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

Dec 20, 2023 – 08:10 AM EST

|  |  |  |
|---|---|---|
| PDB ID | : | 1VFG |
| Title | : | Crystal structure of tRNA nucleotidyltransferase complexed with a primer tRNA and an incoming ATP analog |
| Authors | : | Tomita, K.; Fukai, S.; Ishitani, R.; Ueda, T.; Takeuchi, N.; Vassylyev, D.G.; Nureki, O.; RIKEN Structural Genomics/Proteomics Initiative (RSGI) |
| Deposited on | : | 2004-04-13 |
| Resolution | : | 2.80 Å(reported) |

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

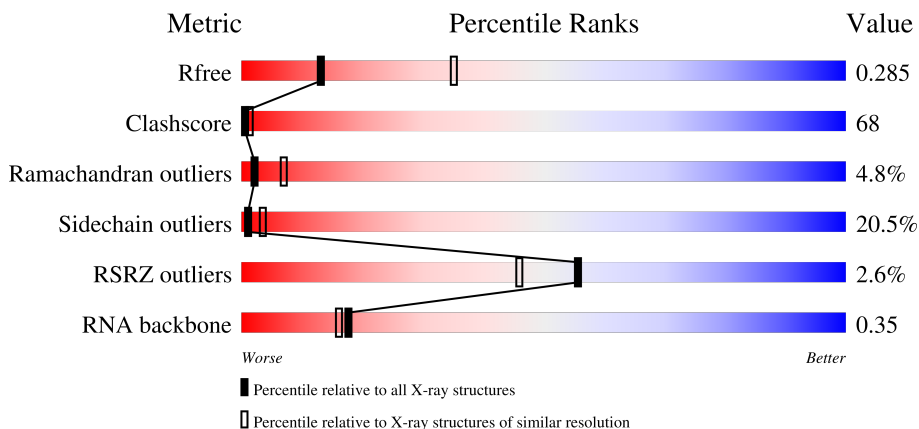|  |  |  |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.36 |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac | : | 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) | : | 2.36 |

# 1   Overall quality at a glance   ⓘ

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

The reported resolution of this entry is 2.80 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 | Percentile Ranks | Value |
|---|---|---|
| Rfree | | 0.285 |
| Clashscore | | 68 |
| Ramachandran outliers | | 4.8% |
| Sidechain outliers | | 20.5% |
| RSRZ outliers | | 2.6% |
| RNA backbone | | 0.35 |

*Worse*      *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|---|---|---|
| R$_{free}$ | 130704 | 3140 (2.80-2.80) |
| Clashscore | 141614 | 3569 (2.80-2.80) |
| Ramachandran outliers | 138981 | 3498 (2.80-2.80) |
| Sidechain outliers | 138945 | 3500 (2.80-2.80) |
| RSRZ outliers | 127900 | 3078 (2.80-2.80) |
| RNA backbone | 3102 | 1227 (3.10-2.50) |

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 | C | 75 | 8%   21%   12%   59% |
| 1 | D | 75 | 8%   25%   12%   55% |
| 2 | A | 390 | 3%   23%   49%   15%   ·   12% |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 2 | B | 390 | 2% 26% 49% 15% 8% |

## 2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 7319 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 RNA chain called RNA (75-MER).

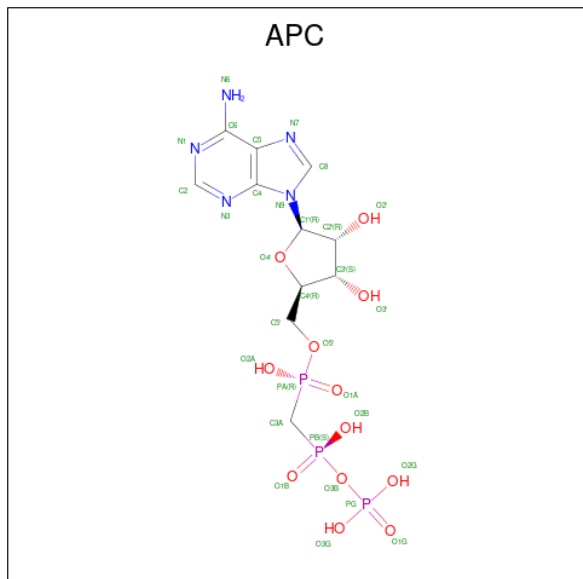| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | C | 31 | Total 661 | C 293 | N 116 | O 221 | P 31 | 0 | 0 | 0 |
| 1 | D | 34 | Total 723 | C 321 | N 127 | O 241 | P 34 | 0 | 0 | 0 |

- Molecule 2 is a protein called poly A polymerase.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | A | 342 | Total 2833 | C 1846 | N 489 | O 492 | S 6 | 0 | 0 | 0 |
| 2 | B | 358 | Total 2961 | C 1928 | N 512 | O 514 | S 7 | 0 | 0 | 0 |

There are 16 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 1 | MET | - | initiating methionine | UNP O66728 |
| A | 384 | LYS | - | cloning artifact | UNP O66728 |
| A | 385 | LEU | - | cloning artifact | UNP O66728 |
| A | 386 | ALA | - | cloning artifact | UNP O66728 |
| A | 387 | ALA | - | cloning artifact | UNP O66728 |
| A | 388 | ALA | - | cloning artifact | UNP O66728 |
| A | 389 | LEU | - | cloning artifact | UNP O66728 |
| A | 390 | GLU | - | cloning artifact | UNP O66728 |
| B | 1 | MET | - | initiating methionine | UNP O66728 |
| B | 384 | LYS | - | cloning artifact | UNP O66728 |
| B | 385 | LEU | - | cloning artifact | UNP O66728 |
| B | 386 | ALA | - | cloning artifact | UNP O66728 |
| B | 387 | ALA | - | cloning artifact | UNP O66728 |
| B | 388 | ALA | - | cloning artifact | UNP O66728 |
| B | 389 | LEU | - | cloning artifact | UNP O66728 |
| B | 390 | GLU | - | cloning artifact | UNP O66728 |

- Molecule 3 is DIPHOSPHOMETHYLPHOSPHONIC ACID ADENOSYL ESTER (three-letter code: APC) (formula: $C_{11}H_{18}N_5O_{12}P_3$).



| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|---|
| 3 | A | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 31 | 11 | 5 | 12 | 3 | | |
| 3 | B | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 31 | 11 | 5 | 12 | 3 | | |

- Molecule 4 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 4 | C | 2 | Total | O | 0 | 0 |
| | | | 2 | 2 | | |
| 4 | D | 8 | Total | O | 0 | 0 |
| | | | 8 | 8 | | |
| 4 | A | 31 | Total | O | 0 | 0 |
| | | | 31 | 31 | | |
| 4 | B | 38 | Total | O | 0 | 0 |
| | | | 38 | 38 | | |

# 3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.
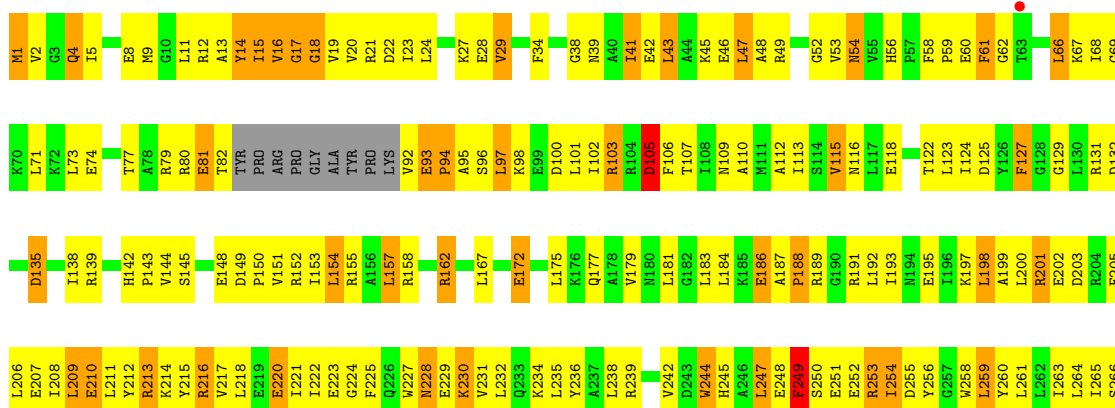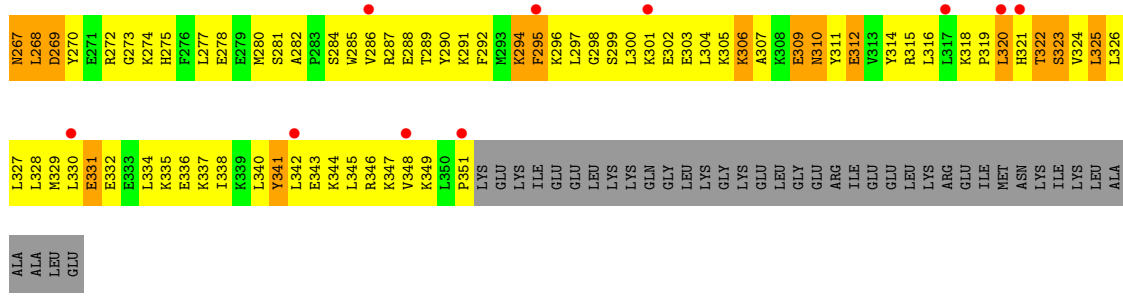
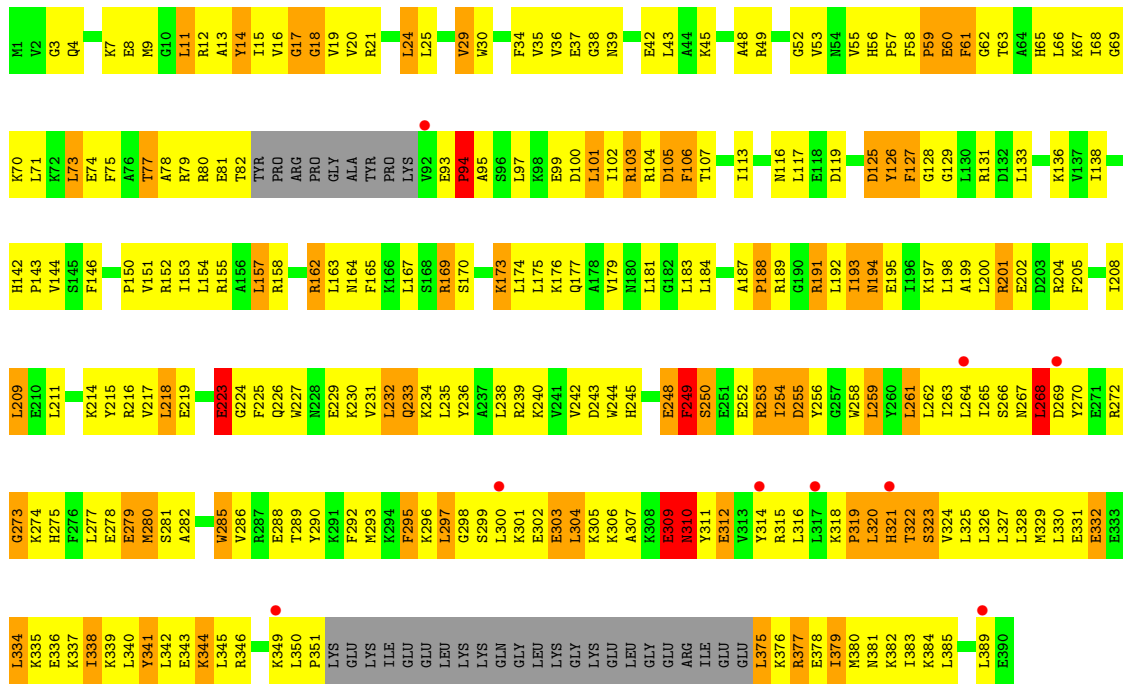- Molecule 1: RNA (75-MER)



- Molecule 1: RNA (75-MER)



- Molecule 2: poly A polymerase

N267 L268 D269 Y270 E271 R272 G273 K274 H275 F276 L277 E278 E279 M280 S281 A282 P283 S284 W285 V286 R287 E288 T289 Y290 K291 F292 M293 K294 F295 K296 L297 G298 S299 L300 K301 E302 E303 L304 K305 K306 A307 K308 E309 N310 Y311 E312 V313 Y314 R315 L316 L317 K318 P319 L320 H321 T322 S323 V324 L325 L326

L327 L328 M329 L330 E331 E332 E333 L334 K335 E336 K337 I338 K339 L340 Y341 L342 E343 K344 L345 R346 K347 V348 K349 L350 P351 LYS GLU LYS ILE GLU GLU LYS LYS GLN GLY LEU LYS GLY LYS GLU LEU GLY GLU ARG ILE GLU GLU LEU LYS ARG GLU ILE MET ASN LYS ILE LYS LEU ALA

ALA ALA LEU GLU

• Molecule 2: poly A polymerase

Chain B:

M1 V2 G3 Q4 K7 E8 M9 G10 L11 R12 A13 Y14 I15 V16 G17 G18 V19 V20 R21 L24 L25 V29 W30 F34 V35 V36 E37 G38 N39 E42 L43 A44 K45 A48 R49 G52 V53 N54 V55 H56 P57 F58 P59 E60 F61 G62 T63 A64 H65 L66 K67 I68 G69

K70 L71 K72 L73 E74 F75 A76 T77 A78 R79 R80 E81 T82 TYR PRO ARG PRO GLY ALA TYR PRO LYS V92 E93 P94 A95 S96 L97 K98 E99 D100 L101 I102 R103 R104 D105 F106 T107 I113 N116 L117 E118 D119 D125 Y126 F127 G128 G129 L130 R131 D132 L133 K136 V137 I138

H142 P143 V144 S145 F146 P150 V151 R152 I153 L154 R155 A156 L157 R158 R162 L163 N164 F165 K166 L167 S168 R169 S170 K173 L174 L175 K176 Q177 A178 V179 N180 L181 G182 L183 L184 A187 P188 R189 G190 R191 L192 I193 N194 E195 I196 K197 L198 A199 L200 R201 E202 D203 R204 F205 I208

L209 E210 L211 K214 Y215 R216 V217 L218 E219 I223 G224 F225 Q226 W227 N228 E229 K230 V231 L232 Q233 K234 L235 Y236 A237 L238 R239 K240 V241 V242 D243 W244 H245 E248 F249 S250 E251 E252 R253 I254 D255 Y256 G257 W258 L259 Y260 L261 L262 I263 L264 I265 S266 N267 L268 D269 Y270 E271 R272

G273 K274 H275 F276 L277 E278 E279 M280 S281 A282 W285 V286 R287 E288 T289 Y290 K291 F292 M293 K294 F295 K296 L297 G298 S299 L300 K301 E302 E303 L304 K305 K306 A307 K308 E309 N310 Y311 E312 V313 Y314 R315 L316 L317 K318 P319 L320 H321 T322 S323 V324 L325 L326 L327 L328 M329 L330 E331 E332 E333

L334 K335 E336 K337 I338 K339 L340 Y341 L342 E343 K344 L345 R346 K349 L350 P351 LYS GLU LYS ILE GLU GLU LYS LYS GLN GLY LEU LYS GLY LYS GLU LEU GLY GLU ARG ILE GLU GLU LEU LYS ARG GLU ILE GLU GLU GLU L375 K376 R377 E378 I379 M380 N381 K382 I383 K384 L385 L389 E390

# 4 Data and refinement statistics ⓘ

| Property | Value | Source |
|---|---|---|
| Space group | P 1 2 1 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 109.48Å   125.90Å   58.92Å<br>90.00°   90.00°   90.00° | Depositor |
| Resolution (Å) | 40.00  –  2.80<br>39.19  –  2.80 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | (Not available) (40.00-2.80)<br>99.1 (39.19-2.80) | Depositor<br>EDS |
| $R_{merge}$ | (Not available) | Depositor |
| $R_{sym}$ | 0.07 | Depositor |
| $< I/\sigma(I) >$ [1] | 4.92 (at 2.81Å) | Xtriage |
| Refinement program | CNS | Depositor |
| R, $R_{free}$ | 0.230  ,  0.286<br>0.228  ,  0.285 | Depositor<br>DCC |
| $R_{free}$ test set | 1945 reflections (4.98%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 71.5 | Xtriage |
| Anisotropy | 0.332 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.31 , 82.1 | EDS |
| L-test for twinning[2] | $< |L| > = 0.47, < L^2 > = 0.30$ | Xtriage |
| Estimated twinning fraction | 0.499 for -h,-k,l | Xtriage |
| $F_o$,$F_c$ correlation | 0.93 | EDS |
| Total number of atoms | 7319 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 87.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.49% of the height of the origin peak. No significant pseudotranslation is detected.*

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

# 5   Model quality ⓘ

## 5.1   Standard geometry ⓘ

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

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 | C | 0.62 | 1/735 (0.1%) | 0.93 | 0/1140 |
| 1 | D | 0.64 | 1/804 (0.1%) | 0.93 | 0/1247 |
| 2 | A | 0.61 | 1/2885 (0.0%) | 0.78 | 3/3876 (0.1%) |
| 2 | B | 0.63 | 0/3012 | 0.79 | 2/4041 (0.0%) |
| All | All | 0.62 | 3/7436 (0.0%) | 0.82 | 5/10304 (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 |
| 1 | D | 0 | 1 |
| All | All | 0 | 2 |

All (3) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|-----|-------------|----------|
| 1 | C | 1 | G | OP3-P | -7.11 | 1.52 | 1.61 |
| 1 | D | 1 | G | OP3-P | -7.07 | 1.52 | 1.61 |
| 2 | A | 1 | MET | CG-SD | 5.60 | 1.95 | 1.81 |

All (5) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|----------|------|----------------|-------------|
| 2 | A | 1 | MET | CB-CG-SD | 5.53 | 128.99 | 112.40 |
| 2 | B | 307 | ALA | N-CA-C | 5.49 | 125.83 | 111.00 |
| 2 | A | 81 | GLU | N-CA-C | 5.46 | 125.73 | 111.00 |
| 2 | A | 307 | ALA | N-CA-C | 5.40 | 125.59 | 111.00 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|---|----------------|-------------|
| 2 | B | 259 | LEU | CA-CB-CG | 5.14 | 127.13 | 115.30 |

There are no chirality outliers.

