# Full wwPDB X-ray Structure Validation Report ⓘ

May 19, 2020 – 01:18 am BST

| | | |
|---|---|---|
| PDB ID | : | 4NA0 |
| Title | : | Crystal structure of mouse poly(ADP-ribose) glycohydrolase (PARG) catalytic domain with ADPRibose |
| Authors | : | Wang, Z.; Cheng, Z.; Xu, W. |
| Deposited on | : | 2013-10-21 |
| Resolution | : | 2.40 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 following versions of software and data (see references ⓘ) were used in the production of this report:

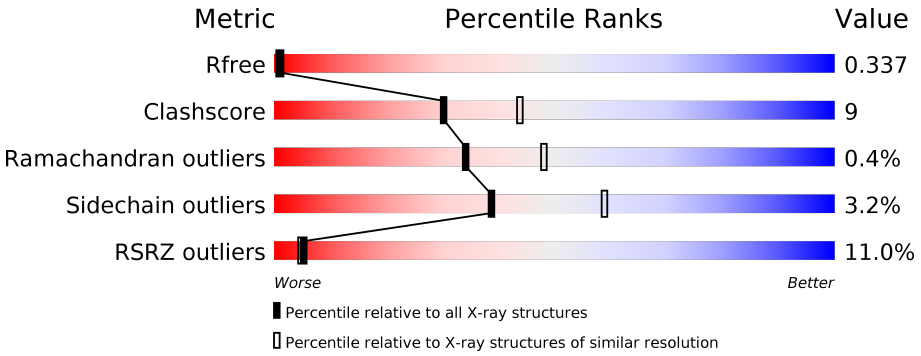
| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.11 |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac | : | 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 (i)

The following experimental techniques were used to determine the structure:
*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.40 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 | 3907 (2.40-2.40) |
| Clashscore | 141614 | 4398 (2.40-2.40) |
| Ramachandran outliers | 138981 | 4318 (2.40-2.40) |
| Sidechain outliers | 138945 | 4319 (2.40-2.40) |
| RSRZ outliers | 127900 | 3811 (2.40-2.40) |

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 >=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 | 522 | 4% 82% 12% |
| 1 | B | 522 | 10% 78% 18% |
| 1 | C | 522 | 17% 73% 21% |

## 2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 12337 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 Poly(ADP-ribose) glycohydrolase.

| Mol | Chain | Residues | Atoms | | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 501 | Total | C | N | O | S | Se | 0 | 0 | 0 |
| | | | 4074 | 2603 | 710 | 738 | 14 | 9 | | | |
| 1 | B | 502 | Total | C | N | O | S | Se | 0 | 0 | 0 |
| | | | 4079 | 2605 | 710 | 741 | 14 | 9 | | | |
| 1 | C | 501 | Total | C | N | O | S | Se | 0 | 0 | 0 |
| | | | 4070 | 2598 | 709 | 741 | 13 | 9 | | | |

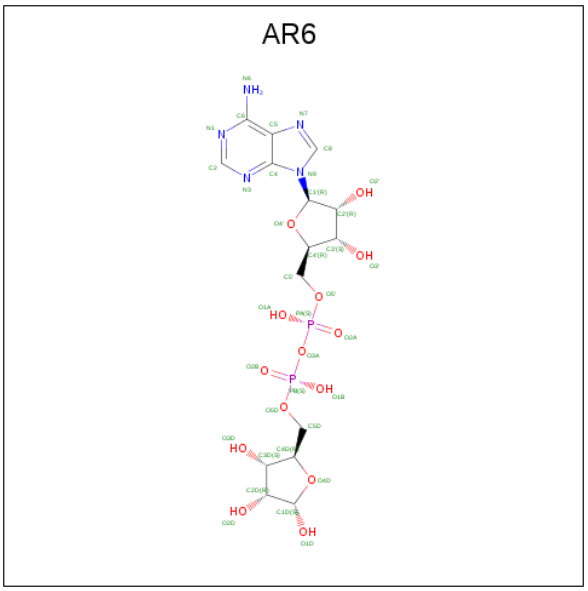
There are 3 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 438 | GLY | - | EXPRESSION TAG | UNP O88622 |
| B | 438 | GLY | - | EXPRESSION TAG | UNP O88622 |
| C | 438 | GLY | - | EXPRESSION TAG | UNP O88622 |

- Molecule 2 is IODIDE ION (three-letter code: IOD) (formula: I).

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 2 | B | 2 | Total | I | 0 | 0 |
| | | | 2 | 2 | | |
| 2 | A | 2 | Total | I | 0 | 0 |
| | | | 2 | 2 | | |
| 2 | C | 2 | Total | I | 0 | 0 |
| | | | 2 | 2 | | |

- Molecule 3 is [(2R,3S,4R,5R)-5-(6-AMINOPURIN-9-YL)-3,4-DIHYDROXY-OXOLAN-2-YL]METHYL [HYDROXY-[[(2R,3S,4R,5S)-3,4,5-TRIHYDROXYOXOLAN-2-YL]METHOXY]PHOSPHORYL] HYDROGEN PHOSPHATE (three-letter code: AR6) (formula: $C_{15}H_{23}N_5O_{14}P_2$).



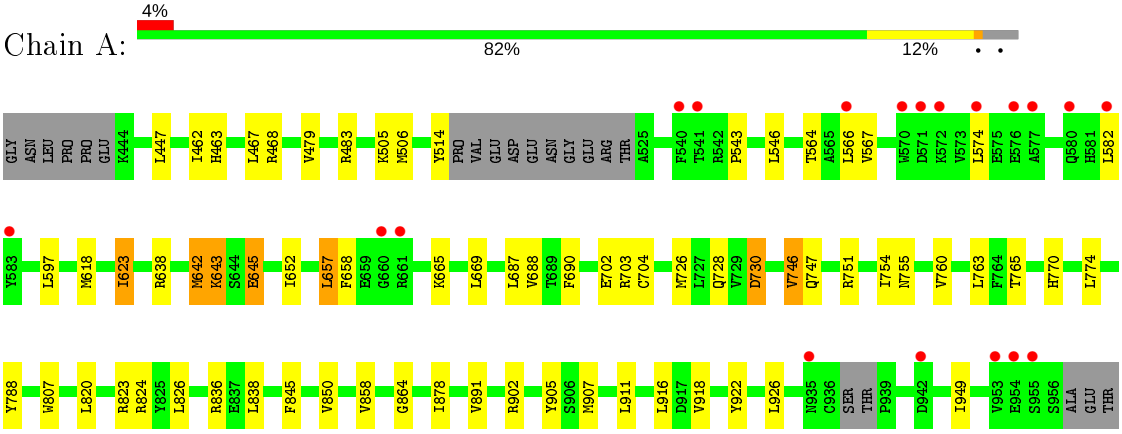

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|---|
| 3 | A | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 36 | 15 | 5 | 14 | 2 | | |
| 3 | B | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 36 | 15 | 5 | 14 | 2 | | |
| 3 | C | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 36 | 15 | 5 | 14 | 2 | | |

# 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 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.

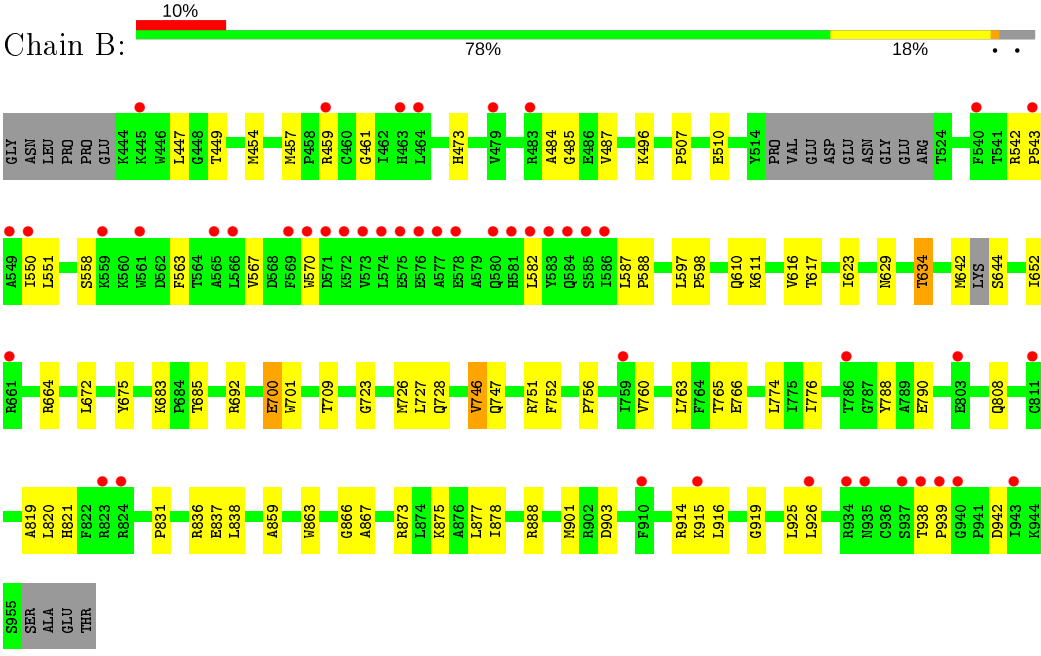
• Molecule 1: Poly(ADP-ribose) glycohydrolase

Chain A:



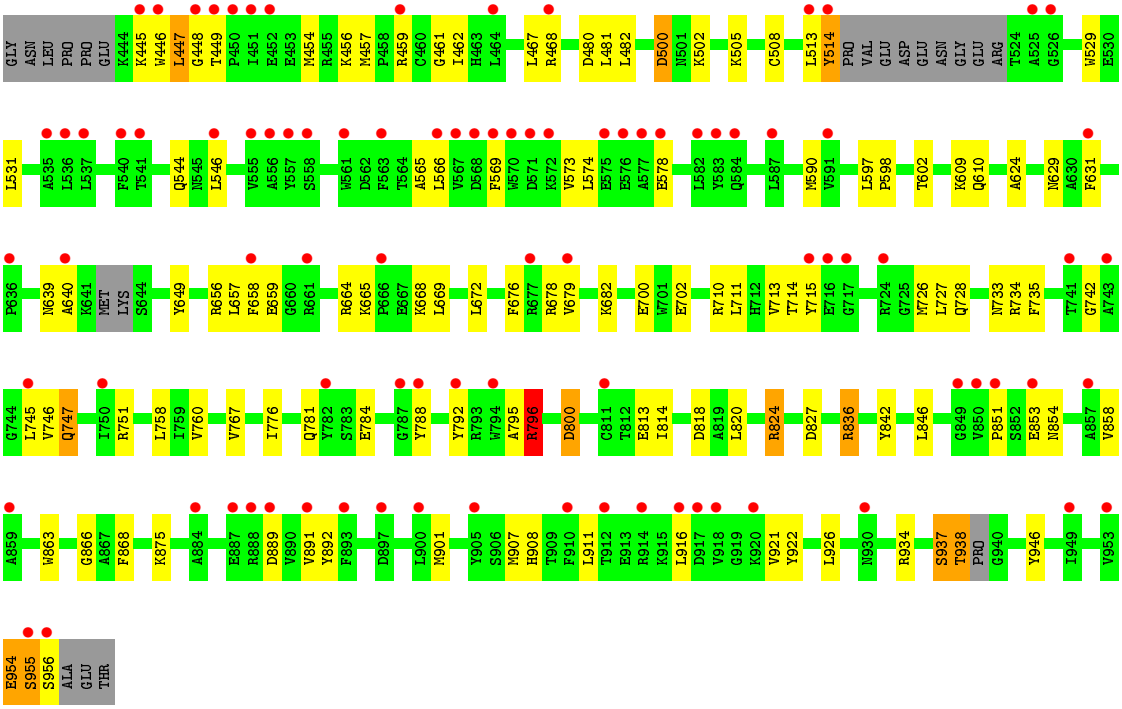

• Molecule 1: Poly(ADP-ribose) glycohydrolase

Chain B:




• Molecule 1: Poly(ADP-ribose) glycohydrolase

Chain C:


GLY ASN LEU PRO PRO GLU K444 K445 W446 L447 G448 T449 P450 I451 E452 E453 M454 R455 K456 M457 P458 R459 C460 G461 I462 H463 L464 L467 R468 D480 L481 L482 D500 N501 K502 K505 C508 L513 Y514 PRO VAL GLU ASP GLU ASN GLY GLU ARG T524 A525 G526 W529 E530
L531 A535 L536 L537 P540 T541 Q544 N545 L546 V555 A556 Y557 S558 W561 D562 F563 T564 A565 L566 V567 D568 F569 W570 D571 K572 V573 L574 E575 E576 A577 E578 L582 Y583 Q584 L587 M590 V591 L597 P598 T602 K609 Q610 A624 N629 A630 F631
P636 N639 A640 K641 MET LYS S644 Y649 R656 L657 F658 E659 G660 R661 R664 K665 P666 E667 K668 L669 L672 F676 R677 R678 V679 K682 E700 W701 E702 R710 L711 H712 V713 T714 Y715 E716 G717 R724 G725 M726 L727 Q728 N733 R734 F735 T741 G742 A743
G744 L745 V746 Q747 I750 R751 L758 I759 V760 V767 I776 Q781 Y782 S783 E784 G787 Y788 Y792 R793 W794 A795 R796 D800 C811 T812 E813 I814 D818 A819 L820 R824 D827 R836 Y842 L846 G849 V850 P851 S852 E853 N854 A857 V858
A859 W863 G866 A867 F868 K875 A884 E887 R888 D889 V890 V891 Y892 F893 D897 L900 M901 Y905 S906 M907 H908 T909 F910 L911 T912 E913 R914 K915 L916 D917 V918 G919 K920 V921 Y922 L926 N930 R934 S937 T938 PRO G940 Y946 I949 V953
E954 S955 S956 ALA GLU THR

# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | P 21 21 2 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 188.30Å 55.66Å 166.15Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 50.00 – 2.40<br>47.74 – 2.40 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 97.7 (50.00-2.40)<br>97.6 (47.74-2.40) | Depositor<br>EDS |
| $R_{merge}$ | 0.11 | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 2.94 (at 2.39Å) | Xtriage |
| Refinement program | REFMAC 5.5.0110 | Depositor |
| R, $R_{free}$ | 0.298 , 0.342<br>0.294 , 0.337 | Depositor<br>DCC |
| $R_{free}$ test set | 3419 reflections (5.06%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 50.2 | Xtriage |
| Anisotropy | 0.339 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.30 , 37.4 | EDS |
| L-test for twinning[2] | $< \|L\| > = 0.49$, $< L^2 > = 0.33$ | Xtriage |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| $F_o$,$F_c$ correlation | 0.93 | EDS |
| Total number of atoms | 12337 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 70.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 70.75 % 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 2.9603e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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

Bond lengths and bond angles in the following residue types are not validated in this section: IOD, AR6

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 | 0.36 | 0/4165 | 0.55 | 0/5617 |
| 1 | B | 0.37 | 0/4170 | 0.53 | 0/5627 |
| 1 | C | 0.38 | 0/4159 | 0.55 | 1/5610 (0.0%) |
| All | All | 0.37 | 0/12494 | 0.54 | 1/16854 (0.0%) |

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|---|---|---|---|
| 1 | C | 0 | 1 |

There are no bond length outliers.

All (1) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | C | 796 | ARG | NE-CZ-NH1 | 6.19 | 123.39 | 120.30 |

There are no chirality outliers.

All (1) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 1 | C | 700 | GLU | Peptide |

## 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 | 4074 | 0 | 4042 | 59 | 0 |
| 1 | B | 4079 | 0 | 4042 | 66 | 0 |
| 1 | C | 4070 | 0 | 4030 | 103 | 0 |
| 2 | A | 2 | 0 | 0 | 2 | 0 |
| 2 | B | 2 | 0 | 0 | 0 | 0 |
| 2 | C | 2 | 0 | 0 | 1 | 0 |
| 3 | A | 36 | 0 | 20 | 2 | 0 |
| 3 | B | 36 | 0 | 20 | 2 | 0 |
| 3 | C | 36 | 0 | 21 | 6 | 0 |
| All | All | 12337 | 0 | 12175 | 229 | 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 9.

