# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 23, 2025 – 06:29 PM JST

| | | |
|---|---|---|
| PDB ID | : | 9UU0 / pdb_00009uu0 |
| Title | : | The structure of Bacteroides fragilis T6SS effector BteO |
| Authors | : | He, J.; Gao, X. |
| Deposited on | : | 2025-05-05 |
| Resolution | : | 2.72 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 types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

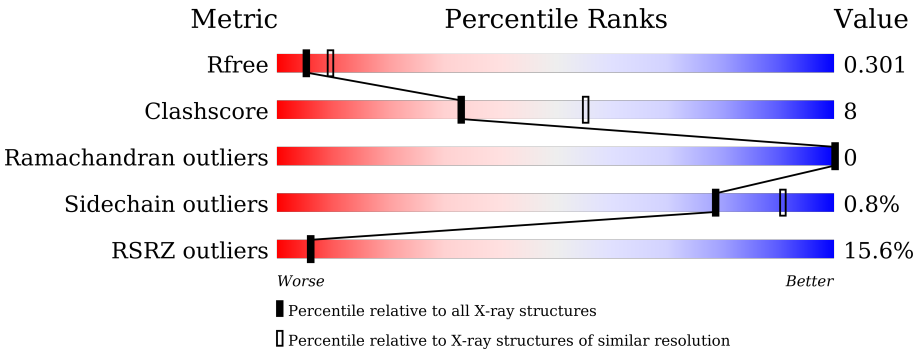
| | | |
|---|---|---|
| MolProbity | : | 4-5-2 with Phenix2.0 |
| Xtriage (Phenix) | : | 2.0 |
| EDS | : | 3.0 |
| Percentile statistics | : | 20231227.v01 (using entries in the PDB archive December 27th 2023) |
| CCP4 | : | 9.0.010 (Gargrove) |
| Density-Fitness | : | 1.0.12 |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.46 |

# 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 2.72 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)) |
|---|---|---|
| $R_{free}$ | 164625 | 4050 (2.74-2.70) |
| Clashscore | 180529 | 4439 (2.74-2.70) |
| Ramachandran outliers | 177936 | 4374 (2.74-2.70) |
| Sidechain outliers | 177891 | 4375 (2.74-2.70) |
| RSRZ outliers | 164620 | 4050 (2.74-2.70) |

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 | 590 | 13% 83% 16% |
| 1 | B | 590 | 18% 84% 16% |

# 2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 9234 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 Maltose/maltodextrin-binding periplasmic protein,Bacteroides fragilis T6SS effector.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 590 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 4606 | 2926 | 787 | 882 | 11 | | | |
| 1 | B | 590 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 4606 | 2926 | 787 | 882 | 11 | | | |

There are 12 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 1 | MET | - | initiating methionine | UNP P0AEX9 |
| A | 83 | ALA | ASP | conflict | UNP P0AEX9 |
| A | 84 | ALA | LYS | conflict | UNP P0AEX9 |
| A | 173 | ALA | GLU | conflict | UNP P0AEX9 |
| A | 174 | ALA | ASN | conflict | UNP P0AEX9 |
| A | 240 | ALA | LYS | conflict | UNP P0AEX9 |
| B | 1 | MET | - | initiating methionine | UNP P0AEX9 |
| B | 83 | ALA | ASP | conflict | UNP P0AEX9 |
| B | 84 | ALA | LYS | conflict | UNP P0AEX9 |
| B | 173 | ALA | GLU | conflict | UNP P0AEX9 |
| B | 174 | ALA | ASN | conflict | UNP P0AEX9 |
| B | 240 | ALA | LYS | conflict | UNP P0AEX9 |

- Molecule 2 is water.

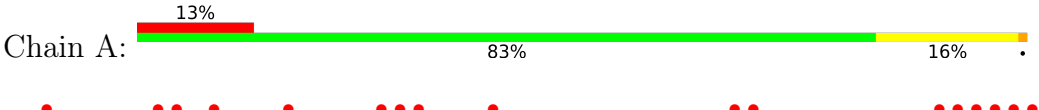
| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 2 | A | 12 | Total | O | 0 | 0 |
| | | | 12 | 12 | | |
| 2 | B | 10 | Total | O | 0 | 0 |
| | | | 10 | 10 | | |