All (2) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|-----|-------|-----|------|-------|
| 1 | C | 59 | U | Sidechain |
| 1 | D | 59 | U | 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 | C | 661 | 0 | 338 | 37 | 0 |
| 1 | D | 723 | 0 | 371 | 57 | 0 |
| 2 | A | 2833 | 0 | 2976 | 399 | 0 |
| 2 | B | 2961 | 0 | 3124 | 468 | 0 |
| 3 | A | 31 | 0 | 14 | 5 | 0 |
| 3 | B | 31 | 0 | 14 | 5 | 0 |
| 4 | A | 31 | 0 | 0 | 9 | 0 |
| 4 | B | 38 | 0 | 0 | 24 | 0 |
| 4 | C | 2 | 0 | 0 | 0 | 0 |
| 4 | D | 8 | 0 | 0 | 1 | 0 |
| All | All | 7319 | 0 | 6837 | 952 | 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 68.

All (952) 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) |
|--------|--------|--------------------------|-------------------|
| 2:B:253:ARG:HH11 | 2:B:253:ARG:HB3 | 1.04 | 1.15 |
| 2:B:302:GLU:HA | 2:B:305:LYS:HE3 | 1.26 | 1.13 |
| 2:A:15:ILE:HD11 | 2:A:113:ILE:HB | 1.22 | 1.10 |
| 2:A:5:ILE:HD12 | 2:A:47:LEU:HD22 | 1.32 | 1.08 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:39:ASN:HD21 | 2:A:41:ILE:HG12 | 1.12 | 1.06 |
| 2:A:97:LEU:HD11 | 2:A:101:LEU:HD22 | 1.34 | 1.05 |
| 1:C:57:G:H2' | 1:C:58:A:H5' | 1.41 | 1.03 |
| 2:B:268:LEU:HD13 | 2:B:272:ARG:H | 1.24 | 1.02 |
| 2:B:334:LEU:HD23 | 2:B:334:LEU:H | 1.24 | 1.01 |
| 2:B:274:LYS:HA | 2:B:277:LEU:HD13 | 1.43 | 1.00 |
| 2:B:128:GLY:HA2 | 2:B:131:ARG:HH21 | 1.25 | 1.00 |
| 2:A:268:LEU:HD13 | 2:A:272:ARG:H | 1.27 | 1.00 |
| 2:A:300:LEU:HA | 2:A:315:ARG:HH12 | 1.23 | 0.99 |
| 2:A:253:ARG:NH1 | 2:A:253:ARG:HB3 | 1.77 | 0.98 |
| 1:D:75:C:H41 | 2:B:191:ARG:HH22 | 1.07 | 0.97 |
| 2:B:15:ILE:HG22 | 2:B:34:PHE:HE2 | 1.24 | 0.97 |
| 1:D:57:G:H2' | 1:D:58:A:H5' | 1.46 | 0.97 |
| 2:B:79:ARG:HG3 | 2:B:103:ARG:NH1 | 1.79 | 0.97 |
| 2:B:79:ARG:HG3 | 2:B:103:ARG:HH12 | 1.26 | 0.97 |
| 2:B:253:ARG:HB3 | 2:B:253:ARG:NH1 | 1.81 | 0.96 |
| 2:A:304:LEU:HD23 | 2:A:304:LEU:O | 1.66 | 0.96 |
| 2:A:19:VAL:HG23 | 2:A:29:VAL:HG21 | 1.48 | 0.95 |
| 2:B:223:GLU:HG3 | 2:B:224:GLY:H | 1.31 | 0.95 |
| 2:B:380:MET:HA | 2:B:383:ILE:CD1 | 1.96 | 0.95 |
| 2:B:67:LYS:O | 2:B:67:LYS:HD3 | 1.66 | 0.95 |
| 2:B:233:GLN:HE21 | 2:B:234:LYS:N | 1.64 | 0.95 |
| 2:A:15:ILE:HD11 | 2:A:113:ILE:CB | 1.97 | 0.94 |
| 2:B:67:LYS:HE2 | 2:B:69:GLY:N | 1.82 | 0.94 |
| 2:B:193:ILE:HG23 | 2:B:197:LYS:HE3 | 1.50 | 0.93 |
| 2:B:277:LEU:HD12 | 2:B:277:LEU:H | 1.33 | 0.93 |
| 2:B:7:LYS:NZ | 2:B:117:LEU:H | 1.66 | 0.92 |
| 2:B:189:ARG:NH1 | 2:B:279:GLU:HG2 | 1.84 | 0.92 |
| 1:C:54:U:H3' | 1:C:55:U:H5" | 1.52 | 0.92 |
| 2:B:342:LEU:O | 2:B:346:ARG:HG3 | 1.69 | 0.92 |
| 2:A:183:LEU:HA | 2:A:186:GLU:HG3 | 1.52 | 0.91 |
| 2:B:245:HIS:CE1 | 2:B:249:PHE:HB3 | 2.05 | 0.91 |
| 2:A:342:LEU:O | 2:A:346:ARG:HG3 | 1.70 | 0.91 |
| 2:A:39:ASN:ND2 | 2:A:41:ILE:HG12 | 1.84 | 0.91 |
| 2:B:344:LYS:NZ | 2:B:345:LEU:HG | 1.85 | 0.90 |
| 1:D:75:C:H41 | 2:B:191:ARG:NH2 | 1.70 | 0.90 |
| 2:A:300:LEU:HA | 2:A:315:ARG:NH1 | 1.86 | 0.90 |
| 2:B:7:LYS:HZ1 | 2:B:117:LEU:H | 0.94 | 0.90 |
| 2:B:15:ILE:HG22 | 2:B:34:PHE:CE2 | 2.05 | 0.90 |
| 2:A:316:LEU:C | 2:A:319:PRO:HD2 | 1.92 | 0.90 |
| 2:B:268:LEU:HD22 | 2:B:272:ARG:HA | 1.53 | 0.90 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:D:54:U:H3' | 1:D:55:U:H5" | 1.52 | 0.89 |
| 2:A:213:ARG:HB3 | 2:A:213:ARG:HH11 | 1.37 | 0.89 |
| 2:A:15:ILE:CD1 | 2:A:113:ILE:HB | 2.02 | 0.89 |
| 2:A:183:LEU:HA | 2:A:186:GLU:CG | 2.01 | 0.89 |
| 2:A:200:LEU:HD22 | 2:A:201:ARG:HH21 | 1.36 | 0.89 |
| 1:D:50:G:H2' | 1:D:51:C:C6 | 2.08 | 0.88 |
| 1:C:50:G:H2' | 1:C:51:C:C6 | 2.08 | 0.88 |
| 2:B:345:LEU:HD12 | 4:B:1511:HOH:O | 1.74 | 0.88 |
| 2:A:41:ILE:HG22 | 2:A:45:LYS:HE3 | 1.55 | 0.88 |
| 2:B:297:LEU:HA | 4:B:1519:HOH:O | 1.74 | 0.87 |
| 2:A:197:LYS:HG2 | 2:A:201:ARG:HH22 | 1.38 | 0.87 |
| 2:A:261:LEU:O | 2:A:265:ILE:HG12 | 1.75 | 0.87 |
| 2:A:253:ARG:HB3 | 2:A:253:ARG:CZ | 2.05 | 0.86 |
| 2:A:41:ILE:CG2 | 2:A:45:LYS:HE3 | 2.06 | 0.86 |
| 2:B:384:LYS:HG3 | 2:B:385:LEU:HD23 | 1.57 | 0.85 |
| 1:C:68:U:H2' | 1:C:69:G:C8 | 2.11 | 0.85 |
| 2:B:7:LYS:NZ | 2:B:117:LEU:HG | 1.91 | 0.85 |
| 2:A:206:LEU:HD23 | 2:A:239:ARG:HD2 | 1.54 | 0.85 |
| 1:D:54:U:C3' | 1:D:55:U:H5" | 2.07 | 0.85 |
| 2:A:19:VAL:O | 2:A:23:ILE:HD12 | 1.75 | 0.85 |
| 2:A:149:ASP:OD1 | 2:A:151:VAL:HG12 | 1.77 | 0.84 |
| 2:B:268:LEU:HD13 | 2:B:272:ARG:N | 1.91 | 0.84 |
| 1:C:54:U:C3' | 1:C:55:U:H5" | 2.06 | 0.84 |
| 2:A:39:ASN:HD21 | 2:A:41:ILE:CG1 | 1.90 | 0.84 |
| 2:B:256:TYR:HA | 2:B:259:LEU:HD13 | 1.57 | 0.84 |
| 1:D:68:U:H2' | 1:D:69:G:C8 | 2.12 | 0.84 |
| 2:B:12:ARG:HA | 2:B:116:ASN:HD21 | 1.40 | 0.84 |
| 2:A:343:GLU:HB3 | 2:A:347:LYS:HZ2 | 1.42 | 0.84 |
| 2:B:19:VAL:HG23 | 2:B:29:VAL:HG21 | 1.58 | 0.84 |
| 2:B:309:GLU:O | 2:B:311:TYR:N | 2.11 | 0.84 |
| 2:B:322:THR:HG22 | 2:B:326:LEU:HD21 | 1.58 | 0.83 |
| 2:A:222:ILE:CG2 | 2:A:225:PHE:HB2 | 2.09 | 0.83 |
| 2:A:43:LEU:HD12 | 2:A:47:LEU:HD23 | 1.59 | 0.83 |
| 2:B:285:TRP:HE1 | 2:B:323:SER:HB3 | 1.41 | 0.83 |
| 2:B:297:LEU:HD23 | 2:B:298:GLY:N | 1.94 | 0.83 |
| 2:A:80:ARG:HE | 2:A:95:ALA:HB2 | 1.43 | 0.83 |
| 1:C:67:C:H2' | 1:C:68:U:C5 | 2.14 | 0.82 |
| 2:A:193:ILE:HG23 | 2:A:280:MET:HE1 | 1.58 | 0.82 |
| 2:B:343:GLU:HA | 2:B:346:ARG:HD2 | 1.61 | 0.82 |
| 1:D:74:C:H4' | 4:D:76:HOH:O | 1.78 | 0.82 |
| 2:A:131:ARG:HH22 | 2:A:139:ARG:HH12 | 1.27 | 0.82 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:261:LEU:HA | 2:B:264:LEU:HD12 | 1.61 | 0.82 |
| 2:B:224:GLY:HA3 | 2:B:269:ASP:HB2 | 1.62 | 0.81 |
| 2:A:144:VAL:O | 2:A:148:GLU:HG3 | 1.80 | 0.81 |
| 2:B:227:TRP:CZ3 | 2:B:232:LEU:HD12 | 2.16 | 0.81 |
| 2:A:59:PRO:O | 2:A:61:PHE:HD1 | 1.63 | 0.81 |
| 1:D:67:C:H2' | 1:D:68:U:C5 | 2.16 | 0.80 |
| 2:A:309:GLU:O | 2:A:311:TYR:N | 2.13 | 0.80 |
| 2:A:304:LEU:HA | 2:A:315:ARG:HH21 | 1.47 | 0.80 |
| 2:A:316:LEU:O | 2:A:319:PRO:HD2 | 1.82 | 0.80 |
| 2:B:3:GLY:O | 2:B:7:LYS:HG2 | 1.81 | 0.80 |
| 2:A:97:LEU:HD12 | 2:A:97:LEU:O | 1.83 | 0.79 |
| 2:B:376:LYS:HD2 | 2:B:379:ILE:HD11 | 1.63 | 0.79 |
| 2:A:268:LEU:HD13 | 2:A:272:ARG:N | 1.98 | 0.79 |
| 2:B:253:ARG:HH11 | 2:B:253:ARG:CB | 1.92 | 0.79 |
| 2:A:205:PHE:HA | 2:A:208:ILE:HD12 | 1.64 | 0.79 |
| 2:B:268:LEU:HD22 | 2:B:272:ARG:CA | 2.12 | 0.79 |
| 2:A:222:ILE:HG22 | 2:A:225:PHE:HB2 | 1.63 | 0.79 |
| 2:A:216:ARG:NH1 | 2:A:216:ARG:HB2 | 1.98 | 0.79 |
| 2:B:245:HIS:CD2 | 2:B:326:LEU:HD11 | 2.18 | 0.79 |
| 2:A:13:ALA:H | 2:A:116:ASN:HD21 | 1.28 | 0.78 |
| 2:A:242:VAL:HG13 | 2:A:256:TYR:CD2 | 2.17 | 0.78 |
| 2:B:316:LEU:C | 2:B:319:PRO:HD2 | 2.03 | 0.78 |
| 2:A:258:TRP:HH2 | 2:A:280:MET:HB3 | 1.48 | 0.78 |
| 2:A:154:LEU:H | 2:A:154:LEU:CD2 | 1.97 | 0.78 |
| 2:B:62:GLY:O | 2:B:77:THR:HG22 | 1.83 | 0.78 |
| 2:B:30:TRP:CZ3 | 2:B:71:LEU:HG | 2.19 | 0.77 |
| 2:A:268:LEU:HD22 | 2:A:272:ARG:HA | 1.64 | 0.77 |
| 2:B:341:TYR:HD2 | 2:B:342:LEU:N | 1.81 | 0.77 |
| 2:A:205:PHE:CE2 | 2:A:209:LEU:HD21 | 2.20 | 0.77 |
| 2:B:67:LYS:HE2 | 2:B:69:GLY:H | 1.47 | 0.77 |
| 2:B:272:ARG:HH11 | 2:B:272:ARG:HG2 | 1.49 | 0.76 |
| 2:B:322:THR:HG22 | 2:B:326:LEU:CD2 | 2.14 | 0.76 |
| 2:B:377:ARG:HD2 | 2:B:378:GLU:H | 1.47 | 0.76 |
| 2:A:297:LEU:O | 2:A:301:LYS:HD2 | 1.85 | 0.76 |
| 2:A:343:GLU:O | 2:A:347:LYS:HD2 | 1.86 | 0.76 |
| 2:B:335:LYS:HE2 | 2:B:339:LYS:HE3 | 1.67 | 0.76 |
| 2:A:15:ILE:HD12 | 2:A:20:VAL:HG22 | 1.66 | 0.75 |
| 2:A:38:GLY:O | 2:A:77:THR:HG23 | 1.86 | 0.75 |
| 2:A:154:LEU:H | 2:A:154:LEU:HD22 | 1.52 | 0.75 |
| 2:A:205:PHE:O | 2:A:209:LEU:HD22 | 1.87 | 0.75 |
| 2:B:245:HIS:HD2 | 2:B:326:LEU:HD11 | 1.48 | 0.75 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:7:LYS:HZ1 | 2:B:117:LEU:HG | 1.49 | 0.75 |
| 2:B:164:ASN:HB2 | 2:B:204:ARG:NH2 | 2.01 | 0.75 |
| 2:B:174:LEU:HA | 2:B:177:GLN:HG3 | 1.69 | 0.75 |
| 2:A:295:PHE:N | 2:A:295:PHE:CD2 | 2.54 | 0.75 |
| 2:B:11:LEU:HD23 | 2:B:12:ARG:H | 1.51 | 0.75 |
| 2:B:268:LEU:CD1 | 2:B:272:ARG:H | 1.98 | 0.75 |
| 2:A:206:LEU:HA | 2:A:209:LEU:HD23 | 1.69 | 0.74 |
| 2:B:229:GLU:CD | 2:B:229:GLU:H | 1.90 | 0.74 |
| 2:B:380:MET:HA | 2:B:383:ILE:HD12 | 1.69 | 0.74 |
| 2:B:302:GLU:HA | 2:B:305:LYS:CE | 2.12 | 0.74 |
| 2:B:344:LYS:HD2 | 2:B:345:LEU:N | 2.02 | 0.74 |
| 2:A:285:TRP:HB3 | 2:A:321:HIS:NE2 | 2.02 | 0.74 |
| 2:B:344:LYS:HZ1 | 2:B:345:LEU:HG | 1.48 | 0.74 |
| 1:C:57:G:C2' | 1:C:58:A:H5' | 2.16 | 0.73 |
| 2:B:7:LYS:HZ1 | 2:B:117:LEU:N | 1.80 | 0.73 |
| 1:C:67:C:H2' | 1:C:68:U:C6 | 2.24 | 0.73 |
| 2:A:149:ASP:OD2 | 2:A:191:ARG:NH2 | 2.21 | 0.73 |
| 2:A:193:ILE:HG23 | 2:A:280:MET:CE | 2.18 | 0.73 |
| 2:A:213:ARG:HB3 | 2:A:213:ARG:NH1 | 2.04 | 0.73 |
| 2:B:242:VAL:HG13 | 2:B:256:TYR:CD1 | 2.23 | 0.72 |
| 2:A:5:ILE:HD12 | 2:A:47:LEU:CD2 | 2.17 | 0.72 |
| 2:A:216:ARG:HB2 | 2:A:216:ARG:CZ | 2.19 | 0.72 |
| 2:A:197:LYS:HG2 | 2:A:201:ARG:NH2 | 2.04 | 0.72 |
| 2:A:189:ARG:O | 2:A:193:ILE:HG12 | 1.90 | 0.72 |
| 2:B:214:LYS:HE3 | 4:B:1531:HOH:O | 1.88 | 0.72 |
| 2:A:59:PRO:O | 2:A:61:PHE:CD1 | 2.42 | 0.72 |
| 2:B:341:TYR:CE2 | 2:B:345:LEU:HD12 | 2.24 | 0.72 |
| 1:D:72:C:H2' | 1:D:73:A:C8 | 2.25 | 0.72 |
| 2:B:293:MET:O | 2:B:297:LEU:HB3 | 1.90 | 0.72 |
| 2:A:54:ASN:ND2 | 2:A:54:ASN:H | 1.88 | 0.71 |
| 2:A:304:LEU:CA | 2:A:315:ARG:HH21 | 2.02 | 0.71 |
| 1:D:67:C:H2' | 1:D:68:U:C6 | 2.25 | 0.71 |
| 2:B:382:LYS:HA | 2:B:385:LEU:CD1 | 2.21 | 0.71 |
| 2:B:226:GLN:HA | 4:B:1512:HOH:O | 1.89 | 0.71 |
| 2:B:334:LEU:H | 2:B:334:LEU:CD2 | 2.03 | 0.71 |
| 2:B:341:TYR:C | 2:B:341:TYR:CD2 | 2.64 | 0.71 |
| 2:A:144:VAL:HG23 | 4:A:530:HOH:O | 1.89 | 0.71 |
| 2:A:228:ASN:ND2 | 2:A:231:VAL:HG23 | 2.05 | 0.71 |
| 2:A:242:VAL:HG22 | 2:A:256:TYR:HD2 | 1.56 | 0.70 |
| 2:B:326:LEU:N | 2:B:326:LEU:HD22 | 2.06 | 0.70 |
| 2:A:258:TRP:CH2 | 2:A:280:MET:HB3 | 2.25 | 0.70 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:277:LEU:HD12 | 2:B:277:LEU:N | 2.05 | 0.70 |
| 2:A:42:GLU:HA | 2:A:45:LYS:HD2 | 1.73 | 0.70 |
| 2:B:312:GLU:OE2 | 2:B:344:LYS:HE3 | 1.92 | 0.70 |
| 2:A:167:LEU:HD12 | 2:A:172:GLU:HG2 | 1.74 | 0.70 |
| 2:B:344:LYS:HD2 | 2:B:344:LYS:C | 2.12 | 0.70 |
| 2:A:19:VAL:HG22 | 2:A:23:ILE:HD11 | 1.73 | 0.69 |
| 2:B:334:LEU:HA | 2:B:337:LYS:HG3 | 1.73 | 0.69 |
| 2:A:209:LEU:HA | 2:A:212:TYR:HD2 | 1.57 | 0.69 |
| 2:B:381:ASN:O | 2:B:384:LYS:HG2 | 1.92 | 0.69 |
