# Full wwPDB X-ray Structure Validation Report (i)

Dec 17, 2023 – 02:52 am GMT

| | | |
|---|---|---|
| PDB ID | : | 4U0R |
| Title | : | Plasmodium falciparum reticulocyte-binding protein homologue 5 (PfRH5) bound to monoclonal antibody 9AD4 |
| Authors | : | Wright, K.E.; Hjerrild, K.A.; Bartlett, J.; Douglas, A.D.; Jin, J.; Brown, R.E.; Ashfield, R.; Clemmensen, S.B.; de Jongh, W.A.; Draper, S.J.; Higgins, M.K. |
| Deposited on | : | 2014-07-14 |
| Resolution | : | 2.30 Å(reported) |

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

| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.36 |
| 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) | : | 2.36 |

# 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 2.30 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.
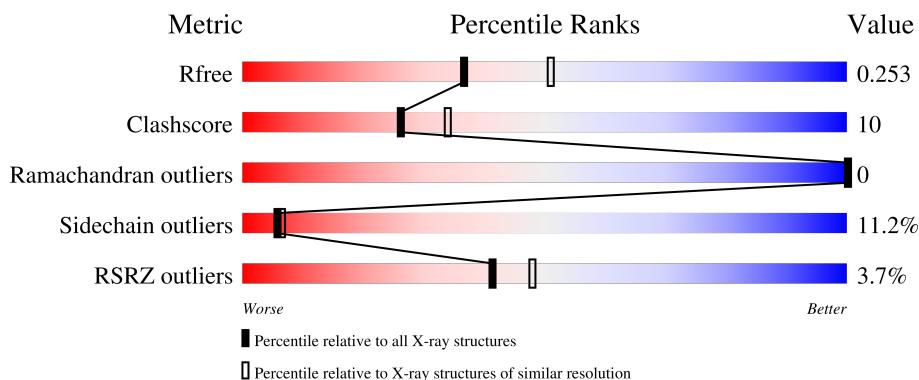


| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|---|---|---|
| $R_{free}$ | 130704 | 5042 (2.30-2.30) |
| Clashscore | 141614 | 5643 (2.30-2.30) |
| Ramachandran outliers | 138981 | 5575 (2.30-2.30) |
| Sidechain outliers | 138945 | 5575 (2.30-2.30) |
| RSRZ outliers | 127900 | 4938 (2.30-2.30) |

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 <=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 | 526 | 3% — 42% 11% · 45% |
| 2 | B | 258 | 3% — 67% 15% · 14% |
| 3 | C | 238 | 2% — 70% 18% · 9% |
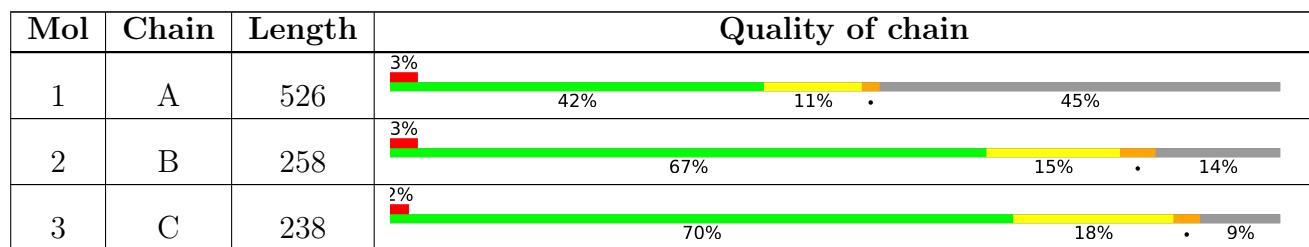
## 2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 6005 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 Reticulocyte binding protein 5.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 288 | Total<br>2450 | C<br>1584 | N<br>410 | O<br>441 | S<br>15 | 0 | 0 | 0 |

There is a discrepancy between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 216 | ALA | THR | conflict | UNP B2L3N7 |

- Molecule 2 is a protein called Monoclonal antibody 9AD4 heavy chain.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | B | 221 | Total<br>1668 | C<br>1060 | N<br>272 | O<br>327 | S<br>9 | 0 | 0 | 0 |

