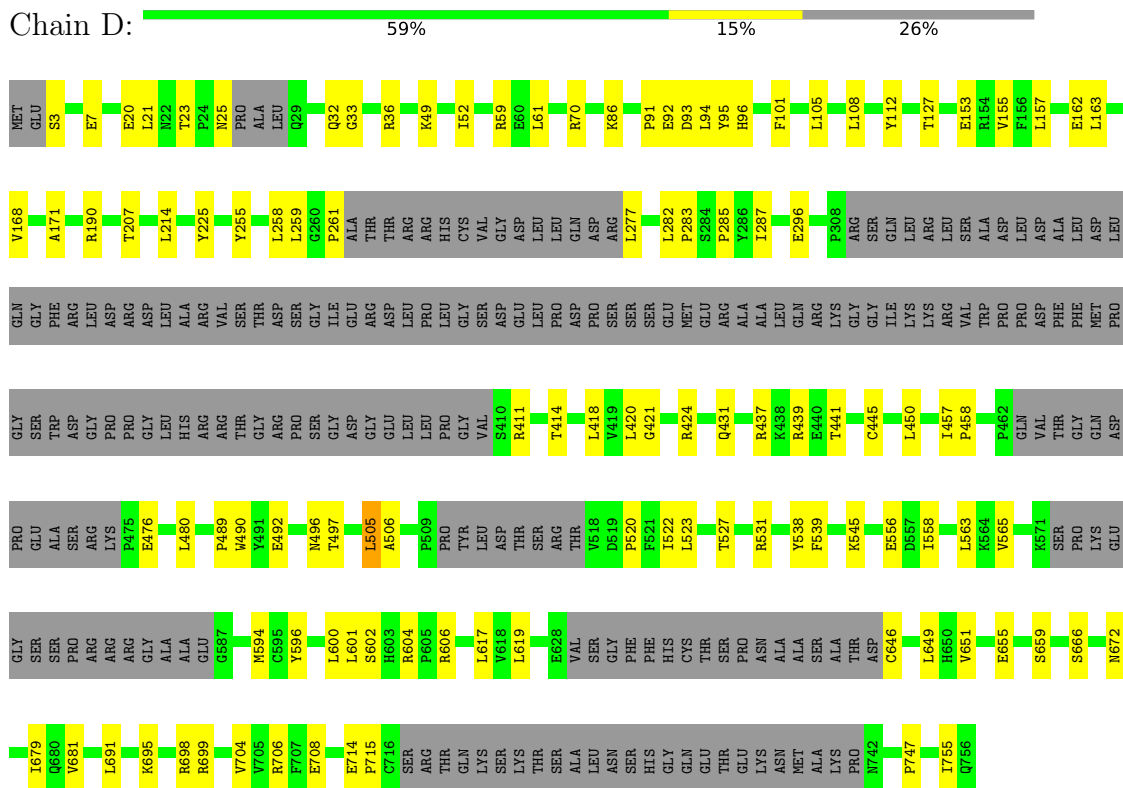
Chain G: 81% 9% 10%



● Molecule 2: Phosphoinositide 3-kinase regulatory subunit 6



● Molecule 2: Phosphoinositide 3-kinase regulatory subunit 6



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	322.35Å 166.60Å 255.79Å 90.00° 114.02° 90.00°	Depositor
Resolution (Å)	90.29 – 8.50 90.29 – 8.50	Depositor EDS
% Data completeness (in resolution range)	97.6 (90.29-8.50) 94.0 (90.29-8.50)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	0.12	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.75 (at 8.41Å)	Xtrriage
Refinement program	PHENIX 1.19.1_4122	Depositor
R, R_{free}	0.280 , 0.340 0.280 , 0.343	Depositor DCC
R_{free} test set	1084 reflections (9.89%)	wwPDB-VP
Wilson B-factor (Å ²)	449.1	Xtrriage
Anisotropy	0.200	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 613.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.73	EDS
Total number of atoms	50008	wwPDB-VP
Average B, all atoms (Å ²)	545.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 40.07 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.8875e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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	0.29	0/8247	0.50	1/11169 (0.0%)
1	C	0.28	0/8247	0.50	0/11169
1	E	0.27	0/8247	0.49	0/11169
1	G	0.28	0/8247	0.49	0/11169
2	B	0.28	0/4522	0.53	1/6136 (0.0%)
2	D	0.30	0/4522	0.54	0/6136
2	F	0.28	0/4522	0.54	2/6136 (0.0%)
2	H	0.28	0/4522	0.54	2/6136 (0.0%)
All	All	0.28	0/51076	0.51	6/69220 (0.0%)

