



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 01:16 AM UTC

PDB ID : 2TOD / pdb\_00002tod  
Title : ORNITHINE DECARBOXYLASE FROM TRYPANOSOMA BRUCEI K69A  
MUTANT IN COMPLEX WITH ALPHA-DIFLUOROMETHYLORNITHIN  
E  
Authors : Grishin, N.V.; Osterman, A.L.; Brooks, H.B.; Phillips, M.A.; Goldsmith, E.J.  
Deposited on : 1999-05-18  
Resolution : 2.00 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

|                                |   |                                                                  |
|--------------------------------|---|------------------------------------------------------------------|
| MolProbity                     | : | 4-5-2 with Phenix2.0                                             |
| Mogul                          | : | 2022.3.0, CSD as543be (2022)                                     |
| Xtriage (Phenix)               | : | NOT EXECUTED                                                     |
| EDS                            | : | NOT EXECUTED                                                     |
| Percentile statistics          | : | 20250101.v01 (using entries in the PDB archive January 1st 2025) |
| Ideal geometry (proteins)      | : | Engh & Huber (2001)                                              |
| Ideal geometry (DNA, RNA)      | : | Parkinson et al. (1996)                                          |
| Validation Pipeline (wwPDB-VP) | : | 2.49                                                             |

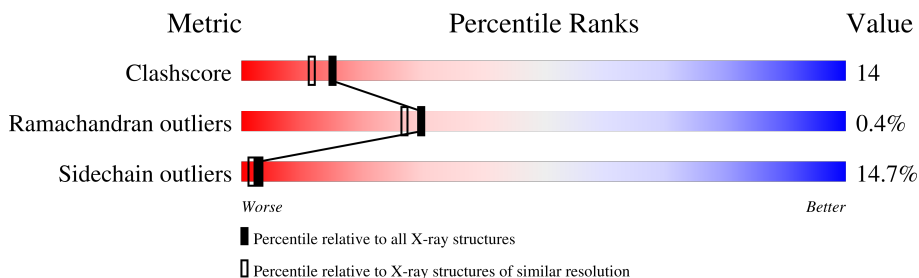
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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<br>(#Entries) | Similar resolution<br>(#Entries, resolution range(Å)) |
|-----------------------|-----------------------------|-------------------------------------------------------|
| Clashscore            | 190562                      | 11152 (2.00-2.00)                                     |
| Ramachandran outliers | 187476                      | 11031 (2.00-2.00)                                     |
| Sidechain outliers    | 187428                      | 11029 (2.00-2.00)                                     |

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  $\geq 3$ , 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  $\leq 5\%$ .

Note EDS was not executed.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1   | A     | 425    |                  |
| 1   | B     | 425    |                  |
| 1   | C     | 425    |                  |
| 1   | D     | 425    |                  |

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 11966 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.

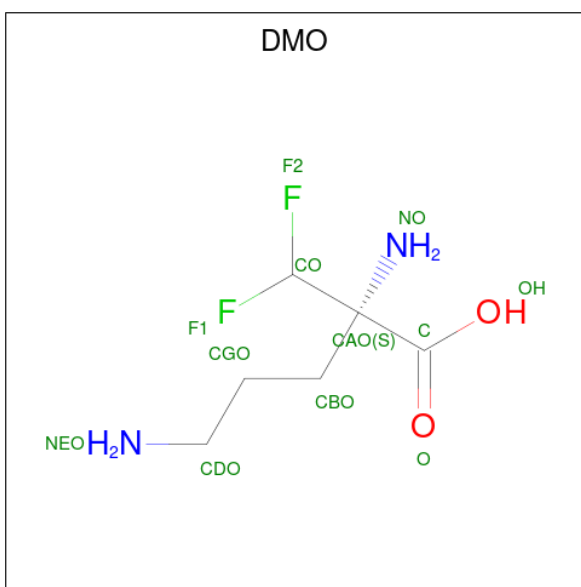
- Molecule 1 is a protein called PROTEIN (ORNITHINE DECARBOXYLASE).

| Mol | Chain | Residues | Atoms |      |     |     |    | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|---------|-------|
| 1   | A     | 353      | Total | C    | N   | O   | S  | 0       | 0       | 0     |
|     |       |          | 2754  | 1772 | 456 | 511 | 15 |         |         |       |
| 1   | B     | 352      | Total | C    | N   | O   | S  | 0       | 0       | 0     |
|     |       |          | 2747  | 1767 | 455 | 510 | 15 |         |         |       |
| 1   | C     | 353      | Total | C    | N   | O   | S  | 0       | 0       | 0     |
|     |       |          | 2754  | 1772 | 456 | 511 | 15 |         |         |       |
| 1   | D     | 353      | Total | C    | N   | O   | S  | 0       | 0       | 0     |
|     |       |          | 2754  | 1772 | 456 | 511 | 15 |         |         |       |

There are 8 discrepancies between the modelled and reference sequences:

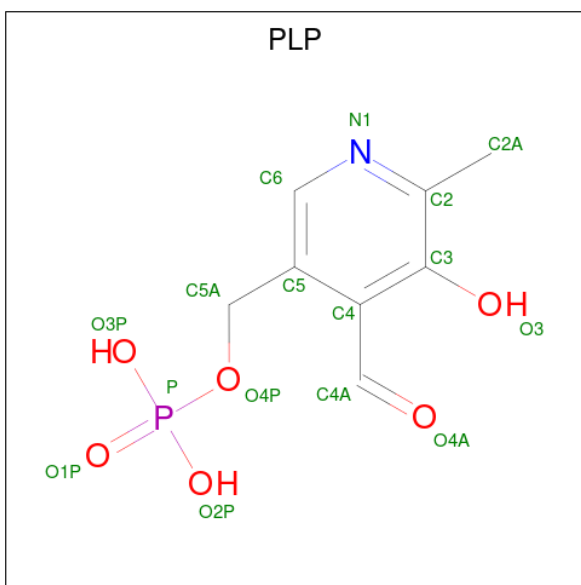
| Chain | Residue | Modelled | Actual | Comment             | Reference  |
|-------|---------|----------|--------|---------------------|------------|
| A     | 1       | GLY      | LYS    | engineered mutation | UNP P07805 |
| A     | 2       | ALA      | SER    | engineered mutation | UNP P07805 |
| B     | 1       | GLY      | LYS    | engineered mutation | UNP P07805 |
| B     | 2       | ALA      | SER    | engineered mutation | UNP P07805 |
| C     | 1       | GLY      | LYS    | engineered mutation | UNP P07805 |
| C     | 2       | ALA      | SER    | engineered mutation | UNP P07805 |
| D     | 1       | GLY      | LYS    | engineered mutation | UNP P07805 |
| D     | 2       | ALA      | SER    | engineered mutation | UNP P07805 |

- Molecule 2 is ALPHA-DIFLUOROMETHYLORNITHINE (CCD ID: DMO) (formula:  $C_6H_{12}F_2N_2O_2$ ).



| Mol | Chain | Residues | Atoms |   |   | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---------|---------|
| 2   | A     | 1        | Total | C | N | 0       | 0       |
|     |       |          | 7     | 5 | 2 |         |         |
| 2   | B     | 1        | Total | C | N | 0       | 0       |
|     |       |          | 7     | 5 | 2 |         |         |
| 2   | C     | 1        | Total | C | N | 0       | 0       |
|     |       |          | 7     | 5 | 2 |         |         |
| 2   | D     | 1        | Total | C | N | 0       | 0       |
|     |       |          | 7     | 5 | 2 |         |         |

- Molecule 3 is PYRIDOXAL-5'-PHOSPHATE (CCD ID: PLP) (formula:  $C_8H_{10}NO_6P$ ).

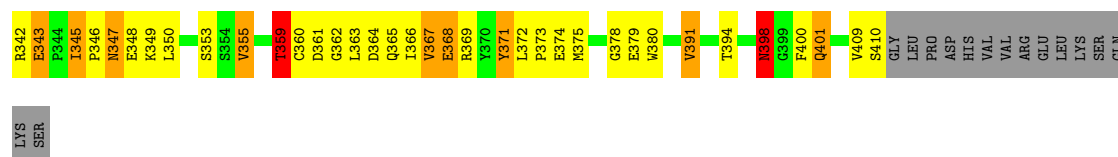


| Mol | Chain | Residues | Atoms |   |   |   |   | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---|---|---------|---------|
| 3   | A     | 1        | Total | C | N | O | P | 0       | 0       |
|     |       |          | 15    | 8 | 1 | 5 | 1 |         |         |
| 3   | B     | 1        | Total | C | N | O | P | 0       | 0       |
|     |       |          | 15    | 8 | 1 | 5 | 1 |         |         |
| 3   | C     | 1        | Total | C | N | O | P | 0       | 0       |
|     |       |          | 15    | 8 | 1 | 5 | 1 |         |         |
| 3   | D     | 1        | Total | C | N | O | P | 0       | 0       |
|     |       |          | 15    | 8 | 1 | 5 | 1 |         |         |

- Molecule 4 is water.

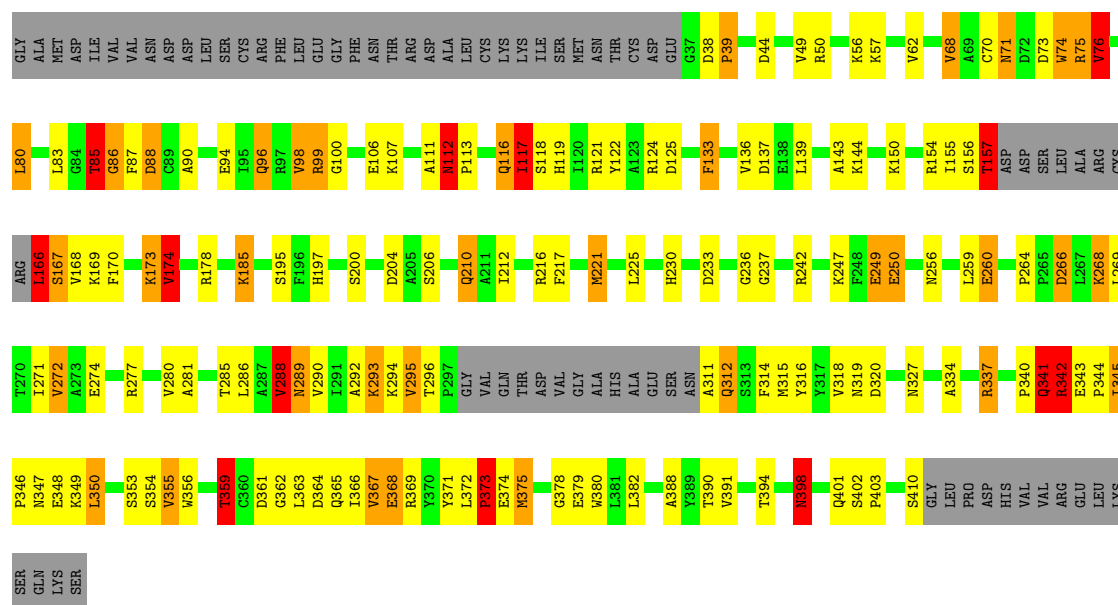
| Mol | Chain | Residues | Atoms |     | ZeroOcc | AltConf |
|-----|-------|----------|-------|-----|---------|---------|
| 4   | A     | 233      | Total | O   | 0       | 0       |
|     |       |          | 233   | 233 |         |         |
| 4   | B     | 212      | Total | O   | 0       | 0       |
|     |       |          | 212   | 212 |         |         |
| 4   | C     | 206      | Total | O   | 0       | 0       |
|     |       |          | 206   | 206 |         |         |
| 4   | D     | 218      | Total | O   | 0       | 0       |
|     |       |          | 218   | 218 |         |         |





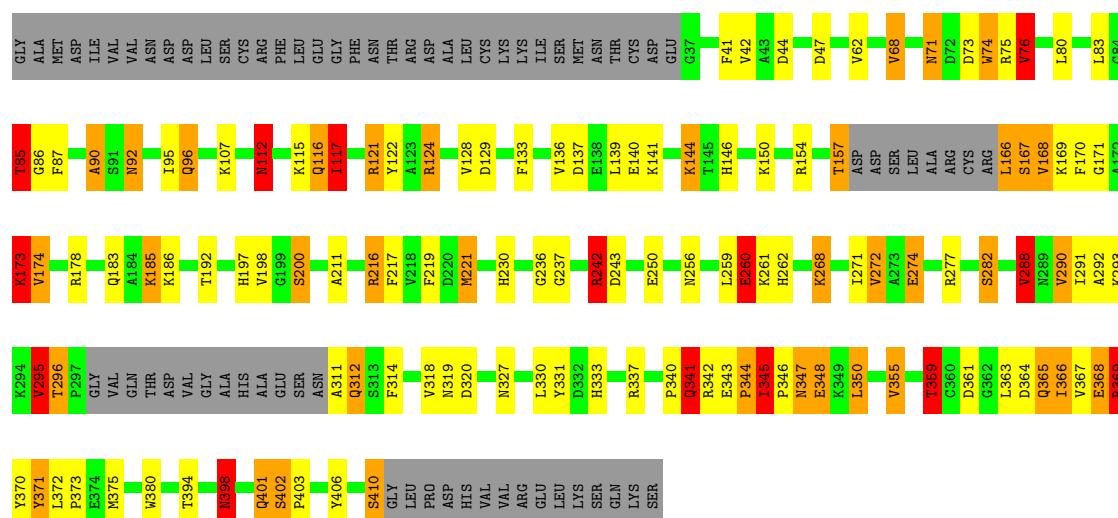
• Molecule 1: PROTEIN (ORNITHINE DECARBOXYLASE)

Chain C: 46% 25% 8% 17%



• Molecule 1: PROTEIN (ORNITHINE DECARBOXYLASE)

Chain D: 52% 18% 9% 17%



## 4 Data and refinement statistics

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

| Property                                                 | Value                                         | Source    |
|----------------------------------------------------------|-----------------------------------------------|-----------|
| Space group                                              | P 1 21 1                                      | Depositor |
| Cell constants<br>a, b, c, $\alpha$ , $\beta$ , $\gamma$ | 66.80Å 154.50Å 77.10Å<br>90.00° 90.58° 90.00° | Depositor |
| Resolution (Å)                                           | 8.00 – 2.00                                   | Depositor |
| % Data completeness<br>(in resolution range)             | 96.2 (8.00-2.00)                              | Depositor |
| $R_{merge}$                                              | 0.09                                          | Depositor |
| $R_{sym}$                                                | (Not available)                               | Depositor |
| Refinement program                                       | REFMAC, X-PLOR, CNS                           | Depositor |
| R, $R_{free}$                                            | 0.212 , 0.270                                 | Depositor |
| Estimated twinning fraction                              | No twinning to report.                        | Xtriage   |
| Total number of atoms                                    | 11966                                         | wwPDB-VP  |
| Average B, all atoms (Å <sup>2</sup> )                   | 38.0                                          | 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: DMO, PLP