- Molecule 3 is a protein called Monoclonal antibody 9AD4 light chain.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | C | 217 | Total<br>1677 | C<br>1046 | N<br>286 | O<br>338 | S<br>7 | 0 | 0 | 0 |

- Molecule 4 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 4 | A | 45 | Total<br>45 | O<br>45 | 0 | 0 |
| 4 | B | 100 | Total<br>100 | O<br>100 | 0 | 0 |
| 4 | C | 65 | Total<br>65 | O<br>65 | 0 | 0 |

# 3 Residue-property plots ⓘ

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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: Reticulocyte binding protein 5
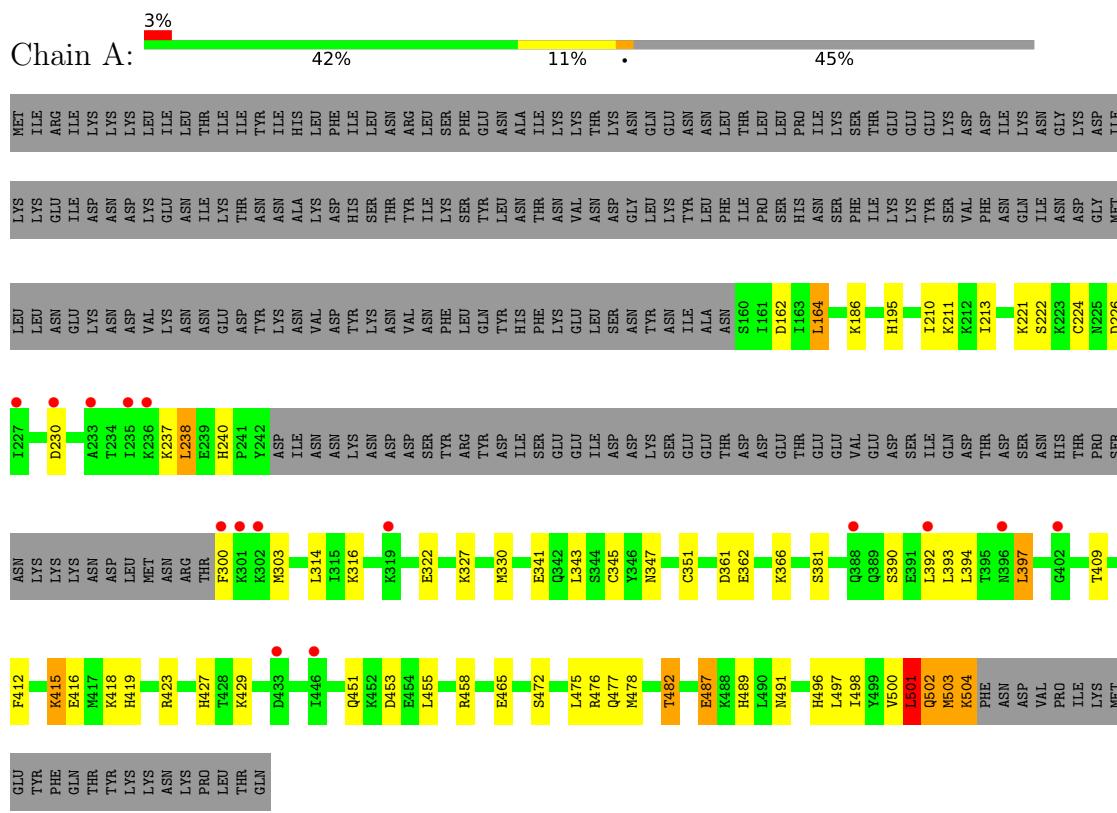