| 2:A:260:TYR:O | 2:A:264:LEU:HD12 | 1.92 | 0.69 |
| 2:B:193:ILE:HG22 | 2:B:194:ASN:N | 2.06 | 0.69 |
| 2:A:345:LEU:HA | 2:A:348:VAL:HG23 | 1.74 | 0.69 |
| 2:B:194:ASN:O | 2:B:198:LEU:HD23 | 1.92 | 0.69 |
| 2:A:343:GLU:HB3 | 2:A:347:LYS:NZ | 2.07 | 0.69 |
| 2:B:233:GLN:HE21 | 2:B:233:GLN:C | 1.96 | 0.69 |
| 2:B:296:LYS:HD3 | 2:B:299:SER:HB2 | 1.74 | 0.69 |
| 1:D:57:G:C2' | 1:D:58:A:H5' | 2.21 | 0.69 |
| 2:A:127:PHE:CD1 | 2:A:127:PHE:N | 2.61 | 0.69 |
| 2:B:326:LEU:HA | 2:B:329:MET:CE | 2.23 | 0.69 |
| 2:A:239:ARG:HA | 2:A:260:TYR:OH | 1.93 | 0.68 |
| 2:B:223:GLU:HG3 | 2:B:224:GLY:N | 2.05 | 0.68 |
| 2:A:296:LYS:HB3 | 2:A:300:LEU:HD13 | 1.75 | 0.68 |
| 2:A:316:LEU:O | 2:A:316:LEU:HD23 | 1.93 | 0.68 |
| 2:B:316:LEU:HG | 2:B:341:TYR:OH | 1.94 | 0.68 |
| 2:B:169:ARG:HH21 | 2:B:173:LYS:HZ2 | 1.38 | 0.68 |
| 2:A:202:GLU:HG3 | 2:A:208:ILE:HD11 | 1.75 | 0.67 |
| 2:A:216:ARG:NH1 | 2:A:216:ARG:CB | 2.57 | 0.67 |
| 2:B:381:ASN:O | 2:B:385:LEU:HG | 1.94 | 0.67 |
| 2:A:304:LEU:HD13 | 2:A:334:LEU:HD22 | 1.75 | 0.67 |
| 2:B:197:LYS:O | 2:B:201:ARG:HG2 | 1.93 | 0.67 |
| 2:A:295:PHE:N | 2:A:295:PHE:HD2 | 1.92 | 0.67 |
| 2:A:304:LEU:N | 2:A:315:ARG:NH2 | 2.43 | 0.67 |
| 2:B:170:SER:O | 2:B:174:LEU:HG | 1.94 | 0.67 |
| 2:B:254:ILE:HG12 | 2:B:285:TRP:CH2 | 2.30 | 0.67 |
| 2:A:5:ILE:HG21 | 2:A:43:LEU:HD13 | 1.76 | 0.67 |
| 2:A:238:LEU:HD21 | 2:A:259:LEU:HB3 | 1.77 | 0.67 |
| 2:B:344:LYS:HZ3 | 2:B:345:LEU:H | 1.40 | 0.67 |
| 2:A:318:LYS:HE2 | 4:A:531:HOH:O | 1.93 | 0.66 |
| 2:B:285:TRP:HB2 | 2:B:321:HIS:CE1 | 2.30 | 0.66 |
| 2:A:183:LEU:HA | 2:A:186:GLU:HG2 | 1.76 | 0.66 |
| 1:C:1:G:H2' | 1:C:1:G:N3 | 2.09 | 0.66 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:210:GLU:OE1 | 2:A:210:GLU:HA | 1.94 | 0.66 |
| 2:A:213:ARG:HA | 4:A:522:HOH:O | 1.95 | 0.66 |
| 2:A:324:VAL:O | 2:A:328:LEU:HG | 1.96 | 0.66 |
| 2:B:195:GLU:O | 2:B:198:LEU:HB2 | 1.95 | 0.66 |
| 2:B:199:ALA:HA | 2:B:202:GLU:HG2 | 1.77 | 0.66 |
| 2:B:380:MET:HA | 2:B:383:ILE:HD11 | 1.77 | 0.66 |
| 2:A:162:ARG:HG3 | 2:A:162:ARG:HH11 | 1.60 | 0.66 |
| 2:B:311:TYR:O | 2:B:315:ARG:HG2 | 1.96 | 0.66 |
| 2:B:316:LEU:HD23 | 2:B:316:LEU:O | 1.96 | 0.66 |
| 2:B:375:LEU:HA | 2:B:377:ARG:NE | 2.10 | 0.66 |
| 2:A:289:THR:HG23 | 2:A:324:VAL:HG22 | 1.77 | 0.66 |
| 1:D:75:C:N4 | 2:B:191:ARG:NH2 | 2.42 | 0.65 |
| 2:A:200:LEU:HD22 | 2:A:201:ARG:NH2 | 2.10 | 0.65 |
| 2:A:272:ARG:O | 2:A:274:LYS:N | 2.29 | 0.65 |
| 2:A:343:GLU:O | 2:A:346:ARG:HB2 | 1.96 | 0.65 |
| 1:D:1:G:H2' | 1:D:1:G:N3 | 2.11 | 0.65 |
| 2:B:272:ARG:O | 2:B:274:LYS:N | 2.28 | 0.65 |
| 2:B:342:LEU:HB3 | 2:B:346:ARG:HH21 | 1.62 | 0.65 |
| 2:B:66:LEU:O | 2:B:73:LEU:HD23 | 1.96 | 0.65 |
| 2:B:259:LEU:HA | 2:B:262:LEU:HD12 | 1.79 | 0.65 |
| 2:B:128:GLY:HA2 | 2:B:131:ARG:NH2 | 2.04 | 0.65 |
| 2:B:150:PRO:HG2 | 2:B:187:ALA:HB2 | 1.77 | 0.65 |
| 2:A:183:LEU:HD23 | 2:A:186:GLU:HG3 | 1.79 | 0.65 |
| 2:A:131:ARG:HG2 | 2:A:135:ASP:OD2 | 1.97 | 0.64 |
| 2:A:238:LEU:HD22 | 2:A:263:ILE:HD11 | 1.78 | 0.64 |
| 2:B:30:TRP:HZ3 | 2:B:71:LEU:HG | 1.61 | 0.64 |
| 2:A:97:LEU:HD12 | 2:A:97:LEU:C | 2.16 | 0.64 |
| 2:A:224:GLY:HA3 | 2:A:269:ASP:HB3 | 1.78 | 0.64 |
| 2:A:315:ARG:O | 2:A:319:PRO:HD3 | 1.97 | 0.64 |
| 2:B:11:LEU:HD21 | 2:B:37:GLU:C | 2.17 | 0.64 |
| 2:B:79:ARG:CG | 2:B:103:ARG:HH12 | 2.05 | 0.64 |
| 2:B:126:TYR:HB2 | 2:B:127:PHE:CD2 | 2.32 | 0.64 |
| 2:A:294:LYS:HZ2 | 2:A:295:PHE:HE2 | 1.44 | 0.64 |
| 2:B:66:LEU:HD11 | 2:B:68:ILE:HD11 | 1.79 | 0.64 |
| 2:A:157:LEU:N | 2:A:157:LEU:CD1 | 2.61 | 0.64 |
| 2:B:377:ARG:O | 2:B:381:ASN:N | 2.22 | 0.64 |
| 2:A:287:ARG:HG3 | 2:A:287:ARG:HH11 | 1.63 | 0.64 |
| 1:D:73:A:O2' | 1:D:74:C:H5' | 1.99 | 0.63 |
| 2:B:12:ARG:HA | 2:B:116:ASN:ND2 | 2.12 | 0.63 |
| 2:B:300:LEU:O | 2:B:304:LEU:HD12 | 1.98 | 0.63 |
| 2:B:341:TYR:CD2 | 2:B:342:LEU:N | 2.66 | 0.63 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:189:ARG:CZ | 2:B:279:GLU:HG2 | 2.27 | 0.63 |
| 2:B:193:ILE:CG2 | 2:B:197:LYS:HE3 | 2.27 | 0.63 |
| 2:A:300:LEU:O | 2:A:304:LEU:HB2 | 1.97 | 0.63 |
| 2:A:334:LEU:O | 2:A:338:ILE:HD13 | 1.99 | 0.63 |
| 2:B:285:TRP:HB2 | 2:B:321:HIS:CG | 2.34 | 0.63 |
| 2:A:228:ASN:HD22 | 2:A:231:VAL:HG23 | 1.60 | 0.63 |
| 2:A:297:LEU:HA | 2:A:301:LYS:HZ3 | 1.63 | 0.63 |
| 2:A:304:LEU:HD21 | 2:A:337:LYS:HD3 | 1.79 | 0.63 |
| 2:B:66:LEU:CD1 | 2:B:68:ILE:HD11 | 2.27 | 0.63 |
| 2:B:285:TRP:NE1 | 2:B:323:SER:HB3 | 2.13 | 0.63 |
| 2:A:115:VAL:HG23 | 2:A:115:VAL:O | 1.98 | 0.63 |
| 2:A:316:LEU:HD12 | 2:A:345:LEU:HD21 | 1.81 | 0.63 |
| 2:B:248:GLU:N | 2:B:248:GLU:CD | 2.52 | 0.63 |
| 2:B:99:GLU:O | 2:B:102:ILE:HG22 | 1.97 | 0.63 |
| 2:A:105:ASP:N | 3:A:500:APC:H2 | 2.14 | 0.62 |
| 2:B:285:TRP:HB2 | 2:B:321:HIS:ND1 | 2.14 | 0.62 |
| 2:A:254:ILE:HG12 | 2:A:255:ASP:N | 2.15 | 0.62 |
| 2:B:236:TYR:O | 2:B:239:ARG:HB3 | 1.99 | 0.62 |
| 2:B:244:TRP:O | 2:B:248:GLU:OE2 | 2.16 | 0.62 |
| 2:A:259:LEU:CD1 | 2:A:327:LEU:HD21 | 2.28 | 0.62 |
| 2:A:43:LEU:CD1 | 2:A:47:LEU:HD23 | 2.28 | 0.62 |
| 2:B:169:ARG:NH2 | 2:B:173:LYS:HZ2 | 1.97 | 0.62 |
| 2:B:277:LEU:H | 2:B:277:LEU:CD1 | 2.06 | 0.62 |
| 1:D:73:A:H2' | 1:D:74:C:O4' | 1.99 | 0.62 |
| 2:B:274:LYS:HG3 | 2:B:290:TYR:CD2 | 2.35 | 0.62 |
| 2:B:342:LEU:HA | 4:B:1511:HOH:O | 1.99 | 0.62 |
| 2:A:61:PHE:CD1 | 2:A:61:PHE:N | 2.65 | 0.62 |
| 2:B:193:ILE:CG2 | 2:B:194:ASN:N | 2.62 | 0.61 |
| 2:A:285:TRP:HB2 | 2:A:321:HIS:CG | 2.35 | 0.61 |
| 1:C:5:A:C2 | 1:C:69:G:C6 | 2.88 | 0.61 |
| 2:B:223:GLU:CG | 2:B:224:GLY:H | 2.10 | 0.61 |
| 1:D:5:A:C2 | 1:D:69:G:C6 | 2.89 | 0.61 |
| 2:B:325:LEU:HA | 2:B:328:LEU:HD12 | 1.83 | 0.61 |
| 2:B:339:LYS:HD2 | 4:B:1534:HOH:O | 1.99 | 0.61 |
| 2:B:66:LEU:CD1 | 2:B:73:LEU:HD21 | 2.30 | 0.61 |
| 2:A:154:LEU:HD22 | 2:A:154:LEU:N | 2.15 | 0.61 |
| 2:A:59:PRO:O | 2:A:60:GLU:HB3 | 2.00 | 0.61 |
| 2:B:343:GLU:O | 2:B:346:ARG:HB2 | 2.01 | 0.61 |
| 2:A:205:PHE:O | 2:A:208:ILE:HB | 2.01 | 0.61 |
| 2:A:131:ARG:NH2 | 2:A:139:ARG:HH12 | 1.96 | 0.61 |
| 2:A:259:LEU:HD11 | 2:A:327:LEU:HD21 | 1.83 | 0.61 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:384:LYS:HG3 | 2:B:385:LEU:CD2 | 2.29 | 0.61 |
| 2:A:13:ALA:C | 2:A:14:TYR:CD1 | 2.74 | 0.60 |
| 2:A:53:VAL:HG11 | 2:A:67:LYS:O | 2.02 | 0.60 |
| 2:A:285:TRP:CB | 2:A:321:HIS:CE1 | 2.83 | 0.60 |
| 2:B:30:TRP:CE3 | 2:B:71:LEU:HG | 2.36 | 0.60 |
| 2:B:184:LEU:HD11 | 2:B:217:VAL:HG13 | 1.83 | 0.60 |
| 2:B:256:TYR:HA | 2:B:259:LEU:CD1 | 2.29 | 0.60 |
| 1:D:73:A:O5' | 1:D:73:A:H8 | 1.84 | 0.60 |
| 2:A:232:LEU:O | 2:A:235:LEU:HB2 | 2.01 | 0.60 |
| 2:A:322:THR:HG23 | 2:A:325:LEU:HD22 | 1.82 | 0.60 |
| 2:B:15:ILE:HG12 | 2:B:113:ILE:HB | 1.84 | 0.60 |
| 2:B:292:PHE:CE1 | 2:B:296:LYS:HB2 | 2.37 | 0.60 |
| 2:A:15:ILE:HD12 | 2:A:20:VAL:CG2 | 2.31 | 0.60 |
| 2:B:175:LEU:HD23 | 2:B:175:LEU:C | 2.22 | 0.60 |
| 2:B:336:GLU:OE2 | 2:B:339:LYS:HD2 | 2.01 | 0.60 |
| 1:D:74:C:OP1 | 2:B:191:ARG:NH2 | 2.35 | 0.60 |
| 2:A:205:PHE:CZ | 2:A:209:LEU:HD21 | 2.36 | 0.60 |
| 2:B:229:GLU:O | 2:B:233:GLN:HG3 | 2.01 | 0.60 |
| 2:A:242:VAL:HG22 | 2:A:256:TYR:CD2 | 2.37 | 0.60 |
| 2:A:48:ALA:HB1 | 2:A:53:VAL:O | 2.01 | 0.60 |
| 2:A:312:GLU:OE2 | 2:A:345:LEU:HD11 | 2.02 | 0.60 |
| 2:B:97:LEU:HG | 2:B:101:LEU:HD22 | 1.83 | 0.60 |
| 2:B:15:ILE:HD11 | 2:B:113:ILE:HD12 | 1.83 | 0.60 |
| 2:B:169:ARG:NH2 | 2:B:173:LYS:NZ | 2.50 | 0.60 |
| 2:B:105:ASP:HB3 | 2:B:106:PHE:CD1 | 2.37 | 0.59 |
| 2:A:304:LEU:CA | 2:A:315:ARG:NH2 | 2.64 | 0.59 |
| 2:B:335:LYS:NZ | 2:B:339:LYS:NZ | 2.50 | 0.59 |
| 2:B:11:LEU:HD21 | 2:B:38:GLY:N | 2.18 | 0.59 |
| 2:B:280:MET:O | 2:B:282:ALA:N | 2.34 | 0.59 |
| 2:B:20:VAL:HG13 | 2:B:113:ILE:HD11 | 1.84 | 0.59 |
| 1:D:5:A:H2' | 1:D:6:G:C8 | 2.36 | 0.59 |
| 2:B:335:LYS:HG2 | 4:B:1534:HOH:O | 2.02 | 0.59 |
| 2:A:15:ILE:CD1 | 2:A:20:VAL:HG22 | 2.32 | 0.59 |
| 2:B:341:TYR:HD2 | 2:B:341:TYR:C | 2.04 | 0.59 |
| 2:B:303:GLU:HA | 2:B:306:LYS:NZ | 2.18 | 0.59 |
| 2:B:173:LYS:O | 2:B:177:GLN:HG2 | 2.02 | 0.59 |
| 2:B:324:VAL:O | 2:B:328:LEU:HG | 2.02 | 0.59 |
| 1:C:5:A:H2' | 1:C:6:G:C8 | 2.37 | 0.58 |
| 2:A:285:TRP:HB3 | 2:A:321:HIS:CD2 | 2.38 | 0.58 |
| 2:A:345:LEU:O | 2:A:349:LYS:HD3 | 2.03 | 0.58 |
| 2:B:79:ARG:NH1 | 2:B:81:GLU:C | 2.56 | 0.58 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:230:LYS:O | 2:B:233:GLN:NE2 | 2.35 | 0.58 |
| 2:A:41:ILE:O | 2:A:45:LYS:HG3 | 2.03 | 0.58 |
| 2:A:153:ILE:HD12 | 2:A:184:LEU:HD21 | 1.86 | 0.58 |
| 2:A:197:LYS:O | 2:A:201:ARG:NE | 2.36 | 0.58 |
| 2:B:342:LEU:HB3 | 2:B:346:ARG:NH2 | 2.17 | 0.58 |
| 1:C:5:A:O2' | 1:C:69:G:N2 | 2.35 | 0.58 |
| 2:A:216:ARG:CB | 2:A:216:ARG:HH11 | 2.16 | 0.58 |
| 2:B:39:ASN:OD1 | 2:B:42:GLU:HB2 | 2.03 | 0.58 |
| 2:B:376:LYS:O | 2:B:379:ILE:HG13 | 2.04 | 0.58 |
| 2:A:110:ALA:O | 2:A:127:PHE:CE1 | 2.57 | 0.58 |
| 2:A:131:ARG:HH11 | 2:A:131:ARG:HB3 | 1.68 | 0.58 |
| 2:B:268:LEU:C | 2:B:268:LEU:HD12 | 2.23 | 0.58 |
| 2:B:7:LYS:CE | 2:B:117:LEU:H | 2.17 | 0.58 |
| 2:B:173:LYS:O | 2:B:177:GLN:CG | 2.51 | 0.58 |
| 2:B:230:LYS:O | 2:B:234:LYS:HB2 | 2.03 | 0.58 |
| 2:B:138:ILE:HB | 2:B:167:LEU:HD23 | 1.84 | 0.58 |
| 2:A:122:THR:HG22 | 2:A:124:ILE:HD12 | 1.86 | 0.58 |
| 2:A:199:ALA:O | 2:A:202:GLU:HB2 | 2.03 | 0.58 |
| 1:D:5:A:O2' | 1:D:69:G:N2 | 2.37 | 0.58 |
| 2:B:227:TRP:CE3 | 2:B:232:LEU:HD12 | 2.38 | 0.58 |
| 2:A:19:VAL:HG22 | 2:A:23:ILE:CD1 | 2.34 | 0.57 |
| 2:B:164:ASN:N | 2:B:204:ARG:HH21 | 2.01 | 0.57 |
| 1:D:58:A:N1 | 1:D:60:U:O4 | 2.38 | 0.57 |
| 2:A:67:LYS:HE3 | 2:A:69:GLY:O | 2.03 | 0.57 |
| 2:B:170:SER:HA | 2:B:173:LYS:CE | 2.34 | 0.57 |
| 2:B:377:ARG:HD2 | 2:B:378:GLU:N | 2.18 | 0.57 |
| 2:A:153:ILE:HD12 | 2:A:184:LEU:CD2 | 2.34 | 0.57 |
| 2:B:377:ARG:O | 2:B:381:ASN:CG | 2.42 | 0.57 |
| 2:B:379:ILE:O | 2:B:383:ILE:HG13 | 2.04 | 0.57 |
| 2:B:66:LEU:HG | 2:B:73:LEU:HD21 | 1.85 | 0.57 |
| 2:B:316:LEU:HG | 2:B:341:TYR:CZ | 2.39 | 0.57 |
| 1:D:73:A:C2' | 1:D:74:C:H5' | 2.35 | 0.57 |
| 2:A:15:ILE:HD11 | 2:A:113:ILE:CG1 | 2.33 | 0.57 |
| 2:A:214:LYS:HE3 | 2:A:215:TYR:HH | 1.69 | 0.57 |
| 2:A:230:LYS:O | 2:A:234:LYS:HB2 | 2.03 | 0.57 |
| 2:B:298:GLY:O | 2:B:302:GLU:HG3 | 2.05 | 0.57 |
| 2:B:310:ASN:ND2 | 2:B:379:ILE:HG22 | 2.20 | 0.57 |
| 2:B:315:ARG:O | 2:B:319:PRO:HD3 | 2.05 | 0.57 |
| 1:D:63:G:H2' | 1:D:64:C:O4' | 2.05 | 0.57 |
