



# Full wwPDB X-ray Structure Validation Report ⓘ

May 21, 2020 – 04:26 am BST

PDB ID : 1X11  
Title : X11 PTB DOMAIN  
Authors : Lee, C.-H.; Zhang, Z.; Kuriyan, J.  
Deposited on : 1997-07-28  
Resolution : 2.50 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](mailto: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.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
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

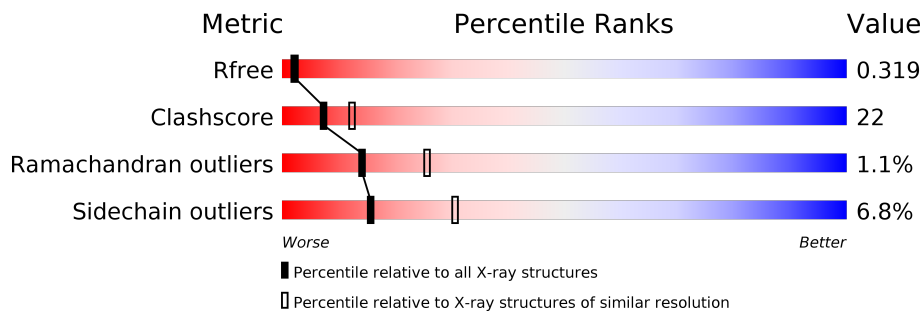
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)

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  $\geq 3$ , 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	172	48% (green), 27% (yellow), 22% (grey)
1	B	172	38% (green), 29% (yellow), 29% (grey)
2	C	13	62% (green), 31% (yellow), 8% (grey)
2	D	13	62% (green), 38% (yellow)

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 3196 atoms, of which 814 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 X11.

Mol	Chain	Residues	Atoms							ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S	Se			
1	A	135	1288	661	237	180	200	1	9	0	0	0
1	B	122	1151	602	204	161	175	1	8	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	354	MSE	MET	MODIFIED RESIDUE	UNP Q02410
A	355	MSE	MET	MODIFIED RESIDUE	UNP Q02410
A	366	MSE	MET	MODIFIED RESIDUE	UNP Q02410
A	385	MSE	MET	MODIFIED RESIDUE	UNP Q02410
A	408	MSE	MET	MODIFIED RESIDUE	UNP Q02410
A	409	MSE	MET	MODIFIED RESIDUE	UNP Q02410
A	429	MSE	MET	MODIFIED RESIDUE	UNP Q02410
A	458	MSE	MET	MODIFIED RESIDUE	UNP Q02410
B	354	MSE	MET	MODIFIED RESIDUE	UNP Q02410
B	355	MSE	MET	MODIFIED RESIDUE	UNP Q02410
B	366	MSE	MET	MODIFIED RESIDUE	UNP Q02410
B	385	MSE	MET	MODIFIED RESIDUE	UNP Q02410
B	408	MSE	MET	MODIFIED RESIDUE	UNP Q02410
B	409	MSE	MET	MODIFIED RESIDUE	UNP Q02410
B	429	MSE	MET	MODIFIED RESIDUE	UNP Q02410
B	458	MSE	MET	MODIFIED RESIDUE	UNP Q02410

- Molecule 2 is a protein called 13-MER PEPTIDE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
2	C	12	132	71	25	16	20	0	0	0
2	D	13	142	76	26	17	23	0	0	0

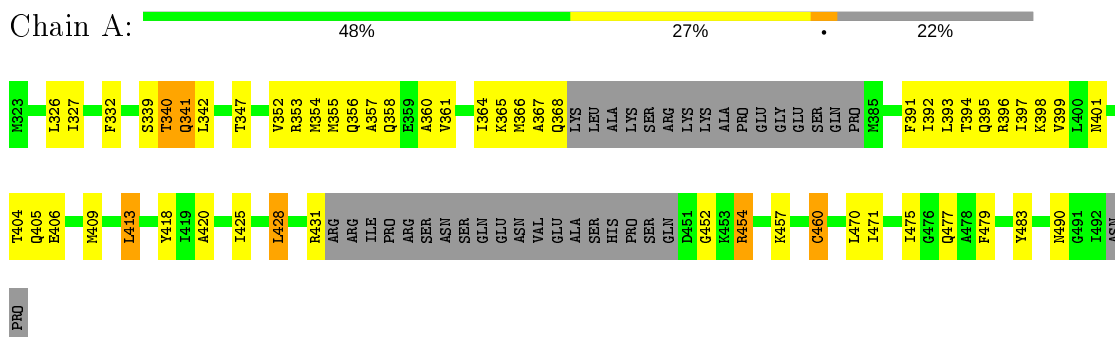
- Molecule 3 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	83	Total	H	O	0	0
			249	166	83		
3	C	8	Total	H	O	0	0
			24	16	8		
3	B	55	Total	H	O	0	0
			165	110	55		
3	D	15	Total	H	O	0	0
			45	30	15		