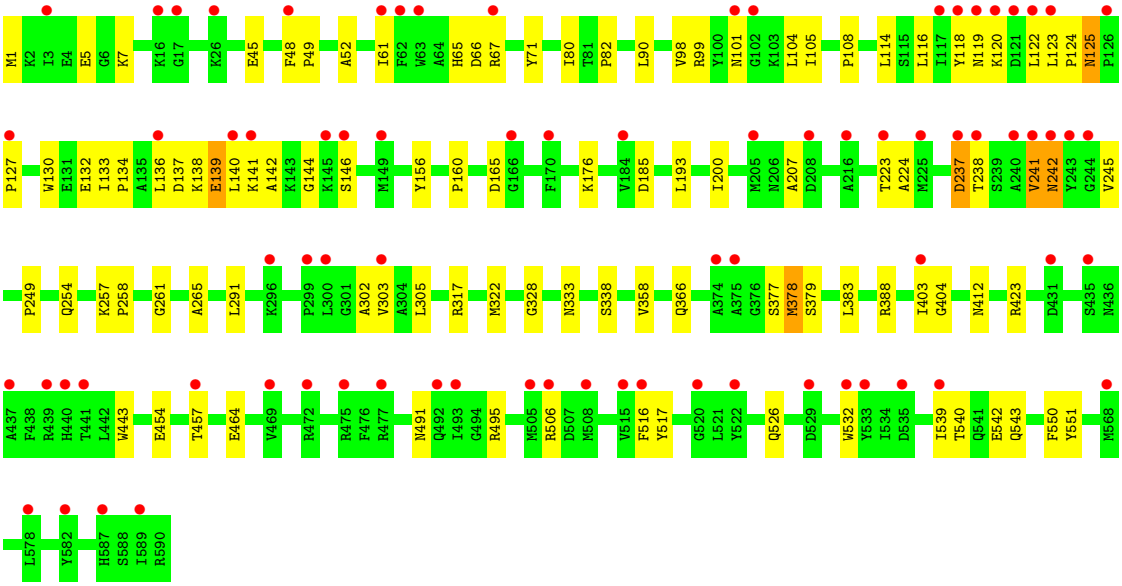
# 3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry 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: Maltose/maltodextrin-binding periplasmic protein,Bacteroides fragilis T6SS effector

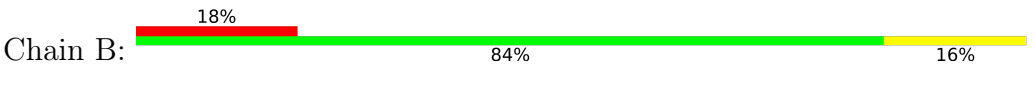
Chain A:

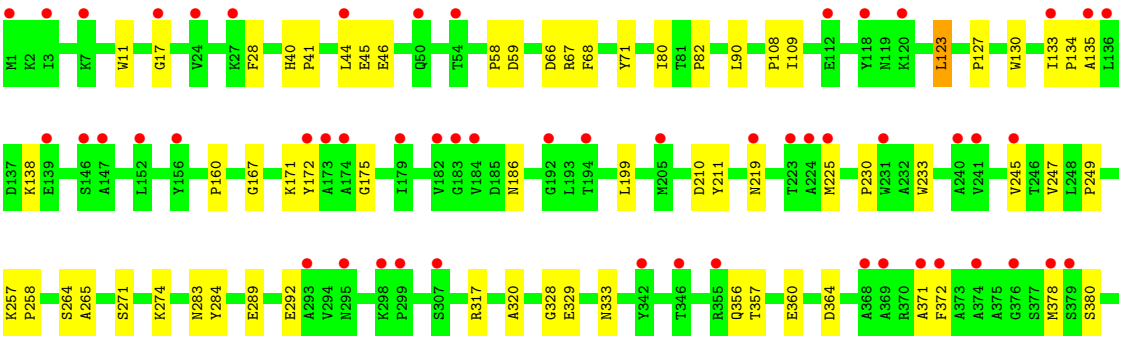


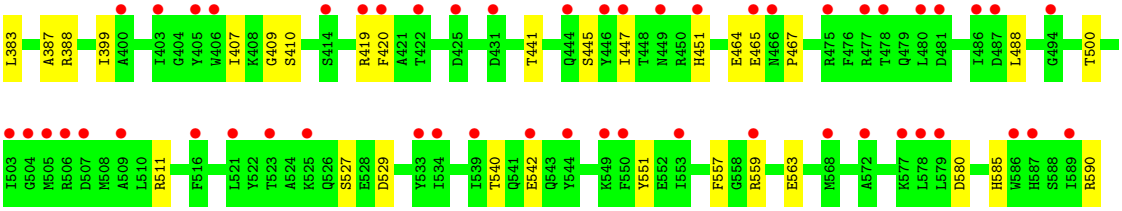




• Molecule 1: Maltose/maltodextrin-binding periplasmic protein,Bacteroides fragilis T6SS effector

Chain B:




L383
A387
R388
I399
A400
I403
G404
Y405
W406
I407
K408
G409
S410
S414
R419
F420
A421
T422
D425
D431
T441
Q444
S445
Y446
I447
T448
N449
R450
H451
E464
E465
N466
P467
R475
F476
R477
T478
Q479
L480
D481
I486
D487
L488
G494
T500
I503
G504
M505
R506
D507
M508
A509
L510
R511
F516
L521
Y522
T523
A524
K525
Q526
S527
E528
D529
Y533
I534
I539
T540
Q541
E542
Q543
Y544
K549
F550
Y551
E552
I553
F557
G558
R559
E563
M568
A572
K577
L578
L579
D580
H585
W586
H587
S588
I589
R590

# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | C 1 2 1 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 234.12Å 63.46Å 113.61Å<br>90.00° 110.79° 90.00° | Depositor |
| Resolution (Å) | 56.26 – 2.72<br>56.26 – 2.72 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 99.0 (56.26-2.72)<br>99.1 (56.26-2.72) | Depositor<br>EDS |
| $R_{merge}$ | (Not available) | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 1.50 (at 2.73Å) | Xtriage |
| Refinement program | PHENIX 1.17.1_3660 | Depositor |
| R, $R_{free}$ | 0.275 , 0.297<br>0.278 , 0.301 | Depositor<br>DCC |
| $R_{free}$ test set | 2089 reflections (4.93%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 61.3 | Xtriage |
| Anisotropy | 0.540 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.34 , 55.6 | EDS |
| L-test for twinning[2] | $< \|L\| > = 0.50$, $< L^2 > = 0.34$ | Xtriage |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| $F_o$,$F_c$ correlation | 0.91 | EDS |
| Total number of atoms | 9234 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 82.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.22% of the height of the origin peak. No significant pseudotranslation is detected.*

[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 | 0.28 | 0/4708 | 0.47 | 3/6378 (0.0%) |
| 1 | B | 0.14 | 0/4708 | 0.33 | 1/6378 (0.0%) |
| All | All | 0.22 | 0/9416 | 0.41 | 4/12756 (0.0%) |

There are no bond length outliers.

All (4) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | A | 242 | ASN | N-CA-C | 8.41 | 122.99 | 111.39 |
| 1 | A | 378 | MET | N-CA-C | -6.86 | 104.78 | 113.02 |
| 1 | A | 241 | VAL | N-CA-C | -5.24 | 107.61 | 112.43 |
| 1 | B | 17 | GLY | N-CA-C | -5.09 | 103.03 | 110.97 |

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 | 4606 | 0 | 4532 | 78 | 0 |
| 1 | B | 4606 | 0 | 4532 | 71 | 0 |
| 2 | A | 12 | 0 | 0 | 0 | 0 |
| 2 | B | 10 | 0 | 0 | 9 | 0 |
| All | All | 9234 | 0 | 9064 | 141 | 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 8.

