# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 2, 2021 – 03:17 AM EDT

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|---|---|---|
| PDB ID | : | 1JF6 |
| Title | : | Crystal structure of thermoactinomyces vulgaris r-47 alpha-amylase mutant F286Y |
| Authors | : | Ohtaki, A.; Kondo, S.; Shimura, Y.; Tonozuka, T.; Sakano, Y.; Kamitori, S. |
| Deposited on | : | 2001-06-20 |
| Resolution | : | 3.20 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:

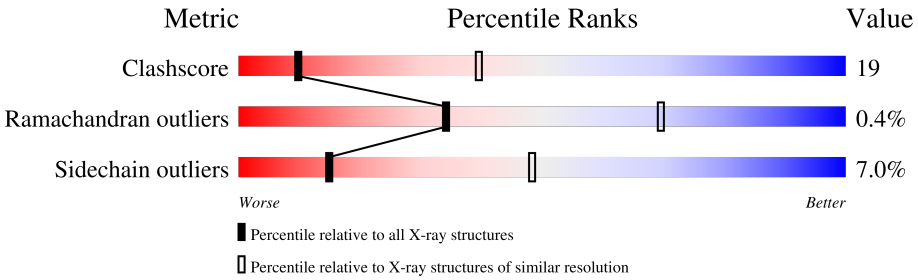
| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Xtriage (Phenix) | : | NOT EXECUTED |
| EDS | : | NOT EXECUTED |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.23.2 |

# 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 3.20 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)) |
|---|---|---|
| Clashscore | 141614 | 1253 (3.20-3.20) |
| Ramachandran outliers | 138981 | 1234 (3.20-3.20) |
| Sidechain outliers | 138945 | 1233 (3.20-3.20) |

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%

Note EDS was not executed.

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 585 | 58% 39% . |
| 1 | B | 585 | 59% 37% . |

# 2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 9556 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 ALPHA AMYLASE II.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 585 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 4777 | 3056 | 831 | 875 | 15 | | | |
| 1 | B | 585 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 4777 | 3056 | 831 | 875 | 15 | | | |

There are 2 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 286 | TYR | PHE | engineered mutation | UNP Q08751 |
| B | 286 | TYR | PHE | engineered mutation | UNP Q08751 |

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 2 | A | 1 | Total | Ca | 0 | 0 |
| | | | 1 | 1 | | |
| 2 | B | 1 | Total | Ca | 0 | 0 |
| | | | 1 | 1 | | |

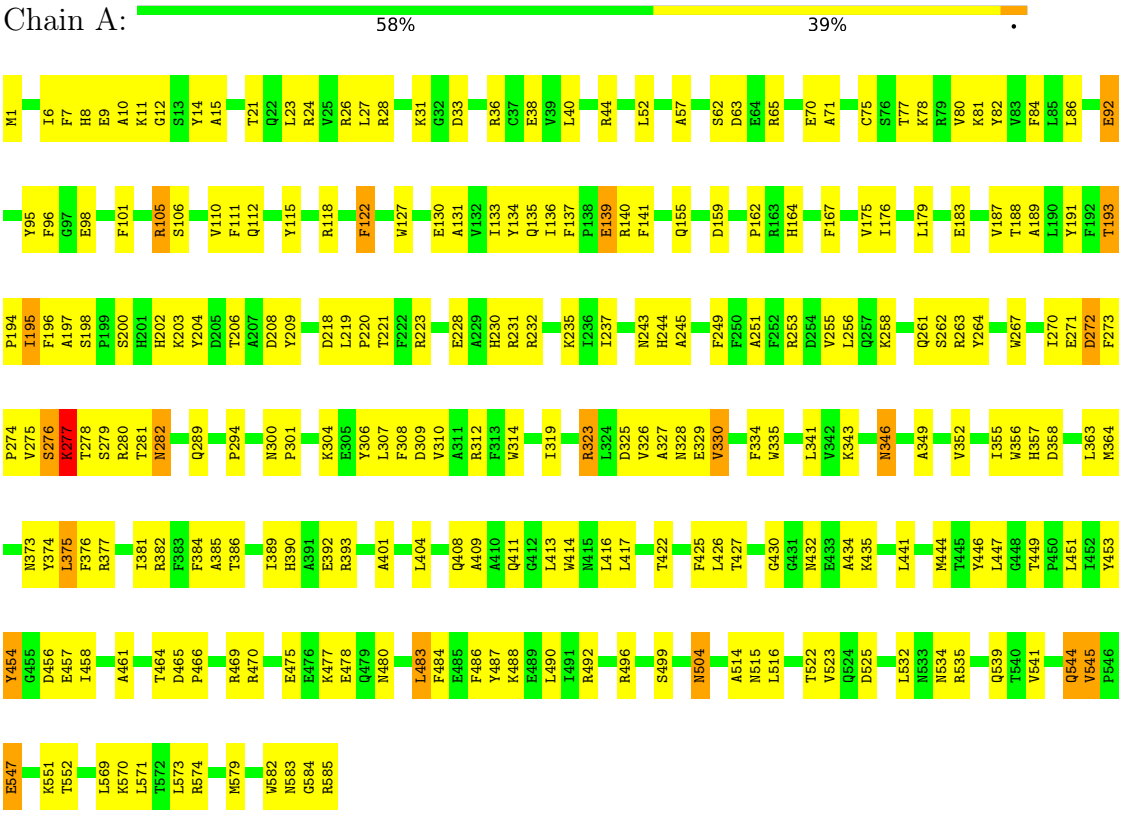
# 3 Residue-property plots (i)

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. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

Note EDS was not executed.

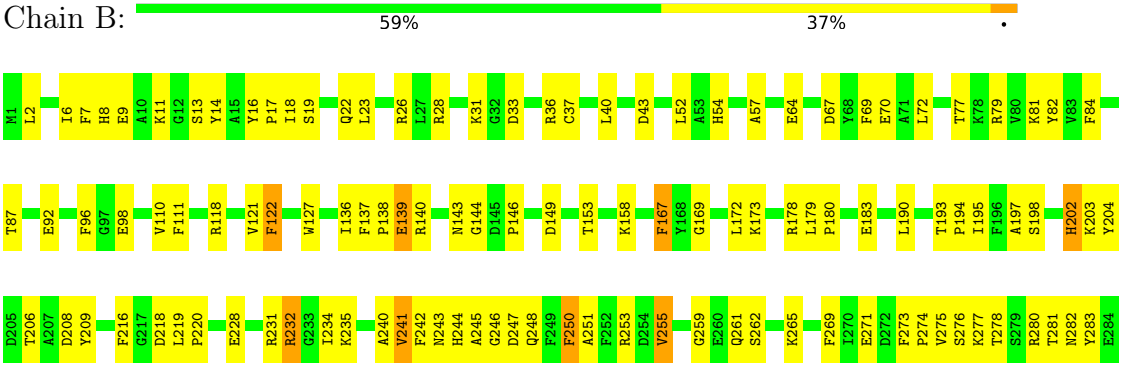
• Molecule 1: ALPHA AMYLASE II

Chain A:




• Molecule 1: ALPHA AMYLASE II

Chain B:




T285 Y286 Q289 A292 M293 P294 K295 L296 R297 N300 P301 E302 D309 R312 M315 E316 Q317 G318 I319 W322 R323 L324 D325 N328 E329 V330 D331 H332 A333 F334 W335 R336 E337 F338 R339 R340 V352 G353 E354 I355 W356 H357 D358 M364 Q367 V371 M372 N373
Y374 L375 F376 R377 V380 I381 F384 A385 I389 H390 A391 E392 R393 L398 P406 Q411 W414 N415 L416 R424 F425 L426 T427 S428 F436 R437 L438 F442 L447 G448 T449 P450 L451 I452 Y453 Y454 G455 D456 E457 I458 G459 M460 A461 T464 D465 P466 D467 C468
R469 R470 P471 M472 I473 W474 E475 E478 L483 F486 Y487 I491 R492 L493 R494 L497 A498 S499 L500 N504 V505 A514 A518 R521 T522 V523 Q526 H527 V530 V531 L532 N533 N534 R535 Q539 V545 P546 E547 K551 T552 W553 L554 D555 C556 E560
E561 V562 L569 K570 L571 T572 L573 Y576 M579 I580 L581 W582 N583 G584 R585

# 4 Data and refinement statistics (i)

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

| Property | Value | Source |
|---|---|---|
| Space group | P 21 21 21 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 112.25Å 117.94Å 113.32Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 38.39 – 3.20 | Depositor |
| % Data completeness<br>(in resolution range) | 91.7 (38.39-3.20) | Depositor |
| $R_{merge}$ | 0.12 | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| Refinement program | CNS | Depositor |
| R, $R_{free}$ | 0.204 , 0.282 | Depositor |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| Total number of atoms | 9556 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 27.0 | wwPDB-VP |

# 5 Model quality

## 5.1 Standard geometry

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

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 | 0.49 | 0/4907 | 0.66 | 0/6643 |
| 1 | B | 0.50 | 0/4907 | 0.66 | 0/6643 |
| All | All | 0.50 | 0/9814 | 0.66 | 0/13286 |

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 | B | 0 | 1 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 1 | B | 14 | TYR | Sidechain |

## 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 | 4777 | 0 | 4607 | 184 | 0 |
| 1 | B | 4777 | 0 | 4607 | 181 | 0 |
| 2 | A | 1 | 0 | 0 | 0 | 0 |
| 2 | B | 1 | 0 | 0 | 0 | 0 |
| All | All | 9556 | 0 | 9214 | 361 | 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 19.