| 1:D:66:C:N4 | 1:D:67:C:N4 | 2.52 | 0.57 |
| 1:D:75:C:N4 | 2:B:191:ARG:HH22 | 1.89 | 0.57 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:19:VAL:C | 2:A:23:ILE:HD12 | 2.25 | 0.57 |
| 2:A:230:LYS:HE2 | 2:A:234:LYS:CE | 2.34 | 0.57 |
| 2:A:175:LEU:O | 2:A:179:VAL:HG23 | 2.05 | 0.57 |
| 2:A:261:LEU:HD11 | 2:A:265:ILE:HD11 | 1.87 | 0.57 |
| 2:B:59:PRO:O | 2:B:60:GLU:HB2 | 2.05 | 0.57 |
| 2:B:381:ASN:O | 2:B:385:LEU:CG | 2.52 | 0.57 |
| 2:A:81:GLU:O | 2:A:82:THR:C | 2.43 | 0.56 |
| 2:A:239:ARG:CA | 2:A:260:TYR:OH | 2.52 | 0.56 |
| 2:B:151:VAL:HG22 | 2:B:192:LEU:HD23 | 1.87 | 0.56 |
| 2:B:268:LEU:HD12 | 2:B:269:ASP:N | 2.20 | 0.56 |
| 2:A:20:VAL:HG13 | 2:A:113:ILE:HD11 | 1.86 | 0.56 |
| 2:A:79:ARG:CZ | 2:A:103:ARG:HH12 | 2.18 | 0.56 |
| 1:C:58:A:N1 | 1:C:60:U:O4 | 2.38 | 0.56 |
| 2:B:66:LEU:HG | 2:B:73:LEU:CD2 | 2.34 | 0.56 |
| 2:B:126:TYR:HB2 | 2:B:127:PHE:CE2 | 2.40 | 0.56 |
| 2:B:248:GLU:C | 2:B:250:SER:H | 2.08 | 0.56 |
| 2:B:339:LYS:CD | 4:B:1534:HOH:O | 2.52 | 0.56 |
| 2:A:318:LYS:HG2 | 4:A:531:HOH:O | 2.05 | 0.56 |
| 2:A:184:LEU:HB2 | 2:A:220:GLU:OE1 | 2.05 | 0.56 |
| 2:B:253:ARG:NH1 | 2:B:256:TYR:CZ | 2.74 | 0.56 |
| 2:B:334:LEU:HD23 | 2:B:334:LEU:N | 2.07 | 0.56 |
| 2:A:100:ASP:O | 2:A:103:ARG:HG3 | 2.06 | 0.56 |
| 2:A:263:ILE:O | 2:A:266:SER:HB3 | 2.04 | 0.56 |
| 2:B:7:LYS:NZ | 2:B:117:LEU:N | 2.47 | 0.56 |
| 2:B:67:LYS:HD3 | 2:B:67:LYS:C | 2.25 | 0.56 |
| 2:B:16:VAL:HG11 | 2:B:35:VAL:CG2 | 2.35 | 0.56 |
| 2:B:155:ARG:HG2 | 4:B:1504:HOH:O | 2.05 | 0.56 |
| 2:B:312:GLU:CD | 2:B:344:LYS:HE3 | 2.26 | 0.56 |
| 2:A:225:PHE:HE2 | 2:A:227:TRP:CD1 | 2.23 | 0.56 |
| 2:B:274:LYS:HG3 | 2:B:290:TYR:CE2 | 2.40 | 0.56 |
| 2:A:20:VAL:O | 2:A:24:LEU:HD22 | 2.05 | 0.56 |
| 2:A:149:ASP:CG | 2:A:151:VAL:HG12 | 2.27 | 0.56 |
| 2:A:214:LYS:HE3 | 2:A:215:TYR:CE2 | 2.41 | 0.56 |
| 2:B:146:PHE:CE2 | 2:B:153:ILE:HA | 2.40 | 0.56 |
| 2:A:341:TYR:CD1 | 2:A:341:TYR:C | 2.79 | 0.55 |
| 2:B:382:LYS:HA | 2:B:385:LEU:HD12 | 1.87 | 0.55 |
| 1:D:56:C:H2' | 1:D:57:G:O4' | 2.06 | 0.55 |
| 1:D:61:C:H2' | 1:D:62:C:C6 | 2.41 | 0.55 |
| 2:A:144:VAL:O | 2:A:144:VAL:HG12 | 2.07 | 0.55 |
| 2:B:231:VAL:O | 2:B:235:LEU:HG | 2.05 | 0.55 |
| 2:B:285:TRP:HE1 | 2:B:323:SER:CB | 2.14 | 0.55 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:335:LYS:HZ3 | 2:B:339:LYS:HZ2 | 1.55 | 0.55 |
| 2:A:244:TRP:HA | 2:A:247:LEU:HG | 1.88 | 0.55 |
| 2:B:20:VAL:O | 2:B:24:LEU:HD22 | 2.06 | 0.55 |
| 2:B:81:GLU:O | 2:B:82:THR:C | 2.45 | 0.55 |
| 2:A:214:LYS:HG2 | 2:A:215:TYR:CE2 | 2.41 | 0.55 |
| 2:A:316:LEU:C | 2:A:316:LEU:HD23 | 2.27 | 0.55 |
| 1:C:63:G:H2' | 1:C:64:C:O4' | 2.06 | 0.55 |
| 2:A:248:GLU:C | 2:A:250:SER:H | 2.10 | 0.55 |
| 2:B:316:LEU:O | 2:B:319:PRO:HD2 | 2.05 | 0.55 |
| 2:A:316:LEU:HG | 2:A:341:TYR:OH | 2.07 | 0.55 |
| 2:B:7:LYS:HG3 | 2:B:117:LEU:HD12 | 1.87 | 0.54 |
| 2:B:94:PRO:O | 2:B:95:ALA:HB3 | 2.07 | 0.54 |
| 2:B:274:LYS:CA | 2:B:277:LEU:HD13 | 2.28 | 0.54 |
| 2:B:382:LYS:HA | 2:B:385:LEU:HG | 1.88 | 0.54 |
| 2:A:61:PHE:HD1 | 2:A:61:PHE:N | 2.05 | 0.54 |
| 2:A:94:PRO:O | 2:A:95:ALA:HB3 | 2.07 | 0.54 |
| 2:A:253:ARG:HB3 | 2:A:253:ARG:HH11 | 1.64 | 0.54 |
| 2:A:285:TRP:CB | 2:A:321:HIS:CD2 | 2.91 | 0.54 |
| 2:B:21:ARG:NH2 | 2:B:162:ARG:NH2 | 2.55 | 0.54 |
| 2:B:375:LEU:C | 2:B:377:ARG:H | 2.10 | 0.54 |
| 2:A:9:MET:O | 2:A:11:LEU:HG | 2.06 | 0.54 |
| 2:A:316:LEU:CG | 2:A:341:TYR:OH | 2.55 | 0.54 |
| 2:B:7:LYS:HZ2 | 2:B:116:ASN:HA | 1.72 | 0.54 |
| 2:B:261:LEU:O | 2:B:265:ILE:HG12 | 2.06 | 0.54 |
| 2:A:59:PRO:C | 2:A:61:PHE:H | 2.11 | 0.54 |
| 2:B:341:TYR:CE2 | 4:B:1511:HOH:O | 2.54 | 0.54 |
| 2:A:14:TYR:CD1 | 2:A:14:TYR:N | 2.76 | 0.54 |
| 2:A:122:THR:HG22 | 2:A:124:ILE:CD1 | 2.37 | 0.54 |
| 2:A:205:PHE:CZ | 2:A:209:LEU:HD11 | 2.42 | 0.54 |
| 2:A:41:ILE:HD11 | 2:A:62:GLY:HA2 | 1.89 | 0.54 |
| 2:A:261:LEU:CD1 | 2:A:265:ILE:HD11 | 2.38 | 0.54 |
| 2:B:170:SER:HA | 2:B:173:LYS:HE2 | 1.90 | 0.54 |
| 2:A:197:LYS:HE2 | 2:A:280:MET:HA | 1.89 | 0.54 |
| 2:A:296:LYS:HD3 | 2:A:299:SER:HB2 | 1.88 | 0.54 |
| 2:B:328:LEU:HB2 | 2:B:338:ILE:CD1 | 2.38 | 0.54 |
| 1:D:73:A:H4' | 2:B:191:ARG:HA | 1.90 | 0.54 |
| 2:A:107:THR:HB | 2:A:129:GLY:HA2 | 1.89 | 0.54 |
| 2:A:299:SER:O | 2:A:303:GLU:HG3 | 2.08 | 0.54 |
| 1:C:66:C:N4 | 1:C:67:C:N4 | 2.56 | 0.54 |
| 2:A:153:ILE:HB | 2:A:154:LEU:HD22 | 1.90 | 0.54 |
| 2:B:79:ARG:HH12 | 2:B:81:GLU:C | 2.11 | 0.54 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:181:LEU:HG | 2:B:183:LEU:HD11 | 1.89 | 0.54 |
| 2:B:223:GLU:CD | 2:B:270:TYR:HB2 | 2.29 | 0.54 |
| 2:A:296:LYS:O | 2:A:300:LEU:HB2 | 2.08 | 0.54 |
| 2:B:7:LYS:CE | 2:B:117:LEU:N | 2.71 | 0.54 |
| 2:A:298:GLY:O | 2:A:302:GLU:OE1 | 2.26 | 0.53 |
| 2:B:15:ILE:HD11 | 2:B:20:VAL:HG22 | 1.90 | 0.53 |
| 2:A:268:LEU:HD22 | 2:A:272:ARG:CA | 2.36 | 0.53 |
| 2:B:245:HIS:NE2 | 2:B:249:PHE:HD2 | 2.06 | 0.53 |
| 2:B:310:ASN:ND2 | 2:B:383:ILE:HD11 | 2.24 | 0.53 |
| 2:A:138:ILE:HB | 2:A:167:LEU:HD23 | 1.91 | 0.53 |
| 2:A:162:ARG:HD2 | 2:A:202:GLU:OE2 | 2.07 | 0.53 |
| 2:A:322:THR:HG22 | 2:A:326:LEU:CD1 | 2.39 | 0.53 |
| 2:B:48:ALA:HB1 | 2:B:53:VAL:O | 2.08 | 0.53 |
| 2:B:240:LYS:HA | 2:B:240:LYS:HE2 | 1.90 | 0.53 |
| 2:B:310:ASN:OD1 | 2:B:383:ILE:HD13 | 2.07 | 0.53 |
| 2:B:349:LYS:O | 2:B:350:LEU:HD23 | 2.08 | 0.53 |
| 2:A:131:ARG:HB3 | 2:A:131:ARG:NH1 | 2.22 | 0.53 |
| 2:A:222:ILE:HG21 | 2:A:225:PHE:HB2 | 1.89 | 0.53 |
| 2:B:344:LYS:HZ3 | 2:B:345:LEU:N | 2.05 | 0.53 |
| 3:A:500:APC:O1B | 3:A:500:APC:H3' | 2.09 | 0.53 |
| 2:B:101:LEU:O | 2:B:104:ARG:HG2 | 2.08 | 0.53 |
| 1:C:61:C:H2' | 1:C:62:C:C6 | 2.43 | 0.53 |
| 2:A:338:ILE:N | 2:A:338:ILE:HD12 | 2.23 | 0.53 |
| 2:A:15:ILE:HD11 | 2:A:113:ILE:HD12 | 1.90 | 0.53 |
| 2:A:177:GLN:O | 2:A:181:LEU:HB2 | 2.09 | 0.53 |
| 2:A:5:ILE:HA | 2:A:8:GLU:HG3 | 1.91 | 0.53 |
| 2:A:187:ALA:HB3 | 2:A:192:LEU:HD11 | 1.91 | 0.53 |
| 2:B:11:LEU:CD2 | 2:B:12:ARG:H | 2.19 | 0.53 |
| 2:B:239:ARG:O | 2:B:243:ASP:CG | 2.48 | 0.53 |
| 2:B:326:LEU:HD13 | 2:B:329:MET:HE1 | 1.91 | 0.53 |
| 2:B:377:ARG:HB2 | 2:B:381:ASN:HD21 | 1.73 | 0.53 |
| 2:A:125:ASP:OD2 | 2:A:129:GLY:N | 2.42 | 0.53 |
| 1:D:61:C:C4' | 2:B:320:LEU:HD22 | 2.38 | 0.52 |
| 2:A:280:MET:O | 2:A:282:ALA:N | 2.34 | 0.52 |
| 2:B:268:LEU:HD22 | 2:B:272:ARG:CB | 2.39 | 0.52 |
| 2:B:375:LEU:O | 2:B:377:ARG:HD2 | 2.09 | 0.52 |
| 2:A:157:LEU:HD11 | 2:A:175:LEU:HD11 | 1.91 | 0.52 |
| 2:B:73:LEU:HD23 | 2:B:73:LEU:H | 1.73 | 0.52 |
| 2:A:275:HIS:HA | 2:A:278:GLU:HG3 | 1.91 | 0.52 |
| 1:C:56:C:H2' | 1:C:57:G:O4' | 2.09 | 0.52 |
| 1:D:74:C:O5' | 1:D:74:C:C6 | 2.62 | 0.52 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:343:GLU:C | 2:A:347:LYS:HZ2 | 2.13 | 0.52 |
| 2:A:344:LYS:HG2 | 2:A:345:LEU:HD12 | 1.91 | 0.52 |
| 2:B:158:ARG:HA | 2:B:208:ILE:CD1 | 2.39 | 0.52 |
| 2:B:343:GLU:HA | 2:B:346:ARG:CD | 2.34 | 0.52 |
| 2:A:216:ARG:HH11 | 2:A:216:ARG:HB3 | 1.75 | 0.52 |
| 2:A:329:MET:HE1 | 2:A:335:LYS:O | 2.08 | 0.52 |
| 2:B:183:LEU:HD12 | 2:B:183:LEU:N | 2.25 | 0.52 |
| 2:B:292:PHE:CZ | 2:B:296:LYS:HB2 | 2.44 | 0.52 |
| 2:A:46:GLU:CD | 2:A:49:ARG:NH2 | 2.63 | 0.52 |
| 2:B:68:ILE:HD12 | 2:B:68:ILE:N | 2.24 | 0.52 |
| 2:B:125:ASP:OD2 | 2:B:131:ARG:NH2 | 2.43 | 0.52 |
| 2:B:242:VAL:HG13 | 2:B:256:TYR:CE1 | 2.44 | 0.52 |
| 2:A:329:MET:SD | 2:A:338:ILE:HB | 2.49 | 0.52 |
| 2:B:59:PRO:C | 2:B:61:PHE:H | 2.14 | 0.52 |
| 2:B:232:LEU:O | 2:B:235:LEU:HB2 | 2.08 | 0.52 |
| 2:B:335:LYS:CG | 4:B:1534:HOH:O | 2.58 | 0.52 |
| 3:B:1500:APC:H3' | 3:B:1500:APC:H3A1 | 1.92 | 0.52 |
| 2:A:34:PHE:HD1 | 2:A:74:GLU:O | 1.93 | 0.52 |
| 2:B:199:ALA:O | 2:B:202:GLU:HG2 | 2.09 | 0.52 |
| 2:A:285:TRP:HB3 | 2:A:321:HIS:CE1 | 2.45 | 0.52 |
| 2:B:80:ARG:HA | 2:B:103:ARG:HD2 | 1.91 | 0.52 |
| 2:B:263:ILE:O | 2:B:266:SER:OG | 2.17 | 0.52 |
| 2:B:375:LEU:HA | 2:B:377:ARG:CZ | 2.40 | 0.52 |
| 2:B:81:GLU:H | 2:B:103:ARG:CZ | 2.23 | 0.51 |
| 2:A:155:ARG:NH1 | 4:A:501:HOH:O | 2.31 | 0.51 |
| 2:B:304:LEU:HD13 | 2:B:334:LEU:CD1 | 2.40 | 0.51 |
| 2:B:310:ASN:HD22 | 2:B:379:ILE:CG2 | 2.22 | 0.51 |
| 2:B:336:GLU:HA | 2:B:339:LYS:HB2 | 1.90 | 0.51 |
| 2:A:150:PRO:HG2 | 2:A:187:ALA:HB2 | 1.91 | 0.51 |
| 2:A:5:ILE:HG21 | 2:A:43:LEU:CD1 | 2.40 | 0.51 |
| 2:A:303:GLU:HA | 2:A:306:LYS:HE3 | 1.91 | 0.51 |
| 2:A:228:ASN:HD21 | 2:A:230:LYS:HB3 | 1.76 | 0.51 |
| 2:A:319:PRO:C | 2:A:321:HIS:N | 2.63 | 0.51 |
| 2:B:7:LYS:HE2 | 2:B:117:LEU:HB2 | 1.93 | 0.51 |
| 2:B:162:ARG:HG3 | 2:B:163:LEU:HD23 | 1.93 | 0.51 |
| 2:B:187:ALA:HB3 | 2:B:192:LEU:HD11 | 1.93 | 0.51 |
| 1:C:49:G:O2' | 1:C:50:G:H5' | 2.11 | 0.51 |
| 1:C:54:U:C2' | 1:C:55:U:H5" | 2.41 | 0.51 |
| 2:B:136:LYS:HA | 2:B:165:PHE:CE2 | 2.46 | 0.51 |
| 1:D:54:U:C2' | 1:D:55:U:H5" | 2.41 | 0.51 |
| 2:A:79:ARG:NH1 | 2:A:103:ARG:NH1 | 2.59 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:378:GLU:O | 2:B:382:LYS:HG3 | 2.10 | 0.51 |
| 2:A:294:LYS:HB2 | 2:A:295:PHE:CD2 | 2.46 | 0.51 |
| 2:B:100:ASP:O | 2:B:103:ARG:HG3 | 2.11 | 0.51 |
| 2:B:304:LEU:HD13 | 2:B:334:LEU:HD12 | 1.92 | 0.51 |
| 2:A:4:GLN:NE2 | 4:A:502:HOH:O | 2.44 | 0.50 |
| 2:B:181:LEU:HB3 | 2:B:183:LEU:HD13 | 1.93 | 0.50 |
| 2:A:336:GLU:O | 2:A:340:LEU:HG | 2.12 | 0.50 |
| 2:B:175:LEU:O | 2:B:179:VAL:HG23 | 2.12 | 0.50 |
| 2:B:326:LEU:CD2 | 2:B:326:LEU:N | 2.74 | 0.50 |
| 2:B:144:VAL:HG12 | 2:B:144:VAL:O | 2.10 | 0.50 |
| 2:A:131:ARG:HH22 | 2:A:139:ARG:NH1 | 2.03 | 0.50 |
| 2:A:268:LEU:HD13 | 2:A:272:ARG:CA | 2.42 | 0.50 |
| 2:B:151:VAL:HG21 | 2:B:191:ARG:HB3 | 1.93 | 0.50 |
| 2:B:344:LYS:HZ3 | 2:B:345:LEU:HG | 1.75 | 0.50 |
| 2:A:304:LEU:CD2 | 2:A:337:LYS:HD3 | 2.41 | 0.50 |
| 1:D:74:C:C5 | 1:D:74:C:OP2 | 2.65 | 0.50 |
| 2:A:102:ILE:HG12 | 2:A:102:ILE:O | 2.11 | 0.50 |
| 2:A:294:LYS:NZ | 2:A:294:LYS:CB | 2.74 | 0.50 |
| 2:A:301:LYS:HA | 2:A:334:LEU:HD21 | 1.93 | 0.50 |
| 2:A:344:LYS:HG2 | 2:A:345:LEU:N | 2.26 | 0.50 |
| 2:B:197:LYS:HE2 | 2:B:281:SER:H | 1.77 | 0.50 |
| 2:B:244:TRP:CE2 | 2:B:248:GLU:HG3 | 2.46 | 0.50 |
| 2:A:142:HIS:HB2 | 2:A:143:PRO:CD | 2.42 | 0.50 |
| 2:A:235:LEU:HD22 | 2:A:260:TYR:HD2 | 1.77 | 0.50 |
| 2:B:253:ARG:NH2 | 2:B:256:TYR:CE1 | 2.80 | 0.50 |
| 2:B:319:PRO:C | 2:B:321:HIS:N | 2.65 | 0.50 |
| 1:D:5:A:C6 | 1:D:6:G:C6 | 3.00 | 0.49 |
| 2:A:292:PHE:CZ | 2:A:296:LYS:HB2 | 2.47 | 0.49 |