All (229) 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:907:MSE:HE1 | 1:A:949:ILE:HG21 | 1.22 | 1.09 |
| 1:C:447:LEU:CD2 | 1:C:713:VAL:HG23 | 1.86 | 1.05 |
| 1:B:726:MSE:HE3 | 1:B:859:ALA:HB2 | 1.39 | 1.04 |
| 1:C:711:LEU:HD21 | 1:C:713:VAL:HG13 | 1.41 | 1.00 |
| 1:A:618:MSE:HE3 | 1:A:623:ILE:CD1 | 1.94 | 0.98 |
| 1:A:907:MSE:HE3 | 1:A:911:LEU:HD11 | 1.49 | 0.93 |
| 1:C:713:VAL:HG12 | 1:C:892:TYR:HB3 | 1.51 | 0.92 |
| 1:C:447:LEU:HD23 | 1:C:713:VAL:HG23 | 1.54 | 0.90 |
| 1:C:447:LEU:HD22 | 1:C:447:LEU:N | 1.87 | 0.90 |
| 1:C:447:LEU:HD21 | 1:C:713:VAL:HG23 | 1.52 | 0.89 |
| 1:C:911:LEU:HD21 | 1:C:921:VAL:HG22 | 1.55 | 0.88 |
| 1:B:447:LEU:HG | 1:B:901:MSE:HE3 | 1.57 | 0.86 |
| 1:C:447:LEU:HD23 | 1:C:713:VAL:CG2 | 2.07 | 0.85 |
| 1:B:728:GLN:OE1 | 1:B:751:ARG:NH2 | 2.14 | 0.81 |
| 1:A:728:GLN:OE1 | 1:A:751:ARG:NH2 | 2.14 | 0.81 |
| 1:A:907:MSE:HE1 | 1:A:949:ILE:CG2 | 2.09 | 0.79 |
| 1:B:447:LEU:HG | 1:B:901:MSE:CE | 2.11 | 0.79 |
| 1:C:711:LEU:HD21 | 1:C:713:VAL:CG1 | 2.12 | 0.78 |
| 1:C:858:VAL:HG12 | 1:C:889:ASP:O | 1.84 | 0.78 |
| 1:A:467:LEU:O | 1:A:479:VAL:HG11 | 1.83 | 0.78 |
| 1:A:907:MSE:CE | 1:A:949:ILE:HG21 | 2.11 | 0.77 |
| 1:B:726:MSE:CE | 1:B:859:ALA:HB2 | 2.16 | 0.76 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:447:LEU:N | 1:C:447:LEU:CD2 | 2.51 | 0.73 |
| 1:C:624:ALA:HB1 | 1:C:679:VAL:HG11 | 1.69 | 0.73 |
| 1:B:629:ASN:OD1 | 1:B:634:THR:HG21 | 1.90 | 0.72 |
| 1:C:711:LEU:CD2 | 1:C:713:VAL:HG13 | 2.18 | 0.72 |
| 1:C:447:LEU:HD21 | 1:C:901:MSE:HG2 | 1.73 | 0.71 |
| 1:C:514:TYR:CE2 | 1:C:531:LEU:HD22 | 2.26 | 0.71 |
| 1:C:746:VAL:HG13 | 1:C:788:TYR:OH | 1.90 | 0.71 |
| 1:B:723:GLY:HA2 | 1:B:726:MSE:HE2 | 1.73 | 0.70 |
| 1:A:618:MSE:CE | 1:A:623:ILE:CD1 | 2.70 | 0.70 |
| 1:A:746:VAL:HG13 | 1:A:747:GLN:H | 1.56 | 0.70 |
| 1:C:447:LEU:CD2 | 1:C:713:VAL:CG2 | 2.65 | 0.70 |
| 1:B:746:VAL:HG22 | 1:B:788:TYR:OH | 1.90 | 0.69 |
| 1:B:709:THR:HG21 | 1:B:888:ARG:O | 1.91 | 0.69 |
| 1:A:618:MSE:HE3 | 1:A:623:ILE:HD13 | 1.72 | 0.69 |
| 1:B:692:ARG:NH2 | 1:B:766:GLU:O | 2.26 | 0.68 |
| 1:A:820:LEU:HD11 | 1:A:836:ARG:HG2 | 1.76 | 0.67 |
| 1:C:746:VAL:HG11 | 3:C:1003:AR6:O2A | 1.96 | 0.65 |
| 1:C:665:LYS:O | 1:C:669:LEU:HD23 | 1.97 | 0.65 |
| 1:C:818:ASP:O | 1:C:836:ARG:NH2 | 2.30 | 0.64 |
| 1:A:618:MSE:HE3 | 1:A:623:ILE:HD11 | 1.77 | 0.64 |
| 1:A:623:ILE:HD11 | 1:A:688:VAL:HG21 | 1.80 | 0.63 |
| 1:A:746:VAL:HG13 | 1:A:747:GLN:N | 2.14 | 0.63 |
| 1:A:907:MSE:HE3 | 1:A:911:LEU:CD1 | 2.26 | 0.62 |
| 1:B:746:VAL:HG13 | 1:B:747:GLN:N | 2.14 | 0.62 |
| 1:C:447:LEU:HD21 | 1:C:901:MSE:CG | 2.29 | 0.62 |
| 1:C:781:GLN:N | 1:C:800:ASP:OD2 | 2.32 | 0.62 |
| 1:B:657:LEU:HD21 | 1:B:672:LEU:HD12 | 1.81 | 0.62 |
| 1:C:715:TYR:H | 1:C:901:MSE:HE2 | 1.63 | 0.62 |
| 1:B:838:LEU:HD23 | 1:B:878:ILE:HG23 | 1.82 | 0.62 |
| 1:C:824:ARG:HB3 | 1:C:827:ASP:HB2 | 1.82 | 0.61 |
| 1:C:668:LYS:NZ | 1:C:742:GLY:O | 2.34 | 0.61 |
| 1:A:618:MSE:CE | 1:A:623:ILE:HD11 | 2.31 | 0.60 |
| 1:B:597:LEU:HD22 | 1:B:629:ASN:ND2 | 2.16 | 0.60 |
| 1:A:514:TYR:C | 2:A:1002:IOD:I | 3.10 | 0.60 |
| 1:A:687:LEU:HD12 | 1:A:807:TRP:O | 2.00 | 0.60 |
| 1:A:618:MSE:HE2 | 1:A:690:PHE:CE1 | 2.37 | 0.59 |
| 1:A:704:CYS:HB3 | 1:A:918:VAL:HG23 | 1.83 | 0.59 |
| 1:A:657:LEU:HD12 | 1:A:669:LEU:HD21 | 1.85 | 0.59 |
| 1:C:715:TYR:N | 1:C:901:MSE:HE2 | 2.18 | 0.59 |
| 1:C:784:GLU:O | 1:C:795:ALA:HB3 | 2.01 | 0.59 |
| 1:B:487:VAL:HG21 | 1:B:683:LYS:HB2 | 1.84 | 0.58 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:618:MSE:HE3 | 1:A:623:ILE:CG1 | 2.33 | 0.58 |
| 1:C:858:VAL:CG1 | 1:C:889:ASP:O | 2.51 | 0.58 |
| 1:C:911:LEU:HD21 | 1:C:921:VAL:CG2 | 2.30 | 0.58 |
| 1:A:746:VAL:HG22 | 1:A:788:TYR:OH | 2.04 | 0.58 |
| 1:A:447:LEU:HD13 | 1:A:905:TYR:CD2 | 2.40 | 0.57 |
| 1:C:566:LEU:HD13 | 1:C:658:PHE:CD1 | 2.39 | 0.57 |
| 1:A:462:ILE:HD11 | 1:A:850:VAL:HG13 | 1.86 | 0.57 |
| 1:C:457:MSE:SE | 1:C:461:GLY:HA2 | 2.54 | 0.57 |
| 1:B:867:ALA:HB3 | 3:B:1003:AR6:O5D | 2.05 | 0.57 |
| 1:B:727:LEU:HD13 | 1:B:813:GLU:OE2 | 2.05 | 0.57 |
| 1:C:590:MSE:HE1 | 1:C:631:PHE:CG | 2.40 | 0.56 |
| 1:B:746:VAL:HG13 | 1:B:747:GLN:H | 1.69 | 0.56 |
| 1:C:624:ALA:CB | 1:C:679:VAL:HG11 | 2.35 | 0.56 |
| 1:A:657:LEU:HD12 | 1:A:669:LEU:CD2 | 2.35 | 0.56 |
| 1:B:863:TRP:O | 1:B:875:LYS:HG2 | 2.06 | 0.55 |
| 1:B:837:GLU:OE2 | 1:B:875:LYS:NZ | 2.25 | 0.55 |
| 1:A:642:MET:HG2 | 1:A:643:LYS:N | 2.22 | 0.55 |
| 1:C:480:ASP:OD2 | 1:C:481:LEU:HD12 | 2.06 | 0.55 |
| 1:A:638:ARG:NH2 | 1:A:763:LEU:O | 2.39 | 0.55 |
| 1:C:598:PRO:O | 1:C:602:THR:HG22 | 2.06 | 0.55 |
| 1:A:765:THR:HG21 | 1:A:774:LEU:HD22 | 1.89 | 0.55 |
| 1:C:446:TRP:C | 1:C:447:LEU:HD22 | 2.28 | 0.55 |
| 1:C:863:TRP:O | 1:C:875:LYS:HG2 | 2.07 | 0.54 |
| 1:C:851:PRO:HB2 | 1:C:854:ASN:HD22 | 1.72 | 0.54 |
| 1:C:937:SER:O | 1:C:938:THR:HG23 | 2.07 | 0.54 |
| 1:A:746:VAL:HG13 | 3:A:1003:AR6:O2A | 2.08 | 0.54 |
| 1:B:616:VAL:HG13 | 1:B:616:VAL:O | 2.08 | 0.54 |
| 1:B:664:ARG:NH1 | 1:B:790:GLU:O | 2.41 | 0.54 |
| 1:B:820:LEU:HD11 | 1:B:836:ARG:HD2 | 1.88 | 0.54 |
| 1:C:569:PHE:CE2 | 1:C:574:LEU:HD11 | 2.43 | 0.54 |
| 1:A:623:ILE:HD13 | 1:A:760:VAL:HG11 | 1.90 | 0.54 |
| 1:A:726:MSE:SE | 1:A:891:VAL:HG21 | 2.58 | 0.54 |
| 1:C:728:GLN:OE1 | 1:C:751:ARG:NH2 | 2.40 | 0.54 |
| 1:B:485:GLY:O | 1:B:685:THR:HG21 | 2.08 | 0.54 |
| 1:B:657:LEU:HD21 | 1:B:672:LEU:CD1 | 2.37 | 0.54 |
| 1:C:820:LEU:HD11 | 1:C:836:ARG:HG2 | 1.90 | 0.54 |
| 1:C:911:LEU:HD11 | 1:C:916:LEU:HD23 | 1.90 | 0.54 |
| 1:A:826:LEU:HD23 | 1:A:826:LEU:O | 2.08 | 0.53 |
| 1:A:618:MSE:HE3 | 1:A:623:ILE:HG12 | 1.91 | 0.53 |
| 1:B:914:ARG:O | 1:B:915:LYS:HG2 | 2.08 | 0.53 |
| 1:C:639:ASN:O | 1:C:640:ALA:HB2 | 2.09 | 0.53 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:954:GLU:O | 1:C:955:SER:C | 2.46 | 0.53 |
| 1:C:513:LEU:O | 1:C:514:TYR:CD2 | 2.62 | 0.52 |
| 1:C:866:GLY:HA3 | 3:C:1003:AR6:O1A | 2.09 | 0.52 |
| 1:A:618:MSE:HE2 | 1:A:690:PHE:HE1 | 1.73 | 0.52 |
| 1:A:911:LEU:HD22 | 1:A:916:LEU:HD12 | 1.91 | 0.52 |
| 1:C:456:LYS:CE | 1:C:726:MSE:HE2 | 2.40 | 0.52 |
| 1:A:704:CYS:SG | 1:A:918:VAL:HG21 | 2.50 | 0.51 |
| 1:A:746:VAL:CG1 | 1:A:747:GLN:N | 2.74 | 0.51 |