All (361) 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:328:ASN:HB3 | 1:A:355:ILE:HD12 | 1.40 | 1.02 |
| 1:A:255:VAL:HA | 1:A:262:SER:OG | 1.67 | 0.93 |
| 1:A:162:PRO:HG2 | 1:A:470:ARG:HA | 1.60 | 0.83 |
| 1:B:26:ARG:HG2 | 1:B:70:GLU:HG2 | 1.62 | 0.81 |
| 1:A:197:ALA:HB3 | 1:A:208:ASP:HB3 | 1.62 | 0.79 |
| 1:A:416:LEU:H | 1:A:416:LEU:HD23 | 1.47 | 0.79 |
| 1:B:328:ASN:HB3 | 1:B:355:ILE:HG12 | 1.67 | 0.76 |
| 1:B:499:SER:HB3 | 1:B:523:VAL:HG12 | 1.67 | 0.75 |
| 1:B:247:ASP:HB3 | 1:B:292:ALA:HA | 1.69 | 0.73 |
| 1:B:255:VAL:O | 1:B:275:VAL:HG21 | 1.89 | 0.72 |
| 1:B:569:LEU:HD23 | 1:B:571:LEU:HD21 | 1.69 | 0.72 |
| 1:A:401:ALA:O | 1:A:404:LEU:HB2 | 1.90 | 0.72 |
| 1:B:26:ARG:HG2 | 1:B:70:GLU:CG | 2.21 | 0.70 |
| 1:B:138:PRO:HG3 | 1:B:195:ILE:HG22 | 1.73 | 0.70 |
| 1:A:582:TRP:CZ2 | 1:A:584:GLY:HA2 | 2.27 | 0.70 |
| 1:A:275:VAL:O | 1:A:276:SER:HB2 | 1.91 | 0.69 |
| 1:A:133:ILE:HG13 | 1:A:189:ALA:HB3 | 1.76 | 0.68 |
| 1:A:514:ALA:HB1 | 1:A:539:GLN:HE22 | 1.59 | 0.68 |
| 1:A:98:GLU:OE2 | 1:B:357:HIS:HB2 | 1.94 | 0.67 |
| 1:B:202:HIS:CD2 | 1:B:204:TYR:HB2 | 2.30 | 0.66 |
| 1:B:198:SER:HB3 | 1:B:203:LYS:HG3 | 1.77 | 0.66 |
| 1:A:583:ASN:HD21 | 1:A:585:ARG:HD2 | 1.61 | 0.66 |
| 1:B:312:ARG:O | 1:B:316:GLU:HG3 | 1.97 | 0.65 |
| 1:A:195:ILE:O | 1:A:196:PHE:HD2 | 1.79 | 0.65 |
| 1:B:228:GLU:O | 1:B:231:ARG:HG2 | 1.97 | 0.65 |
| 1:B:467:ASP:CG | 1:B:470:ARG:HH12 | 2.00 | 0.65 |
| 1:A:92:GLU:O | 1:A:92:GLU:HG2 | 1.97 | 0.64 |
| 1:A:374:TYR:CE1 | 1:A:375:LEU:HD13 | 2.33 | 0.64 |
| 1:A:409:ALA:O | 1:A:413:LEU:HD13 | 1.96 | 0.64 |
| 1:A:326:VAL:HG12 | 1:A:329:GLU:HB2 | 1.78 | 0.64 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:555:ASP:OD1 | 1:B:579:MET:HG2 | 1.98 | 0.64 |
| 1:B:228:GLU:OE2 | 1:B:231:ARG:HD3 | 1.96 | 0.64 |
| 1:A:515:ASN:ND2 | 1:A:534:ASN:HB3 | 2.12 | 0.63 |
| 1:B:504:ASN:C | 1:B:504:ASN:HD22 | 2.00 | 0.63 |
| 1:A:31:LYS:HE2 | 1:A:63:ASP:O | 2.00 | 0.62 |
| 1:A:195:ILE:O | 1:A:195:ILE:HG13 | 2.00 | 0.61 |
| 1:A:243:ASN:HD22 | 1:A:244:HIS:HD2 | 1.47 | 0.61 |
| 1:A:426:LEU:HD23 | 1:A:461:ALA:HB2 | 1.81 | 0.61 |
| 1:B:447:LEU:HB2 | 1:B:505:VAL:CG2 | 2.31 | 0.61 |
| 1:B:353:GLY:O | 1:B:371:VAL:HA | 2.01 | 0.61 |
| 1:B:453:TYR:HB3 | 1:B:456:ASP:OD2 | 2.01 | 0.61 |
| 1:A:253:ARG:HA | 1:A:256:LEU:HD12 | 1.83 | 0.60 |
| 1:A:381:ILE:O | 1:A:385:ALA:HB3 | 2.02 | 0.60 |
| 1:B:143:ASN:ND2 | 1:B:169:GLY:HA3 | 2.16 | 0.60 |
| 1:A:183:GLU:OE2 | 1:A:232:ARG:HD3 | 2.02 | 0.60 |
| 1:A:84:PHE:HB2 | 1:A:96:PHE:HB3 | 1.84 | 0.60 |
| 1:A:551:LYS:HG3 | 1:A:552:THR:HG23 | 1.84 | 0.59 |
| 1:A:84:PHE:O | 1:A:95:TYR:HA | 2.01 | 0.59 |
| 1:A:140:ARG:HG2 | 1:A:469:ARG:O | 2.02 | 0.59 |
| 1:A:162:PRO:CG | 1:A:470:ARG:HA | 2.33 | 0.58 |
| 1:A:535:ARG:HH21 | 1:A:535:ARG:HG3 | 1.68 | 0.58 |
| 1:A:441:LEU:HD22 | 1:A:532:LEU:HD21 | 1.84 | 0.58 |
| 1:A:258:LYS:HB3 | 1:A:261:GLN:HB2 | 1.85 | 0.58 |
| 1:A:582:TRP:CE2 | 1:A:584:GLY:HA2 | 2.38 | 0.58 |
| 1:B:455:GLY:O | 1:B:458:ILE:HG13 | 2.04 | 0.58 |
| 1:A:218:ASP:OD1 | 1:A:220:PRO:HD2 | 2.03 | 0.58 |
| 1:B:458:ILE:HD11 | 1:B:460:MET:HG3 | 1.85 | 0.58 |
| 1:A:255:VAL:HA | 1:A:262:SER:HG | 1.70 | 0.57 |
| 1:B:82:TYR:O | 1:B:110:VAL:HG23 | 2.03 | 0.57 |
| 1:B:390:HIS:CE1 | 1:B:392:GLU:HB2 | 2.38 | 0.57 |
| 1:A:514:ALA:HB1 | 1:A:539:GLN:NE2 | 2.19 | 0.57 |
| 1:B:127:TRP:CD2 | 1:B:235:LYS:HE3 | 2.39 | 0.57 |
| 1:B:36:ARG:HB3 | 1:B:87:THR:HB | 1.85 | 0.57 |
| 1:A:134:TYR:HB2 | 1:A:187:VAL:HG11 | 1.86 | 0.57 |
| 1:B:136:ILE:HD12 | 1:B:190:LEU:HG | 1.86 | 0.56 |
| 1:B:447:LEU:HB2 | 1:B:505:VAL:HG21 | 1.85 | 0.56 |
| 1:B:31:LYS:HG2 | 1:B:67:ASP:OD1 | 2.05 | 0.56 |
| 1:A:416:LEU:H | 1:A:416:LEU:CD2 | 2.18 | 0.56 |
| 1:A:277:LYS:HB2 | 1:A:277:LYS:NZ | 2.20 | 0.56 |
| 1:A:574:ARG:HH11 | 1:A:574:ARG:HB3 | 1.70 | 0.56 |
| 1:B:240:ALA:HB1 | 1:B:242:PHE:CE1 | 2.41 | 0.56 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:259:GLY:HA2 | 1:B:275:VAL:CG2 | 2.35 | 0.56 |