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     | 1.09         | 4/2823 (0.1%)   | 2.04        | 85/3835 (2.2%)   |
| 1   | B     | 1.03         | 2/2815 (0.1%)   | 2.08        | 105/3823 (2.7%)  |
| 1   | C     | 1.06         | 2/2823 (0.1%)   | 2.10        | 106/3835 (2.8%)  |
| 1   | D     | 1.10         | 3/2823 (0.1%)   | 2.06        | 87/3835 (2.3%)   |
| All | All   | 1.07         | 11/11284 (0.1%) | 2.07        | 383/15328 (2.5%) |

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   | A     | 0                   | 2                   |
| 1   | B     | 0                   | 1                   |
| 1   | D     | 0                   | 1                   |
| All | All   | 0                   | 4                   |

All (11) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms   | Z    | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|---------|------|-------------|----------|
| 1   | A     | 171 | GLY  | CA-C    | 9.70 | 1.58        | 1.52     |
| 1   | D     | 171 | GLY  | CA-C    | 8.25 | 1.57        | 1.52     |
| 1   | B     | 263 | PHE  | CA-CB   | 7.35 | 1.61        | 1.53     |
| 1   | C     | 320 | ASP  | N-CA    | 5.87 | 1.53        | 1.45     |
| 1   | D     | 274 | GLU  | CA-CB   | 5.71 | 1.59        | 1.53     |
| 1   | B     | 273 | ALA  | C-N     | 5.57 | 1.40        | 1.33     |
| 1   | D     | 320 | ASP  | N-CA    | 5.49 | 1.52        | 1.45     |
| 1   | C     | 367 | VAL  | C-O     | 5.32 | 1.29        | 1.24     |
| 1   | A     | 119 | HIS  | CD2-NE2 | 5.08 | 1.43        | 1.37     |
| 1   | A     | 274 | GLU  | CA-CB   | 5.07 | 1.58        | 1.53     |
| 1   | A     | 134 | ASP  | N-CA    | 5.04 | 1.50        | 1.46     |

