



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 26, 2024 – 04:13 AM EDT

PDB ID : 6RVB
Title : NADH-dependent Coenzyme A Disulfide Reductase soaked with NADH
Authors : Koepke, J.; Preu, J.
Deposited on : 2019-05-31
Resolution : 2.90 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.37.1
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.37.1

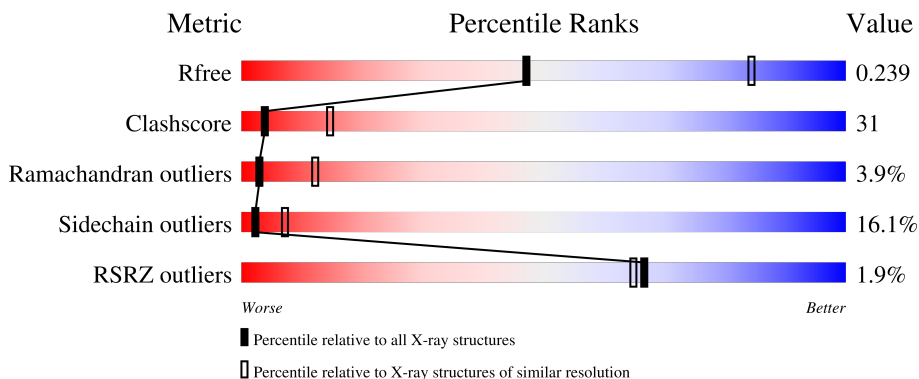
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|-----------------------|-----------------------------|---|
| R_{free} | 130704 | 1957 (2.90-2.90) |
| Clashscore | 141614 | 2172 (2.90-2.90) |
| Ramachandran outliers | 138981 | 2115 (2.90-2.90) |
| Sidechain outliers | 138945 | 2117 (2.90-2.90) |
| RSRZ outliers | 127900 | 1906 (2.90-2.90) |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|----------------------|
| 1 | A | 443 | 2% 59% 28% 9% • |
| 1 | B | 443 | 2% 53% 32% 11% • |
| 1 | C | 443 | 2% 58% 27% 12% • |
| 1 | D | 443 | % 56% 30% 12% • |

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 14205 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 NADH oxidase.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|---------------|-----------|----------|----------|--------|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 1 | A | 443 | Total 3379 | C 2147 | N 608 | O 617 | S 7 | 0 | 0 | 0 |
| 1 | B | 443 | Total 3379 | C 2147 | N 608 | O 617 | S 7 | 0 | 0 | 0 |
| 1 | C | 443 | Total 3378 | C 2146 | N 608 | O 617 | S 7 | 0 | 0 | 0 |
| 1 | D | 443 | Total 3377 | C 2146 | N 608 | O 616 | S 7 | 0 | 0 | 0 |

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: C₂₇H₃₃N₉O₁₅P₂) (labeled as "Ligand of Interest" by depositor).



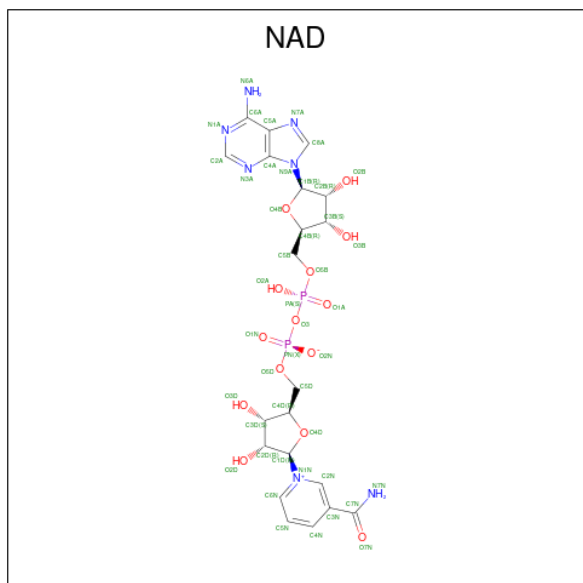
| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf | |
|-----|-------|----------|-------------|---------|--------|---------|---------|---------|---|
| | | | Total | C | N | O | | | P |
| 2 | A | 1 | Total 53 | C 27 | N 9 | O 15 | P 2 | 0 | 0 |
| 2 | B | 1 | Total 53 | C 27 | N 9 | O 15 | P 2 | 0 | 0 |

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| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---|----|---|---------|---------|
| 2 | C | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 53 | 27 | 9 | 15 | 2 | | |
| 2 | D | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 53 | 27 | 9 | 15 | 2 | | |

- Molecule 3 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$).



| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---|----|---|---------|---------|
| 3 | A | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 44 | 21 | 7 | 14 | 2 | | |
| 3 | B | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 44 | 21 | 7 | 14 | 2 | | |
| 3 | C | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 44 | 21 | 7 | 14 | 2 | | |
| 3 | D | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 44 | 21 | 7 | 14 | 2 | | |

- Molecule 4 is COENZYME A (three-letter code: COA) (formula: $C_{21}H_{36}N_7O_{16}P_3S$).



| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | | |
|-----|-------|----------|-------|----|----|---|----|---------|---------|---|---|
| | | | Total | C | N | O | P | | | S | |
| 4 | A | 1 | Total | 48 | 21 | 7 | 16 | 3 | 1 | 0 | 0 |
| 4 | B | 1 | Total | 48 | 21 | 7 | 16 | 3 | 1 | 0 | 0 |
| 4 | C | 1 | Total | 48 | 21 | 7 | 16 | 3 | 1 | 0 | 0 |
| 4 | D | 1 | Total | 48 | 21 | 7 | 16 | 3 | 1 | 0 | 0 |

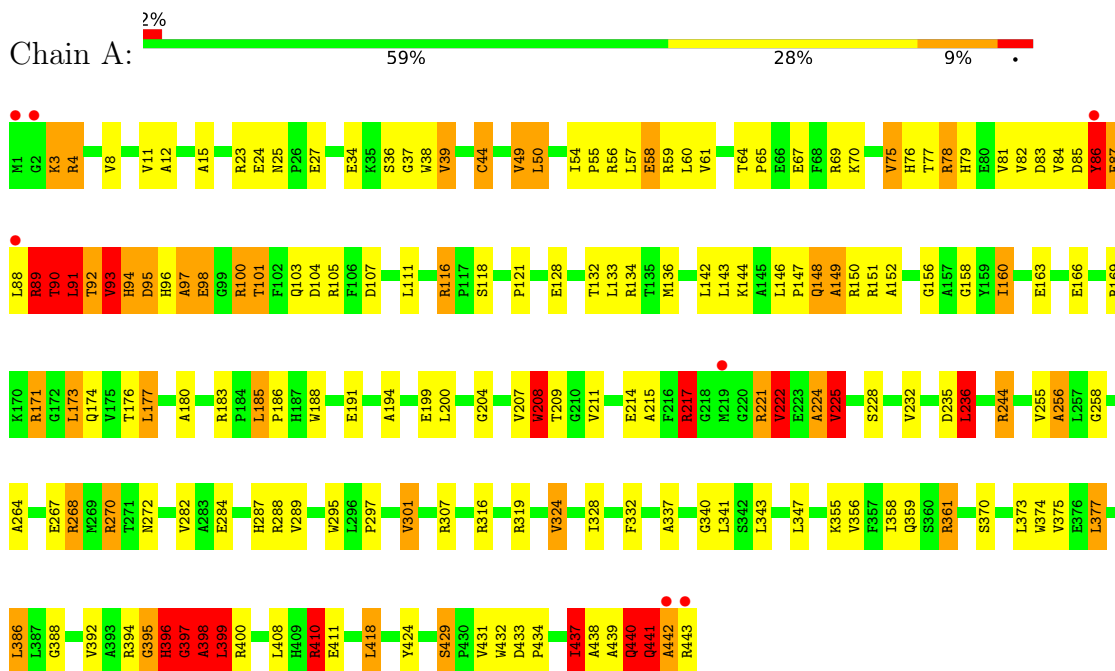
- Molecule 5 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---------|---------|
| 5 | A | 32 | Total | O | 0 | 0 |
| | | | 32 | 32 | | |
| 5 | B | 27 | Total | O | 0 | 0 |
| | | | 27 | 27 | | |
| 5 | C | 27 | Total | O | 0 | 0 |
| | | | 27 | 27 | | |
| 5 | D | 26 | Total | O | 0 | 0 |
| | | | 26 | 26 | | |

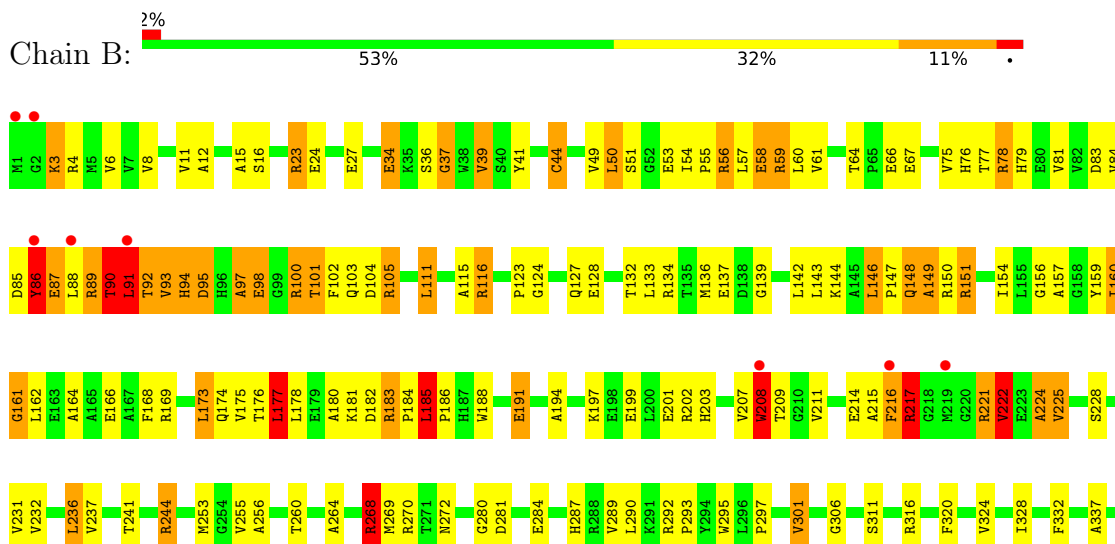
3 Residue-property plots

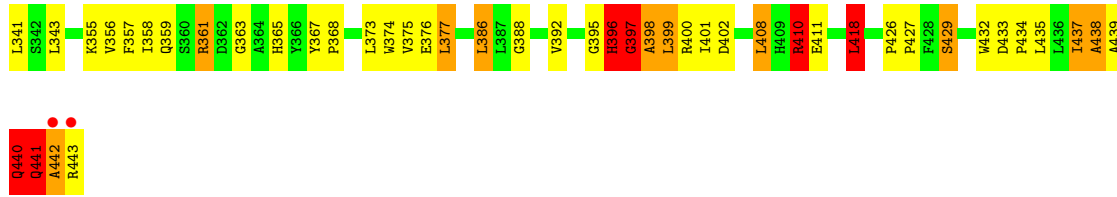
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

- Molecule 1: NADH oxidase

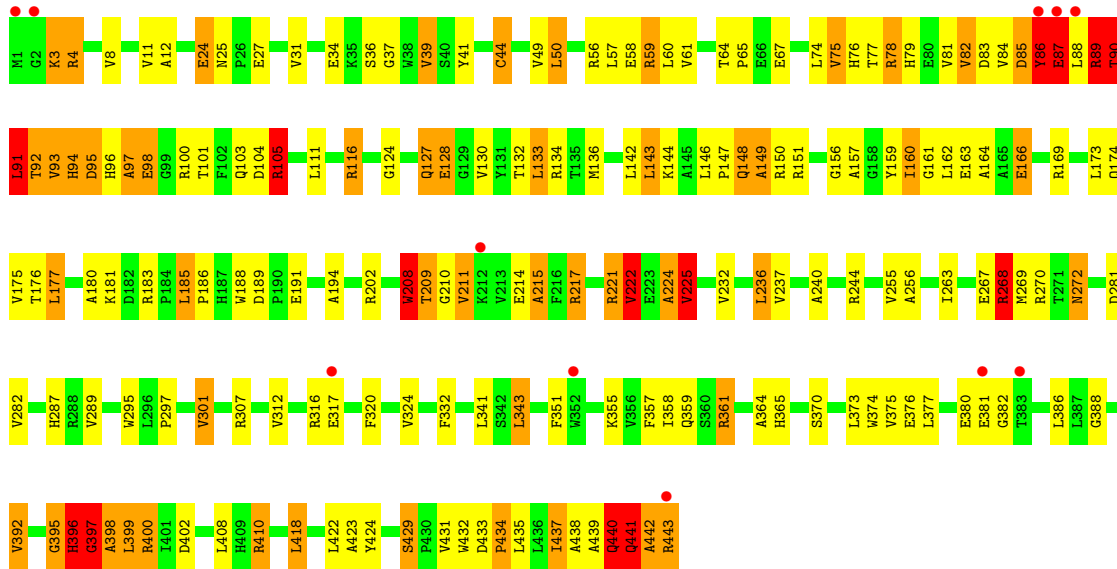


- Molecule 1: NADH oxidase

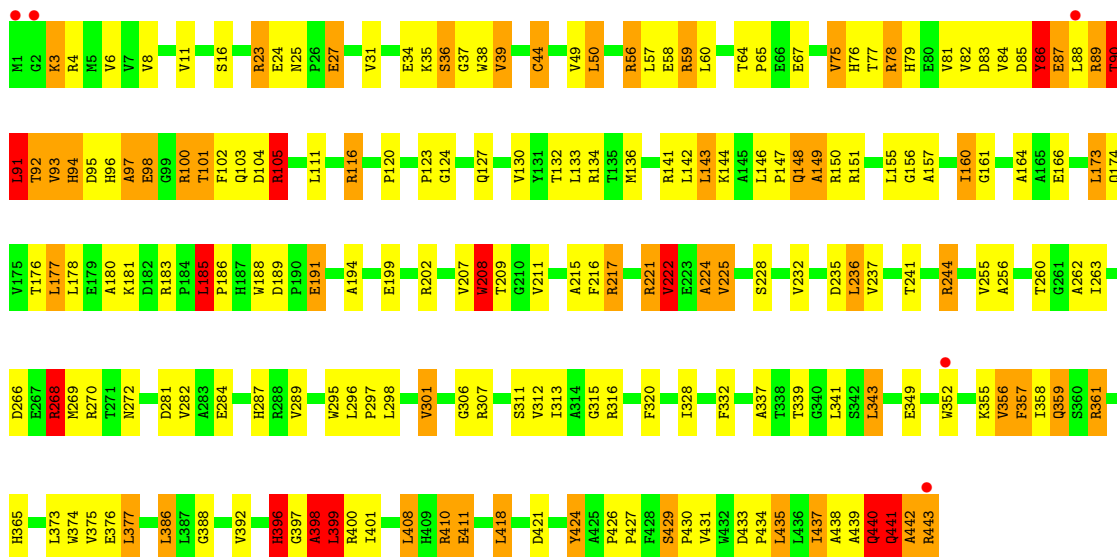




• Molecule 1: NADH oxidase



• Molecule 1: NADH oxidase



4 Data and refinement statistics

| Property | Value | Source |
|---|---|------------------|
| Space group | P 42 21 2 | Depositor |
| Cell constants a, b, c, α , β , γ | 160.75Å 160.75Å 256.92Å 90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 47.90 – 2.90 47.90 – 2.90 | Depositor EDS |
| % Data completeness (in resolution range) | 100.0 (47.90-2.90) 100.0 (47.90-2.90) | Depositor EDS |
| R_{merge} | (Not available) | Depositor |
| R_{sym} | 0.27 | Depositor |
| $\langle I/\sigma(I) \rangle$ ¹ | 1.34 (at 2.91Å) | Xtrriage |
| Refinement program | PHENIX 1.6.4_486 | Depositor |
| R, R_{free} | 0.201 , 0.246 0.193 , 0.239 | Depositor DCC |
| R_{free} test set | 2000 reflections (2.66%) | wwPDB-VP |
| Wilson B-factor (Å ²) | 63.0 | Xtrriage |
| Anisotropy | 0.084 | Xtrriage |
| Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²) | 0.35 , 59.4 | EDS |
| L-test for twinning ² | $\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$ | Xtrriage |
| Estimated twinning fraction | No twinning to report. | Xtrriage |
| F_o, F_c correlation | 0.94 | EDS |
| Total number of atoms | 14205 | wwPDB-VP |
| Average B, all atoms (Å ²) | 53.0 | wwPDB-VP |

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.42% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: COA, NAD, FAD

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 | 1.55 | 36/3451 (1.0%) | 1.39 | 37/4686 (0.8%) |
| 1 | B | 1.50 | 28/3451 (0.8%) | 1.38 | 31/4686 (0.7%) |
| 1 | C | 1.48 | 32/3450 (0.9%) | 1.37 | 29/4683 (0.6%) |
| 1 | D | 1.49 | 25/3449 (0.7%) | 1.38 | 36/4683 (0.8%) |
| All | All | 1.51 | 121/13801 (0.9%) | 1.38 | 133/18738 (0.7%) |

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 | 6 |
| 1 | B | 0 | 4 |
| 1 | C | 0 | 6 |
| 1 | D | 0 | 3 |
| All | All | 0 | 19 |

All (121) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|--------|-------|-------------|----------|
| 1 | A | 98 | GLU | CG-CD | 11.35 | 1.69 | 1.51 |
| 1 | D | 396 | HIS | C-O | 9.65 | 1.41 | 1.23 |
| 1 | C | 440 | GLN | C-O | 9.27 | 1.41 | 1.23 |
| 1 | B | 208 | TRP | CG-CD1 | 9.14 | 1.49 | 1.36 |
| 1 | D | 440 | GLN | CD-NE2 | 9.05 | 1.55 | 1.32 |
| 1 | B | 301 | VAL | CB-CG1 | -8.92 | 1.34 | 1.52 |
| 1 | A | 440 | GLN | CD-NE2 | 8.77 | 1.54 | 1.32 |
| 1 | C | 396 | HIS | C-O | 8.65 | 1.39 | 1.23 |
| 1 | A | 86 | TYR | CB-CG | 8.60 | 1.64 | 1.51 |
| 1 | C | 441 | GLN | CG-CD | 8.60 | 1.70 | 1.51 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|---------|-------|-------------|----------|
| 1 | D | 97 | ALA | CA-CB | 8.46 | 1.70 | 1.52 |
| 1 | C | 194 | ALA | CA-CB | -8.39 | 1.34 | 1.52 |
| 1 | A | 208 | TRP | CG-CD1 | 8.35 | 1.48 | 1.36 |
| 1 | A | 396 | HIS | C-O | 8.34 | 1.39 | 1.23 |
| 1 | B | 98 | GLU | CG-CD | 8.29 | 1.64 | 1.51 |
| 1 | B | 440 | GLN | C-O | 8.29 | 1.39 | 1.23 |
| 1 | C | 86 | TYR | CB-CG | 8.13 | 1.63 | 1.51 |
| 1 | B | 98 | GLU | CD-OE1 | 8.03 | 1.34 | 1.25 |
| 1 | C | 208 | TRP | CG-CD1 | 8.02 | 1.48 | 1.36 |
| 1 | D | 441 | GLN | CG-CD | 8.00 | 1.69 | 1.51 |
| 1 | A | 440 | GLN | C-O | 7.99 | 1.38 | 1.23 |
| 1 | A | 441 | GLN | CG-CD | 7.96 | 1.69 | 1.51 |
| 1 | D | 208 | TRP | CG-CD1 | 7.88 | 1.47 | 1.36 |
| 1 | B | 441 | GLN | CG-CD | 7.82 | 1.69 | 1.51 |
| 1 | C | 98 | GLU | CG-CD | 7.75 | 1.63 | 1.51 |
| 1 | D | 440 | GLN | C-O | 7.71 | 1.38 | 1.23 |
| 1 | C | 208 | TRP | CB-CG | 7.66 | 1.64 | 1.50 |
| 1 | C | 215 | ALA | CA-CB | -7.55 | 1.36 | 1.52 |
| 1 | D | 98 | GLU | CD-OE1 | 7.52 | 1.33 | 1.25 |
| 1 | B | 86 | TYR | CB-CG | 7.48 | 1.62 | 1.51 |
| 1 | D | 98 | GLU | CG-CD | 7.29 | 1.62 | 1.51 |
| 1 | D | 208 | TRP | CB-CG | 7.16 | 1.63 | 1.50 |
| 1 | D | 58 | GLU | CG-CD | 7.14 | 1.62 | 1.51 |
| 1 | B | 440 | GLN | CD-NE2 | 7.08 | 1.50 | 1.32 |
| 1 | B | 208 | TRP | CB-CG | 7.07 | 1.62 | 1.50 |
| 1 | A | 58 | GLU | CG-CD | 7.00 | 1.62 | 1.51 |
| 1 | A | 86 | TYR | CG-CD1 | 6.93 | 1.48 | 1.39 |
| 1 | A | 87 | GLU | CD-OE2 | 6.93 | 1.33 | 1.25 |
| 1 | C | 97 | ALA | CA-CB | 6.87 | 1.66 | 1.52 |
| 1 | B | 194 | ALA | CA-CB | -6.86 | 1.38 | 1.52 |
| 1 | B | 356 | VAL | CB-CG2 | -6.85 | 1.38 | 1.52 |
| 1 | B | 137 | GLU | CG-CD | 6.68 | 1.61 | 1.51 |
| 1 | B | 438 | ALA | CA-CB | -6.54 | 1.38 | 1.52 |
| 1 | C | 240 | ALA | CA-CB | -6.51 | 1.38 | 1.52 |
| 1 | B | 86 | TYR | CD1-CE1 | 6.48 | 1.49 | 1.39 |
| 1 | A | 208 | TRP | CB-CG | 6.46 | 1.61 | 1.50 |
| 1 | C | 31 | VAL | CB-CG2 | -6.43 | 1.39 | 1.52 |
| 1 | A | 163 | GLU | CD-OE1 | 6.40 | 1.32 | 1.25 |
| 1 | D | 194 | ALA | CA-CB | -6.39 | 1.39 | 1.52 |
| 1 | C | 440 | GLN | CD-NE2 | 6.38 | 1.48 | 1.32 |
| 1 | D | 87 | GLU | CD-OE1 | 6.37 | 1.32 | 1.25 |
| 1 | C | 24 | GLU | CD-OE2 | 6.36 | 1.32 | 1.25 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|---------|-------|-------------|----------|
| 1 | A | 58 | GLU | CB-CG | 6.34 | 1.64 | 1.52 |
| 1 | A | 225 | VAL | CA-CB | 6.23 | 1.67 | 1.54 |
| 1 | A | 87 | GLU | CD-OE1 | 6.20 | 1.32 | 1.25 |
| 1 | B | 396 | HIS | C-O | 6.15 | 1.35 | 1.23 |
| 1 | A | 49 | VAL | CB-CG2 | -6.09 | 1.40 | 1.52 |
| 1 | D | 424 | TYR | CE2-CZ | 6.02 | 1.46 | 1.38 |
| 1 | C | 93 | VAL | CB-CG1 | -5.99 | 1.40 | 1.52 |
| 1 | C | 301 | VAL | CB-CG1 | -5.93 | 1.40 | 1.52 |
| 1 | D | 86 | TYR | CD1-CE1 | 5.92 | 1.48 | 1.39 |
| 1 | A | 93 | VAL | CB-CG1 | -5.92 | 1.40 | 1.52 |
| 1 | B | 432 | TRP | CB-CG | -5.89 | 1.39 | 1.50 |
| 1 | B | 356 | VAL | CB-CG1 | -5.85 | 1.40 | 1.52 |
| 1 | D | 349 | GLU | CD-OE1 | 5.85 | 1.32 | 1.25 |
| 1 | C | 267 | GLU | CG-CD | 5.84 | 1.60 | 1.51 |
| 1 | B | 216 | PHE | CE2-CZ | 5.82 | 1.48 | 1.37 |
| 1 | A | 399 | LEU | N-CA | 5.81 | 1.57 | 1.46 |
| 1 | A | 437 | ILE | CA-CB | 5.81 | 1.68 | 1.54 |
| 1 | B | 51 | SER | CB-OG | 5.79 | 1.49 | 1.42 |
| 1 | C | 24 | GLU | CG-CD | 5.78 | 1.60 | 1.51 |
| 1 | C | 86 | TYR | CD1-CE1 | 5.78 | 1.48 | 1.39 |
| 1 | C | 93 | VAL | CB-CG2 | -5.78 | 1.40 | 1.52 |
| 1 | B | 191 | GLU | CG-CD | 5.73 | 1.60 | 1.51 |
| 1 | C | 86 | TYR | CE1-CZ | 5.72 | 1.46 | 1.38 |
| 1 | D | 357 | PHE | CD1-CE1 | 5.70 | 1.50 | 1.39 |
| 1 | B | 87 | GLU | CD-OE2 | 5.69 | 1.31 | 1.25 |
| 1 | D | 86 | TYR | CB-CG | 5.68 | 1.60 | 1.51 |
| 1 | D | 440 | GLN | CD-OE1 | 5.66 | 1.36 | 1.24 |
| 1 | A | 98 | GLU | CD-OE1 | 5.64 | 1.31 | 1.25 |
| 1 | D | 191 | GLU | CD-OE2 | 5.63 | 1.31 | 1.25 |
| 1 | D | 301 | VAL | CB-CG1 | -5.62 | 1.41 | 1.52 |
| 1 | B | 87 | GLU | CA-C | 5.60 | 1.67 | 1.52 |
| 1 | A | 324 | VAL | CB-CG2 | -5.59 | 1.41 | 1.52 |
| 1 | D | 356 | VAL | CB-CG2 | -5.57 | 1.41 | 1.52 |
| 1 | A | 194 | ALA | CA-CB | -5.55 | 1.40 | 1.52 |
| 1 | A | 270 | ARG | CB-CG | 5.54 | 1.67 | 1.52 |
| 1 | A | 256 | ALA | CA-CB | -5.54 | 1.40 | 1.52 |
| 1 | C | 86 | TYR | CG-CD1 | 5.51 | 1.46 | 1.39 |
| 1 | D | 93 | VAL | CA-CB | 5.49 | 1.66 | 1.54 |
| 1 | A | 244 | ARG | CB-CG | 5.48 | 1.67 | 1.52 |
| 1 | A | 270 | ARG | CG-CD | 5.46 | 1.65 | 1.51 |
| 1 | D | 87 | GLU | CA-C | 5.41 | 1.67 | 1.52 |
| 1 | C | 225 | VAL | CA-CB | 5.40 | 1.66 | 1.54 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|--------|-------|-------------|----------|
| 1 | C | 224 | ALA | CA-CB | -5.38 | 1.41 | 1.52 |
| 1 | A | 264 | ALA | CA-CB | -5.36 | 1.41 | 1.52 |
| 1 | A | 97 | ALA | N-CA | 5.34 | 1.57 | 1.46 |
| 1 | C | 351 | PHE | CB-CG | -5.33 | 1.42 | 1.51 |
| 1 | A | 301 | VAL | CB-CG1 | -5.32 | 1.41 | 1.52 |
| 1 | C | 211 | VAL | CB-CG2 | -5.31 | 1.41 | 1.52 |
| 1 | B | 58 | GLU | CG-CD | 5.29 | 1.59 | 1.51 |
| 1 | A | 440 | GLN | CA-CB | 5.28 | 1.65 | 1.53 |
| 1 | A | 398 | ALA | CA-CB | -5.25 | 1.41 | 1.52 |
| 1 | A | 93 | VAL | CA-CB | 5.25 | 1.65 | 1.54 |
| 1 | C | 317 | GLU | CG-CD | 5.24 | 1.59 | 1.51 |
| 1 | D | 411 | GLU | CB-CG | 5.22 | 1.62 | 1.52 |
| 1 | B | 53 | GLU | CD-OE2 | 5.21 | 1.31 | 1.25 |
| 1 | B | 6 | VAL | CB-CG2 | -5.18 | 1.42 | 1.52 |
| 1 | C | 324 | VAL | CB-CG2 | -5.18 | 1.42 | 1.52 |
| 1 | A | 86 | TYR | CE1-CZ | 5.17 | 1.45 | 1.38 |
| 1 | A | 89 | ARG | CB-CG | 5.17 | 1.66 | 1.52 |
| 1 | C | 85 | ASP | C-O | -5.16 | 1.13 | 1.23 |
| 1 | C | 87 | GLU | CA-C | 5.15 | 1.66 | 1.52 |
| 1 | B | 66 | GLU | CG-CD | 5.15 | 1.59 | 1.51 |
| 1 | A | 97 | ALA | CA-CB | 5.14 | 1.63 | 1.52 |
| 1 | D | 244 | ARG | CG-CD | 5.11 | 1.64 | 1.51 |
| 1 | A | 95 | ASP | CB-CG | -5.09 | 1.41 | 1.51 |
| 1 | C | 423 | ALA | CA-CB | -5.07 | 1.41 | 1.52 |
| 1 | C | 166 | GLU | CG-CD | 5.04 | 1.59 | 1.51 |
| 1 | B | 86 | TYR | CG-CD1 | 5.03 | 1.45 | 1.39 |
| 1 | B | 264 | ALA | CA-CB | -5.00 | 1.42 | 1.52 |