All (141) 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:465:GLU:HG2 | 2:B:607:HOH:O | 1.63 | 0.99 |
| 1:A:120:LYS:HE2 | 1:B:138:LYS:NZ | 1.92 | 0.85 |
| 1:A:122:LEU:HD22 | 1:A:224:ALA:HB1 | 1.57 | 0.83 |
| 1:B:357:THR:HB | 2:B:604:HOH:O | 1.81 | 0.80 |
| 1:A:90:LEU:HD23 | 1:A:108:PRO:HG2 | 1.71 | 0.73 |
| 1:B:172:TYR:CZ | 1:B:175:GLY:HA2 | 2.25 | 0.71 |
| 1:B:357:THR:CB | 2:B:604:HOH:O | 2.36 | 0.69 |
| 1:A:101:ASN:OD1 | 1:A:176:LYS:NZ | 2.26 | 0.68 |
| 1:B:380:SER:HA | 1:B:383:LEU:HD12 | 1.77 | 0.66 |
| 1:A:1:MET:HE1 | 1:A:5:GLU:HB2 | 1.78 | 0.66 |
| 1:B:559:ARG:HB3 | 1:B:563:GLU:HG3 | 1.79 | 0.65 |
| 1:B:80:ILE:HG22 | 1:B:82:PRO:HD3 | 1.78 | 0.65 |
| 1:A:80:ILE:HG22 | 1:A:82:PRO:HD3 | 1.78 | 0.64 |
| 1:A:241:VAL:HG12 | 1:A:241:VAL:O | 1.98 | 0.64 |
| 1:A:120:LYS:HE2 | 1:B:138:LYS:HZ1 | 1.60 | 0.62 |
| 1:B:388:ARG:NH2 | 1:B:464:GLU:O | 2.33 | 0.61 |
| 1:A:517:TYR:HA | 1:A:539:ILE:HG22 | 1.82 | 0.61 |
| 1:A:120:LYS:HA | 1:A:123:LEU:HB2 | 1.82 | 0.61 |
| 1:B:585:HIS:HA | 2:B:603:HOH:O | 2.01 | 0.60 |
| 1:B:219:ASN:ND2 | 2:B:602:HOH:O | 2.35 | 0.60 |
| 1:A:120:LYS:HE2 | 1:B:138:LYS:CE | 2.33 | 0.59 |
| 1:A:120:LYS:NZ | 1:B:135:ALA:HA | 2.18 | 0.59 |
| 1:B:407:ILE:HB | 1:B:410:SER:HB2 | 1.84 | 0.58 |
| 1:B:11:TRP:HB3 | 1:B:44:LEU:HD11 | 1.86 | 0.58 |
| 1:A:165:ASP:HA | 1:A:254:GLN:OE1 | 2.04 | 0.58 |
| 1:A:539:ILE:HD11 | 1:A:543:GLN:HB3 | 1.86 | 0.57 |
| 1:A:122:LEU:O | 1:A:123:LEU:C | 2.48 | 0.57 |
| 1:A:291:LEU:HD13 | 1:A:303:VAL:HG11 | 1.87 | 0.57 |
| 1:B:172:TYR:OH | 1:B:175:GLY:HA2 | 2.04 | 0.57 |
| 1:A:124:PRO:O | 1:A:125:ASN:C | 2.46 | 0.56 |
| 1:A:516:PHE:CE2 | 1:A:539:ILE:HB | 2.40 | 0.56 |
| 1:A:257:LYS:HA | 1:A:328:GLY:HA2 | 1.87 | 0.56 |
| 1:A:404:GLY:HA3 | 1:A:412:ASN:HD22 | 1.72 | 0.55 |
| 1:A:99:ARG:HG3 | 1:A:104:LEU:HD23 | 1.89 | 0.54 |
| 1:A:193:LEU:HD23 | 1:A:358:VAL:HG13 | 1.90 | 0.54 |
| 1:B:257:LYS:HA | 1:B:328:GLY:HA2 | 1.90 | 0.53 |
| 1:A:146:SER:OG | 1:A:223:THR:HB | 2.08 | 0.53 |
| 1:A:388:ARG:NH2 | 1:A:464:GLU:O | 2.41 | 0.53 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:303:VAL:HG12 | 1:A:305:LEU:H | 1.74 | 0.52 |
| 1:A:48:PHE:CE1 | 1:A:61:ILE:HD11 | 2.44 | 0.52 |
| 1:A:132:GLU:O | 1:A:136:LEU:HG | 2.09 | 0.52 |
| 1:B:123:LEU:HD21 | 1:B:127:PRO:HD3 | 1.91 | 0.52 |
| 1:B:372:PHE:HB3 | 1:B:378:MET:HE1 | 1.92 | 0.52 |
| 1:B:245:VAL:HG12 | 1:B:320:ALA:HB3 | 1.92 | 0.51 |
| 1:B:230:PRO:HA | 1:B:233:TRP:CE2 | 2.46 | 0.51 |
| 1:B:356:GLN:NE2 | 1:B:364:ASP:OD2 | 2.44 | 0.50 |
| 1:B:45:GLU:O | 1:B:71:TYR:OH | 2.28 | 0.50 |
| 1:B:133:ILE:HG13 | 1:B:134:PRO:HD3 | 1.92 | 0.50 |
| 1:B:500:THR:HG1 | 1:B:511:ARG:HH12 | 1.57 | 0.50 |
| 1:B:245:VAL:HB | 1:B:317:ARG:HA | 1.94 | 0.49 |
| 1:A:120:LYS:HE2 | 1:B:138:LYS:HE2 | 1.93 | 0.49 |
| 1:A:120:LYS:HZ2 | 1:B:135:ALA:HA | 1.77 | 0.49 |
| 1:B:130:TRP:CD1 | 1:B:249:PRO:HB2 | 2.47 | 0.49 |
| 1:B:527:SER:OG | 1:B:529:ASP:OD1 | 2.23 | 0.49 |
| 1:B:540:THR:HG22 | 1:B:542:GLU:H | 1.76 | 0.49 |
| 1:A:49:PRO:HG3 | 1:A:71:TYR:CE1 | 2.48 | 0.49 |
| 1:A:237:ASP:O | 1:A:238:THR:C | 2.55 | 0.49 |
| 1:A:123:LEU:HB3 | 1:A:124:PRO:HD3 | 1.95 | 0.49 |
| 1:B:28:PHE:HA | 1:B:284:TYR:HE2 | 1.77 | 0.48 |
| 1:A:66:ASP:HA | 1:A:333:ASN:HA | 1.96 | 0.48 |
| 1:A:45:GLU:HB2 | 1:A:67:ARG:CZ | 2.43 | 0.48 |
| 1:B:90:LEU:HD23 | 1:B:108:PRO:HG2 | 1.96 | 0.48 |
| 1:B:133:ILE:N | 1:B:134:PRO:HD2 | 2.29 | 0.48 |
| 1:A:383:LEU:O | 1:A:388:ARG:NH1 | 2.45 | 0.47 |
| 1:A:338:SER:OG | 1:A:378:MET:HE3 | 2.15 | 0.47 |
| 1:B:66:ASP:HA | 1:B:333:ASN:HA | 1.97 | 0.47 |
| 1:A:137:ASP:O | 1:A:138:LYS:C | 2.58 | 0.47 |
| 1:A:491:ASN:O | 1:A:495:ARG:HG3 | 2.15 | 0.47 |
| 1:A:138:LYS:O | 1:A:139:GLU:C | 2.58 | 0.47 |
| 1:B:257:LYS:HE2 | 1:B:329:GLU:HB2 | 1.96 | 0.47 |
| 1:B:371:ALA:HB1 | 1:B:387:ALA:HB2 | 1.98 | 0.46 |
| 1:A:200:ILE:HD13 | 1:A:207:ALA:HB2 | 1.97 | 0.46 |
| 1:A:540:THR:OG1 | 1:A:543:GLN:HG3 | 2.15 | 0.46 |