| 2:B:193:ILE:HG22 | 2:B:194:ASN:H | 1.77 | 0.49 |
| 2:B:292:PHE:HZ | 2:B:300:LEU:HD22 | 1.78 | 0.49 |
| 2:A:34:PHE:CD1 | 2:A:34:PHE:N | 2.80 | 0.49 |
| 2:A:294:LYS:HZ2 | 2:A:294:LYS:HB2 | 1.77 | 0.49 |
| 2:B:322:THR:CG2 | 2:B:326:LEU:HD21 | 2.36 | 0.49 |
| 2:A:66:LEU:N | 2:A:66:LEU:HD23 | 2.28 | 0.49 |
| 2:B:67:LYS:C | 2:B:67:LYS:CD | 2.80 | 0.49 |
| 2:B:316:LEU:HG | 2:B:341:TYR:CE1 | 2.47 | 0.49 |
| 2:B:66:LEU:CG | 2:B:73:LEU:HD21 | 2.43 | 0.49 |
| 2:B:127:PHE:CD2 | 2:B:127:PHE:N | 2.76 | 0.49 |
| 2:B:377:ARG:C | 2:B:381:ASN:ND2 | 2.65 | 0.49 |
| 2:A:209:LEU:HA | 2:A:212:TYR:CD2 | 2.44 | 0.49 |
| 2:A:300:LEU:O | 2:A:315:ARG:NH2 | 2.46 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:191:ARG:HB3 | 2:B:191:ARG:HH11 | 1.78 | 0.49 |
| 2:A:179:VAL:HG13 | 2:A:184:LEU:HD12 | 1.95 | 0.49 |
| 1:C:5:A:N3 | 1:C:69:G:N1 | 2.61 | 0.49 |
| 1:D:66:C:H2' | 1:D:67:C:C6 | 2.48 | 0.49 |
| 2:B:238:LEU:HD11 | 2:B:259:LEU:HD22 | 1.94 | 0.49 |
| 2:B:280:MET:SD | 4:B:1530:HOH:O | 2.60 | 0.49 |
| 2:B:310:ASN:OD1 | 2:B:383:ILE:CD1 | 2.60 | 0.49 |
| 2:B:384:LYS:HE3 | 2:B:385:LEU:HD21 | 1.94 | 0.49 |
| 2:A:292:PHE:CE2 | 2:A:300:LEU:HD22 | 2.47 | 0.49 |
| 2:A:318:LYS:N | 2:A:319:PRO:CD | 2.76 | 0.49 |
| 2:B:223:GLU:CG | 2:B:224:GLY:N | 2.71 | 0.49 |
| 2:B:273:GLY:O | 2:B:277:LEU:CD1 | 2.60 | 0.49 |
| 1:C:5:A:C6 | 1:C:6:G:C6 | 3.01 | 0.48 |
| 2:A:58:PHE:O | 2:A:61:PHE:HB2 | 2.13 | 0.48 |
| 2:A:304:LEU:HD23 | 2:A:304:LEU:C | 2.30 | 0.48 |
| 2:B:377:ARG:HB2 | 2:B:381:ASN:OD1 | 2.12 | 0.48 |
| 1:D:5:A:N3 | 1:D:69:G:N1 | 2.61 | 0.48 |
| 2:B:311:TYR:CE2 | 2:B:314:TYR:HB3 | 2.48 | 0.48 |
| 2:B:375:LEU:C | 2:B:377:ARG:N | 2.65 | 0.48 |
| 2:B:199:ALA:HA | 2:B:202:GLU:CG | 2.44 | 0.48 |
| 2:B:253:ARG:CZ | 2:B:256:TYR:CZ | 2.95 | 0.48 |
| 2:A:184:LEU:HB2 | 2:A:220:GLU:CD | 2.34 | 0.48 |
| 2:A:301:LYS:HD3 | 2:A:331:GLU:CD | 2.34 | 0.48 |
| 2:B:7:LYS:NZ | 2:B:116:ASN:HA | 2.29 | 0.48 |
| 2:B:255:ASP:HB3 | 2:B:258:TRP:CD1 | 2.49 | 0.48 |
| 2:B:344:LYS:CE | 2:B:345:LEU:HG | 2.43 | 0.48 |
| 1:D:66:C:C4 | 1:D:67:C:N4 | 2.81 | 0.48 |
| 2:A:285:TRP:HB2 | 2:A:321:HIS:ND1 | 2.29 | 0.48 |
| 2:B:211:LEU:HD21 | 4:B:1537:HOH:O | 2.13 | 0.48 |
| 2:B:231:VAL:HG13 | 2:B:263:ILE:HG22 | 1.94 | 0.48 |
| 2:B:285:TRP:CB | 2:B:321:HIS:CE1 | 2.97 | 0.48 |
| 2:B:73:LEU:CD2 | 2:B:73:LEU:H | 2.27 | 0.48 |
| 2:A:322:THR:O | 2:A:325:LEU:N | 2.44 | 0.48 |
| 2:B:301:LYS:O | 2:B:304:LEU:HB2 | 2.13 | 0.48 |
| 2:B:375:LEU:C | 2:B:375:LEU:HD13 | 2.34 | 0.48 |
| 1:D:49:G:O2' | 1:D:50:G:H5' | 2.13 | 0.48 |
| 1:D:61:C:H4' | 2:B:320:LEU:HD22 | 1.95 | 0.48 |
| 2:A:206:LEU:HD22 | 2:A:260:TYR:CE2 | 2.47 | 0.48 |
| 2:A:274:LYS:HA | 2:A:277:LEU:HD13 | 1.96 | 0.48 |
| 2:A:19:VAL:CG2 | 2:A:29:VAL:HG21 | 2.32 | 0.48 |
| 2:A:68:ILE:O | 2:A:71:LEU:HB2 | 2.14 | 0.48 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:176:LYS:NZ | 2:B:215:TYR:HE2 | 2.12 | 0.48 |
| 2:B:326:LEU:O | 2:B:330:LEU:HD23 | 2.14 | 0.48 |
| 3:B:1500:APC:H3A2 | 3:B:1500:APC:O2G | 2.14 | 0.48 |
| 2:B:107:THR:HB | 2:B:129:GLY:HA2 | 1.95 | 0.47 |
| 2:B:316:LEU:HD11 | 2:B:345:LEU:HD11 | 1.96 | 0.47 |
| 1:C:66:C:H2' | 1:C:67:C:C6 | 2.48 | 0.47 |
| 2:A:345:LEU:HD23 | 2:A:349:LYS:HZ3 | 1.78 | 0.47 |
| 2:B:68:ILE:O | 2:B:71:LEU:HB2 | 2.14 | 0.47 |
| 1:D:68:U:H6 | 1:D:68:U:O5' | 1.97 | 0.47 |
| 2:B:65:HIS:NE2 | 2:B:74:GLU:HG3 | 2.29 | 0.47 |
| 2:B:267:ASN:O | 2:B:268:LEU:O | 2.32 | 0.47 |
| 2:A:12:ARG:HB3 | 2:A:14:TYR:OH | 2.14 | 0.47 |
| 2:A:93:GLU:HB3 | 2:A:94:PRO:CD | 2.43 | 0.47 |
| 2:A:157:LEU:N | 2:A:157:LEU:HD13 | 2.27 | 0.47 |
| 2:A:238:LEU:HA | 2:A:330:LEU:HD21 | 1.95 | 0.47 |
| 2:B:335:LYS:NZ | 2:B:339:LYS:HZ2 | 2.12 | 0.47 |
| 2:B:336:GLU:N | 4:B:1534:HOH:O | 2.46 | 0.47 |
| 2:A:15:ILE:CG1 | 2:A:113:ILE:HB | 2.44 | 0.47 |
| 2:A:21:ARG:NH1 | 2:A:109:ASN:OD1 | 2.47 | 0.47 |
| 2:A:152:ARG:NE | 3:A:500:APC:N1 | 2.58 | 0.47 |
| 2:A:154:LEU:HB2 | 2:A:195:GLU:HG2 | 1.96 | 0.47 |
| 1:C:6:G:C6 | 1:C:7:G:N7 | 2.83 | 0.47 |
| 2:B:184:LEU:CD1 | 2:B:217:VAL:HG13 | 2.43 | 0.47 |
| 2:A:20:VAL:O | 2:A:24:LEU:CD2 | 2.62 | 0.47 |
| 2:B:11:LEU:CD2 | 2:B:36:VAL:HG12 | 2.45 | 0.47 |
| 2:B:25:LEU:HD21 | 2:B:133:LEU:HD11 | 1.97 | 0.47 |
| 2:B:152:ARG:HA | 2:B:155:ARG:HB2 | 1.96 | 0.47 |
| 2:B:154:LEU:HB2 | 2:B:195:GLU:HG2 | 1.96 | 0.47 |
| 2:B:155:ARG:CG | 4:B:1504:HOH:O | 2.61 | 0.47 |
| 2:B:286:VAL:C | 2:B:288:GLU:N | 2.68 | 0.47 |
| 2:B:376:LYS:HB3 | 2:B:379:ILE:HD12 | 1.95 | 0.47 |
| 1:C:5:A:C2 | 1:C:69:G:N1 | 2.83 | 0.47 |
| 1:D:50:G:C2 | 1:D:51:C:N3 | 2.83 | 0.47 |
| 2:A:183:LEU:CA | 2:A:186:GLU:HG2 | 2.43 | 0.47 |
| 2:B:377:ARG:O | 2:B:378:GLU:C | 2.52 | 0.47 |
| 2:A:286:VAL:C | 2:A:288:GLU:N | 2.68 | 0.47 |
| 2:B:102:ILE:O | 2:B:102:ILE:HG13 | 2.15 | 0.47 |
| 2:B:191:ARG:HD2 | 4:B:1522:HOH:O | 2.13 | 0.47 |
| 2:B:316:LEU:O | 2:B:316:LEU:CD2 | 2.63 | 0.47 |
| 2:B:14:TYR:N | 2:B:14:TYR:CD1 | 2.83 | 0.47 |
| 2:B:245:HIS:HE2 | 2:B:249:PHE:HD2 | 1.62 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:381:ASN:HA | 2:B:384:LYS:HE2 | 1.97 | 0.47 |
| 1:C:68:U:O5' | 1:C:68:U:H6 | 1.98 | 0.46 |
| 2:B:381:ASN:O | 2:B:385:LEU:CD2 | 2.63 | 0.46 |
| 2:B:381:ASN:O | 2:B:385:LEU:HD21 | 2.15 | 0.46 |
| 2:B:382:LYS:HA | 2:B:385:LEU:CG | 2.44 | 0.46 |
| 1:C:66:C:C4 | 1:C:67:C:N4 | 2.84 | 0.46 |
| 2:B:146:PHE:HE2 | 2:B:153:ILE:HA | 1.79 | 0.46 |
| 2:A:15:ILE:HG13 | 2:A:113:ILE:O | 2.16 | 0.46 |
| 2:A:267:ASN:O | 2:A:268:LEU:O | 2.34 | 0.46 |
| 2:B:79:ARG:NH1 | 2:B:82:THR:N | 2.63 | 0.46 |
| 2:B:218:LEU:HD12 | 2:B:218:LEU:HA | 1.75 | 0.46 |
| 2:A:157:LEU:HD13 | 2:A:157:LEU:H | 1.81 | 0.46 |
| 2:A:205:PHE:CD2 | 2:A:209:LEU:HD21 | 2.49 | 0.46 |
| 2:A:318:LYS:CE | 4:A:531:HOH:O | 2.59 | 0.46 |
| 2:A:319:PRO:O | 2:A:321:HIS:N | 2.48 | 0.46 |
| 2:A:222:ILE:HG22 | 2:A:225:PHE:CB | 2.39 | 0.46 |
| 2:B:12:ARG:HG3 | 4:B:1538:HOH:O | 2.15 | 0.46 |
| 2:B:125:ASP:C | 2:B:125:ASP:OD1 | 2.54 | 0.46 |
| 2:B:238:LEU:HA | 2:B:330:LEU:HD11 | 1.96 | 0.46 |
| 1:C:50:G:C2 | 1:C:51:C:N3 | 2.83 | 0.46 |
| 2:A:155:ARG:NH2 | 3:A:500:APC:H2' | 2.31 | 0.46 |
| 1:D:2:G:H5' | 2:B:201:ARG:HH21 | 1.81 | 0.46 |
| 2:A:142:HIS:HB2 | 2:A:143:PRO:HD2 | 1.98 | 0.46 |
| 2:A:323:SER:O | 2:A:326:LEU:HB2 | 2.16 | 0.46 |
| 2:B:199:ALA:CA | 2:B:202:GLU:HG2 | 2.44 | 0.46 |
| 2:B:295:PHE:N | 2:B:295:PHE:CD1 | 2.84 | 0.46 |
| 2:B:300:LEU:C | 2:B:304:LEU:HD12 | 2.36 | 0.46 |
| 1:D:61:C:H4' | 2:B:320:LEU:HD13 | 1.97 | 0.46 |
| 2:A:225:PHE:HE2 | 2:A:227:TRP:NE1 | 2.14 | 0.46 |
| 2:B:269:ASP:CG | 2:B:270:TYR:H | 2.19 | 0.46 |
| 2:B:303:GLU:HA | 2:B:306:LYS:HZ2 | 1.79 | 0.46 |
| 2:B:326:LEU:CD1 | 2:B:329:MET:HE1 | 2.46 | 0.46 |
| 1:D:5:A:C2 | 1:D:69:G:N1 | 2.84 | 0.46 |
| 2:A:15:ILE:HD11 | 2:A:113:ILE:CD1 | 2.46 | 0.46 |
| 2:A:15:ILE:HG13 | 2:A:15:ILE:H | 1.49 | 0.46 |
| 2:A:197:LYS:NZ | 2:A:281:SER:H | 2.13 | 0.46 |
| 2:B:335:LYS:HZ3 | 2:B:339:LYS:NZ | 2.13 | 0.46 |
| 2:A:301:LYS:HE2 | 2:A:331:GLU:OE1 | 2.16 | 0.46 |
| 2:A:345:LEU:HA | 2:A:348:VAL:CG2 | 2.44 | 0.46 |
| 2:A:46:GLU:OE1 | 2:A:49:ARG:NH2 | 2.49 | 0.45 |
| 2:B:322:THR:O | 2:B:325:LEU:N | 2.45 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:376:LYS:CD | 2:B:379:ILE:HD11 | 2.39 | 0.45 |
| 2:B:377:ARG:HB2 | 2:B:381:ASN:ND2 | 2.32 | 0.45 |
| 2:B:389:LEU:HD23 | 2:B:389:LEU:C | 2.37 | 0.45 |
| 2:A:214:LYS:HE3 | 2:A:215:TYR:OH | 2.15 | 0.45 |
| 1:C:2:G:H2' | 1:C:3:C:O4' | 2.16 | 0.45 |
| 2:A:221:ILE:HD12 | 2:A:221:ILE:N | 2.31 | 0.45 |
| 2:A:255:ASP:HB2 | 2:A:285:TRP:HZ2 | 1.81 | 0.45 |
| 2:B:67:LYS:CE | 2:B:69:GLY:H | 2.23 | 0.45 |
| 2:B:105:ASP:OD2 | 2:B:155:ARG:NH2 | 2.48 | 0.45 |
| 2:A:154:LEU:CD2 | 2:A:154:LEU:N | 2.70 | 0.45 |
| 2:A:230:LYS:HE2 | 2:A:234:LYS:NZ | 2.31 | 0.45 |
| 2:A:54:ASN:H | 2:A:54:ASN:HD22 | 1.59 | 0.45 |
| 2:A:213:ARG:CG | 2:A:227:TRP:CD2 | 3.00 | 0.45 |
| 2:B:3:GLY:O | 2:B:7:LYS:NZ | 2.35 | 0.45 |
| 2:B:181:LEU:HG | 2:B:183:LEU:CD1 | 2.46 | 0.45 |
| 2:B:268:LEU:CD2 | 2:B:272:ARG:HA | 2.35 | 0.45 |
| 1:D:73:A:H3' | 1:D:74:C:C6 | 2.52 | 0.45 |
| 2:B:70:LYS:HD2 | 2:B:70:LYS:N | 2.30 | 0.45 |
| 2:B:158:ARG:HE | 2:B:195:GLU:CD | 2.20 | 0.45 |
| 1:D:6:G:C6 | 1:D:7:G:N7 | 2.85 | 0.45 |
| 1:D:58:A:C2 | 1:D:60:U:O4 | 2.70 | 0.45 |
| 2:A:344:LYS:HA | 2:A:347:LYS:HD3 | 1.98 | 0.45 |
| 2:B:216:ARG:N | 2:B:216:ARG:HD2 | 2.31 | 0.45 |
| 2:B:304:LEU:HA | 2:B:315:ARG:NH2 | 2.31 | 0.45 |
| 2:B:318:LYS:N | 2:B:319:PRO:CD | 2.80 | 0.45 |
| 2:B:322:THR:O | 2:B:323:SER:C | 2.54 | 0.45 |
| 2:A:67:LYS:HE2 | 2:A:67:LYS:HB3 | 1.83 | 0.45 |
| 2:A:210:GLU:OE2 | 2:A:213:ARG:NH2 | 2.49 | 0.45 |
| 2:A:231:VAL:HG13 | 2:A:263:ILE:HG22 | 1.98 | 0.45 |
| 2:A:341:TYR:C | 2:A:341:TYR:HD1 | 2.20 | 0.45 |
| 2:B:153:ILE:O | 2:B:157:LEU:HD22 | 2.17 | 0.45 |
| 2:B:218:LEU:HB3 | 2:B:225:PHE:CE2 | 2.52 | 0.45 |
| 2:B:277:LEU:HD22 | 2:B:290:TYR:CD2 | 2.51 | 0.45 |
| 2:B:292:PHE:CZ | 2:B:296:LYS:CB | 3.00 | 0.45 |
| 2:B:248:GLU:CD | 2:B:248:GLU:H | 2.18 | 0.45 |
| 2:A:142:HIS:HD2 | 4:A:530:HOH:O | 2.00 | 0.45 |
| 2:A:304:LEU:HD23 | 2:A:337:LYS:NZ | 2.32 | 0.45 |
| 2:B:20:VAL:HG12 | 2:B:24:LEU:CD2 | 2.48 | 0.45 |
| 2:B:155:ARG:HH22 | 3:B:1500:APC:C3A | 2.30 | 0.45 |
| 2:B:183:LEU:CD1 | 2:B:183:LEU:H | 2.30 | 0.45 |
| 2:B:272:ARG:HG2 | 2:B:272:ARG:NH1 | 2.22 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|-------------------|
| 2:A:167:LEU:HB2 | 2:A:172:GLU:HG2 | 1.99 | 0.44 |
| 2:B:154:LEU:HD21 | 2:B:217:VAL:HG11 | 1.99 | 0.44 |
| 2:B:268:LEU:HD13 | 2:B:272:ARG:CA | 2.46 | 0.44 |
| 1:D:2:G:H2' | 1:D:3:C:O4' | 2.18 | 0.44 |
| 2:A:131:ARG:NH2 | 2:A:139:ARG:NH1 | 2.64 | 0.44 |
| 2:A:316:LEU:HD12 | 2:A:341:TYR:OH | 2.17 | 0.44 |
| 2:B:341:TYR:HE2 | 4:B:1511:HOH:O | 1.95 | 0.44 |
| 1:C:58:A:C2 | 1:C:60:U:O4 | 2.70 | 0.44 |
| 2:A:106:PHE:CD1 | 2:A:106:PHE:N | 2.84 | 0.44 |
| 2:A:297:LEU:O | 2:A:301:LYS:CD | 2.60 | 0.44 |
| 2:A:322:THR:O | 2:A:324:VAL:N | 2.51 | 0.44 |
| 2:A:341:TYR:HD1 | 2:A:342:LEU:N | 2.15 | 0.44 |
| 2:B:223:GLU:OE1 | 2:B:270:TYR:CD1 | 2.69 | 0.44 |
| 2:B:289:THR:HG23 | 2:B:324:VAL:HG22 | 1.98 | 0.44 |
| 2:B:319:PRO:O | 2:B:321:HIS:N | 2.50 | 0.44 |
| 1:D:73:A:H2' | 1:D:74:C:C5' | 2.47 | 0.44 |
| 2:A:48:ALA:O | 2:A:52:GLY:N | 2.51 | 0.44 |
| 2:A:97:LEU:HG | 2:A:98:LYS:N | 2.32 | 0.44 |