| 1:B:642:MET:O | 1:B:644:SER:N | 2.44 | 0.51 |
| 1:C:665:LYS:HE2 | 2:C:1001:IOD:I | 2.81 | 0.51 |
| 1:B:507:PRO:CB | 1:B:634:THR:HG23 | 2.41 | 0.50 |
| 1:B:551:LEU:HD22 | 1:B:558:SER:HA | 1.93 | 0.50 |
| 1:C:784:GLU:HB3 | 1:C:796:ARG:HD3 | 1.93 | 0.50 |
| 1:A:564:THR:O | 1:A:567:VAL:HG22 | 2.12 | 0.50 |
| 1:B:831:PRO:HG3 | 1:B:926:LEU:HD13 | 1.93 | 0.50 |
| 1:C:746:VAL:CG1 | 1:C:747:GLN:N | 2.75 | 0.50 |
| 1:B:507:PRO:HB3 | 1:B:634:THR:HG23 | 1.94 | 0.50 |
| 1:C:500:ASP:O | 1:C:505:LYS:NZ | 2.44 | 0.50 |
| 1:C:449:THR:HG21 | 1:C:710:ARG:NE | 2.27 | 0.49 |
| 1:A:754:ILE:HG13 | 1:A:755:ASN:HD22 | 1.78 | 0.49 |
| 1:C:454:MSE:HE1 | 1:C:889:ASP:HB3 | 1.93 | 0.49 |
| 1:A:566:LEU:HD13 | 1:A:658:PHE:CD1 | 2.46 | 0.49 |
| 1:A:543:PRO:HB2 | 1:A:567:VAL:HG12 | 1.94 | 0.49 |
| 1:C:610:GLN:HE21 | 1:C:767:VAL:HG13 | 1.78 | 0.49 |
| 1:B:652:ILE:HG12 | 1:B:763:LEU:HD13 | 1.93 | 0.49 |
| 1:C:922:TYR:CE2 | 1:C:926:LEU:HD11 | 2.48 | 0.49 |
| 1:C:866:GLY:HA3 | 3:C:1003:AR6:O3' | 2.11 | 0.49 |
| 1:C:746:VAL:HG12 | 1:C:747:GLN:N | 2.28 | 0.49 |
| 1:C:678:ARG:NH1 | 1:C:682:LYS:O | 2.46 | 0.49 |
| 1:B:449:THR:HB | 1:B:454:MSE:HE2 | 1.94 | 0.49 |
| 1:A:618:MSE:CE | 1:A:623:ILE:HD13 | 2.38 | 0.49 |
| 1:C:462:ILE:HD12 | 1:C:462:ILE:C | 2.33 | 0.49 |
| 3:C:1003:AR6:C3' | 3:C:1003:AR6:O1A | 2.60 | 0.48 |
| 1:B:938:THR:HG23 | 1:B:939:PRO:HD2 | 1.96 | 0.48 |
| 1:B:587:LEU:HB2 | 1:B:588:PRO:HD3 | 1.95 | 0.48 |
| 1:C:447:LEU:HD23 | 1:C:713:VAL:HG22 | 1.90 | 0.48 |
| 1:B:473:HIS:NE2 | 1:B:617:THR:OG1 | 2.36 | 0.48 |
| 1:B:752:PHE:O | 1:B:756:PRO:HA | 2.13 | 0.48 |
| 1:B:507:PRO:HG3 | 1:B:634:THR:CG2 | 2.44 | 0.48 |
| 1:A:574:LEU:CD1 | 1:A:582:LEU:HD22 | 2.44 | 0.47 |
| 1:A:746:VAL:HG22 | 1:A:788:TYR:CZ | 2.49 | 0.47 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:700:GLU:H | 1:B:700:GLU:CD | 2.16 | 0.47 |
| 1:C:733:ASN:HD22 | 1:C:735:PHE:H | 1.61 | 0.47 |
| 1:C:514:TYR:CZ | 1:C:531:LEU:HD22 | 2.49 | 0.47 |
| 1:B:746:VAL:HG22 | 1:B:788:TYR:CZ | 2.50 | 0.47 |
| 1:A:652:ILE:HG12 | 1:A:763:LEU:HD13 | 1.95 | 0.47 |
| 1:A:462:ILE:HG22 | 1:A:463:HIS:N | 2.30 | 0.47 |
| 1:C:657:LEU:HD11 | 1:C:672:LEU:CD1 | 2.45 | 0.47 |
| 1:A:845:PHE:CE1 | 1:A:858:VAL:HG11 | 2.50 | 0.46 |
| 1:A:907:MSE:HE2 | 1:A:949:ILE:HD13 | 1.96 | 0.46 |
| 1:C:573:VAL:HG12 | 1:C:573:VAL:O | 2.15 | 0.46 |
| 1:B:866:GLY:HA3 | 3:B:1003:AR6:O5' | 2.16 | 0.46 |
| 1:C:776:ILE:HD12 | 1:C:776:ILE:N | 2.29 | 0.46 |
| 1:A:864:GLY:HA2 | 3:A:1003:AR6:O2B | 2.15 | 0.46 |
| 1:B:484:ALA:HB2 | 1:B:808:GLN:HE22 | 1.81 | 0.46 |
| 1:C:597:LEU:HD22 | 1:C:629:ASN:ND2 | 2.30 | 0.46 |
| 1:B:945:LEU:HD11 | 1:B:949:ILE:HD11 | 1.98 | 0.46 |
| 1:C:842:TYR:CZ | 1:C:846:LEU:HD22 | 2.50 | 0.46 |
| 1:C:447:LEU:HD21 | 1:C:901:MSE:SE | 2.66 | 0.46 |
| 1:B:675:TYR:CG | 1:B:756:PRO:HG2 | 2.51 | 0.46 |
| 1:C:454:MSE:HE2 | 1:C:891:VAL:HG23 | 1.97 | 0.46 |
| 1:C:784:GLU:HB3 | 1:C:796:ARG:CD | 2.45 | 0.45 |
| 1:C:597:LEU:N | 1:C:598:PRO:HD2 | 2.32 | 0.45 |
| 1:A:770:HIS:CD2 | 1:A:836:ARG:HE | 2.35 | 0.45 |
| 1:A:704:CYS:SG | 1:A:918:VAL:CG2 | 3.04 | 0.45 |
| 1:B:727:LEU:HD11 | 1:B:815:VAL:CG1 | 2.46 | 0.45 |
| 1:C:456:LYS:HE2 | 1:C:726:MSE:HE2 | 1.97 | 0.45 |
| 1:C:467:LEU:HD12 | 1:C:468:ARG:N | 2.32 | 0.45 |
| 1:B:542:ARG:HB2 | 1:B:543:PRO:HD2 | 1.99 | 0.45 |
| 1:A:665:LYS:HD2 | 2:A:1001:IOD:I | 2.87 | 0.44 |
| 1:C:668:LYS:HE3 | 1:C:745:LEU:HG | 1.99 | 0.44 |
| 1:C:745:LEU:HD22 | 1:C:792:TYR:CG | 2.52 | 0.44 |
| 1:A:506:MSE:HE1 | 1:A:597:LEU:HD11 | 1.99 | 0.44 |
| 1:B:610:GLN:O | 1:B:611:LYS:HB2 | 2.17 | 0.44 |
| 1:B:873:ARG:NH2 | 1:B:903:ASP:OD2 | 2.47 | 0.44 |
| 1:C:565:ALA:HB3 | 1:C:658:PHE:O | 2.18 | 0.44 |
| 1:B:776:ILE:HD12 | 1:B:776:ILE:N | 2.32 | 0.44 |
| 1:C:590:MSE:HE3 | 1:C:676:PHE:CD1 | 2.53 | 0.44 |
| 1:C:796:ARG:HG2 | 1:C:796:ARG:HH11 | 1.82 | 0.44 |
| 1:C:796:ARG:CG | 1:C:796:ARG:HH11 | 2.30 | 0.44 |
| 1:C:727:LEU:HD13 | 1:C:813:GLU:HG2 | 2.00 | 0.43 |
| 1:C:569:PHE:CZ | 1:C:574:LEU:HD11 | 2.53 | 0.43 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:701:TRP:O | 1:B:919:GLY:HA2 | 2.17 | 0.43 |
| 1:B:819:ALA:HB2 | 1:B:863:TRP:CE2 | 2.52 | 0.43 |
| 1:C:656:ARG:NE | 1:C:659:GLU:OE1 | 2.42 | 0.43 |
| 1:C:508:CYS:HA | 1:C:529:TRP:CD2 | 2.54 | 0.43 |
| 1:C:955:SER:O | 1:C:956:SER:CB | 2.67 | 0.43 |
| 1:C:449:THR:HG21 | 1:C:710:ARG:CZ | 2.49 | 0.43 |
| 1:A:730:ASP:OD2 | 1:A:730:ASP:C | 2.56 | 0.43 |
| 1:C:500:ASP:HB3 | 1:C:502:LYS:H | 1.83 | 0.43 |
| 1:C:574:LEU:HD22 | 1:C:578:GLU:HB3 | 2.01 | 0.43 |
| 1:B:838:LEU:CD2 | 1:B:878:ILE:HG23 | 2.48 | 0.42 |
| 1:C:911:LEU:CD1 | 1:C:916:LEU:HD23 | 2.49 | 0.42 |
| 1:B:597:LEU:N | 1:B:598:PRO:HD2 | 2.35 | 0.42 |
| 1:C:609:LYS:HG2 | 1:C:649:TYR:OH | 2.19 | 0.42 |
| 1:C:758:LEU:HD11 | 1:C:814:ILE:HD12 | 2.01 | 0.42 |
| 1:A:838:LEU:HD23 | 1:A:878:ILE:HG23 | 2.02 | 0.42 |
| 1:B:543:PRO:HG3 | 1:B:570:TRP:HB3 | 2.02 | 0.42 |
| 1:B:820:LEU:CD1 | 1:B:836:ARG:HD2 | 2.50 | 0.42 |
| 1:C:746:VAL:CG1 | 3:C:1003:AR6:O2A | 2.65 | 0.42 |
| 1:B:563:PHE:O | 1:B:567:VAL:HG23 | 2.19 | 0.42 |
| 1:B:726:MSE:HE3 | 1:B:859:ALA:CB | 2.29 | 0.42 |
| 1:C:454:MSE:HE1 | 1:C:889:ASP:CB | 2.50 | 0.42 |
| 1:C:456:LYS:NZ | 1:C:726:MSE:HE2 | 2.35 | 0.42 |
| 1:C:711:LEU:C | 1:C:711:LEU:HD23 | 2.40 | 0.42 |
| 1:A:922:TYR:CZ | 1:A:926:LEU:HD11 | 2.55 | 0.41 |
| 1:C:868:PHE:CD1 | 3:C:1003:AR6:H5DA | 2.55 | 0.41 |
| 1:C:454:MSE:HE2 | 1:C:891:VAL:CG2 | 2.50 | 0.41 |
| 1:A:483:ARG:HA | 1:A:483:ARG:NE | 2.35 | 0.41 |
| 1:B:546:LEU:HD22 | 1:B:550:ILE:CD1 | 2.51 | 0.41 |
| 1:A:505:LYS:NZ | 1:A:645:GLU:OE1 | 2.52 | 0.41 |
| 1:B:457:MSE:SE | 1:B:461:GLY:CA | 3.18 | 0.41 |
| 1:B:765:THR:HG21 | 1:B:774:LEU:HD22 | 2.02 | 0.41 |
| 1:B:877:LEU:HD23 | 1:B:925:LEU:HD21 | 2.03 | 0.41 |
| 1:C:746:VAL:O | 1:C:747:GLN:C | 2.58 | 0.41 |
| 1:B:623:ILE:HG12 | 1:B:760:VAL:HG11 | 2.01 | 0.41 |
| 1:C:907:MSE:HE3 | 1:C:946:TYR:HA | 2.02 | 0.41 |
| 1:B:746:VAL:CG1 | 1:B:747:GLN:N | 2.83 | 0.41 |
| 1:C:448:GLY:HA3 | 1:C:711:LEU:O | 2.21 | 0.41 |
| 1:C:454:MSE:CE | 1:C:891:VAL:HG23 | 2.51 | 0.41 |
| 1:C:711:LEU:HD13 | 1:C:908:HIS:ND1 | 2.36 | 0.41 |
| 1:C:590:MSE:HE3 | 1:C:676:PHE:CE1 | 2.56 | 0.40 |
| 1:B:727:LEU:HD11 | 1:B:815:VAL:HB | 2.03 | 0.40 |