All (133) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-----------|--------|-------------|----------|
| 1 | B | 397 | GLY | N-CA-C | 14.29 | 148.83 | 113.10 |
| 1 | D | 268 | ARG | NE-CZ-NH1 | 10.93 | 125.77 | 120.30 |
| 1 | D | 396 | HIS | CA-C-N | -10.42 | 95.36 | 116.20 |
| 1 | D | 396 | HIS | O-C-N | 10.28 | 140.67 | 123.20 |
| 1 | C | 396 | HIS | CA-C-N | -9.77 | 96.66 | 116.20 |
| 1 | B | 410 | ARG | NE-CZ-NH1 | 9.49 | 125.04 | 120.30 |
| 1 | A | 396 | HIS | CA-C-N | -9.48 | 97.23 | 116.20 |
| 1 | D | 396 | HIS | C-N-CA | 9.38 | 142.00 | 122.30 |
| 1 | C | 89 | ARG | NE-CZ-NH1 | 8.87 | 124.73 | 120.30 |
| 1 | D | 217 | ARG | NE-CZ-NH1 | -8.86 | 115.87 | 120.30 |
| 1 | D | 343 | LEU | CB-CG-CD2 | -8.70 | 96.21 | 111.00 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1 | D | 160 | ILE | C-N-CA | -8.67 | 104.10 | 122.30 |
| 1 | B | 402 | ASP | CB-CG-OD2 | 8.62 | 126.05 | 118.30 |
| 1 | B | 160 | ILE | C-N-CA | -8.49 | 104.47 | 122.30 |
| 1 | C | 343 | LEU | CB-CG-CD2 | -8.48 | 96.58 | 111.00 |
| 1 | B | 23 | ARG | NE-CZ-NH2 | -8.35 | 116.12 | 120.30 |
| 1 | B | 183 | ARG | NE-CZ-NH1 | -8.31 | 116.14 | 120.30 |
| 1 | D | 87 | GLU | OE1-CD-OE2 | 8.20 | 133.14 | 123.30 |
| 1 | B | 87 | GLU | OE1-CD-OE2 | 8.14 | 133.07 | 123.30 |
| 1 | C | 396 | HIS | O-C-N | 8.13 | 137.01 | 123.20 |
| 1 | A | 87 | GLU | OE1-CD-OE2 | 8.12 | 133.05 | 123.30 |
| 1 | C | 160 | ILE | C-N-CA | -8.12 | 105.26 | 122.30 |
| 1 | B | 23 | ARG | NE-CZ-NH1 | 8.07 | 124.33 | 120.30 |
| 1 | C | 396 | HIS | C-N-CA | 8.01 | 139.12 | 122.30 |
| 1 | D | 307 | ARG | NE-CZ-NH1 | -7.88 | 116.36 | 120.30 |
| 1 | C | 105 | ARG | NE-CZ-NH2 | -7.71 | 116.44 | 120.30 |
| 1 | A | 396 | HIS | O-C-N | 7.71 | 136.30 | 123.20 |
| 1 | D | 4 | ARG | NE-CZ-NH1 | -7.67 | 116.46 | 120.30 |
| 1 | A | 160 | ILE | C-N-CA | -7.56 | 106.43 | 122.30 |
| 1 | C | 208 | TRP | CA-CB-CG | 7.48 | 127.92 | 113.70 |
| 1 | C | 4 | ARG | NE-CZ-NH1 | -7.42 | 116.59 | 120.30 |
| 1 | A | 217 | ARG | NE-CZ-NH1 | -7.42 | 116.59 | 120.30 |
| 1 | A | 268 | ARG | NE-CZ-NH2 | -7.36 | 116.62 | 120.30 |
| 1 | A | 134 | ARG | NE-CZ-NH2 | -7.28 | 116.66 | 120.30 |
| 1 | B | 185 | LEU | CA-CB-CG | 7.20 | 131.87 | 115.30 |
| 1 | A | 97 | ALA | N-CA-CB | 7.16 | 120.13 | 110.10 |
| 1 | A | 396 | HIS | C-N-CA | 7.13 | 137.27 | 122.30 |
| 1 | A | 95 | ASP | CB-CG-OD1 | -7.12 | 111.89 | 118.30 |
| 1 | C | 36 | SER | C-N-CA | -7.05 | 107.50 | 122.30 |
| 1 | D | 36 | SER | C-N-CA | -7.01 | 107.58 | 122.30 |
| 1 | B | 217 | ARG | NE-CZ-NH1 | -7.01 | 116.80 | 120.30 |
| 1 | C | 95 | ASP | CB-CG-OD1 | -6.99 | 112.01 | 118.30 |
| 1 | C | 440 | GLN | O-C-N | 6.95 | 133.82 | 122.70 |
| 1 | C | 397 | GLY | N-CA-C | 6.93 | 130.42 | 113.10 |
| 1 | D | 105 | ARG | NE-CZ-NH1 | 6.90 | 123.75 | 120.30 |
| 1 | B | 268 | ARG | NE-CZ-NH2 | -6.87 | 116.87 | 120.30 |
| 1 | A | 343 | LEU | CB-CG-CD2 | -6.86 | 99.33 | 111.00 |
| 1 | A | 440 | GLN | O-C-N | 6.85 | 133.67 | 122.70 |
| 1 | D | 397 | GLY | N-CA-C | 6.85 | 130.22 | 113.10 |
| 1 | C | 307 | ARG | NE-CZ-NH1 | -6.83 | 116.88 | 120.30 |
| 1 | A | 270 | ARG | NE-CZ-NH1 | -6.76 | 116.92 | 120.30 |
| 1 | A | 98 | GLU | CG-CD-OE1 | 6.75 | 131.79 | 118.30 |
| 1 | C | 91 | LEU | CA-CB-CG | 6.68 | 130.66 | 115.30 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1 | D | 208 | TRP | CA-CB-CG | 6.52 | 126.09 | 113.70 |
| 1 | C | 93 | VAL | CG1-CB-CG2 | -6.52 | 100.47 | 110.90 |
| 1 | D | 268 | ARG | NE-CZ-NH2 | -6.49 | 117.06 | 120.30 |
| 1 | A | 208 | TRP | CA-CB-CG | 6.45 | 125.96 | 113.70 |
| 1 | C | 97 | ALA | N-CA-CB | 6.44 | 119.12 | 110.10 |
| 1 | D | 97 | ALA | N-CA-CB | 6.41 | 119.07 | 110.10 |
| 1 | A | 394 | ARG | NE-CZ-NH2 | 6.40 | 123.50 | 120.30 |
| 1 | C | 440 | GLN | CA-C-N | -6.40 | 103.12 | 117.20 |
| 1 | B | 208 | TRP | CA-CB-CG | 6.34 | 125.75 | 113.70 |
| 1 | A | 236 | LEU | CA-CB-CG | 6.34 | 129.87 | 115.30 |
| 1 | A | 398 | ALA | CB-CA-C | 6.33 | 119.59 | 110.10 |
| 1 | D | 185 | LEU | CA-CB-CG | 6.30 | 129.79 | 115.30 |
| 1 | D | 235 | ASP | CB-CG-OD2 | -6.30 | 112.63 | 118.30 |
| 1 | D | 23 | ARG | NE-CZ-NH2 | -6.29 | 117.15 | 120.30 |
| 1 | D | 440 | GLN | O-C-N | 6.27 | 132.73 | 122.70 |
| 1 | A | 177 | LEU | CB-CG-CD1 | -6.14 | 100.56 | 111.00 |
| 1 | B | 182 | ASP | CB-CG-OD1 | -6.14 | 112.77 | 118.30 |
| 1 | B | 36 | SER | C-N-CA | -6.13 | 109.43 | 122.30 |
| 1 | D | 96 | HIS | N-CA-CB | -6.12 | 99.58 | 110.60 |
| 1 | A | 399 | LEU | N-CA-CB | 6.10 | 122.61 | 110.40 |
| 1 | D | 307 | ARG | NE-CZ-NH2 | 6.07 | 123.33 | 120.30 |
| 1 | B | 97 | ALA | N-CA-CB | 6.07 | 118.59 | 110.10 |
| 1 | A | 98 | GLU | OE1-CD-OE2 | -6.06 | 116.03 | 123.30 |
| 1 | C | 268 | ARG | NE-CZ-NH2 | -6.02 | 117.29 | 120.30 |
| 1 | D | 141 | ARG | NE-CZ-NH1 | -5.96 | 117.32 | 120.30 |
| 1 | C | 422 | LEU | CB-CG-CD1 | -5.95 | 100.88 | 111.00 |
| 1 | C | 96 | HIS | N-CA-CB | -5.90 | 99.99 | 110.60 |
| 1 | D | 98 | GLU | CG-CD-OE1 | 5.83 | 129.96 | 118.30 |
| 1 | C | 82 | VAL | CB-CA-C | -5.83 | 100.33 | 111.40 |
| 1 | A | 91 | LEU | CA-CB-CG | 5.81 | 128.66 | 115.30 |
| 1 | C | 134 | ARG | NE-CZ-NH2 | -5.80 | 117.40 | 120.30 |
| 1 | A | 235 | ASP | CB-CG-OD2 | -5.79 | 113.09 | 118.30 |
| 1 | A | 440 | GLN | CA-C-N | -5.78 | 104.49 | 117.20 |
| 1 | B | 244 | ARG | NE-CZ-NH2 | -5.77 | 117.42 | 120.30 |
| 1 | B | 90 | THR | C-N-CA | 5.75 | 136.07 | 121.70 |
| 1 | D | 105 | ARG | NE-CZ-NH2 | -5.74 | 117.43 | 120.30 |
| 1 | B | 224 | ALA | N-CA-C | 5.72 | 126.45 | 111.00 |
| 1 | A | 397 | GLY | N-CA-C | 5.70 | 127.36 | 113.10 |
| 1 | A | 93 | VAL | CG1-CB-CG2 | -5.70 | 101.79 | 110.90 |
| 1 | D | 421 | ASP | CB-CG-OD2 | -5.68 | 113.19 | 118.30 |
| 1 | B | 95 | ASP | CB-CG-OD1 | -5.68 | 113.19 | 118.30 |
| 1 | D | 386 | LEU | CB-CG-CD2 | -5.66 | 101.37 | 111.00 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|------------|-------|-------------|----------|
| 1 | B | 440 | GLN | O-C-N | 5.66 | 131.75 | 122.70 |
| 1 | A | 4 | ARG | NE-CZ-NH1 | 5.65 | 123.12 | 120.30 |
| 1 | D | 386 | LEU | CA-CB-CG | 5.61 | 128.21 | 115.30 |
| 1 | B | 363 | GLY | N-CA-C | -5.56 | 99.20 | 113.10 |
| 1 | A | 386 | LEU | CA-CB-CG | 5.55 | 128.07 | 115.30 |
| 1 | A | 36 | SER | C-N-CA | -5.53 | 110.69 | 122.30 |
| 1 | B | 440 | GLN | CA-C-N | -5.52 | 105.06 | 117.20 |
| 1 | B | 343 | LEU | CB-CG-CD2 | -5.51 | 101.63 | 111.00 |
| 1 | B | 402 | ASP | CB-CG-OD1 | -5.45 | 113.39 | 118.30 |
| 1 | C | 400 | ARG | NE-CZ-NH2 | -5.45 | 117.57 | 120.30 |
| 1 | D | 398 | ALA | CB-CA-C | 5.40 | 118.20 | 110.10 |
| 1 | B | 151 | ARG | NE-CZ-NH1 | 5.39 | 123.00 | 120.30 |
| 1 | A | 171 | ARG | NE-CZ-NH2 | -5.38 | 117.61 | 120.30 |
| 1 | A | 307 | ARG | NE-CZ-NH1 | -5.34 | 117.63 | 120.30 |
| 1 | B | 93 | VAL | CB-CA-C | 5.33 | 121.53 | 111.40 |
| 1 | C | 98 | GLU | CA-CB-CG | -5.33 | 101.67 | 113.40 |
| 1 | A | 288 | ARG | NE-CZ-NH1 | 5.33 | 122.96 | 120.30 |
| 1 | B | 91 | LEU | CB-CG-CD1 | 5.28 | 119.98 | 111.00 |
| 1 | D | 266 | ASP | CB-CG-OD2 | 5.26 | 123.04 | 118.30 |
| 1 | D | 134 | ARG | NE-CZ-NH2 | -5.26 | 117.67 | 120.30 |
| 1 | C | 128 | GLU | C-N-CA | -5.25 | 111.27 | 122.30 |
| 1 | D | 441 | GLN | CA-CB-CG | 5.25 | 124.94 | 113.40 |
| 1 | D | 435 | LEU | CB-CG-CD2 | -5.21 | 102.15 | 111.00 |
| 1 | D | 143 | LEU | CA-CB-CG | 5.12 | 127.08 | 115.30 |
| 1 | C | 89 | ARG | NE-CZ-NH2 | -5.11 | 117.74 | 120.30 |
| 1 | D | 224 | ALA | N-CA-C | 5.11 | 124.80 | 111.00 |
| 1 | C | 91 | LEU | CA-C-N | -5.11 | 105.97 | 117.20 |
| 1 | A | 410 | ARG | O-C-N | -5.10 | 114.54 | 122.70 |
| 1 | C | 402 | ASP | CB-CG-OD2 | 5.10 | 122.89 | 118.30 |
| 1 | B | 91 | LEU | CA-CB-CG | 5.10 | 127.03 | 115.30 |
| 1 | B | 34 | GLU | OE1-CD-OE2 | -5.09 | 117.19 | 123.30 |
| 1 | A | 200 | LEU | CB-CG-CD2 | -5.09 | 102.35 | 111.00 |
| 1 | D | 399 | LEU | N-CA-CB | 5.05 | 120.51 | 110.40 |
| 1 | A | 347 | LEU | CB-CG-CD2 | 5.05 | 119.59 | 111.00 |
| 1 | A | 224 | ALA | N-CA-C | 5.03 | 124.59 | 111.00 |
| 1 | B | 418 | LEU | CB-CG-CD1 | -5.03 | 102.46 | 111.00 |
| 1 | B | 177 | LEU | CB-CG-CD1 | -5.01 | 102.48 | 111.00 |
| 1 | A | 96 | HIS | N-CA-CB | -5.01 | 101.59 | 110.60 |

There are no chirality outliers.

All (19) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|-----|-------|-----|------|-------------------|
| 1 | A | 396 | HIS | Peptide |
| 1 | A | 398 | ALA | Peptide |
| 1 | A | 399 | LEU | Peptide |
| 1 | A | 440 | GLN | Peptide |
| 1 | A | 91 | LEU | Peptide |
| 1 | A | 93 | VAL | Peptide |
| 1 | B | 161 | GLY | Peptide |
| 1 | B | 37 | GLY | Peptide |
| 1 | B | 440 | GLN | Peptide |
| 1 | B | 86 | TYR | Peptide |
| 1 | C | 127 | GLN | Peptide |
| 1 | C | 396 | HIS | Peptide,Mainchain |
| 1 | C | 440 | GLN | Peptide |
| 1 | C | 90 | THR | Peptide |
| 1 | C | 91 | LEU | Peptide |
| 1 | D | 396 | HIS | Peptide |
| 1 | D | 440 | GLN | Peptide |
| 1 | D | 91 | LEU | Peptide |

5.2 Too-close contacts [i](#)

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 | 3379 | 0 | 3407 | 215 | 0 |
| 1 | B | 3379 | 0 | 3407 | 257 | 0 |
| 1 | C | 3378 | 0 | 3402 | 191 | 0 |
| 1 | D | 3377 | 0 | 3402 | 201 | 0 |
| 2 | A | 53 | 0 | 31 | 7 | 0 |
| 2 | B | 53 | 0 | 31 | 11 | 0 |
| 2 | C | 53 | 0 | 31 | 7 | 0 |
| 2 | D | 53 | 0 | 31 | 6 | 0 |
| 3 | A | 44 | 0 | 26 | 11 | 0 |
| 3 | B | 44 | 0 | 26 | 10 | 0 |
| 3 | C | 44 | 0 | 26 | 9 | 0 |
| 3 | D | 44 | 0 | 26 | 12 | 0 |
| 4 | A | 48 | 0 | 31 | 3 | 0 |
| 4 | B | 48 | 0 | 31 | 5 | 0 |
| 4 | C | 48 | 0 | 31 | 0 | 0 |
| 4 | D | 48 | 0 | 31 | 3 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 5 | A | 32 | 0 | 0 | 10 | 1 |
| 5 | B | 27 | 0 | 0 | 17 | 1 |
| 5 | C | 27 | 0 | 0 | 17 | 0 |
| 5 | D | 26 | 0 | 0 | 13 | 0 |
| All | All | 14205 | 0 | 13970 | 862 | 1 |

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 31.

