# Full wwPDB NMR Structure Validation Report (i)

Feb 12, 2022 – 05:42 PM EST

| | | |
|---|---|---|
| PDB ID | : | 1GYF |
| Title | : | GYF DOMAIN FROM HUMAN CD2BP2 PROTEIN |
| Authors | : | Freund, C.; Doetsch, V.; Nishizawa, K.; Reinherz, E.L.; Wagner, G. |
| Deposited on | : | 1999-04-30 |

This is a Full wwPDB NMR 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/NMRValidationReportHelp
with specific help available everywhere you see the (i) symbol.

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

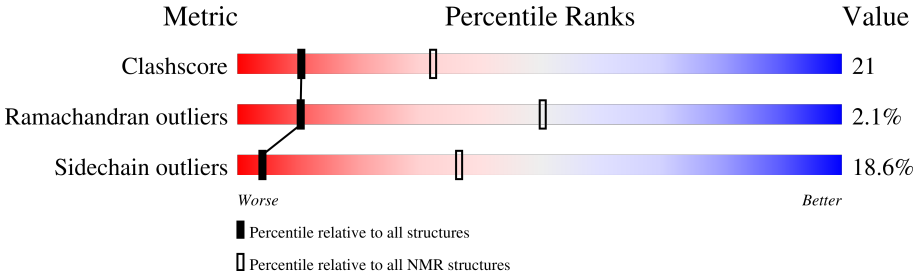
| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| RCI | : | v_1n_11_5_13_A (Berjanski et al., 2005) |
| PANAV | : | Wang et al. (2010) |
| ShiftChecker | : | 2.26 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.26 |

# 1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
*SOLUTION NMR*

The overall completeness of chemical shifts assignment was not calculated.

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) | NMR archive (#Entries) |
|---|---|---|
| Clashscore | 158937 | 12864 |
| Ramachandran outliers | 154571 | 11451 |
| Sidechain outliers | 154315 | 11428 |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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 <=5%

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 62 | 44% 44% 13% |

# 2 Ensemble composition and analysis (i)

This entry contains 16 models. Model 14 is the overall representative, medoid model (most similar to other models). The authors have identified model 6 as representative.

The following residues are included in the computation of the global validation metrics.

| Well-defined (core) protein residues | | | |
|---|---|---|---|
| **Well-defined core** | **Residue range (total)** | **Backbone RMSD (Å)** | **Medoid model** |
| 1 | A:26-A:67, A:75-A:86 (54) | 0.22 | 14 |

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 2 clusters and 1 single-model cluster was found.

| Cluster number | Models |
|---|---|
| 1 | 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15, 16 |
| 2 | 9, 13 |
| Single-model clusters | 5 |

# 3 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 982 atoms, of which 464 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2)).

| Mol | Chain | Residues | Atoms | | | | | | Trace |
|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | H | N | O | S | |
| 1 | A | 62 | 982 | 335 | 464 | 79 | 101 | 3 | 0 |

# 4 Residue-property plots (i)

## 4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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 outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 44% 44% 13%

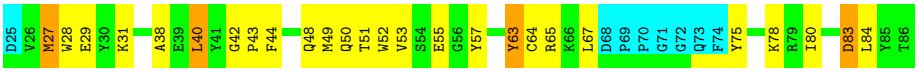
## 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

### 4.2.1 Score per residue for model 1

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 45% 35% 6% 13%




### 4.2.2 Score per residue for model 2

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 40% 37% 8% • 13%

### 4.2.3 Score per residue for model 3

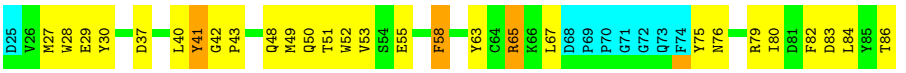
• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 45% 37% 5% 13%

### 4.2.4 Score per residue for model 4

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

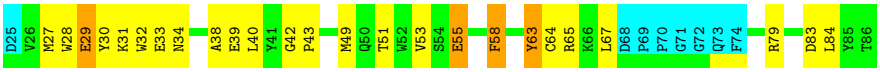
Chain A: 42% 40% 5% 13%




### 4.2.5 Score per residue for model 5

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 47% 34% 6% 13%




### 4.2.6 Score per residue for model 6

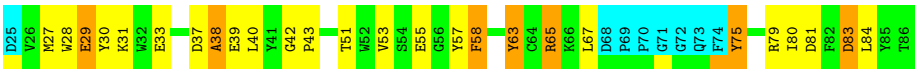
• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 42% 39% 6% 13%