• Molecule 2: Monoclonal antibody 9AD4 heavy chain
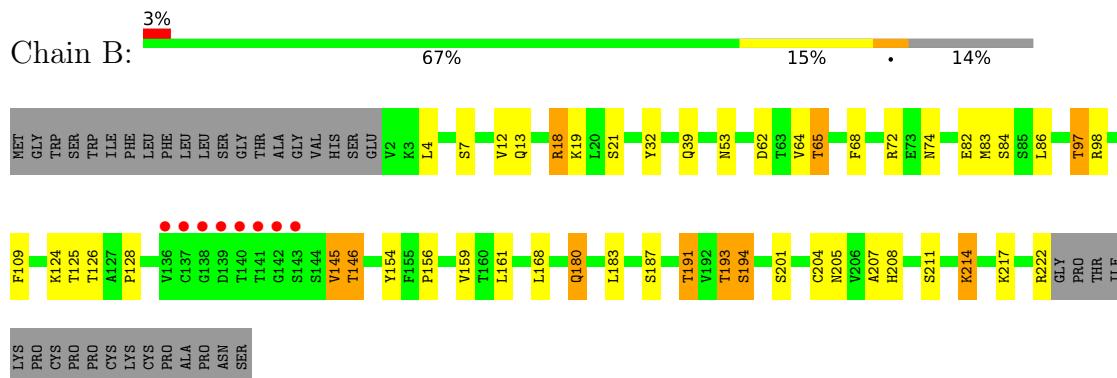


• Molecule 3: Monoclonal antibody 9AD4 light chain

Chain C:

2%

70% 18% • 9%

MET VAL SER THR PRO GLN PHE LEU VAL PHE LEU LEU PHE TRP ILE PRO ALA SER ARG GLY D1 S7 A12 V13 S14 I21 S22 C23 R24 A25 S26 L36 M37 Q38 Q41 Q42 L50 L51 I52 H53 G54 A55 S56 T73 D74 V82 E83 M89 C92

S95 T96 K97 V98 P99 W100 K107 L108 E109 I110 K111 T118 P124 S125 S126 E127 T130 N149 V150 K151 I154 R159 Q160 N161 W167 D174 L183 D188 R192 T197 K203 S207 E217 CYS
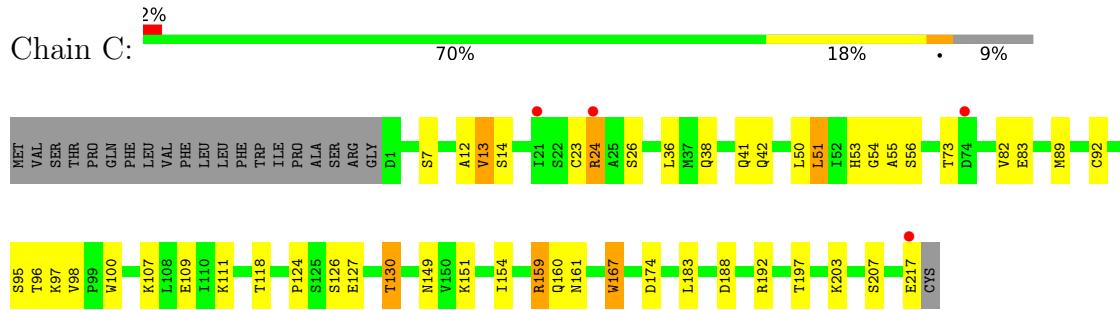
# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | P 21 21 21 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 39.79Å    86.66Å    324.04Å<br>90.00°    90.00°    90.00° | Depositor |
| Resolution (Å) | 40.83  –  2.30<br>40.83  –  2.30 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 96.1 (40.83-2.30)<br>96.1 (40.83-2.30) | Depositor<br>EDS |
| $R_{merge}$ | (Not available) | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 1.75 (at 2.29Å) | Xtriage |
| Refinement program | BUSTER 2.10.0 | Depositor |
| R, $R_{free}$ | 0.221  ,   0.258<br>0.236  ,   0.253 | Depositor<br>DCC |
| $R_{free}$ test set | 2462 reflections (4.99%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 41.1 | Xtriage |
| Anisotropy | 0.603 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.31 , 41.9 | EDS |
| L-test for twinning[2] | $< |L| > = 0.47, < L^2 > = 0.30$ | Xtriage |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| $F_o,F_c$ correlation | 0.93 | EDS |
| Total number of atoms | 6005 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 53.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.70% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality ⓘ

### 5.1 Standard geometry ⓘ

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 | 0.52 | 0/2502 | 0.70 | 2/3354 (0.1%) |
| 2 | B | 0.55 | 1/1714 (0.1%) | 0.82 | 0/2343 |
| 3 | C | 0.60 | 2/1717 (0.1%) | 0.73 | 1/2332 (0.0%) |
| All | All | 0.55 | 3/5933 (0.1%) | 0.75 | 3/8029 (0.0%) |