All (862) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|------------------|--------------------------|-------------------|
| 1:A:160:ILE:CD1 | 1:A:160:ILE:CG1 | 1.77 | 1.61 |
| 1:D:160:ILE:CD1 | 1:D:160:ILE:CG1 | 1.77 | 1.54 |
| 1:B:160:ILE:CD1 | 1:B:160:ILE:CG1 | 1.80 | 1.53 |
| 1:C:160:ILE:CD1 | 1:C:160:ILE:CG1 | 1.83 | 1.52 |
| 1:A:149:ALA:CB | 1:A:150:ARG:HA | 1.62 | 1.28 |
| 1:D:149:ALA:CB | 1:D:150:ARG:HA | 1.63 | 1.26 |
| 1:B:149:ALA:CB | 1:B:150:ARG:HA | 1.62 | 1.24 |
| 1:D:439:ALA:O | 1:D:441:GLN:HB2 | 1.10 | 1.23 |
| 1:C:149:ALA:CB | 1:C:150:ARG:HA | 1.70 | 1.20 |
| 1:A:439:ALA:O | 1:A:441:GLN:HB2 | 1.03 | 1.19 |
| 1:C:439:ALA:O | 1:C:441:GLN:CB | 1.89 | 1.18 |
| 1:B:37:GLY:HA2 | 1:B:77:THR:HB | 1.25 | 1.18 |
| 1:B:439:ALA:O | 1:B:441:GLN:CB | 1.92 | 1.16 |
| 1:D:105:ARG:HD3 | 5:D:606:HOH:O | 1.41 | 1.16 |
| 1:A:149:ALA:HB1 | 1:A:150:ARG:HA | 1.16 | 1.13 |
| 1:B:439:ALA:O | 1:B:441:GLN:HB2 | 0.96 | 1.12 |
| 1:D:37:GLY:HA2 | 1:D:77:THR:HB | 1.32 | 1.11 |
| 1:A:439:ALA:O | 1:A:441:GLN:CB | 1.98 | 1.11 |
| 1:B:437:ILE:C | 1:B:437:ILE:HD12 | 1.71 | 1.11 |
| 1:D:149:ALA:HB1 | 1:D:150:ARG:HA | 1.16 | 1.11 |
| 1:A:440:GLN:NE2 | 1:A:440:GLN:HA | 1.63 | 1.10 |
| 1:C:439:ALA:O | 1:C:441:GLN:HB2 | 0.94 | 1.10 |
| 1:C:437:ILE:C | 1:C:437:ILE:HD12 | 1.71 | 1.10 |
| 1:B:85:ASP:O | 1:B:92:THR:HG22 | 1.49 | 1.09 |
| 1:A:90:THR:HA | 1:A:92:THR:HG23 | 1.09 | 1.08 |
| 1:B:396:HIS:N | 1:B:397:GLY:HA2 | 1.67 | 1.08 |
| 1:A:37:GLY:HA2 | 1:A:77:THR:HB | 1.35 | 1.07 |
| 1:B:90:THR:HA | 1:B:92:THR:HG23 | 1.13 | 1.07 |
| 1:C:149:ALA:HB1 | 1:C:150:ARG:HA | 1.28 | 1.07 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:D:440:GLN:HA | 1:D:440:GLN:NE2 | 1.68 | 1.06 |
| 1:A:437:ILE:HD12 | 1:A:437:ILE:C | 1.73 | 1.05 |
| 1:B:149:ALA:HB1 | 1:B:150:ARG:HA | 1.06 | 1.04 |
| 1:A:398:ALA:H | 1:A:399:LEU:HB2 | 1.19 | 1.04 |
| 1:A:147:PRO:O | 1:A:148:GLN:HB2 | 1.57 | 1.04 |
| 1:D:439:ALA:O | 1:D:441:GLN:CB | 2.04 | 1.03 |
| 1:C:443:ARG:NH2 | 5:C:603:HOH:O | 1.91 | 1.03 |
| 1:D:398:ALA:H | 1:D:399:LEU:HB2 | 1.23 | 1.02 |
| 1:A:440:GLN:HA | 1:A:440:GLN:HE21 | 1.17 | 1.00 |
| 1:B:85:ASP:C | 1:B:92:THR:HG22 | 1.80 | 1.00 |
| 1:B:92:THR:N | 5:B:602:HOH:O | 1.94 | 1.00 |
| 1:B:90:THR:HA | 1:B:92:THR:CG2 | 1.90 | 0.99 |
| 1:A:85:ASP:C | 1:A:92:THR:HG22 | 1.82 | 0.99 |
| 1:A:410:ARG:NH1 | 1:B:410:ARG:NH1 | 2.11 | 0.98 |
| 1:D:440:GLN:HA | 1:D:440:GLN:HE21 | 1.24 | 0.98 |
| 1:A:90:THR:HA | 1:A:92:THR:CG2 | 1.94 | 0.96 |
| 1:D:437:ILE:HD12 | 1:D:437:ILE:C | 1.86 | 0.96 |
| 1:B:440:GLN:HA | 1:B:440:GLN:NE2 | 1.79 | 0.95 |
| 1:B:91:LEU:O | 5:B:601:HOH:O | 1.84 | 0.95 |
| 1:B:256:ALA:H | 1:B:272:ASN:ND2 | 1.65 | 0.95 |
| 1:C:147:PRO:O | 1:C:148:GLN:HB2 | 1.66 | 0.95 |
| 1:B:398:ALA:H | 1:B:399:LEU:HB2 | 1.32 | 0.94 |
| 1:D:85:ASP:OD1 | 1:D:88:LEU:HD23 | 1.67 | 0.94 |
| 1:A:89:ARG:O | 1:A:90:THR:O | 1.86 | 0.94 |
| 1:C:440:GLN:HA | 1:C:440:GLN:HE21 | 1.32 | 0.93 |
| 1:B:151:ARG:HG2 | 1:B:174:GLN:HE21 | 1.34 | 0.93 |
| 1:D:443:ARG:NH1 | 5:D:601:HOH:O | 1.94 | 0.93 |
| 1:A:150:ARG:NH1 | 5:A:601:HOH:O | 2.02 | 0.92 |
| 1:C:440:GLN:HA | 1:C:440:GLN:NE2 | 1.83 | 0.92 |
| 1:A:396:HIS:CG | 1:B:396:HIS:CE1 | 2.58 | 0.91 |
| 1:D:147:PRO:O | 1:D:148:GLN:HB2 | 1.70 | 0.91 |
| 1:D:149:ALA:HB1 | 1:D:150:ARG:CA | 2.01 | 0.91 |
| 1:A:85:ASP:O | 1:A:92:THR:HG22 | 1.70 | 0.91 |
| 1:A:396:HIS:CE1 | 1:B:396:HIS:CG | 2.59 | 0.91 |
| 1:B:396:HIS:N | 1:B:397:GLY:CA | 2.33 | 0.90 |
| 1:A:410:ARG:HH11 | 1:B:410:ARG:NH1 | 1.70 | 0.90 |
| 1:D:256:ALA:H | 1:D:272:ASN:ND2 | 1.69 | 0.90 |
| 3:A:502:NAD:C4A | 3:A:502:NAD:O2B | 2.14 | 0.89 |
| 3:C:502:NAD:O2B | 3:C:502:NAD:C4A | 2.14 | 0.89 |
| 1:B:149:ALA:CB | 1:B:150:ARG:CA | 2.50 | 0.89 |
| 1:B:373:LEU:HD22 | 1:B:434:PRO:HG2 | 1.55 | 0.89 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:89:ARG:O | 5:C:601:HOH:O | 1.90 | 0.89 |
| 1:A:149:ALA:HB3 | 1:A:150:ARG:HA | 1.56 | 0.88 |
| 1:B:147:PRO:O | 1:B:148:GLN:HB2 | 1.72 | 0.88 |
| 1:C:37:GLY:HA2 | 1:C:77:THR:HB | 1.53 | 0.88 |
| 1:B:93:VAL:HG23 | 1:B:104:ASP:HB3 | 1.53 | 0.87 |
| 1:B:441:GLN:O | 1:B:442:ALA:O | 1.91 | 0.87 |
| 1:A:116:ARG:NH1 | 1:A:244:ARG:HD2 | 1.88 | 0.87 |
| 1:B:149:ALA:HB1 | 1:B:150:ARG:CA | 1.99 | 0.87 |
| 1:C:149:ALA:HB3 | 1:C:150:ARG:HA | 1.57 | 0.87 |
| 1:D:149:ALA:HB3 | 1:D:150:ARG:HA | 1.56 | 0.87 |
| 1:D:116:ARG:NH1 | 1:D:244:ARG:HD2 | 1.89 | 0.87 |
| 1:A:396:HIS:CD2 | 1:B:396:HIS:NE2 | 2.43 | 0.86 |
| 1:A:410:ARG:NH1 | 1:B:410:ARG:HH11 | 1.69 | 0.86 |
| 1:D:93:VAL:HG23 | 1:D:104:ASP:HB3 | 1.57 | 0.86 |
| 1:C:87:GLU:OE1 | 5:C:602:HOH:O | 1.91 | 0.85 |
| 1:C:398:ALA:H | 1:C:399:LEU:HB2 | 1.40 | 0.85 |
| 1:B:64:THR:OG1 | 1:B:67:GLU:HG3 | 1.76 | 0.85 |
| 1:B:91:LEU:C | 5:B:602:HOH:O | 2.12 | 0.85 |
| 1:A:149:ALA:HB1 | 1:A:150:ARG:CA | 2.05 | 0.85 |
| 1:D:400:ARG:HH12 | 1:D:429:SER:HB2 | 1.39 | 0.85 |
| 1:A:50:LEU:HD12 | 1:A:143:LEU:HD13 | 1.59 | 0.85 |
| 1:B:104:ASP:O | 5:B:602:HOH:O | 1.93 | 0.84 |
| 1:A:396:HIS:NE2 | 1:B:396:HIS:CD2 | 2.45 | 0.84 |
| 1:B:224:ALA:O | 1:B:232:VAL:O | 1.96 | 0.84 |
| 1:B:85:ASP:O | 1:B:92:THR:CG2 | 2.25 | 0.83 |
| 1:D:64:THR:OG1 | 1:D:67:GLU:HG3 | 1.79 | 0.83 |
| 1:C:272:ASN:H | 1:C:272:ASN:HD22 | 1.26 | 0.83 |
| 1:D:149:ALA:CB | 1:D:150:ARG:CA | 2.48 | 0.83 |
| 1:C:400:ARG:HH12 | 1:C:429:SER:HB2 | 1.45 | 0.82 |
| 1:A:396:HIS:CE1 | 1:B:396:HIS:CE1 | 2.69 | 0.81 |
| 1:C:440:GLN:HA | 5:C:608:HOH:O | 1.79 | 0.81 |
| 1:D:440:GLN:NE2 | 1:D:440:GLN:CA | 2.44 | 0.81 |
| 1:B:85:ASP:H | 1:B:92:THR:HA | 1.46 | 0.81 |
| 1:A:64:THR:OG1 | 1:A:67:GLU:HG3 | 1.82 | 0.80 |
| 1:A:149:ALA:CB | 1:A:150:ARG:CA | 2.49 | 0.80 |
| 1:A:224:ALA:O | 1:A:232:VAL:O | 2.00 | 0.80 |
| 1:A:186:PRO:HG2 | 5:A:604:HOH:O | 1.81 | 0.80 |
| 1:B:437:ILE:HD12 | 1:B:438:ALA:N | 1.96 | 0.80 |
| 1:B:50:LEU:HD12 | 1:B:143:LEU:HD13 | 1.62 | 0.79 |
| 1:A:396:HIS:CE1 | 1:B:396:HIS:ND1 | 2.50 | 0.79 |
| 1:D:398:ALA:H | 1:D:399:LEU:CB | 1.95 | 0.79 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:441:GLN:O | 1:C:442:ALA:O | 2.01 | 0.79 |
| 1:A:398:ALA:H | 1:A:399:LEU:CB | 1.96 | 0.79 |
| 1:D:50:LEU:HD12 | 1:D:143:LEU:HD13 | 1.64 | 0.79 |
| 3:D:502:NAD:C4B | 5:D:604:HOH:O | 2.31 | 0.79 |
| 1:A:256:ALA:H | 1:A:272:ASN:ND2 | 1.80 | 0.79 |
| 1:A:440:GLN:NE2 | 1:A:440:GLN:CA | 2.43 | 0.78 |
| 1:C:270:ARG:NE | 5:C:607:HOH:O | 2.15 | 0.78 |
| 1:A:93:VAL:HG23 | 1:A:104:ASP:HB3 | 1.65 | 0.78 |
| 1:C:256:ALA:H | 1:C:272:ASN:ND2 | 1.82 | 0.78 |
| 1:A:396:HIS:ND1 | 1:B:396:HIS:CE1 | 2.53 | 0.77 |
| 1:C:50:LEU:HD12 | 1:C:143:LEU:HD13 | 1.66 | 0.77 |
| 1:B:44:CYS:HA | 2:B:501:FAD:C5X | 2.14 | 0.77 |
| 1:C:418:LEU:HD13 | 1:C:439:ALA:HB3 | 1.66 | 0.77 |
| 1:C:149:ALA:HB1 | 1:C:150:ARG:CA | 2.14 | 0.77 |
| 1:A:295:TRP:CE2 | 1:A:297:PRO:HG3 | 2.20 | 0.77 |
| 1:B:440:GLN:HA | 1:B:440:GLN:HE21 | 1.45 | 0.77 |
| 1:A:121:PRO:HG3 | 1:D:149:ALA:CB | 2.15 | 0.76 |
| 1:D:256:ALA:H | 1:D:272:ASN:HD21 | 1.30 | 0.76 |
| 1:B:328:ILE:HG13 | 1:B:337:ALA:HB2 | 1.67 | 0.76 |
| 1:B:236:LEU:C | 1:B:236:LEU:HD12 | 2.06 | 0.76 |
| 1:C:149:ALA:CB | 1:C:150:ARG:CA | 2.56 | 0.76 |
| 1:A:441:GLN:O | 1:A:442:ALA:O | 2.03 | 0.76 |
| 1:B:437:ILE:C | 1:B:437:ILE:CD1 | 2.53 | 0.76 |
| 1:D:224:ALA:O | 1:D:232:VAL:O | 2.03 | 0.76 |
| 1:A:94:HIS:CD2 | 1:A:94:HIS:H | 2.04 | 0.75 |
| 1:C:88:LEU:O | 1:C:89:ARG:HB2 | 1.87 | 0.75 |
| 3:D:502:NAD:C4A | 3:D:502:NAD:O2B | 2.29 | 0.74 |
| 1:A:91:LEU:O | 1:A:92:THR:HG23 | 1.87 | 0.74 |
| 1:C:34:GLU:HG2 | 1:C:39:VAL:HG23 | 1.68 | 0.74 |
| 1:C:270:ARG:CD | 5:C:607:HOH:O | 2.36 | 0.74 |
| 3:A:502:NAD:O5B | 3:A:502:NAD:O3B | 2.00 | 0.74 |
| 1:B:398:ALA:H | 1:B:399:LEU:CB | 2.01 | 0.74 |
| 1:D:398:ALA:O | 5:D:602:HOH:O | 2.06 | 0.74 |
| 1:C:381:GLU:N | 5:C:604:HOH:O | 2.19 | 0.73 |
| 1:B:87:GLU:HA | 1:B:88:LEU:C | 2.08 | 0.73 |
| 1:B:191:GLU:OE2 | 1:B:355:LYS:HE3 | 1.86 | 0.73 |
| 1:A:396:HIS:CD2 | 1:B:396:HIS:CE1 | 2.76 | 0.73 |
| 1:C:191:GLU:OE2 | 1:C:355:LYS:HE3 | 1.87 | 0.73 |
| 1:D:441:GLN:O | 1:D:442:ALA:O | 2.06 | 0.73 |
| 1:B:151:ARG:CG | 1:B:174:GLN:HE21 | 2.02 | 0.73 |
| 1:A:94:HIS:CD2 | 1:A:94:HIS:N | 2.57 | 0.73 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:224:ALA:O | 1:C:232:VAL:O | 2.06 | 0.72 |
| 1:B:256:ALA:H | 1:B:272:ASN:HD21 | 1.37 | 0.72 |
| 1:C:87:GLU:HA | 1:C:88:LEU:C | 2.10 | 0.72 |
| 1:D:44:CYS:HA | 2:D:501:FAD:C5X | 2.20 | 0.72 |
| 1:D:89:ARG:O | 1:D:90:THR:O | 2.08 | 0.72 |
| 1:A:89:ARG:C | 1:A:90:THR:O | 2.27 | 0.72 |
| 1:A:151:ARG:HG2 | 1:A:174:GLN:HE21 | 1.54 | 0.72 |
| 1:C:156:GLY:HA2 | 3:C:502:NAD:H2B | 1.71 | 0.72 |
| 1:D:91:LEU:HD13 | 1:D:103:GLN:OE1 | 1.89 | 0.72 |
| 1:B:78:ARG:NH1 | 5:B:604:HOH:O | 2.21 | 0.72 |
| 1:C:382:GLY:N | 5:C:604:HOH:O | 1.97 | 0.72 |
| 3:D:502:NAD:H51A | 5:D:604:HOH:O | 1.88 | 0.72 |
| 1:B:91:LEU:HD13 | 1:B:103:GLN:OE1 | 1.89 | 0.71 |
| 1:B:116:ARG:NH1 | 1:B:244:ARG:HH11 | 1.88 | 0.71 |
| 1:D:94:HIS:CD2 | 1:D:94:HIS:H | 2.08 | 0.71 |
| 1:B:49:VAL:HG11 | 1:B:57:LEU:HD13 | 1.70 | 0.71 |
| 1:A:91:LEU:HD13 | 1:A:103:GLN:OE1 | 1.90 | 0.71 |
| 3:A:502:NAD:C4A | 3:A:502:NAD:HO2A | 2.00 | 0.71 |
| 1:C:151:ARG:HG2 | 1:C:174:GLN:HE21 | 1.55 | 0.71 |
| 1:C:440:GLN:NE2 | 5:C:608:HOH:O | 2.23 | 0.71 |
| 1:B:123:PRO:HG2 | 1:B:215:ALA:HB2 | 1.72 | 0.71 |
| 1:B:395:GLY:C | 1:B:397:GLY:CA | 2.58 | 0.71 |
| 1:D:373:LEU:HD22 | 1:D:434:PRO:HG2 | 1.73 | 0.71 |
| 1:D:191:GLU:OE2 | 1:D:355:LYS:HE3 | 1.90 | 0.71 |
| 1:A:396:HIS:H | 1:B:396:HIS:HE1 | 1.38 | 0.71 |
| 1:D:148:GLN:O | 1:D:149:ALA:O | 2.09 | 0.70 |
| 3:D:502:NAD:O5B | 3:D:502:NAD:O3B | 2.06 | 0.70 |
| 1:D:98:GLU:HA | 1:D:98:GLU:OE2 | 1.89 | 0.70 |
| 1:B:359:GLN:HB2 | 1:B:374:TRP:CD1 | 2.26 | 0.70 |
| 1:A:91:LEU:O | 1:A:92:THR:OG1 | 2.10 | 0.70 |
| 1:A:396:HIS:HE1 | 1:B:396:HIS:H | 1.39 | 0.70 |
| 3:C:502:NAD:O3B | 3:C:502:NAD:O5B | 1.99 | 0.70 |
| 1:D:123:PRO:HG2 | 1:D:215:ALA:HB2 | 1.73 | 0.70 |
| 1:B:98:GLU:OE2 | 1:B:98:GLU:HA | 1.91 | 0.70 |
| 1:C:116:ARG:NH1 | 1:C:244:ARG:HD2 | 2.06 | 0.70 |
| 1:A:396:HIS:H | 1:B:396:HIS:CE1 | 2.10 | 0.70 |
| 1:C:163:GLU:OE1 | 5:C:605:HOH:O | 2.08 | 0.70 |
| 1:B:173:LEU:HD23 | 1:B:173:LEU:N | 2.07 | 0.70 |
| 1:A:396:HIS:NE2 | 1:B:396:HIS:NE2 | 2.39 | 0.69 |
| 1:B:395:GLY:C | 1:B:397:GLY:HA2 | 2.11 | 0.69 |
| 1:D:130:VAL:O | 5:D:603:HOH:O | 2.09 | 0.69 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 3:B:502:NAD:C4A | 3:B:502:NAD:O2B | 2.35 | 0.69 |
| 1:B:116:ARG:NH1 | 1:B:244:ARG:HD2 | 2.07 | 0.69 |
| 1:B:295:TRP:CE2 | 1:B:297:PRO:HG3 | 2.27 | 0.69 |
| 1:D:24:GLU:HG2 | 1:D:316:ARG:HG3 | 1.75 | 0.69 |
| 3:D:502:NAD:C5B | 5:D:604:HOH:O | 2.41 | 0.69 |
| 1:A:92:THR:O | 1:A:93:VAL:C | 2.30 | 0.69 |
| 3:B:502:NAD:O5B | 3:B:502:NAD:O3B | 2.00 | 0.69 |
| 1:C:64:THR:OG1 | 1:C:67:GLU:HG3 | 1.93 | 0.69 |
| 1:C:295:TRP:CE2 | 1:C:297:PRO:HG3 | 2.28 | 0.69 |
| 1:B:386:LEU:O | 5:B:603:HOH:O | 2.11 | 0.69 |
| 1:B:440:GLN:HA | 5:B:612:HOH:O | 1.92 | 0.69 |
| 1:C:93:VAL:HG23 | 1:C:104:ASP:HB3 | 1.72 | 0.69 |
| 1:A:398:ALA:N | 1:A:399:LEU:HB2 | 2.02 | 0.68 |
| 1:B:37:GLY:HA2 | 1:B:77:THR:CB | 2.15 | 0.68 |
| 1:C:44:CYS:HA | 2:C:501:FAD:C5X | 2.23 | 0.68 |
| 1:A:85:ASP:H | 1:A:92:THR:HA | 1.56 | 0.68 |
| 1:A:396:HIS:CE1 | 1:B:396:HIS:H | 2.11 | 0.68 |
| 1:B:149:ALA:HB3 | 1:B:150:ARG:HA | 1.70 | 0.68 |
| 1:D:236:LEU:HD12 | 1:D:236:LEU:C | 2.14 | 0.68 |
| 3:A:502:NAD:C4B | 5:A:604:HOH:O | 2.42 | 0.68 |
| 1:B:86:TYR:CE1 | 1:B:88:LEU:HD22 | 2.29 | 0.68 |
| 1:D:287:HIS:HD2 | 1:D:289:VAL:H | 1.41 | 0.68 |
| 1:A:396:HIS:CE1 | 1:B:396:HIS:CD2 | 2.81 | 0.68 |
| 1:B:49:VAL:HG11 | 1:B:57:LEU:CD1 | 2.24 | 0.68 |
| 1:D:25:ASN:OD1 | 1:D:27:GLU:HB2 | 1.94 | 0.68 |
| 1:B:89:ARG:O | 1:B:90:THR:O | 2.11 | 0.67 |
| 1:B:270:ARG:HH11 | 1:B:270:ARG:HB2 | 1.59 | 0.67 |
| 1:C:92:THR:O | 1:C:93:VAL:C | 2.31 | 0.67 |
| 1:A:98:GLU:HA | 1:A:98:GLU:OE2 | 1.95 | 0.67 |
| 1:D:398:ALA:CA | 5:D:602:HOH:O | 2.43 | 0.67 |
| 1:A:44:CYS:HA | 2:A:501:FAD:C5X | 2.25 | 0.67 |
| 1:B:440:GLN:NE2 | 1:B:440:GLN:CA | 2.57 | 0.67 |
| 1:D:87:GLU:HA | 1:D:88:LEU:C | 2.15 | 0.67 |
| 1:D:398:ALA:N | 1:D:399:LEU:HB2 | 2.04 | 0.67 |
| 1:B:148:GLN:O | 1:B:149:ALA:O | 2.12 | 0.67 |
| 1:D:268:ARG:HH12 | 1:D:270:ARG:HH22 | 1.41 | 0.67 |
| 1:A:255:VAL:HA | 1:A:272:ASN:HD21 | 1.60 | 0.66 |
| 1:B:398:ALA:N | 1:B:399:LEU:HB2 | 2.08 | 0.66 |
| 1:B:34:GLU:HG2 | 1:B:39:VAL:HG23 | 1.76 | 0.66 |
| 1:B:221:ARG:O | 1:B:222:VAL:HG12 | 1.95 | 0.66 |
| 1:C:185:LEU:N | 1:C:186:PRO:HD3 | 2.10 | 0.66 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:85:ASP:OD1 | 1:C:88:LEU:HD23 | 1.96 | 0.66 |
| 1:C:91:LEU:HD13 | 1:C:103:GLN:OE1 | 1.95 | 0.66 |
| 1:B:91:LEU:O | 1:B:92:THR:OG1 | 2.13 | 0.66 |
| 1:C:94:HIS:N | 1:C:94:HIS:CD2 | 2.64 | 0.66 |
| 3:A:502:NAD:C5B | 5:A:604:HOH:O | 2.44 | 0.66 |
| 1:C:437:ILE:HD12 | 1:C:438:ALA:N | 2.10 | 0.66 |
| 1:A:121:PRO:HG3 | 1:D:149:ALA:HB3 | 1.78 | 0.65 |
| 1:B:76:HIS:HB3 | 1:B:79:HIS:CE1 | 2.29 | 0.65 |
| 1:A:86:TYR:CE1 | 1:A:88:LEU:HD22 | 2.31 | 0.65 |
| 1:B:116:ARG:HH12 | 1:B:244:ARG:HH11 | 1.44 | 0.65 |
| 1:D:94:HIS:CD2 | 1:D:94:HIS:N | 2.64 | 0.65 |
| 1:A:440:GLN:OE1 | 5:A:602:HOH:O | 2.14 | 0.65 |
| 1:B:149:ALA:HA | 1:B:173:LEU:HD22 | 1.78 | 0.65 |
| 1:B:87:GLU:N | 1:B:87:GLU:OE2 | 2.30 | 0.65 |
| 1:B:410:ARG:HG3 | 1:B:411:GLU:N | 2.09 | 0.65 |
| 1:B:44:CYS:HA | 2:B:501:FAD:C6 | 2.27 | 0.65 |
| 1:A:156:GLY:HA2 | 3:A:502:NAD:H2B | 1.77 | 0.65 |
| 1:A:270:ARG:HB2 | 1:A:270:ARG:HH11 | 1.62 | 0.65 |
| 1:B:156:GLY:HA2 | 3:B:502:NAD:H2B | 1.78 | 0.65 |
| 1:C:395:GLY:HA3 | 1:C:397:GLY:O | 1.97 | 0.64 |
| 1:B:85:ASP:H | 1:B:92:THR:CA | 2.09 | 0.64 |
| 1:A:34:GLU:HG2 | 1:A:39:VAL:HG23 | 1.79 | 0.64 |
| 1:B:92:THR:O | 1:B:93:VAL:C | 2.35 | 0.64 |
| 1:A:149:ALA:HA | 1:A:173:LEU:HD22 | 1.80 | 0.64 |
| 1:C:272:ASN:H | 1:C:272:ASN:ND2 | 1.93 | 0.64 |
| 1:D:85:ASP:H | 1:D:92:THR:HA | 1.62 | 0.64 |
| 1:C:287:HIS:HD2 | 1:C:289:VAL:H | 1.46 | 0.64 |
| 1:C:440:GLN:NE2 | 1:C:440:GLN:CA | 2.59 | 0.64 |
| 1:B:88:LEU:O | 1:B:89:ARG:HB2 | 1.99 | 0.63 |
| 1:D:50:LEU:CD1 | 1:D:143:LEU:HD13 | 2.27 | 0.63 |
| 1:C:94:HIS:CD2 | 1:C:94:HIS:H | 2.16 | 0.63 |
| 1:D:87:GLU:N | 1:D:87:GLU:OE2 | 2.30 | 0.63 |
| 1:A:91:LEU:C | 1:A:92:THR:HG23 | 2.19 | 0.63 |
| 1:D:34:GLU:HG2 | 1:D:39:VAL:HG23 | 1.81 | 0.63 |
| 1:A:88:LEU:O | 1:A:89:ARG:HB2 | 1.99 | 0.63 |
| 1:B:166:GLU:HA | 1:B:332:PHE:CZ | 2.34 | 0.63 |
| 1:D:359:GLN:HB2 | 1:D:374:TRP:CD1 | 2.33 | 0.63 |
| 1:B:123:PRO:HG2 | 1:B:215:ALA:CB | 2.28 | 0.62 |
| 1:A:116:ARG:HH12 | 1:A:244:ARG:HD2 | 1.62 | 0.62 |
| 1:D:151:ARG:HG2 | 1:D:174:GLN:HE21 | 1.64 | 0.62 |
| 1:A:208:TRP:HB3 | 1:A:211:VAL:HG21 | 1.82 | 0.62 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:418:LEU:HD13 | 1:A:439:ALA:HB3 | 1.80 | 0.62 |
| 1:C:98:GLU:OE2 | 1:C:98:GLU:HA | 1.98 | 0.62 |
| 1:D:116:ARG:HH12 | 1:D:244:ARG:HD2 | 1.62 | 0.62 |
| 1:C:398:ALA:H | 1:C:399:LEU:CB | 2.11 | 0.62 |
| 1:A:87:GLU:OE2 | 1:A:87:GLU:N | 2.33 | 0.62 |
| 1:B:3:LYS:HA | 5:B:613:HOH:O | 1.97 | 0.62 |
| 1:C:116:ARG:NH1 | 1:C:244:ARG:HH11 | 1.97 | 0.62 |
| 1:A:85:ASP:O | 1:A:92:THR:CG2 | 2.46 | 0.61 |
| 1:A:270:ARG:HB2 | 1:A:270:ARG:NH1 | 2.16 | 0.61 |
| 1:C:87:GLU:OE2 | 1:C:87:GLU:N | 2.33 | 0.61 |
| 1:B:83:ASP:HB3 | 1:B:94:HIS:CD2 | 2.35 | 0.61 |
| 1:C:49:VAL:HG11 | 1:C:57:LEU:HD13 | 1.81 | 0.61 |
| 1:D:358:ILE:C | 1:D:358:ILE:HD12 | 2.20 | 0.61 |
| 1:A:398:ALA:HA | 1:A:400:ARG:H | 1.66 | 0.61 |
| 2:A:501:FAD:H2' | 4:A:503:COA:S1P | 2.40 | 0.61 |
| 1:C:373:LEU:HD22 | 1:C:434:PRO:HG2 | 1.81 | 0.61 |
| 1:A:437:ILE:C | 1:A:437:ILE:CD1 | 2.59 | 0.61 |
| 1:B:91:LEU:C | 1:B:92:THR:HG23 | 2.20 | 0.61 |
| 1:C:437:ILE:C | 1:C:437:ILE:CD1 | 2.55 | 0.61 |
| 1:A:411:GLU:OE1 | 1:A:411:GLU:HA | 2.01 | 0.61 |
| 1:C:24:GLU:HG2 | 1:C:316:ARG:HG3 | 1.82 | 0.61 |
| 1:D:328:ILE:HG13 | 1:D:337:ALA:HB2 | 1.81 | 0.61 |
| 1:A:396:HIS:N | 1:B:396:HIS:HE1 | 1.99 | 0.61 |
| 1:C:85:ASP:H | 1:C:92:THR:HA | 1.64 | 0.61 |
| 1:B:255:VAL:HA | 1:B:272:ASN:HD21 | 1.65 | 0.61 |
| 1:D:156:GLY:HA2 | 3:D:502:NAD:H2B | 1.83 | 0.60 |
| 1:A:410:ARG:NH1 | 1:B:410:ARG:HH12 | 1.99 | 0.60 |
| 1:D:270:ARG:HH11 | 1:D:270:ARG:HB2 | 1.65 | 0.60 |
| 1:B:395:GLY:C | 1:B:397:GLY:HA3 | 2.22 | 0.60 |
| 1:B:115:ALA:HB1 | 1:B:244:ARG:O | 2.02 | 0.60 |
| 1:D:38:TRP:CE3 | 1:D:136:MET:HE2 | 2.37 | 0.60 |
| 1:D:217:ARG:HB3 | 1:D:224:ALA:HB3 | 1.82 | 0.60 |
| 1:B:400:ARG:HB3 | 1:B:435:LEU:HD11 | 1.82 | 0.60 |
| 1:A:49:VAL:HG11 | 1:A:57:LEU:HD13 | 1.83 | 0.59 |
| 1:C:270:ARG:HB2 | 1:C:270:ARG:HH11 | 1.66 | 0.59 |
| 1:D:161:GLY:H | 1:D:164:ALA:H | 1.48 | 0.59 |
| 1:B:185:LEU:N | 1:B:186:PRO:HD3 | 2.16 | 0.59 |
| 1:A:87:GLU:HA | 1:A:88:LEU:C | 2.22 | 0.59 |
| 1:A:272:ASN:H | 1:A:272:ASN:HD22 | 1.47 | 0.59 |
| 1:B:93:VAL:CG2 | 1:B:104:ASP:HB3 | 2.30 | 0.59 |
| 1:B:400:ARG:HH12 | 1:B:429:SER:HB2 | 1.67 | 0.59 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|------------------|--------------------------|-------------------|
| 1:A:85:ASP:H | 1:A:92:THR:CA | 2.15 | 0.59 |
| 1:A:91:LEU:O | 1:A:92:THR:CG2 | 2.50 | 0.59 |
| 1:C:221:ARG:O | 1:C:222:VAL:HG12 | 2.02 | 0.59 |
| 1:A:396:HIS:HE1 | 1:B:396:HIS:N | 2.00 | 0.59 |
| 1:B:214:GLU:O | 1:B:215:ALA:HB2 | 2.03 | 0.59 |
| 1:D:78:ARG:HB3 | 1:D:78:ARG:NH1 | 2.18 | 0.59 |
| 1:D:83:ASP:HB3 | 1:D:94:HIS:CD2 | 2.37 | 0.59 |
| 1:C:49:VAL:HG11 | 1:C:57:LEU:CD1 | 2.33 | 0.58 |
| 1:D:357:PHE:HD2 | 1:D:376:GLU:HB2 | 1.68 | 0.58 |
| 1:A:85:ASP:CB | 1:A:92:THR:HA | 2.34 | 0.58 |
| 1:A:185:LEU:N | 1:A:186:PRO:HD3 | 2.17 | 0.58 |
| 1:B:44:CYS:HB3 | 2:B:501:FAD:C4X | 2.34 | 0.58 |
| 1:B:78:ARG:CZ | 1:B:78:ARG:HB3 | 2.34 | 0.58 |
| 1:C:50:LEU:CD1 | 1:C:143:LEU:HD13 | 2.34 | 0.58 |
| 1:C:149:ALA:HA | 1:C:173:LEU:HD22 | 1.84 | 0.58 |
| 1:D:398:ALA:HB3 | 5:D:602:HOH:O | 2.03 | 0.58 |
| 1:D:89:ARG:C | 1:D:90:THR:O | 2.41 | 0.58 |
| 1:D:123:PRO:HG2 | 1:D:215:ALA:CB | 2.34 | 0.58 |
| 1:D:50:LEU:HD12 | 1:D:143:LEU:CD1 | 2.32 | 0.58 |
| 1:B:4:ARG:NH1 | 1:B:104:ASP:OD2 | 2.37 | 0.58 |
| 1:B:98:GLU:HB2 | 5:B:605:HOH:O | 2.04 | 0.58 |
| 1:A:440:GLN:C | 1:A:441:GLN:O | 2.41 | 0.57 |
| 1:B:94:HIS:HA | 1:B:102:PHE:O | 2.04 | 0.57 |
| 1:C:236:LEU:C | 1:C:236:LEU:HD12 | 2.24 | 0.57 |
| 1:D:116:ARG:NH1 | 1:D:244:ARG:HH11 | 2.01 | 0.57 |
| 1:D:44:CYS:HA | 2:D:501:FAD:C6 | 2.35 | 0.57 |
| 1:A:287:HIS:HD2 | 1:A:289:VAL:H | 1.53 | 0.57 |
| 1:B:440:GLN:C | 1:B:441:GLN:O | 2.42 | 0.57 |
| 1:D:85:ASP:CB | 1:D:92:THR:HA | 2.34 | 0.57 |
| 1:B:11:VAL:HG23 | 2:B:501:FAD:H4B | 1.87 | 0.57 |
| 1:A:85:ASP:OD1 | 1:A:88:LEU:HD23 | 2.05 | 0.57 |
| 1:C:78:ARG:CZ | 1:C:78:ARG:HB3 | 2.34 | 0.57 |
| 1:D:149:ALA:HA | 1:D:173:LEU:HD22 | 1.85 | 0.57 |
| 1:A:95:ASP:OD1 | 1:A:95:ASP:C | 2.42 | 0.57 |
| 1:B:58:GLU:O | 1:B:61:VAL:HG12 | 2.05 | 0.57 |
| 1:D:90:THR:OG1 | 1:D:91:LEU:O | 2.18 | 0.57 |
| 1:D:93:VAL:CG2 | 1:D:104:ASP:HB3 | 2.34 | 0.57 |
| 1:D:24:GLU:CG | 1:D:316:ARG:HG3 | 2.35 | 0.56 |
| 1:B:85:ASP:CA | 1:B:92:THR:HG22 | 2.35 | 0.56 |
| 1:C:400:ARG:HB3 | 1:C:435:LEU:HD11 | 1.87 | 0.56 |
| 1:A:121:PRO:CG | 1:D:149:ALA:CB | 2.84 | 0.56 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:270:ARG:NE | 5:C:610:HOH:O | 2.37 | 0.56 |
| 1:D:84:VAL:O | 1:D:86:TYR:HD1 | 1.87 | 0.56 |
| 1:D:185:LEU:N | 1:D:186:PRO:HD3 | 2.20 | 0.56 |
| 1:B:183:ARG:NH1 | 1:B:188:TRP:O | 2.39 | 0.56 |
| 1:D:208:TRP:HB3 | 1:D:211:VAL:HG21 | 1.87 | 0.56 |
| 1:D:173:LEU:HD23 | 1:D:173:LEU:N | 2.20 | 0.56 |
| 1:B:84:VAL:O | 1:B:86:TYR:HD1 | 1.89 | 0.56 |
| 1:B:270:ARG:HH11 | 1:B:270:ARG:CB | 2.19 | 0.56 |
| 1:B:270:ARG:CB | 1:B:270:ARG:NH1 | 2.69 | 0.56 |
| 1:B:287:HIS:HD2 | 1:B:289:VAL:H | 1.52 | 0.56 |
| 1:C:86:TYR:CE1 | 1:C:88:LEU:HD22 | 2.40 | 0.56 |
| 1:A:97:ALA:O | 1:A:98:GLU:OE1 | 2.24 | 0.56 |
| 1:A:359:GLN:HB2 | 1:A:374:TRP:CD1 | 2.41 | 0.56 |
| 1:B:395:GLY:O | 1:B:397:GLY:HA3 | 2.06 | 0.56 |
| 1:B:85:ASP:OD1 | 1:B:88:LEU:HD23 | 2.06 | 0.55 |
| 1:B:437:ILE:O | 1:B:441:GLN:HB3 | 2.07 | 0.55 |
| 1:D:398:ALA:N | 1:D:399:LEU:CB | 2.66 | 0.55 |
| 1:A:437:ILE:HD12 | 1:A:437:ILE:O | 2.06 | 0.55 |
| 1:B:8:VAL:HG13 | 1:B:81:VAL:HG13 | 1.87 | 0.55 |
| 1:B:85:ASP:N | 1:B:92:THR:HA | 2.18 | 0.55 |
| 1:D:418:LEU:HD13 | 1:D:439:ALA:HB3 | 1.87 | 0.55 |
| 1:B:85:ASP:CB | 1:B:92:THR:HA | 2.36 | 0.55 |
| 1:C:83:ASP:HB3 | 1:C:94:HIS:CD2 | 2.41 | 0.55 |
| 1:C:255:VAL:HA | 1:C:272:ASN:HD21 | 1.70 | 0.55 |
| 1:C:418:LEU:HD13 | 1:C:439:ALA:CB | 2.35 | 0.55 |
| 1:D:151:ARG:CG | 1:D:174:GLN:HE21 | 2.20 | 0.55 |
| 1:C:214:GLU:O | 1:C:215:ALA:HB2 | 2.06 | 0.55 |
| 1:D:343:LEU:HD22 | 1:D:355:LYS:HB3 | 1.88 | 0.55 |
| 1:D:86:TYR:HD1 | 1:D:86:TYR:H | 1.52 | 0.55 |
| 1:D:208:TRP:HB3 | 1:D:211:VAL:CG2 | 2.36 | 0.55 |
| 1:A:128:GLU:HG2 | 1:A:221:ARG:NH2 | 2.22 | 0.55 |
| 1:A:358:ILE:HD12 | 1:A:358:ILE:C | 2.28 | 0.55 |
| 1:B:216:PHE:CD1 | 1:B:225:VAL:HG22 | 2.42 | 0.55 |
| 1:C:256:ALA:H | 1:C:272:ASN:HD21 | 1.51 | 0.55 |
| 1:C:400:ARG:HH12 | 1:C:429:SER:CB | 2.16 | 0.55 |
| 1:D:88:LEU:O | 1:D:89:ARG:HB2 | 2.07 | 0.55 |
| 1:B:183:ARG:HG3 | 1:B:184:PRO:O | 2.07 | 0.55 |
| 1:C:381:GLU:CA | 5:C:604:HOH:O | 2.55 | 0.55 |
| 1:B:105:ARG:NH1 | 5:B:608:HOH:O | 2.40 | 0.55 |
| 1:B:78:ARG:HD3 | 5:B:604:HOH:O | 2.07 | 0.54 |
| 1:A:121:PRO:CG | 1:D:149:ALA:HB2 | 2.38 | 0.54 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 3:A:502:NAD:H51A | 5:A:604:HOH:O | 2.06 | 0.54 |
| 1:B:287:HIS:CD2 | 1:B:290:LEU:H | 2.25 | 0.54 |
| 1:D:398:ALA:HA | 1:D:400:ARG:H | 1.71 | 0.54 |
| 1:A:89:ARG:O | 1:A:90:THR:C | 2.45 | 0.54 |
| 1:B:83:ASP:O | 1:B:94:HIS:HD2 | 1.90 | 0.54 |
| 1:B:208:TRP:HB3 | 1:B:211:VAL:HG21 | 1.89 | 0.54 |
| 1:B:236:LEU:HD12 | 1:B:237:VAL:N | 2.21 | 0.54 |
| 1:D:78:ARG:HB3 | 1:D:78:ARG:CZ | 2.38 | 0.54 |
| 1:B:197:LYS:NZ | 5:B:607:HOH:O | 2.37 | 0.54 |
| 1:C:84:VAL:O | 1:C:86:TYR:HD1 | 1.90 | 0.54 |
| 1:A:437:ILE:HD12 | 1:A:438:ALA:N | 2.18 | 0.54 |
| 1:B:91:LEU:O | 1:B:92:THR:HG23 | 2.07 | 0.54 |
| 1:B:295:TRP:CZ2 | 1:B:297:PRO:HG3 | 2.43 | 0.54 |
| 1:B:373:LEU:HD22 | 1:B:434:PRO:CG | 2.35 | 0.54 |
| 1:C:41:TYR:CE2 | 1:C:136:MET:HG2 | 2.43 | 0.54 |
| 1:A:92:THR:OG1 | 1:A:93:VAL:N | 2.37 | 0.54 |
| 1:A:8:VAL:HG13 | 1:A:81:VAL:HG13 | 1.90 | 0.54 |
| 1:A:85:ASP:CA | 1:A:92:THR:HG22 | 2.38 | 0.54 |
| 1:B:241:THR:HA | 3:B:502:NAD:O2B | 2.08 | 0.54 |
| 1:C:343:LEU:HD22 | 1:C:355:LYS:HB3 | 1.89 | 0.54 |
| 1:C:357:PHE:HD2 | 1:C:376:GLU:HB2 | 1.73 | 0.54 |
| 1:B:78:ARG:NH1 | 1:B:78:ARG:HB3 | 2.23 | 0.53 |
| 1:B:151:ARG:HG2 | 1:B:174:GLN:NE2 | 2.15 | 0.53 |
| 1:A:128:GLU:HG2 | 1:A:221:ARG:CZ | 2.37 | 0.53 |
| 3:D:502:NAD:C4A | 3:D:502:NAD:HO2A | 2.20 | 0.53 |
| 1:C:270:ARG:HH11 | 1:C:270:ARG:CB | 2.21 | 0.53 |
| 1:D:8:VAL:HG13 | 1:D:81:VAL:HG13 | 1.89 | 0.53 |
| 1:D:268:ARG:NH1 | 1:D:270:ARG:HH22 | 2.06 | 0.53 |
| 1:D:49:VAL:HG11 | 1:D:57:LEU:HD13 | 1.91 | 0.53 |
| 1:A:173:LEU:N | 1:A:173:LEU:HD23 | 2.24 | 0.53 |
| 1:C:89:ARG:O | 1:C:90:THR:O | 2.27 | 0.53 |
| 1:A:148:GLN:O | 1:A:149:ALA:O | 2.27 | 0.53 |