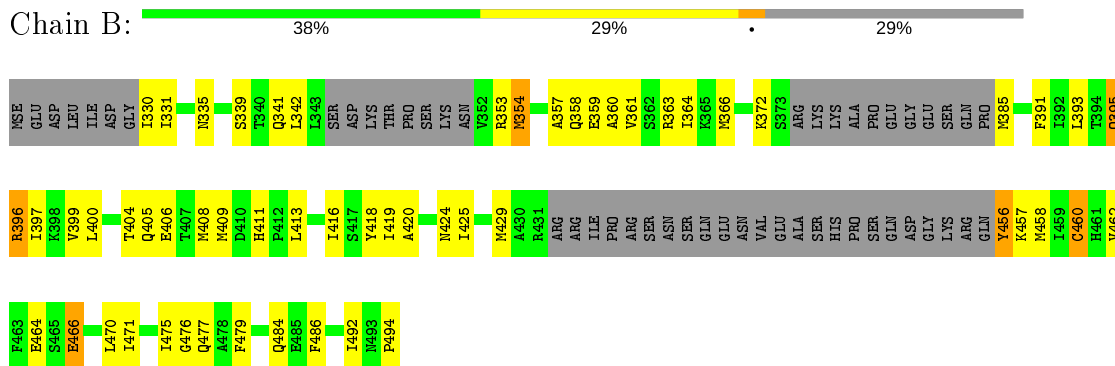
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: X11



- Molecule 1: X11



- Molecule 2: 13-MER PEPTIDE



- Molecule 2: 13-MER PEPTIDE



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	74.60Å 74.60Å 155.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	6.00 – 2.50 15.00 – 2.40	Depositor EDS
% Data completeness (in resolution range)	82.7 (6.00-2.50) 92.3 (15.00-2.40)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.05	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.13 (at 2.39Å)	Xtrriage
Refinement program	X-PLOR 3.8	Depositor
R, $R_{free}$	0.214 , 0.304 0.235 , 0.319	Depositor DCC
$R_{free}$ test set	1638 reflections (9.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	45.9	Xtrriage
Anisotropy	0.026	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.25 , 69.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.88	EDS
Total number of atoms	3196	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	32.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.87% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>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	0.96	1/1054 (0.1%)	0.75	0/1406
1	B	1.00	3/949 (0.3%)	0.74	0/1267
2	C	0.52	0/111	0.58	0/149
2	D	0.60	0/120	0.68	0/161
All	All	0.95	4/2234 (0.2%)	0.73	0/2983

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	460	CYS	CB-SG	-22.65	1.43	1.82
1	A	460	CYS	CB-SG	-22.53	1.44	1.82
1	B	354	MSE	CG-SE	-5.18	1.77	1.95
1	B	385	MSE	CG-SE	-5.10	1.78	1.95

There are no bond angle outliers.

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	1051	237	1052	54	0
1	B	947	204	950	42	0
2	C	107	25	94	7	0
2	D	116	26	100	4	0
3	A	83	166	0	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	55	110	0	2	0
3	C	8	16	0	1	0
3	D	15	30	0	0	0
All	All	2382	814	2196	99	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 22.