All (383) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms     | Z      | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-----------|--------|-------------|----------|
| 1   | A     | 50  | ARG  | CD-NE-CZ  | 15.35  | 145.89      | 124.40   |
| 1   | C     | 341 | GLN  | CA-CB-CG  | 14.12  | 142.34      | 114.10   |
| 1   | B     | 341 | GLN  | CA-CB-CG  | 13.96  | 142.01      | 114.10   |
| 1   | D     | 341 | GLN  | CA-CB-CG  | 11.90  | 137.91      | 114.10   |
| 1   | A     | 347 | ASN  | CA-CB-CG  | 11.21  | 123.81      | 112.60   |
| 1   | B     | 359 | THR  | N-CA-CB   | -11.05 | 95.24       | 110.38   |
| 1   | A     | 242 | ARG  | CA-C-N    | 10.59  | 141.82      | 122.54   |
| 1   | A     | 242 | ARG  | C-N-CA    | 10.59  | 141.82      | 122.54   |
| 1   | B     | 76  | VAL  | N-CA-CB   | 10.31  | 122.61      | 110.55   |
| 1   | D     | 288 | VAL  | N-CA-CB   | -10.17 | 93.12       | 111.93   |
| 1   | D     | 369 | ARG  | CD-NE-CZ  | 9.98   | 138.37      | 124.40   |
| 1   | A     | 288 | VAL  | N-CA-CB   | -9.94  | 93.55       | 111.93   |
| 1   | C     | 288 | VAL  | N-CA-CB   | -9.73  | 96.09       | 112.44   |
| 1   | B     | 359 | THR  | CA-C-N    | 9.62   | 134.13      | 120.28   |
| 1   | B     | 359 | THR  | C-N-CA    | 9.62   | 134.13      | 120.28   |
| 1   | B     | 288 | VAL  | N-CA-CB   | -9.61  | 95.69       | 111.45   |
| 1   | C     | 216 | ARG  | CD-NE-CZ  | 9.55   | 137.77      | 124.40   |
| 1   | C     | 272 | VAL  | N-CA-CB   | -9.50  | 96.49       | 112.44   |
| 1   | C     | 76  | VAL  | CA-C-O    | -9.48  | 110.80      | 120.85   |
| 1   | C     | 359 | THR  | N-CA-CB   | -9.39  | 96.17       | 110.45   |
| 1   | C     | 75  | ARG  | CD-NE-CZ  | 9.36   | 137.51      | 124.40   |
| 1   | A     | 359 | THR  | N-CA-CB   | -9.35  | 97.07       | 110.44   |
| 1   | D     | 272 | VAL  | N-CA-CB   | -9.33  | 95.09       | 112.36   |
| 1   | D     | 398 | ASN  | CA-CB-CG  | 9.22   | 121.82      | 112.60   |
| 1   | B     | 216 | ARG  | NE-CZ-NH2 | -9.22  | 110.90      | 119.20   |
| 1   | B     | 186 | LYS  | CA-C-O    | -9.17  | 109.74      | 120.10   |
| 1   | D     | 242 | ARG  | CA-C-N    | 9.11   | 138.95      | 121.54   |
| 1   | D     | 242 | ARG  | C-N-CA    | 9.11   | 138.95      | 121.54   |
| 1   | C     | 124 | ARG  | CD-NE-CZ  | 9.06   | 137.08      | 124.40   |
| 1   | B     | 272 | VAL  | N-CA-CB   | -9.02  | 97.28       | 112.44   |
| 1   | D     | 359 | THR  | N-CA-CB   | -8.97  | 96.79       | 110.42   |
| 1   | C     | 86  | GLY  | O-C-N     | -8.91  | 114.41      | 122.88   |
| 1   | A     | 85  | THR  | N-CA-CB   | -8.91  | 96.91       | 110.45   |
| 1   | B     | 391 | VAL  | O-C-N     | -8.88  | 113.19      | 121.89   |
| 1   | B     | 76  | VAL  | CA-C-O    | -8.80  | 111.84      | 121.17   |
| 1   | A     | 341 | GLN  | CA-CB-CG  | 8.73   | 131.56      | 114.10   |
| 1   | D     | 96  | GLN  | CA-CB-CG  | 8.73   | 131.56      | 114.10   |
| 1   | D     | 345 | ILE  | CA-C-O    | 8.72   | 124.92      | 119.51   |
| 1   | D     | 115 | LYS  | CA-C-O    | -8.68  | 111.51      | 120.71   |
| 1   | B     | 49  | VAL  | CA-C-O    | -8.66  | 111.99      | 121.17   |
| 1   | A     | 216 | ARG  | CD-NE-CZ  | 8.66   | 136.52      | 124.40   |
| 1   | B     | 96  | GLN  | CA-CB-CG  | 8.56   | 131.22      | 114.10   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | C     | 221 | MET  | CA-CB-CG   | 8.56  | 131.21      | 114.10   |
| 1   | C     | 374 | GLU  | CA-C-O     | -8.52 | 111.33      | 121.05   |
| 1   | D     | 85  | THR  | N-CA-CB    | -8.49 | 97.54       | 110.45   |
| 1   | A     | 272 | VAL  | CA-CB-CG1  | 8.49  | 124.83      | 110.40   |
| 1   | D     | 129 | ASP  | CA-C-O     | -8.43 | 109.95      | 118.97   |
| 1   | D     | 216 | ARG  | CD-NE-CZ   | 8.25  | 135.96      | 124.40   |
| 1   | B     | 289 | ASN  | OD1-CG-ND2 | -8.21 | 114.39      | 122.60   |
| 1   | B     | 261 | LYS  | CB-CG-CD   | -8.20 | 92.44       | 111.30   |
| 1   | B     | 93  | THR  | N-CA-C     | 8.04  | 120.76      | 111.11   |
| 1   | C     | 76  | VAL  | N-CA-CB    | 7.97  | 122.54      | 110.58   |
| 1   | C     | 49  | VAL  | CA-C-O     | -7.91 | 113.04      | 121.27   |
| 1   | D     | 282 | SER  | CB-CA-C    | -7.90 | 93.48       | 109.99   |
| 1   | D     | 117 | ILE  | N-CA-CB    | 7.89  | 121.27      | 110.54   |
| 1   | C     | 112 | ASN  | CA-CB-CG   | 7.89  | 120.49      | 112.60   |
| 1   | A     | 87  | PHE  | CA-CB-CG   | -7.84 | 105.96      | 113.80   |
| 1   | A     | 167 | SER  | N-CA-C     | 7.78  | 120.35      | 108.52   |
| 1   | A     | 116 | GLN  | OE1-CD-NE2 | -7.77 | 114.83      | 122.60   |
| 1   | A     | 71  | ASN  | OD1-CG-ND2 | -7.76 | 114.84      | 122.60   |
| 1   | C     | 272 | VAL  | CA-CB-CG1  | 7.76  | 123.59      | 110.40   |
| 1   | D     | 290 | VAL  | N-CA-CB    | 7.76  | 120.39      | 111.39   |
| 1   | A     | 117 | ILE  | CA-CB-CG2  | 7.75  | 123.68      | 110.50   |
| 1   | C     | 391 | VAL  | O-C-N      | -7.74 | 114.31      | 121.89   |
| 1   | C     | 285 | THR  | CA-C-O     | -7.70 | 112.04      | 120.36   |
| 1   | A     | 96  | GLN  | CA-CB-CG   | 7.66  | 129.41      | 114.10   |
| 1   | D     | 87  | PHE  | CA-CB-CG   | -7.65 | 106.15      | 113.80   |
| 1   | A     | 272 | VAL  | N-CA-CB    | -7.64 | 98.23       | 112.36   |
| 1   | B     | 272 | VAL  | CA-CB-CG1  | 7.62  | 123.34      | 110.40   |
| 1   | B     | 85  | THR  | N-CA-CB    | -7.60 | 98.90       | 110.45   |
| 1   | A     | 320 | ASP  | CA-C-O     | -7.59 | 112.48      | 120.99   |
| 1   | D     | 260 | GLU  | CB-CG-CD   | 7.57  | 125.48      | 112.60   |
| 1   | D     | 121 | ARG  | CA-C-O     | 7.57  | 128.65      | 120.10   |
| 1   | C     | 57  | LYS  | N-CA-C     | 7.52  | 119.11      | 111.07   |
| 1   | A     | 211 | ALA  | O-C-N      | -7.45 | 114.39      | 122.07   |
| 1   | B     | 133 | PHE  | CA-C-O     | -7.37 | 113.57      | 121.45   |
| 1   | B     | 347 | ASN  | CA-CB-CG   | 7.33  | 119.94      | 112.60   |
| 1   | A     | 260 | GLU  | CB-CG-CD   | 7.33  | 125.06      | 112.60   |
| 1   | C     | 359 | THR  | CA-CB-CG2  | 7.32  | 122.95      | 110.50   |
| 1   | D     | 344 | PRO  | CA-C-N     | -7.31 | 116.97      | 123.33   |
| 1   | D     | 344 | PRO  | C-N-CA     | -7.31 | 116.97      | 123.33   |
| 1   | B     | 263 | PHE  | O-C-N      | -7.30 | 114.38      | 121.17   |
| 1   | C     | 99  | ARG  | NE-CZ-NH2  | -7.29 | 112.64      | 119.20   |
| 1   | A     | 221 | MET  | CA-CB-CG   | 7.24  | 128.57      | 114.10   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | D     | 62  | VAL  | CA-C-O     | -7.22 | 112.80      | 120.53   |
| 1   | C     | 373 | PRO  | CA-C-O     | -7.21 | 111.93      | 122.31   |
| 1   | D     | 340 | PRO  | CA-C-O     | -7.20 | 113.22      | 121.36   |
| 1   | B     | 99  | ARG  | O-C-N      | -7.18 | 114.62      | 122.09   |
| 1   | D     | 365 | GLN  | OE1-CD-NE2 | -7.17 | 115.43      | 122.60   |
| 1   | A     | 355 | VAL  | CA-CB-CG1  | 7.17  | 122.58      | 110.40   |
| 1   | C     | 382 | LEU  | CA-C-N     | -7.15 | 112.68      | 122.77   |
| 1   | C     | 382 | LEU  | C-N-CA     | -7.15 | 112.68      | 122.77   |
| 1   | B     | 221 | MET  | CA-CB-CG   | 7.14  | 128.38      | 114.10   |
| 1   | B     | 50  | ARG  | CD-NE-CZ   | 7.12  | 134.37      | 124.40   |
| 1   | A     | 216 | ARG  | NE-CZ-NH1  | 7.11  | 128.61      | 121.50   |
| 1   | C     | 359 | THR  | CA-C-N     | 7.10  | 130.50      | 120.28   |
| 1   | C     | 359 | THR  | C-N-CA     | 7.10  | 130.50      | 120.28   |
| 1   | D     | 167 | SER  | N-CA-C     | 7.09  | 119.96      | 108.76   |
| 1   | A     | 178 | ARG  | NH1-CZ-NH2 | -7.07 | 110.11      | 119.30   |
| 1   | B     | 290 | VAL  | CA-C-O     | 7.02  | 129.40      | 120.76   |
| 1   | B     | 87  | PHE  | CA-CB-CG   | -6.98 | 106.82      | 113.80   |
| 1   | B     | 235 | GLY  | O-C-N      | -6.97 | 115.00      | 122.67   |
| 1   | D     | 272 | VAL  | CA-CB-CG1  | 6.96  | 122.24      | 110.40   |
| 1   | C     | 117 | ILE  | CA-CB-CG2  | 6.92  | 122.27      | 110.50   |
| 1   | B     | 290 | VAL  | CB-CA-C    | 6.90  | 118.69      | 111.23   |
| 1   | C     | 293 | LYS  | O-C-N      | -6.87 | 115.37      | 123.41   |
| 1   | B     | 362 | GLY  | O-C-N      | -6.83 | 115.02      | 122.54   |
| 1   | B     | 366 | ILE  | CB-CA-C    | -6.83 | 103.69      | 111.55   |
| 1   | B     | 283 | ALA  | N-CA-C     | 6.82  | 120.86      | 112.54   |
| 1   | A     | 96  | GLN  | CB-CA-C    | -6.82 | 100.18      | 110.88   |
| 1   | D     | 221 | MET  | CA-CB-CG   | 6.81  | 127.72      | 114.10   |
| 1   | B     | 146 | HIS  | CA-CB-CG   | 6.80  | 120.60      | 113.80   |
| 1   | D     | 355 | VAL  | CA-CB-CG1  | 6.79  | 121.94      | 110.40   |
| 1   | B     | 204 | ASP  | CA-CB-CG   | -6.78 | 105.82      | 112.60   |
| 1   | A     | 76  | VAL  | N-CA-CB    | 6.78  | 120.75      | 110.58   |
| 1   | A     | 121 | ARG  | CA-C-O     | 6.76  | 127.59      | 120.42   |
| 1   | B     | 343 | GLU  | CB-CG-CD   | 6.71  | 124.02      | 112.60   |
| 1   | B     | 75  | ARG  | CD-NE-CZ   | 6.67  | 133.74      | 124.40   |
| 1   | B     | 398 | ASN  | CA-CB-CG   | 6.67  | 119.27      | 112.60   |
| 1   | C     | 125 | ASP  | CA-CB-CG   | 6.61  | 119.21      | 112.60   |
| 1   | D     | 183 | GLN  | CA-C-O     | -6.61 | 113.42      | 120.42   |
| 1   | C     | 167 | SER  | N-CA-C     | 6.59  | 119.34      | 108.99   |
| 1   | C     | 342 | ARG  | NE-CZ-NH2  | 6.59  | 125.13      | 119.20   |
| 1   | D     | 345 | ILE  | CB-CA-C    | 6.59  | 116.52      | 110.13   |
| 1   | B     | 133 | PHE  | O-C-N      | 6.58  | 130.67      | 123.10   |
| 1   | D     | 211 | ALA  | CA-C-O     | 6.57  | 127.38      | 120.42   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | D     | 320 | ASP  | CA-CB-CG   | 6.54  | 119.14      | 112.60   |
| 1   | B     | 57  | LYS  | N-CA-C     | 6.54  | 118.07      | 111.07   |
| 1   | C     | 167 | SER  | CA-CB-OG   | 6.54  | 124.19      | 111.10   |
| 1   | A     | 204 | ASP  | N-CA-C     | 6.53  | 119.59      | 109.07   |
| 1   | A     | 216 | ARG  | NE-CZ-NH2  | -6.52 | 113.33      | 119.20   |
| 1   | D     | 112 | ASN  | CA-CB-CG   | 6.52  | 119.12      | 112.60   |
| 1   | D     | 369 | ARG  | NE-CZ-NH1  | 6.52  | 128.02      | 121.50   |
| 1   | D     | 96  | GLN  | CA-C-O     | 6.51  | 127.66      | 120.82   |
| 1   | A     | 370 | TYR  | CA-C-O     | -6.42 | 113.61      | 121.06   |
| 1   | B     | 259 | LEU  | CA-C-O     | 6.37  | 127.17      | 120.42   |
| 1   | D     | 76  | VAL  | N-CA-CB    | 6.37  | 120.14      | 110.58   |
| 1   | D     | 116 | GLN  | OE1-CD-NE2 | -6.37 | 116.23      | 122.60   |
| 1   | C     | 334 | ALA  | CA-C-N     | -6.36 | 114.81      | 123.14   |
| 1   | C     | 334 | ALA  | C-N-CA     | -6.36 | 114.81      | 123.14   |
| 1   | C     | 166 | LEU  | CA-C-N     | -6.35 | 110.60      | 121.85   |
| 1   | C     | 166 | LEU  | C-N-CA     | -6.35 | 110.60      | 121.85   |
| 1   | C     | 204 | ASP  | CA-C-O     | 6.35  | 127.30      | 120.32   |
| 1   | C     | 285 | THR  | CA-C-N     | -6.33 | 113.22      | 122.65   |
| 1   | C     | 285 | THR  | C-N-CA     | -6.33 | 113.22      | 122.65   |
| 1   | B     | 260 | GLU  | CB-CG-CD   | 6.32  | 123.35      | 112.60   |
| 1   | C     | 174 | VAL  | CA-C-O     | -6.32 | 113.81      | 120.57   |
| 1   | C     | 341 | GLN  | CA-C-N     | 6.29  | 130.32      | 121.02   |
| 1   | C     | 341 | GLN  | C-N-CA     | 6.29  | 130.32      | 121.02   |
| 1   | D     | 402 | SER  | CA-CB-OG   | -6.28 | 98.54       | 111.10   |
| 1   | A     | 178 | ARG  | NE-CZ-NH1  | 6.26  | 127.76      | 121.50   |
| 1   | D     | 359 | THR  | CA-C-N     | 6.26  | 131.18      | 120.72   |
| 1   | D     | 359 | THR  | C-N-CA     | 6.26  | 131.18      | 120.72   |
| 1   | A     | 167 | SER  | CA-C-O     | 6.26  | 127.76      | 120.75   |
| 1   | B     | 117 | ILE  | CA-CB-CG2  | 6.23  | 121.10      | 110.50   |
| 1   | A     | 85  | THR  | OG1-CB-CG2 | 6.23  | 121.75      | 109.30   |
| 1   | D     | 292 | ALA  | CA-C-O     | -6.22 | 114.57      | 121.23   |
| 1   | C     | 133 | PHE  | CA-C-O     | -6.22 | 114.58      | 121.23   |
| 1   | A     | 239 | PRO  | CA-C-O     | -6.21 | 114.19      | 121.95   |
| 1   | C     | 85  | THR  | N-CA-CB    | -6.21 | 101.01      | 110.45   |
| 1   | C     | 119 | HIS  | CA-CB-CG   | 6.20  | 120.00      | 113.80   |
| 1   | D     | 355 | VAL  | N-CA-CB    | 6.20  | 121.62      | 111.58   |
| 1   | B     | 290 | VAL  | CA-CB-CG2  | 6.19  | 120.93      | 110.40   |
| 1   | B     | 375 | MET  | CA-C-O     | -6.19 | 114.22      | 121.46   |
| 1   | B     | 167 | SER  | N-CA-C     | 6.17  | 118.50      | 108.76   |
| 1   | C     | 96  | GLN  | CA-CB-CG   | 6.16  | 126.42      | 114.10   |
| 1   | A     | 178 | ARG  | CD-NE-CZ   | 6.16  | 133.02      | 124.40   |
| 1   | C     | 49  | VAL  | N-CA-C     | 6.16  | 116.82      | 110.36   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | C     | 216 | ARG  | NE-CZ-NH2  | -6.16 | 113.66      | 119.20   |
| 1   | D     | 288 | VAL  | CB-CA-C    | 6.15  | 120.53      | 110.69   |
| 1   | C     | 204 | ASP  | N-CA-C     | 6.14  | 118.53      | 108.52   |
| 1   | C     | 83  | LEU  | O-C-N      | -6.14 | 113.99      | 122.46   |
| 1   | A     | 185 | LYS  | N-CA-C     | 6.13  | 117.64      | 111.07   |
| 1   | C     | 76  | VAL  | O-C-N      | 6.13  | 128.15      | 121.83   |
| 1   | D     | 261 | LYS  | CA-C-O     | -6.12 | 114.40      | 120.70   |
| 1   | A     | 68  | VAL  | CA-CB-CG2  | 6.11  | 120.79      | 110.40   |
| 1   | C     | 178 | ARG  | CD-NE-CZ   | 6.11  | 132.95      | 124.40   |
| 1   | D     | 371 | TYR  | CA-CB-CG   | -6.10 | 102.93      | 113.90   |
| 1   | A     | 203 | THR  | N-CA-C     | -6.09 | 105.66      | 114.12   |
| 1   | B     | 178 | ARG  | CD-NE-CZ   | 6.07  | 132.90      | 124.40   |
| 1   | D     | 140 | GLU  | CA-C-O     | -6.07 | 114.12      | 120.55   |
| 1   | D     | 167 | SER  | CA-C-O     | 6.05  | 127.55      | 120.89   |
| 1   | B     | 355 | VAL  | CA-CB-CG1  | 6.05  | 120.68      | 110.40   |
| 1   | B     | 400 | PHE  | CA-CB-CG   | -6.03 | 107.77      | 113.80   |
| 1   | C     | 327 | ASN  | CA-C-N     | 6.03  | 128.96      | 120.28   |
| 1   | C     | 327 | ASN  | C-N-CA     | 6.03  | 128.96      | 120.28   |
| 1   | C     | 212 | ILE  | CA-C-O     | 6.02  | 127.23      | 120.85   |
| 1   | B     | 124 | ARG  | CD-NE-CZ   | 5.98  | 132.77      | 124.40   |