All (3) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|------|-------------|----------|
| 3 | C | 51 | LEU | C-N | -7.71 | 1.16 | 1.34 |
| 3 | C | 50 | LEU | C-N | -7.60 | 1.16 | 1.34 |
| 2 | B | 204 | CYS | CB-SG | -6.51 | 1.71 | 1.82 |

All (3) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|----------|-------|-------------|----------|
| 3 | C | 51 | LEU | O-C-N | -6.90 | 111.66 | 122.70 |
| 1 | A | 501 | LEU | N-CA-CB | -5.95 | 98.51 | 110.40 |
| 1 | A | 503 | MET | N-CA-CB | -5.09 | 101.43 | 110.60 |

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts ⓘ

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 | 2450 | 0 | 2481 | 61 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 2   | B     | 1668  | 0        | 1612     | 35      | 0            |
| 3   | C     | 1677  | 0        | 1605     | 24      | 0            |
| 4   | A     | 45    | 0        | 0        | 15      | 0            |
| 4   | B     | 100   | 0        | 0        | 14      | 0            |
| 4   | C     | 65    | 0        | 0        | 5       | 0            |
| All | All   | 6005  | 0        | 5698     | 116     | 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 10.

All (116) 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:A:238:LEU:CD2 | 1:A:300:PHE:HE2 | 1.45 | 1.29 |
| 1:A:238:LEU:CD2 | 1:A:300:PHE:CE2 | 2.17 | 1.27 |
| 1:A:496:HIS:O | 1:A:501:LEU:HD13 | 1.32 | 1.23 |
| 2:B:21:SER:HB2 | 4:B:309:HOH:O | 1.35 | 1.22 |
| 1:A:501:LEU:HD12 | 1:A:501:LEU:N | 1.59 | 1.16 |
| 1:A:496:HIS:O | 1:A:501:LEU:CD1 | 1.95 | 1.14 |
| 1:A:238:LEU:HD21 | 1:A:300:PHE:CE2 | 1.79 | 1.13 |
| 1:A:238:LEU:HD23 | 1:A:300:PHE:HE2 | 1.15 | 1.10 |
| 1:A:300:PHE:CE2 | 1:A:409:THR:HG22 | 1.87 | 1.09 |
| 1:A:500:VAL:C | 1:A:501:LEU:HD12 | 1.75 | 1.06 |
| 3:C:217:GLU:HG2 | 4:C:352:HOH:O | 1.62 | 0.98 |
| 2:B:97:THR:HG21 | 2:B:109:PHE:HB3 | 1.45 | 0.98 |
| 1:A:501:LEU:N | 1:A:501:LEU:CD1 | 2.30 | 0.91 |
| 3:C:23:CYS:HG | 3:C:92:CYS:HG | 1.15 | 0.89 |
| 1:A:451:GLN:HE22 | 1:A:453:ASP:HB3 | 1.44 | 0.83 |
| 1:A:478:MET:O | 1:A:482:THR:HG23 | 1.78 | 0.82 |
| 1:A:238:LEU:HD23 | 1:A:300:PHE:CE2 | 2.02 | 0.82 |
| 3:C:188:ASP:OD2 | 3:C:192:ARG:NH1 | 2.12 | 0.81 |
| 2:B:128:PRO:HB3 | 2:B:154:TYR:HB3 | 1.66 | 0.77 |
| 2:B:39:GLN:HE22 | 3:C:42:GLN:HE22 | 1.33 | 0.76 |
| 1:A:500:VAL:CA | 1:A:501:LEU:HD12 | 2.17 | 0.75 |
| 1:A:476:ARG:NH2 | 4:A:623:HOH:O | 1.86 | 0.75 |
| 2:B:97:THR:CG2 | 2:B:109:PHE:HB3 | 2.17 | 0.73 |