All (99) 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:393:LEU:HD21	1:B:396:ARG:HG2	1.56	0.87
1:B:429:MSE:HB3	1:B:458:MSE:HE1	1.60	0.81
1:A:397:ILE:HG21	1:A:428:LEU:HD11	1.63	0.80
1:B:391:PHE:CE2	1:B:393:LEU:HD22	2.17	0.80
1:A:395:GLN:HE21	1:A:396:ARG:NH1	1.87	0.72
1:A:413:LEU:HD11	1:A:479:PHE:HD1	1.53	0.72
1:B:492:ILE:O	1:B:494:PRO:HD3	1.90	0.72
1:B:393:LEU:HG	1:B:395:GLN:H	1.55	0.71
1:A:352:VAL:O	1:A:356:GLN:HG3	1.89	0.71
1:A:395:GLN:HE21	1:A:396:ARG:HH12	1.40	0.68
1:B:393:LEU:HD23	1:B:396:ARG:O	1.94	0.68
1:B:466:GLU:CD	1:B:466:GLU:H	1.94	0.68
1:A:332:PHE:CE1	1:A:470:LEU:HD23	2.29	0.67
1:B:360:ALA:O	1:B:364:ILE:HG12	1.97	0.64
1:A:413:LEU:HD11	1:A:479:PHE:CD1	2.33	0.64
1:B:418:TYR:OH	2:D:3:GLY:HA3	2.00	0.62
1:A:342:LEU:O	1:A:457:LYS:HD3	2.01	0.61
1:A:332:PHE:HE1	1:A:470:LEU:HD23	1.64	0.61
1:A:454:ARG:H	1:A:454:ARG:HD3	1.65	0.60
1:B:341:GLN:HB3	1:B:456:TYR:HB2	1.83	0.60
2:C:1:GLN:NE2	1:B:477:GLN:HE21	1.99	0.60
1:A:327:ILE:O	1:A:393:LEU:HD11	2.03	0.59
1:A:395:GLN:NE2	1:A:396:ARG:HH12	1.99	0.59
1:A:361:VAL:HG12	1:A:365:LYS:HE2	1.85	0.59
1:A:471:ILE:O	1:A:475:ILE:HG13	2.03	0.59
1:B:418:TYR:CE2	1:B:420:ALA:HB2	2.39	0.57
1:B:339:SER:HB2	1:B:460:CYS:O	2.06	0.56
1:B:353:ARG:HH12	1:B:458:MSE:HE2	1.70	0.56
1:B:396:ARG:O	1:B:397:ILE:HD13	2.07	0.55
1:B:364:ILE:HG13	1:B:462:VAL:HG21	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:431:ARG:HB3	2:C:9:TYR:CE2	2.42	0.54
2:D:10:LYS:HE2	2:D:11:PHE:CE1	2.43	0.54
1:A:399:VAL:HG21	1:A:409:MSE:HE2	1.89	0.53
1:A:366:MSE:HB3	3:A:118:HOH:O	2.09	0.52
2:C:10:LYS:HB2	3:C:17:HOH:O	2.08	0.52
1:A:355:MSE:HA	1:A:358:GLN:HE21	1.74	0.52
1:B:404:THR:OG1	1:B:406:GLU:HB3	2.10	0.51
1:B:354:MSE:HE2	1:B:418:TYR:OH	2.10	0.51
1:A:477:GLN:NE2	3:A:89:HOH:O	2.43	0.51
1:B:425:ILE:HD12	1:B:464:GLU:HG3	1.92	0.51
1:A:355:MSE:HA	1:A:358:GLN:NE2	2.26	0.50
1:A:364:ILE:O	1:A:368:GLN:HG3	2.12	0.49
1:A:357:ALA:O	1:A:360:ALA:HB3	2.12	0.49
1:A:454:ARG:N	1:A:454:ARG:HD3	2.28	0.49
1:A:391:PHE:HB3	1:A:398:LYS:HB2	1.94	0.48
1:B:396:ARG:HB2	1:B:411:HIS:O	2.13	0.48
1:B:357:ALA:O	1:B:361:VAL:HG23	2.13	0.48
1:A:365:LYS:HE3	1:B:470:LEU:HD23	1.95	0.48
1:B:359:GLU:O	1:B:363:ARG:HG2	2.13	0.48
1:A:340:THR:CG2	1:A:341:GLN:N	2.76	0.47
1:B:399:VAL:O	1:B:408:MSE:HB2	2.14	0.47
1:A:326:LEU:O	1:A:394:THR:HG23	2.13	0.47
1:A:353:ARG:HD3	1:A:418:TYR:CD1	2.49	0.47
1:A:401:ASN:O	1:A:405:GLN:N	2.46	0.47
1:A:454:ARG:O	1:A:454:ARG:HG2	2.13	0.47
1:B:425:ILE:CD1	1:B:464:GLU:HG3	2.45	0.47
1:B:458:MSE:HB3	1:B:458:MSE:HE3	1.76	0.46
1:A:418:TYR:CE2	1:A:420:ALA:HB2	2.51	0.46
1:A:341:GLN:HG3	1:A:457:LYS:HD2	1.98	0.46
1:A:341:GLN:CG	1:A:457:LYS:HD2	2.47	0.45
1:A:401:ASN:HB3	1:A:404:THR:OG1	2.17	0.45
1:A:413:LEU:HD13	1:A:413:LEU:O	2.17	0.45
1:B:400:LEU:HD23	1:B:405:GLN:O	2.16	0.45