| 1:B:172:TYR:CE2 | 1:B:175:GLY:HA2 | 2.50 | 0.46 |
| 1:B:441:THR:O | 1:B:445:SER:OG | 2.30 | 0.46 |
| 1:A:130:TRP:CD1 | 1:A:249:PRO:HB2 | 2.51 | 0.45 |
| 1:A:423:ARG:HD3 | 1:A:550:PHE:CE1 | 2.51 | 0.45 |
| 1:A:241:VAL:O | 1:A:241:VAL:CG1 | 2.64 | 0.45 |
| 1:B:11:TRP:CD2 | 1:B:58:PRO:HG3 | 2.51 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:45:GLU:HG2 | 1:B:46:GLU:HG3 | 1.98 | 0.45 |
| 1:B:133:ILE:HG13 | 1:B:134:PRO:CD | 2.46 | 0.45 |
| 1:A:302:ALA:HB1 | 1:A:322:MET:HE2 | 1.99 | 0.45 |
| 1:A:185:ASP:HB3 | 1:A:366:GLN:OE1 | 2.17 | 0.45 |
| 1:B:271:SER:O | 1:B:274:LYS:HG3 | 2.16 | 0.45 |
| 1:A:539:ILE:HG12 | 1:A:543:GLN:HB2 | 1.99 | 0.44 |
| 1:B:399:ILE:HG23 | 1:B:451:HIS:CE1 | 2.52 | 0.44 |
| 1:A:127:PRO:HG3 | 1:A:136:LEU:CD1 | 2.47 | 0.44 |
| 1:B:167:GLY:HA2 | 1:B:186:ASN:HD21 | 1.82 | 0.44 |
| 1:A:146:SER:OG | 1:A:223:THR:CB | 2.66 | 0.44 |
| 1:A:516:PHE:CD2 | 1:A:539:ILE:HB | 2.52 | 0.44 |
| 1:A:454:GLU:HA | 1:A:457:THR:HG22 | 1.99 | 0.44 |
| 1:B:41:PRO:HD2 | 1:B:44:LEU:HD12 | 1.99 | 0.43 |
| 1:A:61:ILE:O | 1:A:265:ALA:HA | 2.18 | 0.43 |
| 1:A:116:LEU:HD12 | 1:A:249:PRO:HD3 | 2.00 | 0.43 |
| 1:A:120:LYS:HZ2 | 1:B:135:ALA:CB | 2.31 | 0.43 |
| 1:A:90:LEU:CD2 | 1:A:108:PRO:HG2 | 2.45 | 0.43 |
| 1:B:59:ASP:OD1 | 1:B:271:SER:OG | 2.33 | 0.43 |
| 1:A:49:PRO:HG3 | 1:A:71:TYR:HE1 | 1.84 | 0.43 |
| 1:A:98:VAL:O | 1:A:105:ILE:HG12 | 2.19 | 0.43 |
| 1:B:467:PRO:HA | 1:B:488:LEU:HD11 | 2.01 | 0.43 |
| 1:B:40:HIS:O | 1:B:40:HIS:ND1 | 2.52 | 0.43 |
| 1:A:7:LYS:HE2 | 1:A:7:LYS:HB3 | 1.92 | 0.43 |
| 1:A:138:LYS:HA | 1:A:141:LYS:HB2 | 2.01 | 0.43 |
| 1:A:140:LEU:O | 1:A:141:LYS:C | 2.62 | 0.43 |
| 1:B:585:HIS:CB | 2:B:603:HOH:O | 2.67 | 0.42 |
| 1:A:48:PHE:CE1 | 1:A:52:ALA:HB2 | 2.54 | 0.42 |
| 1:B:210:ASP:OD1 | 1:B:211:TYR:N | 2.47 | 0.42 |
| 1:B:28:PHE:HA | 1:B:284:TYR:CE2 | 2.54 | 0.42 |
| 1:A:119:ASN:OD1 | 1:A:120:LYS:N | 2.49 | 0.42 |
| 1:A:142:ALA:C | 1:A:144:GLY:H | 2.27 | 0.42 |
| 1:A:127:PRO:HG3 | 1:A:136:LEU:HD12 | 2.00 | 0.42 |
| 1:A:242:ASN:HD22 | 1:A:242:ASN:N | 2.17 | 0.42 |
| 1:B:289:GLU:O | 1:B:292:GLU:HG3 | 2.20 | 0.42 |
| 1:A:133:ILE:N | 1:A:134:PRO:HD2 | 2.34 | 0.42 |
| 1:A:245:VAL:HB | 1:A:317:ARG:HA | 2.02 | 0.42 |
| 1:A:516:PHE:CE2 | 1:A:539:ILE:HD12 | 2.55 | 0.42 |
| 1:B:127:PRO:HG2 | 1:B:225:MET:HE1 | 2.02 | 0.42 |
| 1:B:283:ASN:C | 1:B:284:TYR:HD1 | 2.28 | 0.42 |
| 1:B:580:ASP:HB3 | 1:B:590:ARG:HG2 | 2.01 | 0.42 |
| 1:B:66:ASP:OD1 | 1:B:67:ARG:N | 2.53 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:160:PRO:HG3 | 1:B:258:PRO:HA | 2.00 | 0.41 |
| 1:B:447:ILE:HA | 1:B:451:HIS:HD2 | 1.83 | 0.41 |
| 1:B:68:PHE:CE2 | 1:B:264:SER:HB2 | 2.55 | 0.41 |
| 1:B:133:ILE:HD11 | 1:B:199:LEU:HD21 | 2.03 | 0.41 |
| 1:A:65:HIS:HE1 | 1:A:261:GLY:HA2 | 1.84 | 0.41 |
| 1:B:419:ARG:HD2 | 1:B:557:PHE:O | 2.20 | 0.41 |
| 1:A:118:TYR:HB2 | 1:A:122:LEU:HD21 | 2.03 | 0.41 |
| 1:A:114:LEU:HD13 | 1:A:156:TYR:HE2 | 1.86 | 0.41 |
| 1:A:142:ALA:C | 1:A:144:GLY:N | 2.78 | 0.41 |
| 1:A:120:LYS:NZ | 1:B:135:ALA:CA | 2.81 | 0.41 |
| 1:A:160:PRO:HG3 | 1:A:258:PRO:HA | 2.03 | 0.40 |
| 1:A:506:ARG:HD2 | 1:A:551:TYR:O | 2.21 | 0.40 |
| 1:A:542:GLU:O | 1:A:543:GLN:C | 2.64 | 0.40 |
| 1:B:409:GLY:HA2 | 1:B:419:ARG:HH22 | 1.86 | 0.40 |
| 1:B:420:PHE:O | 1:B:551:TYR:OH | 2.37 | 0.40 |
| 1:A:403:ILE:HG23 | 1:A:443:TRP:HE1 | 1.86 | 0.40 |
| 1:B:360:GLU:OE1 | 2:B:601:HOH:O | 2.22 | 0.40 |
| 1:A:526:GLN:HB2 | 1:A:532:TRP:CZ3 | 2.56 | 0.40 |
| 1:B:109:ILE:HD11 | 1:B:265:ALA:HB2 | 2.03 | 0.40 |
| 1:B:585:HIS:ND1 | 2:B:603:HOH:O | 2.37 | 0.40 |
| 1:B:585:HIS:CA | 2:B:603:HOH:O | 2.65 | 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 | 588/590 (100%) | 567 (96%) | 21 (4%) | 0 | 100 | 100 |
| 1 | B | 588/590 (100%) | 580 (99%) | 8 (1%) | 0 | 100 | 100 |
| All | All | 1176/1180 (100%) | 1147 (98%) | 29 (2%) | 0 | 100 | 100 |