| 3:C:154:ILE:HD11 | 3:C:183:LEU:HD21 | 1.72 | 0.71 |
| 1:A:366:LYS:HE3 | 4:A:636:HOH:O | 1.91 | 0.70 |
| 1:A:164:LEU:HD22 | 1:A:478:MET:HB3 | 1.74 | 0.70 |
| 1:A:503:MET:O | 1:A:504:LYS:C | 2.30 | 0.70 |
| 1:A:238:LEU:HD21 | 1:A:300:PHE:CZ | 2.26 | 0.69 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:13:GLN:NE2 | 4:B:301:HOH:O | 2.26 | 0.68 |
| 2:B:65:THR:HG21 | 4:B:397:HOH:O | 1.92 | 0.68 |
| 2:B:64:VAL:HG13 | 2:B:68:PHE:HB2 | 1.80 | 0.63 |
| 2:B:156:PRO:O | 2:B:208:HIS:HE1 | 1.82 | 0.62 |
| 2:B:7:SER:HB2 | 4:B:309:HOH:O | 1.99 | 0.61 |
| 1:A:381:SER:HB3 | 4:A:640:HOH:O | 2.00 | 0.61 |
| 2:B:193:THR:HG23 | 4:B:315:HOH:O | 2.00 | 0.61 |
| 2:B:222:ARG:NH2 | 3:C:124:PRO:O | 2.34 | 0.61 |
| 1:A:345:CYS:HG | 1:A:351:CYS:HG | 0.69 | 0.60 |
| 1:A:300:PHE:CD2 | 1:A:409:THR:HG22 | 2.36 | 0.60 |
| 2:B:72:ARG:HD3 | 2:B:74:ASN:OD1 | 2.02 | 0.60 |
| 2:B:124:LYS:HD3 | 4:B:301:HOH:O | 2.02 | 0.60 |
| 1:A:238:LEU:CD2 | 1:A:300:PHE:CZ | 2.82 | 0.59 |
| 1:A:300:PHE:HE1 | 1:A:412:PHE:HB2 | 1.66 | 0.59 |
| 2:B:145:VAL:HG22 | 2:B:194:SER:HA | 1.84 | 0.59 |
| 1:A:498:ILE:O | 1:A:502:GLN:HA | 2.02 | 0.59 |
| 3:C:54:GLY:O | 3:C:55:ALA:HB3 | 2.02 | 0.59 |
| 2:B:39:GLN:NE2 | 3:C:42:GLN:HE22 | 1.99 | 0.59 |
| 1:A:487:GLU:CG | 4:A:603:HOH:O | 2.51 | 0.58 |
| 1:A:501:LEU:HD12 | 1:A:501:LEU:H | 1.63 | 0.58 |
| 1:A:211:LYS:HD3 | 4:A:643:HOH:O | 2.03 | 0.58 |
| 1:A:427:HIS:ND1 | 1:A:472:SER:HB2 | 2.19 | 0.57 |
| 1:A:491:ASN:O | 4:A:601:HOH:O | 2.17 | 0.57 |
| 1:A:366:LYS:HG3 | 4:A:636:HOH:O | 2.05 | 0.57 |
| 1:A:429:LYS:HG3 | 4:A:639:HOH:O | 2.06 | 0.56 |
| 3:C:83:GLU:OE2 | 4:C:360:HOH:O | 2.18 | 0.56 |
| 3:C:36:LEU:HD12 | 3:C:96:THR:HA | 1.89 | 0.55 |
| 1:A:341:GLU:HG2 | 2:B:53:ASN:HB2 | 1.89 | 0.54 |
| 3:C:26:SER:HB3 | 4:C:326:HOH:O | 2.08 | 0.54 |
| 3:C:217:GLU:CG | 4:C:352:HOH:O | 2.35 | 0.54 |
| 2:B:124:LYS:CE | 4:B:301:HOH:O | 2.57 | 0.53 |
| 1:A:393:LEU:O | 1:A:397:LEU:HB2 | 2.08 | 0.53 |
| 3:C:127:GLU:HB2 | 4:C:321:HOH:O | 2.09 | 0.53 |
| 1:A:186:LYS:HG3 | 1:A:210:ILE:HD13 | 1.91 | 0.53 |
| 3:C:41:GLN:HB2 | 3:C:51:LEU:HD11 | 1.91 | 0.53 |
| 1:A:300:PHE:CE2 | 1:A:409:THR:CG2 | 2.78 | 0.52 |
| 2:B:207:ALA:HB2 | 2:B:214:LYS:HD3 | 1.90 | 0.52 |
| 1:A:361:ASP:O | 4:A:636:HOH:O | 2.19 | 0.52 |
| 1:A:300:PHE:CE1 | 1:A:412:PHE:HB2 | 2.45 | 0.51 |
| 2:B:191:THR:HG23 | 4:B:347:HOH:O | 2.10 | 0.51 |
| 2:B:62:ASP:CB | 4:B:397:HOH:O | 2.59 | 0.50 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:208:HIS:HD2 | 2:B:211:SER:OG | 1.95 | 0.49 |