*Continued on next page...*

*Continued from previous page...*

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:831:PRO:CG | 1:B:926:LEU:HD13 | 2.51 | 0.40 |
| 1:B:914:ARG:O | 1:B:916:LEU:HD12 | 2.21 | 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 | 495/522 (95%) | 473 (96%) | 20 (4%) | 2 (0%) | 34 48 |
| 1 | B | 496/522 (95%) | 482 (97%) | 14 (3%) | 0 | 100 100 |
| 1 | C | 493/522 (94%) | 464 (94%) | 25 (5%) | 4 (1%) | 19 29 |
| All | All | 1484/1566 (95%) | 1419 (96%) | 59 (4%) | 6 (0%) | 34 48 |

All (6) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 643 | LYS |
| 1 | C | 937 | SER |
| 1 | C | 954 | GLU |
| 1 | C | 747 | GLN |
| 1 | C | 955 | SER |
| 1 | A | 645 | GLU |

### 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 | 441/450 (98%) | 429 (97%) | 12 (3%) | 44 65 |
| 1 | B | 442/450 (98%) | 431 (98%) | 11 (2%) | 47 67 |
| 1 | C | 441/450 (98%) | 421 (96%) | 20 (4%) | 27 44 |
| All | All | 1324/1350 (98%) | 1281 (97%) | 43 (3%) | 39 59 |

All (43) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 468 | ARG |
| 1 | A | 546 | LEU |
| 1 | A | 623 | ILE |
| 1 | A | 642 | MET |
| 1 | A | 657 | LEU |
| 1 | A | 702 | GLU |
| 1 | A | 703 | ARG |
| 1 | A | 730 | ASP |
| 1 | A | 746 | VAL |
| 1 | A | 823 | ARG |
| 1 | A | 824 | ARG |
| 1 | A | 902 | ARG |
| 1 | B | 459 | ARG |
| 1 | B | 496 | LYS |
| 1 | B | 510 | GLU |
| 1 | B | 544 | GLN |
| 1 | B | 546 | LEU |
| 1 | B | 582 | LEU |
| 1 | B | 634 | THR |
| 1 | B | 700 | GLU |
| 1 | B | 746 | VAL |
| 1 | B | 821 | HIS |
| 1 | B | 942 | ASP |
| 1 | C | 445 | LYS |
| 1 | C | 447 | LEU |
| 1 | C | 459 | ARG |
| 1 | C | 482 | LEU |
| 1 | C | 500 | ASP |
| 1 | C | 514 | TYR |
| 1 | C | 544 | GLN |
| 1 | C | 546 | LEU |
| 1 | C | 664 | ARG |
| 1 | C | 702 | GLU |
| 1 | C | 714 | THR |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | C | 734 | ARG |
| 1 | C | 760 | VAL |
| 1 | C | 796 | ARG |
| 1 | C | 800 | ASP |
| 1 | C | 824 | ARG |
| 1 | C | 836 | ARG |
| 1 | C | 853 | GLU |
| 1 | C | 934 | ARG |
| 1 | C | 938 | THR |

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 544 | GLN |
| 1 | A | 545 | ASN |
| 1 | A | 755 | ASN |
| 1 | A | 770 | HIS |
| 1 | B | 545 | ASN |
| 1 | B | 614 | HIS |
| 1 | B | 770 | HIS |
| 1 | C | 544 | GLN |
| 1 | C | 610 | GLN |
| 1 | C | 629 | ASN |
| 1 | C | 733 | ASN |
| 1 | C | 808 | GLN |
| 1 | C | 854 | ASN |
| 1 | C | 879 | 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)

Of 9 ligands modelled in this entry, 6 are monoatomic - leaving 3 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | $\#\|Z\| > 2$ | Counts | RMSZ | $\#\|Z\| > 2$ |
| 3 | AR6 | B | 1003 | - | 34,39,39 | 1.43 | 5 (14%) | 40,60,60 | 2.40 | 10 (25%) |
| 3 | AR6 | C | 1003 | - | 34,39,39 | 1.51 | 5 (14%) | 40,60,60 | 2.90 | 9 (22%) |
| 3 | AR6 | A | 1003 | - | 34,39,39 | 1.43 | 6 (17%) | 40,60,60 | 2.21 | 8 (20%) |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 3 | AR6 | B | 1003 | - | - | 9/18/54/54 | 0/4/4/4 |
| 3 | AR6 | C | 1003 | - | - | 10/18/54/54 | 0/4/4/4 |
| 3 | AR6 | A | 1003 | - | - | 8/18/54/54 | 0/4/4/4 |

All (16) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 3 | C | 1003 | AR6 | PA-O2A | 4.68 | 1.67 | 1.50 |
| 3 | C | 1003 | AR6 | C6-N6 | 4.66 | 1.51 | 1.34 |
| 3 | B | 1003 | AR6 | PA-O2A | 4.34 | 1.66 | 1.50 |
| 3 | B | 1003 | AR6 | C6-N6 | 4.16 | 1.49 | 1.34 |
| 3 | A | 1003 | AR6 | PA-O2A | 4.04 | 1.65 | 1.50 |
| 3 | A | 1003 | AR6 | C6-N6 | 4.04 | 1.48 | 1.34 |
| 3 | B | 1003 | AR6 | PA-O5' | 2.86 | 1.70 | 1.59 |
| 3 | A | 1003 | AR6 | PA-O5' | 2.76 | 1.70 | 1.59 |
| 3 | B | 1003 | AR6 | PA-O1A | 2.67 | 1.67 | 1.55 |
| 3 | C | 1003 | AR6 | O4'-C1' | 2.65 | 1.44 | 1.41 |
| 3 | C | 1003 | AR6 | PA-O1A | 2.48 | 1.67 | 1.55 |
| 3 | A | 1003 | AR6 | PA-O1A | 2.47 | 1.66 | 1.55 |
| 3 | A | 1003 | AR6 | C2-N3 | 2.42 | 1.36 | 1.32 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 3 | B | 1003 | AR6 | O4'-C1' | 2.17 | 1.44 | 1.41 |
| 3 | C | 1003 | AR6 | PA-O5' | 2.16 | 1.68 | 1.59 |
| 3 | A | 1003 | AR6 | O4'-C1' | 2.01 | 1.43 | 1.41 |

All (27) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 3 | C | 1003 | AR6 | O5'-C5'-C4' | 10.15 | 143.91 | 108.99 |
| 3 | A | 1003 | AR6 | PA-O5'-C5' | -8.58 | 71.38 | 121.68 |
| 3 | B | 1003 | AR6 | PA-O5'-C5' | -8.53 | 71.64 | 121.68 |
| 3 | C | 1003 | AR6 | PA-O5'-C5' | -8.42 | 72.28 | 121.68 |
| 3 | C | 1003 | AR6 | O1A-PA-O5' | 6.39 | 137.43 | 107.75 |
| 3 | B | 1003 | AR6 | O5'-C5'-C4' | -5.77 | 89.14 | 108.99 |
| 3 | C | 1003 | AR6 | N3-C2-N1 | -4.67 | 121.38 | 128.68 |
| 3 | B | 1003 | AR6 | O1A-PA-O5' | -4.63 | 86.25 | 107.75 |
| 3 | B | 1003 | AR6 | N3-C2-N1 | -4.62 | 121.45 | 128.68 |
| 3 | A | 1003 | AR6 | O5'-C5'-C4' | -4.57 | 93.25 | 108.99 |
| 3 | C | 1003 | AR6 | O1A-PA-O2A | -4.52 | 89.89 | 112.24 |
| 3 | A | 1003 | AR6 | N3-C2-N1 | -4.42 | 121.78 | 128.68 |
| 3 | A | 1003 | AR6 | O1A-PA-O5' | -4.30 | 87.79 | 107.75 |
| 3 | B | 1003 | AR6 | O5'-PA-O2A | 4.22 | 125.55 | 109.07 |
| 3 | B | 1003 | AR6 | PB-O3A-PA | -4.03 | 119.01 | 132.83 |
| 3 | C | 1003 | AR6 | O5'-PA-O2A | -3.86 | 93.99 | 109.07 |
| 3 | C | 1003 | AR6 | PB-O3A-PA | -3.73 | 120.01 | 132.83 |
| 3 | A | 1003 | AR6 | O5'-PA-O2A | 3.62 | 123.20 | 109.07 |
| 3 | B | 1003 | AR6 | C3'-C2'-C1' | 3.43 | 106.15 | 100.98 |
| 3 | A | 1003 | AR6 | PB-O3A-PA | -3.25 | 121.67 | 132.83 |
| 3 | A | 1003 | AR6 | C3'-C2'-C1' | 3.22 | 105.82 | 100.98 |
| 3 | B | 1003 | AR6 | O1D-C1D-O4D | -2.59 | 107.81 | 111.13 |
| 3 | C | 1003 | AR6 | O4'-C1'-C2' | -2.43 | 103.38 | 106.93 |
| 3 | B | 1003 | AR6 | C4-C5-N7 | -2.29 | 107.01 | 109.40 |
| 3 | C | 1003 | AR6 | C3'-C2'-C1' | 2.25 | 104.36 | 100.98 |
| 3 | B | 1003 | AR6 | O4D-C1D-C2D | 2.19 | 107.16 | 104.46 |
| 3 | A | 1003 | AR6 | O1A-PA-O2A | -2.11 | 101.80 | 112.24 |

There are no chirality outliers.