| 2:A:223:GLU:OE2 | 2:A:223:GLU:O | 2.36 | 0.44 |
| 2:A:304:LEU:HD23 | 2:A:337:LYS:HZ3 | 1.82 | 0.44 |
| 2:A:345:LEU:HB3 | 2:A:349:LYS:NZ | 2.33 | 0.44 |
| 2:B:8:GLU:C | 2:B:9:MET:SD | 2.96 | 0.44 |
| 2:B:163:LEU:C | 2:B:204:ARG:NH2 | 2.70 | 0.44 |
| 1:C:55:U:OP1 | 2:A:349:LYS:HG2 | 2.18 | 0.44 |
| 2:A:2:VAL:HG11 | 2:A:115:VAL:HG21 | 2.00 | 0.44 |
| 2:A:322:THR:O | 2:A:323:SER:C | 2.55 | 0.44 |
| 2:B:80:ARG:NH2 | 2:B:99:GLU:OE1 | 2.51 | 0.44 |
| 1:C:55:U:OP1 | 2:A:349:LYS:CG | 2.66 | 0.44 |
| 2:A:206:LEU:HD11 | 2:A:235:LEU:HB3 | 2.00 | 0.44 |
| 2:A:304:LEU:CD2 | 2:A:337:LYS:NZ | 2.80 | 0.44 |
| 2:B:11:LEU:HD22 | 2:B:36:VAL:CG1 | 2.48 | 0.44 |
| 2:B:328:LEU:C | 2:B:330:LEU:N | 2.71 | 0.44 |
| 2:A:285:TRP:HB2 | 2:A:321:HIS:CE1 | 2.52 | 0.44 |
| 1:C:67:C:H2' | 1:C:68:U:H5 | 1.78 | 0.44 |
| 2:A:183:LEU:C | 2:A:186:GLU:HG2 | 2.38 | 0.44 |
| 2:A:294:LYS:HB2 | 2:A:295:PHE:HD2 | 1.83 | 0.44 |
| 2:A:316:LEU:CD1 | 2:A:345:LEU:HD21 | 2.47 | 0.44 |
| 2:B:334:LEU:CD2 | 2:B:334:LEU:N | 2.76 | 0.44 |
| 1:D:54:U:H2' | 1:D:55:U:H5'' | 2.00 | 0.44 |
| 2:A:20:VAL:HA | 2:A:23:ILE:HD12 | 2.00 | 0.44 |
| 2:A:67:LYS:C | 2:A:68:ILE:HD12 | 2.38 | 0.44 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:245:HIS:CE1 | 2:A:249:PHE:HB3 | 2.53 | 0.44 |
| 2:A:284:SER:O | 2:A:288:GLU:HB2 | 2.18 | 0.44 |
| 2:B:245:HIS:ND1 | 2:B:245:HIS:C | 2.71 | 0.44 |
| 2:B:318:LYS:C | 2:B:320:LEU:H | 2.21 | 0.44 |
| 2:B:330:LEU:N | 2:B:330:LEU:HD22 | 2.33 | 0.44 |
| 2:A:183:LEU:CD2 | 2:A:186:GLU:HG3 | 2.44 | 0.43 |
| 2:A:303:GLU:HA | 2:A:306:LYS:CE | 2.47 | 0.43 |
| 2:B:323:SER:O | 2:B:326:LEU:HB2 | 2.18 | 0.43 |
| 2:A:79:ARG:CZ | 2:A:103:ARG:NH1 | 2.82 | 0.43 |
| 2:A:214:LYS:HE3 | 2:A:215:TYR:CZ | 2.53 | 0.43 |
| 2:A:255:ASP:HB2 | 2:A:285:TRP:CZ2 | 2.53 | 0.43 |
| 2:A:292:PHE:CZ | 2:A:318:LYS:HD2 | 2.54 | 0.43 |
| 2:A:349:LYS:C | 2:A:351:PRO:HD3 | 2.38 | 0.43 |
| 2:B:376:LYS:HB2 | 2:B:380:MET:CE | 2.48 | 0.43 |
| 2:A:105:ASP:HB3 | 2:A:106:PHE:H | 1.40 | 0.43 |
| 2:B:345:LEU:HB2 | 4:B:1511:HOH:O | 2.19 | 0.43 |
| 2:A:105:ASP:HB3 | 2:A:106:PHE:CD1 | 2.54 | 0.43 |
| 2:A:152:ARG:HA | 2:A:155:ARG:HG3 | 2.01 | 0.43 |
| 2:A:158:ARG:CZ | 2:A:198:LEU:HD22 | 2.48 | 0.43 |
| 2:A:231:VAL:O | 2:A:235:LEU:HG | 2.18 | 0.43 |
| 2:B:310:ASN:HD21 | 2:B:383:ILE:HD11 | 1.82 | 0.43 |
| 2:B:376:LYS:HB2 | 2:B:380:MET:HE1 | 2.00 | 0.43 |
| 2:A:22:ASP:HB3 | 2:A:27:LYS:HB3 | 2.01 | 0.43 |
| 2:A:217:VAL:O | 2:A:221:ILE:HD13 | 2.18 | 0.43 |
| 2:A:325:LEU:HD23 | 2:A:326:LEU:HD12 | 1.99 | 0.43 |
| 2:A:343:GLU:CB | 2:A:347:LYS:HZ2 | 2.21 | 0.43 |
| 2:B:142:HIS:NE2 | 2:B:144:VAL:HB | 2.33 | 0.43 |
| 2:B:183:LEU:HD12 | 2:B:183:LEU:H | 1.81 | 0.43 |
| 2:B:344:LYS:CD | 2:B:345:LEU:N | 2.78 | 0.43 |
| 1:D:61:C:O4' | 2:B:320:LEU:HD22 | 2.17 | 0.43 |
| 2:A:200:LEU:HD12 | 2:A:261:LEU:HD22 | 2.00 | 0.43 |
| 2:A:206:LEU:O | 2:A:209:LEU:HB2 | 2.18 | 0.43 |
| 2:A:211:LEU:HD23 | 2:A:214:LYS:HD3 | 1.99 | 0.43 |
| 2:A:288:GLU:C | 2:A:290:TYR:N | 2.72 | 0.43 |
| 2:B:13:ALA:C | 2:B:14:TYR:CD1 | 2.91 | 0.43 |
| 2:A:323:SER:O | 2:A:326:LEU:N | 2.47 | 0.43 |
| 2:B:101:LEU:HD12 | 2:B:101:LEU:HA | 1.80 | 0.43 |
| 2:B:219:GLU:OE1 | 2:B:227:TRP:HD1 | 2.02 | 0.43 |
| 2:B:261:LEU:CA | 2:B:264:LEU:HD12 | 2.41 | 0.43 |
| 2:A:272:ARG:HH12 | 2:A:291:LYS:HE3 | 1.84 | 0.43 |
| 2:A:318:LYS:C | 2:A:320:LEU:H | 2.23 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:B:155:ARG:HH22 | 3:B:1500:APC:H3A1 | 1.84 | 0.43 |
| 2:B:225:PHE:CG | 2:B:226:GLN:N | 2.87 | 0.43 |
| 2:B:318:LYS:HA | 2:B:318:LYS:HD3 | 1.71 | 0.43 |
| 2:A:184:LEU:HD22 | 2:A:221:ILE:HD11 | 2.01 | 0.43 |
| 2:A:213:ARG:HG3 | 2:A:227:TRP:CD2 | 2.54 | 0.43 |
| 2:A:329:MET:C | 2:A:331:GLU:H | 2.23 | 0.43 |
| 2:B:20:VAL:O | 2:B:24:LEU:CD2 | 2.67 | 0.43 |
| 2:B:238:LEU:HD12 | 2:B:238:LEU:O | 2.19 | 0.43 |
| 2:B:289:THR:HG23 | 2:B:324:VAL:CG2 | 2.49 | 0.43 |
| 1:D:54:U:H2' | 1:D:55:U:O4' | 2.19 | 0.43 |
| 2:B:301:LYS:CE | 4:B:1536:HOH:O | 2.67 | 0.43 |
| 2:B:301:LYS:HE3 | 4:B:1536:HOH:O | 2.19 | 0.43 |
| 2:A:93:GLU:HB3 | 2:A:94:PRO:HD2 | 2.00 | 0.42 |
| 2:B:322:THR:O | 2:B:324:VAL:N | 2.52 | 0.42 |
| 2:B:325:LEU:O | 2:B:325:LEU:HD23 | 2.18 | 0.42 |
| 2:A:41:ILE:CB | 2:A:45:LYS:HE3 | 2.49 | 0.42 |
| 2:A:123:LEU:C | 2:A:124:ILE:HD12 | 2.40 | 0.42 |
| 2:A:280:MET:C | 2:A:282:ALA:N | 2.72 | 0.42 |
| 2:B:48:ALA:CB | 2:B:55:VAL:HG22 | 2.49 | 0.42 |
| 2:B:303:GLU:C | 2:B:315:ARG:HH22 | 2.22 | 0.42 |
| 1:C:67:C:C4 | 1:C:68:U:O4 | 2.72 | 0.42 |
| 2:A:181:LEU:HD12 | 2:A:181:LEU:HA | 1.79 | 0.42 |
| 2:B:164:ASN:N | 2:B:204:ARG:NH2 | 2.68 | 0.42 |
| 2:B:295:PHE:N | 2:B:295:PHE:HD1 | 2.17 | 0.42 |
| 2:B:335:LYS:CE | 2:B:339:LYS:HE3 | 2.44 | 0.42 |
| 2:A:153:ILE:O | 2:A:157:LEU:HD13 | 2.19 | 0.42 |
| 2:A:175:LEU:O | 2:A:175:LEU:HD23 | 2.19 | 0.42 |
| 2:B:43:LEU:HD12 | 2:B:43:LEU:O | 2.19 | 0.42 |
| 2:B:57:PRO:O | 2:B:58:PHE:CD1 | 2.73 | 0.42 |
| 2:A:162:ARG:HB2 | 2:A:202:GLU:CD | 2.39 | 0.42 |
| 2:A:303:GLU:C | 2:A:315:ARG:NH2 | 2.73 | 0.42 |
| 2:A:298:GLY:O | 2:A:302:GLU:HB2 | 2.20 | 0.42 |
| 2:B:131:ARG:HH11 | 2:B:131:ARG:HG3 | 1.82 | 0.42 |
| 2:B:205:PHE:O | 2:B:208:ILE:HB | 2.19 | 0.42 |
| 2:B:240:LYS:HA | 2:B:240:LYS:CE | 2.48 | 0.42 |
| 2:A:328:LEU:C | 2:A:330:LEU:N | 2.72 | 0.42 |
| 2:B:188:PRO:O | 2:B:189:ARG:C | 2.57 | 0.42 |
| 2:B:233:GLN:NE2 | 2:B:234:LYS:N | 2.48 | 0.42 |
| 2:B:329:MET:C | 2:B:331:GLU:H | 2.23 | 0.42 |
| 1:C:54:U:H2' | 1:C:55:U:H5" | 2.01 | 0.42 |
| 2:A:5:ILE:HD13 | 2:A:46:GLU:HG2 | 2.02 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 2:A:97:LEU:HD12 | 2:A:101:LEU:HB2 | 2.02 | 0.42 |
| 2:A:162:ARG:HG3 | 2:A:162:ARG:NH1 | 2.30 | 0.42 |
| 2:A:301:LYS:HD3 | 2:A:331:GLU:OE2 | 2.19 | 0.42 |
| 2:A:320:LEU:HD23 | 2:A:320:LEU:HA | 1.92 | 0.42 |
| 2:B:250:SER:HA | 2:B:253:ARG:HD3 | 2.02 | 0.42 |
| 2:B:310:ASN:ND2 | 2:B:379:ILE:CG2 | 2.81 | 0.42 |
| 2:B:349:LYS:C | 2:B:351:PRO:HD3 | 2.40 | 0.42 |
| 2:A:46:GLU:OE2 | 2:A:49:ARG:NH2 | 2.51 | 0.42 |
| 2:A:188:PRO:O | 2:A:189:ARG:C | 2.57 | 0.42 |
| 2:A:234:LYS:HD3 | 2:A:234:LYS:HA | 1.90 | 0.42 |
| 2:A:297:LEU:HD23 | 2:A:297:LEU:C | 2.40 | 0.42 |
| 3:A:500:APC:H5'1 | 3:A:500:APC:PB | 2.60 | 0.42 |
| 2:B:12:ARG:NH2 | 2:B:116:ASN:HB2 | 2.34 | 0.42 |
| 2:A:13:ALA:N | 2:A:116:ASN:HD21 | 2.07 | 0.42 |
| 2:A:225:PHE:CE2 | 2:A:227:TRP:CD1 | 3.07 | 0.42 |
| 2:A:229:GLU:OE1 | 2:A:232:LEU:HD23 | 2.20 | 0.42 |
| 2:B:327:LEU:N | 2:B:327:LEU:HD23 | 2.35 | 0.42 |
| 1:D:66:C:N4 | 1:D:67:C:H41 | 2.18 | 0.41 |
| 2:B:151:VAL:HG22 | 2:B:192:LEU:CD2 | 2.48 | 0.41 |
| 2:B:274:LYS:HG3 | 2:B:290:TYR:HD2 | 1.80 | 0.41 |
| 2:A:274:LYS:CE | 4:A:524:HOH:O | 2.67 | 0.41 |
| 2:A:274:LYS:O | 2:A:278:GLU:HG2 | 2.20 | 0.41 |
| 2:B:11:LEU:HD23 | 2:B:12:ARG:N | 2.29 | 0.41 |
| 2:B:173:LYS:O | 2:B:177:GLN:HG3 | 2.18 | 0.41 |
| 2:B:275:HIS:HA | 2:B:278:GLU:CD | 2.40 | 0.41 |
| 2:B:335:LYS:HZ1 | 2:B:339:LYS:HZ1 | 1.68 | 0.41 |
| 2:B:380:MET:HA | 2:B:383:ILE:CG1 | 2.48 | 0.41 |
| 1:D:56:C:N4 | 1:D:57:G:C6 | 2.89 | 0.41 |
| 2:B:7:LYS:HE2 | 2:B:117:LEU:CB | 2.50 | 0.41 |
| 2:B:15:ILE:CD1 | 2:B:20:VAL:HG22 | 2.50 | 0.41 |
| 2:A:16:VAL:HG23 | 2:A:112:ALA:HB2 | 2.02 | 0.41 |
| 2:A:17:GLY:O | 2:A:18:GLY:C | 2.58 | 0.41 |
| 2:A:341:TYR:CE1 | 2:A:345:LEU:HD22 | 2.54 | 0.41 |
| 2:B:7:LYS:HZ3 | 2:B:117:LEU:HG | 1.81 | 0.41 |
| 2:B:16:VAL:HG11 | 2:B:35:VAL:HG21 | 2.02 | 0.41 |
| 2:B:16:VAL:HG21 | 2:B:35:VAL:HG23 | 2.02 | 0.41 |
| 2:B:66:LEU:HD12 | 2:B:68:ILE:HD11 | 2.00 | 0.41 |
| 2:B:341:TYR:O | 2:B:344:LYS:HB3 | 2.20 | 0.41 |
| 2:A:236:TYR:O | 2:A:239:ARG:HB3 | 2.20 | 0.41 |
| 2:A:319:PRO:C | 2:A:321:HIS:H | 2.24 | 0.41 |
| 2:B:173:LYS:HG2 | 2:B:174:LEU:N | 2.36 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|--------|--------|--------------------------|-------------------|
| 2:B:253:ARG:CZ | 2:B:256:TYR:CE1 | 3.03 | 0.41 |
| 2:A:20:VAL:HG12 | 2:A:24:LEU:CD2 | 2.51 | 0.41 |
| 2:A:268:LEU:HD22 | 2:A:272:ARG:CB | 2.49 | 0.41 |
| 2:A:285:TRP:CD1 | 2:A:285:TRP:C | 2.94 | 0.41 |
| 2:B:200:LEU:HD23 | 2:B:200:LEU:C | 2.41 | 0.41 |
| 2:B:211:LEU:CD2 | 4:B:1537:HOH:O | 2.68 | 0.41 |
| 2:A:259:LEU:HD12 | 2:A:259:LEU:HA | 1.57 | 0.41 |
| 2:A:341:TYR:O | 2:A:344:LYS:HB3 | 2.20 | 0.41 |
| 2:B:48:ALA:O | 2:B:52:GLY:N | 2.54 | 0.41 |
| 2:B:248:GLU:C | 2:B:250:SER:N | 2.74 | 0.41 |
| 2:B:336:GLU:HA | 4:B:1534:HOH:O | 2.20 | 0.41 |
| 2:A:15:ILE:CD1 | 2:A:113:ILE:HD12 | 2.50 | 0.41 |
| 2:A:61:PHE:HD1 | 2:A:61:PHE:H | 1.69 | 0.41 |
| 2:A:184:LEU:HD13 | 2:A:221:ILE:CD1 | 2.51 | 0.41 |
| 2:A:292:PHE:HE1 | 2:A:318:LYS:HZ2 | 1.67 | 0.41 |
| 2:A:309:GLU:HB3 | 2:A:310:ASN:H | 1.71 | 0.41 |
| 2:B:233:GLN:HG3 | 2:B:233:GLN:H | 1.70 | 0.41 |
| 2:B:341:TYR:HD2 | 2:B:342:LEU:CA | 2.31 | 0.41 |
| 2:A:294:LYS:H | 2:A:294:LYS:HG3 | 1.57 | 0.41 |
| 2:B:16:VAL:HB | 2:B:104:ARG:HH21 | 1.85 | 0.41 |
| 2:B:255:ASP:HB3 | 2:B:258:TRP:HD1 | 1.85 | 0.41 |
| 2:B:326:LEU:HA | 2:B:329:MET:HE1 | 2.00 | 0.41 |
| 2:B:78:ALA:HA | 2:B:100:ASP:OD2 | 2.21 | 0.40 |
| 2:B:302:GLU:O | 2:B:305:LYS:HG3 | 2.21 | 0.40 |
| 2:B:376:LYS:CB | 2:B:380:MET:HE1 | 2.50 | 0.40 |
| 2:B:34:PHE:CD1 | 2:B:75:PHE:CZ | 3.09 | 0.40 |
| 2:B:292:PHE:CE1 | 2:B:318:LYS:HD2 | 2.55 | 0.40 |
| 2:A:184:LEU:CD1 | 2:A:217:VAL:HG13 | 2.51 | 0.40 |
| 2:B:11:LEU:HD22 | 2:B:36:VAL:HG12 | 2.04 | 0.40 |
| 2:B:17:GLY:O | 2:B:18:GLY:C | 2.60 | 0.40 |
| 2:B:176:LYS:HZ1 | 2:B:215:TYR:HE2 | 1.68 | 0.40 |
| 2:B:200:LEU:HD11 | 2:B:258:TRP:CE3 | 2.57 | 0.40 |
| 2:B:262:LEU:O | 2:B:266:SER:N | 2.54 | 0.40 |
| 2:B:304:LEU:HD22 | 4:B:1525:HOH:O | 2.21 | 0.40 |
| 1:C:2:G:H8 | 1:C:2:G:O5' | 2.03 | 0.40 |
| 1:C:65:C:N4 | 1:C:66:C:N4 | 2.69 | 0.40 |
| 1:D:5:A:C2 | 1:D:6:G:C5 | 3.10 | 0.40 |
| 1:D:58:A:C4 | 1:D:60:U:H5 | 2.39 | 0.40 |
| 2:A:224:GLY:HA3 | 2:A:269:ASP:CB | 2.48 | 0.40 |
| 2:B:254:ILE:HG22 | 2:B:256:TYR:HD2 | 1.84 | 0.40 |
| 2:B:280:MET:C | 2:B:282:ALA:N | 2.73 | 0.40 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:58:A:C4 | 1:C:60:U:H5 | 2.38 | 0.40 |
| 1:D:75:C:H3' | 3:B:1500:APC:O4' | 2.22 | 0.40 |
| 2:A:286:VAL:C | 2:A:288:GLU:H | 2.24 | 0.40 |
| 2:A:325:LEU:CD2 | 2:A:326:LEU:HD12 | 2.51 | 0.40 |
| 2:B:209:LEU:HA | 2:B:209:LEU:HD12 | 1.69 | 0.40 |