| 1:D:11:VAL:HG23 | 2:D:501:FAD:H4B | 1.91 | 0.53 |
| 1:D:256:ALA:N | 1:D:272:ASN:HD21 | 2.03 | 0.53 |
| 1:B:124:GLY:O | 1:B:127:GLN:HG3 | 2.08 | 0.53 |
| 1:C:148:GLN:O | 1:C:149:ALA:O | 2.26 | 0.53 |
| 1:D:426:PRO:HB2 | 1:D:427:PRO:HD3 | 1.91 | 0.53 |
| 1:A:12:ALA:HB3 | 2:A:501:FAD:H5'2 | 1.91 | 0.52 |
| 1:D:86:TYR:CE1 | 1:D:88:LEU:HD22 | 2.44 | 0.52 |
| 1:A:44:CYS:HA | 2:A:501:FAD:C6 | 2.40 | 0.52 |
| 1:C:282:VAL:O | 1:C:282:VAL:HG22 | 2.09 | 0.52 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:39:VAL:HG11 | 1:A:75:VAL:HG21 | 1.91 | 0.52 |
| 1:C:358:ILE:HD12 | 1:C:358:ILE:C | 2.29 | 0.52 |
| 1:A:396:HIS:CE1 | 1:B:395:GLY:HA2 | 2.45 | 0.52 |
| 1:A:400:ARG:HH12 | 1:A:429:SER:HB2 | 1.73 | 0.52 |
| 1:B:90:THR:CA | 1:B:92:THR:HG23 | 2.09 | 0.52 |
| 1:B:208:TRP:HB3 | 1:B:211:VAL:CG2 | 2.39 | 0.52 |
| 1:C:86:TYR:HD1 | 1:C:86:TYR:H | 1.54 | 0.52 |
| 3:C:502:NAD:O2B | 3:C:502:NAD:N3A | 2.42 | 0.52 |
| 1:A:217:ARG:HB3 | 1:A:224:ALA:HB3 | 1.92 | 0.52 |
| 1:B:56:ARG:NH1 | 1:B:59:ARG:HD2 | 2.24 | 0.52 |
| 1:B:173:LEU:HD23 | 1:B:173:LEU:H | 1.74 | 0.52 |
| 1:C:56:ARG:NH1 | 1:C:59:ARG:HD2 | 2.24 | 0.52 |
| 1:D:85:ASP:H | 1:D:92:THR:CA | 2.22 | 0.52 |
| 1:B:292:ARG:HB2 | 1:B:293:PRO:HD2 | 1.92 | 0.52 |
| 1:C:50:LEU:HD12 | 1:C:143:LEU:CD1 | 2.39 | 0.52 |
| 1:A:151:ARG:CG | 1:A:174:GLN:HE21 | 2.20 | 0.52 |
| 1:B:98:GLU:CB | 5:B:605:HOH:O | 2.57 | 0.52 |
| 1:C:88:LEU:O | 1:C:89:ARG:CB | 2.55 | 0.52 |
| 3:D:502:NAD:O2B | 3:D:502:NAD:N3A | 2.42 | 0.52 |
| 1:A:395:GLY:HA3 | 1:A:397:GLY:O | 2.10 | 0.51 |
| 1:A:400:ARG:HH12 | 1:A:429:SER:CB | 2.22 | 0.51 |
| 1:B:24:GLU:CG | 1:B:316:ARG:HG3 | 2.40 | 0.51 |
| 3:D:502:NAD:O4B | 5:D:604:HOH:O | 2.18 | 0.51 |
| 1:A:149:ALA:HB3 | 1:A:150:ARG:CA | 2.31 | 0.51 |
| 1:C:8:VAL:HG13 | 1:C:81:VAL:HG13 | 1.92 | 0.51 |
| 1:C:157:ALA:HB2 | 1:C:177:LEU:HD22 | 1.91 | 0.51 |
| 1:B:84:VAL:HG13 | 1:B:92:THR:HB | 1.93 | 0.51 |
| 1:C:268:ARG:HG2 | 1:C:312:VAL:HG21 | 1.93 | 0.51 |
| 1:D:221:ARG:O | 1:D:222:VAL:HG12 | 2.09 | 0.51 |
| 1:D:295:TRP:CE2 | 1:D:297:PRO:HG3 | 2.46 | 0.51 |
| 1:A:24:GLU:HG2 | 1:A:316:ARG:HG3 | 1.93 | 0.51 |
| 1:D:16:SER:HB2 | 1:D:306:GLY:HA3 | 1.93 | 0.51 |
| 1:A:373:LEU:HD22 | 1:A:434:PRO:HG2 | 1.92 | 0.51 |
| 1:C:78:ARG:HB3 | 1:C:78:ARG:NH1 | 2.25 | 0.51 |
| 1:C:270:ARG:CB | 1:C:270:ARG:NH1 | 2.74 | 0.51 |
| 2:C:501:FAD:O2' | 2:C:501:FAD:H9 | 2.10 | 0.51 |
| 1:A:90:THR:CA | 1:A:92:THR:HG23 | 2.05 | 0.51 |
| 1:A:270:ARG:NH1 | 1:A:270:ARG:CB | 2.74 | 0.51 |
| 1:B:94:HIS:CD2 | 1:B:94:HIS:H | 2.27 | 0.51 |
| 1:D:56:ARG:NH1 | 1:D:59:ARG:HH11 | 2.09 | 0.51 |
| 1:A:82:VAL:HG12 | 1:A:82:VAL:O | 2.11 | 0.51 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:160:ILE:HD11 | 3:B:502:NAD:O1N | 2.11 | 0.51 |
| 1:B:357:PHE:HD2 | 1:B:376:GLU:HB2 | 1.74 | 0.51 |
| 1:D:157:ALA:HB2 | 1:D:177:LEU:HD22 | 1.92 | 0.51 |
| 1:C:44:CYS:HA | 2:C:501:FAD:C6 | 2.41 | 0.51 |
| 1:C:166:GLU:HA | 1:C:332:PHE:CZ | 2.46 | 0.51 |
| 1:D:76:HIS:HB3 | 1:D:79:HIS:CE1 | 2.45 | 0.51 |
| 1:D:166:GLU:HA | 1:D:332:PHE:CZ | 2.46 | 0.51 |
| 1:B:244:ARG:NH2 | 5:B:611:HOH:O | 2.44 | 0.50 |
| 1:D:272:ASN:HD22 | 1:D:272:ASN:H | 1.58 | 0.50 |
| 1:A:267:GLU:OE2 | 1:A:319:ARG:HD3 | 2.10 | 0.50 |
| 1:B:146:LEU:HD12 | 1:B:173:LEU:HD11 | 1.92 | 0.50 |
| 1:A:91:LEU:O | 1:A:92:THR:CB | 2.60 | 0.50 |
| 1:B:50:LEU:HD12 | 1:B:143:LEU:CD1 | 2.36 | 0.50 |
| 1:C:76:HIS:HB3 | 1:C:79:HIS:CE1 | 2.46 | 0.50 |
| 1:B:105:ARG:HA | 5:B:601:HOH:O | 2.12 | 0.50 |
| 1:C:25:ASN:OD1 | 1:C:27:GLU:HB2 | 2.12 | 0.50 |
| 1:C:116:ARG:HH12 | 1:C:244:ARG:HH11 | 1.59 | 0.50 |
| 1:C:437:ILE:HD12 | 1:C:437:ILE:O | 2.10 | 0.50 |
| 1:C:440:GLN:C | 1:C:441:GLN:O | 2.49 | 0.50 |
| 1:A:221:ARG:O | 1:A:222:VAL:HG12 | 2.11 | 0.50 |
| 1:B:50:LEU:CD1 | 1:B:143:LEU:HD13 | 2.35 | 0.50 |
| 1:C:287:HIS:CD2 | 1:C:289:VAL:H | 2.29 | 0.50 |
| 1:D:424:TYR:O | 5:D:605:HOH:O | 2.19 | 0.50 |
| 1:A:24:GLU:CG | 1:A:316:ARG:HG3 | 2.41 | 0.50 |
| 1:B:94:HIS:CD2 | 1:B:94:HIS:N | 2.79 | 0.50 |
| 1:D:341:LEU:O | 1:D:388:GLY:HA3 | 2.11 | 0.50 |
| 1:A:116:ARG:NH1 | 1:A:244:ARG:HH11 | 2.09 | 0.50 |
| 1:A:395:GLY:HA2 | 1:B:396:HIS:CE1 | 2.47 | 0.50 |
| 1:D:97:ALA:O | 1:D:98:GLU:OE1 | 2.30 | 0.50 |
| 1:A:166:GLU:HA | 1:A:332:PHE:CZ | 2.47 | 0.50 |
| 1:C:3:LYS:NZ | 1:C:3:LYS:HB3 | 2.27 | 0.50 |
| 1:C:159:TYR:HB3 | 3:C:502:NAD:C4N | 2.42 | 0.50 |
| 1:A:11:VAL:HG23 | 2:A:501:FAD:H4B | 1.94 | 0.49 |
| 1:A:208:TRP:HB3 | 1:A:211:VAL:CG2 | 2.42 | 0.49 |
| 1:B:160:ILE:HG12 | 3:B:502:NAD:PN | 2.51 | 0.49 |
| 1:D:85:ASP:O | 1:D:86:TYR:O | 2.30 | 0.49 |
| 1:D:149:ALA:HB3 | 1:D:150:ARG:CA | 2.31 | 0.49 |
| 1:B:139:GLY:O | 1:B:143:LEU:HB2 | 2.12 | 0.49 |
| 1:B:400:ARG:HH12 | 1:B:429:SER:CB | 2.25 | 0.49 |
| 1:D:216:PHE:CD1 | 1:D:225:VAL:HG22 | 2.46 | 0.49 |
| 1:A:90:THR:HA | 1:A:91:LEU:O | 2.12 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:272:ASN:ND2 | 1:A:272:ASN:H | 2.10 | 0.49 |
| 3:A:502:NAD:O2B | 3:A:502:NAD:N3A | 2.38 | 0.49 |
| 1:B:44:CYS:HB3 | 2:B:501:FAD:N5 | 2.27 | 0.49 |
| 1:C:97:ALA:O | 1:C:98:GLU:OE1 | 2.29 | 0.49 |
| 1:D:400:ARG:HB3 | 1:D:435:LEU:HD11 | 1.94 | 0.49 |
| 1:B:86:TYR:HD1 | 1:B:86:TYR:H | 1.57 | 0.49 |
| 1:C:208:TRP:HB3 | 1:C:211:VAL:CG2 | 2.43 | 0.49 |
| 1:C:37:GLY:CA | 1:C:77:THR:HB | 2.35 | 0.49 |
| 1:C:224:ALA:O | 1:C:225:VAL:CB | 2.60 | 0.49 |
| 1:D:82:VAL:HG12 | 1:D:82:VAL:O | 2.13 | 0.49 |
| 1:A:171:ARG:NH2 | 5:A:605:HOH:O | 2.32 | 0.49 |
| 2:B:501:FAD:H2' | 4:B:503:COA:S1P | 2.52 | 0.49 |
| 1:C:272:ASN:ND2 | 1:C:272:ASN:N | 2.61 | 0.49 |
| 1:D:216:PHE:HD1 | 1:D:225:VAL:HG22 | 1.78 | 0.49 |
| 1:B:84:VAL:HG22 | 1:B:93:VAL:HG12 | 1.95 | 0.49 |
| 1:B:287:HIS:HD2 | 1:B:290:LEU:H | 1.61 | 0.49 |
| 1:D:287:HIS:CD2 | 1:D:289:VAL:H | 2.25 | 0.49 |
| 1:B:92:THR:OG1 | 1:B:93:VAL:N | 2.46 | 0.49 |
| 1:C:433:ASP:O | 1:C:434:PRO:C | 2.51 | 0.49 |
| 1:D:23:ARG:NH2 | 4:D:503:COA:O5A | 2.46 | 0.49 |
| 1:D:160:ILE:HD11 | 3:D:502:NAD:O1N | 2.13 | 0.49 |
| 1:B:426:PRO:N | 1:B:427:PRO:CD | 2.76 | 0.49 |
| 1:C:224:ALA:O | 1:C:225:VAL:HB | 2.13 | 0.49 |
| 1:C:361:ARG:NH1 | 1:C:370:SER:OG | 2.46 | 0.49 |
| 1:D:160:ILE:CD1 | 1:D:160:ILE:CG2 | 2.91 | 0.49 |
| 1:A:37:GLY:CA | 1:A:77:THR:HB | 2.26 | 0.48 |
| 1:D:25:ASN:OD1 | 1:D:25:ASN:C | 2.52 | 0.48 |
| 1:A:437:ILE:O | 1:A:441:GLN:HB3 | 2.13 | 0.48 |
| 1:B:97:ALA:O | 1:B:98:GLU:OE1 | 2.30 | 0.48 |
| 1:B:269:MET:HE3 | 1:B:320:PHE:CD2 | 2.48 | 0.48 |
| 1:B:440:GLN:NE2 | 5:B:612:HOH:O | 2.47 | 0.48 |
| 1:A:328:ILE:HG13 | 1:A:337:ALA:HB2 | 1.95 | 0.48 |
| 1:D:92:THR:O | 1:D:93:VAL:C | 2.49 | 0.48 |
| 1:D:160:ILE:CD1 | 1:D:160:ILE:HG21 | 2.43 | 0.48 |
| 1:D:398:ALA:CB | 5:D:602:HOH:O | 2.61 | 0.48 |
| 1:A:152:ALA:HA | 1:A:236:LEU:O | 2.14 | 0.48 |
| 1:B:418:LEU:HD13 | 1:B:439:ALA:HB3 | 1.94 | 0.48 |
| 1:A:23:ARG:NH2 | 4:A:503:COA:O5A | 2.47 | 0.48 |
| 1:B:270:ARG:HB2 | 1:B:270:ARG:NH1 | 2.28 | 0.48 |
| 1:C:11:VAL:HG23 | 2:C:501:FAD:H4B | 1.95 | 0.48 |
| 1:D:437:ILE:HD12 | 1:D:438:ALA:N | 2.27 | 0.48 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:D:263:ILE:HD12 | 1:D:282:VAL:HG22 | 1.95 | 0.48 |
| 1:D:437:ILE:C | 1:D:437:ILE:CD1 | 2.69 | 0.48 |
| 1:C:24:GLU:CG | 1:C:316:ARG:HG3 | 2.44 | 0.48 |
| 1:C:95:ASP:C | 1:C:95:ASP:OD1 | 2.52 | 0.48 |
| 1:A:258:GLY:HA3 | 1:A:284:GLU:OE1 | 2.14 | 0.48 |
| 1:B:268:ARG:NH1 | 1:B:270:ARG:HH12 | 2.11 | 0.48 |
| 1:B:224:ALA:O | 1:B:225:VAL:HB | 2.14 | 0.47 |
| 1:A:282:VAL:O | 1:A:282:VAL:HG22 | 2.15 | 0.47 |
| 1:A:396:HIS:NE2 | 1:B:396:HIS:CE1 | 2.81 | 0.47 |
| 1:C:202:ARG:NH1 | 5:C:614:HOH:O | 2.47 | 0.47 |
| 1:C:263:ILE:HD12 | 1:C:282:VAL:HG22 | 1.96 | 0.47 |
| 1:D:37:GLY:CA | 1:D:77:THR:HB | 2.23 | 0.47 |
| 1:D:178:LEU:HD23 | 1:D:208:TRP:HB2 | 1.95 | 0.47 |
| 1:B:49:VAL:HG22 | 1:B:54:ILE:HB | 1.95 | 0.47 |
| 1:B:86:TYR:HB3 | 1:B:253:MET:HB2 | 1.95 | 0.47 |
| 1:B:287:HIS:CD2 | 1:B:289:VAL:H | 2.30 | 0.47 |
| 1:A:25:ASN:OD1 | 1:A:25:ASN:C | 2.51 | 0.47 |
| 1:C:380:GLU:HG2 | 5:C:604:HOH:O | 2.13 | 0.47 |
| 1:D:65:PRO:HB3 | 1:D:75:VAL:HG22 | 1.97 | 0.47 |
| 1:D:180:ALA:H | 3:D:502:NAD:C8A | 2.28 | 0.47 |
| 1:D:183:ARG:NH1 | 1:D:188:TRP:O | 2.47 | 0.47 |
| 1:D:357:PHE:CD2 | 1:D:376:GLU:HB2 | 2.49 | 0.47 |
| 1:A:3:LYS:NZ | 1:A:3:LYS:HB3 | 2.29 | 0.47 |
| 1:A:158:GLY:CA | 5:A:607:HOH:O | 2.61 | 0.47 |
| 1:A:160:ILE:HG23 | 3:A:502:NAD:H6N | 1.97 | 0.47 |
| 1:B:76:HIS:HB3 | 1:B:79:HIS:ND1 | 2.29 | 0.47 |
| 1:B:440:GLN:CA | 5:B:612:HOH:O | 2.55 | 0.47 |
| 1:B:440:GLN:O | 1:B:441:GLN:O | 2.32 | 0.47 |
| 1:C:4:ARG:NH1 | 1:C:104:ASP:OD2 | 2.47 | 0.47 |
| 1:C:116:ARG:HH12 | 1:C:244:ARG:HD2 | 1.79 | 0.47 |
| 1:C:161:GLY:H | 1:C:164:ALA:H | 1.61 | 0.47 |
| 1:C:169:ARG:CD | 1:C:175:VAL:HG13 | 2.44 | 0.47 |
| 1:D:56:ARG:NH1 | 1:D:59:ARG:HD2 | 2.29 | 0.47 |
| 1:D:116:ARG:HH12 | 1:D:244:ARG:HH11 | 1.62 | 0.47 |
| 1:A:180:ALA:H | 3:A:502:NAD:C8A | 2.27 | 0.47 |
| 1:B:128:GLU:HG2 | 1:B:221:ARG:NH2 | 2.30 | 0.47 |
| 1:C:359:GLN:HB2 | 1:C:374:TRP:CD1 | 2.50 | 0.47 |
| 1:D:440:GLN:C | 1:D:441:GLN:O | 2.52 | 0.47 |
| 1:A:58:GLU:O | 1:A:61:VAL:HG12 | 2.15 | 0.47 |
| 1:A:150:ARG:HH12 | 1:C:150:ARG:NH2 | 2.13 | 0.47 |
| 1:A:398:ALA:N | 1:A:399:LEU:CB | 2.68 | 0.47 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:154:ILE:HD11 | 1:B:168:PHE:CD2 | 2.50 | 0.47 |
| 1:B:224:ALA:O | 1:B:225:VAL:CB | 2.63 | 0.47 |
| 1:C:180:ALA:H | 3:C:502:NAD:C8A | 2.27 | 0.47 |
| 1:C:217:ARG:HB3 | 1:C:224:ALA:HB3 | 1.97 | 0.47 |
| 1:D:83:ASP:O | 1:D:94:HIS:HD2 | 1.96 | 0.47 |
| 1:D:86:TYR:O | 1:D:89:ARG:CA | 2.63 | 0.47 |
| 1:A:37:GLY:HA2 | 1:A:77:THR:CB | 2.26 | 0.47 |
| 1:B:411:GLU:OE1 | 1:B:411:GLU:HA | 2.14 | 0.47 |
| 1:C:56:ARG:NH1 | 1:C:59:ARG:HH11 | 2.11 | 0.47 |
| 1:C:151:ARG:NH1 | 5:C:612:HOH:O | 2.38 | 0.47 |
| 1:D:270:ARG:HH11 | 1:D:270:ARG:CB | 2.27 | 0.47 |
| 1:A:65:PRO:HB3 | 1:A:75:VAL:HG22 | 1.96 | 0.47 |
| 1:A:204:GLY:O | 5:A:603:HOH:O | 2.21 | 0.47 |
| 1:A:256:ALA:H | 1:A:272:ASN:HD21 | 1.58 | 0.47 |
| 1:C:58:GLU:O | 1:C:61:VAL:HG12 | 2.15 | 0.47 |
| 1:C:437:ILE:O | 1:C:441:GLN:HB3 | 2.14 | 0.47 |
| 1:A:116:ARG:HH12 | 1:A:244:ARG:HH11 | 1.62 | 0.47 |
| 1:A:236:LEU:HD12 | 1:A:236:LEU:C | 2.35 | 0.47 |
| 1:B:37:GLY:CA | 1:B:77:THR:HB | 2.18 | 0.47 |
| 1:D:160:ILE:HG12 | 3:D:502:NAD:O2N | 2.15 | 0.47 |
| 1:A:432:TRP:HB3 | 1:A:437:ILE:HG22 | 1.97 | 0.46 |
| 1:C:269:MET:HE1 | 1:C:320:PHE:CD2 | 2.50 | 0.46 |
| 1:D:255:VAL:HA | 1:D:272:ASN:HD21 | 1.80 | 0.46 |
| 1:D:269:MET:HE3 | 1:D:320:PHE:CD2 | 2.51 | 0.46 |
| 1:B:41:TYR:CE2 | 1:B:136:MET:HG2 | 2.50 | 0.46 |
| 1:C:160:ILE:HG23 | 3:C:502:NAD:H6N | 1.97 | 0.46 |
| 1:D:6:VAL:HG22 | 1:D:31:VAL:CG1 | 2.45 | 0.46 |
| 1:B:408:LEU:HA | 1:B:408:LEU:HD12 | 1.65 | 0.46 |
| 1:D:85:ASP:HB2 | 1:D:92:THR:HA | 1.97 | 0.46 |
| 1:D:86:TYR:O | 1:D:89:ARG:N | 2.49 | 0.46 |
| 1:A:84:VAL:O | 1:A:86:TYR:HD1 | 1.98 | 0.46 |
| 1:B:128:GLU:HG2 | 1:B:221:ARG:CZ | 2.45 | 0.46 |
| 1:C:149:ALA:HB3 | 1:C:150:ARG:CA | 2.35 | 0.46 |
| 1:C:221:ARG:O | 1:C:222:VAL:CB | 2.62 | 0.46 |
| 1:B:95:ASP:C | 1:B:95:ASP:OD1 | 2.54 | 0.46 |
| 1:C:222:VAL:O | 1:C:222:VAL:CG1 | 2.63 | 0.46 |
| 1:D:86:TYR:HB2 | 1:D:87:GLU:H | 1.23 | 0.46 |
| 1:A:356:VAL:HG12 | 1:A:377:LEU:HB2 | 1.98 | 0.46 |
| 1:C:343:LEU:CD2 | 1:C:355:LYS:HD3 | 2.45 | 0.46 |
| 1:A:91:LEU:C | 1:A:92:THR:CG2 | 2.81 | 0.46 |
| 1:B:169:ARG:CD | 1:B:175:VAL:HG13 | 2.46 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:398:ALA:N | 1:B:399:LEU:CB | 2.74 | 0.46 |
| 1:C:124:GLY:O | 1:C:127:GLN:HG3 | 2.16 | 0.46 |
| 2:D:501:FAD:H2' | 4:D:503:COA:S1P | 2.55 | 0.46 |
| 1:A:50:LEU:HD12 | 1:A:50:LEU:HA | 1.78 | 0.46 |
| 1:B:85:ASP:H | 1:B:92:THR:CB | 2.28 | 0.46 |
| 1:B:216:PHE:HD1 | 1:B:225:VAL:HG22 | 1.79 | 0.46 |
| 1:B:361:ARG:HD3 | 1:B:365:HIS:HA | 1.97 | 0.46 |
| 1:C:128:GLU:HG2 | 1:C:221:ARG:NH2 | 2.31 | 0.46 |
| 1:A:295:TRP:CZ2 | 1:A:297:PRO:HG3 | 2.51 | 0.46 |
| 1:A:431:VAL:HG21 | 4:B:503:COA:H32 | 1.97 | 0.45 |
| 1:B:37:GLY:H | 1:B:78:ARG:H | 1.64 | 0.45 |
| 1:D:339:THR:HG22 | 1:D:401:ILE:HD11 | 1.97 | 0.45 |
| 1:B:341:LEU:O | 1:B:388:GLY:HA3 | 2.16 | 0.45 |
| 1:C:56:ARG:CZ | 1:C:59:ARG:HH11 | 2.29 | 0.45 |
| 1:D:124:GLY:O | 1:D:127:GLN:HG3 | 2.16 | 0.45 |
| 1:A:191:GLU:OE2 | 1:A:355:LYS:HE3 | 2.16 | 0.45 |
| 1:B:399:LEU:C | 1:B:401:ILE:N | 2.69 | 0.45 |
| 1:A:49:VAL:HG11 | 1:A:57:LEU:CD1 | 2.45 | 0.45 |
| 1:B:12:ALA:HB3 | 2:B:501:FAD:H5'2 | 1.99 | 0.45 |
| 1:B:91:LEU:CD1 | 1:B:94:HIS:CE1 | 2.99 | 0.45 |
| 1:C:151:ARG:CG | 1:C:174:GLN:HE21 | 2.25 | 0.45 |
| 1:C:208:TRP:HB3 | 1:C:211:VAL:HG21 | 1.98 | 0.45 |
| 1:D:3:LYS:NZ | 1:D:3:LYS:HB3 | 2.32 | 0.45 |
| 1:B:180:ALA:H | 3:B:502:NAD:C8A | 2.29 | 0.45 |
| 1:C:183:ARG:NH1 | 1:C:188:TRP:O | 2.49 | 0.45 |
| 1:D:91:LEU:HB2 | 1:D:92:THR:H | 1.28 | 0.45 |
| 1:D:94:HIS:HA | 1:D:102:PHE:O | 2.17 | 0.45 |
| 1:D:356:VAL:HG12 | 1:D:377:LEU:HB2 | 1.97 | 0.45 |
| 1:D:418:LEU:HD13 | 1:D:439:ALA:CB | 2.46 | 0.45 |
| 1:B:161:GLY:H | 1:B:164:ALA:H | 1.63 | 0.45 |
| 1:C:268:ARG:HH12 | 1:C:270:ARG:HH22 | 1.63 | 0.45 |
| 1:C:374:TRP:CE3 | 1:C:392:VAL:HG22 | 2.51 | 0.45 |
| 1:D:160:ILE:HG21 | 1:D:160:ILE:HD13 | 1.99 | 0.45 |
| 1:D:260:THR:HG23 | 1:D:284:GLU:OE1 | 2.17 | 0.45 |
| 1:A:3:LYS:HB2 | 1:A:107:ASP:OD2 | 2.17 | 0.45 |
| 1:A:83:ASP:O | 1:A:94:HIS:HD2 | 1.99 | 0.45 |
| 1:D:91:LEU:O | 1:D:92:THR:CB | 2.64 | 0.45 |
| 1:A:396:HIS:ND1 | 1:B:396:HIS:ND1 | 2.64 | 0.45 |
| 1:B:256:ALA:N | 1:B:272:ASN:HD21 | 2.10 | 0.45 |
| 1:B:260:THR:HG23 | 1:B:284:GLU:OE1 | 2.17 | 0.45 |
| 1:B:358:ILE:C | 1:B:358:ILE:HD12 | 2.37 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:156:GLY:CA | 3:C:502:NAD:H2B | 2.45 | 0.45 |
| 1:A:341:LEU:O | 1:A:388:GLY:HA3 | 2.17 | 0.45 |
| 1:A:361:ARG:NH1 | 1:A:370:SER:OG | 2.50 | 0.45 |
| 1:B:272:ASN:HD22 | 1:B:272:ASN:H | 1.64 | 0.45 |
| 1:C:443:ARG:OXT | 1:C:443:ARG:HG2 | 2.17 | 0.45 |
| 1:D:224:ALA:O | 1:D:225:VAL:CB | 2.65 | 0.45 |
| 1:D:35:LYS:O | 1:D:78:ARG:HA | 2.18 | 0.44 |
| 1:A:340:GLY:HA3 | 1:A:388:GLY:HA2 | 1.98 | 0.44 |
| 1:A:410:ARG:HH11 | 1:A:410:ARG:HG2 | 1.81 | 0.44 |
| 1:D:36:SER:O | 1:D:37:GLY:C | 2.54 | 0.44 |
| 1:D:295:TRP:CZ2 | 1:D:297:PRO:HG3 | 2.52 | 0.44 |
| 2:B:501:FAD:O2' | 2:B:501:FAD:H9 | 2.18 | 0.44 |
| 1:B:50:LEU:HD12 | 1:B:50:LEU:HA | 1.70 | 0.44 |
| 1:C:341:LEU:O | 1:C:388:GLY:HA3 | 2.18 | 0.44 |
| 1:C:432:TRP:HB3 | 1:C:437:ILE:HG22 | 1.99 | 0.44 |
| 1:D:262:ALA:HB3 | 1:D:284:GLU:HG2 | 1.99 | 0.44 |
| 1:D:400:ARG:NH1 | 1:D:433:ASP:OD2 | 2.49 | 0.44 |
| 1:A:418:LEU:HD13 | 1:A:439:ALA:CB | 2.46 | 0.44 |
| 1:C:173:LEU:N | 1:C:173:LEU:HD23 | 2.32 | 0.44 |
| 1:C:398:ALA:HA | 1:C:400:ARG:H | 1.82 | 0.44 |
| 1:B:148:GLN:O | 1:B:149:ALA:C | 2.55 | 0.44 |
| 1:C:104:ASP:OD1 | 1:C:105:ARG:N | 2.48 | 0.44 |
| 1:A:160:ILE:CD1 | 1:A:160:ILE:HG21 | 2.48 | 0.43 |
| 1:A:76:HIS:HB3 | 1:A:79:HIS:CE1 | 2.52 | 0.43 |
| 1:C:12:ALA:HB3 | 2:C:501:FAD:H5'2 | 1.99 | 0.43 |
| 1:C:361:ARG:HD3 | 1:C:365:HIS:HA | 2.00 | 0.43 |
| 1:C:410:ARG:HG2 | 1:C:410:ARG:HH11 | 1.82 | 0.43 |
| 1:D:37:GLY:HA2 | 1:D:77:THR:CB | 2.24 | 0.43 |
| 1:B:292:ARG:HB2 | 1:B:293:PRO:CD | 2.48 | 0.43 |
| 1:C:61:VAL:O | 1:C:61:VAL:HG13 | 2.19 | 0.43 |
| 1:C:83:ASP:O | 1:C:94:HIS:HD2 | 2.01 | 0.43 |
| 1:C:396:HIS:N | 1:C:397:GLY:CA | 2.78 | 0.43 |
| 2:A:501:FAD:H9 | 2:A:501:FAD:O2' | 2.18 | 0.43 |
| 1:B:16:SER:CB | 1:B:306:GLY:HA3 | 2.48 | 0.43 |
| 2:D:501:FAD:O2' | 2:D:501:FAD:H9 | 2.18 | 0.43 |
| 1:B:367:TYR:CD1 | 1:B:368:PRO:HD2 | 2.54 | 0.43 |
| 1:C:128:GLU:HG2 | 1:C:221:ARG:CZ | 2.48 | 0.43 |
| 1:A:88:LEU:O | 1:A:89:ARG:CB | 2.67 | 0.43 |
| 1:C:160:ILE:HG12 | 3:C:502:NAD:PN | 2.59 | 0.43 |
| 1:D:352:TRP:NE1 | 5:D:612:HOH:O | 2.50 | 0.43 |
| 1:B:12:ALA:HB3 | 2:B:501:FAD:O1P | 2.19 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:23:ARG:HH22 | 4:B:503:COA:P2A | 2.42 | 0.43 |
| 1:B:377:LEU:HD22 | 1:B:438:ALA:HB1 | 2.00 | 0.43 |
| 1:C:410:ARG:HG2 | 1:C:410:ARG:NH1 | 2.34 | 0.43 |
| 1:D:38:TRP:CD2 | 1:D:136:MET:HE2 | 2.54 | 0.43 |
| 1:D:85:ASP:OD1 | 1:D:88:LEU:CD2 | 2.54 | 0.43 |
| 1:A:38:TRP:CE3 | 1:A:136:MET:HE2 | 2.54 | 0.43 |
| 1:B:89:ARG:O | 1:B:90:THR:C | 2.57 | 0.43 |
| 1:D:437:ILE:O | 1:D:441:GLN:HB3 | 2.19 | 0.43 |
| 1:A:54:ILE:HA | 1:A:55:PRO:HD2 | 1.60 | 0.43 |
| 1:D:236:LEU:HD12 | 1:D:237:VAL:N | 2.33 | 0.43 |
| 1:D:270:ARG:CB | 1:D:270:ARG:NH1 | 2.81 | 0.43 |
| 1:A:91:LEU:C | 1:A:92:THR:OG1 | 2.51 | 0.43 |
| 1:B:24:GLU:HG3 | 1:B:316:ARG:HG3 | 2.01 | 0.43 |
| 1:B:217:ARG:O | 1:B:222:VAL:HA | 2.19 | 0.43 |
| 1:D:161:GLY:N | 1:D:164:ALA:H | 2.15 | 0.43 |
| 1:A:100:ARG:O | 1:A:101:THR:HG22 | 2.19 | 0.42 |
| 1:B:268:ARG:HH12 | 1:B:270:ARG:HH22 | 1.65 | 0.42 |
| 1:C:343:LEU:HD22 | 1:C:355:LYS:HD3 | 2.01 | 0.42 |
| 1:C:398:ALA:N | 1:C:399:LEU:CB | 2.81 | 0.42 |
| 1:A:85:ASP:O | 1:A:86:TYR:O | 2.38 | 0.42 |
| 1:A:160:ILE:CD1 | 1:A:160:ILE:CB | 2.82 | 0.42 |
| 1:A:287:HIS:CD2 | 1:A:289:VAL:H | 2.35 | 0.42 |
| 1:A:44:CYS:HB3 | 2:A:501:FAD:C4X | 2.49 | 0.42 |
| 1:A:224:ALA:O | 1:A:225:VAL:CB | 2.67 | 0.42 |
| 1:B:16:SER:HB2 | 1:B:306:GLY:HA3 | 2.01 | 0.42 |
| 1:B:397:GLY:O | 1:B:398:ALA:CB | 2.67 | 0.42 |
| 1:C:74:LEU:HD23 | 1:C:74:LEU:HA | 1.92 | 0.42 |
| 1:D:23:ARG:HH22 | 4:D:503:COA:P2A | 2.42 | 0.42 |
| 1:A:8:VAL:HG13 | 1:A:81:VAL:CG1 | 2.49 | 0.42 |
| 1:A:441:GLN:C | 1:A:442:ALA:O | 2.58 | 0.42 |
| 1:B:4:ARG:HD3 | 1:B:105:ARG:O | 2.20 | 0.42 |
| 1:C:180:ALA:O | 1:C:210:GLY:HA2 | 2.19 | 0.42 |
| 1:D:424:TYR:CD1 | 1:D:431:VAL:HA | 2.53 | 0.42 |
| 1:A:4:ARG:NH1 | 1:A:104:ASP:OD2 | 2.52 | 0.42 |
| 1:A:57:LEU:HG | 1:A:136:MET:HE3 | 2.00 | 0.42 |
| 1:B:159:TYR:HB3 | 3:B:502:NAD:C4N | 2.49 | 0.42 |
| 1:B:280:GLY:HA3 | 2:B:501:FAD:O2P | 2.20 | 0.42 |
| 1:C:268:ARG:O | 1:C:269:MET:HB2 | 2.20 | 0.42 |
| 1:D:272:ASN:ND2 | 1:D:272:ASN:H | 2.16 | 0.42 |
| 1:D:296:LEU:HG | 1:D:298:LEU:HD12 | 2.01 | 0.42 |
| 1:B:85:ASP:HB2 | 1:B:92:THR:HA | 2.01 | 0.42 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:B:111:LEU:HD12 | 1:B:111:LEU:HA | 1.84 | 0.42 |
| 1:B:396:HIS:N | 1:B:397:GLY:HA3 | 2.25 | 0.42 |
| 1:D:90:THR:HA | 1:D:91:LEU:O | 2.20 | 0.42 |
| 1:D:343:LEU:HD22 | 1:D:355:LYS:HD3 | 2.01 | 0.42 |
| 1:A:160:ILE:CD1 | 1:A:160:ILE:CG2 | 2.96 | 0.42 |
| 1:B:57:LEU:HA | 1:B:57:LEU:HD12 | 1.81 | 0.42 |
| 1:B:86:TYR:O | 1:B:89:ARG:CA | 2.67 | 0.42 |
| 1:C:281:ASP:OD2 | 2:C:501:FAD:H3' | 2.20 | 0.42 |
| 1:D:89:ARG:O | 1:D:90:THR:C | 2.58 | 0.42 |
| 1:A:160:ILE:HG12 | 3:A:502:NAD:PN | 2.60 | 0.42 |
| 1:D:410:ARG:HG3 | 1:D:411:GLU:N | 2.35 | 0.42 |
| 1:D:430:PRO:HD2 | 1:D:434:PRO:HD3 | 2.02 | 0.42 |
| 1:A:158:GLY:N | 5:A:607:HOH:O | 2.50 | 0.42 |
| 1:C:65:PRO:HB3 | 1:C:75:VAL:HG22 | 2.02 | 0.42 |
| 1:C:270:ARG:HG2 | 5:C:607:HOH:O | 2.19 | 0.42 |
| 1:D:281:ASP:OD2 | 2:D:501:FAD:H3' | 2.20 | 0.42 |
| 1:D:95:ASP:OD1 | 1:D:95:ASP:C | 2.58 | 0.42 |
| 1:A:183:ARG:NH1 | 1:A:188:TRP:O | 2.53 | 0.41 |
| 1:B:23:ARG:NH2 | 4:B:503:COA:O5A | 2.53 | 0.41 |
| 1:B:24:GLU:HG2 | 1:B:316:ARG:HG3 | 2.00 | 0.41 |
| 1:B:97:ALA:HB1 | 1:B:98:GLU:H | 1.52 | 0.41 |
| 1:C:85:ASP:H | 1:C:92:THR:CA | 2.29 | 0.41 |
| 1:C:86:TYR:HB2 | 1:C:87:GLU:H | 1.10 | 0.41 |
| 1:C:424:TYR:CD1 | 1:C:431:VAL:HA | 2.55 | 0.41 |
| 1:A:424:TYR:HD2 | 2:B:501:FAD:O2 | 2.03 | 0.41 |
| 1:B:15:ALA:HB1 | 4:B:503:COA:H142 | 2.02 | 0.41 |
| 1:B:134:ARG:NH2 | 1:B:281:ASP:OD2 | 2.53 | 0.41 |
| 1:B:231:VAL:O | 1:B:231:VAL:HG12 | 2.19 | 0.41 |
| 1:D:88:LEU:O | 1:D:89:ARG:CB | 2.67 | 0.41 |
| 1:D:127:GLN:NE2 | 1:D:216:PHE:O | 2.53 | 0.41 |
| 1:B:396:HIS:H | 1:B:397:GLY:HA2 | 1.67 | 0.41 |
| 1:D:50:LEU:HD12 | 1:D:50:LEU:HA | 1.58 | 0.41 |
| 1:A:94:HIS:H | 1:A:94:HIS:HD2 | 1.64 | 0.41 |
| 1:B:178:LEU:HD23 | 1:B:208:TRP:HB2 | 2.02 | 0.41 |
| 1:B:221:ARG:O | 1:B:221:ARG:HD3 | 2.20 | 0.41 |
| 1:C:85:ASP:CB | 1:C:92:THR:HA | 2.50 | 0.41 |
| 1:D:408:LEU:HD12 | 1:D:408:LEU:HA | 1.84 | 0.41 |
| 1:A:15:ALA:HB1 | 4:A:503:COA:H142 | 2.02 | 0.41 |
| 1:A:86:TYR:O | 1:A:89:ARG:CA | 2.69 | 0.41 |
| 1:A:169:ARG:HH11 | 1:A:169:ARG:HD2 | 1.72 | 0.41 |
| 1:B:201:GLU:O | 1:B:203:HIS:N | 2.53 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:C:130:VAL:HG13 | 1:C:237:VAL:HG22 | 2.03 | 0.41 |
| 1:A:328:ILE:HG21 | 1:A:328:ILE:HD13 | 1.79 | 0.41 |
| 1:A:424:TYR:CD1 | 1:A:431:VAL:HA | 2.56 | 0.41 |
| 1:C:82:VAL:HG12 | 1:C:82:VAL:O | 2.19 | 0.41 |
| 1:C:398:ALA:N | 1:C:399:LEU:HB2 | 2.20 | 0.41 |
| 1:C:410:ARG:NH2 | 5:C:606:HOH:O | 2.14 | 0.41 |
| 1:D:56:ARG:CZ | 1:D:59:ARG:HH11 | 2.33 | 0.41 |
| 1:D:100:ARG:O | 1:D:101:THR:HG22 | 2.21 | 0.41 |
| 1:A:85:ASP:H | 1:A:92:THR:CB | 2.33 | 0.41 |
| 1:A:85:ASP:N | 1:A:92:THR:HA | 2.29 | 0.41 |
| 1:A:148:GLN:O | 1:A:149:ALA:C | 2.59 | 0.41 |
| 1:B:160:ILE:HG23 | 3:B:502:NAD:H6N | 2.03 | 0.41 |
| 3:B:502:NAD:H2N | 3:B:502:NAD:H2D | 1.88 | 0.41 |
| 1:C:50:LEU:HD12 | 1:C:50:LEU:HA | 1.64 | 0.41 |
| 1:C:209:THR:HG23 | 1:C:210:GLY:N | 2.35 | 0.41 |
| 1:D:398:ALA:CA | 1:D:399:LEU:CB | 2.99 | 0.41 |
| 1:A:97:ALA:O | 1:A:98:GLU:CD | 2.59 | 0.41 |
| 1:A:418:LEU:HD12 | 1:A:418:LEU:HA | 1.69 | 0.41 |
| 1:B:433:ASP:O | 1:B:434:PRO:C | 2.57 | 0.41 |
| 1:C:181:LYS:H | 1:C:181:LYS:HG2 | 1.61 | 0.41 |
| 1:C:270:ARG:NH1 | 1:C:270:ARG:HB3 | 2.36 | 0.41 |
| 1:D:361:ARG:HD3 | 1:D:365:HIS:HA | 2.02 | 0.41 |
| 1:A:64:THR:HG1 | 1:A:67:GLU:HG3 | 1.82 | 0.41 |
| 1:A:69:ARG:O | 1:A:70:LYS:C | 2.58 | 0.41 |
| 1:A:86:TYR:O | 1:A:89:ARG:N | 2.54 | 0.41 |
| 1:A:214:GLU:O | 1:A:215:ALA:HB2 | 2.20 | 0.41 |
| 1:C:162:LEU:HD23 | 1:C:162:LEU:HA | 1.74 | 0.41 |
| 1:C:221:ARG:O | 1:C:222:VAL:CG1 | 2.68 | 0.41 |
| 1:C:439:ALA:O | 1:C:441:GLN:CA | 2.67 | 0.41 |
| 1:D:148:GLN:O | 1:D:149:ALA:C | 2.60 | 0.41 |
| 1:D:411:GLU:HA | 1:D:411:GLU:OE1 | 2.21 | 0.41 |
| 1:B:89:ARG:C | 1:B:90:THR:O | 2.59 | 0.41 |
| 1:A:410:ARG:HG3 | 1:A:411:GLU:N | 2.36 | 0.40 |
| 1:B:162:LEU:HD23 | 1:B:162:LEU:HA | 1.70 | 0.40 |
| 1:C:295:TRP:CZ2 | 1:C:297:PRO:HG3 | 2.55 | 0.40 |
| 1:B:157:ALA:HB2 | 1:B:177:LEU:HD22 | 2.03 | 0.40 |
| 1:C:44:CYS:HB3 | 2:C:501:FAD:C4X | 2.51 | 0.40 |
| 1:C:133:LEU:HD23 | 1:C:133:LEU:HA | 1.69 | 0.40 |
| 1:D:268:ARG:HH22 | 1:D:270:ARG:NH2 | 2.20 | 0.40 |
| 1:D:268:ARG:O | 1:D:269:MET:HB2 | 2.21 | 0.40 |
| 1:D:373:LEU:HD22 | 1:D:434:PRO:CG | 2.47 | 0.40 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:A:37:GLY:H | 1:A:78:ARG:H | 1.68 | 0.40 |
| 1:A:410:ARG:HH12 | 1:B:410:ARG:NH1 | 2.08 | 0.40 |
| 1:B:91:LEU:O | 1:B:92:THR:CG2 | 2.69 | 0.40 |
| 1:B:399:LEU:C | 1:B:401:ILE:H | 2.24 | 0.40 |
| 1:C:440:GLN:O | 1:C:441:GLN:O | 2.39 | 0.40 |
| 1:A:400:ARG:NH1 | 1:A:433:ASP:OD2 | 2.49 | 0.40 |
| 1:B:100:ARG:O | 1:B:101:THR:HG22 | 2.21 | 0.40 |
| 1:C:169:ARG:HD3 | 1:C:175:VAL:HG13 | 2.03 | 0.40 |
| 1:D:268:ARG:CG | 1:D:312:VAL:HG21 | 2.51 | 0.40 |
| 1:D:313:ILE:C | 1:D:315:GLY:H | 2.25 | 0.40 |
| 1:D:400:ARG:HH12 | 1:D:429:SER:CB | 2.22 | 0.40 |
| 1:D:160:ILE:CD1 | 1:D:160:ILE:CB | 2.81 | 0.40 |
| 1:D:418:LEU:HA | 1:D:418:LEU:HD12 | 1.50 | 0.40 |