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	108	LEU	CB-CG-CD1	8.02	124.63	111.00
2	H	108	LEU	CA-CB-CG	7.74	133.10	115.30
2	B	108	LEU	CA-CB-CG	7.37	132.25	115.30
2	F	108	LEU	CA-CB-CG	7.06	131.53	115.30
1	A	258	LEU	CB-CG-CD2	-5.90	100.97	111.00

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	8066	0	8121	86	0
1	C	8066	0	8121	84	0
1	E	8066	0	8121	68	0
1	G	8066	0	8121	79	0
2	B	4436	0	4519	88	1
2	D	4436	0	4519	88	0
2	F	4436	0	4519	72	1
2	H	4436	0	4519	84	0
All	All	50008	0	50560	562	1

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 6.

The worst 5 of 562 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:359:ARG:HH12	2:F:108:LEU:HG	1.10	1.15
1:C:359:ARG:HH12	2:D:108:LEU:HD23	1.22	1.04
1:C:513:SER:O	2:D:604:ARG:NH2	1.97	0.98
1:E:359:ARG:NH1	2:F:108:LEU:HG	1.85	0.92
1:E:505:ARG:HH12	1:E:710:GLN:HG2	1.36	0.90

All (1) 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)
2:B:30:SER:OG	2:F:30:SER:OG[2_555]	2.16	0.04

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	983/1102 (89%)	967 (98%)	15 (2%)	1 (0%)	51	86
1	C	983/1102 (89%)	967 (98%)	15 (2%)	1 (0%)	51	86
1	E	983/1102 (89%)	967 (98%)	15 (2%)	1 (0%)	51	86
1	G	983/1102 (89%)	967 (98%)	15 (2%)	1 (0%)	51	86
2	B	540/756 (71%)	530 (98%)	10 (2%)	0	100	100
2	D	540/756 (71%)	530 (98%)	10 (2%)	0	100	100
2	F	540/756 (71%)	530 (98%)	10 (2%)	0	100	100
2	H	540/756 (71%)	530 (98%)	10 (2%)	0	100	100
All	All	6092/7432 (82%)	5988 (98%)	100 (2%)	4 (0%)	51	86

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	964	ASP
1	C	964	ASP
1	E	964	ASP
1	G	964	ASP

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	897/988 (91%)	894 (100%)	3 (0%)	92	95
1	C	897/988 (91%)	894 (100%)	3 (0%)	92	95
1	E	897/988 (91%)	894 (100%)	3 (0%)	92	95
1	G	897/988 (91%)	894 (100%)	3 (0%)	92	95
2	B	500/665 (75%)	496 (99%)	4 (1%)	81	89
2	D	500/665 (75%)	496 (99%)	4 (1%)	81	89
2	F	500/665 (75%)	496 (99%)	4 (1%)	81	89
2	H	500/665 (75%)	496 (99%)	4 (1%)	81	89
All	All	5588/6612 (84%)	5560 (100%)	28 (0%)	88	93

5 of 28 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	404	PHE
2	H	505	LEU
2	F	3	SER
2	H	3	SER
1	E	690	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	117	GLN
1	G	64	HIS
1	C	391	GLN
1	E	391	GLN
1	C	117	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 monosaccharides 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

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.