| 1:B:436:PHE:HE2 | 1:B:483:LEU:HD21 | 1.70 | 0.56 |
| 1:B:465:ASP:OD2 | 1:B:466:PRO:HA | 2.05 | 0.56 |
| 1:A:105:ARG:HG3 | 1:A:106:SER:N | 2.21 | 0.56 |
| 1:B:84:PHE:HB2 | 1:B:96:PHE:HB3 | 1.87 | 0.56 |
| 1:A:11:LYS:N | 1:A:15:ALA:HB3 | 2.21 | 0.55 |
| 1:B:43:ASP:O | 1:B:81:LYS:HE2 | 2.06 | 0.55 |
| 1:A:122:PHE:O | 1:A:408:GLN:HG2 | 2.07 | 0.55 |
| 1:A:141:PHE:HD1 | 1:A:175:VAL:HG22 | 1.73 | 0.54 |
| 1:A:544:GLN:CD | 1:A:544:GLN:N | 2.61 | 0.54 |
| 1:B:300:ASN:OD1 | 1:B:302:GLU:N | 2.41 | 0.54 |
| 1:B:522:THR:HG23 | 1:B:527:HIS:CD2 | 2.43 | 0.54 |
| 1:B:183:GLU:OE2 | 1:B:232:ARG:HG3 | 2.07 | 0.54 |
| 1:B:139:GLU:OE2 | 1:B:140:ARG:NH1 | 2.40 | 0.54 |
| 1:B:518:ALA:HA | 1:B:530:VAL:O | 2.07 | 0.54 |
| 1:A:82:TYR:N | 1:A:110:VAL:HG23 | 2.23 | 0.54 |
| 1:A:278:THR:O | 1:A:279:SER:HB3 | 2.07 | 0.54 |
| 1:A:544:GLN:N | 1:A:544:GLN:OE1 | 2.40 | 0.54 |
| 1:B:82:TYR:C | 1:B:110:VAL:HG23 | 2.29 | 0.54 |
| 1:A:570:LYS:O | 1:A:571:LEU:HD12 | 2.07 | 0.54 |
| 1:A:346:ASN:HB3 | 1:A:349:ALA:HB2 | 1.89 | 0.53 |
| 1:A:162:PRO:CD | 1:A:470:ARG:HG2 | 2.38 | 0.53 |
| 1:A:276:SER:O | 1:A:277:LYS:HB2 | 2.08 | 0.53 |
| 1:B:219:LEU:HB3 | 1:B:220:PRO:HD3 | 1.89 | 0.53 |
| 1:A:583:ASN:ND2 | 1:A:585:ARG:HD2 | 2.23 | 0.53 |
| 1:A:133:ILE:HD12 | 1:A:133:ILE:N | 2.23 | 0.52 |
| 1:B:26:ARG:NE | 1:B:70:GLU:OE2 | 2.41 | 0.52 |
| 1:B:138:PRO:HG3 | 1:B:195:ILE:CG2 | 2.39 | 0.52 |
| 1:A:202:HIS:HB2 | 1:A:204:TYR:HD2 | 1.74 | 0.52 |
| 1:A:523:VAL:O | 1:A:523:VAL:HG13 | 2.09 | 0.52 |
| 1:B:332:HIS:HD2 | 1:B:367:GLN:HE22 | 1.56 | 0.52 |
| 1:A:135:GLN:HG3 | 1:A:191:TYR:CD2 | 2.45 | 0.52 |
| 1:B:332:HIS:CD2 | 1:B:367:GLN:HE22 | 2.28 | 0.52 |
| 1:B:197:ALA:HB3 | 1:B:208:ASP:HB3 | 1.92 | 0.51 |
| 1:A:309:ASP:OD2 | 1:A:312:ARG:NH1 | 2.43 | 0.51 |
| 1:B:497:LEU:HB2 | 1:B:500:LEU:HD12 | 1.91 | 0.51 |
| 1:B:153:THR:HA | 1:B:167:PHE:O | 2.10 | 0.51 |
| 1:B:240:ALA:HB2 | 1:B:322:TRP:CE3 | 2.45 | 0.51 |
| 1:A:390:HIS:HD2 | 1:A:392:GLU:H | 1.57 | 0.51 |
| 1:B:389:ILE:HB | 1:B:393:ARG:HG2 | 1.93 | 0.51 |
| 1:A:1:MET:HB2 | 1:A:33:ASP:OD2 | 2.11 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:250:PHE:CG | 1:B:251:ALA:N | 2.79 | 0.51 |
| 1:A:202:HIS:HB2 | 1:A:204:TYR:CD2 | 2.46 | 0.51 |
| 1:A:139:GLU:OE2 | 1:A:140:ARG:NH1 | 2.42 | 0.50 |
| 1:A:275:VAL:O | 1:A:276:SER:CB | 2.57 | 0.50 |
| 1:B:244:HIS:CD2 | 1:B:286:TYR:HB2 | 2.47 | 0.50 |
| 1:B:273:PHE:HA | 1:B:274:PRO:C | 2.32 | 0.50 |
| 1:A:206:THR:HG21 | 1:A:209:TYR:CD2 | 2.46 | 0.50 |
| 1:A:488:LYS:HB3 | 1:A:492:ARG:HH12 | 1.77 | 0.50 |
| 1:B:8:HIS:CG | 1:B:9:GLU:N | 2.79 | 0.50 |
| 1:B:193:THR:O | 1:B:195:ILE:HG23 | 2.11 | 0.50 |
| 1:B:352:VAL:HG21 | 1:B:414:TRP:CZ2 | 2.46 | 0.50 |
| 1:B:137:PHE:HE1 | 1:B:469:ARG:HH11 | 1.58 | 0.50 |
| 1:B:545:VAL:HG21 | 1:B:569:LEU:HD13 | 1.93 | 0.50 |
| 1:A:544:GLN:CD | 1:A:544:GLN:H | 2.14 | 0.50 |
| 1:A:133:ILE:HD13 | 1:A:449:THR:HG21 | 1.94 | 0.50 |
| 1:B:438:LEU:HD11 | 1:B:532:LEU:HB3 | 1.93 | 0.50 |
| 1:B:144:GLY:HA3 | 1:B:173:LYS:HG3 | 1.94 | 0.49 |
| 1:A:232:ARG:HH21 | 1:A:232:ARG:HG3 | 1.77 | 0.49 |
| 1:B:2:LEU:N | 1:B:33:ASP:OD2 | 2.44 | 0.49 |
| 1:B:315:MET:HA | 1:B:319:ILE:HG12 | 1.95 | 0.49 |
| 1:A:304:LYS:HG2 | 1:A:308:PHE:CE1 | 2.48 | 0.49 |
| 1:A:335:TRP:HA | 1:A:335:TRP:CE3 | 2.48 | 0.49 |
| 1:A:44:ARG:HA | 1:A:81:LYS:HD3 | 1.94 | 0.49 |
| 1:A:92:GLU:O | 1:A:92:GLU:CG | 2.60 | 0.49 |
| 1:B:271:GLU:N | 1:B:271:GLU:OE2 | 2.46 | 0.49 |
| 1:A:200:SER:OG | 1:A:202:HIS:CE1 | 2.66 | 0.49 |
| 1:B:436:PHE:CE2 | 1:B:483:LEU:HD21 | 2.48 | 0.49 |
| 1:A:118:ARG:NH2 | 1:B:297:ARG:HH12 | 2.11 | 0.49 |
| 1:B:218:ASP:OD2 | 1:B:220:PRO:HD2 | 2.12 | 0.49 |
| 1:B:255:VAL:HA | 1:B:262:SER:HB2 | 1.95 | 0.49 |
| 1:B:467:ASP:CG | 1:B:470:ARG:NH1 | 2.66 | 0.49 |
| 1:B:494:ARG:NH1 | 1:B:494:ARG:HG3 | 2.28 | 0.49 |
| 1:B:504:ASN:C | 1:B:504:ASN:ND2 | 2.66 | 0.49 |
| 1:B:323:ARG:HD2 | 1:B:323:ARG:C | 2.33 | 0.49 |