| 1   | D     | 76  | VAL  | CA-C-O     | -5.97 | 114.52      | 120.85   |
| 1   | C     | 342 | ARG  | N-CA-C     | 5.96  | 118.85      | 109.96   |
| 1   | B     | 52  | HIS  | CA-CB-CG   | -5.96 | 107.84      | 113.80   |
| 1   | C     | 286 | LEU  | CA-C-N     | -5.95 | 114.78      | 123.00   |
| 1   | C     | 286 | LEU  | C-N-CA     | -5.95 | 114.78      | 123.00   |
| 1   | C     | 204 | ASP  | CA-CB-CG   | -5.95 | 106.65      | 112.60   |
| 1   | A     | 359 | THR  | CA-CB-CG2  | 5.95  | 120.61      | 110.50   |
| 1   | C     | 157 | THR  | CA-C-O     | -5.94 | 110.70      | 120.80   |
| 1   | C     | 87  | PHE  | CA-CB-CG   | -5.93 | 107.87      | 113.80   |
| 1   | A     | 66  | TYR  | CA-C-O     | -5.93 | 114.50      | 120.96   |
| 1   | C     | 292 | ALA  | CA-C-O     | -5.91 | 114.94      | 121.33   |
| 1   | D     | 41  | PHE  | CA-C-N     | -5.91 | 115.44      | 123.12   |
| 1   | D     | 41  | PHE  | C-N-CA     | -5.91 | 115.44      | 123.12   |
| 1   | B     | 371 | TYR  | CA-CB-CG   | -5.89 | 103.29      | 113.90   |
| 1   | C     | 398 | ASN  | CA-CB-CG   | 5.89  | 118.49      | 112.60   |
| 1   | C     | 398 | ASN  | OD1-CG-ND2 | -5.88 | 116.72      | 122.60   |
| 1   | B     | 272 | VAL  | CA-C-O     | -5.87 | 115.51      | 121.67   |
| 1   | C     | 337 | ARG  | CA-C-O     | -5.84 | 115.04      | 119.59   |
| 1   | C     | 155 | ILE  | CA-C-O     | -5.83 | 115.09      | 121.92   |
| 1   | A     | 312 | GLN  | CA-C-N     | 5.83  | 132.40      | 122.37   |
| 1   | A     | 312 | GLN  | C-N-CA     | 5.83  | 132.40      | 122.37   |
| 1   | A     | 398 | ASN  | CA-CB-CG   | 5.82  | 118.42      | 112.60   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | D     | 327 | ASN  | OD1-CG-ND2 | -5.82 | 116.78      | 122.60   |
| 1   | A     | 344 | PRO  | CA-C-O     | -5.82 | 115.00      | 121.23   |
| 1   | A     | 170 | PHE  | CA-CB-CG   | 5.81  | 119.61      | 113.80   |
| 1   | B     | 167 | SER  | CA-C-O     | 5.80  | 127.28      | 120.89   |
| 1   | A     | 371 | TYR  | CA-CB-CG   | -5.80 | 103.46      | 113.90   |
| 1   | C     | 44  | ASP  | CA-C-O     | 5.79  | 127.88      | 121.39   |
| 1   | B     | 83  | LEU  | O-C-N      | -5.79 | 114.73      | 122.43   |
| 1   | D     | 401 | GLN  | OE1-CD-NE2 | -5.79 | 116.81      | 122.60   |
| 1   | C     | 288 | VAL  | O-C-N      | -5.78 | 116.62      | 123.04   |
| 1   | B     | 68  | VAL  | N-CA-CB    | 5.78  | 120.53      | 110.65   |
| 1   | C     | 98  | VAL  | N-CA-CB    | 5.77  | 120.20      | 110.56   |
| 1   | B     | 228 | ASN  | CA-CB-CG   | 5.77  | 118.37      | 112.60   |
| 1   | D     | 68  | VAL  | CA-CB-CG2  | 5.76  | 120.20      | 110.40   |
| 1   | A     | 347 | ASN  | OD1-CG-ND2 | -5.75 | 116.84      | 122.60   |
| 1   | D     | 295 | VAL  | CB-CA-C    | -5.75 | 102.12      | 110.63   |
| 1   | B     | 48  | ILE  | CB-CG1-CD1 | 5.72  | 125.82      | 113.80   |
| 1   | C     | 355 | VAL  | CA-CB-CG2  | 5.72  | 120.12      | 110.40   |
| 1   | C     | 39  | PRO  | CA-C-O     | -5.71 | 114.94      | 121.56   |
| 1   | D     | 117 | ILE  | CA-CB-CG2  | 5.71  | 120.20      | 110.50   |
| 1   | C     | 88  | ASP  | CA-C-O     | 5.70  | 126.82      | 120.43   |
| 1   | D     | 83  | LEU  | CA-C-O     | -5.70 | 111.81      | 119.11   |
| 1   | A     | 180 | ILE  | CB-CG1-CD1 | 5.70  | 125.77      | 113.80   |
| 1   | A     | 71  | ASN  | CA-CB-CG   | 5.70  | 118.30      | 112.60   |
| 1   | B     | 216 | ARG  | NH1-CZ-NH2 | 5.69  | 126.70      | 119.30   |
| 1   | B     | 262 | HIS  | CA-C-N     | 5.68  | 129.25      | 122.89   |
| 1   | B     | 262 | HIS  | C-N-CA     | 5.68  | 129.25      | 122.89   |
| 1   | D     | 366 | ILE  | CB-CA-C    | -5.67 | 105.86      | 111.30   |
| 1   | C     | 375 | MET  | CA-C-O     | -5.66 | 115.02      | 121.58   |
| 1   | B     | 186 | LYS  | O-C-N      | 5.66  | 128.84      | 122.22   |
| 1   | B     | 266 | ASP  | CA-C-O     | -5.65 | 113.92      | 120.31   |
| 1   | A     | 146 | HIS  | CA-C-N     | 5.65  | 125.27      | 119.56   |
| 1   | A     | 146 | HIS  | C-N-CA     | 5.65  | 125.27      | 119.56   |
| 1   | A     | 364 | ASP  | CA-CB-CG   | 5.65  | 118.25      | 112.60   |
| 1   | C     | 62  | VAL  | O-C-N      | -5.64 | 116.51      | 123.10   |
| 1   | C     | 340 | PRO  | CA-C-O     | -5.62 | 114.94      | 121.34   |
| 1   | B     | 341 | GLN  | CB-CG-CD   | 5.62  | 122.15      | 112.60   |
| 1   | B     | 277 | ARG  | CD-NE-CZ   | -5.62 | 116.54      | 124.40   |
| 1   | B     | 401 | GLN  | OE1-CD-NE2 | -5.62 | 116.98      | 122.60   |
| 1   | D     | 117 | ILE  | CA-C-O     | -5.61 | 115.11      | 120.95   |
| 1   | A     | 74  | TRP  | CB-CG-CD2  | 5.59  | 134.62      | 126.80   |
| 1   | C     | 342 | ARG  | CB-CA-C    | -5.59 | 102.11      | 110.16   |
| 1   | D     | 141 | LYS  | CB-CA-C    | -5.59 | 101.35      | 110.85   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | A     | 211 | ALA  | CA-C-O     | 5.59  | 126.69      | 120.82   |
| 1   | D     | 92  | ASN  | CA-CB-CG   | -5.58 | 107.02      | 112.60   |
| 1   | D     | 124 | ARG  | O-C-N      | -5.58 | 116.20      | 122.12   |
| 1   | C     | 295 | VAL  | N-CA-C     | 5.58  | 116.34      | 108.36   |
| 1   | A     | 343 | GLU  | CB-CG-CD   | 5.57  | 122.07      | 112.60   |
| 1   | A     | 68  | VAL  | N-CA-CB    | 5.56  | 120.84      | 110.77   |
| 1   | C     | 289 | ASN  | CA-C-O     | -5.55 | 114.64      | 120.80   |
| 1   | C     | 68  | VAL  | CA-CB-CG2  | 5.55  | 119.83      | 110.40   |
| 1   | C     | 143 | ALA  | CA-C-N     | 5.52  | 128.71      | 120.31   |
| 1   | C     | 143 | ALA  | C-N-CA     | 5.52  | 128.71      | 120.31   |
| 1   | B     | 88  | ASP  | CA-C-O     | 5.52  | 126.27      | 120.36   |
| 1   | B     | 335 | VAL  | CA-C-O     | -5.52 | 114.59      | 120.39   |
| 1   | D     | 211 | ALA  | O-C-N      | -5.51 | 115.87      | 122.15   |
| 1   | B     | 291 | ILE  | CA-C-O     | -5.50 | 113.26      | 119.42   |
| 1   | A     | 239 | PRO  | CB-CA-C    | -5.50 | 104.03      | 111.12   |
| 1   | A     | 355 | VAL  | N-CA-CB    | 5.49  | 120.46      | 111.45   |
| 1   | D     | 173 | LYS  | CG-CD-CE   | 5.47  | 123.88      | 111.30   |
| 1   | B     | 272 | VAL  | CB-CA-C    | 5.46  | 118.85      | 110.55   |
| 1   | B     | 340 | PRO  | CB-CA-C    | 5.46  | 118.50      | 111.46   |
| 1   | A     | 283 | ALA  | N-CA-C     | 5.46  | 118.15      | 111.82   |
| 1   | A     | 238 | PHE  | O-C-N      | -5.45 | 115.33      | 121.43   |
| 1   | B     | 288 | VAL  | O-C-N      | -5.45 | 117.01      | 123.05   |
| 1   | A     | 61  | ARG  | NE-CZ-NH1  | -5.43 | 116.07      | 121.50   |
| 1   | B     | 96  | GLN  | CB-CA-C    | -5.42 | 102.37      | 110.88   |
| 1   | A     | 285 | THR  | CA-C-N     | -5.42 | 114.58      | 122.65   |
| 1   | A     | 285 | THR  | C-N-CA     | -5.42 | 114.58      | 122.65   |
| 1   | A     | 402 | SER  | CA-CB-OG   | -5.41 | 100.28      | 111.10   |
| 1   | A     | 51  | LYS  | O-C-N      | -5.41 | 116.39      | 122.12   |
| 1   | C     | 295 | VAL  | CA-C-O     | -5.40 | 114.79      | 120.57   |
| 1   | B     | 68  | VAL  | CA-CB-CG2  | 5.40  | 119.58      | 110.40   |
| 1   | B     | 125 | ASP  | CA-CB-CG   | 5.40  | 118.00      | 112.60   |
| 1   | B     | 156 | SER  | N-CA-CB    | 5.40  | 118.66      | 110.45   |
| 1   | C     | 210 | GLN  | OE1-CD-NE2 | -5.39 | 117.21      | 122.60   |
| 1   | A     | 129 | ASP  | CA-C-N     | -5.39 | 115.64      | 122.37   |
| 1   | A     | 129 | ASP  | C-N-CA     | -5.39 | 115.64      | 122.37   |
| 1   | A     | 288 | VAL  | CA-CB-CG1  | 5.38  | 119.55      | 110.40   |
| 1   | D     | 291 | ILE  | CA-C-O     | -5.38 | 113.39      | 119.42   |
| 1   | B     | 98  | VAL  | O-C-N      | -5.38 | 114.75      | 121.84   |
| 1   | B     | 56  | LYS  | CA-C-O     | -5.37 | 114.86      | 120.55   |
| 1   | A     | 204 | ASP  | CA-CB-CG   | -5.36 | 107.24      | 112.60   |
| 1   | D     | 129 | ASP  | CA-C-N     | -5.36 | 115.67      | 122.37   |
| 1   | D     | 129 | ASP  | C-N-CA     | -5.36 | 115.67      | 122.37   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | A     | 242 | ARG  | O-C-N      | -5.36 | 115.47      | 122.59   |
| 1   | B     | 360 | CYS  | CA-CB-SG   | 5.35  | 126.71      | 114.40   |
| 1   | B     | 320 | ASP  | CA-C-O     | -5.35 | 114.99      | 120.99   |
| 1   | B     | 40  | PHE  | O-C-N      | -5.35 | 117.16      | 123.25   |
| 1   | B     | 279 | TYR  | N-CA-CB    | -5.35 | 102.07      | 110.30   |
| 1   | C     | 260 | GLU  | CB-CG-CD   | 5.34  | 121.69      | 112.60   |
| 1   | A     | 338 | PRO  | CA-C-N     | 5.33  | 129.70      | 122.56   |
| 1   | A     | 338 | PRO  | C-N-CA     | 5.33  | 129.70      | 122.56   |
| 1   | C     | 167 | SER  | CA-C-O     | 5.33  | 126.96      | 120.99   |
| 1   | D     | 95  | ILE  | CA-C-O     | -5.33 | 115.52      | 121.17   |
| 1   | D     | 170 | PHE  | CA-CB-CG   | 5.33  | 119.13      | 113.80   |
| 1   | D     | 274 | GLU  | O-C-N      | -5.32 | 116.22      | 121.17   |
| 1   | D     | 74  | TRP  | O-C-N      | -5.32 | 116.48      | 122.12   |
| 1   | A     | 401 | GLN  | CG-CD-NE2  | 5.31  | 124.36      | 116.40   |
| 1   | B     | 293 | LYS  | N-CA-C     | 5.31  | 117.82      | 108.75   |
| 1   | D     | 282 | SER  | CA-CB-OG   | 5.29  | 121.68      | 111.10   |
| 1   | C     | 96  | GLN  | CB-CA-C    | -5.29 | 102.51      | 110.92   |
| 1   | B     | 166 | LEU  | CA-CB-CG   | 5.29  | 134.81      | 116.30   |
| 1   | A     | 263 | PHE  | O-C-N      | -5.29 | 116.25      | 121.17   |
| 1   | B     | 282 | SER  | CA-C-O     | -5.28 | 112.89      | 119.18   |
| 1   | D     | 178 | ARG  | NE-CZ-NH2  | 5.28  | 123.95      | 119.20   |
| 1   | B     | 257 | ASN  | OD1-CG-ND2 | -5.28 | 117.32      | 122.60   |
| 1   | B     | 116 | GLN  | OE1-CD-NE2 | -5.26 | 117.34      | 122.60   |
| 1   | A     | 295 | VAL  | CB-CA-C    | -5.26 | 103.32      | 110.42   |
| 1   | A     | 401 | GLN  | CB-CG-CD   | 5.26  | 121.54      | 112.60   |
| 1   | D     | 296 | THR  | N-CA-CB    | 5.26  | 118.88      | 109.94   |
| 1   | A     | 111 | ALA  | O-C-N      | -5.25 | 114.68      | 122.67   |
| 1   | C     | 390 | THR  | CA-C-O     | -5.25 | 113.63      | 119.40   |
| 1   | C     | 56  | LYS  | CA-C-O     | -5.24 | 114.99      | 120.55   |
| 1   | B     | 203 | THR  | N-CA-CB    | 5.24  | 118.62      | 110.44   |
| 1   | A     | 216 | ARG  | CG-CD-NE   | 5.23  | 123.51      | 112.00   |
| 1   | C     | 80  | LEU  | CA-C-O     | 5.23  | 125.96      | 119.79   |
| 1   | C     | 362 | GLY  | O-C-N      | -5.22 | 116.79      | 122.54   |
| 1   | D     | 333 | HIS  | CA-CB-CG   | 5.21  | 119.01      | 113.80   |
| 1   | C     | 264 | PRO  | N-CA-CB    | 5.21  | 108.14      | 103.08   |
| 1   | B     | 374 | GLU  | CA-C-O     | -5.21 | 115.12      | 121.05   |
| 1   | C     | 225 | LEU  | CA-C-N     | -5.21 | 113.97      | 122.40   |
| 1   | C     | 225 | LEU  | C-N-CA     | -5.21 | 113.97      | 122.40   |
| 1   | D     | 398 | ASN  | OD1-CG-ND2 | -5.20 | 117.40      | 122.60   |
| 1   | A     | 218 | VAL  | N-CA-C     | -5.19 | 104.49      | 111.44   |
| 1   | B     | 292 | ALA  | CA-C-O     | -5.18 | 115.69      | 121.23   |
| 1   | C     | 293 | LYS  | N-CA-C     | 5.17  | 117.60      | 108.75   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | C     | 116 | GLN  | OE1-CD-NE2 | -5.17 | 117.43      | 122.60   |
| 1   | D     | 90  | ALA  | CB-CA-C    | -5.16 | 101.01      | 109.99   |
| 1   | B     | 221 | MET  | N-CA-CB    | 5.15  | 117.48      | 110.01   |
| 1   | C     | 94  | GLU  | CB-CG-CD   | 5.15  | 121.36      | 112.60   |
| 1   | B     | 62  | VAL  | N-CA-CB    | -5.14 | 105.19      | 111.67   |
| 1   | B     | 261 | LYS  | N-CA-CB    | -5.13 | 102.55      | 110.20   |
| 1   | C     | 266 | ASP  | CA-C-O     | -5.13 | 114.52      | 120.31   |
| 1   | C     | 249 | GLU  | CA-C-O     | -5.12 | 115.12      | 120.55   |
| 1   | C     | 74  | TRP  | CA-C-N     | 5.12  | 127.56      | 120.29   |
| 1   | C     | 74  | TRP  | C-N-CA     | 5.12  | 127.56      | 120.29   |
| 1   | C     | 320 | ASP  | CA-CB-CG   | 5.12  | 117.72      | 112.60   |
| 1   | C     | 70  | CYS  | CA-C-O     | 5.11  | 125.97      | 120.55   |
| 1   | C     | 74  | TRP  | N-CA-C     | 5.11  | 116.85      | 111.28   |
| 1   | A     | 90  | ALA  | O-C-N      | 5.11  | 128.23      | 122.20   |
| 1   | C     | 359 | THR  | CA-CB-OG1  | 5.11  | 117.26      | 109.60   |
| 1   | B     | 219 | PHE  | N-CA-C     | 5.10  | 116.84      | 111.28   |
| 1   | C     | 354 | SER  | CA-C-O     | -5.10 | 115.34      | 121.11   |
| 1   | B     | 273 | ALA  | CA-C-N     | -5.10 | 117.14      | 123.21   |
| 1   | B     | 273 | ALA  | C-N-CA     | -5.10 | 117.14      | 123.21   |
| 1   | A     | 141 | LYS  | CB-CA-C    | -5.09 | 102.20      | 110.85   |
| 1   | D     | 186 | LYS  | CA-C-O     | -5.09 | 114.50      | 120.20   |
| 1   | A     | 353 | SER  | N-CA-C     | 5.08  | 117.53      | 109.50   |
| 1   | D     | 331 | TYR  | CA-CB-CG   | 5.08  | 123.05      | 113.90   |
| 1   | A     | 259 | LEU  | CA-C-O     | 5.08  | 125.93      | 120.70   |
| 1   | B     | 170 | PHE  | CA-CB-CG   | 5.08  | 118.88      | 113.80   |
| 1   | B     | 211 | ALA  | O-C-N      | -5.07 | 116.75      | 122.12   |
| 1   | B     | 325 | SER  | N-CA-C     | 5.07  | 117.54      | 111.71   |
| 1   | D     | 327 | ASN  | CA-C-N     | 5.07  | 128.79      | 120.63   |
| 1   | D     | 327 | ASN  | C-N-CA     | 5.07  | 128.79      | 120.63   |
| 1   | C     | 388 | ALA  | CA-C-O     | -5.06 | 114.75      | 120.32   |
| 1   | D     | 347 | ASN  | CA-CB-CG   | 5.06  | 117.66      | 112.60   |
| 1   | C     | 99  | ARG  | O-C-N      | -5.06 | 116.76      | 122.12   |
| 1   | B     | 89  | CYS  | CA-C-O     | -5.06 | 115.35      | 120.71   |
| 1   | B     | 188 | ASN  | CA-C-N     | -5.06 | 115.85      | 122.37   |
| 1   | B     | 188 | ASN  | C-N-CA     | -5.06 | 115.85      | 122.37   |
| 1   | D     | 216 | ARG  | NE-CZ-NH2  | -5.06 | 114.65      | 119.20   |
| 1   | B     | 312 | GLN  | N-CA-CB    | -5.05 | 101.22      | 109.56   |
| 1   | A     | 76  | VAL  | CA-CB-CG2  | 5.05  | 118.98      | 110.40   |
| 1   | D     | 370 | TYR  | CA-C-O     | -5.05 | 115.20      | 121.11   |
| 1   | A     | 261 | LYS  | N-CA-C     | 5.05  | 116.59      | 111.14   |
| 1   | B     | 391 | VAL  | CA-C-O     | 5.05  | 126.30      | 121.05   |
| 1   | B     | 50  | ARG  | N-CA-C     | 5.02  | 116.83      | 111.36   |