All (1) 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) |
|---------------|----------------------|--------------------------|-------------------|
| 5:A:614:HOH:O | 5:B:624:HOH:O[2_655] | 2.01 | 0.19 |

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 | 441/443 (100%) | 392 (89%) | 31 (7%) | 18 (4%) | 3 | 11 |
| 1 | B | 441/443 (100%) | 392 (89%) | 31 (7%) | 18 (4%) | 3 | 11 |
| 1 | C | 441/443 (100%) | 390 (88%) | 35 (8%) | 16 (4%) | 3 | 14 |
| 1 | D | 441/443 (100%) | 388 (88%) | 36 (8%) | 17 (4%) | 3 | 12 |
| All | All | 1764/1772 (100%) | 1562 (88%) | 133 (8%) | 69 (4%) | 3 | 12 |

All (69) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 86 | TYR |
| 1 | A | 89 | ARG |
| 1 | A | 90 | THR |
| 1 | A | 91 | LEU |
| 1 | A | 92 | THR |
| 1 | A | 148 | GLN |
| 1 | A | 149 | ALA |
| 1 | A | 398 | ALA |
| 1 | A | 441 | GLN |
| 1 | A | 442 | ALA |
| 1 | B | 86 | TYR |
| 1 | B | 89 | ARG |
| 1 | B | 90 | THR |
| 1 | B | 91 | LEU |
| 1 | B | 92 | THR |
| 1 | B | 149 | ALA |
| 1 | B | 398 | ALA |
| 1 | B | 441 | GLN |
| 1 | B | 442 | ALA |
| 1 | C | 86 | TYR |
| 1 | C | 89 | ARG |
| 1 | C | 92 | THR |
| 1 | C | 149 | ALA |
| 1 | C | 398 | ALA |
| 1 | C | 441 | GLN |
| 1 | C | 442 | ALA |
| 1 | D | 86 | TYR |
| 1 | D | 90 | THR |
| 1 | D | 91 | LEU |
| 1 | D | 92 | THR |
| 1 | D | 149 | ALA |
| 1 | D | 398 | ALA |
| 1 | D | 441 | GLN |
| 1 | D | 442 | ALA |
| 1 | A | 222 | VAL |
| 1 | A | 399 | LEU |
| 1 | B | 148 | GLN |
| 1 | B | 202 | ARG |
| 1 | B | 228 | SER |
| 1 | C | 148 | GLN |
| 1 | C | 222 | VAL |
| 1 | D | 89 | ARG |
| 1 | D | 148 | GLN |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | D | 222 | VAL |
| 1 | D | 399 | LEU |
| 1 | A | 228 | SER |
| 1 | B | 222 | VAL |
| 1 | B | 440 | GLN |
| 1 | C | 364 | ALA |
| 1 | C | 399 | LEU |
| 1 | C | 440 | GLN |
| 1 | A | 397 | GLY |
| 1 | A | 410 | ARG |
| 1 | A | 440 | GLN |
| 1 | C | 397 | GLY |
| 1 | D | 228 | SER |
| 1 | D | 440 | GLN |
| 1 | A | 225 | VAL |
| 1 | B | 225 | VAL |
| 1 | C | 189 | ASP |
| 1 | C | 225 | VAL |
| 1 | C | 395 | GLY |
| 1 | D | 202 | ARG |
| 1 | D | 225 | VAL |
| 1 | B | 55 | PRO |
| 1 | B | 399 | LEU |
| 1 | D | 189 | ASP |
| 1 | B | 397 | GLY |
| 1 | A | 395 | GLY |

5.3.2 Protein sidechains [i](#)

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

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

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|-----|-------|----------------|-----------|----------|-------------|---|
| 1 | A | 338/338 (100%) | 284 (84%) | 54 (16%) | 2 | 7 |
| 1 | B | 338/338 (100%) | 283 (84%) | 55 (16%) | 2 | 7 |
| 1 | C | 337/338 (100%) | 286 (85%) | 51 (15%) | 3 | 9 |
| 1 | D | 337/338 (100%) | 280 (83%) | 57 (17%) | 2 | 6 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles |
|-----|-------|------------------|------------|-----------|-------------------|
| All | All | 1350/1352 (100%) | 1133 (84%) | 217 (16%) | 2 7 |

All (217) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 3 | LYS |
| 1 | A | 27 | GLU |
| 1 | A | 39 | VAL |
| 1 | A | 44 | CYS |
| 1 | A | 50 | LEU |
| 1 | A | 56 | ARG |
| 1 | A | 59 | ARG |
| 1 | A | 60 | LEU |
| 1 | A | 75 | VAL |
| 1 | A | 78 | ARG |
| 1 | A | 86 | TYR |
| 1 | A | 90 | THR |
| 1 | A | 91 | LEU |
| 1 | A | 94 | HIS |
| 1 | A | 100 | ARG |
| 1 | A | 101 | THR |
| 1 | A | 105 | ARG |
| 1 | A | 111 | LEU |
| 1 | A | 116 | ARG |
| 1 | A | 118 | SER |
| 1 | A | 132 | THR |
| 1 | A | 133 | LEU |
| 1 | A | 142 | LEU |
| 1 | A | 144 | LYS |
| 1 | A | 146 | LEU |
| 1 | A | 173 | LEU |
| 1 | A | 176 | THR |
| 1 | A | 177 | LEU |
| 1 | A | 185 | LEU |
| 1 | A | 199 | GLU |
| 1 | A | 207 | VAL |
| 1 | A | 208 | TRP |
| 1 | A | 209 | THR |
| 1 | A | 217 | ARG |
| 1 | A | 221 | ARG |
| 1 | A | 222 | VAL |
| 1 | A | 236 | LEU |

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| Mol | Chain | Res | Type |
|------------|--------------|------------|-------------|
| 1 | A | 268 | ARG |
| 1 | A | 301 | VAL |
| 1 | A | 324 | VAL |
| 1 | A | 361 | ARG |
| 1 | A | 375 | VAL |
| 1 | A | 377 | LEU |
| 1 | A | 386 | LEU |
| 1 | A | 392 | VAL |
| 1 | A | 396 | HIS |
| 1 | A | 408 | LEU |
| 1 | A | 410 | ARG |
| 1 | A | 418 | LEU |
| 1 | A | 429 | SER |
| 1 | A | 437 | ILE |
| 1 | A | 440 | GLN |
| 1 | A | 441 | GLN |
| 1 | A | 443 | ARG |
| 1 | B | 3 | LYS |
| 1 | B | 27 | GLU |
| 1 | B | 39 | VAL |
| 1 | B | 44 | CYS |
| 1 | B | 50 | LEU |
| 1 | B | 56 | ARG |
| 1 | B | 59 | ARG |
| 1 | B | 60 | LEU |
| 1 | B | 75 | VAL |
| 1 | B | 78 | ARG |
| 1 | B | 86 | TYR |
| 1 | B | 90 | THR |
| 1 | B | 91 | LEU |
| 1 | B | 94 | HIS |
| 1 | B | 100 | ARG |
| 1 | B | 101 | THR |
| 1 | B | 105 | ARG |
| 1 | B | 111 | LEU |
| 1 | B | 116 | ARG |
| 1 | B | 132 | THR |
| 1 | B | 133 | LEU |
| 1 | B | 142 | LEU |
| 1 | B | 144 | LYS |
| 1 | B | 146 | LEU |
| 1 | B | 173 | LEU |

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| Mol | Chain | Res | Type |
|------------|--------------|------------|-------------|
| 1 | B | 176 | THR |
| 1 | B | 177 | LEU |
| 1 | B | 181 | LYS |
| 1 | B | 185 | LEU |
| 1 | B | 199 | GLU |
| 1 | B | 207 | VAL |
| 1 | B | 208 | TRP |
| 1 | B | 209 | THR |
| 1 | B | 217 | ARG |
| 1 | B | 221 | ARG |
| 1 | B | 222 | VAL |
| 1 | B | 236 | LEU |
| 1 | B | 268 | ARG |
| 1 | B | 301 | VAL |
| 1 | B | 311 | SER |
| 1 | B | 324 | VAL |
| 1 | B | 361 | ARG |
| 1 | B | 375 | VAL |
| 1 | B | 377 | LEU |
| 1 | B | 386 | LEU |
| 1 | B | 392 | VAL |
| 1 | B | 396 | HIS |
| 1 | B | 408 | LEU |
| 1 | B | 410 | ARG |
| 1 | B | 418 | LEU |
| 1 | B | 429 | SER |
| 1 | B | 437 | ILE |
| 1 | B | 440 | GLN |
| 1 | B | 441 | GLN |
| 1 | B | 443 | ARG |
| 1 | C | 3 | LYS |
| 1 | C | 39 | VAL |
| 1 | C | 44 | CYS |
| 1 | C | 50 | LEU |
| 1 | C | 59 | ARG |
| 1 | C | 60 | LEU |
| 1 | C | 75 | VAL |
| 1 | C | 78 | ARG |
| 1 | C | 86 | TYR |
| 1 | C | 87 | GLU |
| 1 | C | 90 | THR |
| 1 | C | 91 | LEU |

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| Mol | Chain | Res | Type |
|------------|--------------|------------|-------------|
| 1 | C | 94 | HIS |
| 1 | C | 100 | ARG |
| 1 | C | 101 | THR |
| 1 | C | 105 | ARG |
| 1 | C | 111 | LEU |
| 1 | C | 116 | ARG |
| 1 | C | 132 | THR |
| 1 | C | 133 | LEU |
| 1 | C | 142 | LEU |
| 1 | C | 143 | LEU |
| 1 | C | 144 | LYS |
| 1 | C | 146 | LEU |
| 1 | C | 176 | THR |
| 1 | C | 177 | LEU |
| 1 | C | 185 | LEU |
| 1 | C | 208 | TRP |
| 1 | C | 209 | THR |
| 1 | C | 217 | ARG |
| 1 | C | 221 | ARG |
| 1 | C | 222 | VAL |
| 1 | C | 236 | LEU |
| 1 | C | 268 | ARG |
| 1 | C | 272 | ASN |
| 1 | C | 301 | VAL |
| 1 | C | 361 | ARG |
| 1 | C | 375 | VAL |
| 1 | C | 377 | LEU |
| 1 | C | 386 | LEU |
| 1 | C | 392 | VAL |
| 1 | C | 396 | HIS |
| 1 | C | 408 | LEU |
| 1 | C | 410 | ARG |
| 1 | C | 418 | LEU |
| 1 | C | 429 | SER |
| 1 | C | 434 | PRO |
| 1 | C | 437 | ILE |
| 1 | C | 440 | GLN |
| 1 | C | 441 | GLN |
| 1 | C | 443 | ARG |
| 1 | D | 3 | LYS |
| 1 | D | 27 | GLU |
| 1 | D | 39 | VAL |

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| Mol | Chain | Res | Type |
|------------|--------------|------------|-------------|
| 1 | D | 44 | CYS |
| 1 | D | 50 | LEU |
| 1 | D | 56 | ARG |
| 1 | D | 59 | ARG |
| 1 | D | 60 | LEU |
| 1 | D | 75 | VAL |
| 1 | D | 78 | ARG |
| 1 | D | 86 | TYR |
| 1 | D | 90 | THR |
| 1 | D | 91 | LEU |
| 1 | D | 94 | HIS |
| 1 | D | 100 | ARG |
| 1 | D | 101 | THR |
| 1 | D | 105 | ARG |
| 1 | D | 111 | LEU |
| 1 | D | 116 | ARG |
| 1 | D | 120 | PRO |
| 1 | D | 132 | THR |
| 1 | D | 133 | LEU |
| 1 | D | 142 | LEU |
| 1 | D | 144 | LYS |
| 1 | D | 146 | LEU |
| 1 | D | 155 | LEU |
| 1 | D | 173 | LEU |
| 1 | D | 176 | THR |
| 1 | D | 177 | LEU |
| 1 | D | 181 | LYS |
| 1 | D | 185 | LEU |
| 1 | D | 199 | GLU |
| 1 | D | 207 | VAL |
| 1 | D | 208 | TRP |
| 1 | D | 209 | THR |
| 1 | D | 221 | ARG |
| 1 | D | 222 | VAL |
| 1 | D | 236 | LEU |
| 1 | D | 241 | THR |
| 1 | D | 268 | ARG |
| 1 | D | 301 | VAL |
| 1 | D | 311 | SER |
| 1 | D | 359 | GLN |
| 1 | D | 361 | ARG |
| 1 | D | 375 | VAL |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | D | 377 | LEU |
| 1 | D | 386 | LEU |
| 1 | D | 392 | VAL |
| 1 | D | 396 | HIS |
| 1 | D | 408 | LEU |
| 1 | D | 410 | ARG |
| 1 | D | 418 | LEU |
| 1 | D | 429 | SER |
| 1 | D | 437 | ILE |
| 1 | D | 440 | GLN |
| 1 | D | 441 | GLN |
| 1 | D | 443 | ARG |

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

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 94 | HIS |
| 1 | A | 96 | HIS |
| 1 | A | 103 | GLN |
| 1 | A | 174 | GLN |
| 1 | A | 203 | HIS |
| 1 | A | 272 | ASN |
| 1 | A | 287 | HIS |
| 1 | A | 396 | HIS |
| 1 | A | 440 | GLN |
| 1 | A | 441 | GLN |
| 1 | B | 96 | HIS |
| 1 | B | 174 | GLN |
| 1 | B | 272 | ASN |
| 1 | B | 287 | HIS |
| 1 | B | 396 | HIS |
| 1 | B | 440 | GLN |
| 1 | B | 441 | GLN |
| 1 | C | 96 | HIS |
| 1 | C | 174 | GLN |
| 1 | C | 272 | ASN |
| 1 | C | 287 | HIS |
| 1 | C | 440 | GLN |
| 1 | D | 94 | HIS |
| 1 | D | 96 | HIS |
| 1 | D | 103 | GLN |
| 1 | D | 174 | GLN |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | D | 187 | HIS |
| 1 | D | 272 | ASN |
| 1 | D | 287 | HIS |
| 1 | D | 409 | HIS |
| 1 | D | 440 | 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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

12 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 | FAD | B | 501 | - | 53,58,58 | 2.25 | 16 (30%) | 68,89,89 | 1.89 | 18 (26%) |
| 4 | COA | D | 503 | 1 | 41,50,50 | 1.28 | 4 (9%) | 52,75,75 | 2.13 | 19 (36%) |
| 3 | NAD | D | 502 | - | 42,48,48 | 2.48 | 12 (28%) | 50,73,73 | 2.68 | 20 (40%) |
| 2 | FAD | A | 501 | - | 53,58,58 | 2.20 | 16 (30%) | 68,89,89 | 1.79 | 15 (22%) |
| 2 | FAD | D | 501 | - | 53,58,58 | 2.13 | 18 (33%) | 68,89,89 | 1.74 | 19 (27%) |
| 3 | NAD | A | 502 | - | 42,48,48 | 2.47 | 11 (26%) | 50,73,73 | 2.71 | 22 (44%) |
| 4 | COA | A | 503 | 1 | 41,50,50 | 1.21 | 4 (9%) | 52,75,75 | 2.05 | 16 (30%) |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|-----|------|--------------|------|----------|-------------|------|----------|
| | | | | | Counts | RMSZ | # Z > 2 | Counts | RMSZ | # Z > 2 |
| 3 | NAD | C | 502 | - | 42,48,48 | 2.55 | 9 (21%) | 50,73,73 | 2.68 | 20 (40%) |
| 4 | COA | B | 503 | 1 | 41,50,50 | 1.31 | 4 (9%) | 52,75,75 | 1.96 | 14 (26%) |
| 4 | COA | C | 503 | 1 | 41,50,50 | 1.23 | 5 (12%) | 52,75,75 | 2.14 | 17 (32%) |
| 2 | FAD | C | 501 | - | 53,58,58 | 2.05 | 16 (30%) | 68,89,89 | 1.74 | 15 (22%) |
| 3 | NAD | B | 502 | - | 42,48,48 | 2.42 | 9 (21%) | 50,73,73 | 2.46 | 19 (38%) |

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 | FAD | B | 501 | - | - | 8/30/50/50 | 0/6/6/6 |
| 4 | COA | D | 503 | 1 | - | 19/44/64/64 | 0/3/3/3 |
| 3 | NAD | D | 502 | - | - | 6/26/62/62 | 0/5/5/5 |
| 2 | FAD | A | 501 | - | - | 6/30/50/50 | 0/6/6/6 |
| 2 | FAD | D | 501 | - | - | 8/30/50/50 | 0/6/6/6 |
| 3 | NAD | A | 502 | - | - | 6/26/62/62 | 0/5/5/5 |
| 4 | COA | A | 503 | 1 | - | 17/44/64/64 | 0/3/3/3 |
| 3 | NAD | C | 502 | - | - | 5/26/62/62 | 0/5/5/5 |
| 4 | COA | B | 503 | 1 | - | 18/44/64/64 | 0/3/3/3 |
| 4 | COA | C | 503 | 1 | - | 19/44/64/64 | 0/3/3/3 |
| 2 | FAD | C | 501 | - | - | 5/30/50/50 | 0/6/6/6 |
| 3 | NAD | B | 502 | - | - | 5/26/62/62 | 0/5/5/5 |

All (124) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|---------|-------|-------------|----------|
| 3 | D | 502 | NAD | O7N-C7N | 10.20 | 1.43 | 1.24 |
| 3 | C | 502 | NAD | O7N-C7N | 9.31 | 1.42 | 1.24 |
| 3 | B | 502 | NAD | O7N-C7N | 9.15 | 1.41 | 1.24 |
| 3 | A | 502 | NAD | O7N-C7N | 9.04 | 1.41 | 1.24 |
| 2 | B | 501 | FAD | C9A-C5X | 8.71 | 1.55 | 1.41 |
| 2 | A | 501 | FAD | C9A-C5X | 8.50 | 1.55 | 1.41 |
| 2 | D | 501 | FAD | C9A-C5X | 8.11 | 1.54 | 1.41 |
| 3 | C | 502 | NAD | O4B-C1B | 7.58 | 1.51 | 1.41 |
| 2 | C | 501 | FAD | C9A-C5X | 7.49 | 1.53 | 1.41 |
| 3 | B | 502 | NAD | O4B-C1B | 6.19 | 1.49 | 1.41 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|---------|-------|-------------|----------|
| 3 | C | 502 | NAD | C2A-N3A | 5.61 | 1.41 | 1.32 |
| 3 | D | 502 | NAD | C2A-N3A | 5.60 | 1.41 | 1.32 |
| 3 | A | 502 | NAD | C2B-C1B | -5.38 | 1.45 | 1.53 |
| 3 | A | 502 | NAD | C2A-N3A | 5.11 | 1.40 | 1.32 |
| 2 | B | 501 | FAD | C8-C7 | 5.07 | 1.53 | 1.40 |
| 3 | B | 502 | NAD | C2A-N3A | 4.87 | 1.39 | 1.32 |
| 2 | C | 501 | FAD | C8-C7 | 4.62 | 1.52 | 1.40 |
| 2 | B | 501 | FAD | C4X-N5 | 4.59 | 1.39 | 1.30 |
| 2 | C | 501 | FAD | C4X-N5 | 4.46 | 1.39 | 1.30 |
| 3 | D | 502 | NAD | O4B-C1B | 4.36 | 1.47 | 1.41 |
| 2 | A | 501 | FAD | C8-C7 | 4.33 | 1.51 | 1.40 |
| 4 | B | 503 | COA | C2A-N3A | 4.29 | 1.39 | 1.32 |
| 2 | B | 501 | FAD | C9A-N10 | 4.12 | 1.48 | 1.41 |
| 2 | D | 501 | FAD | C5A-C4A | 4.09 | 1.51 | 1.40 |
| 2 | A | 501 | FAD | C4X-N5 | 4.05 | 1.38 | 1.30 |
| 2 | D | 501 | FAD | C8-C7 | 4.04 | 1.51 | 1.40 |
| 3 | B | 502 | NAD | C2N-N1N | 4.03 | 1.39 | 1.35 |
| 4 | A | 503 | COA | C2A-N3A | 4.03 | 1.38 | 1.32 |
| 4 | D | 503 | COA | C2A-N3A | 3.92 | 1.38 | 1.32 |
| 2 | A | 501 | FAD | C5A-C4A | 3.87 | 1.51 | 1.40 |
| 3 | A | 502 | NAD | C2A-N1A | 3.83 | 1.41 | 1.33 |
| 3 | D | 502 | NAD | C2A-N1A | 3.81 | 1.41 | 1.33 |
| 3 | A | 502 | NAD | C2N-N1N | 3.78 | 1.39 | 1.35 |
| 3 | C | 502 | NAD | C2N-N1N | 3.77 | 1.39 | 1.35 |
| 2 | D | 501 | FAD | C9A-N10 | 3.70 | 1.47 | 1.41 |
| 3 | B | 502 | NAD | C2A-N1A | 3.70 | 1.40 | 1.33 |
| 3 | A | 502 | NAD | C4A-N3A | -3.67 | 1.30 | 1.35 |
| 3 | D | 502 | NAD | C2N-N1N | 3.66 | 1.39 | 1.35 |
| 2 | A | 501 | FAD | C2A-N3A | 3.63 | 1.37 | 1.32 |
| 2 | D | 501 | FAD | C4X-N5 | 3.62 | 1.37 | 1.30 |
| 2 | C | 501 | FAD | O4-C4 | 3.56 | 1.30 | 1.23 |
| 3 | D | 502 | NAD | C6A-C5A | -3.54 | 1.30 | 1.43 |
| 4 | B | 503 | COA | C5A-C4A | 3.54 | 1.50 | 1.40 |
| 2 | C | 501 | FAD | C2A-N3A | 3.37 | 1.37 | 1.32 |
| 2 | A | 501 | FAD | O4B-C1B | -3.35 | 1.36 | 1.41 |
| 3 | D | 502 | NAD | C8A-N7A | 3.30 | 1.40 | 1.34 |
| 2 | B | 501 | FAD | C5A-C4A | 3.26 | 1.49 | 1.40 |
| 3 | C | 502 | NAD | C2B-C1B | -3.24 | 1.48 | 1.53 |
| 2 | B | 501 | FAD | C4X-C10 | 3.20 | 1.53 | 1.44 |
| 2 | A | 501 | FAD | PA-O1A | 3.19 | 1.62 | 1.50 |
| 3 | C | 502 | NAD | C2A-N1A | 3.17 | 1.39 | 1.33 |
| 4 | C | 503 | COA | C5A-C4A | 3.16 | 1.49 | 1.40 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|---------|-------|-------------|----------|
| 2 | A | 501 | FAD | O4-C4 | 3.15 | 1.29 | 1.23 |
| 2 | D | 501 | FAD | PA-O1A | 3.10 | 1.61 | 1.50 |
| 3 | A | 502 | NAD | C3B-C4B | -3.06 | 1.45 | 1.53 |
| 4 | D | 503 | COA | C5A-C4A | 3.05 | 1.49 | 1.40 |
| 2 | B | 501 | FAD | O4-C4 | 3.05 | 1.29 | 1.23 |
| 3 | D | 502 | NAD | C2B-C1B | -3.04 | 1.49 | 1.53 |
| 4 | A | 503 | COA | C5A-C4A | 3.02 | 1.48 | 1.40 |
| 2 | B | 501 | FAD | C10-N1 | 2.95 | 1.39 | 1.33 |
| 2 | A | 501 | FAD | C2A-N1A | 2.91 | 1.39 | 1.33 |
| 2 | C | 501 | FAD | C9A-N10 | 2.91 | 1.46 | 1.41 |
| 2 | D | 501 | FAD | C6-C5X | 2.89 | 1.44 | 1.40 |
| 2 | C | 501 | FAD | C5A-C4A | 2.83 | 1.48 | 1.40 |
| 2 | D | 501 | FAD | O4B-C1B | -2.83 | 1.37 | 1.41 |
| 3 | C | 502 | NAD | C6A-C5A | -2.81 | 1.32 | 1.43 |
| 2 | B | 501 | FAD | C10-N10 | 2.80 | 1.43 | 1.37 |
| 3 | C | 502 | NAD | C4A-N3A | -2.78 | 1.31 | 1.35 |
| 2 | B | 501 | FAD | C6-C7 | 2.77 | 1.43 | 1.39 |
| 4 | C | 503 | COA | C2A-N3A | 2.74 | 1.36 | 1.32 |
| 3 | B | 502 | NAD | C8A-N7A | 2.73 | 1.39 | 1.34 |
| 4 | B | 503 | COA | C4A-N3A | 2.72 | 1.39 | 1.35 |
| 3 | A | 502 | NAD | C6A-C5A | -2.71 | 1.33 | 1.43 |
| 2 | B | 501 | FAD | C2A-N3A | 2.71 | 1.36 | 1.32 |
| 2 | D | 501 | FAD | C10-N1 | 2.70 | 1.38 | 1.33 |
| 4 | D | 503 | COA | C6A-C5A | 2.64 | 1.53 | 1.43 |
| 4 | C | 503 | COA | OAP-CAP | 2.64 | 1.47 | 1.42 |
| 2 | C | 501 | FAD | C6-C7 | 2.61 | 1.43 | 1.39 |
| 4 | A | 503 | COA | C6A-C5A | 2.58 | 1.52 | 1.43 |
| 2 | D | 501 | FAD | C2A-N3A | 2.52 | 1.36 | 1.32 |
| 2 | D | 501 | FAD | O2-C2 | 2.52 | 1.28 | 1.24 |
| 2 | D | 501 | FAD | O4-C4 | 2.51 | 1.28 | 1.23 |
| 2 | A | 501 | FAD | C4X-C10 | 2.50 | 1.51 | 1.44 |
| 3 | B | 502 | NAD | C2N-C3N | 2.50 | 1.42 | 1.39 |
| 2 | D | 501 | FAD | C4X-C10 | 2.46 | 1.51 | 1.44 |
| 2 | B | 501 | FAD | C4A-N3A | 2.45 | 1.39 | 1.35 |
| 4 | A | 503 | COA | O4B-C1B | 2.44 | 1.44 | 1.41 |
| 2 | D | 501 | FAD | O4B-C4B | -2.41 | 1.39 | 1.45 |
| 3 | A | 502 | NAD | O3B-C3B | -2.40 | 1.37 | 1.43 |
| 3 | B | 502 | NAD | C6A-C5A | -2.37 | 1.34 | 1.43 |
| 4 | B | 503 | COA | C2A-N1A | 2.37 | 1.38 | 1.33 |
| 2 | A | 501 | FAD | C9A-N10 | 2.36 | 1.45 | 1.41 |
| 3 | D | 502 | NAD | C2N-C3N | 2.36 | 1.42 | 1.39 |
| 2 | C | 501 | FAD | O2-C2 | 2.35 | 1.28 | 1.24 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|---------|-------|-------------|----------|
| 2 | C | 501 | FAD | O4'-C4' | 2.35 | 1.48 | 1.43 |
| 2 | B | 501 | FAD | PA-O1A | 2.33 | 1.59 | 1.50 |
| 2 | A | 501 | FAD | C10-N10 | 2.33 | 1.42 | 1.37 |
| 3 | A | 502 | NAD | PA-O2A | -2.33 | 1.44 | 1.55 |
| 2 | D | 501 | FAD | C8A-N7A | 2.28 | 1.38 | 1.34 |
| 4 | C | 503 | COA | C2A-N1A | 2.26 | 1.38 | 1.33 |
| 2 | C | 501 | FAD | O4B-C4B | -2.25 | 1.40 | 1.45 |
| 2 | A | 501 | FAD | C2B-C3B | -2.23 | 1.47 | 1.53 |
| 2 | D | 501 | FAD | C6A-C5A | 2.23 | 1.51 | 1.43 |
| 3 | B | 502 | NAD | C3N-C7N | 2.22 | 1.53 | 1.50 |
| 3 | A | 502 | NAD | C8A-N7A | 2.20 | 1.38 | 1.34 |
| 2 | C | 501 | FAD | C10-N1 | 2.19 | 1.37 | 1.33 |
| 2 | D | 501 | FAD | O4'-C4' | 2.18 | 1.48 | 1.43 |
| 2 | B | 501 | FAD | C6A-C5A | 2.17 | 1.51 | 1.43 |
| 2 | B | 501 | FAD | O4'-C4' | 2.13 | 1.47 | 1.43 |
| 4 | D | 503 | COA | O4B-C1B | 2.12 | 1.44 | 1.41 |
| 2 | D | 501 | FAD | C10-N10 | 2.09 | 1.41 | 1.37 |
| 2 | C | 501 | FAD | C4X-C4 | 2.08 | 1.52 | 1.44 |
| 3 | D | 502 | NAD | C5B-C4B | 2.06 | 1.58 | 1.51 |
| 2 | C | 501 | FAD | C4X-C10 | 2.05 | 1.50 | 1.44 |
| 2 | C | 501 | FAD | C5'-C4' | 2.05 | 1.54 | 1.51 |
| 3 | D | 502 | NAD | PN-O2N | -2.05 | 1.45 | 1.55 |
| 3 | D | 502 | NAD | C4A-N3A | -2.04 | 1.32 | 1.35 |
| 4 | C | 503 | COA | C6A-C5A | 2.03 | 1.50 | 1.43 |
| 2 | A | 501 | FAD | O3B-C3B | 2.03 | 1.47 | 1.43 |
| 2 | B | 501 | FAD | C2A-N1A | 2.02 | 1.37 | 1.33 |
| 2 | A | 501 | FAD | C4A-N3A | 2.02 | 1.38 | 1.35 |
| 2 | C | 501 | FAD | C5X-N5 | -2.01 | 1.35 | 1.39 |
| 3 | C | 502 | NAD | PA-O2A | -2.01 | 1.45 | 1.55 |
| 2 | A | 501 | FAD | O4'-C4' | 2.01 | 1.47 | 1.43 |