There are no Ramachandran outliers to report.

### 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 | 472/472 (100%) | 467 (99%) | 5 (1%) | 70 87 |
| 1 | B | 472/472 (100%) | 469 (99%) | 3 (1%) | 84 93 |
| All | All | 944/944 (100%) | 936 (99%) | 8 (1%) | 79 91 |

All (8) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 125 | ASN |
| 1 | A | 139 | GLU |
| 1 | A | 237 | ASP |
| 1 | A | 377 | SER |
| 1 | A | 379 | SER |
| 1 | B | 123 | LEU |
| 1 | B | 171 | LYS |
| 1 | B | 247 | VAL |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 153 | GLN |
| 1 | A | 204 | HIS |
| 1 | A | 242 | ASN |
| 1 | A | 356 | GLN |
| 1 | A | 436 | ASN |
| 1 | A | 451 | HIS |
| 1 | B | 396 | HIS |
| 1 | B | 444 | GLN |
| 1 | B | 451 | HIS |

#### 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 oligosaccharides 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

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 | 590/590 (100%) | 1.12 | 78 (13%) | 8 | 8 | 44, 75, 111, 153 | 0 |
| 1 | B | 590/590 (100%) | 1.30 | 106 (17%) | 4 | 5 | 51, 83, 126, 153 | 0 |
| All | All | 1180/1180 (100%) | 1.21 | 184 (15%) | 6 | 6 | 44, 79, 120, 153 | 0 |