| 2:B:62:ASP:HB3 | 4:B:397:HOH:O | 2.11 | 0.49 |
| 1:A:419:HIS:HB3 | 1:A:423:ARG:NH2 | 2.27 | 0.49 |
| 1:A:381:SER:CB | 4:A:640:HOH:O | 2.60 | 0.49 |
| 3:C:154:ILE:HD12 | 3:C:159:ARG:HG3 | 1.95 | 0.49 |
| 1:A:362:GLU:O | 1:A:362:GLU:HG3 | 2.11 | 0.49 |
| 1:A:186:LYS:CE | 4:A:638:HOH:O | 2.62 | 0.48 |
| 1:A:501:LEU:C | 1:A:502:GLN:NE2 | 2.66 | 0.48 |
| 3:C:38:GLN:OE1 | 3:C:53:HIS:O | 2.32 | 0.48 |
| 3:C:95:SER:HA | 3:C:100:TRP:CD1 | 2.49 | 0.48 |
| 1:A:500:VAL:CB | 1:A:501:LEU:HD12 | 2.43 | 0.48 |
| 1:A:504:LYS:HB2 | 1:A:504:LYS:HE3 | 1.75 | 0.46 |
| 1:A:300:PHE:CD2 | 1:A:409:THR:CG2 | 2.97 | 0.46 |
| 3:C:126:SER:O | 3:C:130:THR:HG23 | 2.16 | 0.46 |
| 1:A:186:LYS:NZ | 4:A:638:HOH:O | 2.25 | 0.45 |
| 2:B:62:ASP:HA | 4:B:397:HOH:O | 2.16 | 0.45 |
| 1:A:501:LEU:CD1 | 1:A:501:LEU:H | 2.23 | 0.45 |
| 3:C:167:TRP:CD1 | 3:C:167:TRP:N | 2.84 | 0.45 |
| 2:B:12:VAL:CG2 | 2:B:18:ARG:HG3 | 2.47 | 0.44 |
| 1:A:419:HIS:HB2 | 4:A:628:HOH:O | 2.18 | 0.44 |
| 2:B:124:LYS:HE2 | 4:B:301:HOH:O | 2.17 | 0.44 |
| 1:A:237:LYS:HB2 | 1:A:303:MET:HE1 | 1.99 | 0.44 |
| 1:A:477:GLN:HG2 | 4:A:611:HOH:O | 2.18 | 0.44 |
| 3:C:149:ASN:HD21 | 3:C:151:LYS:HE3 | 1.83 | 0.44 |
| 2:B:65:THR:CG2 | 4:B:397:HOH:O | 2.56 | 0.44 |
| 2:B:191:THR:CG2 | 4:B:347:HOH:O | 2.66 | 0.43 |
| 1:A:500:VAL:HB | 1:A:501:LEU:CD1 | 2.48 | 0.43 |
| 3:C:54:GLY:C | 3:C:56:SER:H | 2.22 | 0.43 |
| 2:B:83:MET:HB3 | 2:B:86:LEU:HD21 | 2.00 | 0.43 |
| 2:B:146:THR:HB | 2:B:191:THR:HG22 | 2.01 | 0.43 |
| 2:B:32:TYR:O | 2:B:72:ARG:NH2 | 2.49 | 0.43 |
| 2:B:128:PRO:CB | 2:B:154:TYR:HB3 | 2.43 | 0.43 |
| 1:A:497:LEU:O | 1:A:503:MET:HG3 | 2.19 | 0.42 |
| 1:A:195:HIS:CB | 1:A:343:LEU:HD11 | 2.49 | 0.42 |
| 1:A:419:HIS:HB3 | 1:A:423:ARG:HH22 | 1.83 | 0.42 |
| 3:C:24:ARG:HA | 3:C:73:THR:O | 2.20 | 0.42 |
| 2:B:180:GLN:O | 2:B:180:GLN:HG2 | 2.19 | 0.42 |
| 2:B:146:THR:HB | 2:B:191:THR:HB | 2.02 | 0.42 |
| 1:A:415:LYS:HE3 | 1:A:415:LYS:HB3 | 1.39 | 0.41 |
| 1:A:500:VAL:C | 1:A:501:LEU:CD1 | 2.66 | 0.41 |
| 3:C:12:ALA:HB1 | 3:C:111:LYS:HG3 | 2.03 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:419:HIS:CB | 4:A:628:HOH:O | 2.68 | 0.41 |
| 3:C:13:VAL:HG11 | 3:C:82:VAL:HG21 | 2.03 | 0.41 |
| 1:A:451:GLN:NE2 | 1:A:453:ASP:HB3 | 2.25 | 0.41 |
| 2:B:19:LYS:HG3 | 2:B:82:GLU:HG2 | 2.03 | 0.41 |
| 1:A:240:HIS:HE2 | 1:A:489:HIS:HE2 | 1.69 | 0.41 |
| 1:A:300:PHE:CE1 | 1:A:412:PHE:CB | 3.04 | 0.40 |