### 4.2.7 Score per residue for model 7

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 45% 31% 11% 13%



### 4.2.8 Score per residue for model 8

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 44% 37% 6% 13%

D25 V26 M27 W28 E29 Y30 E33 L40 Y41 G42 P43 F44 Q48 M49 Q50 T51 W52 V53 S54 E55 G56 Y57 F58 Y63 C64 R65 K66 L67 D68 P69 P70 G71 G72 Q73 F74 K78 R79 I80 D83 L84 Y85 T86

### 4.2.9 Score per residue for model 9

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 42% 40% 5% 13%

D25 V26 M27 W28 E29 Y30 K31 A38 E39 L40 Y41 G42 P43 F44 T45 S46 A47 Q48 M49 Q50 T51 W52 V53 S54 E55 F58 Y63 C64 R65 K66 L67 D68 P69 P70 G71 G72 Q73 F74 R79 I80 D83 L84 Y85 T86

### 4.2.10 Score per residue for model 10

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 45% 37% 5% 13%

D25 V26 M27 W28 E29 Y30 K31 A38 E39 L40 Y41 G42 P43 S46 Q50 T51 S54 E55 G56 Y57 G61 V62 Y63 K66 L67 D68 P69 P70 G71 G72 Q73 F74 K78 R79 I80 D81 F82 D83 L84 Y85 T86

### 4.2.11 Score per residue for model 11

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 47% 29% 11% 13%

D25 V26 M27 W28 E29 Y30 K31 N34 A38 E39 L40 Y41 G42 P43 Q48 T51 W52 V53 S54 E55 F58 Y63 C64 R65 K66 L67 D68 P69 P70 G71 G72 Q73 F74 Y75 N76 S77 K78 D83 L84 Y85 T86

### 4.2.12 Score per residue for model 12

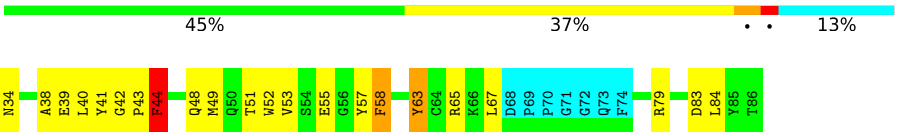
• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 40% 37% 8% • 13%

D25 V26 M27 W28 E29 Y30 K31 A38 E39 L40 Y41 G42 P43 F44 T45 S46 T51 W52 V53 S54 E55 F58 Y63 C64 R65 K66 L67 D68 P69 P70 G71 G72 Q73 F74 Y75 K78 R79 I80 D83 L84 Y85 T86

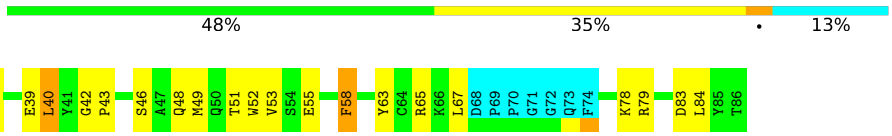
### 4.2.13 Score per residue for model 13

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 

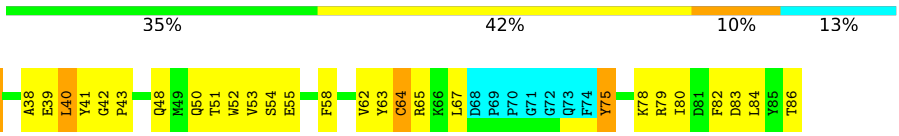

### 4.2.14 Score per residue for model 14 (medoid)

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 

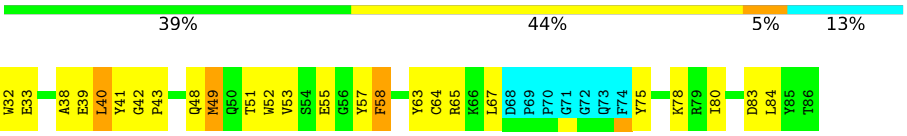

### 4.2.15 Score per residue for model 15

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 


### 4.2.16 Score per residue for model 16

• Molecule 1: PROTEIN (CYTOPLASMIC DOMAIN BINDING PROTEIN (CD2BP2))

Chain A: 

# 5 Refinement protocol and experimental data overview (i)

The models were refined using the following method: *distance geometry*.