| 1:B:547:GLU:OE1 | 1:B:551:LYS:HD2 | 2.12 | 0.49 |
| 1:A:82:TYR:O | 1:A:110:VAL:HG23 | 2.12 | 0.49 |
| 1:A:356:TRP:HA | 1:A:356:TRP:CE3 | 2.48 | 0.49 |
| 1:B:137:PHE:HE1 | 1:B:469:ARG:NH1 | 2.11 | 0.49 |
| 1:A:82:TYR:N | 1:A:110:VAL:CG2 | 2.75 | 0.48 |
| 1:A:195:ILE:O | 1:A:195:ILE:CG1 | 2.59 | 0.48 |
| 1:A:162:PRO:HD3 | 1:A:470:ARG:HG2 | 1.94 | 0.48 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:228:GLU:OE2 | 1:A:231:ARG:HD3 | 2.13 | 0.48 |
| 1:B:514:ALA:O | 1:B:535:ARG:HD2 | 2.14 | 0.48 |
| 1:A:384:PHE:O | 1:A:435:LYS:HD3 | 2.12 | 0.48 |
| 1:A:516:LEU:HD22 | 1:A:541:VAL:HG11 | 1.96 | 0.48 |
| 1:A:197:ALA:CB | 1:A:208:ASP:HB3 | 2.38 | 0.48 |
| 1:A:432:ASN:OD1 | 1:A:434:ALA:N | 2.46 | 0.48 |
| 1:B:193:THR:HB | 1:B:194:PRO:HD2 | 1.96 | 0.48 |
| 1:B:357:HIS:HA | 1:B:374:TYR:OH | 2.13 | 0.48 |
| 1:A:356:TRP:HA | 1:A:356:TRP:HE3 | 1.77 | 0.48 |
| 1:B:40:LEU:HD22 | 1:B:54:HIS:CE1 | 2.49 | 0.48 |
| 1:B:271:GLU:OE2 | 1:B:283:TYR:HA | 2.14 | 0.48 |
| 1:A:7:PHE:CZ | 1:A:9:GLU:HG2 | 2.49 | 0.48 |
| 1:A:57:ALA:HB2 | 1:A:71:ALA:HB2 | 1.96 | 0.48 |
| 1:A:504:ASN:HD21 | 1:A:522:THR:HB | 1.79 | 0.48 |
| 1:B:193:THR:O | 1:B:194:PRO:C | 2.52 | 0.48 |
| 1:A:357:HIS:HB2 | 1:B:98:GLU:OE2 | 2.13 | 0.48 |
| 1:A:574:ARG:HB3 | 1:A:574:ARG:NH1 | 2.29 | 0.48 |
| 1:B:118:ARG:HA | 1:B:121:VAL:HG23 | 1.96 | 0.48 |
| 1:A:416:LEU:HB3 | 1:A:451:LEU:HD23 | 1.96 | 0.47 |
| 1:B:281:THR:HG21 | 1:B:289:GLN:HA | 1.96 | 0.47 |
| 1:B:416:LEU:HD23 | 1:B:416:LEU:H | 1.79 | 0.47 |
| 1:A:23:LEU:HD22 | 1:A:80:VAL:HG11 | 1.96 | 0.47 |
| 1:B:16:TYR:CE2 | 1:B:406:PRO:HA | 2.49 | 0.47 |
| 1:B:140:ARG:HD2 | 1:B:469:ARG:O | 2.13 | 0.47 |
| 1:A:271:GLU:HG3 | 1:A:272:ASP:OD2 | 2.13 | 0.47 |
| 1:B:312:ARG:NH2 | 1:B:312:ARG:HG3 | 2.29 | 0.47 |
| 1:A:492:ARG:HD2 | 1:A:496:ARG:NH1 | 2.29 | 0.47 |
| 1:A:249:PHE:CE2 | 1:A:251:ALA:HB3 | 2.50 | 0.47 |
| 1:A:525:ASP:O | 1:A:585:ARG:HD2 | 2.14 | 0.47 |
| 1:B:494:ARG:HG3 | 1:B:494:ARG:HH11 | 1.78 | 0.47 |
| 1:A:270:ILE:HD13 | 1:A:275:VAL:HG21 | 1.96 | 0.47 |
| 1:B:77:THR:O | 1:B:79:ARG:HG3 | 2.14 | 0.47 |
| 1:B:312:ARG:HG3 | 1:B:312:ARG:HH21 | 1.80 | 0.47 |
| 1:B:385:ALA:HB1 | 1:B:428:SER:O | 2.15 | 0.47 |
| 1:B:22:GLN:HB3 | 1:B:72:LEU:HD11 | 1.97 | 0.47 |
| 1:A:300:ASN:OD1 | 1:A:301:PRO:HD2 | 2.15 | 0.47 |
| 1:B:243:ASN:HD22 | 1:B:329:GLU:HB2 | 1.80 | 0.47 |
| 1:A:82:TYR:C | 1:A:110:VAL:HG23 | 2.36 | 0.46 |
| 1:A:7:PHE:CG | 1:A:8:HIS:N | 2.83 | 0.46 |
| 1:A:457:GLU:HG2 | 1:A:458:ILE:N | 2.29 | 0.46 |
| 1:A:504:ASN:N | 1:A:504:ASN:HD22 | 2.14 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:573:LEU:N | 1:A:573:LEU:HD22 | 2.30 | 0.46 |
| 1:B:259:GLY:HA2 | 1:B:275:VAL:HG21 | 1.98 | 0.46 |
| 1:A:488:LYS:HB3 | 1:A:492:ARG:NH1 | 2.30 | 0.46 |
| 1:B:7:PHE:CD2 | 1:B:28:ARG:CZ | 2.99 | 0.46 |
| 1:B:137:PHE:HD2 | 1:B:138:PRO:HD2 | 1.81 | 0.46 |
| 1:A:478:GLU:OE2 | 1:A:478:GLU:HA | 2.16 | 0.46 |
| 1:B:146:PRO:HA | 1:B:149:ASP:OD2 | 2.15 | 0.46 |
| 1:B:381:ILE:HG12 | 1:B:425:PHE:HE1 | 1.81 | 0.46 |
| 1:B:269:PHE:CE2 | 1:B:295:LYS:HG2 | 2.50 | 0.46 |
| 1:B:285:THR:HB | 1:B:293:MET:O | 2.16 | 0.46 |
| 1:B:487:TYR:O | 1:B:491:ILE:HG13 | 2.16 | 0.46 |
| 1:B:253:ARG:HH11 | 1:B:253:ARG:HB3 | 1.81 | 0.46 |
| 1:A:24:ARG:HD2 | 1:A:70:GLU:CG | 2.45 | 0.46 |
| 1:A:535:ARG:HG3 | 1:A:535:ARG:NH2 | 2.30 | 0.46 |
| 1:B:206:THR:HG21 | 1:B:209:TYR:CD2 | 2.51 | 0.46 |
| 1:A:373:ASN:O | 1:A:376:PHE:HB3 | 2.16 | 0.45 |
| 1:A:382:ARG:HA | 1:A:386:THR:OG1 | 2.16 | 0.45 |
| 1:A:373:ASN:HB2 | 1:A:413:LEU:HB3 | 1.98 | 0.45 |
| 1:A:464:THR:OG1 | 1:A:465:ASP:N | 2.49 | 0.45 |
| 1:A:486:PHE:CZ | 1:A:490:LEU:HD11 | 2.51 | 0.45 |
| 1:B:193:THR:HB | 1:B:194:PRO:CD | 2.47 | 0.45 |
| 1:A:499:SER:HB3 | 1:A:523:VAL:HG12 | 1.98 | 0.45 |
| 1:B:330:VAL:HB | 1:B:335:TRP:NE1 | 2.31 | 0.45 |
| 1:A:10:ALA:O | 1:A:11:LYS:HB3 | 2.16 | 0.45 |
| 1:A:326:VAL:HG12 | 1:A:326:VAL:O | 2.15 | 0.45 |