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

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 | 284/526 (54%) | 274 (96%) | 10 (4%) | 0 | 100 | 100 |
| 2 | B | 219/258 (85%) | 212 (97%) | 7 (3%) | 0 | 100 | 100 |
| 3 | C | 215/238 (90%) | 208 (97%) | 7 (3%) | 0 | 100 | 100 |
| All | All | 718/1022 (70%) | 694 (97%) | 24 (3%) | 0 | 100 | 100 |

There are no Ramachandran outliers to report.

### 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 | 279/511 (55%) | 248 (89%) | 31 (11%) | 6 | 7 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|-----|-------|----------|-----------|----------|-------------|---|
| 2 | B | 185/216 (86%) | 162 (88%) | 23 (12%) | 4 | 5 |
| 3 | C | 190/209 (91%) | 171 (90%) | 19 (10%) | 7 | 9 |
| All | All | 654/936 (70%) | 581 (89%) | 73 (11%) | 6 | 6 |

All (73) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 162 | ASP |
| 1 | A | 164 | LEU |
| 1 | A | 213 | ILE |
| 1 | A | 221 | LYS |
| 1 | A | 222 | SER |
| 1 | A | 224 | CYS |
| 1 | A | 226 | ASP |
| 1 | A | 230 | ASP |
| 1 | A | 238 | LEU |
| 1 | A | 314 | LEU |
| 1 | A | 316 | LYS |
| 1 | A | 322 | GLU |
| 1 | A | 327 | LYS |
| 1 | A | 330 | MET |
| 1 | A | 347 | ASN |
| 1 | A | 390 | SER |
| 1 | A | 392 | LEU |
| 1 | A | 394 | LEU |
| 1 | A | 397 | LEU |
| 1 | A | 415 | LYS |
| 1 | A | 416 | GLU |
| 1 | A | 418 | LYS |
| 1 | A | 455 | LEU |
| 1 | A | 458 | ARG |
| 1 | A | 465 | GLU |
| 1 | A | 475 | LEU |
| 1 | A | 482 | THR |
| 1 | A | 487 | GLU |
| 1 | A | 501 | LEU |
| 1 | A | 502 | GLN |
| 1 | A | 504 | LYS |
| 2 | B | 4 | LEU |
| 2 | B | 18 | ARG |
| 2 | B | 65 | THR |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | B | 84 | SER |
| 2 | B | 97 | THR |
| 2 | B | 98 | ARG |
| 2 | B | 125 | THR |
| 2 | B | 126 | THR |
| 2 | B | 145 | VAL |
| 2 | B | 146 | THR |
| 2 | B | 159 | VAL |
| 2 | B | 161 | LEU |
| 2 | B | 168 | LEU |
| 2 | B | 180 | GLN |
| 2 | B | 183 | LEU |
| 2 | B | 187 | SER |
| 2 | B | 191 | THR |
| 2 | B | 193 | THR |
| 2 | B | 194 | SER |
| 2 | B | 201 | SER |
| 2 | B | 205 | ASN |
| 2 | B | 214 | LYS |
| 2 | B | 217 | LYS |
| 3 | C | 7 | SER |
| 3 | C | 13 | VAL |
| 3 | C | 14 | SER |
| 3 | C | 24 | ARG |
| 3 | C | 89 | MET |
| 3 | C | 97 | LYS |
| 3 | C | 98 | VAL |
| 3 | C | 107 | LYS |
| 3 | C | 109 | GLU |
| 3 | C | 118 | THR |
| 3 | C | 130 | THR |
| 3 | C | 159 | ARG |
| 3 | C | 160 | GLN |
| 3 | C | 161 | ASN |
| 3 | C | 167 | TRP |
| 3 | C | 174 | ASP |
| 3 | C | 197 | THR |
| 3 | C | 203 | LYS |
| 3 | C | 207 | SER |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 165 | GLN |
| 1 | A | 195 | HIS |
| 1 | A | 342 | GLN |
| 1 | A | 347 | ASN |
| 1 | A | 365 | HIS |
| 1 | A | 439 | GLN |
| 1 | A | 451 | GLN |
| 1 | A | 502 | GLN |
| 2 | B | 39 | GLN |
| 2 | B | 180 | GLN |
| 2 | B | 208 | HIS |
| 3 | C | 17 | GLN |
| 3 | C | 38 | GLN |
| 3 | C | 57 | ASN |
| 3 | C | 149 | ASN |
| 3 | C | 160 | GLN |