All (27) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 3 | B | 1003 | AR6 | PB-O3A-PA-O5' |
| 3 | B | 1003 | AR6 | C5'-O5'-PA-O2A |
| 3 | B | 1003 | AR6 | C5D-O5D-PB-O2B |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 3 | C | 1003 | AR6 | C5D-O5D-PB-O2B |
| 3 | C | 1003 | AR6 | C3'-C4'-C5'-O5' |
| 3 | C | 1003 | AR6 | O4D-C4D-C5D-O5D |
| 3 | C | 1003 | AR6 | C4'-C5'-O5'-PA |
| 3 | A | 1003 | AR6 | C5'-O5'-PA-O2A |
| 3 | A | 1003 | AR6 | C3D-C4D-C5D-O5D |
| 3 | C | 1003 | AR6 | C3D-C4D-C5D-O5D |
| 3 | C | 1003 | AR6 | O4'-C4'-C5'-O5' |
| 3 | B | 1003 | AR6 | O4D-C4D-C5D-O5D |
| 3 | B | 1003 | AR6 | C3D-C4D-C5D-O5D |
| 3 | A | 1003 | AR6 | O4D-C4D-C5D-O5D |
| 3 | A | 1003 | AR6 | O4'-C4'-C5'-O5' |
| 3 | C | 1003 | AR6 | PA-O3A-PB-O5D |
| 3 | A | 1003 | AR6 | PB-O3A-PA-O5' |
| 3 | B | 1003 | AR6 | C5D-O5D-PB-O3A |
| 3 | C | 1003 | AR6 | C5'-O5'-PA-O3A |
| 3 | B | 1003 | AR6 | C5D-O5D-PB-O1B |
| 3 | C | 1003 | AR6 | C5'-O5'-PA-O2A |
| 3 | B | 1003 | AR6 | O4'-C4'-C5'-O5' |
| 3 | B | 1003 | AR6 | PB-O3A-PA-O2A |
| 3 | A | 1003 | AR6 | PA-O3A-PB-O2B |
| 3 | C | 1003 | AR6 | C5D-O5D-PB-O3A |
| 3 | A | 1003 | AR6 | PA-O3A-PB-O1B |
| 3 | A | 1003 | AR6 | C5D-O5D-PB-O2B |

There are no ring outliers.

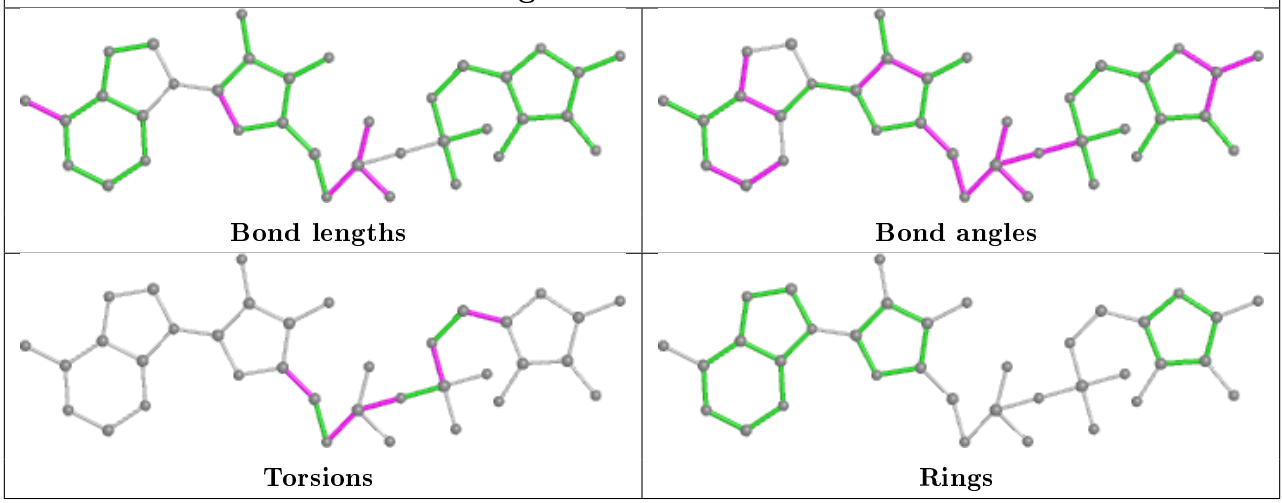
3 monomers are involved in 10 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 3 | B | 1003 | AR6 | 2 | 0 |
| 3 | C | 1003 | AR6 | 6 | 0 |
| 3 | A | 1003 | AR6 | 2 | 0 |

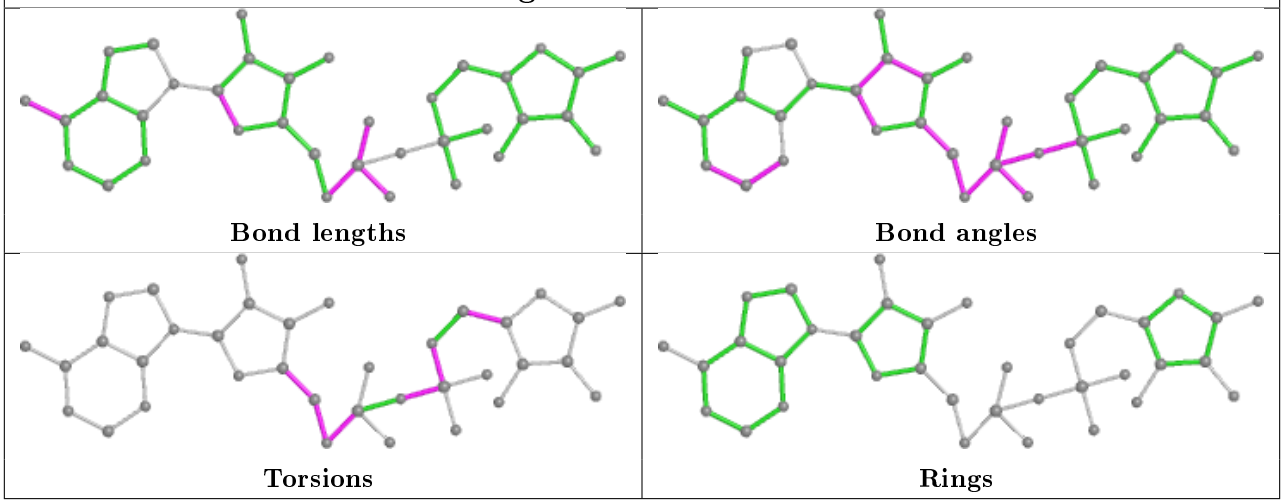
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and

any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

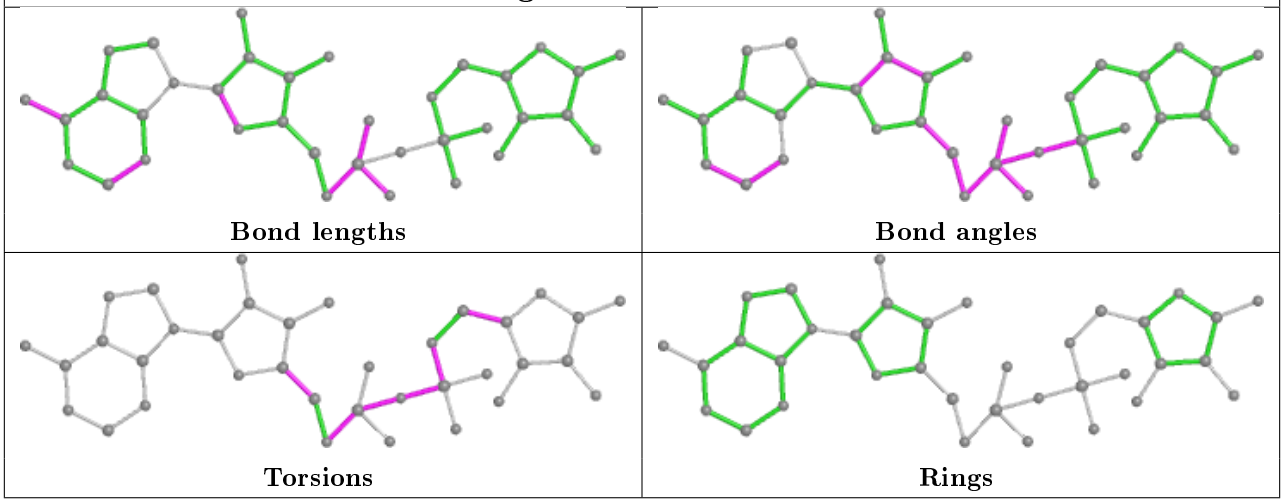
**Ligand AR6 B 1003**




**Ligand AR6 C 1003**




**Ligand AR6 A 1003**



## 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, $95^{th}$ 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 | 492/522 (94%) | 0.25 | 19 (3%) 39 38 | 24, 56, 106, 174 | 0 |
| 1 | B | 493/522 (94%) | 0.52 | 52 (10%) 6 5 | 24, 61, 130, 194 | 0 |
| 1 | C | 492/522 (94%) | 0.97 | 91 (18%) 1 1 | 20, 73, 159, 254 | 0 |
| All | All | 1477/1566 (94%) | 0.58 | 162 (10%) 5 5 | 20, 62, 136, 254 | 0 |