All (214) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|-------|-------------|----------|
| 3 | A | 502 | NAD | O4B-C4B-C5B | 8.22 | 136.41 | 109.37 |
| 3 | C | 502 | NAD | O4B-C4B-C5B | 8.02 | 135.75 | 109.37 |
| 3 | D | 502 | NAD | O4B-C4B-C5B | 7.89 | 135.32 | 109.37 |
| 3 | B | 502 | NAD | O4B-C4B-C5B | 7.51 | 134.08 | 109.37 |
| 4 | A | 503 | COA | C7P-C6P-C5P | -6.70 | 101.21 | 112.36 |
| 3 | B | 502 | NAD | O4B-C1B-C2B | -6.52 | 97.40 | 106.93 |
| 3 | C | 502 | NAD | C5A-C6A-N6A | -6.20 | 110.93 | 120.35 |
| 3 | D | 502 | NAD | C5A-C6A-N6A | -6.03 | 111.19 | 120.35 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|-------|-------------|----------|
| 4 | C | 503 | COA | CEP-CBP-CAP | 5.96 | 119.16 | 108.82 |
| 4 | C | 503 | COA | C3P-N4P-C5P | -5.93 | 111.82 | 122.84 |
| 4 | D | 503 | COA | C7P-C6P-C5P | -5.92 | 102.50 | 112.36 |
| 3 | C | 502 | NAD | C6N-N1N-C2N | -5.88 | 116.61 | 121.97 |
| 4 | A | 503 | COA | C3P-N4P-C5P | -5.88 | 111.92 | 122.84 |
| 3 | A | 502 | NAD | C6N-N1N-C2N | -5.72 | 116.76 | 121.97 |
| 3 | A | 502 | NAD | C5A-C6A-N6A | -5.40 | 112.15 | 120.35 |
| 2 | B | 501 | FAD | C4'-C3'-C2' | -5.36 | 102.22 | 113.36 |
| 4 | C | 503 | COA | C7P-N8P-C9P | -5.25 | 113.22 | 122.59 |
| 2 | D | 501 | FAD | C9A-C5X-N5 | -5.18 | 116.81 | 122.43 |
| 4 | B | 503 | COA | C3P-N4P-C5P | -5.17 | 113.24 | 122.84 |
| 4 | B | 503 | COA | C7P-C6P-C5P | -5.13 | 103.81 | 112.36 |
| 3 | D | 502 | NAD | C4A-C5A-N7A | 5.07 | 114.68 | 109.40 |
| 3 | D | 502 | NAD | C3B-C2B-C1B | 5.04 | 108.57 | 100.98 |
| 4 | D | 503 | COA | C7P-N8P-C9P | -5.00 | 113.67 | 122.59 |
| 2 | C | 501 | FAD | C4'-C3'-C2' | -4.88 | 103.21 | 113.36 |
| 3 | D | 502 | NAD | C6N-N1N-C2N | -4.74 | 117.65 | 121.97 |
| 3 | C | 502 | NAD | C3N-C2N-N1N | 4.57 | 124.90 | 120.43 |
| 3 | A | 502 | NAD | C5B-C4B-C3B | -4.51 | 98.29 | 115.18 |
| 3 | A | 502 | NAD | O2B-C2B-C3B | 4.49 | 126.34 | 111.82 |
| 3 | D | 502 | NAD | N6A-C6A-N1A | 4.46 | 127.83 | 118.57 |
| 3 | A | 502 | NAD | N6A-C6A-N1A | 4.43 | 127.76 | 118.57 |
| 2 | A | 501 | FAD | C3B-C2B-C1B | 4.29 | 107.44 | 100.98 |
| 4 | D | 503 | COA | CEP-CBP-CAP | 4.28 | 116.23 | 108.82 |
| 2 | A | 501 | FAD | C4'-C3'-C2' | -4.27 | 104.49 | 113.36 |
| 4 | B | 503 | COA | C7P-N8P-C9P | -4.25 | 115.00 | 122.59 |
| 4 | C | 503 | COA | C7P-C6P-C5P | -4.25 | 105.27 | 112.36 |
| 3 | A | 502 | NAD | O4B-C1B-C2B | -4.24 | 100.73 | 106.93 |
| 3 | D | 502 | NAD | O2B-C2B-C1B | -4.23 | 95.22 | 110.85 |
| 4 | B | 503 | COA | C5A-C6A-N6A | -4.22 | 113.94 | 120.35 |
| 3 | C | 502 | NAD | C5B-C4B-C3B | -4.21 | 99.41 | 115.18 |
| 2 | B | 501 | FAD | C5X-C9A-N10 | 4.17 | 122.27 | 117.95 |
| 3 | A | 502 | NAD | O3B-C3B-C4B | -4.09 | 99.23 | 111.05 |
| 3 | B | 502 | NAD | N3A-C2A-N1A | -4.08 | 122.30 | 128.68 |
| 4 | D | 503 | COA | C3P-N4P-C5P | -4.07 | 115.29 | 122.84 |
| 3 | B | 502 | NAD | C3B-C2B-C1B | 4.01 | 107.02 | 100.98 |
| 3 | A | 502 | NAD | O2B-C2B-C1B | -4.01 | 96.05 | 110.85 |
| 4 | B | 503 | COA | N6A-C6A-N1A | 4.00 | 126.87 | 118.57 |
| 3 | B | 502 | NAD | C6N-N1N-C2N | -3.87 | 118.45 | 121.97 |
| 3 | A | 502 | NAD | C3B-C2B-C1B | 3.86 | 106.79 | 100.98 |
| 3 | C | 502 | NAD | C4A-C5A-N7A | 3.82 | 113.38 | 109.40 |
| 2 | A | 501 | FAD | C10-N1-C2 | 3.81 | 124.52 | 116.90 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|-------|-------------|----------|
| 3 | D | 502 | NAD | O4B-C1B-C2B | -3.80 | 101.37 | 106.93 |
| 4 | A | 503 | COA | N3A-C2A-N1A | -3.79 | 122.76 | 128.68 |
| 3 | B | 502 | NAD | C3N-C2N-N1N | 3.77 | 124.11 | 120.43 |
| 2 | D | 501 | FAD | C5X-C9A-N10 | 3.77 | 121.84 | 117.95 |
| 2 | C | 501 | FAD | C8M-C8-C9 | -3.73 | 112.58 | 119.49 |
| 3 | C | 502 | NAD | O2B-C2B-C3B | 3.71 | 123.83 | 111.82 |
| 2 | C | 501 | FAD | C5X-C9A-N10 | 3.71 | 121.78 | 117.95 |
| 4 | C | 503 | COA | CDP-CBP-CCP | 3.68 | 114.24 | 108.23 |
| 2 | B | 501 | FAD | O4-C4-C4X | -3.64 | 116.94 | 126.60 |
| 4 | A | 503 | COA | CDP-CBP-CAP | 3.64 | 115.13 | 108.82 |
| 2 | A | 501 | FAD | O2B-C2B-C3B | -3.64 | 100.05 | 111.82 |
| 3 | C | 502 | NAD | C3B-C2B-C1B | 3.63 | 106.44 | 100.98 |
| 2 | A | 501 | FAD | O4-C4-C4X | -3.62 | 116.99 | 126.60 |
| 3 | C | 502 | NAD | N6A-C6A-N1A | 3.62 | 126.08 | 118.57 |
| 3 | B | 502 | NAD | O7N-C7N-C3N | 3.60 | 123.94 | 119.63 |
| 2 | B | 501 | FAD | N6A-C6A-N1A | 3.55 | 125.95 | 118.57 |
| 3 | B | 502 | NAD | N6A-C6A-N1A | 3.55 | 125.94 | 118.57 |
| 4 | D | 503 | COA | N3A-C2A-N1A | -3.54 | 123.14 | 128.68 |
| 3 | D | 502 | NAD | N3A-C2A-N1A | -3.53 | 123.16 | 128.68 |
| 4 | D | 503 | COA | C6P-C5P-N4P | 3.52 | 122.35 | 116.42 |
| 2 | A | 501 | FAD | C5X-C9A-N10 | 3.52 | 121.59 | 117.95 |
| 4 | D | 503 | COA | O9P-C9P-N8P | -3.50 | 115.48 | 122.99 |
| 3 | D | 502 | NAD | C5B-C4B-C3B | -3.49 | 102.08 | 115.18 |
| 4 | A | 503 | COA | C7P-N8P-C9P | -3.45 | 116.43 | 122.59 |
| 3 | D | 502 | NAD | O2B-C2B-C3B | 3.44 | 122.95 | 111.82 |
| 2 | C | 501 | FAD | C9A-C5X-N5 | -3.42 | 118.72 | 122.43 |
| 2 | D | 501 | FAD | C3B-C2B-C1B | 3.39 | 106.08 | 100.98 |
| 3 | B | 502 | NAD | C5B-C4B-C3B | -3.37 | 102.54 | 115.18 |
| 2 | A | 501 | FAD | O4B-C4B-C3B | 3.37 | 111.78 | 105.11 |
| 2 | A | 501 | FAD | C9A-N10-C10 | -3.37 | 115.52 | 120.77 |
| 2 | B | 501 | FAD | C1'-N10-C9A | 3.36 | 126.11 | 120.51 |
| 2 | A | 501 | FAD | N6A-C6A-N1A | 3.35 | 125.53 | 118.57 |
| 4 | A | 503 | COA | CEP-CBP-CAP | 3.33 | 114.60 | 108.82 |
| 4 | D | 503 | COA | O3B-P3B-O7A | -3.32 | 96.58 | 109.39 |
| 3 | D | 502 | NAD | C3N-C2N-N1N | 3.25 | 123.60 | 120.43 |
| 2 | B | 501 | FAD | O4B-C4B-C3B | 3.23 | 111.51 | 105.11 |
| 4 | B | 503 | COA | CDP-CBP-CCP | 3.21 | 113.46 | 108.23 |
| 4 | A | 503 | COA | O5P-C5P-N4P | -3.20 | 116.97 | 123.01 |
| 3 | C | 502 | NAD | C5N-C4N-C3N | -3.19 | 116.57 | 120.34 |
| 4 | A | 503 | COA | O6A-CCP-CBP | -3.18 | 105.43 | 110.55 |
| 3 | A | 502 | NAD | C3N-C2N-N1N | 3.17 | 123.52 | 120.43 |
| 3 | D | 502 | NAD | O5D-PN-O1N | 3.16 | 121.43 | 109.07 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|-------|-------------|----------|
| 2 | B | 501 | FAD | C9A-N10-C10 | -3.16 | 115.85 | 120.77 |
| 4 | D | 503 | COA | O6A-CCP-CBP | -3.16 | 105.47 | 110.55 |
| 3 | A | 502 | NAD | O7N-C7N-N7N | -3.15 | 118.11 | 122.58 |
| 2 | D | 501 | FAD | C4'-C3'-C2' | -3.14 | 106.82 | 113.36 |
| 3 | C | 502 | NAD | C6N-C5N-C4N | 3.13 | 123.99 | 119.44 |
| 2 | C | 501 | FAD | C3B-C2B-C1B | 3.13 | 105.69 | 100.98 |
| 3 | C | 502 | NAD | O2B-C2B-C1B | -3.12 | 99.35 | 110.85 |
| 3 | B | 502 | NAD | O2B-C2B-C3B | 3.11 | 121.89 | 111.82 |
| 2 | C | 501 | FAD | C4A-C5A-N7A | -3.11 | 106.16 | 109.40 |
| 3 | C | 502 | NAD | O4B-C1B-C2B | -3.11 | 102.38 | 106.93 |
| 4 | C | 503 | COA | O6A-CCP-CBP | -3.10 | 105.56 | 110.55 |
| 4 | D | 503 | COA | O5P-C5P-N4P | -3.09 | 117.18 | 123.01 |
| 2 | B | 501 | FAD | N3A-C2A-N1A | -3.08 | 123.86 | 128.68 |
| 2 | C | 501 | FAD | C10-N1-C2 | 3.07 | 123.04 | 116.90 |
| 2 | B | 501 | FAD | O4'-C4'-C5' | 3.04 | 116.76 | 109.92 |
| 2 | C | 501 | FAD | C1'-N10-C9A | 3.04 | 125.58 | 120.51 |
| 3 | D | 502 | NAD | O4D-C4D-C3D | 3.02 | 111.08 | 105.11 |
| 3 | B | 502 | NAD | O7N-C7N-N7N | -3.00 | 118.31 | 122.58 |
| 2 | A | 501 | FAD | O4'-C4'-C3' | 2.98 | 116.34 | 109.10 |
| 2 | A | 501 | FAD | C4X-C10-N1 | -2.96 | 117.85 | 124.73 |
| 4 | C | 503 | COA | CEP-CBP-CCP | -2.93 | 103.46 | 108.23 |
| 3 | A | 502 | NAD | O7N-C7N-C3N | 2.92 | 123.13 | 119.63 |
| 3 | A | 502 | NAD | C4A-C5A-N7A | 2.92 | 112.44 | 109.40 |
| 2 | D | 501 | FAD | O2B-C2B-C3B | -2.88 | 102.51 | 111.82 |
| 2 | B | 501 | FAD | C4A-C5A-N7A | -2.87 | 106.40 | 109.40 |
| 4 | C | 503 | COA | N6A-C6A-N1A | 2.87 | 124.53 | 118.57 |
| 4 | B | 503 | COA | N3A-C2A-N1A | -2.86 | 124.20 | 128.68 |
| 4 | B | 503 | COA | O4B-C1B-C2B | -2.80 | 102.83 | 106.93 |
| 3 | C | 502 | NAD | C5D-C4D-C3D | -2.79 | 104.73 | 115.18 |
| 2 | D | 501 | FAD | O4-C4-C4X | -2.78 | 119.22 | 126.60 |
| 2 | B | 501 | FAD | O2-C2-N1 | -2.76 | 117.25 | 121.83 |
| 4 | B | 503 | COA | O3B-P3B-O7A | -2.76 | 98.73 | 109.39 |
| 3 | C | 502 | NAD | C3D-C2D-C1D | 2.75 | 105.11 | 100.98 |
| 2 | B | 501 | FAD | C3B-C2B-C1B | 2.75 | 105.11 | 100.98 |
| 2 | C | 501 | FAD | O4-C4-C4X | -2.74 | 119.32 | 126.60 |
| 4 | C | 503 | COA | CEP-CBP-CDP | -2.73 | 103.59 | 109.17 |
| 3 | C | 502 | NAD | O7N-C7N-C3N | 2.72 | 122.89 | 119.63 |
| 3 | D | 502 | NAD | C2B-C3B-C4B | -2.71 | 97.37 | 102.64 |
| 4 | B | 503 | COA | CEP-CBP-CCP | -2.71 | 103.82 | 108.23 |
| 4 | D | 503 | COA | CDP-CBP-CAP | 2.69 | 113.49 | 108.82 |
| 3 | A | 502 | NAD | C2D-C3D-C4D | -2.66 | 97.47 | 102.64 |
| 3 | A | 502 | NAD | C3D-C2D-C1D | 2.64 | 104.96 | 100.98 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|-------|-------------|----------|
| 4 | A | 503 | COA | C3B-C2B-C1B | 2.64 | 105.73 | 99.89 |
| 2 | C | 501 | FAD | O4'-C4'-C5' | 2.61 | 115.79 | 109.92 |
| 2 | B | 501 | FAD | O4-C4-N3 | 2.59 | 125.09 | 120.12 |
| 2 | A | 501 | FAD | O2P-P-O5' | 2.57 | 119.69 | 107.75 |
| 3 | D | 502 | NAD | C5N-C4N-C3N | -2.56 | 117.31 | 120.34 |
| 3 | C | 502 | NAD | C2A-N1A-C6A | -2.56 | 114.38 | 118.75 |
| 4 | D | 503 | COA | O9A-P3B-O7A | 2.53 | 120.60 | 110.68 |
| 4 | C | 503 | COA | O3B-P3B-O7A | -2.53 | 99.63 | 109.39 |
| 4 | D | 503 | COA | CAP-C9P-N8P | 2.53 | 121.61 | 116.58 |
| 2 | C | 501 | FAD | C8M-C8-C7 | 2.51 | 125.88 | 120.74 |
| 2 | D | 501 | FAD | C1'-N10-C9A | 2.51 | 124.69 | 120.51 |
| 2 | D | 501 | FAD | N6A-C6A-N1A | 2.50 | 123.76 | 118.57 |
| 2 | C | 501 | FAD | C9A-N10-C10 | -2.50 | 116.88 | 120.77 |
| 2 | D | 501 | FAD | C10-N1-C2 | 2.49 | 121.88 | 116.90 |
| 3 | C | 502 | NAD | N3A-C2A-N1A | -2.48 | 124.81 | 128.68 |
| 4 | D | 503 | COA | O5A-P2A-O4A | 2.45 | 124.34 | 112.24 |
| 2 | D | 501 | FAD | O4B-C4B-C5B | -2.44 | 101.33 | 109.37 |
| 2 | B | 501 | FAD | C9A-C5X-N5 | -2.44 | 119.78 | 122.43 |
| 4 | D | 503 | COA | C5A-C6A-N6A | -2.43 | 116.66 | 120.35 |
| 4 | D | 503 | COA | C4A-C5A-N7A | -2.41 | 106.89 | 109.40 |
| 3 | D | 502 | NAD | O3B-C3B-C4B | -2.40 | 104.11 | 111.05 |
| 3 | B | 502 | NAD | C5D-C4D-C3D | -2.40 | 106.19 | 115.18 |
| 2 | D | 501 | FAD | O2P-P-O1P | 2.40 | 124.09 | 112.24 |
| 4 | A | 503 | COA | N6A-C6A-N1A | 2.38 | 123.52 | 118.57 |
| 3 | B | 502 | NAD | C3D-C2D-C1D | 2.36 | 104.54 | 100.98 |
| 4 | C | 503 | COA | C4A-C5A-N7A | -2.36 | 106.94 | 109.40 |
| 4 | C | 503 | COA | N3A-C2A-N1A | -2.34 | 125.02 | 128.68 |
| 4 | C | 503 | COA | C5A-C6A-N6A | -2.33 | 116.80 | 120.35 |
| 2 | B | 501 | FAD | C2A-N1A-C6A | 2.33 | 122.74 | 118.75 |
| 3 | A | 502 | NAD | O5D-PN-O1N | 2.32 | 118.14 | 109.07 |
| 2 | A | 501 | FAD | C4X-C10-N10 | 2.31 | 119.86 | 116.48 |
| 4 | A | 503 | COA | C6P-C5P-N4P | 2.31 | 120.31 | 116.42 |
| 3 | D | 502 | NAD | C5D-C4D-C3D | -2.31 | 106.53 | 115.18 |
| 3 | B | 502 | NAD | C1B-N9A-C4A | 2.30 | 130.69 | 126.64 |
| 4 | B | 503 | COA | O5A-P2A-O4A | 2.29 | 123.54 | 112.24 |
| 3 | B | 502 | NAD | C2B-C3B-C4B | -2.28 | 98.22 | 102.64 |
| 3 | C | 502 | NAD | O5D-C5D-C4D | 2.27 | 116.82 | 108.99 |
| 2 | A | 501 | FAD | O4-C4-N3 | 2.26 | 124.45 | 120.12 |
| 4 | A | 503 | COA | O4B-C1B-C2B | -2.24 | 103.65 | 106.93 |
| 4 | B | 503 | COA | C3B-C2B-C1B | 2.24 | 104.86 | 99.89 |
| 3 | A | 502 | NAD | O5D-C5D-C4D | 2.24 | 116.70 | 108.99 |
| 3 | B | 502 | NAD | C5A-C6A-N6A | -2.24 | 116.95 | 120.35 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------------|-------|-------------|----------|
| 3 | D | 502 | NAD | C3D-C2D-C1D | 2.23 | 104.33 | 100.98 |
| 4 | D | 503 | COA | O5B-P1A-O1A | -2.22 | 100.40 | 109.07 |
| 2 | D | 501 | FAD | C5X-N5-C4X | 2.21 | 121.75 | 118.07 |
| 2 | C | 501 | FAD | C4X-C10-N1 | -2.21 | 119.60 | 124.73 |
| 3 | B | 502 | NAD | O5D-C5D-C4D | 2.21 | 116.60 | 108.99 |
| 4 | A | 503 | COA | CAP-C9P-N8P | 2.21 | 120.98 | 116.58 |
| 4 | C | 503 | COA | O9P-C9P-N8P | -2.21 | 118.25 | 122.99 |
| 3 | A | 502 | NAD | C2A-N1A-C6A | -2.16 | 115.06 | 118.75 |
| 4 | B | 503 | COA | CDP-CBP-CAP | 2.16 | 112.56 | 108.82 |
| 2 | D | 501 | FAD | C4X-C10-N1 | -2.15 | 119.75 | 124.73 |
| 2 | C | 501 | FAD | C4X-C4-N3 | 2.15 | 118.64 | 113.19 |
| 4 | D | 503 | COA | O8A-P3B-O7A | 2.14 | 119.08 | 110.68 |
| 3 | A | 502 | NAD | C5D-C4D-C3D | -2.14 | 107.18 | 115.18 |
| 2 | B | 501 | FAD | C5A-C6A-N1A | -2.13 | 115.53 | 120.35 |
| 3 | A | 502 | NAD | O4D-C4D-C3D | 2.12 | 109.31 | 105.11 |
| 2 | D | 501 | FAD | O5B-PA-O1A | 2.11 | 117.32 | 109.07 |
| 2 | A | 501 | FAD | C4X-C4-N3 | 2.11 | 118.55 | 113.19 |
| 2 | D | 501 | FAD | O4B-C1B-C2B | -2.11 | 103.84 | 106.93 |
| 3 | B | 502 | NAD | O2A-PA-O5B | -2.11 | 97.95 | 107.75 |
| 4 | C | 503 | COA | CDP-CBP-CAP | 2.10 | 112.46 | 108.82 |
| 4 | C | 503 | COA | O9A-P3B-O7A | 2.09 | 118.87 | 110.68 |
| 4 | D | 503 | COA | N6A-C6A-N1A | 2.08 | 122.90 | 118.57 |
| 2 | D | 501 | FAD | C9-C9A-C5X | -2.07 | 116.19 | 120.11 |
| 4 | A | 503 | COA | O2A-P1A-O1A | 2.07 | 122.49 | 112.24 |
| 4 | A | 503 | COA | O3B-P3B-O7A | -2.06 | 101.42 | 109.39 |
| 2 | B | 501 | FAD | O5'-C5'-C4' | 2.06 | 114.86 | 109.36 |
| 2 | D | 501 | FAD | C6-C5X-C9A | 2.06 | 121.85 | 118.94 |
| 2 | B | 501 | FAD | O2'-C2'-C1' | 2.06 | 114.77 | 109.80 |
| 2 | D | 501 | FAD | O4'-C4'-C3' | 2.06 | 114.10 | 109.10 |
| 4 | B | 503 | COA | O5B-P1A-O1A | -2.05 | 101.04 | 109.07 |
| 3 | D | 502 | NAD | C6N-C5N-C4N | 2.05 | 122.42 | 119.44 |
| 2 | C | 501 | FAD | C4-C4X-N5 | 2.05 | 121.14 | 118.23 |
| 3 | C | 502 | NAD | O7N-C7N-N7N | -2.04 | 119.67 | 122.58 |
| 3 | A | 502 | NAD | C2B-C3B-C4B | -2.04 | 98.68 | 102.64 |
| 4 | C | 503 | COA | O8A-P3B-O7A | 2.03 | 118.61 | 110.68 |
| 3 | B | 502 | NAD | O4D-C4D-C3D | 2.02 | 109.12 | 105.11 |
| 4 | A | 503 | COA | C4A-C5A-N7A | -2.02 | 107.29 | 109.40 |
| 2 | D | 501 | FAD | C8M-C8-C9 | -2.00 | 115.79 | 119.49 |

There are no chirality outliers.