#### 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 monosaccharides 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 (i)

The following chains have linkage breaks:

| Mol | Chain | Number of breaks |
|-----|-------|------------------|
| 3 | C | 2 |

All chain breaks are listed below:

| Model | Chain | Residue-1 | Atom-1 | Residue-2 | Atom-2 | Distance (Å) |
|-------|-------|-----------|--------|-----------|--------|--------------|
| 1 | C | 50:LEU | C | 51:LEU | N | 1.16 |
| 1 | C | 51:LEU | C | 52:ILE | N | 1.16 |

# 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, 95$^{th}$ 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 | 288/526 (54%) | 0.47 | 15 (5%) | 27 | 34 | 24, 67, 93, 117 | 0 |
| 2 | B | 221/258 (85%) | 0.46 | 8 (3%) | 42 | 49 | 10, 41, 61, 72 | 8 (3%) |
| 3 | C | 217/238 (91%) | 0.26 | 4 (1%) | 68 | 74 | 29, 46, 66, 106 | 0 |
| All | All | 726/1022 (71%) | 0.41 | 27 (3%) | 41 | 48 | 10, 49, 87, 117 | 8 (1%) |

All (27) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
| --- | --- | --- | --- | --- |
| 2 | B | 140 | THR | 15.2 |
| 2 | B | 138 | GLY | 12.1 |
| 2 | B | 142 | GLY | 11.5 |
| 2 | B | 137 | CYS | 8.9 |
| 1 | A | 300 | PHE | 7.6 |
| 2 | B | 141 | THR | 5.9 |
| 1 | A | 301 | LYS | 5.9 |
| 3 | C | 217 | GLU | 3.7 |
| 1 | A | 230 | ASP | 3.5 |
| 1 | A | 446 | ILE | 3.4 |
| 2 | B | 139 | ASP | 3.3 |
| 1 | A | 433 | ASP | 3.2 |
| 3 | C | 24 | ARG | 3.1 |
| 1 | A | 396 | ASN | 3.1 |
| 2 | B | 143 | SER | 3.0 |
| 1 | A | 302 | LYS | 3.0 |
| 2 | B | 136 | VAL | 2.7 |
| 1 | A | 236 | LYS | 2.5 |
| 1 | A | 392 | LEU | 2.5 |
| 1 | A | 233 | ALA | 2.4 |
| 1 | A | 227 | ILE | 2.3 |
| 1 | A | 388 | GLN | 2.2 |
| 1 | A | 235 | ILE | 2.2 |

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| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 3 | C | 21 | ILE | 2.2 |
| 3 | C | 74 | ASP | 2.1 |
| 1 | A | 319 | LYS | 2.1 |
| 1 | A | 402 | GLY | 2.0 |

## 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 monosaccharides in this entry.

## 6.4　Ligands ⓘ

There are no ligands in this entry.

## 6.5　Other polymers ⓘ

There are no such residues in this entry.