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| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1   | B     | 117 | ILE  | CB-CG1-CD1 | -5.01 | 103.27      | 113.80   |
| 1   | D     | 74  | TRP  | CB-CG-CD2  | 5.01  | 133.81      | 126.80   |
| 1   | D     | 121 | ARG  | O-C-N      | -5.01 | 116.36      | 122.22   |
| 1   | B     | 367 | VAL  | CA-CB-CG1  | 5.01  | 118.91      | 110.40   |
| 1   | D     | 342 | ARG  | N-CA-C     | 5.00  | 117.46      | 109.96   |

There are no chirality outliers.

All (4) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group     |
|-----|-------|-----|------|-----------|
| 1   | A     | 167 | SER  | Peptide   |
| 1   | A     | 239 | PRO  | Mainchain |
| 1   | B     | 167 | SER  | Peptide   |
| 1   | D     | 168 | VAL  | Mainchain |

## 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     | 2754  | 0        | 2709     | 73      | 0            |
| 1   | B     | 2747  | 0        | 2702     | 74      | 1            |
| 1   | C     | 2754  | 0        | 2709     | 88      | 0            |
| 1   | D     | 2754  | 0        | 2709     | 77      | 0            |
| 2   | A     | 7     | 0        | 9        | 0       | 0            |
| 2   | B     | 7     | 0        | 9        | 0       | 0            |
| 2   | C     | 7     | 0        | 9        | 0       | 0            |
| 2   | D     | 7     | 0        | 9        | 0       | 0            |
| 3   | A     | 15    | 0        | 7        | 1       | 0            |
| 3   | B     | 15    | 0        | 7        | 1       | 0            |
| 3   | C     | 15    | 0        | 7        | 2       | 0            |
| 3   | D     | 15    | 0        | 7        | 1       | 0            |
| 4   | A     | 233   | 0        | 0        | 11      | 0            |
| 4   | B     | 212   | 0        | 0        | 11      | 0            |
| 4   | C     | 206   | 0        | 0        | 14      | 1            |
| 4   | D     | 218   | 0        | 0        | 13      | 2            |
| All | All   | 11966 | 0        | 10893    | 301     | 2            |

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 14.