All (122) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-----------------|
| 2 | A | 501 | FAD | O4B-C4B-C5B-O5B |
| 2 | A | 501 | FAD | C3'-C4'-C5'-O5' |
| 2 | B | 501 | FAD | C1'-C2'-C3'-C4' |
| 2 | C | 501 | FAD | C3'-C4'-C5'-O5' |
| 2 | D | 501 | FAD | C3'-C4'-C5'-O5' |
| 3 | A | 502 | NAD | C5D-O5D-PN-O2N |
| 3 | A | 502 | NAD | O4D-C4D-C5D-O5D |
| 3 | B | 502 | NAD | C5D-O5D-PN-O3 |
| 3 | B | 502 | NAD | C5D-O5D-PN-O2N |
| 3 | C | 502 | NAD | C5D-O5D-PN-O3 |
| 3 | C | 502 | NAD | C5D-O5D-PN-O2N |
| 3 | D | 502 | NAD | C5B-O5B-PA-O1A |
| 3 | D | 502 | NAD | C5D-O5D-PN-O3 |
| 3 | D | 502 | NAD | C5D-O5D-PN-O2N |
| 4 | A | 503 | COA | C3B-O3B-P3B-O7A |
| 4 | A | 503 | COA | CCP-O6A-P2A-O3A |
| 4 | A | 503 | COA | CCP-O6A-P2A-O5A |
| 4 | A | 503 | COA | CDP-CBP-CCP-O6A |
| 4 | A | 503 | COA | CEP-CBP-CCP-O6A |
| 4 | A | 503 | COA | CAP-CBP-CCP-O6A |
| 4 | A | 503 | COA | S1P-C2P-C3P-N4P |
| 4 | B | 503 | COA | C3B-O3B-P3B-O7A |
| 4 | B | 503 | COA | CCP-O6A-P2A-O3A |
| 4 | B | 503 | COA | CCP-O6A-P2A-O5A |
| 4 | B | 503 | COA | CDP-CBP-CCP-O6A |
| 4 | B | 503 | COA | CEP-CBP-CCP-O6A |
| 4 | B | 503 | COA | CAP-CBP-CCP-O6A |
| 4 | B | 503 | COA | S1P-C2P-C3P-N4P |
| 4 | C | 503 | COA | C3B-O3B-P3B-O7A |
| 4 | C | 503 | COA | CCP-O6A-P2A-O4A |
| 4 | C | 503 | COA | CCP-O6A-P2A-O5A |
| 4 | C | 503 | COA | CDP-CBP-CCP-O6A |
| 4 | C | 503 | COA | CEP-CBP-CCP-O6A |
| 4 | C | 503 | COA | CAP-CBP-CCP-O6A |
| 4 | C | 503 | COA | S1P-C2P-C3P-N4P |
| 4 | D | 503 | COA | C3B-O3B-P3B-O7A |
| 4 | D | 503 | COA | C3B-O3B-P3B-O9A |
| 4 | D | 503 | COA | CCP-O6A-P2A-O3A |
| 4 | D | 503 | COA | CCP-O6A-P2A-O5A |
| 4 | D | 503 | COA | CDP-CBP-CCP-O6A |
| 4 | D | 503 | COA | CEP-CBP-CCP-O6A |
| 4 | D | 503 | COA | CAP-CBP-CCP-O6A |
| 4 | D | 503 | COA | S1P-C2P-C3P-N4P |

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| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-----------------|
| 2 | B | 501 | FAD | O4B-C4B-C5B-O5B |
| 3 | B | 502 | NAD | O4D-C4D-C5D-O5D |
| 3 | C | 502 | NAD | O4D-C4D-C5D-O5D |
| 4 | B | 503 | COA | C4B-C3B-O3B-P3B |
| 4 | D | 503 | COA | C4B-C3B-O3B-P3B |
| 4 | D | 503 | COA | O5P-C5P-N4P-C3P |
| 4 | A | 503 | COA | C6P-C5P-N4P-C3P |
| 4 | D | 503 | COA | C6P-C5P-N4P-C3P |
| 3 | D | 502 | NAD | O4D-C4D-C5D-O5D |
| 4 | A | 503 | COA | O5P-C5P-N4P-C3P |
| 4 | A | 503 | COA | C2B-C3B-O3B-P3B |
| 4 | A | 503 | COA | C4B-C3B-O3B-P3B |
| 4 | C | 503 | COA | C2B-C3B-O3B-P3B |
| 4 | C | 503 | COA | C4B-C3B-O3B-P3B |
| 4 | B | 503 | COA | C6P-C5P-N4P-C3P |
| 4 | B | 503 | COA | O5P-C5P-N4P-C3P |
| 4 | C | 503 | COA | C6P-C5P-N4P-C3P |
| 4 | B | 503 | COA | C2B-C3B-O3B-P3B |
| 4 | D | 503 | COA | C2B-C3B-O3B-P3B |
| 4 | C | 503 | COA | O5P-C5P-N4P-C3P |
| 2 | D | 501 | FAD | O4'-C4'-C5'-O5' |
| 2 | B | 501 | FAD | C3B-C4B-C5B-O5B |
| 4 | A | 503 | COA | C3B-C4B-C5B-O5B |
| 2 | A | 501 | FAD | C3B-C4B-C5B-O5B |
| 4 | A | 503 | COA | O4B-C4B-C5B-O5B |
| 4 | B | 503 | COA | O4B-C4B-C5B-O5B |
| 2 | B | 501 | FAD | C3'-C4'-C5'-O5' |
| 4 | D | 503 | COA | P1A-O3A-P2A-O4A |
| 2 | D | 501 | FAD | C3B-C4B-C5B-O5B |
| 4 | D | 503 | COA | O4B-C4B-C5B-O5B |
| 2 | B | 501 | FAD | PA-O3P-P-O5' |
| 2 | C | 501 | FAD | PA-O3P-P-O5' |
| 2 | D | 501 | FAD | PA-O3P-P-O5' |
| 2 | D | 501 | FAD | O4B-C4B-C5B-O5B |
| 4 | C | 503 | COA | O4B-C4B-C5B-O5B |
| 3 | A | 502 | NAD | C5D-O5D-PN-O3 |
| 4 | B | 503 | COA | C3B-O3B-P3B-O9A |
| 4 | C | 503 | COA | C3B-O3B-P3B-O9A |
| 4 | D | 503 | COA | C3B-C4B-C5B-O5B |
| 4 | B | 503 | COA | P2A-O3A-P1A-O1A |
| 4 | D | 503 | COA | P2A-O3A-P1A-O1A |
| 4 | D | 503 | COA | P1A-O3A-P2A-O5A |

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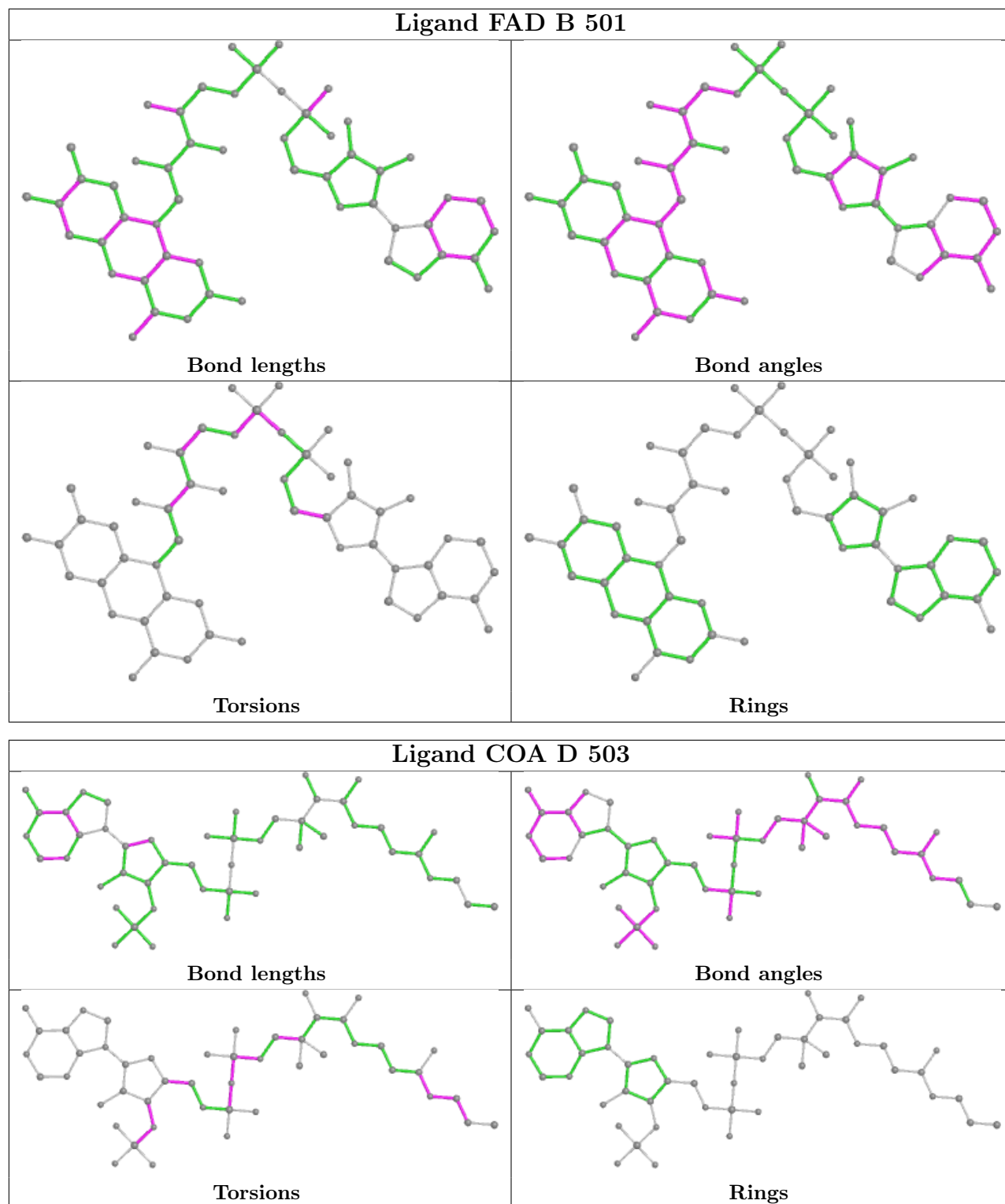
| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-----------------|
| 2 | A | 501 | FAD | C5'-O5'-P-O2P |
| 2 | B | 501 | FAD | C5'-O5'-P-O2P |
| 4 | B | 503 | COA | CCP-O6A-P2A-O4A |
| 2 | C | 501 | FAD | O4B-C4B-C5B-O5B |
| 4 | A | 503 | COA | P1A-O3A-P2A-O5A |
| 4 | B | 503 | COA | P2A-O3A-P1A-O2A |
| 4 | B | 503 | COA | P1A-O3A-P2A-O5A |
| 4 | C | 503 | COA | P2A-O3A-P1A-O1A |
| 4 | C | 503 | COA | P2A-O3A-P1A-O2A |
| 4 | C | 503 | COA | P1A-O3A-P2A-O5A |
| 4 | D | 503 | COA | P2A-O3A-P1A-O2A |
| 3 | B | 502 | NAD | O4B-C4B-C5B-O5B |
| 4 | B | 503 | COA | C3B-C4B-C5B-O5B |
| 4 | D | 503 | COA | C2P-C3P-N4P-C5P |
| 3 | A | 502 | NAD | O4B-C4B-C5B-O5B |
| 2 | C | 501 | FAD | P-O3P-PA-O2A |
| 2 | A | 501 | FAD | PA-O3P-P-O5' |
| 2 | C | 501 | FAD | C3B-C4B-C5B-O5B |
| 4 | C | 503 | COA | C3B-C4B-C5B-O5B |
| 3 | A | 502 | NAD | C3D-C4D-C5D-O5D |
| 3 | D | 502 | NAD | C5B-O5B-PA-O3 |
| 4 | A | 503 | COA | C3B-O3B-P3B-O8A |
| 4 | C | 503 | COA | CCP-O6A-P2A-O3A |
| 2 | A | 501 | FAD | P-O3P-PA-O2A |
| 2 | D | 501 | FAD | P-O3P-PA-O1A |
| 4 | A | 503 | COA | P2A-O3A-P1A-O2A |
| 4 | A | 503 | COA | P1A-O3A-P2A-O4A |
| 4 | C | 503 | COA | P1A-O3A-P2A-O4A |
| 2 | B | 501 | FAD | O2'-C2'-C3'-C4' |
| 2 | D | 501 | FAD | C5'-O5'-P-O1P |
| 3 | A | 502 | NAD | C5B-O5B-PA-O1A |
| 3 | B | 502 | NAD | C5B-O5B-PA-O1A |
| 3 | C | 502 | NAD | C5B-O5B-PA-O1A |
| 3 | C | 502 | NAD | O4B-C4B-C5B-O5B |
| 3 | D | 502 | NAD | O4B-C4B-C5B-O5B |
| 2 | B | 501 | FAD | C1'-C2'-C3'-O3' |
| 2 | D | 501 | FAD | C1'-C2'-C3'-O3' |

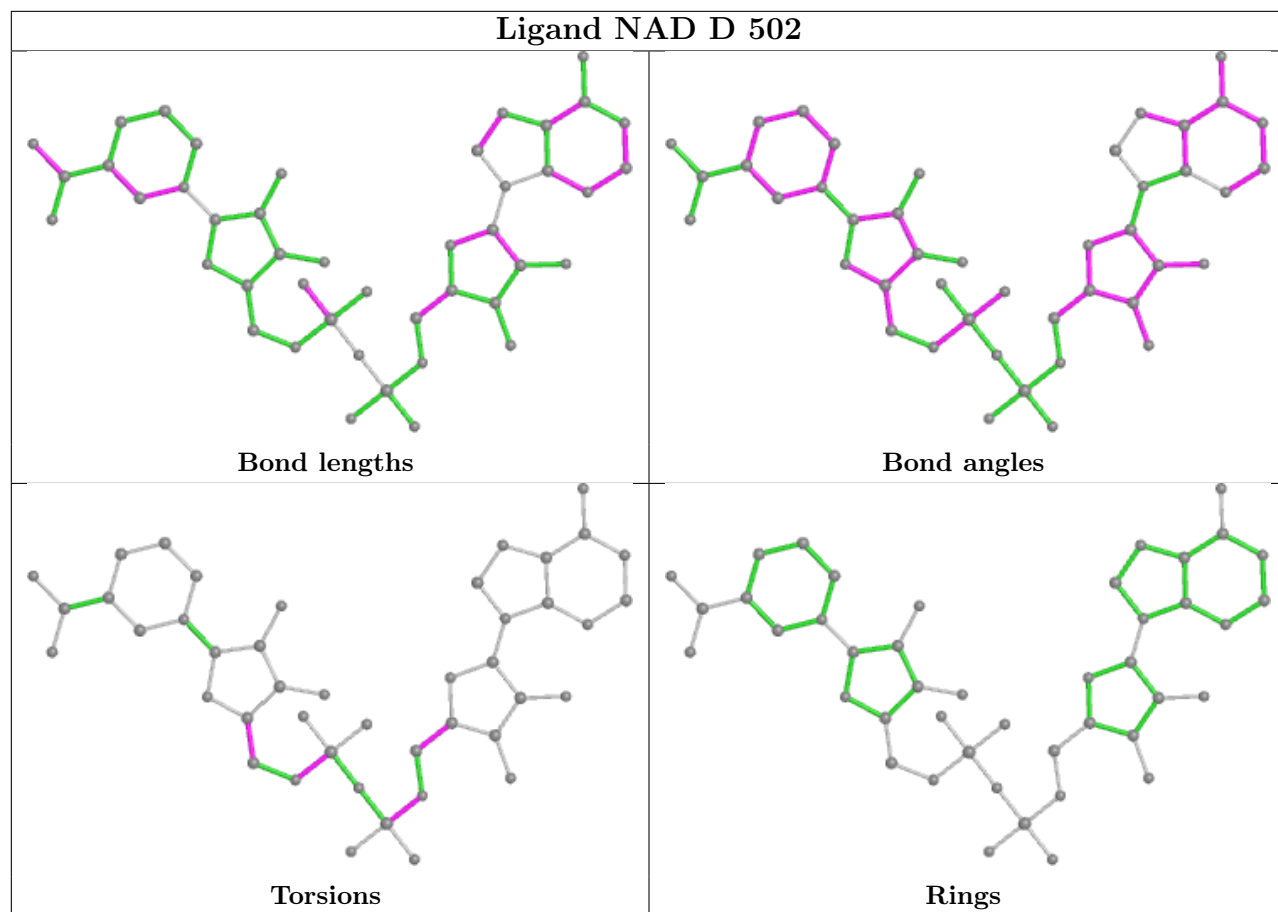
There are no ring outliers.

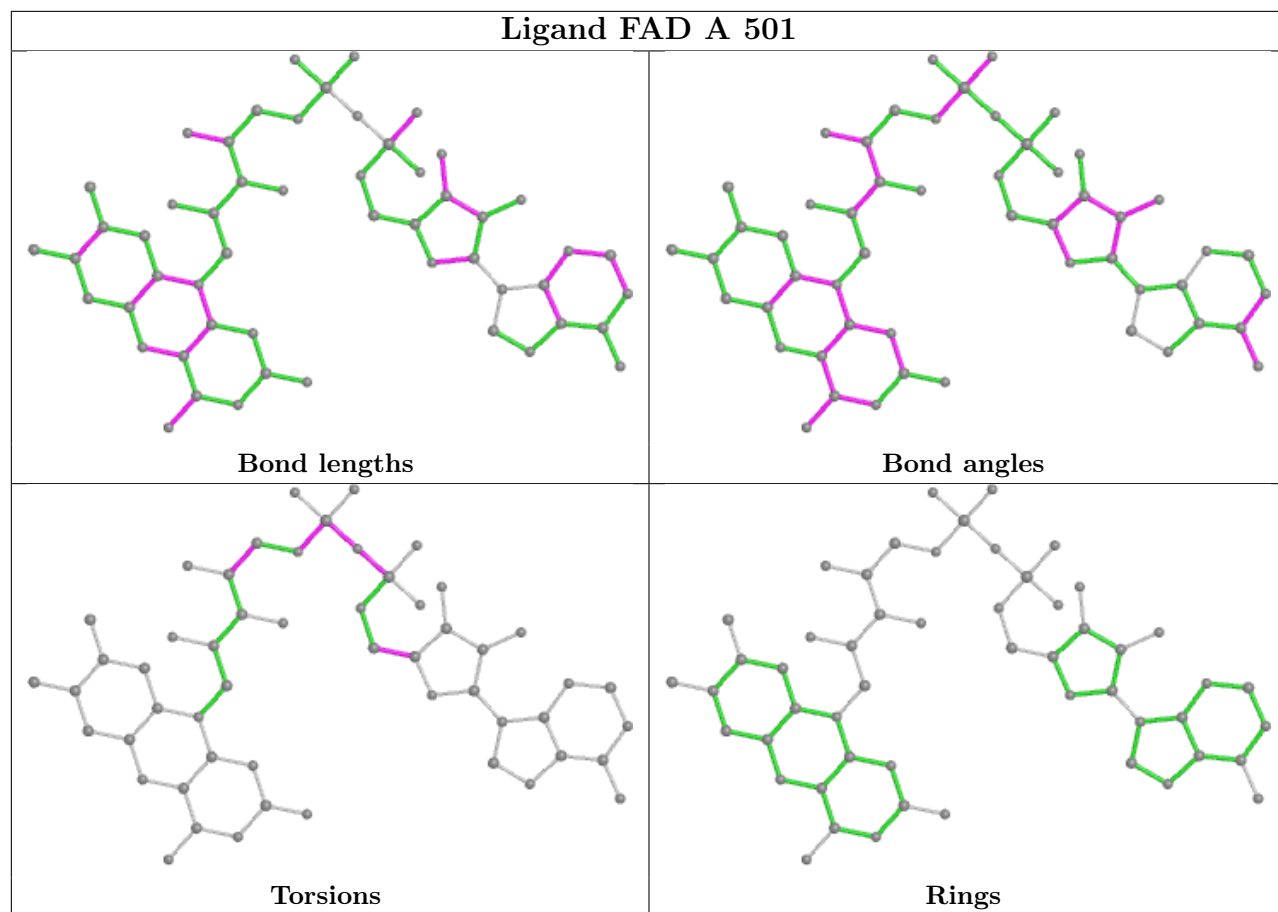
11 monomers are involved in 81 short contacts:

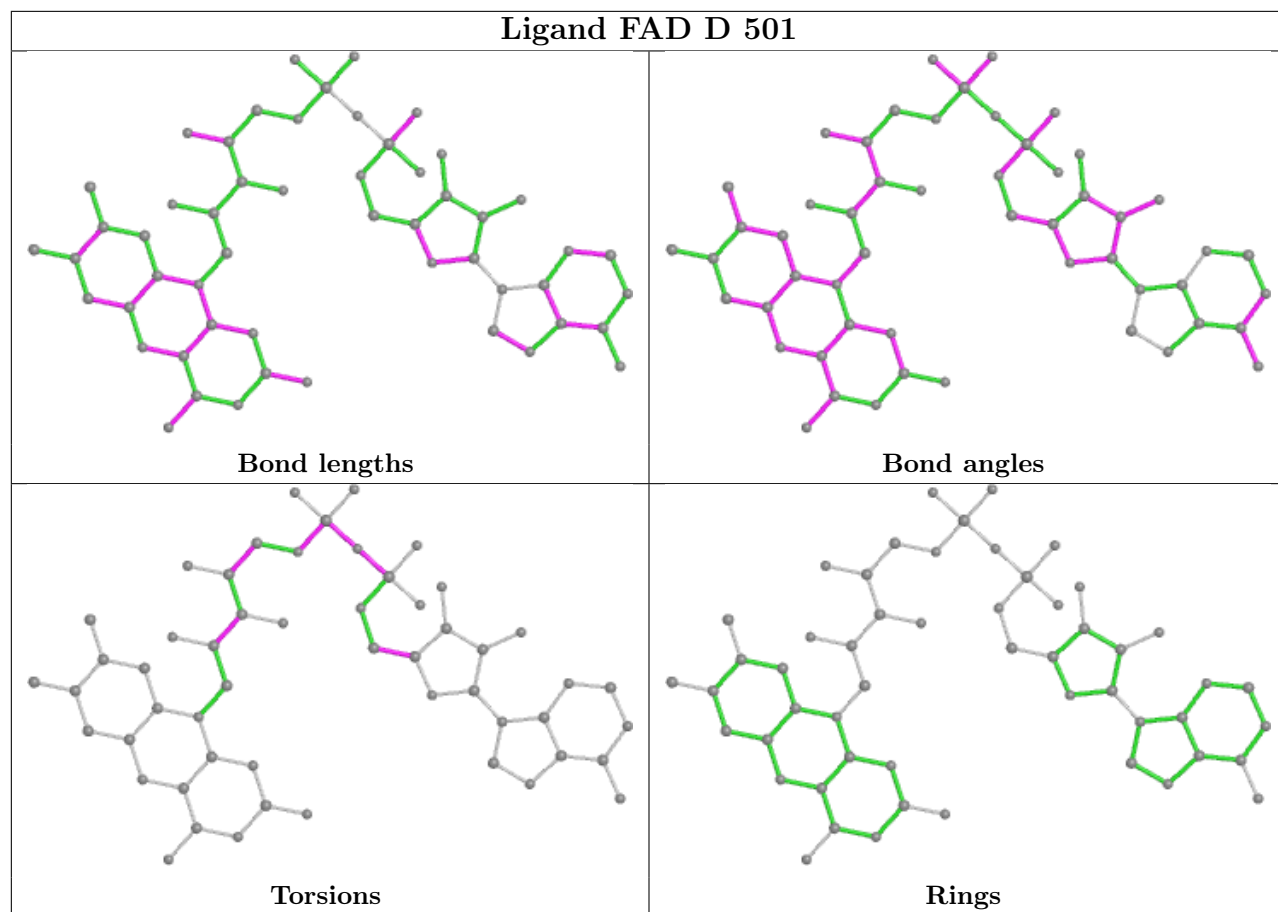
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 2 | B | 501 | FAD | 11 | 0 |
| 4 | D | 503 | COA | 3 | 0 |
| 3 | D | 502 | NAD | 12 | 0 |
| 2 | A | 501 | FAD | 7 | 0 |
| 2 | D | 501 | FAD | 6 | 0 |
| 3 | A | 502 | NAD | 11 | 0 |
| 4 | A | 503 | COA | 3 | 0 |
| 3 | C | 502 | NAD | 9 | 0 |
| 4 | B | 503 | COA | 5 | 0 |
| 2 | C | 501 | FAD | 7 | 0 |
| 3 | B | 502 | NAD | 10 | 0 |

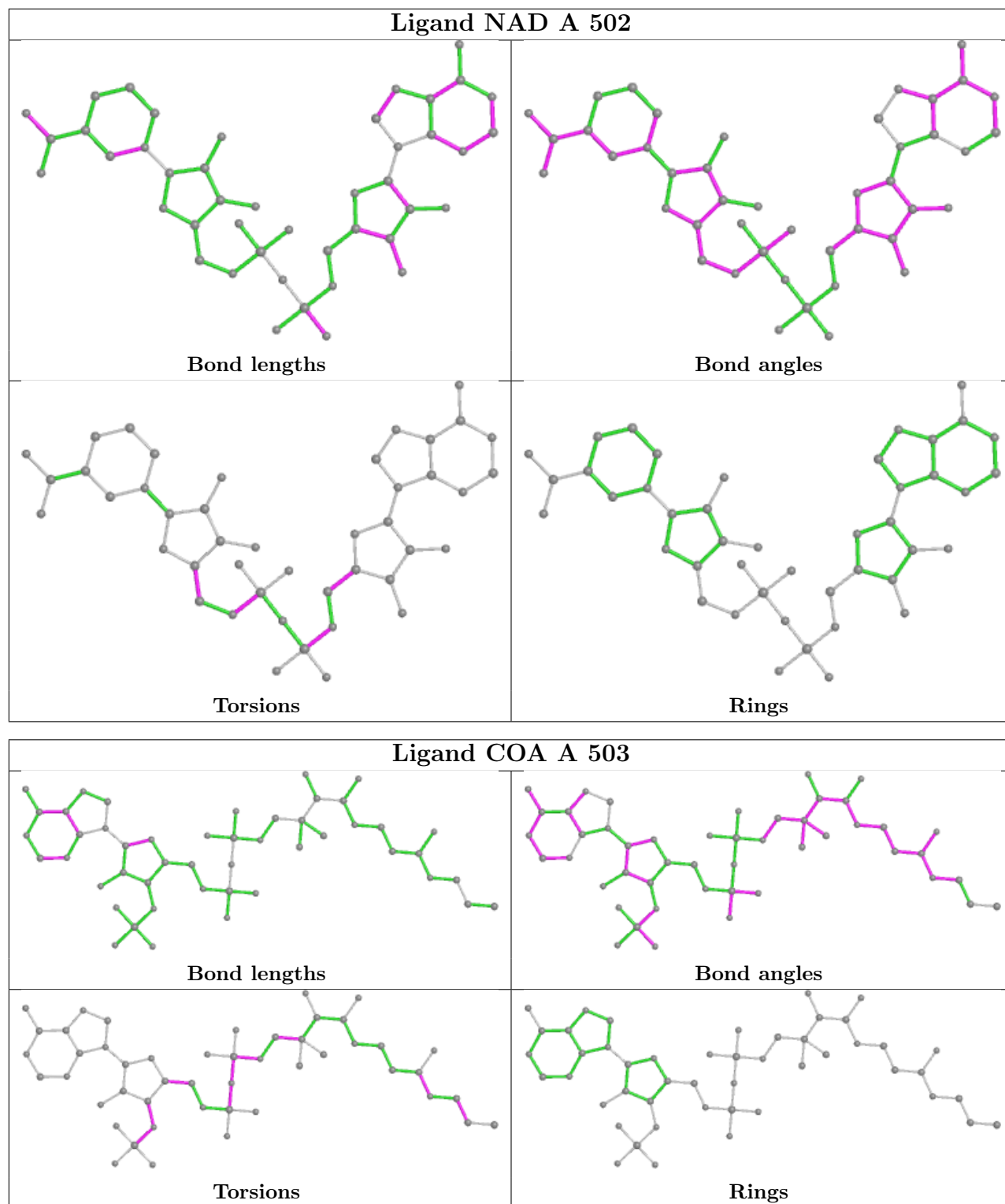
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

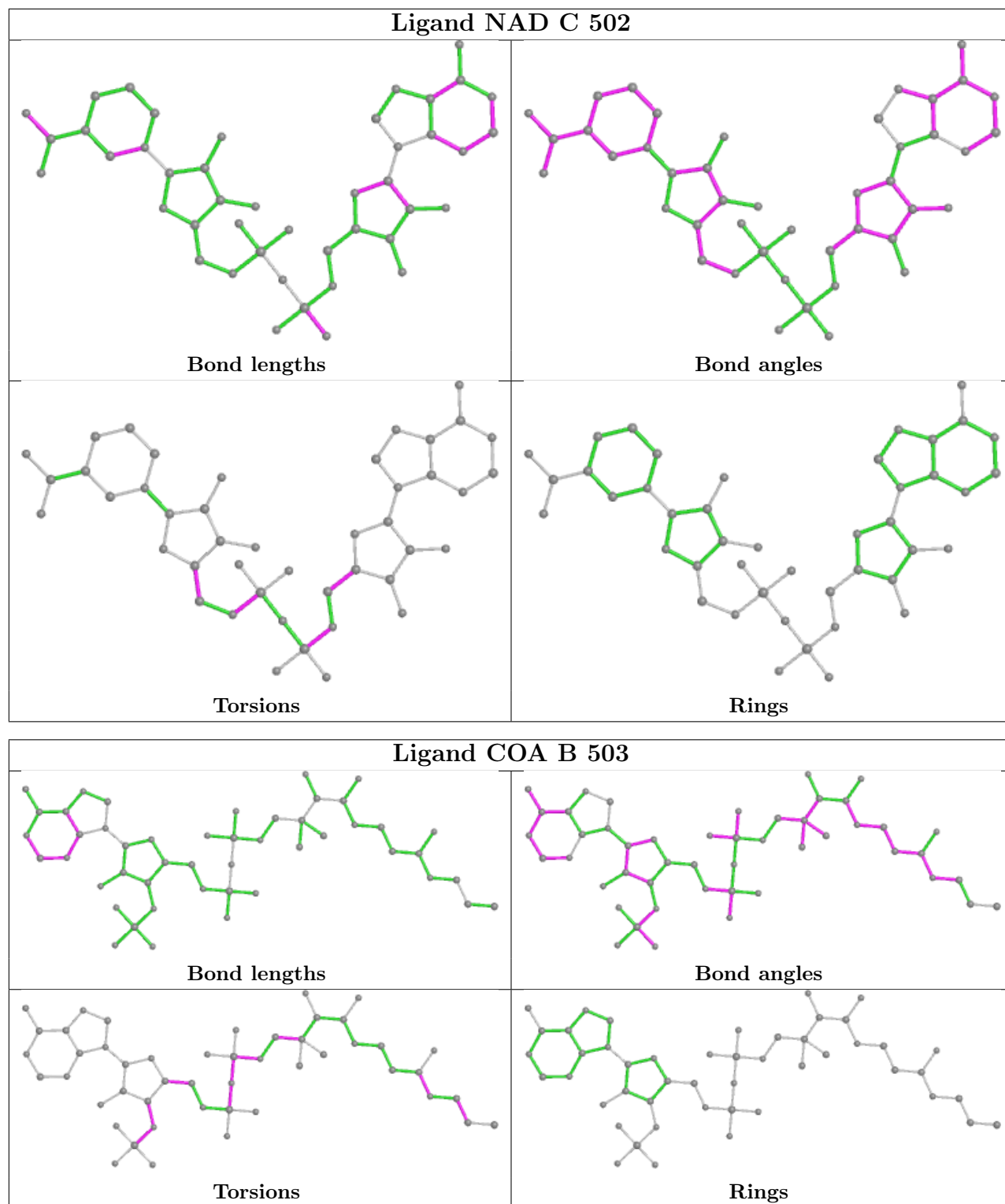


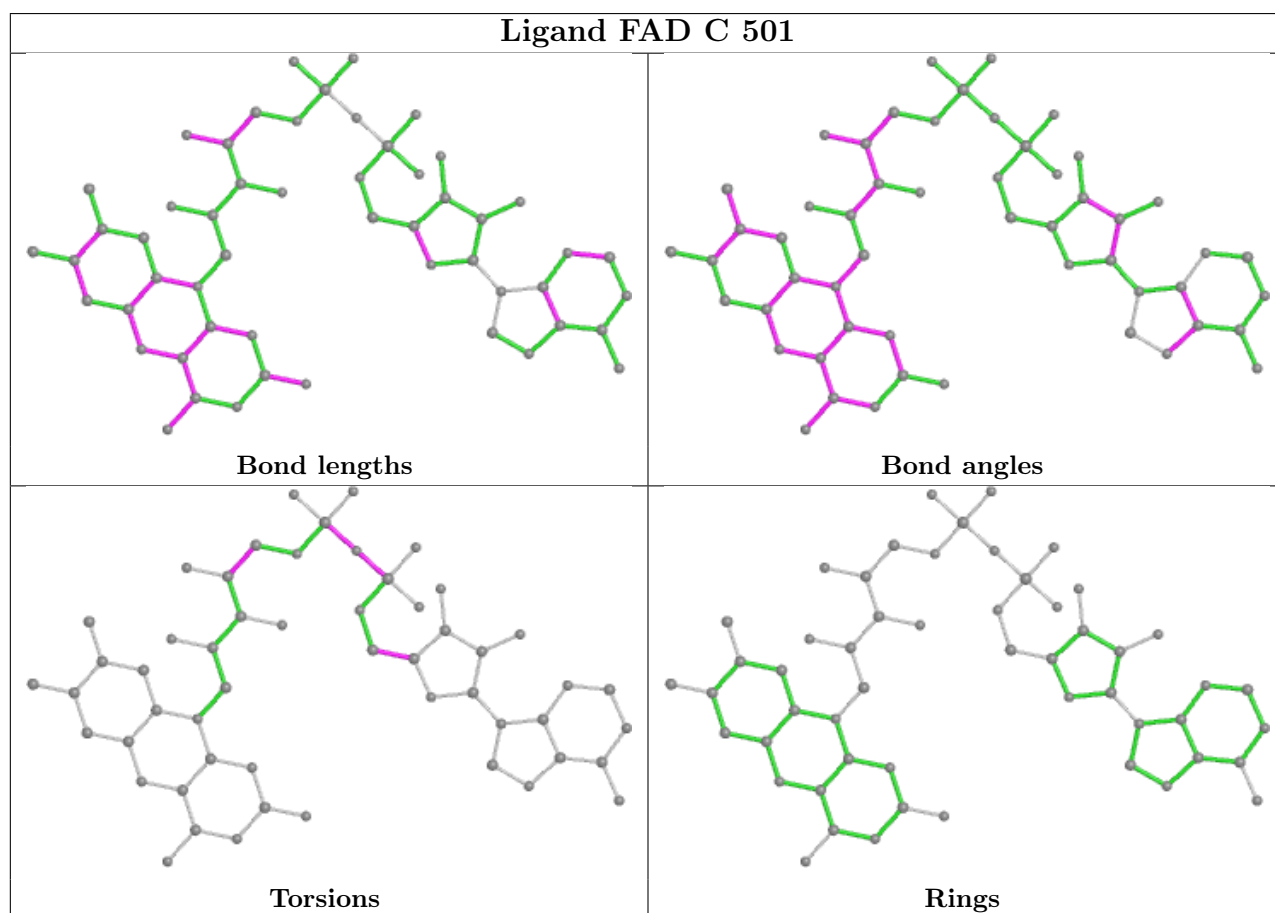
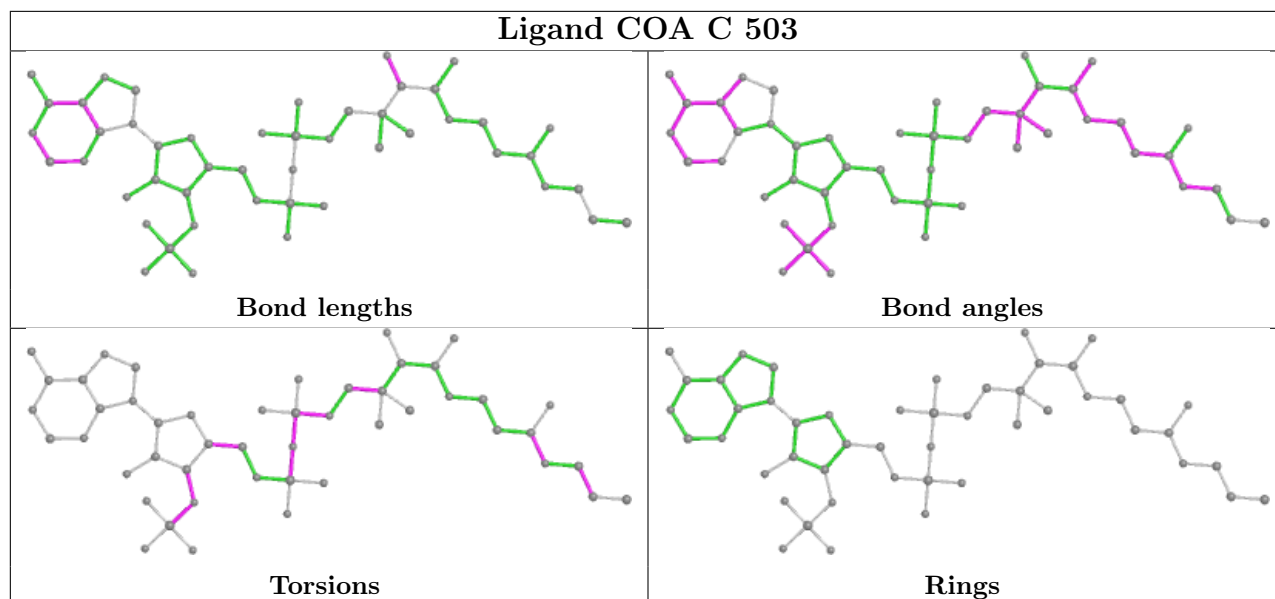