Of the 30 calculated structures, 16 were deposited, based on the following criterion: *LEAST RESTRAINT VIOLATIONS, LEAST ENERGY FUNCTION*.

The following table shows the software used for structure solution, optimisation and refinement.

| Software name | Classification | Version |
|---|---|---|
| X-PLOR | refinement | 3.851 |
| XEASY | structure solution | |
| DYANA | structure solution | |
| X-PLOR | structure solution | |

No chemical shift data was provided.

# 6 Model quality (i)

## 6.1 Standard geometry (i)

There are no covalent bond-length or bond-angle outliers.

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 6.2 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 each 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 averaged over the ensemble.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes |
|---|---|---|---|---|---|
| 1 | A | 460 | 417 | 417 | 18±2 |
| All | All | 7360 | 6672 | 6672 | 295 |

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 21.

All unique clashes are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Clash(Å) | Distance(Å) | Models | |
|---|---|---|---|---|---|
| | | | | Worst | Total |
| 1:A:83:ASP:O | 1:A:84:LEU:HD23 | 0.74 | 1.82 | 4 | 16 |
| 1:A:28:TRP:O | 1:A:67:LEU:HD21 | 0.72 | 1.84 | 1 | 16 |
| 1:A:42:GLY:N | 1:A:43:PRO:CD | 0.69 | 2.55 | 13 | 16 |
| 1:A:29:GLU:CD | 1:A:40:LEU:HD11 | 0.65 | 2.12 | 2 | 3 |
| 1:A:43:PRO:HA | 1:A:67:LEU:HD11 | 0.65 | 1.67 | 13 | 2 |
| 1:A:31:LYS:HD2 | 1:A:38:ALA:HB3 | 0.63 | 1.69 | 13 | 8 |
| 1:A:29:GLU:OE2 | 1:A:67:LEU:HD23 | 0.63 | 1.93 | 12 | 1 |
| 1:A:75:TYR:HB3 | 1:A:80:ILE:HD11 | 0.63 | 1.70 | 7 | 7 |
| 1:A:31:LYS:HD3 | 1:A:38:ALA:HB3 | 0.58 | 1.76 | 6 | 5 |
| 1:A:27:MET:CB | 1:A:67:LEU:HD12 | 0.58 | 2.28 | 4 | 9 |
| 1:A:49:MET:O | 1:A:53:VAL:HG23 | 0.58 | 1.98 | 16 | 10 |
| 1:A:30:TYR:N | 1:A:41:TYR:O | 0.57 | 2.36 | 13 | 7 |
| 1:A:51:THR:O | 1:A:55:GLU:N | 0.56 | 2.38 | 8 | 16 |
| 1:A:27:MET:HB3 | 1:A:67:LEU:HD12 | 0.55 | 1.78 | 4 | 6 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Clash(Å) | Distance(Å) | Models | |
|---|---|---|---|---|---|
| | | | | Worst | Total |
| 1:A:29:GLU:OE1 | 1:A:40:LEU:HD13 | 0.55 | 2.02 | 1 | 1 |
| 1:A:29:GLU:OE1 | 1:A:40:LEU:HD23 | 0.55 | 2.01 | 15 | 1 |
| 1:A:53:VAL:HG22 | 1:A:58:PHE:CD2 | 0.53 | 2.39 | 8 | 9 |
| 1:A:28:TRP:CZ3 | 1:A:80:ILE:HD13 | 0.52 | 2.38 | 16 | 3 |
| 1:A:28:TRP:O | 1:A:42:GLY:O | 0.51 | 2.27 | 14 | 15 |
| 1:A:27:MET:CG | 1:A:67:LEU:HD12 | 0.51 | 2.35 | 2 | 2 |
| 1:A:30:TYR:CD2 | 1:A:42:GLY:CA | 0.50 | 2.95 | 6 | 11 |
| 1:A:86:THR:HG23 | 1:A:86:THR:O | 0.50 | 2.06 | 4 | 2 |
| 1:A:29:GLU:CD | 1:A:67:LEU:HD22 | 0.50 | 2.28 | 8 | 4 |
| 1:A:53:VAL:HG22 | 1:A:58:PHE:HD2 | 0.49 | 1.66 | 8 | 3 |
| 1:A:58:PHE:N | 1:A:58:PHE:CD1 | 0.49 | 2.80 | 12 | 2 |
| 1:A:31:LYS:NZ | 1:A:38:ALA:HB3 | 0.49 | 2.23 | 10 | 1 |