| 1:A:122:PHE:HE1 | 1:A:363:LEU:O | 1.99 | 0.45 |
| 1:A:230:HIS:C | 1:A:232:ARG:N | 2.69 | 0.45 |
| 1:A:327:ALA:O | 1:A:330:VAL:HG13 | 2.17 | 0.45 |
| 1:B:241:VAL:HG13 | 1:B:325:ASP:HB3 | 1.99 | 0.45 |
| 1:B:228:GLU:O | 1:B:232:ARG:HD3 | 2.17 | 0.45 |
| 1:B:381:ILE:HG12 | 1:B:425:PHE:CE1 | 2.51 | 0.45 |
| 1:B:582:TRP:CE2 | 1:B:584:GLY:HA2 | 2.52 | 0.45 |
| 1:B:377:ARG:CZ | 1:B:381:ILE:HD11 | 2.46 | 0.45 |
| 1:B:140:ARG:HG3 | 1:B:469:ARG:HB3 | 1.99 | 0.45 |
| 1:B:493:LEU:HD21 | 1:B:556:CYS:HB3 | 1.99 | 0.45 |
| 1:A:357:HIS:O | 1:A:358:ASP:C | 2.55 | 0.45 |
| 1:A:427:THR:O | 1:A:430:GLY:N | 2.45 | 0.45 |
| 1:B:18:ILE:HD12 | 1:B:19:SER:HB3 | 1.98 | 0.45 |
| 1:B:533:ASN:O | 1:B:576:TYR:HA | 2.16 | 0.45 |
| 1:B:245:ALA:O | 1:B:294:PRO:HD2 | 2.18 | 0.44 |
| 1:B:504:ASN:O | 1:B:521:ARG:HA | 2.17 | 0.44 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:179:LEU:N | 1:B:180:PRO:CD | 2.80 | 0.44 |
| 1:A:573:LEU:CD1 | 1:A:579:MET:SD | 3.05 | 0.44 |
| 1:A:7:PHE:CD2 | 1:A:28:ARG:NH1 | 2.86 | 0.44 |
| 1:B:92:GLU:H | 1:B:92:GLU:CD | 2.21 | 0.44 |
| 1:B:202:HIS:O | 1:B:203:LYS:HB2 | 2.17 | 0.44 |
| 1:B:464:THR:O | 1:B:465:ASP:C | 2.55 | 0.44 |
| 1:A:176:ILE:HA | 1:A:179:LEU:HG | 1.99 | 0.44 |
| 1:A:209:TYR:HB3 | 1:A:310:VAL:HG11 | 1.98 | 0.44 |
| 1:B:218:ASP:HB2 | 1:B:220:PRO:HD2 | 1.99 | 0.44 |
| 1:B:533:ASN:HB2 | 1:B:573:LEU:CB | 2.47 | 0.44 |
| 1:A:306:TYR:O | 1:A:310:VAL:HG23 | 2.17 | 0.44 |
| 1:A:112:GLN:HB2 | 1:B:357:HIS:CD2 | 2.53 | 0.44 |
| 1:B:437:ARG:HB3 | 1:B:486:PHE:CE1 | 2.53 | 0.44 |
| 1:B:315:MET:HG2 | 1:B:319:ILE:HD11 | 1.99 | 0.44 |
| 1:A:8:HIS:CG | 1:A:9:GLU:N | 2.86 | 0.44 |
| 1:A:381:ILE:HD13 | 1:A:425:PHE:CE1 | 2.53 | 0.44 |
| 1:B:246:GLY:HA2 | 1:B:292:ALA:O | 2.18 | 0.44 |
| 1:B:245:ALA:O | 1:B:293:MET:HA | 2.18 | 0.43 |
| 1:A:282:ASN:C | 1:A:282:ASN:HD22 | 2.22 | 0.43 |
| 1:B:190:LEU:HD13 | 1:B:234:ILE:CG2 | 2.48 | 0.43 |
| 1:B:553:TRP:HB3 | 1:B:581:LEU:HB3 | 2.00 | 0.43 |
| 1:A:6:ILE:HD13 | 1:A:86:LEU:HD13 | 2.01 | 0.43 |
| 1:A:127:TRP:O | 1:A:131:ALA:HB2 | 2.18 | 0.43 |
| 1:A:198:SER:HB3 | 1:A:203:LYS:HD2 | 2.00 | 0.43 |
| 1:B:110:VAL:HG22 | 1:B:111:PHE:O | 2.18 | 0.43 |
| 1:B:455:GLY:HA2 | 1:B:472:MET:SD | 2.59 | 0.43 |
| 1:A:277:LYS:HG2 | 1:A:280:ARG:HB3 | 1.99 | 0.43 |
| 1:A:127:TRP:CG | 1:A:235:LYS:HE2 | 2.54 | 0.43 |
| 1:A:133:ILE:HD13 | 1:A:449:THR:CG2 | 2.48 | 0.43 |
| 1:A:465:ASP:OD1 | 1:A:466:PRO:HA | 2.19 | 0.43 |
| 1:A:191:TYR:CE1 | 1:A:323:ARG:HG3 | 2.54 | 0.43 |
| 1:A:453:TYR:HB3 | 1:A:456:ASP:OD2 | 2.18 | 0.43 |
| 1:B:121:VAL:O | 1:B:122:PHE:C | 2.56 | 0.43 |
| 1:B:285:THR:HG22 | 1:B:294:PRO:HA | 2.00 | 0.43 |
| 1:A:307:LEU:HD12 | 1:A:334:PHE:CE2 | 2.53 | 0.43 |
| 1:A:343:LYS:HE2 | 1:A:349:ALA:O | 2.19 | 0.43 |
| 1:A:352:VAL:HG21 | 1:A:414:TRP:CZ2 | 2.53 | 0.43 |
| 1:A:504:ASN:ND2 | 1:A:522:THR:HB | 2.33 | 0.43 |
| 1:A:12:GLY:HA2 | 1:A:364:MET:SD | 2.59 | 0.43 |
| 1:A:457:GLU:HA | 1:A:487:TYR:CE1 | 2.53 | 0.43 |
| 1:A:545:VAL:HG21 | 1:A:569:LEU:HB2 | 2.00 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:26:ARG:HA | 1:B:69:PHE:O | 2.19 | 0.43 |
| 1:B:271:GLU:HB2 | 1:B:282:ASN:O | 2.19 | 0.43 |
| 1:A:191:TYR:HA | 1:A:237:ILE:HB | 2.01 | 0.42 |
| 1:A:264:TYR:HD2 | 1:A:267:TRP:CE2 | 2.37 | 0.42 |
| 1:B:426:LEU:HD23 | 1:B:461:ALA:HB2 | 2.01 | 0.42 |
| 1:B:465:ASP:HA | 1:B:466:PRO:HA | 1.89 | 0.42 |
| 1:A:475:GLU:OE1 | 1:A:477:LYS:HB2 | 2.18 | 0.42 |
| 1:B:37:CYS:O | 1:B:57:ALA:HB3 | 2.19 | 0.42 |
| 1:A:78:LYS:HE3 | 1:A:115:TYR:OH | 2.20 | 0.42 |
| 1:A:96:PHE:CD2 | 1:A:101:PHE:CZ | 3.08 | 0.42 |
| 1:B:276:SER:HA | 1:B:282:ASN:OD1 | 2.18 | 0.42 |
| 1:A:232:ARG:HG3 | 1:A:232:ARG:NH2 | 2.34 | 0.42 |
| 1:B:190:LEU:HD13 | 1:B:234:ILE:HG21 | 2.01 | 0.42 |
| 1:B:278:THR:C | 1:B:280:ARG:H | 2.23 | 0.42 |
| 1:A:14:TYR:HA | 1:A:26:ARG:HB2 | 2.00 | 0.42 |
| 1:A:75:CYS:SG | 1:A:80:VAL:HB | 2.58 | 0.42 |
| 1:B:330:VAL:HG11 | 1:B:334:PHE:CD1 | 2.55 | 0.42 |