All (162) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | C | 916 | LEU | 7.8 |
| 1 | C | 525 | ALA | 7.7 |
| 1 | C | 582 | LEU | 7.6 |
| 1 | C | 658 | PHE | 7.5 |
| 1 | C | 918 | VAL | 7.3 |
| 1 | C | 540 | PHE | 6.7 |
| 1 | B | 566 | LEU | 6.6 |
| 1 | B | 570 | TRP | 6.6 |
| 1 | B | 546 | LEU | 6.4 |
| 1 | B | 574 | LEU | 6.3 |
| 1 | B | 575 | GLU | 6.0 |
| 1 | C | 571 | ASP | 5.8 |
| 1 | B | 582 | LEU | 5.7 |
| 1 | A | 582 | LEU | 5.6 |
| 1 | C | 587 | LEU | 5.6 |
| 1 | C | 953 | VAL | 5.5 |
| 1 | A | 570 | TRP | 5.5 |
| 1 | C | 563 | PHE | 5.3 |
| 1 | C | 584 | GLN | 5.2 |
| 1 | B | 811 | CYS | 4.9 |
| 1 | B | 580 | GLN | 4.8 |
| 1 | B | 940 | GLY | 4.8 |
| 1 | A | 574 | LEU | 4.6 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | B | 803 | GLU | 4.6 |
| 1 | B | 937 | SER | 4.5 |
| 1 | C | 811 | CYS | 4.5 |
| 1 | A | 580 | GLN | 4.5 |
| 1 | C | 792 | TYR | 4.5 |
| 1 | C | 661 | ARG | 4.4 |
| 1 | C | 570 | TRP | 4.4 |
| 1 | B | 935 | ASN | 4.4 |
| 1 | C | 857 | ALA | 4.1 |
| 1 | C | 575 | GLU | 4.1 |
| 1 | C | 567 | VAL | 4.0 |
| 1 | C | 577 | ALA | 3.9 |
| 1 | C | 446 | TRP | 3.9 |
| 1 | A | 571 | ASP | 3.9 |
| 1 | C | 884 | ALA | 3.9 |
| 1 | C | 782 | TYR | 3.8 |
| 1 | C | 956 | SER | 3.8 |
| 1 | B | 581 | HIS | 3.7 |
| 1 | C | 949 | ILE | 3.7 |
| 1 | B | 583 | TYR | 3.6 |
| 1 | A | 954 | GLU | 3.6 |
| 1 | A | 540 | PHE | 3.6 |
| 1 | A | 576 | GLU | 3.5 |
| 1 | C | 450 | PRO | 3.5 |
| 1 | C | 513 | LEU | 3.4 |
| 1 | B | 577 | ALA | 3.4 |
| 1 | A | 572 | LYS | 3.4 |
| 1 | B | 934 | ARG | 3.3 |
| 1 | A | 935 | ASN | 3.3 |
| 1 | B | 943 | ILE | 3.1 |
| 1 | C | 631 | PHE | 3.1 |
| 1 | C | 572 | LYS | 3.1 |
| 1 | C | 910 | PHE | 3.1 |
| 1 | C | 568 | ASP | 3.1 |
| 1 | C | 717 | GLY | 3.1 |
| 1 | C | 741 | THR | 3.1 |
| 1 | C | 905 | TYR | 3.0 |
| 1 | C | 464 | LEU | 3.0 |
| 1 | C | 578 | GLU | 3.0 |
| 1 | C | 526 | GLY | 3.0 |
| 1 | B | 824 | ARG | 3.0 |
| 1 | C | 889 | ASP | 3.0 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | B | 578 | GLU | 3.0 |
| 1 | A | 541 | THR | 3.0 |
| 1 | B | 464 | LEU | 3.0 |
| 1 | C | 920 | LYS | 2.9 |
| 1 | B | 483 | ARG | 2.9 |
| 1 | C | 576 | GLU | 2.9 |
| 1 | C | 452 | GLU | 2.9 |
| 1 | C | 794 | TRP | 2.9 |
| 1 | C | 888 | ARG | 2.8 |
| 1 | B | 463 | HIS | 2.8 |
| 1 | C | 679 | VAL | 2.8 |
| 1 | C | 514 | TYR | 2.8 |
| 1 | C | 851 | PRO | 2.8 |
| 1 | A | 955 | SER | 2.8 |
| 1 | C | 541 | THR | 2.8 |
| 1 | C | 955 | SER | 2.8 |
| 1 | A | 953 | VAL | 2.7 |
| 1 | B | 910 | PHE | 2.7 |
| 1 | C | 448 | GLY | 2.7 |
| 1 | C | 745 | LEU | 2.7 |
| 1 | B | 540 | PHE | 2.7 |
| 1 | C | 451 | ILE | 2.7 |
| 1 | B | 545 | ASN | 2.7 |
| 1 | B | 445 | LYS | 2.7 |
| 1 | B | 573 | VAL | 2.7 |
| 1 | B | 565 | ALA | 2.7 |
| 1 | B | 569 | PHE | 2.6 |
| 1 | C | 914 | ARG | 2.6 |
| 1 | B | 915 | LYS | 2.6 |
| 1 | C | 557 | TYR | 2.6 |
| 1 | C | 849 | GLY | 2.6 |
| 1 | B | 459 | ARG | 2.6 |
| 1 | A | 583 | TYR | 2.6 |
| 1 | C | 912 | THR | 2.5 |
| 1 | B | 572 | LYS | 2.5 |
| 1 | C | 716 | GLU | 2.5 |
| 1 | C | 449 | THR | 2.5 |
| 1 | B | 926 | LEU | 2.5 |
| 1 | C | 900 | LEU | 2.5 |
| 1 | C | 787 | GLY | 2.5 |
| 1 | C | 468 | ARG | 2.4 |
| 1 | B | 661 | ARG | 2.4 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | C | 893 | PHE | 2.4 |
| 1 | C | 556 | ALA | 2.4 |
| 1 | B | 759 | ILE | 2.4 |
| 1 | B | 938 | THR | 2.4 |
| 1 | C | 853 | GLU | 2.4 |
| 1 | B | 584 | GLN | 2.4 |
| 1 | C | 536 | LEU | 2.4 |
| 1 | C | 891 | VAL | 2.4 |
| 1 | C | 750 | ILE | 2.4 |
| 1 | C | 715 | TYR | 2.4 |
| 1 | B | 559 | LYS | 2.3 |
| 1 | C | 537 | LEU | 2.3 |
| 1 | C | 897 | ASP | 2.3 |
| 1 | C | 788 | TYR | 2.3 |
| 1 | B | 586 | ILE | 2.3 |
| 1 | C | 591 | VAL | 2.3 |
| 1 | C | 724 | ARG | 2.3 |
| 1 | C | 636 | PRO | 2.3 |
| 1 | C | 561 | TRP | 2.3 |
| 1 | B | 939 | PRO | 2.3 |
| 1 | C | 930 | ASN | 2.3 |
| 1 | B | 550 | ILE | 2.3 |
| 1 | C | 569 | PHE | 2.3 |
| 1 | C | 859 | ALA | 2.3 |
| 1 | C | 666 | PRO | 2.2 |
| 1 | B | 576 | GLU | 2.2 |
| 1 | A | 566 | LEU | 2.2 |
| 1 | B | 945 | LEU | 2.2 |
| 1 | A | 942 | ASP | 2.2 |
| 1 | B | 658 | PHE | 2.2 |
| 1 | C | 546 | LEU | 2.2 |
| 1 | C | 445 | LYS | 2.2 |
| 1 | A | 577 | ALA | 2.2 |
| 1 | B | 571 | ASP | 2.1 |
| 1 | C | 917 | ASP | 2.1 |
| 1 | C | 566 | LEU | 2.1 |
| 1 | A | 660 | GLY | 2.1 |
| 1 | A | 661 | ARG | 2.1 |
| 1 | C | 850 | VAL | 2.1 |
| 1 | B | 561 | TRP | 2.1 |
| 1 | C | 743 | ALA | 2.1 |
| 1 | C | 887 | GLU | 2.1 |

*Continued on next page...*

*Continued from previous page...*

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | C | 558 | SER | 2.1 |
| 1 | B | 823 | ARG | 2.1 |
| 1 | C | 677 | ARG | 2.1 |
| 1 | B | 585 | SER | 2.1 |
| 1 | C | 640 | ALA | 2.0 |
| 1 | B | 479 | VAL | 2.0 |
| 1 | C | 583 | TYR | 2.0 |
| 1 | B | 786 | THR | 2.0 |
| 1 | C | 459 | ARG | 2.0 |
| 1 | B | 549 | ALA | 2.0 |
| 1 | C | 535 | ALA | 2.0 |
| 1 | C | 555 | VAL | 2.0 |
| 1 | B | 543 | PRO | 2.0 |