| 1:A:27:MET:HG2 | 1:A:67:LEU:HD12 | 0.48 | 1.84 | 11 | 2 |
| 1:A:81:ASP:OD2 | 1:A:84:LEU:HD11 | 0.48 | 2.09 | 7 | 1 |
| 1:A:64:CYS:CB | 1:A:80:ILE:HD12 | 0.47 | 2.39 | 8 | 3 |
| 1:A:29:GLU:N | 1:A:65:ARG:O | 0.47 | 2.47 | 3 | 6 |
| 1:A:61:GLY:O | 1:A:62:VAL:HG13 | 0.47 | 2.10 | 10 | 1 |
| 1:A:48:GLN:CG | 1:A:52:TRP:CZ3 | 0.47 | 2.98 | 16 | 8 |
| 1:A:31:LYS:CD | 1:A:38:ALA:HB3 | 0.46 | 2.41 | 11 | 5 |
| 1:A:34:ASN:ND2 | 1:A:63:TYR:CE2 | 0.46 | 2.84 | 5 | 1 |
| 1:A:42:GLY:N | 1:A:43:PRO:HD2 | 0.45 | 2.26 | 2 | 13 |
| 1:A:44:PHE:CD2 | 1:A:52:TRP:CZ3 | 0.45 | 3.04 | 1 | 3 |
| 1:A:29:GLU:CD | 1:A:40:LEU:HD12 | 0.45 | 2.32 | 8 | 1 |
| 1:A:58:PHE:CD1 | 1:A:58:PHE:N | 0.45 | 2.83 | 5 | 6 |
| 1:A:39:GLU:CB | 1:A:41:TYR:CZ | 0.45 | 3.00 | 10 | 1 |
| 1:A:32:TRP:CH2 | 1:A:58:PHE:CD1 | 0.45 | 3.04 | 5 | 2 |
| 1:A:29:GLU:O | 1:A:64:CYS:HA | 0.45 | 2.12 | 16 | 4 |
| 1:A:48:GLN:CG | 1:A:52:TRP:CH2 | 0.44 | 3.00 | 6 | 4 |
| 1:A:44:PHE:CD1 | 1:A:52:TRP:CZ3 | 0.44 | 3.05 | 8 | 2 |
| 1:A:58:PHE:CD1 | 1:A:62:VAL:HG11 | 0.44 | 2.48 | 15 | 1 |
| 1:A:27:MET:HB2 | 1:A:67:LEU:HD12 | 0.43 | 1.89 | 16 | 4 |
| 1:A:41:TYR:C | 1:A:43:PRO:HD3 | 0.43 | 2.34 | 13 | 2 |
| 1:A:32:TRP:CH2 | 1:A:58:PHE:CE1 | 0.43 | 3.07 | 16 | 1 |
| 1:A:34:ASN:ND2 | 1:A:63:TYR:CZ | 0.43 | 2.87 | 5 | 1 |
| 1:A:28:TRP:C | 1:A:67:LEU:HD21 | 0.43 | 2.33 | 9 | 6 |
| 1:A:48:GLN:O | 1:A:52:TRP:CE3 | 0.43 | 2.72 | 9 | 8 |
| 1:A:28:TRP:CZ2 | 1:A:66:LYS:CE | 0.43 | 3.02 | 10 | 1 |
| 1:A:42:GLY:N | 1:A:43:PRO:HD3 | 0.43 | 2.29 | 13 | 1 |
| 1:A:26:VAL:HG12 | 1:A:27:MET:N | 0.42 | 2.29 | 12 | 1 |
| 1:A:42:GLY:HA2 | 1:A:44:PHE:CE2 | 0.42 | 2.49 | 1 | 1 |
| 1:A:65:ARG:HG3 | 1:A:66:LYS:N | 0.42 | 2.28 | 2 | 2 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Clash(Å) | Distance(Å) | Models | |
|---|---|---|---|---|---|
| | | | | Worst | Total |
| 1:A:28:TRP:CE2 | 1:A:66:LYS:CG | 0.42 | 3.02 | 12 | 1 |
| 1:A:30:TYR:O | 1:A:30:TYR:CD1 | 0.42 | 2.72 | 15 | 2 |
| 1:A:48:GLN:HG2 | 1:A:52:TRP:CH2 | 0.42 | 2.49 | 6 | 3 |
| 1:A:41:TYR:CD1 | 1:A:41:TYR:N | 0.42 | 2.88 | 4 | 2 |
| 1:A:50:GLN:OE1 | 1:A:82:PHE:CD1 | 0.42 | 2.72 | 15 | 2 |
| 1:A:39:GLU:OE2 | 1:A:41:TYR:CE2 | 0.42 | 2.73 | 12 | 1 |
| 1:A:50:GLN:OE1 | 1:A:82:PHE:CG | 0.41 | 2.74 | 4 | 1 |
| 1:A:48:GLN:HG3 | 1:A:52:TRP:CZ3 | 0.41 | 2.51 | 8 | 5 |
| 1:A:34:ASN:OD1 | 1:A:63:TYR:CZ | 0.41 | 2.74 | 11 | 2 |
| 1:A:51:THR:O | 1:A:55:GLU:CB | 0.41 | 2.69 | 11 | 1 |
| 1:A:30:TYR:CD1 | 1:A:30:TYR:C | 0.41 | 2.94 | 6 | 1 |
| 1:A:52:TRP:HB3 | 1:A:58:PHE:CZ | 0.40 | 2.51 | 8 | 1 |
| 1:A:64:CYS:CB | 1:A:80:ILE:CD1 | 0.40 | 3.00 | 8 | 1 |
| 1:A:64:CYS:HB2 | 1:A:80:ILE:HD12 | 0.40 | 1.93 | 8 | 1 |
| 1:A:39:GLU:HB2 | 1:A:41:TYR:CE1 | 0.40 | 2.52 | 10 | 1 |
| 1:A:53:VAL:HG21 | 1:A:77:SER:OG | 0.40 | 2.15 | 11 | 1 |
| 1:A:28:TRP:CD1 | 1:A:46:SER:HB3 | 0.40 | 2.52 | 9 | 1 |