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 2 | A | 338/390 (87%) | 274 (81%) | 48 (14%) | 16 (5%) | 2 | 7 |
| 2 | B | 352/390 (90%) | 285 (81%) | 50 (14%) | 17 (5%) | 2 | 7 |
| All | All | 690/780 (88%) | 559 (81%) | 98 (14%) | 33 (5%) | 2 | 7 |

All (33) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | A | 105 | ASP |
| 2 | A | 268 | LEU |
| 2 | A | 273 | GLY |
| 2 | A | 310 | ASN |
| 2 | A | 323 | SER |
| 2 | A | 332 | GLU |
| 2 | B | 105 | ASP |
| 2 | B | 268 | LEU |
| 2 | B | 273 | GLY |
| 2 | B | 310 | ASN |
| 2 | B | 323 | SER |
| 2 | B | 332 | GLU |
| 2 | A | 322 | THR |

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| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | B | 223 | GLU |
| 2 | B | 322 | THR |
| 2 | A | 18 | GLY |
| 2 | A | 93 | GLU |
| 2 | A | 254 | ILE |
| 2 | B | 249 | PHE |
| 2 | B | 254 | ILE |
| 2 | B | 309 | GLU |
| 2 | A | 188 | PRO |
| 2 | A | 249 | PHE |
| 2 | A | 309 | GLU |
| 2 | A | 320 | LEU |
| 2 | B | 18 | GLY |
| 2 | B | 93 | GLU |
| 2 | B | 188 | PRO |
| 2 | B | 320 | LEU |
| 2 | A | 94 | PRO |
| 2 | B | 17 | GLY |
| 2 | B | 94 | PRO |
| 2 | A | 17 | GLY |