All (301) 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:D:166:LEU:HD13 | 1:D:167:SER:H    | 1.29                     | 0.96              |
| 1:C:117:ILE:HD11 | 1:C:121:ARG:NH2  | 1.88                     | 0.89              |
| 1:B:167:SER:HB2  | 1:B:169:LYS:H    | 1.38                     | 0.85              |
| 1:C:166:LEU:HD13 | 1:C:167:SER:H    | 1.43                     | 0.83              |
| 1:D:406:TYR:HB2  | 4:D:860:HOH:O    | 1.76                     | 0.83              |
| 1:D:192:THR:HG22 | 4:D:834:HOH:O    | 1.79                     | 0.82              |
| 1:B:117:ILE:HD11 | 1:B:121:ARG:NH2  | 1.94                     | 0.82              |
| 1:A:166:LEU:HD13 | 1:A:167:SER:H    | 1.45                     | 0.81              |
| 1:C:200:SER:HA   | 1:C:237:GLY:HA2  | 1.62                     | 0.81              |
| 1:D:42:VAL:HG22  | 4:D:860:HOH:O    | 1.79                     | 0.81              |
| 1:B:166:LEU:HD13 | 1:B:167:SER:H    | 1.46                     | 0.79              |
| 1:A:192:THR:HG22 | 4:A:883:HOH:O    | 1.83                     | 0.79              |
| 1:A:288:VAL:HG13 | 1:A:318:VAL:HB   | 1.64                     | 0.79              |
| 1:A:167:SER:HB2  | 1:A:169:LYS:H    | 1.48                     | 0.78              |
| 1:C:366:ILE:HG22 | 1:C:367:VAL:HG23 | 1.65                     | 0.78              |
| 1:A:185:LYS:HE3  | 1:A:185:LYS:O    | 1.84                     | 0.77              |
| 1:A:157:THR:H    | 1:A:166:LEU:HD12 | 1.50                     | 0.77              |
| 1:C:341:GLN:HG3  | 1:C:380:TRP:HB2  | 1.64                     | 0.76              |
| 1:A:154:ARG:HH21 | 1:A:166:LEU:HD23 | 1.50                     | 0.75              |
| 1:B:185:LYS:HE3  | 1:B:185:LYS:O    | 1.86                     | 0.75              |
| 1:C:185:LYS:HE3  | 1:C:185:LYS:O    | 1.87                     | 0.74              |
| 1:B:341:GLN:HG3  | 1:B:380:TRP:HB2  | 1.70                     | 0.73              |
| 1:D:154:ARG:HH21 | 1:D:166:LEU:HD23 | 1.54                     | 0.73              |
| 1:C:167:SER:HB2  | 4:C:801:HOH:O    | 1.89                     | 0.73              |
| 1:C:73:ASP:HB3   | 1:C:76:VAL:HG13  | 1.71                     | 0.73              |
| 1:D:348:GLU:HG2  | 1:D:350:LEU:HD13 | 1.68                     | 0.73              |
| 1:C:136:VAL:HG12 | 4:C:830:HOH:O    | 1.89                     | 0.72              |
| 1:C:288:VAL:HG13 | 1:C:318:VAL:HB   | 1.70                     | 0.72              |
| 1:C:157:THR:H    | 1:C:166:LEU:HD12 | 1.51                     | 0.72              |
| 1:A:394:THR:HG21 | 4:A:780:HOH:O    | 1.89                     | 0.71              |
| 1:C:117:ILE:HD11 | 1:C:121:ARG:HH22 | 1.55                     | 0.70              |
| 1:A:157:THR:HG21 | 1:A:198:VAL:HA   | 1.73                     | 0.70              |
| 1:B:341:GLN:C    | 1:B:341:GLN:HE21 | 2.00                     | 0.69              |
| 1:D:346:PRO:O    | 1:D:347:ASN:HB2  | 1.92                     | 0.69              |
| 1:A:73:ASP:HB3   | 1:A:76:VAL:HG13  | 1.75                     | 0.69              |
| 1:B:288:VAL:HG13 | 1:B:318:VAL:HB   | 1.75                     | 0.69              |
| 1:A:204:ASP:HA   | 4:A:848:HOH:O    | 1.92                     | 0.68              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:D:157:THR:H    | 1:D:166:LEU:HD12 | 1.59                     | 0.68              |
| 1:D:166:LEU:HD22 | 1:D:167:SER:OG   | 1.93                     | 0.68              |
| 1:D:217:PHE:CD2  | 1:D:221:MET:HE3  | 2.29                     | 0.68              |
| 1:D:85:THR:HG23  | 1:D:86:GLY:O     | 1.94                     | 0.67              |
| 1:B:337:ARG:HH21 | 1:B:337:ARG:HG3  | 1.58                     | 0.67              |
| 1:D:288:VAL:HG13 | 1:D:318:VAL:HB   | 1.77                     | 0.67              |
| 1:D:394:THR:HG21 | 4:D:784:HOH:O    | 1.94                     | 0.66              |
| 1:C:369:ARG:NH2  | 1:C:371:TYR:OH   | 2.28                     | 0.66              |
| 1:A:365:GLN:NE2  | 1:A:368:GLU:HG2  | 2.11                     | 0.65              |
| 1:B:85:THR:HG23  | 1:B:86:GLY:O     | 1.96                     | 0.65              |
| 1:D:136:VAL:HG11 | 4:D:792:HOH:O    | 1.96                     | 0.65              |
| 1:C:117:ILE:HG13 | 1:C:118:SER:N    | 2.12                     | 0.65              |
| 1:C:210:GLN:HG3  | 4:C:855:HOH:O    | 1.97                     | 0.64              |
| 1:C:356:TRP:HH2  | 1:D:168:VAL:HG13 | 1.61                     | 0.64              |
| 1:A:341:GLN:HG3  | 1:A:380:TRP:HB2  | 1.78                     | 0.64              |
| 1:C:394:THR:HG21 | 4:C:764:HOH:O    | 1.97                     | 0.64              |
| 1:B:96:GLN:HG2   | 1:B:122:TYR:OH   | 1.98                     | 0.64              |
| 1:C:345:ILE:HG13 | 1:C:346:PRO:HD2  | 1.80                     | 0.64              |
| 1:C:289:ASN:HD21 | 1:C:378:GLY:HA2  | 1.63                     | 0.63              |
| 1:B:173:LYS:HZ1  | 1:B:174:VAL:H    | 1.47                     | 0.63              |
| 1:C:341:GLN:HE21 | 1:C:341:GLN:C    | 2.06                     | 0.63              |
| 1:A:359:THR:HG23 | 1:A:361:ASP:H    | 1.63                     | 0.63              |
| 1:C:197:HIS:CD2  | 1:C:236:GLY:H    | 2.17                     | 0.63              |
| 1:A:210:GLN:HG3  | 4:A:824:HOH:O    | 1.97                     | 0.63              |
| 1:A:341:GLN:HE21 | 1:A:341:GLN:C    | 2.06                     | 0.63              |
| 1:D:337:ARG:HG3  | 4:D:917:HOH:O    | 1.99                     | 0.63              |
| 1:A:185:LYS:HD3  | 4:A:784:HOH:O    | 1.98                     | 0.62              |
| 1:C:372:LEU:HB3  | 1:C:373:PRO:HD2  | 1.81                     | 0.62              |
| 1:D:157:THR:HG21 | 1:D:198:VAL:HA   | 1.81                     | 0.62              |
| 1:A:230:HIS:HB2  | 1:A:268:LYS:O    | 2.00                     | 0.62              |
| 1:B:198:VAL:HG22 | 1:B:207:THR:HG22 | 1.80                     | 0.62              |
| 1:B:369:ARG:NH2  | 1:B:371:TYR:OH   | 2.32                     | 0.62              |
| 1:C:346:PRO:O    | 1:C:347:ASN:HB2  | 1.99                     | 0.62              |
| 1:D:268:LYS:HE3  | 1:D:268:LYS:HA   | 1.80                     | 0.62              |
| 1:B:346:PRO:O    | 1:B:347:ASN:HB2  | 1.98                     | 0.62              |
| 1:A:200:SER:HA   | 1:A:237:GLY:HA2  | 1.82                     | 0.62              |
| 1:B:167:SER:HB2  | 1:B:169:LYS:N    | 2.12                     | 0.62              |
| 1:D:341:GLN:HG3  | 1:D:380:TRP:HB2  | 1.82                     | 0.62              |
| 1:A:348:GLU:HG2  | 1:A:350:LEU:HD13 | 1.82                     | 0.61              |
| 1:C:107:LYS:NZ   | 4:C:883:HOH:O    | 2.24                     | 0.61              |
| 1:C:319:ASN:HD22 | 1:D:116:GLN:NE2  | 1.98                     | 0.61              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:200:SER:HB3  | 1:B:277:ARG:HE   | 1.66                     | 0.61              |
| 1:B:394:THR:HG21 | 4:B:804:HOH:O    | 2.00                     | 0.60              |
| 1:A:337:ARG:HG3  | 4:A:928:HOH:O    | 2.00                     | 0.60              |
| 1:D:117:ILE:HD11 | 1:D:121:ARG:HH22 | 1.67                     | 0.60              |
| 1:A:200:SER:HB3  | 1:A:277:ARG:HE   | 1.66                     | 0.60              |
| 1:B:73:ASP:HB3   | 1:B:76:VAL:HG13  | 1.84                     | 0.59              |
| 1:B:99:ARG:NE    | 4:B:879:HOH:O    | 2.34                     | 0.59              |
| 1:B:147:PRO:HB3  | 4:B:884:HOH:O    | 2.02                     | 0.59              |
| 1:A:346:PRO:O    | 1:A:347:ASN:HB2  | 2.02                     | 0.59              |
| 1:D:197:HIS:CD2  | 1:D:236:GLY:H    | 2.20                     | 0.59              |
| 1:C:365:GLN:NE2  | 1:C:368:GLU:HG2  | 2.17                     | 0.59              |
| 1:A:345:ILE:HG13 | 1:A:346:PRO:HD2  | 1.84                     | 0.59              |
| 1:D:295:VAL:HG13 | 1:D:314:PHE:CE2  | 2.38                     | 0.59              |
| 1:D:73:ASP:HB3   | 1:D:76:VAL:HG13  | 1.86                     | 0.58              |
| 1:D:167:SER:HB2  | 1:D:169:LYS:H    | 1.69                     | 0.58              |
| 1:C:96:GLN:HG2   | 1:C:122:TYR:OH   | 2.02                     | 0.58              |
| 1:D:71:ASN:HD22  | 1:D:71:ASN:C     | 2.11                     | 0.58              |
| 1:A:154:ARG:HH21 | 1:A:166:LEU:CD2  | 2.16                     | 0.58              |
| 1:A:85:THR:HG23  | 1:A:86:GLY:O     | 2.02                     | 0.57              |
| 1:A:167:SER:HB2  | 1:A:169:LYS:N    | 2.18                     | 0.57              |
| 1:B:247:LYS:HD2  | 4:B:754:HOH:O    | 2.03                     | 0.57              |
| 1:D:200:SER:HB3  | 1:D:277:ARG:HE   | 1.68                     | 0.57              |
| 1:B:200:SER:HA   | 1:B:237:GLY:HA2  | 1.86                     | 0.57              |
| 1:C:71:ASN:C     | 1:C:71:ASN:HD22  | 2.13                     | 0.57              |
| 1:C:144:LYS:HD3  | 1:C:144:LYS:N    | 2.20                     | 0.57              |
| 1:D:365:GLN:NE2  | 1:D:368:GLU:HG2  | 2.20                     | 0.57              |
| 1:B:197:HIS:CD2  | 1:B:236:GLY:H    | 2.22                     | 0.57              |
| 1:B:261:LYS:CE   | 1:B:262:HIS:CE1  | 2.88                     | 0.57              |
| 1:D:96:GLN:HG2   | 1:D:122:TYR:OH   | 2.04                     | 0.56              |
| 1:C:337:ARG:HG3  | 1:C:337:ARG:HH21 | 1.70                     | 0.56              |
| 1:B:156:SER:OG   | 1:B:173:LYS:HD2  | 2.05                     | 0.56              |
| 1:D:366:ILE:HG22 | 1:D:367:VAL:HG23 | 1.88                     | 0.56              |
| 1:D:372:LEU:HB3  | 1:D:373:PRO:HD2  | 1.87                     | 0.56              |
| 1:A:359:THR:CG2  | 1:A:361:ASP:H    | 2.19                     | 0.55              |
| 1:C:90:ALA:HB3   | 1:D:398:ASN:ND2  | 2.21                     | 0.55              |
| 1:A:342:ARG:HG3  | 4:A:733:HOH:O    | 2.05                     | 0.55              |
| 1:D:144:LYS:HD3  | 1:D:144:LYS:N    | 2.22                     | 0.55              |
| 1:A:166:LEU:HD22 | 1:A:167:SER:OG   | 2.07                     | 0.55              |
| 1:A:117:ILE:HD11 | 1:A:121:ARG:HH22 | 1.71                     | 0.55              |
| 1:B:261:LYS:HE3  | 1:B:262:HIS:CE1  | 2.42                     | 0.54              |
| 1:B:289:ASN:ND2  | 4:B:780:HOH:O    | 2.41                     | 0.54              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:359:THR:HB   | 1:B:364:ASP:OD2  | 2.06                     | 0.54              |
| 1:D:173:LYS:HZ2  | 1:D:174:VAL:H    | 1.55                     | 0.54              |
| 1:C:80:LEU:HB3   | 1:C:85:THR:HG21  | 1.90                     | 0.54              |
| 1:A:197:HIS:CD2  | 1:A:236:GLY:H    | 2.25                     | 0.54              |
| 1:B:157:THR:H    | 1:B:166:LEU:HD12 | 1.71                     | 0.54              |
| 1:B:295:VAL:HG13 | 1:B:314:PHE:CE2  | 2.42                     | 0.54              |
| 1:D:216:ARG:HD2  | 1:D:262:HIS:O    | 2.07                     | 0.54              |
| 1:A:241:THR:O    | 1:A:243:ASP:N    | 2.40                     | 0.54              |
| 1:D:197:HIS:HD2  | 1:D:236:GLY:H    | 1.55                     | 0.54              |
| 1:C:359:THR:HG23 | 1:C:361:ASP:H    | 1.72                     | 0.54              |
| 1:A:80:LEU:HB3   | 1:A:85:THR:HG21  | 1.90                     | 0.54              |
| 1:D:242:ARG:HG3  | 4:D:858:HOH:O    | 2.07                     | 0.54              |
| 1:A:90:ALA:HB3   | 1:B:398:ASN:ND2  | 2.23                     | 0.53              |
| 1:C:88:ASP:OD1   | 1:C:111:ALA:HB3  | 2.08                     | 0.53              |
| 1:B:204:ASP:HA   | 4:B:809:HOH:O    | 2.09                     | 0.53              |
| 1:B:274:GLU:O    | 3:B:600:PLP:H6   | 2.08                     | 0.53              |
| 1:B:345:ILE:HG13 | 1:B:346:PRO:HD2  | 1.89                     | 0.53              |
| 1:A:144:LYS:HD3  | 1:A:144:LYS:N    | 2.23                     | 0.53              |
| 1:B:365:GLN:NE2  | 1:B:368:GLU:HG2  | 2.24                     | 0.53              |
| 1:A:217:PHE:CD2  | 1:A:221:MET:HE3  | 2.43                     | 0.53              |
| 1:B:342:ARG:HD3  | 1:B:379:GLU:OE2  | 2.09                     | 0.53              |
| 1:A:372:LEU:HB3  | 1:A:373:PRO:HD2  | 1.89                     | 0.52              |
| 1:B:197:HIS:HD2  | 1:B:236:GLY:H    | 1.56                     | 0.52              |
| 1:D:117:ILE:HD11 | 1:D:121:ARG:NH2  | 2.24                     | 0.52              |
| 1:B:261:LYS:HE2  | 1:B:262:HIS:CE1  | 2.44                     | 0.52              |
| 1:C:99:ARG:NE    | 4:C:829:HOH:O    | 2.42                     | 0.52              |
| 1:B:88:ASP:OD1   | 1:B:111:ALA:HB3  | 2.09                     | 0.52              |
| 1:A:166:LEU:O    | 1:A:167:SER:HB3  | 2.10                     | 0.52              |
| 1:B:136:VAL:HG12 | 4:B:803:HOH:O    | 2.08                     | 0.52              |
| 1:D:369:ARG:NH2  | 1:D:371:TYR:OH   | 2.43                     | 0.52              |
| 1:A:359:THR:HB   | 1:A:364:ASP:OD2  | 2.10                     | 0.51              |
| 1:C:106:GLU:CD   | 1:C:106:GLU:H    | 2.18                     | 0.51              |
| 1:B:289:ASN:HD21 | 1:B:378:GLY:HA2  | 1.74                     | 0.51              |
| 1:C:112:ASN:ND2  | 4:C:884:HOH:O    | 2.43                     | 0.51              |
| 1:D:256:ASN:ND2  | 4:D:722:HOH:O    | 2.44                     | 0.51              |
| 1:B:200:SER:HB3  | 1:B:277:ARG:NE   | 2.25                     | 0.51              |
| 1:B:342:ARG:HG3  | 4:B:781:HOH:O    | 2.09                     | 0.51              |
| 1:C:85:THR:HG23  | 1:C:86:GLY:O     | 2.09                     | 0.51              |
| 1:C:197:HIS:HD2  | 1:C:236:GLY:H    | 1.57                     | 0.51              |
| 1:D:157:THR:H    | 1:D:166:LEU:CD1  | 2.24                     | 0.51              |
| 1:B:198:VAL:HG13 | 1:B:207:THR:HG21 | 1.93                     | 0.51              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:D:274:GLU:O    | 3:D:600:PLP:H6   | 2.11                     | 0.51              |
| 1:C:356:TRP:CH2  | 1:D:168:VAL:HG13 | 2.45                     | 0.50              |
| 1:A:175:GLU:CD   | 1:A:175:GLU:H    | 2.19                     | 0.50              |
| 1:A:295:VAL:HG13 | 1:A:314:PHE:CE2  | 2.47                     | 0.49              |
| 1:B:154:ARG:HH21 | 1:B:166:LEU:CD2  | 2.25                     | 0.49              |
| 1:C:337:ARG:NE   | 4:C:902:HOH:O    | 2.39                     | 0.49              |
| 1:B:157:THR:HG21 | 1:B:198:VAL:HA   | 1.94                     | 0.49              |
| 1:C:289:ASN:ND2  | 4:C:832:HOH:O    | 2.45                     | 0.49              |
| 1:D:71:ASN:HD22  | 1:D:73:ASP:H     | 1.59                     | 0.49              |
| 1:B:112:ASN:C    | 1:B:112:ASN:HD22 | 2.19                     | 0.49              |
| 1:C:157:THR:N    | 1:C:166:LEU:HD12 | 2.22                     | 0.49              |
| 1:A:274:GLU:O    | 3:A:600:PLP:H6   | 2.13                     | 0.49              |
| 1:A:311:ALA:O    | 1:A:312:GLN:C    | 2.56                     | 0.49              |
| 1:B:121:ARG:HD2  | 4:B:882:HOH:O    | 2.13                     | 0.49              |
| 1:C:185:LYS:HE3  | 1:C:185:LYS:C    | 2.37                     | 0.49              |
| 1:C:121:ARG:NH1  | 4:C:885:HOH:O    | 2.35                     | 0.48              |
| 1:B:337:ARG:HH21 | 1:B:337:ARG:CG   | 2.24                     | 0.48              |
| 1:C:342:ARG:NH1  | 1:C:379:GLU:OE1  | 2.46                     | 0.48              |
| 1:D:71:ASN:ND2   | 1:D:73:ASP:H     | 2.12                     | 0.48              |
| 1:A:136:VAL:HG11 | 4:A:813:HOH:O    | 2.14                     | 0.48              |
| 1:C:167:SER:HB2  | 1:C:169:LYS:H    | 1.79                     | 0.48              |
| 1:C:247:LYS:HE2  | 1:C:250:GLU:OE2  | 2.14                     | 0.48              |
| 1:B:359:THR:HG23 | 1:B:361:ASP:H    | 1.79                     | 0.48              |
| 1:A:117:ILE:HD11 | 1:A:121:ARG:NH2  | 2.28                     | 0.48              |
| 1:D:80:LEU:HB3   | 1:D:85:THR:HG21  | 1.96                     | 0.48              |
| 1:C:113:PRO:HG2  | 1:C:170:PHE:CD2  | 2.49                     | 0.47              |
| 1:D:154:ARG:HH21 | 1:D:166:LEU:CD2  | 2.24                     | 0.47              |
| 1:D:200:SER:HA   | 1:D:237:GLY:HA2  | 1.96                     | 0.47              |
| 1:D:343:GLU:OE2  | 1:D:344:PRO:HD2  | 2.14                     | 0.47              |
| 1:A:296:THR:HG23 | 4:A:882:HOH:O    | 2.13                     | 0.47              |
| 1:A:366:ILE:HG22 | 1:A:367:VAL:HG23 | 1.95                     | 0.47              |
| 1:C:156:SER:OG   | 1:C:173:LYS:HD2  | 2.15                     | 0.47              |
| 1:C:316:TYR:CE2  | 1:C:375:MET:HB2  | 2.49                     | 0.47              |
| 1:C:342:ARG:HG3  | 4:C:795:HOH:O    | 2.15                     | 0.47              |
| 1:B:166:LEU:HD22 | 1:B:167:SER:OG   | 2.15                     | 0.47              |
| 1:A:345:ILE:CG1  | 1:A:346:PRO:HD2  | 2.44                     | 0.47              |
| 1:D:47:ASP:OD2   | 1:D:282:SER:HB2  | 2.15                     | 0.47              |
| 1:A:71:ASN:HD22  | 1:A:73:ASP:H     | 1.61                     | 0.47              |
| 1:A:90:ALA:CB    | 1:B:398:ASN:ND2  | 2.78                     | 0.47              |
| 1:B:391:VAL:O    | 1:B:394:THR:HG23 | 2.15                     | 0.47              |
| 1:C:294:LYS:HB2  | 1:C:315:MET:HB2  | 1.97                     | 0.47              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:112:ASN:C    | 1:A:112:ASN:HD22 | 2.23                     | 0.46              |
| 1:D:107:LYS:NZ   | 4:D:902:HOH:O    | 2.38                     | 0.46              |
| 1:D:230:HIS:HB2  | 1:D:268:LYS:O    | 2.15                     | 0.46              |
| 1:B:144:LYS:HD3  | 1:B:144:LYS:N    | 2.30                     | 0.46              |
| 1:C:341:GLN:HE21 | 1:C:342:ARG:N    | 2.13                     | 0.46              |
| 1:A:341:GLN:C    | 1:A:341:GLN:NE2  | 2.74                     | 0.46              |
| 1:B:80:LEU:HB3   | 1:B:85:THR:HG21  | 1.97                     | 0.46              |
| 1:D:268:LYS:HE3  | 1:D:268:LYS:CA   | 2.43                     | 0.46              |
| 1:A:289:ASN:HD21 | 1:A:378:GLY:HA2  | 1.80                     | 0.46              |
| 1:C:274:GLU:O    | 3:C:600:PLP:H6   | 2.16                     | 0.46              |
| 1:B:337:ARG:CG   | 1:B:337:ARG:NH2  | 2.77                     | 0.46              |
| 1:C:319:ASN:HD22 | 1:D:116:GLN:HE22 | 1.63                     | 0.46              |
| 1:C:398:ASN:ND2  | 1:D:90:ALA:HB3   | 2.31                     | 0.46              |
| 1:D:133:PHE:CE1  | 1:D:139:LEU:HD11 | 2.51                     | 0.46              |
| 1:D:359:THR:HB   | 1:D:364:ASP:OD2  | 2.15                     | 0.46              |
| 1:A:293:LYS:HE2  | 1:A:375:MET:O    | 2.16                     | 0.46              |
| 1:D:359:THR:HG23 | 1:D:361:ASP:H    | 1.81                     | 0.46              |
| 1:A:166:LEU:HD13 | 1:A:167:SER:N    | 2.23                     | 0.45              |
| 1:A:398:ASN:ND2  | 1:B:90:ALA:HB3   | 2.32                     | 0.45              |
| 1:A:112:ASN:ND2  | 4:A:913:HOH:O    | 2.48                     | 0.45              |
| 1:D:166:LEU:HD13 | 1:D:167:SER:N    | 2.12                     | 0.45              |
| 1:A:157:THR:N    | 1:A:166:LEU:HD12 | 2.25                     | 0.45              |
| 1:B:337:ARG:HG3  | 1:B:337:ARG:NH2  | 2.29                     | 0.45              |
| 1:B:106:GLU:CD   | 1:B:106:GLU:H    | 2.25                     | 0.45              |
| 1:D:293:LYS:HE2  | 1:D:375:MET:O    | 2.16                     | 0.45              |
| 1:C:256:ASN:ND2  | 4:C:733:HOH:O    | 2.42                     | 0.45              |
| 1:C:217:PHE:CD2  | 1:C:221:MET:HE3  | 2.51                     | 0.45              |
| 1:A:156:SER:HA   | 1:A:166:LEU:HD11 | 1.99                     | 0.45              |
| 1:D:185:LYS:HA   | 1:D:185:LYS:HD2  | 1.88                     | 0.45              |
| 1:D:345:ILE:HA   | 1:D:346:PRO:HD3  | 1.84                     | 0.45              |
| 1:D:347:ASN:O    | 1:D:348:GLU:C    | 2.60                     | 0.45              |
| 1:B:71:ASN:C     | 1:B:71:ASN:HD22  | 2.25                     | 0.45              |
| 1:A:98:VAL:CG2   | 1:A:108:ILE:HD11 | 2.47                     | 0.45              |
| 1:A:128:VAL:O    | 1:A:146:HIS:HE1  | 2.00                     | 0.45              |
| 1:C:166:LEU:HB2  | 1:C:197:HIS:O    | 2.17                     | 0.45              |
| 1:C:269:LEU:HD21 | 1:C:271:ILE:HD11 | 1.99                     | 0.44              |
| 1:C:349:LYS:HD3  | 1:C:350:LEU:H    | 1.82                     | 0.44              |
| 1:C:173:LYS:HD2  | 1:C:173:LYS:HA   | 1.82                     | 0.44              |
| 1:C:50:ARG:HG3   | 4:C:874:HOH:O    | 2.17                     | 0.44              |
| 1:C:154:ARG:HH21 | 1:C:166:LEU:CD2  | 2.31                     | 0.44              |
| 1:D:92:ASN:OD1   | 1:D:92:ASN:N     | 2.50                     | 0.44              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:D:112:ASN:ND2  | 4:D:831:HOH:O    | 2.50                     | 0.44              |
| 1:A:166:LEU:O    | 1:A:167:SER:CB   | 2.64                     | 0.44              |
| 1:C:38:ASP:HB3   | 1:C:39:PRO:HD2   | 1.98                     | 0.44              |
| 1:A:96:GLN:HG2   | 1:A:122:TYR:OH   | 2.18                     | 0.44              |
| 1:D:260:GLU:HG3  | 4:D:810:HOH:O    | 2.18                     | 0.44              |
| 1:A:319:ASN:HD22 | 1:B:116:GLN:NE2  | 2.15                     | 0.44              |
| 1:C:116:GLN:NE2  | 1:D:319:ASN:HD22 | 2.16                     | 0.43              |
| 1:C:230:HIS:HB2  | 1:C:268:LYS:O    | 2.19                     | 0.43              |
| 1:C:295:VAL:HG13 | 1:C:314:PHE:CE2  | 2.54                     | 0.43              |
| 1:C:359:THR:HB   | 1:C:364:ASP:OD2  | 2.18                     | 0.43              |
| 1:C:371:TYR:HB2  | 4:C:774:HOH:O    | 2.18                     | 0.43              |
| 1:C:99:ARG:O     | 1:C:100:GLY:C    | 2.61                     | 0.43              |
| 1:D:341:GLN:C    | 1:D:341:GLN:HE21 | 2.26                     | 0.43              |
| 1:C:343:GLU:HA   | 1:C:344:PRO:HD3  | 1.90                     | 0.43              |
| 1:A:217:PHE:HD2  | 1:A:221:MET:HE3  | 1.83                     | 0.43              |
| 1:D:146:HIS:HD2  | 4:D:733:HOH:O    | 2.01                     | 0.43              |
| 1:A:341:GLN:HE21 | 1:A:342:ARG:N    | 2.17                     | 0.43              |
| 1:B:195:SER:HA   | 1:B:233:ASP:O    | 2.19                     | 0.43              |
| 1:B:349:LYS:HD3  | 1:B:350:LEU:H    | 1.84                     | 0.43              |
| 1:A:402:SER:HA   | 1:A:403:PRO:HD3  | 1.87                     | 0.42              |
| 1:C:311:ALA:O    | 1:C:312:GLN:C    | 2.62                     | 0.42              |
| 1:B:341:GLN:HE21 | 1:B:342:ARG:N    | 2.18                     | 0.42              |
| 1:C:200:SER:OG   | 3:C:600:PLP:O1P  | 2.28                     | 0.42              |
| 1:D:311:ALA:O    | 1:D:312:GLN:C    | 2.61                     | 0.42              |
| 1:B:247:LYS:HE2  | 1:B:250:GLU:OE2  | 2.18                     | 0.42              |
| 1:A:241:THR:C    | 1:A:243:ASP:H    | 2.28                     | 0.42              |
| 1:C:200:SER:HB3  | 1:C:277:ARG:HE   | 1.85                     | 0.42              |
| 1:A:264:PRO:HD2  | 4:A:840:HOH:O    | 2.20                     | 0.42              |
| 1:B:92:ASN:ND2   | 4:B:805:HOH:O    | 2.51                     | 0.42              |
| 1:C:166:LEU:HD22 | 1:C:167:SER:OG   | 2.18                     | 0.42              |
| 1:C:402:SER:HA   | 1:C:403:PRO:HD3  | 1.89                     | 0.42              |
| 1:C:185:LYS:HA   | 1:C:185:LYS:HD2  | 1.83                     | 0.42              |
| 1:D:262:HIS:HD2  | 4:D:757:HOH:O    | 2.03                     | 0.42              |
| 1:A:268:LYS:HE3  | 1:A:268:LYS:HA   | 2.02                     | 0.41              |
| 1:B:154:ARG:HH21 | 1:B:166:LEU:HD21 | 1.86                     | 0.41              |
| 1:D:128:VAL:O    | 1:D:146:HIS:HE1  | 2.03                     | 0.41              |
| 1:B:140:GLU:O    | 1:B:144:LYS:HD3  | 2.20                     | 0.41              |
| 1:B:256:ASN:ND2  | 4:B:731:HOH:O    | 2.49                     | 0.41              |
| 1:D:402:SER:HA   | 1:D:403:PRO:HD3  | 1.88                     | 0.41              |
| 1:B:215:SER:O    | 1:B:219:PHE:HB2  | 2.20                     | 0.41              |
| 1:B:372:LEU:HB3  | 1:B:373:PRO:HD2  | 2.03                     | 0.41              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:D:121:ARG:HG3  | 1:D:124:ARG:NH2  | 2.35                     | 0.41              |
| 1:C:112:ASN:C    | 1:C:112:ASN:HD22 | 2.29                     | 0.41              |
| 1:B:166:LEU:O    | 1:B:167:SER:HB3  | 2.21                     | 0.41              |
| 1:C:117:ILE:CD1  | 1:C:121:ARG:NH2  | 2.73                     | 0.41              |
| 1:C:195:SER:HB3  | 1:C:233:ASP:HB3  | 2.02                     | 0.41              |
| 1:D:44:ASP:OD1   | 1:D:410:SER:HB2  | 2.21                     | 0.41              |
| 1:B:341:GLN:C    | 1:B:341:GLN:NE2  | 2.73                     | 0.41              |
| 1:C:144:LYS:HD3  | 1:C:144:LYS:H    | 1.82                     | 0.41              |
| 1:A:106:GLU:H    | 1:A:106:GLU:CD   | 2.29                     | 0.41              |
| 1:D:348:GLU:HG2  | 1:D:350:LEU:CD1  | 2.46                     | 0.41              |
| 1:C:337:ARG:HH21 | 1:C:337:ARG:CG   | 2.33                     | 0.41              |
| 1:C:173:LYS:NZ   | 1:C:174:VAL:H    | 2.18                     | 0.40              |
| 1:B:230:HIS:HB2  | 1:B:268:LYS:O    | 2.20                     | 0.40              |
| 1:C:133:PHE:CE1  | 1:C:139:LEU:HD11 | 2.56                     | 0.40              |
| 1:A:247:LYS:HE2  | 1:A:247:LYS:HB2  | 1.91                     | 0.40              |
| 1:D:256:ASN:HD22 | 1:D:256:ASN:HA   | 1.70                     | 0.40              |
| 1:C:249:GLU:H    | 1:C:249:GLU:CD   | 2.29                     | 0.40              |
| 1:C:280:VAL:O    | 1:C:281:ALA:C    | 2.64                     | 0.40              |