## 6.3 Torsion angles (i)

### 6.3.1 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 PDB entries followed by that with respect to all NMR entries. 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 | 53/62 (85%) | 44±2 (83±4%) | 8±2 (15±4%) | 1±1 (2±2%) | 10 50 |
| All | All | 848/992 (85%) | 704 (83%) | 126 (15%) | 18 (2%) | 10 50 |

All 4 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

| Mol | Chain | Res | Type | Models (Total) |
|---|---|---|---|---|
| 1 | A | 39 | GLU | 11 |
| 1 | A | 38 | ALA | 4 |
| 1 | A | 44 | PHE | 2 |
| 1 | A | 75 | TYR | 1 |

### 6.3.2 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 PDB entries followed by that with respect to all NMR entries. 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 | 48/54 (89%) | 39±1 (81±3%) | 9±1 (19±3%) | 4 37 |
| All | All | 768/864 (89%) | 625 (81%) | 143 (19%) | 4 37 |

All 25 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

| Mol | Chain | Res | Type | Models (Total) |
|---|---|---|---|---|
| 1 | A | 40 | LEU | 16 |
| 1 | A | 63 | TYR | 16 |
| 1 | A | 65 | ARG | 13 |
| 1 | A | 78 | LYS | 11 |
| 1 | A | 79 | ARG | 11 |
| 1 | A | 58 | PHE | 11 |
| 1 | A | 57 | TYR | 8 |
| 1 | A | 27 | MET | 6 |
| 1 | A | 29 | GLU | 6 |
| 1 | A | 33 | GLU | 6 |
| 1 | A | 75 | TYR | 5 |
| 1 | A | 83 | ASP | 5 |
| 1 | A | 46 | SER | 4 |
| 1 | A | 50 | GLN | 3 |
| 1 | A | 41 | TYR | 3 |
| 1 | A | 55 | GLU | 3 |
| 1 | A | 31 | LYS | 3 |
| 1 | A | 54 | SER | 3 |
| 1 | A | 39 | GLU | 2 |
| 1 | A | 37 | ASP | 2 |
| 1 | A | 49 | MET | 2 |
| 1 | A | 76 | ASN | 1 |
| 1 | A | 77 | SER | 1 |
| 1 | A | 44 | PHE | 1 |
| 1 | A | 64 | CYS | 1 |

### 6.3.3 RNA (i)

There are no RNA molecules in this entry.

## 6.4 Non-standard residues in protein, DNA, RNA chains (i)

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

## 6.5 Carbohydrates (i)

There are no monosaccharides in this entry.

## 6.6 Ligand geometry (i)

There are no ligands in this entry.

## 6.7 Other polymers (i)

There are no such molecules in this entry.

## 6.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

# 7 Chemical shift validation (i)

No chemical shift data were provided