All (184) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | A | 121 | ASP | 5.7 |
| 1 | B | 451 | HIS | 5.2 |
| 1 | B | 579 | LEU | 4.7 |
| 1 | B | 17 | GLY | 4.6 |
| 1 | B | 342 | TYR | 4.5 |
| 1 | B | 550 | PHE | 4.5 |
| 1 | B | 465 | GLU | 4.2 |
| 1 | A | 244 | GLY | 4.2 |
| 1 | A | 241 | VAL | 4.1 |
| 1 | B | 481 | ASP | 4.1 |
| 1 | A | 439 | ARG | 4.0 |
| 1 | A | 493 | ILE | 4.0 |
| 1 | A | 122 | LEU | 3.9 |
| 1 | B | 1 | MET | 3.9 |
| 1 | B | 503 | ILE | 3.9 |
| 1 | B | 146 | SER | 3.8 |
| 1 | B | 225 | MET | 3.8 |
| 1 | A | 516 | PHE | 3.7 |
| 1 | B | 405 | TYR | 3.7 |
| 1 | A | 123 | LEU | 3.6 |
| 1 | B | 578 | LEU | 3.6 |
| 1 | B | 378 | MET | 3.6 |
| 1 | B | 542 | GLU | 3.5 |
| 1 | B | 240 | ALA | 3.5 |

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| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | B | 174 | ALA | 3.5 |
| 1 | B | 355 | ARG | 3.5 |
| 1 | B | 559 | ARG | 3.5 |
| 1 | A | 225 | MET | 3.5 |
| 1 | B | 371 | ALA | 3.5 |
| 1 | B | 422 | THR | 3.5 |
| 1 | A | 205 | MET | 3.4 |
| 1 | A | 243 | TYR | 3.4 |
| 1 | A | 184 | VAL | 3.4 |
| 1 | B | 587 | HIS | 3.4 |
| 1 | B | 549 | LYS | 3.4 |
| 1 | A | 61 | ILE | 3.4 |
| 1 | A | 303 | VAL | 3.3 |
| 1 | A | 3 | ILE | 3.3 |
| 1 | B | 533 | TYR | 3.2 |
| 1 | B | 299 | PRO | 3.2 |
| 1 | B | 182 | VAL | 3.2 |
| 1 | A | 223 | THR | 3.1 |
| 1 | A | 118 | TYR | 3.1 |
| 1 | B | 449 | ASN | 3.1 |
| 1 | B | 298 | LYS | 3.1 |
| 1 | B | 223 | THR | 3.1 |
| 1 | A | 120 | LYS | 3.0 |
| 1 | B | 480 | LEU | 3.0 |
| 1 | B | 477 | ARG | 3.0 |
| 1 | A | 48 | PHE | 3.0 |
| 1 | B | 112 | GLU | 3.0 |
| 1 | A | 403 | ILE | 3.0 |
| 1 | B | 553 | ILE | 3.0 |
| 1 | B | 447 | ILE | 3.0 |
| 1 | B | 589 | ILE | 2.9 |
| 1 | B | 400 | ALA | 2.9 |
| 1 | B | 572 | ALA | 2.9 |
| 1 | B | 414 | SER | 2.9 |
| 1 | A | 140 | LEU | 2.9 |
| 1 | A | 146 | SER | 2.9 |
| 1 | A | 441 | THR | 2.9 |
| 1 | B | 27 | LYS | 2.8 |
| 1 | A | 492 | GLN | 2.8 |
| 1 | B | 431 | ASP | 2.8 |
| 1 | B | 172 | TYR | 2.8 |
| 1 | B | 376 | GLY | 2.8 |

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| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | A | 101 | ASN | 2.8 |
| 1 | B | 219 | ASN | 2.8 |
| 1 | B | 372 | PHE | 2.8 |
| 1 | B | 504 | GLY | 2.8 |
| 1 | B | 486 | ILE | 2.7 |
| 1 | A | 102 | GLY | 2.7 |
| 1 | B | 478 | THR | 2.7 |
| 1 | A | 435 | SER | 2.7 |
| 1 | A | 141 | LYS | 2.7 |
| 1 | A | 535 | ASP | 2.6 |
| 1 | A | 127 | PRO | 2.6 |
| 1 | B | 173 | ALA | 2.6 |
| 1 | B | 293 | ALA | 2.6 |
| 1 | B | 369 | ALA | 2.6 |
| 1 | B | 494 | GLY | 2.6 |
| 1 | A | 582 | TYR | 2.6 |
| 1 | A | 431 | ASP | 2.6 |
| 1 | A | 242 | ASN | 2.6 |
| 1 | B | 147 | ALA | 2.6 |
| 1 | B | 446 | TYR | 2.6 |
| 1 | A | 238 | THR | 2.6 |
| 1 | A | 117 | ILE | 2.6 |
| 1 | A | 149 | MET | 2.6 |
| 1 | A | 240 | ALA | 2.6 |
| 1 | A | 587 | HIS | 2.6 |
| 1 | B | 539 | ILE | 2.6 |
| 1 | A | 578 | LEU | 2.5 |
| 1 | A | 126 | PRO | 2.5 |
| 1 | B | 295 | ASN | 2.5 |
| 1 | A | 532 | TRP | 2.5 |
| 1 | B | 205 | MET | 2.5 |
| 1 | A | 16 | LYS | 2.5 |
| 1 | A | 166 | GLY | 2.5 |
| 1 | A | 145 | LYS | 2.5 |
| 1 | A | 440 | HIS | 2.4 |
| 1 | B | 120 | LYS | 2.4 |
| 1 | B | 184 | VAL | 2.4 |
| 1 | B | 179 | ILE | 2.4 |
| 1 | A | 26 | LYS | 2.4 |
| 1 | B | 586 | TRP | 2.4 |
| 1 | B | 425 | ASP | 2.4 |
| 1 | B | 487 | ASP | 2.4 |