## 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 carbohydrates in this entry.

## 6.4 Ligands (i)

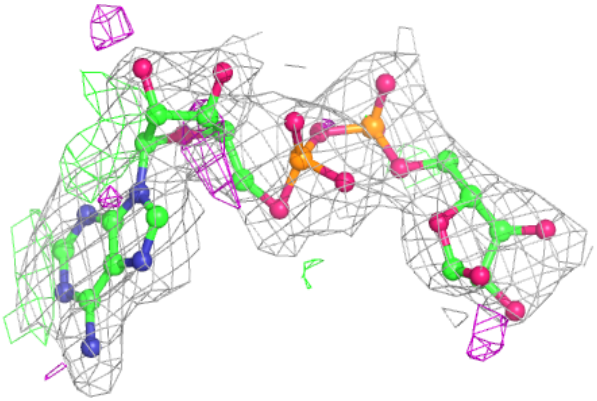
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, $95^{th}$ percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

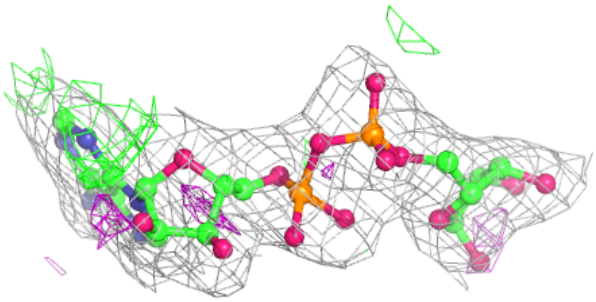
| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å$^2$) | Q<0.9 |
|---|---|---|---|---|---|---|---|---|
| 2 | IOD | A | 1002 | 1/1 | 0.68 | 0.23 | 139,139,139,139 | 0 |
| 2 | IOD | C | 1002 | 1/1 | 0.88 | 0.36 | 175,175,175,175 | 0 |
| 3 | AR6 | C | 1003 | 36/36 | 0.91 | 0.17 | 23,40,50,51 | 0 |
| 3 | AR6 | B | 1003 | 36/36 | 0.94 | 0.14 | 26,38,47,52 | 0 |
| 2 | IOD | C | 1001 | 1/1 | 0.95 | 0.07 | 98,98,98,98 | 0 |
| 2 | IOD | B | 1002 | 1/1 | 0.96 | 0.09 | 93,93,93,93 | 0 |
| 3 | AR6 | A | 1003 | 36/36 | 0.96 | 0.14 | 24,34,41,44 | 0 |
| 2 | IOD | A | 1001 | 1/1 | 0.96 | 0.10 | 78,78,78,78 | 0 |
| 2 | IOD | B | 1001 | 1/1 | 0.96 | 0.04 | 75,75,75,75 | 0 |

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around AR6 C 1003:**

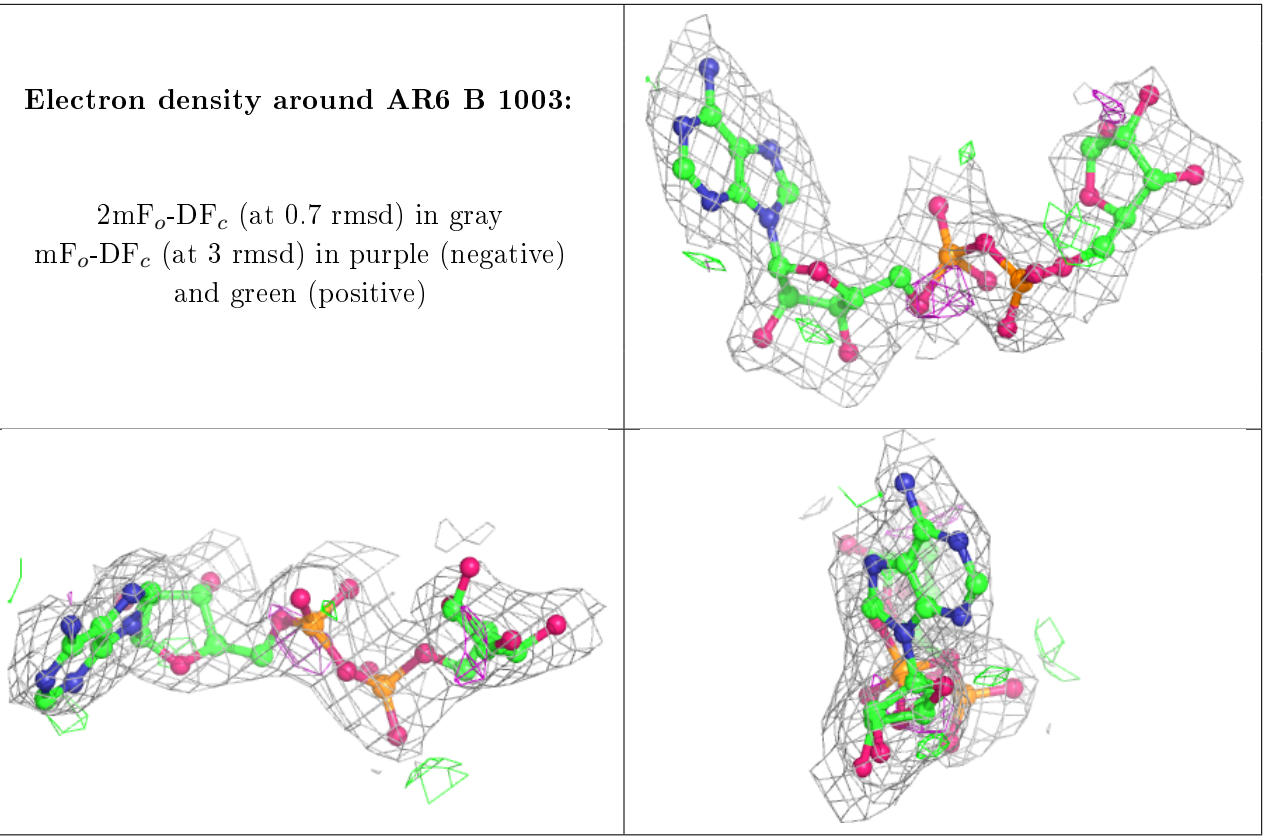
$2mF_o$-$DF_c$ (at 0.7 rmsd) in gray
$mF_o$-$DF_c$ (at 3 rmsd) in purple (negative) and green (positive)





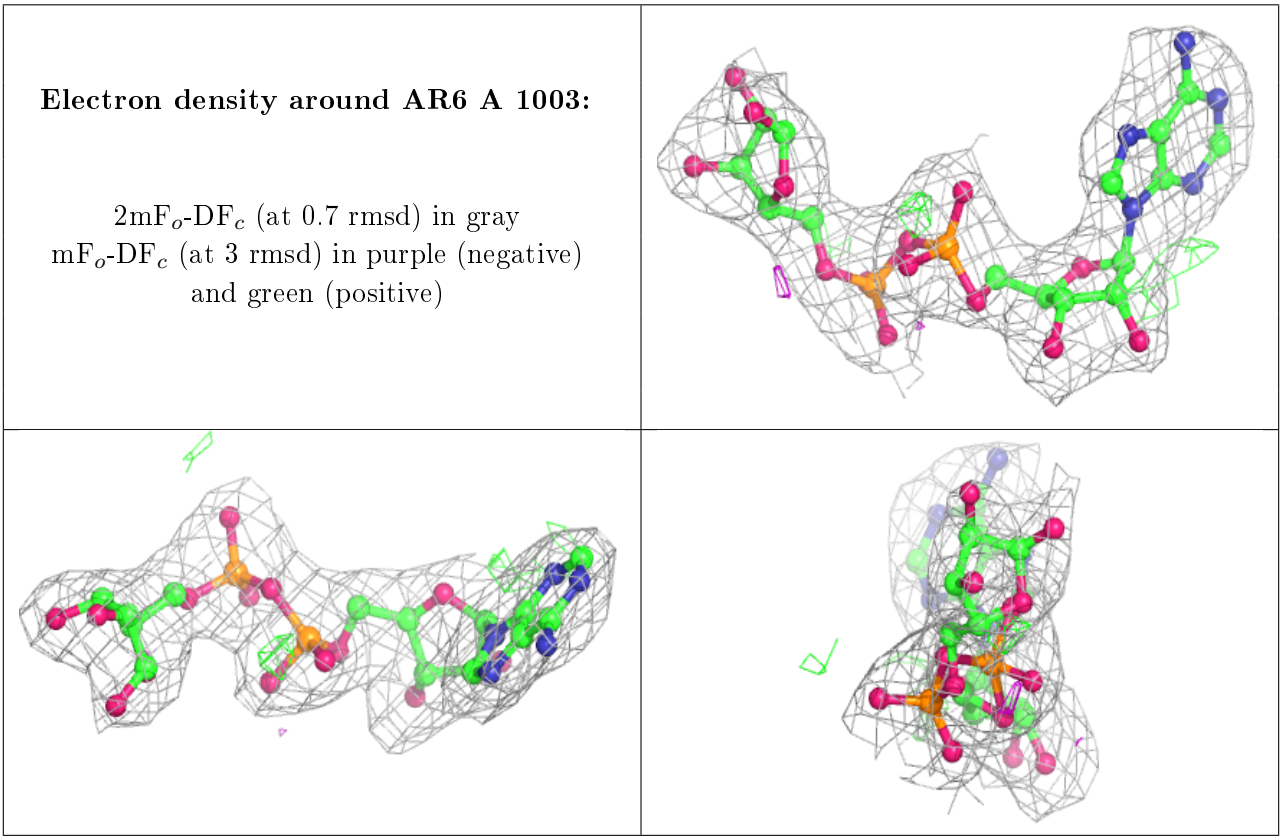
**Electron density around AR6 B 1003:**

$2mF_o$-$DF_c$ (at 0.7 rmsd) in gray
$mF_o$-$DF_c$ (at 3 rmsd) in purple (negative) and green (positive)



**Electron density around AR6 A 1003:**

$2mF_o$-$DF_c$ (at 0.7 rmsd) in gray
$mF_o$-$DF_c$ (at 3 rmsd) in purple (negative) and green (positive)



## 6.5 Other polymers (i)

There are no such residues in this entry.