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

| Atom-1         | Atom-2               | Interatomic distance (Å) | Clash overlap (Å) |
|----------------|----------------------|--------------------------|-------------------|
| 4:C:862:HOH:O  | 4:D:849:HOH:O[2_556] | 2.00                     | 0.20              |
| 1:B:261:LYS:CD | 4:D:912:HOH:O[2_545] | 2.16                     | 0.04              |

## 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     | 347/425 (82%) | 328 (94%) | 17 (5%) | 2 (1%)   | <b>21</b> <b>17</b> |

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| Mol | Chain | Analysed        | Favoured   | Allowed | Outliers | Percentiles |    |
|-----|-------|-----------------|------------|---------|----------|-------------|----|
| 1   | B     | 346/425 (81%)   | 329 (95%)  | 16 (5%) | 1 (0%)   | 36          | 35 |
| 1   | C     | 347/425 (82%)   | 330 (95%)  | 16 (5%) | 1 (0%)   | 36          | 35 |
| 1   | D     | 347/425 (82%)   | 334 (96%)  | 12 (4%) | 1 (0%)   | 36          | 35 |
| All | All   | 1387/1700 (82%) | 1321 (95%) | 61 (4%) | 5 (0%)   | 30          | 27 |

All (5) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 242 | ARG  |
| 1   | D     | 242 | ARG  |
| 1   | C     | 242 | ARG  |
| 1   | A     | 201 | GLY  |
| 1   | B     | 201 | 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 |   |
|-----|-------|-----------------|------------|-----------|-------------|---|
| 1   | A     | 299/361 (83%)   | 253 (85%)  | 46 (15%)  | 2           | 1 |
| 1   | B     | 298/361 (82%)   | 254 (85%)  | 44 (15%)  | 3           | 1 |
| 1   | C     | 299/361 (83%)   | 256 (86%)  | 43 (14%)  | 3           | 2 |
| 1   | D     | 299/361 (83%)   | 256 (86%)  | 43 (14%)  | 3           | 2 |
| All | All   | 1195/1444 (83%) | 1019 (85%) | 176 (15%) | 3           | 2 |

All (176) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 68  | VAL  |
| 1   | A     | 71  | ASN  |
| 1   | A     | 74  | TRP  |
| 1   | A     | 75  | ARG  |
| 1   | A     | 76  | VAL  |
| 1   | A     | 85  | THR  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 98  | VAL  |
| 1   | A     | 112 | ASN  |
| 1   | A     | 117 | ILE  |
| 1   | A     | 137 | ASP  |
| 1   | A     | 144 | LYS  |
| 1   | A     | 150 | LYS  |
| 1   | A     | 157 | THR  |
| 1   | A     | 166 | LEU  |
| 1   | A     | 173 | LYS  |
| 1   | A     | 174 | VAL  |
| 1   | A     | 185 | LYS  |
| 1   | A     | 200 | SER  |
| 1   | A     | 206 | SER  |
| 1   | A     | 219 | PHE  |
| 1   | A     | 250 | GLU  |
| 1   | A     | 259 | LEU  |
| 1   | A     | 260 | GLU  |
| 1   | A     | 268 | LYS  |
| 1   | A     | 272 | VAL  |
| 1   | A     | 288 | VAL  |
| 1   | A     | 290 | VAL  |
| 1   | A     | 293 | LYS  |
| 1   | A     | 296 | THR  |
| 1   | A     | 297 | PRO  |
| 1   | A     | 312 | GLN  |
| 1   | A     | 330 | LEU  |
| 1   | A     | 339 | LEU  |
| 1   | A     | 341 | GLN  |
| 1   | A     | 343 | GLU  |
| 1   | A     | 345 | ILE  |
| 1   | A     | 348 | GLU  |
| 1   | A     | 350 | LEU  |
| 1   | A     | 355 | VAL  |
| 1   | A     | 359 | THR  |
| 1   | A     | 363 | LEU  |
| 1   | A     | 368 | GLU  |
| 1   | A     | 369 | ARG  |
| 1   | A     | 398 | ASN  |
| 1   | A     | 401 | GLN  |
| 1   | A     | 410 | SER  |
| 1   | B     | 68  | VAL  |
| 1   | B     | 71  | ASN  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | B     | 74  | TRP  |
| 1   | B     | 75  | ARG  |
| 1   | B     | 76  | VAL  |
| 1   | B     | 85  | THR  |
| 1   | B     | 98  | VAL  |
| 1   | B     | 112 | ASN  |
| 1   | B     | 117 | ILE  |
| 1   | B     | 137 | ASP  |
| 1   | B     | 150 | LYS  |
| 1   | B     | 157 | THR  |
| 1   | B     | 166 | LEU  |
| 1   | B     | 168 | VAL  |
| 1   | B     | 173 | LYS  |
| 1   | B     | 174 | VAL  |
| 1   | B     | 185 | LYS  |
| 1   | B     | 204 | ASP  |
| 1   | B     | 213 | SER  |
| 1   | B     | 247 | LYS  |
| 1   | B     | 259 | LEU  |
| 1   | B     | 260 | GLU  |
| 1   | B     | 268 | LYS  |
| 1   | B     | 271 | ILE  |
| 1   | B     | 272 | VAL  |
| 1   | B     | 288 | VAL  |
| 1   | B     | 290 | VAL  |
| 1   | B     | 296 | THR  |
| 1   | B     | 312 | GLN  |
| 1   | B     | 330 | LEU  |
| 1   | B     | 341 | GLN  |
| 1   | B     | 343 | GLU  |
| 1   | B     | 345 | ILE  |
| 1   | B     | 348 | GLU  |
| 1   | B     | 353 | SER  |
| 1   | B     | 355 | VAL  |
| 1   | B     | 359 | THR  |
| 1   | B     | 363 | LEU  |
| 1   | B     | 367 | VAL  |
| 1   | B     | 368 | GLU  |
| 1   | B     | 398 | ASN  |
| 1   | B     | 401 | GLN  |
| 1   | B     | 409 | VAL  |
| 1   | B     | 410 | SER  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | C     | 68  | VAL  |
| 1   | C     | 71  | ASN  |
| 1   | C     | 74  | TRP  |
| 1   | C     | 75  | ARG  |
| 1   | C     | 76  | VAL  |
| 1   | C     | 85  | THR  |
| 1   | C     | 98  | VAL  |
| 1   | C     | 112 | ASN  |
| 1   | C     | 117 | ILE  |
| 1   | C     | 137 | ASP  |
| 1   | C     | 150 | LYS  |
| 1   | C     | 157 | THR  |
| 1   | C     | 166 | LEU  |
| 1   | C     | 168 | VAL  |
| 1   | C     | 173 | LYS  |
| 1   | C     | 174 | VAL  |
| 1   | C     | 185 | LYS  |
| 1   | C     | 206 | SER  |
| 1   | C     | 250 | GLU  |
| 1   | C     | 259 | LEU  |
| 1   | C     | 260 | GLU  |
| 1   | C     | 266 | ASP  |
| 1   | C     | 268 | LYS  |
| 1   | C     | 272 | VAL  |
| 1   | C     | 288 | VAL  |
| 1   | C     | 290 | VAL  |
| 1   | C     | 293 | LYS  |
| 1   | C     | 296 | THR  |
| 1   | C     | 312 | GLN  |
| 1   | C     | 341 | GLN  |
| 1   | C     | 342 | ARG  |
| 1   | C     | 345 | ILE  |
| 1   | C     | 348 | GLU  |
| 1   | C     | 350 | LEU  |
| 1   | C     | 353 | SER  |
| 1   | C     | 355 | VAL  |
| 1   | C     | 359 | THR  |
| 1   | C     | 363 | LEU  |
| 1   | C     | 368 | GLU  |
| 1   | C     | 373 | PRO  |
| 1   | C     | 398 | ASN  |
| 1   | C     | 401 | GLN  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | C     | 410 | SER  |
| 1   | D     | 68  | VAL  |
| 1   | D     | 71  | ASN  |
| 1   | D     | 74  | TRP  |
| 1   | D     | 75  | ARG  |
| 1   | D     | 76  | VAL  |
| 1   | D     | 85  | THR  |
| 1   | D     | 112 | ASN  |
| 1   | D     | 117 | ILE  |
| 1   | D     | 137 | ASP  |
| 1   | D     | 144 | LYS  |
| 1   | D     | 150 | LYS  |
| 1   | D     | 157 | THR  |
| 1   | D     | 166 | LEU  |
| 1   | D     | 173 | LYS  |
| 1   | D     | 174 | VAL  |
| 1   | D     | 185 | LYS  |
| 1   | D     | 200 | SER  |
| 1   | D     | 219 | PHE  |
| 1   | D     | 243 | ASP  |
| 1   | D     | 250 | GLU  |
| 1   | D     | 259 | LEU  |
| 1   | D     | 260 | GLU  |
| 1   | D     | 268 | LYS  |
| 1   | D     | 271 | ILE  |
| 1   | D     | 272 | VAL  |
| 1   | D     | 288 | VAL  |
| 1   | D     | 290 | VAL  |
| 1   | D     | 295 | VAL  |
| 1   | D     | 296 | THR  |
| 1   | D     | 312 | GLN  |
| 1   | D     | 330 | LEU  |
| 1   | D     | 341 | GLN  |
| 1   | D     | 345 | ILE  |
| 1   | D     | 348 | GLU  |
| 1   | D     | 350 | LEU  |
| 1   | D     | 355 | VAL  |
| 1   | D     | 359 | THR  |
| 1   | D     | 363 | LEU  |
| 1   | D     | 368 | GLU  |
| 1   | D     | 369 | ARG  |
| 1   | D     | 398 | ASN  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | D     | 401 | GLN  |
| 1   | D     | 410 | SER  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (47) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 71  | ASN  |
| 1   | A     | 112 | ASN  |
| 1   | A     | 116 | GLN  |
| 1   | A     | 119 | HIS  |
| 1   | A     | 146 | HIS  |
| 1   | A     | 197 | HIS  |
| 1   | A     | 256 | ASN  |
| 1   | A     | 262 | HIS  |
| 1   | A     | 289 | ASN  |
| 1   | A     | 341 | GLN  |
| 1   | A     | 376 | GLN  |
| 1   | A     | 398 | ASN  |
| 1   | B     | 71  | ASN  |
| 1   | B     | 112 | ASN  |
| 1   | B     | 116 | GLN  |
| 1   | B     | 188 | ASN  |
| 1   | B     | 197 | HIS  |
| 1   | B     | 210 | GLN  |
| 1   | B     | 256 | ASN  |
| 1   | B     | 262 | HIS  |
| 1   | B     | 289 | ASN  |
| 1   | B     | 312 | GLN  |
| 1   | B     | 327 | ASN  |
| 1   | B     | 341 | GLN  |
| 1   | B     | 365 | GLN  |
| 1   | B     | 398 | ASN  |
| 1   | C     | 71  | ASN  |
| 1   | C     | 112 | ASN  |
| 1   | C     | 116 | GLN  |
| 1   | C     | 119 | HIS  |
| 1   | C     | 197 | HIS  |
| 1   | C     | 210 | GLN  |
| 1   | C     | 256 | ASN  |
| 1   | C     | 289 | ASN  |
| 1   | C     | 312 | GLN  |
| 1   | C     | 341 | GLN  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | C     | 398 | ASN  |
| 1   | D     | 71  | ASN  |
| 1   | D     | 112 | ASN  |
| 1   | D     | 116 | GLN  |
| 1   | D     | 146 | HIS  |
| 1   | D     | 197 | HIS  |
| 1   | D     | 210 | GLN  |
| 1   | D     | 256 | ASN  |
| 1   | D     | 289 | ASN  |
| 1   | D     | 341 | GLN  |
| 1   | D     | 376 | GLN  |