### 5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 2 | A | 303/343 (88%) | 241 (80%) | 62 (20%) | 1 | 3 |
| 2 | B | 316/343 (92%) | 251 (79%) | 65 (21%) | 1 | 3 |
| All | All | 619/686 (90%) | 492 (80%) | 127 (20%) | 1 | 3 |

All (127) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 2 | A | 1 | MET |
| 2 | A | 4 | GLN |
| 2 | A | 14 | TYR |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | A | 15 | ILE |
| 2 | A | 16 | VAL |
| 2 | A | 28 | GLU |
| 2 | A | 29 | VAL |
| 2 | A | 41 | ILE |
| 2 | A | 43 | LEU |
| 2 | A | 47 | LEU |
| 2 | A | 54 | ASN |
| 2 | A | 56 | HIS |
| 2 | A | 61 | PHE |
| 2 | A | 66 | LEU |
| 2 | A | 73 | LEU |
| 2 | A | 92 | VAL |
| 2 | A | 96 | SER |
| 2 | A | 97 | LEU |
| 2 | A | 103 | ARG |
| 2 | A | 105 | ASP |
| 2 | A | 115 | VAL |
| 2 | A | 118 | GLU |
| 2 | A | 127 | PHE |
| 2 | A | 132 | ASP |
| 2 | A | 135 | ASP |
| 2 | A | 145 | SER |
| 2 | A | 154 | LEU |
| 2 | A | 157 | LEU |
| 2 | A | 162 | ARG |
| 2 | A | 172 | GLU |
| 2 | A | 186 | GLU |
| 2 | A | 198 | LEU |
| 2 | A | 201 | ARG |
| 2 | A | 203 | ASP |
| 2 | A | 207 | GLU |
| 2 | A | 209 | LEU |
| 2 | A | 210 | GLU |
| 2 | A | 213 | ARG |
| 2 | A | 216 | ARG |
| 2 | A | 218 | LEU |
| 2 | A | 220 | GLU |
| 2 | A | 228 | ASN |
| 2 | A | 230 | LYS |
| 2 | A | 244 | TRP |
| 2 | A | 247 | LEU |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | A | 249 | PHE |
| 2 | A | 251 | GLU |
| 2 | A | 252 | GLU |
| 2 | A | 253 | ARG |
| 2 | A | 259 | LEU |
| 2 | A | 267 | ASN |
| 2 | A | 269 | ASP |
| 2 | A | 270 | TYR |
| 2 | A | 294 | LYS |
| 2 | A | 295 | PHE |
| 2 | A | 305 | LYS |
| 2 | A | 306 | LYS |
| 2 | A | 312 | GLU |
| 2 | A | 314 | TYR |
| 2 | A | 325 | LEU |
| 2 | A | 331 | GLU |
| 2 | A | 341 | TYR |
| 2 | B | 4 | GLN |
| 2 | B | 11 | LEU |
| 2 | B | 14 | TYR |
| 2 | B | 24 | LEU |
| 2 | B | 29 | VAL |
| 2 | B | 45 | LYS |
| 2 | B | 49 | ARG |
| 2 | B | 56 | HIS |
| 2 | B | 59 | PRO |
| 2 | B | 60 | GLU |
| 2 | B | 61 | PHE |
| 2 | B | 63 | THR |
| 2 | B | 73 | LEU |
| 2 | B | 77 | THR |
| 2 | B | 94 | PRO |
| 2 | B | 101 | LEU |
| 2 | B | 103 | ARG |
| 2 | B | 106 | PHE |
| 2 | B | 119 | ASP |
| 2 | B | 125 | ASP |
| 2 | B | 126 | TYR |
| 2 | B | 127 | PHE |
| 2 | B | 143 | PRO |
| 2 | B | 157 | LEU |
| 2 | B | 162 | ARG |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | B | 169 | ARG |
| 2 | B | 173 | LYS |
| 2 | B | 191 | ARG |
| 2 | B | 193 | ILE |
| 2 | B | 194 | ASN |
| 2 | B | 201 | ARG |
| 2 | B | 209 | LEU |
| 2 | B | 218 | LEU |
| 2 | B | 223 | GLU |
| 2 | B | 232 | LEU |
| 2 | B | 233 | GLN |
| 2 | B | 248 | GLU |
| 2 | B | 249 | PHE |
| 2 | B | 250 | SER |
| 2 | B | 252 | GLU |
| 2 | B | 253 | ARG |
| 2 | B | 255 | ASP |
| 2 | B | 261 | LEU |
| 2 | B | 268 | LEU |
| 2 | B | 279 | GLU |
| 2 | B | 280 | MET |
| 2 | B | 285 | TRP |
| 2 | B | 295 | PHE |
| 2 | B | 297 | LEU |
| 2 | B | 303 | GLU |
| 2 | B | 304 | LEU |
| 2 | B | 309 | GLU |
| 2 | B | 310 | ASN |
| 2 | B | 312 | GLU |
| 2 | B | 319 | PRO |
| 2 | B | 321 | HIS |
| 2 | B | 332 | GLU |
| 2 | B | 334 | LEU |
| 2 | B | 338 | ILE |
| 2 | B | 340 | LEU |
| 2 | B | 341 | TYR |
| 2 | B | 344 | LYS |
| 2 | B | 375 | LEU |
| 2 | B | 377 | ARG |
| 2 | B | 379 | ILE |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | A | 39 | ASN |
| 2 | A | 54 | ASN |
| 2 | A | 116 | ASN |
| 2 | A | 228 | ASN |
| 2 | B | 51 | HIS |
| 2 | B | 116 | ASN |
| 2 | B | 177 | GLN |
| 2 | B | 194 | ASN |
| 2 | B | 226 | GLN |
| 2 | B | 233 | GLN |

### 5.3.3 RNA ⓘ

| Mol | Chain | Analysed | Backbone Outliers | Pucker Outliers |
|-----|-------|----------|-------------------|-----------------|
| 1 | C | 29/75 (38%) | 8 (27%) | 0 |
| 1 | D | 32/75 (42%) | 8 (25%) | 0 |
| All | All | 61/150 (40%) | 16 (26%) | 0 |

All (16) RNA backbone outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | C | 5 | A |
| 1 | C | 55 | U |
| 1 | C | 56 | C |
| 1 | C | 57 | G |
| 1 | C | 58 | A |
| 1 | C | 61 | C |
| 1 | C | 62 | C |
| 1 | C | 68 | U |
| 1 | D | 5 | A |
| 1 | D | 55 | U |
| 1 | D | 56 | C |
| 1 | D | 57 | G |
| 1 | D | 58 | A |
| 1 | D | 61 | C |
| 1 | D | 62 | C |
| 1 | D | 68 | U |

There are no RNA pucker outliers to report.

## 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 ⓘ

2 ligands are modelled in this entry.

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 | APC | A | 500 | - | 27,33,33 | 1.75 | 5 (18%) | 31,52,52 | 1.66 | 5 (16%) |
| 3 | APC | B | 1500 | - | 27,33,33 | 1.40 | 3 (11%) | 31,52,52 | 1.74 | 5 (16%) |

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 | APC | A | 500 | - | - | 7/15/38/38 | 0/3/3/3 |
| 3 | APC | B | 1500 | - | - | 5/15/38/38 | 0/3/3/3 |

All (8) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|------|-------------|----------|
| 3 | A | 500 | APC | PA-O5' | 4.92 | 1.64 | 1.57 |
| 3 | B | 1500 | APC | C2-N3 | 4.47 | 1.39 | 1.32 |
| 3 | A | 500 | APC | C2-N3 | 3.91 | 1.38 | 1.32 |
| 3 | A | 500 | APC | PB-O3B | 2.76 | 1.61 | 1.58 |
| 3 | B | 1500 | APC | PA-O5' | 2.46 | 1.61 | 1.57 |
| 3 | A | 500 | APC | O4'-C4' | -2.44 | 1.39 | 1.45 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|------|------|-------|------|-------------|----------|
| 3 | A | 500 | APC | C2-N1 | 2.32 | 1.38 | 1.33 |
| 3 | B | 1500 | APC | C2-N1 | 2.01 | 1.37 | 1.33 |

All (10) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|------|------|-------|------|-------------|----------|
| 3 | A | 500 | APC | N3-C2-N1 | -5.25 | 120.47 | 128.68 |
| 3 | B | 1500 | APC | N3-C2-N1 | -5.03 | 120.82 | 128.68 |
| 3 | B | 1500 | APC | C4-C5-N7 | -4.09 | 105.14 | 109.40 |
| 3 | B | 1500 | APC | C5-C6-N6 | 4.03 | 126.47 | 120.35 |
| 3 | A | 500 | APC | C4-C5-N7 | -3.52 | 105.73 | 109.40 |
| 3 | A | 500 | APC | C5-C6-N6 | 3.07 | 125.01 | 120.35 |
| 3 | B | 1500 | APC | O2G-PG-O3B | 2.37 | 112.57 | 104.64 |
| 3 | A | 500 | APC | C3'-C2'-C1' | 2.32 | 104.47 | 100.98 |
| 3 | A | 500 | APC | O2'-C2'-C3' | 2.25 | 119.08 | 111.82 |
| 3 | B | 1500 | APC | N6-C6-N1 | -2.15 | 114.11 | 118.57 |

There are no chirality outliers.

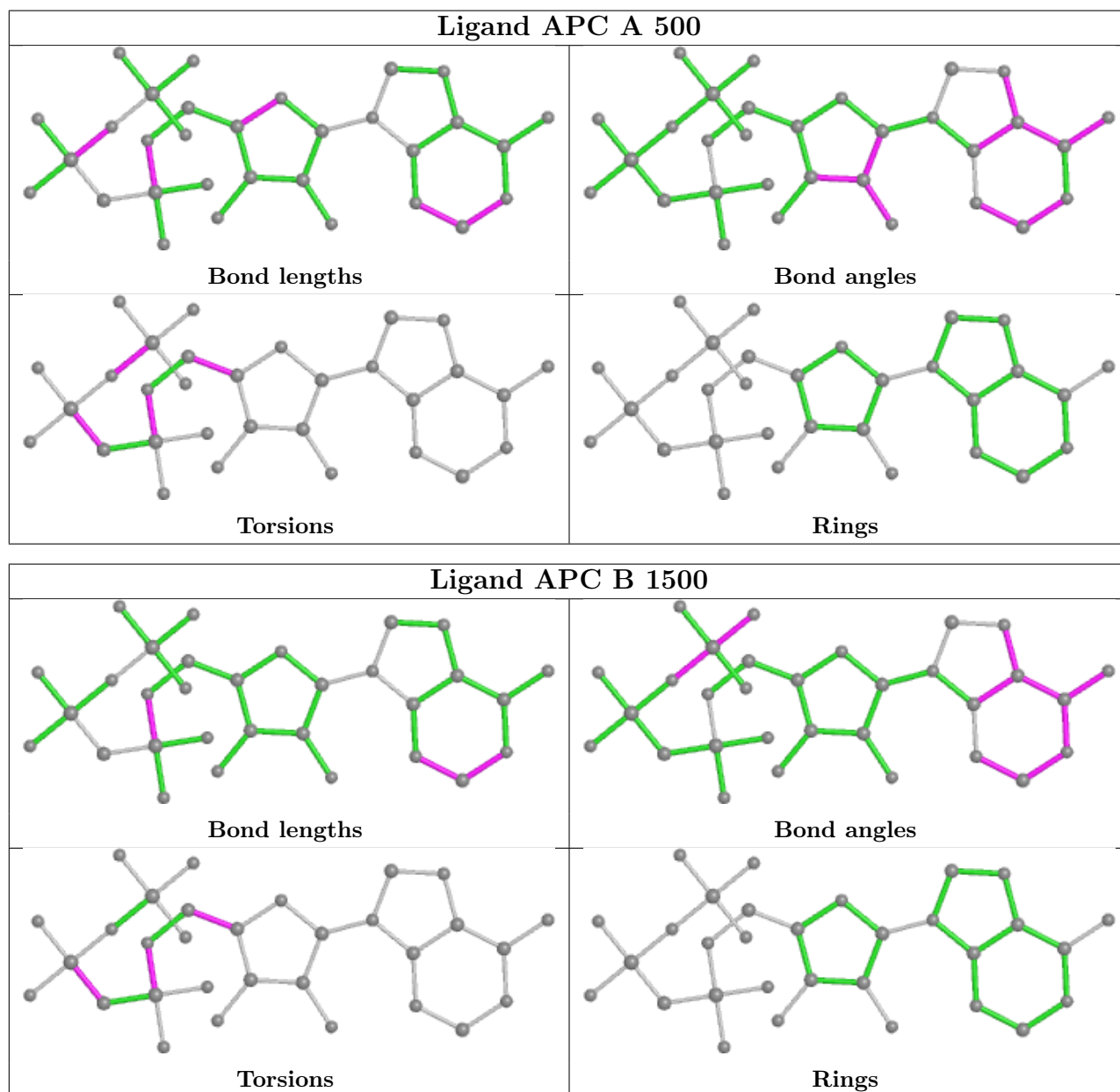All (12) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|------|------|-------|
| 3 | A | 500 | APC | PB-O3B-PG-O2G |
| 3 | A | 500 | APC | PA-C3A-PB-O1B |
| 3 | A | 500 | APC | PA-C3A-PB-O2B |
| 3 | A | 500 | APC | PA-C3A-PB-O3B |
| 3 | A | 500 | APC | C5'-O5'-PA-C3A |
| 3 | A | 500 | APC | O4'-C4'-C5'-O5' |
| 3 | A | 500 | APC | C3'-C4'-C5'-O5' |
| 3 | B | 1500 | APC | PA-C3A-PB-O1B |
| 3 | B | 1500 | APC | PA-C3A-PB-O2B |
| 3 | B | 1500 | APC | C5'-O5'-PA-O1A |
| 3 | B | 1500 | APC | O4'-C4'-C5'-O5' |
| 3 | B | 1500 | APC | C5'-O5'-PA-O2A |

There are no ring outliers.

2 monomers are involved in 10 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|------|------|---------|--------------|
| 3 | A | 500 | APC | 5 | 0 |
| 3 | B | 1500 | APC | 5 | 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 APC A 500**

Bond lengths

Bond angles

Torsions

Rings



**Ligand APC B 1500**

Bond lengths

Bond angles

Torsions

Rings

## 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 | C | 31/75 (41%) | -0.35 | 0 | 100 | 100 | 131, 142, 152, 153 | 0 |
| 1 | D | 34/75 (45%) | -0.40 | 0 | 100 | 100 | 122, 136, 148, 154 | 0 |
| 2 | A | 342/390 (87%) | 0.07 | 11 (3%) | 47 | 37 | 33, 65, 126, 143 | 0 |
| 2 | B | 358/390 (91%) | -0.00 | 9 (2%) | 57 | 47 | 33, 63, 119, 132 | 0 |
| All | All | 765/930 (82%) | -0.00 | 20 (2%) | 56 | 46 | 33, 68, 139, 154 | 0 |

All (20) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 2 | A | 351 | PRO | 6.9 |
| 2 | B | 92 | VAL | 4.5 |
| 2 | A | 348 | VAL | 4.3 |
| 2 | B | 314 | TYR | 3.2 |
| 2 | A | 330 | LEU | 3.0 |
| 2 | B | 321 | HIS | 3.0 |
| 2 | A | 342 | LEU | 3.0 |
| 2 | B | 317 | LEU | 2.9 |
| 2 | B | 389 | LEU | 2.7 |
| 2 | A | 320 | LEU | 2.6 |
| 2 | A | 317 | LEU | 2.6 |
| 2 | B | 269 | ASP | 2.4 |
| 2 | B | 300 | LEU | 2.4 |
| 2 | A | 63 | THR | 2.3 |
| 2 | B | 349 | LYS | 2.2 |
| 2 | A | 301 | LYS | 2.2 |
| 2 | A | 286 | VAL | 2.2 |
| 2 | A | 321 | HIS | 2.1 |
| 2 | B | 264 | LEU | 2.1 |
| 2 | A | 295 | PHE | 2.0 |

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

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

## 6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

## 6.4 Ligands ⓘ

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.

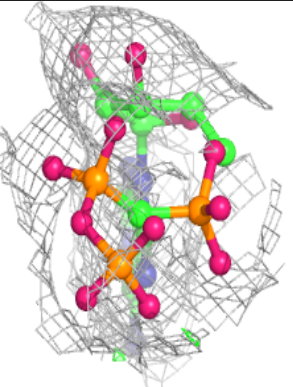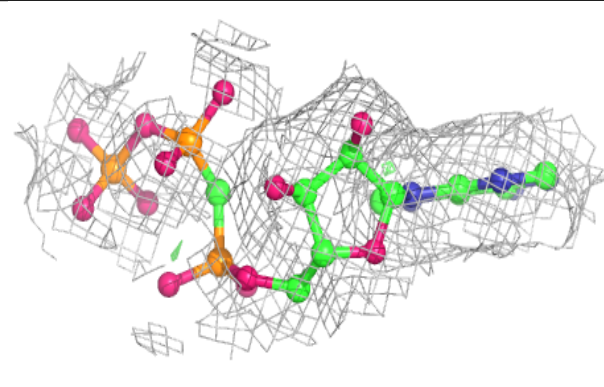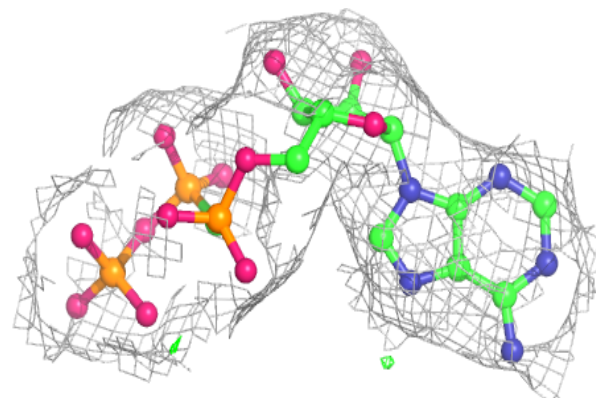| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å²) | Q<0.9 |
|-----|------|-------|------|-------|------|------|---------------|-------|
| 3 | APC | A | 500 | 31/31 | 0.93 | 0.15 | 65,71,84,84 | 0 |
| 3 | APC | B | 1500 | 31/31 | 0.93 | 0.17 | 75,80,89,91 | 0 |

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.

WORLDWIDE
wwPDB
PROTEIN DATA BANK

**Electron density around APC A 500:**

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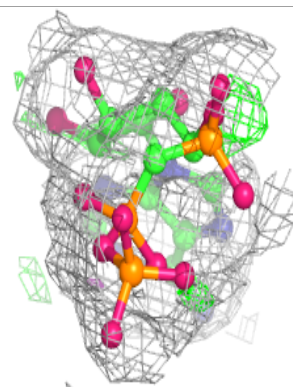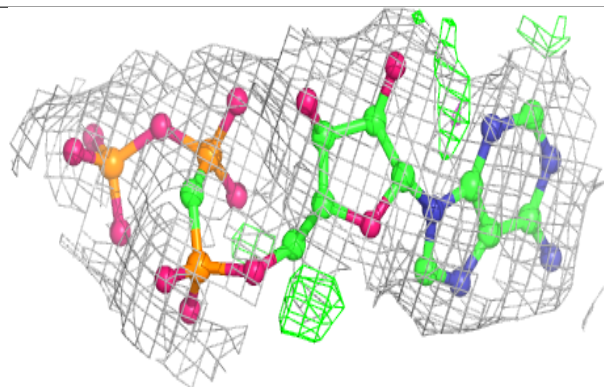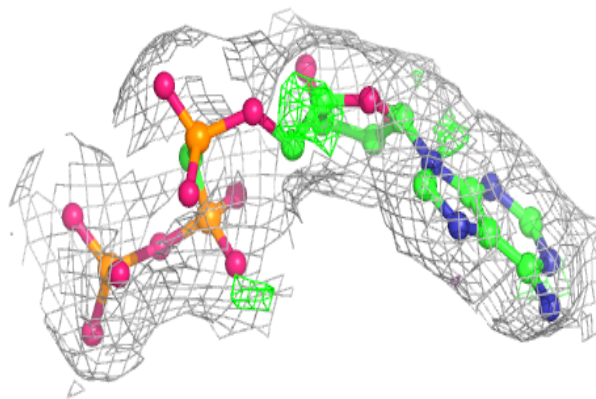


**Electron density around APC B 1500:**

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

## 6.5 Other polymers ⓘ

There are no such residues in this entry.