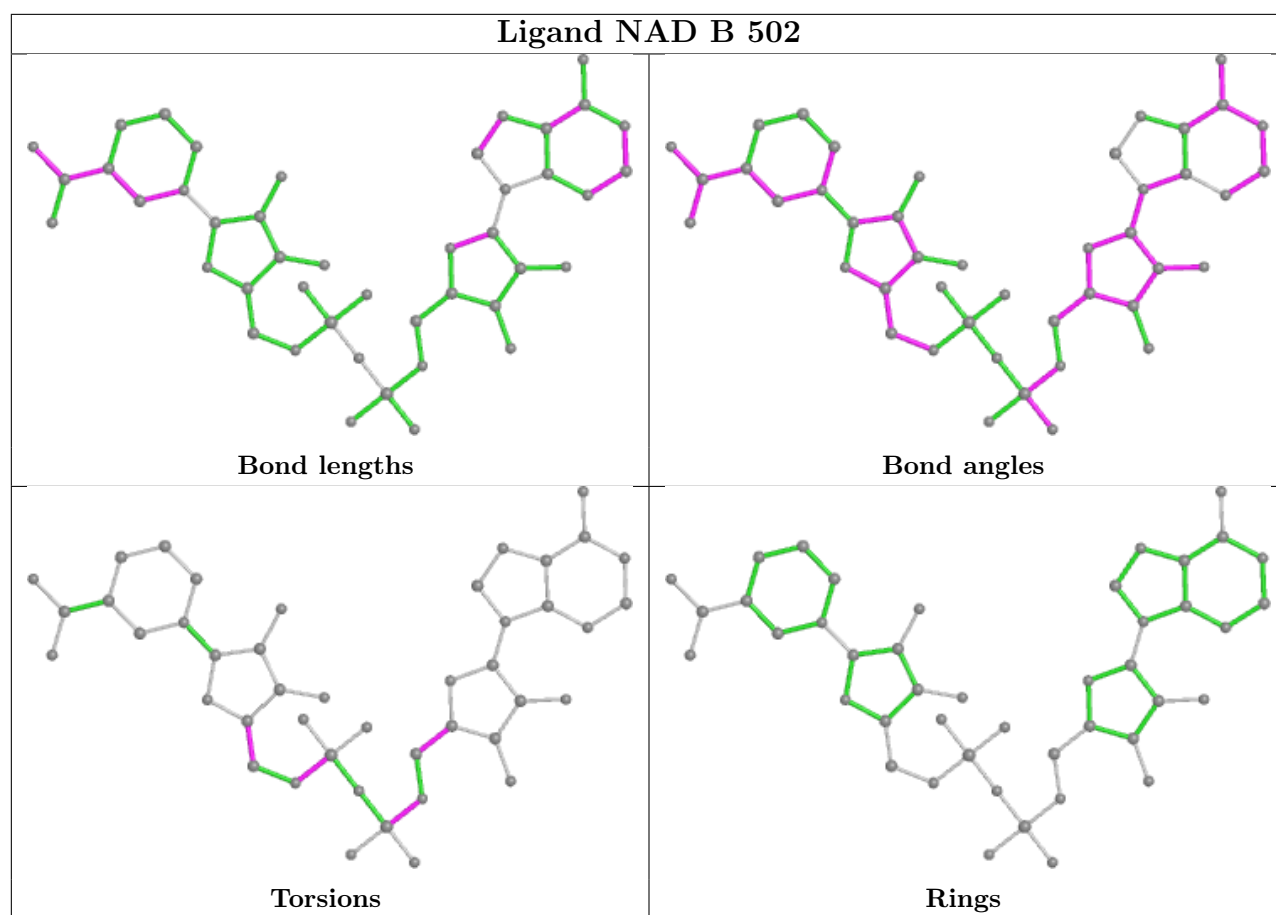












5.7 Other polymers [i](#)

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

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

| Mol | Chain | Analysed | <RSRZ> | #RSRZ>2 | OWAB(Å ²) | Q<0.9 |
|-----|-------|------------------|--------|---------------|-----------------------|-------|
| 1 | A | 443/443 (100%) | -0.21 | 7 (1%) 72 71 | 30, 47, 75, 130 | 0 |
| 1 | B | 443/443 (100%) | -0.06 | 10 (2%) 60 58 | 31, 49, 77, 129 | 0 |
| 1 | C | 443/443 (100%) | -0.16 | 11 (2%) 57 55 | 31, 48, 76, 132 | 0 |
| 1 | D | 443/443 (100%) | -0.18 | 5 (1%) 80 80 | 29, 49, 78, 132 | 0 |
| All | All | 1772/1772 (100%) | -0.15 | 33 (1%) 66 65 | 29, 48, 77, 132 | 0 |

All (33) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 1 | D | 1 | MET | 10.5 |
| 1 | B | 443 | ARG | 8.5 |
| 1 | B | 1 | MET | 8.5 |
| 1 | A | 1 | MET | 8.2 |
| 1 | C | 1 | MET | 7.7 |
| 1 | C | 2 | GLY | 5.8 |
| 1 | B | 2 | GLY | 5.7 |
| 1 | A | 86 | TYR | 5.3 |
| 1 | C | 443 | ARG | 5.2 |
| 1 | A | 88 | LEU | 4.9 |
| 1 | D | 2 | GLY | 4.7 |
| 1 | A | 2 | GLY | 4.4 |
| 1 | B | 86 | TYR | 4.2 |
| 1 | D | 443 | ARG | 4.1 |
| 1 | A | 443 | ARG | 3.8 |
| 1 | C | 86 | TYR | 3.4 |
| 1 | D | 352 | TRP | 3.3 |
| 1 | C | 352 | TRP | 3.1 |
| 1 | B | 442 | ALA | 3.1 |
| 1 | B | 88 | LEU | 3.1 |
| 1 | B | 208 | TRP | 2.8 |

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| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 1 | D | 88 | LEU | 2.8 |
| 1 | C | 88 | LEU | 2.7 |
| 1 | A | 219 | MET | 2.7 |
| 1 | A | 442 | ALA | 2.6 |
| 1 | B | 219 | MET | 2.5 |
| 1 | B | 216 | PHE | 2.5 |
| 1 | C | 383 | THR | 2.5 |
| 1 | B | 91 | LEU | 2.4 |
| 1 | C | 381 | GLU | 2.3 |
| 1 | C | 87 | GLU | 2.2 |
| 1 | C | 317 | GLU | 2.2 |
| 1 | C | 212 | LYS | 2.1 |

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

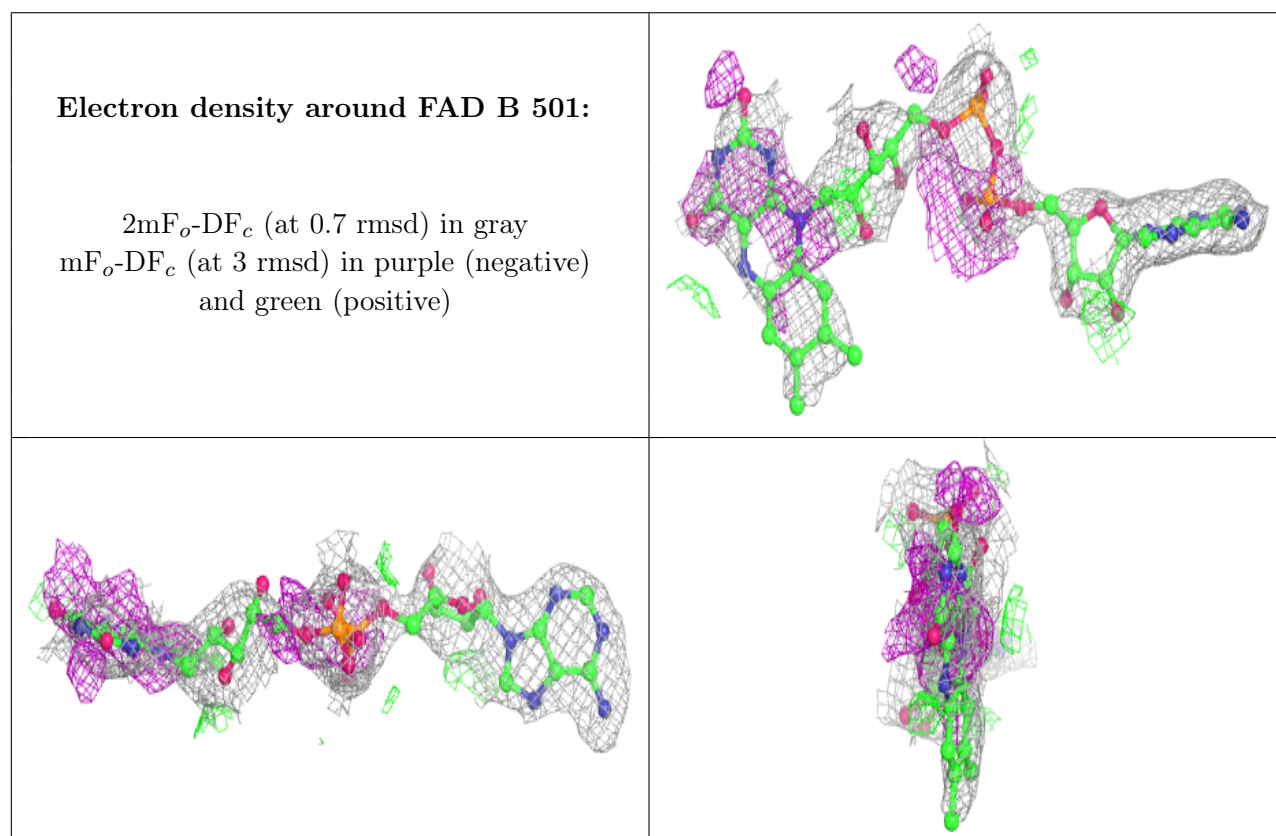
| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å ²) | Q<0.9 |
|-----|------|-------|-----|-------|------|------|----------------------------|-------|
| 2 | FAD | B | 501 | 53/53 | 0.92 | 0.26 | 57,76,96,111 | 0 |
| 2 | FAD | D | 501 | 53/53 | 0.92 | 0.20 | 49,74,93,109 | 0 |
| 3 | NAD | B | 502 | 44/44 | 0.93 | 0.20 | 43,64,82,87 | 0 |
| 2 | FAD | A | 501 | 53/53 | 0.94 | 0.24 | 53,71,92,117 | 0 |
| 3 | NAD | D | 502 | 44/44 | 0.94 | 0.18 | 45,62,79,82 | 0 |
| 2 | FAD | C | 501 | 53/53 | 0.95 | 0.19 | 51,73,93,97 | 0 |
| 4 | COA | A | 503 | 48/48 | 0.95 | 0.23 | 54,72,85,110 | 0 |
| 4 | COA | C | 503 | 48/48 | 0.95 | 0.15 | 54,71,80,116 | 0 |
| 4 | COA | D | 503 | 48/48 | 0.95 | 0.17 | 51,71,81,111 | 0 |
| 4 | COA | B | 503 | 48/48 | 0.96 | 0.16 | 54,70,80,103 | 0 |
| 3 | NAD | A | 502 | 44/44 | 0.96 | 0.17 | 39,58,76,83 | 0 |

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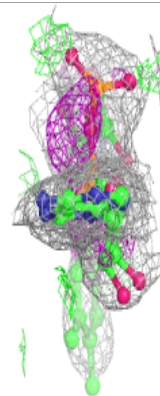
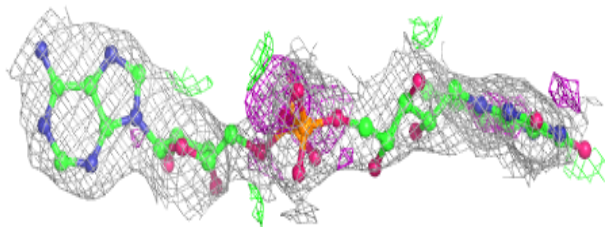
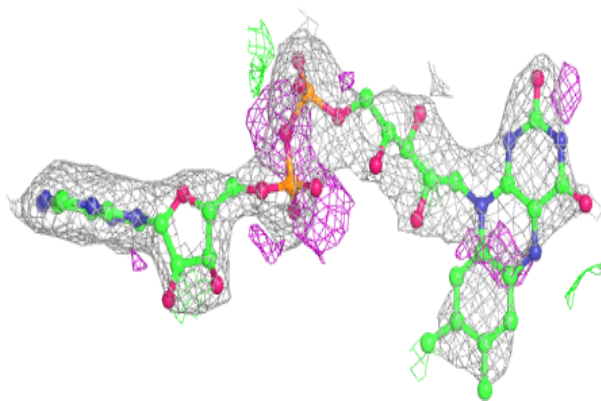
| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(\AA^2) | Q<0.9 |
|-----|------|-------|-----|-------|------|------|-----------------------------|-------|
| 3 | NAD | C | 502 | 44/44 | 0.96 | 0.17 | 39,57,78,82 | 0 |

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

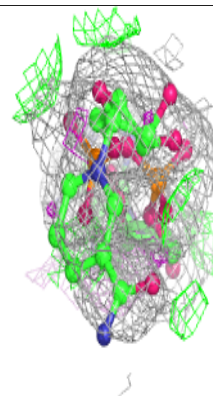
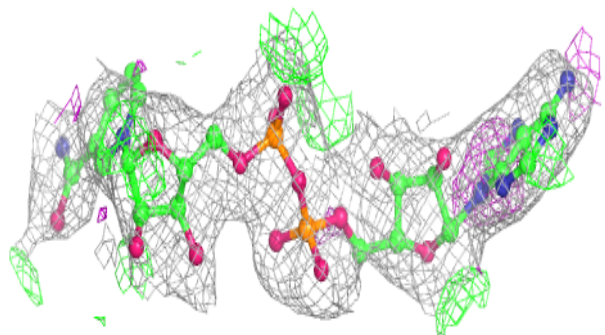
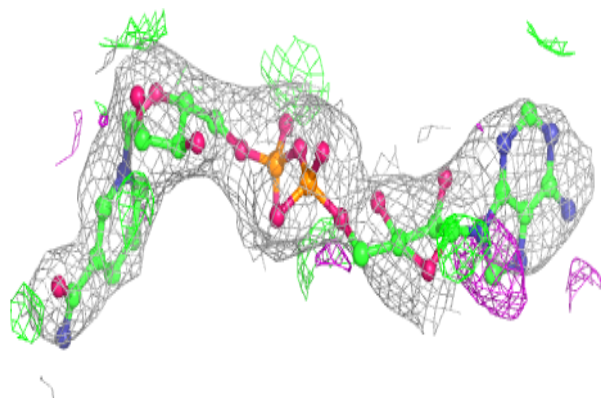


Electron density around FAD D 501:

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

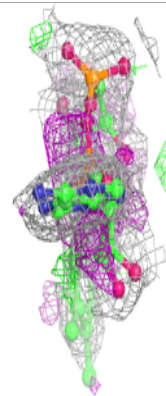
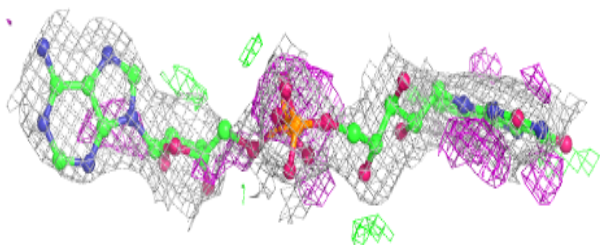
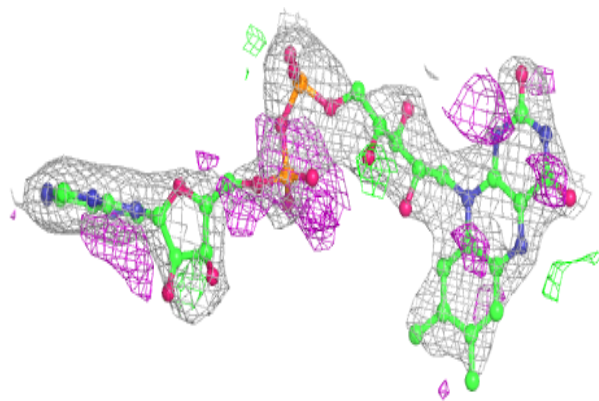
**Electron density around NAD B 502:**

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

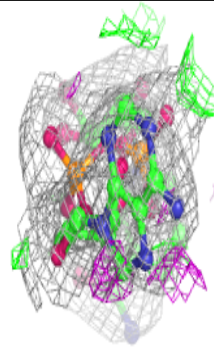
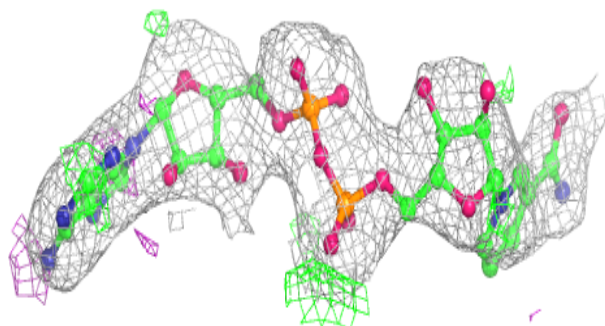
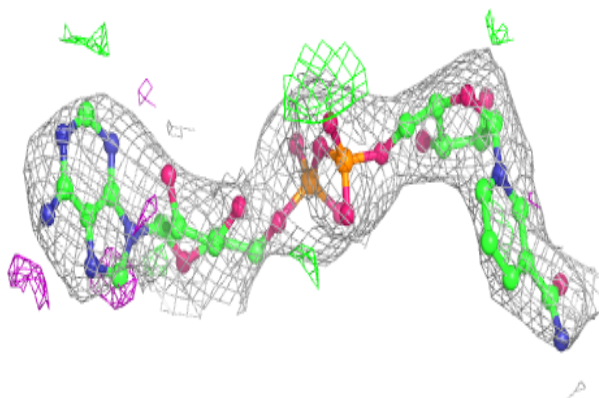


Electron density around FAD A 501:

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

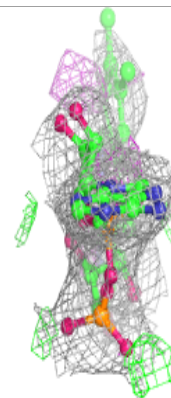
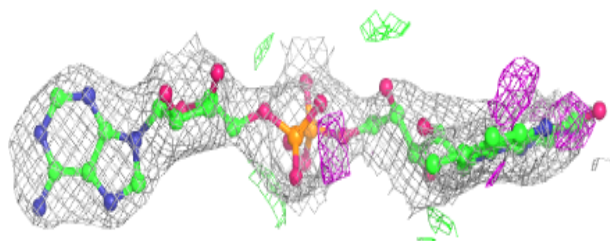
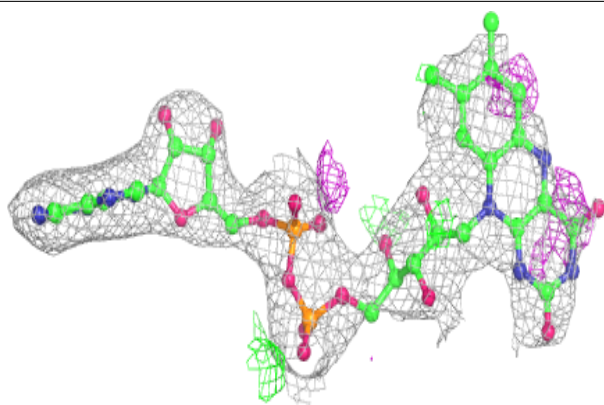
**Electron density around NAD D 502:**

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

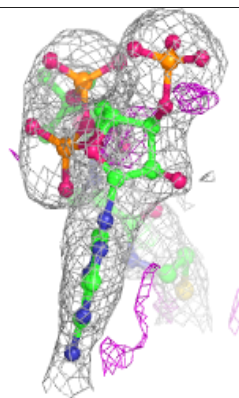
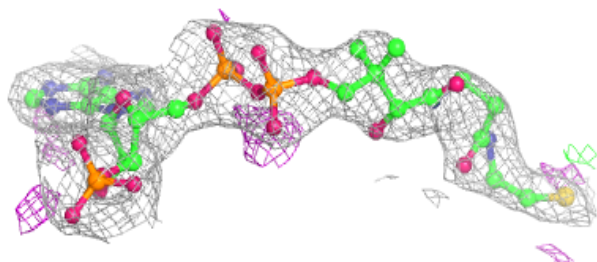
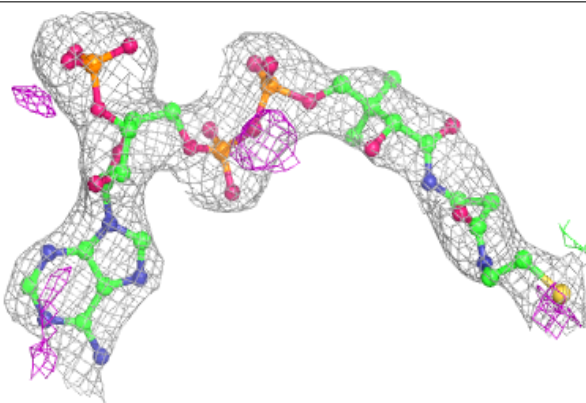


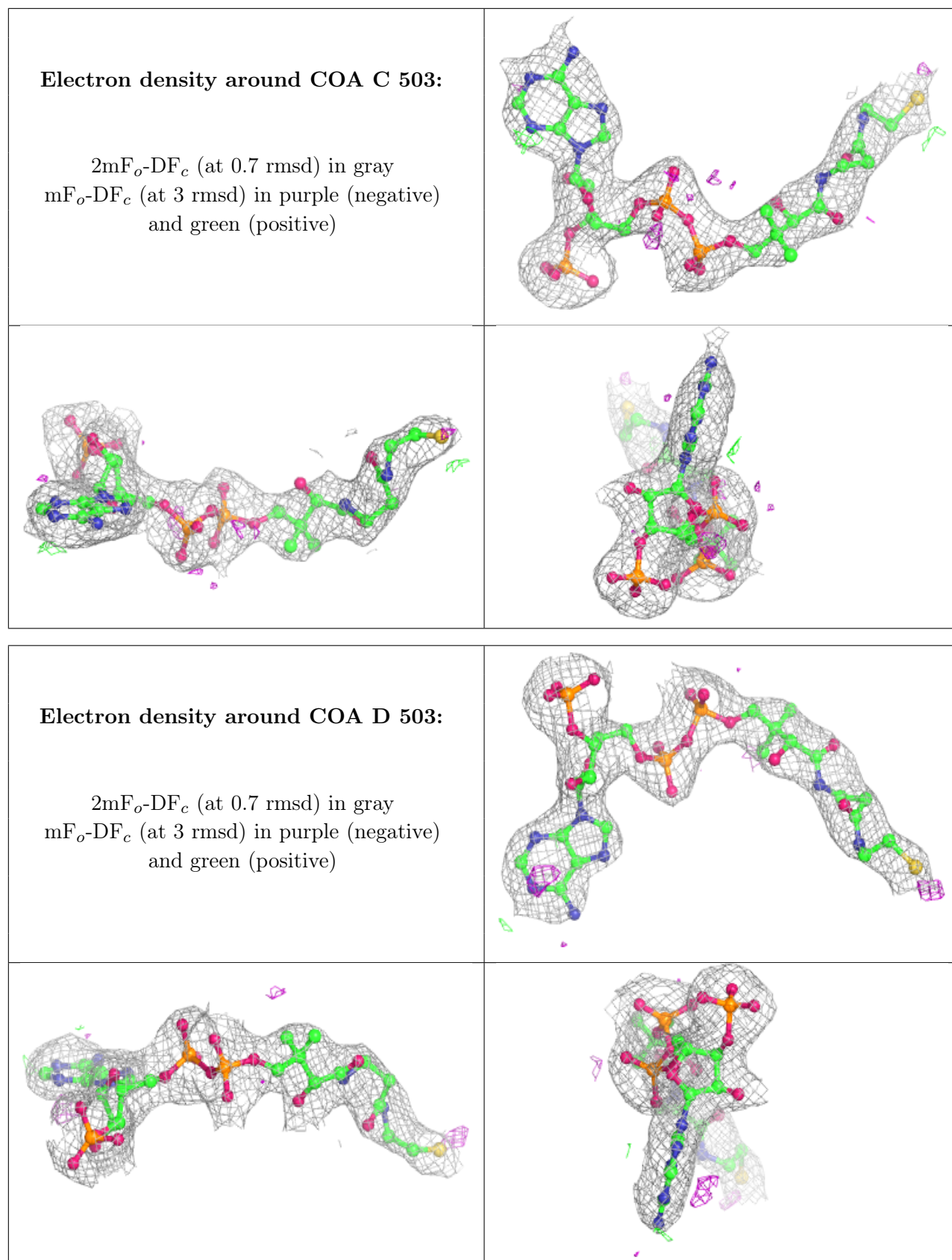
Electron density around FAD C 501:

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

**Electron density around COA A 503:**

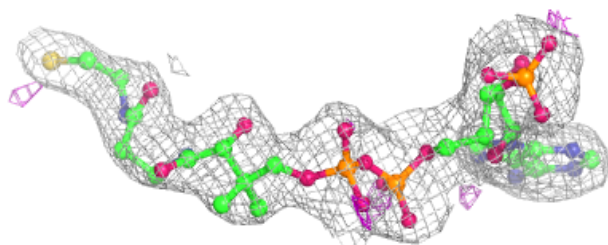
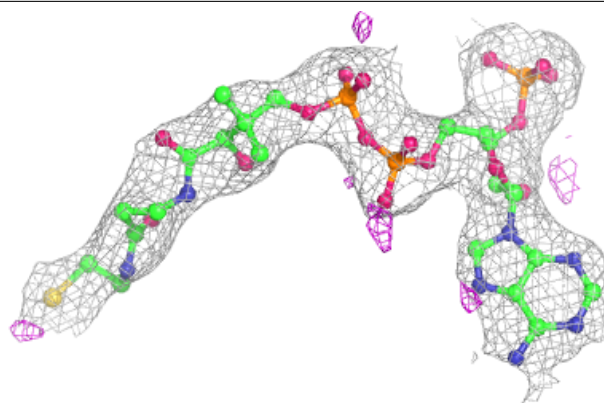
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



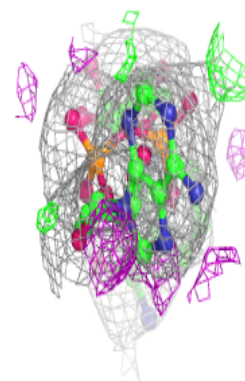
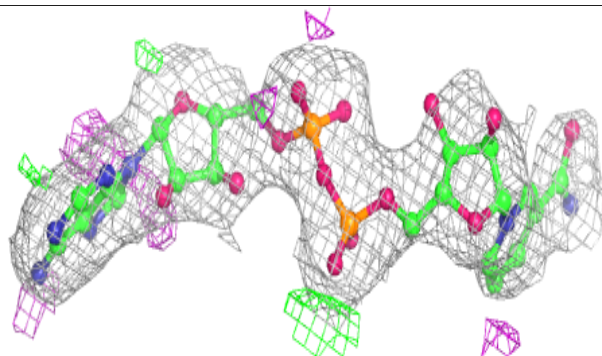
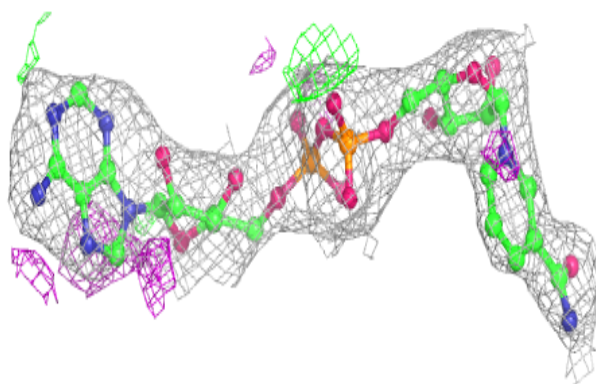


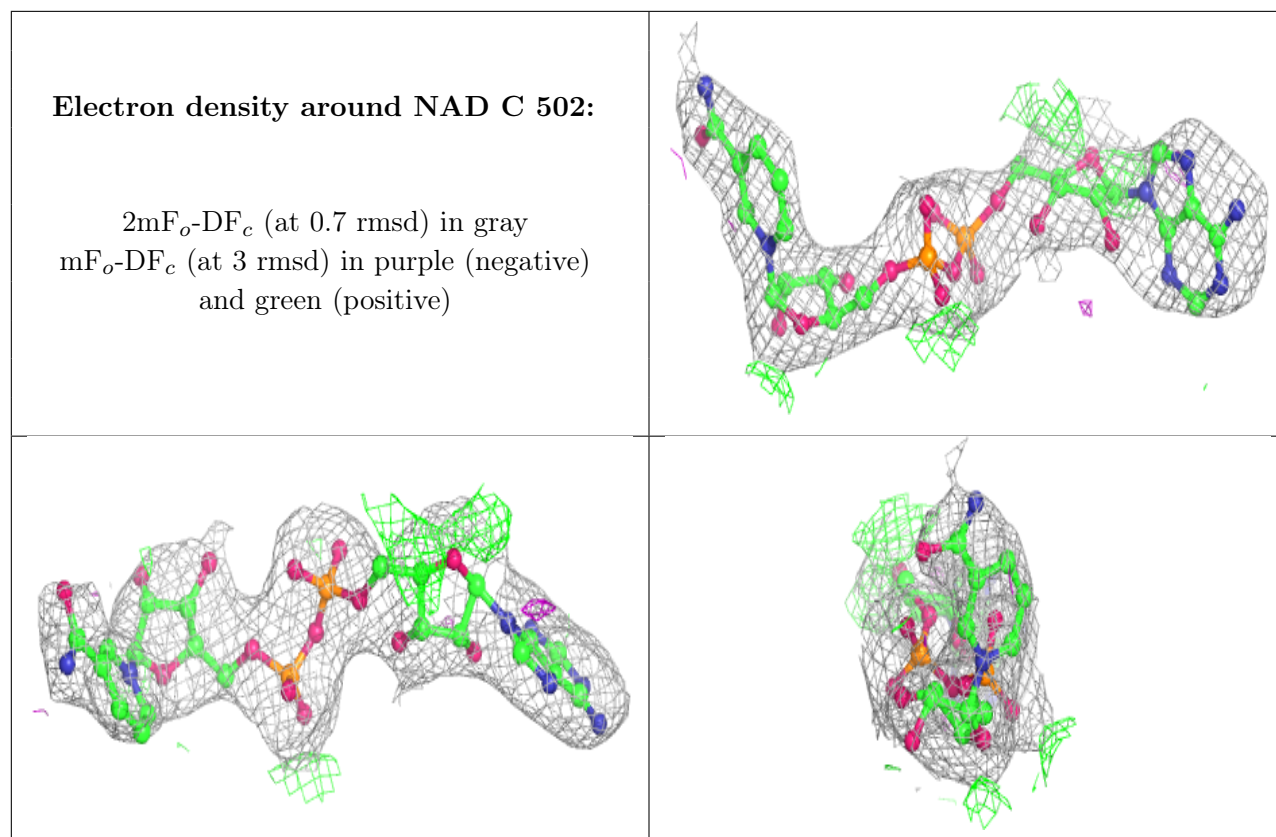
Electron density around COA B 503:

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

**Electron density around NAD A 502:**

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





6.5 Other polymers [i](#)

There are no such residues in this entry.