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

8 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 | $\# Z  > 2$ |
| 2   | DMO  | B     | 700 | 1,3  | 6,6,11       | 0.44 | 0           | 6,6,15      | 2.62 | 3 (50%)     |
| 3   | PLP  | A     | 600 | 2    | 15,15,16     | 3.16 | 5 (33%)     | 21,22,23    | 2.41 | 8 (38%)     |

| Mol | Type | Chain | Res | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|-----|------|--------------|------|----------|-------------|------|----------|
|     |      |       |     |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 2   | DMO  | C     | 700 | 3,1  | 6,6,11       | 0.50 | 0        | 6,6,15      | 2.70 | 3 (50%)  |
| 3   | PLP  | C     | 600 | 2    | 15,15,16     | 3.09 | 6 (40%)  | 21,22,23    | 2.33 | 9 (42%)  |
| 2   | DMO  | D     | 700 | 1,3  | 6,6,11       | 0.79 | 0        | 6,6,15      | 2.93 | 3 (50%)  |
| 3   | PLP  | D     | 600 | 2    | 15,15,16     | 2.94 | 4 (26%)  | 21,22,23    | 2.61 | 11 (52%) |
| 2   | DMO  | A     | 700 | 3,1  | 6,6,11       | 0.47 | 0        | 6,6,15      | 2.46 | 4 (66%)  |
| 3   | PLP  | B     | 600 | 2    | 15,15,16     | 3.49 | 6 (40%)  | 21,22,23    | 2.14 | 9 (42%)  |

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   |
|-----|------|-------|-----|------|---------|----------|---------|
| 2   | DMO  | B     | 700 | 1,3  | -       | 1/4/4/17 | -       |
| 3   | PLP  | A     | 600 | 2    | -       | 0/6/6/8  | 0/1/1/1 |
| 2   | DMO  | C     | 700 | 3,1  | -       | 2/4/4/17 | -       |
| 3   | PLP  | C     | 600 | 2    | -       | 0/6/6/8  | 0/1/1/1 |
| 2   | DMO  | D     | 700 | 1,3  | -       | 1/4/4/17 | -       |
| 3   | PLP  | D     | 600 | 2    | -       | 0/6/6/8  | 0/1/1/1 |
| 2   | DMO  | A     | 700 | 3,1  | -       | 2/4/4/17 | -       |
| 3   | PLP  | B     | 600 | 2    | -       | 0/6/6/8  | 0/1/1/1 |

All (21) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms  | Z     | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|--------|-------|-------------|----------|
| 3   | B     | 600 | PLP  | C5-C4  | 10.16 | 1.52        | 1.40     |
| 3   | A     | 600 | PLP  | C5-C4  | 9.19  | 1.50        | 1.40     |
| 3   | C     | 600 | PLP  | C5-C4  | 8.77  | 1.50        | 1.40     |
| 3   | D     | 600 | PLP  | C5-C4  | 7.75  | 1.49        | 1.40     |
| 3   | B     | 600 | PLP  | C4A-C4 | 5.80  | 1.63        | 1.51     |
| 3   | D     | 600 | PLP  | C4A-C4 | 5.75  | 1.63        | 1.51     |
| 3   | A     | 600 | PLP  | C4A-C4 | 5.42  | 1.62        | 1.51     |
| 3   | C     | 600 | PLP  | C4A-C4 | 5.17  | 1.61        | 1.51     |
| 3   | D     | 600 | PLP  | P-O4P  | 4.18  | 1.73        | 1.60     |
| 3   | B     | 600 | PLP  | C3-C2  | 3.66  | 1.44        | 1.41     |
| 3   | C     | 600 | PLP  | P-O4P  | 3.23  | 1.70        | 1.60     |
| 3   | A     | 600 | PLP  | P-O4P  | 3.04  | 1.69        | 1.60     |
| 3   | B     | 600 | PLP  | O3-C3  | 2.92  | 1.43        | 1.36     |
| 3   | B     | 600 | PLP  | P-O4P  | 2.80  | 1.69        | 1.60     |
| 3   | C     | 600 | PLP  | O3-C3  | 2.58  | 1.42        | 1.36     |

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| Mol | Chain | Res | Type | Atoms  | Z     | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|--------|-------|-------------|----------|
| 3   | C     | 600 | PLP  | C3-C2  | 2.34  | 1.43        | 1.41     |
| 3   | B     | 600 | PLP  | C6-C5  | -2.31 | 1.33        | 1.37     |
| 3   | D     | 600 | PLP  | C6-C5  | -2.18 | 1.33        | 1.37     |
| 3   | A     | 600 | PLP  | O3-C3  | 2.16  | 1.41        | 1.36     |
| 3   | C     | 600 | PLP  | C5A-C5 | 2.16  | 1.56        | 1.50     |
| 3   | A     | 600 | PLP  | C6-C5  | -2.03 | 1.33        | 1.37     |

All (50) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms       | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|-------|-------------|----------|
| 3   | D     | 600 | PLP  | C2A-C2-C3   | -6.01 | 113.76      | 120.80   |
| 3   | A     | 600 | PLP  | C2A-C2-C3   | -5.65 | 114.19      | 120.80   |
| 3   | C     | 600 | PLP  | C2A-C2-C3   | -5.48 | 114.38      | 120.80   |
| 2   | C     | 700 | DMO  | CO-CAO-CBO  | 5.13  | 126.84      | 111.99   |
| 2   | B     | 700 | DMO  | CO-CAO-CBO  | 5.00  | 126.46      | 111.99   |
| 3   | C     | 600 | PLP  | C2A-C2-N1   | 4.88  | 126.84      | 117.64   |
| 3   | B     | 600 | PLP  | C6-C5-C4    | 4.77  | 122.01      | 118.10   |
| 2   | D     | 700 | DMO  | CO-CAO-CBO  | 4.73  | 125.69      | 111.99   |
| 3   | D     | 600 | PLP  | C2A-C2-N1   | 4.58  | 126.27      | 117.64   |
| 3   | D     | 600 | PLP  | C6-C5-C4    | 4.10  | 121.45      | 118.10   |
| 3   | A     | 600 | PLP  | C4A-C4-C5   | 4.07  | 125.14      | 120.94   |
| 2   | D     | 700 | DMO  | CGO-CBO-CAO | 3.99  | 128.02      | 113.40   |
| 3   | A     | 600 | PLP  | C6-C5-C4    | 3.90  | 121.30      | 118.10   |
| 2   | A     | 700 | DMO  | CO-CAO-CBO  | 3.89  | 123.24      | 111.99   |
| 3   | B     | 600 | PLP  | O3-C3-C4    | 3.85  | 128.14      | 118.10   |
| 3   | A     | 600 | PLP  | C2A-C2-N1   | 3.74  | 124.68      | 117.64   |
| 3   | D     | 600 | PLP  | C4A-C4-C5   | 3.69  | 124.75      | 120.94   |
| 3   | A     | 600 | PLP  | O4P-P-O1P   | -3.31 | 97.49       | 106.44   |
| 2   | D     | 700 | DMO  | CBO-CAO-NO  | 3.11  | 117.71      | 108.68   |
| 3   | D     | 600 | PLP  | O4P-P-O1P   | -3.06 | 98.17       | 106.44   |
| 2   | A     | 700 | DMO  | CBO-CAO-NO  | 3.05  | 117.55      | 108.68   |
| 3   | C     | 600 | PLP  | O2P-P-O4P   | -3.05 | 98.72       | 106.67   |
| 3   | B     | 600 | PLP  | C6-N1-C2    | 3.00  | 124.64      | 119.20   |
| 3   | B     | 600 | PLP  | C5-C6-N1    | -2.95 | 119.04      | 123.83   |
| 3   | C     | 600 | PLP  | C6-N1-C2    | 2.81  | 124.29      | 119.20   |
| 3   | D     | 600 | PLP  | O3-C3-C4    | 2.79  | 125.39      | 118.10   |
| 3   | C     | 600 | PLP  | C4A-C4-C5   | 2.65  | 123.67      | 120.94   |
| 2   | A     | 700 | DMO  | CGO-CBO-CAO | 2.60  | 122.93      | 113.40   |
| 2   | C     | 700 | DMO  | CGO-CBO-CAO | 2.60  | 122.92      | 113.40   |
| 3   | C     | 600 | PLP  | O3-C3-C4    | 2.60  | 124.87      | 118.10   |
| 3   | C     | 600 | PLP  | O3P-P-O4P   | 2.59  | 113.41      | 106.67   |
| 3   | B     | 600 | PLP  | C2A-C2-N1   | 2.59  | 122.52      | 117.64   |

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| Mol | Chain | Res | Type | Atoms       | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|-------|-------------|----------|
| 3   | B     | 600 | PLP  | O4P-C5A-C5  | -2.53 | 104.60      | 109.36   |
| 2   | B     | 700 | DMO  | CGO-CBO-CAO | 2.51  | 122.59      | 113.40   |
| 2   | C     | 700 | DMO  | CBO-CAO-NO  | 2.50  | 115.96      | 108.68   |
| 3   | B     | 600 | PLP  | C3-C4-C5    | -2.48 | 115.61      | 118.59   |
| 3   | D     | 600 | PLP  | O2P-P-O1P   | 2.46  | 120.42      | 110.83   |
| 3   | B     | 600 | PLP  | C2A-C2-C3   | -2.45 | 117.93      | 120.80   |
| 2   | B     | 700 | DMO  | CBO-CAO-NO  | 2.43  | 115.74      | 108.68   |
| 3   | D     | 600 | PLP  | O3P-P-O2P   | 2.39  | 116.75      | 107.80   |
| 3   | C     | 600 | PLP  | O3P-P-O2P   | 2.38  | 116.72      | 107.80   |
| 3   | B     | 600 | PLP  | O3-C3-C2    | -2.34 | 112.73      | 117.58   |
| 3   | A     | 600 | PLP  | O4P-C5A-C5  | -2.33 | 104.98      | 109.36   |
| 3   | A     | 600 | PLP  | C5-C6-N1    | -2.33 | 120.05      | 123.83   |
| 3   | A     | 600 | PLP  | O3-C3-C4    | 2.30  | 124.10      | 118.10   |
| 3   | D     | 600 | PLP  | C3-C4-C5    | -2.25 | 115.89      | 118.59   |
| 3   | D     | 600 | PLP  | O2P-P-O4P   | -2.23 | 100.84      | 106.67   |
| 3   | D     | 600 | PLP  | C5-C6-N1    | -2.23 | 120.21      | 123.83   |
| 2   | A     | 700 | DMO  | CO-CAO-NO   | 2.22  | 119.05      | 109.01   |
| 3   | C     | 600 | PLP  | C5-C6-N1    | -2.22 | 120.23      | 123.83   |

There are no chirality outliers.

All (6) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms          |
|-----|-------|-----|------|----------------|
| 2   | A     | 700 | DMO  | CO-CAO-CBO-CGO |
| 2   | B     | 700 | DMO  | CO-CAO-CBO-CGO |
| 2   | C     | 700 | DMO  | CO-CAO-CBO-CGO |
| 2   | D     | 700 | DMO  | CO-CAO-CBO-CGO |
| 2   | A     | 700 | DMO  | NO-CAO-CBO-CGO |
| 2   | C     | 700 | DMO  | NO-CAO-CBO-CGO |

There are no ring outliers.

4 monomers are involved in 5 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 3   | A     | 600 | PLP  | 1       | 0            |
| 3   | C     | 600 | PLP  | 2       | 0            |
| 3   | D     | 600 | PLP  | 1       | 0            |
| 3   | B     | 600 | PLP  | 1       | 0            |

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

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.