| 1:A:574:ARG:NH1 | 1:A:574:ARG:CB | 2.83 | 0.42 |
| 1:B:206:THR:HG21 | 1:B:209:TYR:CG | 2.55 | 0.42 |
| 1:A:255:VAL:HG22 | 1:A:262:SER:CB | 2.49 | 0.42 |
| 1:A:446:TYR:CG | 1:A:447:LEU:N | 2.88 | 0.42 |
| 1:B:424:ARG:NH1 | 1:B:454:TYR:O | 2.42 | 0.42 |
| 1:B:373:ASN:ND2 | 1:B:376:PHE:HB2 | 2.34 | 0.42 |
| 1:B:398:LEU:HD21 | 1:B:442:PHE:CZ | 2.55 | 0.42 |
| 1:B:499:SER:OG | 1:B:526:GLN:OE1 | 2.21 | 0.42 |
| 1:A:193:THR:HB | 1:A:194:PRO:CD | 2.49 | 0.41 |
| 1:A:245:ALA:O | 1:A:294:PRO:HD2 | 2.20 | 0.41 |
| 1:B:40:LEU:CD2 | 1:B:54:HIS:ND1 | 2.83 | 0.41 |
| 1:B:178:ARG:HD2 | 1:B:474:TRP:CZ3 | 2.55 | 0.41 |
| 1:B:358:ASP:OD1 | 1:B:358:ASP:C | 2.58 | 0.41 |
| 1:A:110:VAL:HG22 | 1:A:111:PHE:O | 2.20 | 0.41 |
| 1:A:134:TYR:CE2 | 1:A:136:ILE:CD1 | 3.03 | 0.41 |
| 1:A:480:ASN:OD1 | 1:A:483:LEU:HB2 | 2.20 | 0.41 |
| 1:B:9:GLU:OE2 | 1:B:11:LYS:HE3 | 2.19 | 0.41 |
| 1:B:280:ARG:HD2 | 1:B:281:THR:N | 2.36 | 0.41 |
| 1:B:355:ILE:CG2 | 1:B:357:HIS:CE1 | 3.03 | 0.41 |
| 1:B:377:ARG:O | 1:B:380:VAL:HG22 | 2.19 | 0.41 |
| 1:A:137:PHE:HD1 | 1:A:140:ARG:HB2 | 1.86 | 0.41 |
| 1:A:281:THR:OG1 | 1:A:289:GLN:NE2 | 2.53 | 0.41 |
| 1:A:484:PHE:O | 1:A:488:LYS:HG3 | 2.20 | 0.41 |
| 1:B:309:ASP:HA | 1:B:312:ARG:HH21 | 1.83 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:560:GLU:OE2 | 1:B:562:VAL:HG12 | 2.20 | 0.41 |
| 1:A:52:LEU:HD12 | 1:A:105:ARG:HH11 | 1.86 | 0.41 |
| 1:A:312:ARG:NE | 1:A:341:LEU:HD11 | 2.34 | 0.41 |
| 1:A:579:MET:HE2 | 1:A:579:MET:HB3 | 1.87 | 0.41 |
| 1:B:384:PHE:CE2 | 1:B:438:LEU:HD12 | 2.55 | 0.41 |
| 1:A:36:ARG:HG2 | 1:A:36:ARG:HH11 | 1.85 | 0.41 |
| 1:A:141:PHE:CD1 | 1:A:175:VAL:HG22 | 2.54 | 0.41 |
| 1:A:454:TYR:CD1 | 1:A:454:TYR:C | 2.93 | 0.41 |
| 1:B:158:LYS:HD2 | 1:B:478:GLU:HB3 | 2.02 | 0.41 |
| 1:A:202:HIS:O | 1:A:203:LYS:HB2 | 2.21 | 0.41 |
| 1:A:270:ILE:HG21 | 1:A:275:VAL:HG22 | 2.03 | 0.41 |
| 1:B:16:TYR:O | 1:B:16:TYR:CD1 | 2.73 | 0.41 |
| 1:B:535:ARG:HD3 | 1:B:539:GLN:OE1 | 2.20 | 0.41 |
| 1:A:271:GLU:HG3 | 1:A:272:ASP:CG | 2.41 | 0.41 |
| 1:B:172:LEU:HG | 1:B:216:PHE:HB3 | 2.03 | 0.41 |
| 1:B:219:LEU:HD11 | 1:B:317:GLN:OE1 | 2.21 | 0.41 |
| 1:B:356:TRP:CZ3 | 1:B:374:TYR:HB3 | 2.56 | 0.41 |
| 1:B:335:TRP:CE3 | 1:B:335:TRP:HA | 2.56 | 0.41 |
| 1:A:264:TYR:O | 1:A:267:TRP:HB2 | 2.20 | 0.41 |
| 1:A:314:TRP:O | 1:A:319:ILE:HG12 | 2.20 | 0.41 |
| 1:A:377:ARG:HD2 | 1:A:417:LEU:C | 2.41 | 0.41 |
| 1:A:389:ILE:HB | 1:A:393:ARG:HG2 | 2.02 | 0.41 |
| 1:B:449:THR:HA | 1:B:450:PRO:HD3 | 1.92 | 0.41 |
| 1:B:464:THR:OG1 | 1:B:465:ASP:N | 2.54 | 0.41 |
| 1:A:27:LEU:HD23 | 1:A:27:LEU:C | 2.42 | 0.41 |
| 1:A:249:PHE:CD2 | 1:A:251:ALA:HB3 | 2.55 | 0.41 |
| 1:A:374:TYR:CE1 | 1:A:375:LEU:CD1 | 3.03 | 0.41 |
| 1:B:7:PHE:CD2 | 1:B:28:ARG:NH1 | 2.89 | 0.41 |
| 1:B:82:TYR:N | 1:B:110:VAL:CG2 | 2.84 | 0.41 |
| 1:B:332:HIS:HD2 | 1:B:367:GLN:NE2 | 2.18 | 0.41 |
| 1:B:526:GLN:C | 1:B:527:HIS:HD2 | 2.23 | 0.41 |
| 1:B:569:LEU:CD2 | 1:B:571:LEU:HD21 | 2.46 | 0.41 |
| 1:A:273:PHE:HA | 1:A:274:PRO:C | 2.42 | 0.40 |
| 1:B:232:ARG:HH11 | 1:B:232:ARG:CG | 2.34 | 0.40 |
| 1:B:243:ASN:ND2 | 1:B:329:GLU:HB2 | 2.35 | 0.40 |
| 1:B:389:ILE:HB | 1:B:393:ARG:CG | 2.50 | 0.40 |
| 1:B:17:PRO:HA | 1:B:23:LEU:HA | 2.03 | 0.40 |
| 1:B:6:ILE:HA | 1:B:28:ARG:O | 2.21 | 0.40 |
| 1:B:158:LYS:HD3 | 1:B:478:GLU:OE1 | 2.21 | 0.40 |
| 1:A:465:ASP:HA | 1:A:466:PRO:HA | 1.79 | 0.40 |
| 1:B:242:PHE:N | 1:B:242:PHE:CD1 | 2.88 | 0.40 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:374:TYR:CD1 | 1:A:375:LEU:HD13 | 2.56 | 0.40 |
| 1:B:339:ARG:HD2 | 1:B:367:GLN:O | 2.21 | 0.40 |
| 1:B:454:TYR:O | 1:B:454:TYR:CG | 2.74 | 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 | 583/585 (100%) | 551 (94%) | 28 (5%) | 4 (1%) | 22 | 61 |
| 1 | B | 583/585 (100%) | 552 (95%) | 30 (5%) | 1 (0%) | 47 | 79 |
| All | All | 1166/1170 (100%) | 1103 (95%) | 58 (5%) | 5 (0%) | 34 | 69 |