1:B:476:GLY:O	1:B:479:PHE:HB2	2.17	0.45
1:A:395:GLN:NE2	1:A:396:ARG:NH1	2.59	0.44
1:A:353:ARG:HD3	1:A:418:TYR:CG	2.52	0.44
1:B:353:ARG:HH11	1:B:429:MSE:SE	2.50	0.44
1:A:483:TYR:HA	2:C:8:THR:OG1	2.17	0.44
1:B:484:GLN:O	1:B:494:PRO:HG3	2.18	0.44
1:A:413:LEU:HA	1:A:413:LEU:HD22	1.86	0.43
1:B:413:LEU:HD23	1:B:416:ILE:HD12	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:360:ALA:O	1:A:364:ILE:HG12	2.17	0.43
1:A:361:VAL:CG1	1:A:365:LYS:HE2	2.48	0.43
1:B:330:ILE:C	1:B:331:ILE:HG13	2.39	0.43
1:B:364:ILE:HG13	1:B:462:VAL:CG2	2.47	0.43
1:A:431:ARG:HB3	2:C:9:TYR:HE2	1.82	0.43
1:B:405:GLN:HA	1:B:405:GLN:NE2	2.34	0.43
1:B:361:VAL:HG22	1:B:425:ILE:HG21	1.99	0.43
1:A:392:ILE:HG12	1:A:475:ILE:HG12	1.99	0.42
1:A:425:ILE:HD11	3:A:76:HOH:O	2.18	0.42
1:A:393:LEU:HG	1:A:395:GLN:HG2	2.02	0.42
1:B:397:ILE:HD11	1:B:413:LEU:HD21	2.01	0.42
1:B:393:LEU:HB2	3:B:111:HOH:O	2.20	0.42
2:D:4:TYR:N	2:D:4:TYR:CD1	2.88	0.42
1:B:399:VAL:HG21	1:B:409:MSE:HE2	2.01	0.42
1:A:399:VAL:HB	1:A:409:MSE:HB2	2.02	0.42
1:A:431:ARG:HB3	2:C:9:TYR:OH	2.20	0.42
1:B:486:PHE:HB2	3:B:137:HOH:O	2.19	0.41
1:B:424:ASN:C	1:B:425:ILE:HD12	2.41	0.41
2:D:12:PHE:N	2:D:12:PHE:CD1	2.88	0.41
1:B:424:ASN:OD1	1:B:424:ASN:N	2.54	0.41
1:A:347:THR:HG22	3:A:44:HOH:O	2.20	0.41
1:A:393:LEU:HB3	1:A:396:ARG:H	1.85	0.41
1:A:354:MSE:O	1:A:358:GLN:HG3	2.20	0.41
1:A:339:SER:HA	1:A:460:CYS:O	2.21	0.41
1:A:354:MSE:HE2	1:A:418:TYR:OH	2.21	0.40
1:B:471:ILE:O	1:B:475:ILE:HG13	2.20	0.40
1:A:452:GLY:HA2	2:C:10:LYS:HG2	2.02	0.40
1:A:326:LEU:O	1:A:393:LEU:HD12	2.22	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	129/172 (75%)	120 (93%)	8 (6%)	1 (1%)	19	35
1	B	114/172 (66%)	107 (94%)	5 (4%)	2 (2%)	8	14
2	C	10/13 (77%)	9 (90%)	1 (10%)	0	100	100
2	D	11/13 (85%)	11 (100%)	0	0	100	100
All	All	264/370 (71%)	247 (94%)	14 (5%)	3 (1%)	14	26

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	457	LYS
1	A	367	ALA
1	B	372	LYS

### 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	113/140 (81%)	106 (94%)	7 (6%)	18	35
1	B	100/140 (71%)	91 (91%)	9 (9%)	9	19
2	C	11/12 (92%)	11 (100%)	0	100	100
2	D	12/12 (100%)	12 (100%)	0	100	100
All	All	236/304 (78%)	220 (93%)	16 (7%)	16	30

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	340	THR
1	A	341	GLN
1	A	406	GLU
1	A	413	LEU
1	A	428	LEU
1	A	454	ARG
1	A	490	ASN
1	B	335	ASN

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Mol	Chain	Res	Type
1	B	342	LEU
1	B	358	GLN
1	B	366	MSE
1	B	395	GLN
1	B	396	ARG
1	B	419	ILE
1	B	456	TYR
1	B	466	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	358	GLN
1	A	395	GLN
1	A	477	GLN
1	A	490	ASN
2	C	1	GLN
1	B	341	GLN
1	B	358	GLN
1	B	469	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

### 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.