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| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | B | 475 | ARG | 2.4 |
| 1 | A | 568 | MET | 2.4 |
| 1 | B | 505 | MET | 2.4 |
| 1 | B | 307 | SER | 2.4 |
| 1 | B | 374 | ALA | 2.4 |
| 1 | A | 67 | ARG | 2.3 |
| 1 | A | 299 | PRO | 2.3 |
| 1 | A | 63 | TRP | 2.3 |
| 1 | B | 516 | PHE | 2.3 |
| 1 | A | 589 | ILE | 2.3 |
| 1 | B | 224 | ALA | 2.3 |
| 1 | A | 533 | TYR | 2.3 |
| 1 | A | 136 | LEU | 2.3 |
| 1 | B | 136 | LEU | 2.3 |
| 1 | A | 508 | MET | 2.3 |
| 1 | A | 539 | ILE | 2.3 |
| 1 | A | 216 | ALA | 2.3 |
| 1 | A | 437 | ALA | 2.3 |
| 1 | A | 457 | THR | 2.3 |
| 1 | B | 507 | ASP | 2.3 |
| 1 | A | 505 | MET | 2.3 |
| 1 | A | 515 | VAL | 2.3 |
| 1 | B | 24 | VAL | 2.3 |
| 1 | B | 133 | ILE | 2.3 |
| 1 | B | 44 | LEU | 2.3 |
| 1 | A | 208 | ASP | 2.3 |
| 1 | B | 54 | THR | 2.3 |
| 1 | B | 346 | THR | 2.3 |
| 1 | B | 241 | VAL | 2.3 |
| 1 | B | 231 | TRP | 2.3 |
| 1 | B | 368 | ALA | 2.3 |
| 1 | B | 379 | SER | 2.3 |
| 1 | B | 521 | LEU | 2.3 |
| 1 | A | 475 | ARG | 2.2 |
| 1 | B | 245 | VAL | 2.2 |
| 1 | A | 520 | GLY | 2.2 |
| 1 | B | 183 | GLY | 2.2 |
| 1 | A | 472 | ARG | 2.2 |
| 1 | A | 62 | PHE | 2.2 |
| 1 | A | 375 | ALA | 2.2 |
| 1 | B | 419 | ARG | 2.2 |
| 1 | B | 139 | GLU | 2.2 |

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| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | B | 544 | TYR | 2.2 |
| 1 | A | 237 | ASP | 2.2 |
| 1 | B | 50 | GLN | 2.2 |
| 1 | B | 152 | LEU | 2.2 |
| 1 | A | 469 | VAL | 2.2 |
| 1 | A | 300 | LEU | 2.2 |
| 1 | A | 17 | GLY | 2.2 |
| 1 | B | 3 | ILE | 2.1 |
| 1 | B | 577 | LYS | 2.1 |
| 1 | B | 194 | THR | 2.1 |
| 1 | B | 403 | ILE | 2.1 |
| 1 | B | 444 | GLN | 2.1 |
| 1 | B | 135 | ALA | 2.1 |
| 1 | B | 506 | ARG | 2.1 |
| 1 | B | 568 | MET | 2.1 |
| 1 | A | 119 | ASN | 2.1 |
| 1 | A | 529 | ASP | 2.1 |
| 1 | B | 118 | TYR | 2.1 |
| 1 | A | 374 | ALA | 2.1 |
| 1 | B | 406 | TRP | 2.1 |
| 1 | B | 7 | LYS | 2.1 |
| 1 | B | 525 | LYS | 2.1 |
| 1 | B | 420 | PHE | 2.1 |
| 1 | B | 466 | ASN | 2.1 |
| 1 | B | 156 | TYR | 2.1 |
| 1 | A | 477 | ARG | 2.1 |
| 1 | A | 506 | ARG | 2.1 |
| 1 | B | 192 | GLY | 2.1 |
| 1 | A | 296 | LYS | 2.0 |
| 1 | B | 534 | ILE | 2.0 |
| 1 | B | 509 | ALA | 2.0 |
| 1 | B | 523 | THR | 2.0 |
| 1 | A | 170 | PHE | 2.0 |
| 1 | A | 522 | TYR | 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 oligosaccharides in this entry.

## 6.4 Ligands (i)

There are no ligands in this entry.

## 6.5 Other polymers (i)

There are no such residues in this entry.