All (5) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 276 | SER |
| 1 | A | 547 | GLU |
| 1 | B | 547 | GLU |
| 1 | A | 277 | LYS |
| 1 | A | 195 | ILE |

### 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 | 493/493 (100%) | 455 (92%) | 38 (8%) | 13 44 |
| 1 | B | 493/493 (100%) | 462 (94%) | 31 (6%) | 18 52 |
| All | All | 986/986 (100%) | 917 (93%) | 69 (7%) | 15 48 |

All (69) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 21 | THR |
| 1 | A | 38 | GLU |
| 1 | A | 40 | LEU |
| 1 | A | 62 | SER |
| 1 | A | 65 | ARG |
| 1 | A | 77 | THR |
| 1 | A | 92 | GLU |
| 1 | A | 105 | ARG |
| 1 | A | 122 | PHE |
| 1 | A | 130 | GLU |
| 1 | A | 139 | GLU |
| 1 | A | 155 | GLN |
| 1 | A | 159 | ASP |
| 1 | A | 164 | HIS |
| 1 | A | 167 | PHE |
| 1 | A | 188 | THR |
| 1 | A | 193 | THR |
| 1 | A | 219 | LEU |
| 1 | A | 221 | THR |
| 1 | A | 223 | ARG |
| 1 | A | 263 | ARG |
| 1 | A | 272 | ASP |
| 1 | A | 277 | LYS |
| 1 | A | 282 | ASN |
| 1 | A | 323 | ARG |
| 1 | A | 325 | ASP |
| 1 | A | 330 | VAL |
| 1 | A | 346 | ASN |
| 1 | A | 375 | LEU |
| 1 | A | 411 | GLN |
| 1 | A | 422 | THR |
| 1 | A | 444 | MET |
| 1 | A | 454 | TYR |
| 1 | A | 483 | LEU |
| 1 | A | 504 | ASN |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 544 | GLN |
| 1 | A | 545 | VAL |
| 1 | A | 547 | GLU |
| 1 | B | 13 | SER |
| 1 | B | 52 | LEU |
| 1 | B | 64 | GLU |
| 1 | B | 122 | PHE |
| 1 | B | 139 | GLU |
| 1 | B | 167 | PHE |
| 1 | B | 202 | HIS |
| 1 | B | 232 | ARG |
| 1 | B | 241 | VAL |
| 1 | B | 248 | GLN |
| 1 | B | 250 | PHE |
| 1 | B | 255 | VAL |
| 1 | B | 261 | GLN |
| 1 | B | 265 | LYS |
| 1 | B | 277 | LYS |
| 1 | B | 323 | ARG |
| 1 | B | 325 | ASP |
| 1 | B | 328 | ASN |
| 1 | B | 337 | GLU |
| 1 | B | 340 | ARG |
| 1 | B | 364 | MET |
| 1 | B | 398 | LEU |
| 1 | B | 411 | GLN |
| 1 | B | 438 | LEU |
| 1 | B | 451 | LEU |
| 1 | B | 464 | THR |
| 1 | B | 467 | ASP |
| 1 | B | 475 | GLU |
| 1 | B | 504 | ASN |
| 1 | B | 552 | THR |
| 1 | B | 569 | LEU |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 8 | HIS |
| 1 | A | 135 | GLN |
| 1 | A | 155 | GLN |
| 1 | A | 244 | HIS |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 282 | ASN |
| 1 | A | 289 | GLN |
| 1 | A | 332 | HIS |
| 1 | A | 346 | ASN |
| 1 | A | 367 | GLN |
| 1 | A | 390 | HIS |
| 1 | A | 411 | GLN |
| 1 | A | 504 | ASN |
| 1 | A | 526 | GLN |
| 1 | A | 527 | HIS |
| 1 | A | 539 | GLN |
| 1 | B | 135 | GLN |
| 1 | B | 257 | GLN |
| 1 | B | 261 | GLN |
| 1 | B | 328 | ASN |
| 1 | B | 332 | HIS |
| 1 | B | 357 | HIS |
| 1 | B | 367 | GLN |
| 1 | B | 411 | GLN |
| 1 | B | 495 | HIS |
| 1 | B | 504 | ASN |
| 1 | B | 524 | GLN |
| 1 | B | 527 | HIS |
| 1 | B | 534 | ASN |
| 1 | B | 539 | GLN |
| 1 | B | 544 | GLN |
| 1 | B | 566 | 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

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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

EDS was not executed - this section is therefore empty.

## 6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

## 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

## 6.4 Ligands

EDS was not executed - this section is therefore empty.

## 6.5 Other polymers

EDS was not executed - this section is therefore empty.