# WORLDWIDE wwPDB PROTEIN DATA BANK

# wwPDB X-ray Structure Validation Summary Report ⓘ

Sep 11, 2023 – 10:25 AM EDT

PDB ID : 4MVJ

Title : 2.85 Angstrom Resolution Crystal Structure of Glyceraldehyde 3-phosphate Dehydrogenase A (gapA) from Escherichia coli Modified by Acetyl Phosphate.

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Deposited on : 2013-09-24

Resolution : 2.85 Å(reported)

The following versions of software and data (see references ①) 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 | : | 2.35.1 |
| 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) | : | 2.35.1 |

# 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 2.85 Å.

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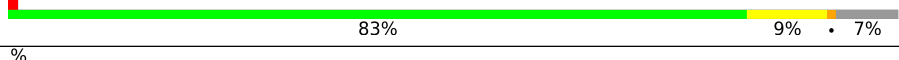


| Metric | Percentile Ranks | Value |
|---|---|---|
| Rfree | | 0.221 |
| Clashscore | | 4 |
| Ramachandran outliers | | 0.3% |
| Sidechain outliers | | 0.9% |
| RSRZ outliers | | 1.8% |

*Worse*        *Better*

■ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution
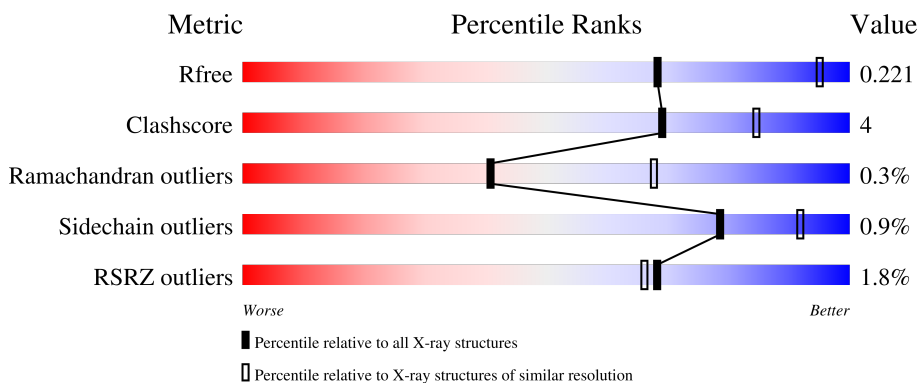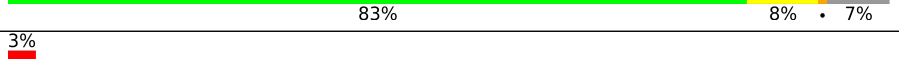
| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|---|---|---|
| $R_{free}$ | 130704 | 3168 (2.90-2.82) |
| Clashscore | 141614 | 3438 (2.90-2.82) |
| Ramachandran outliers | 138981 | 3348 (2.90-2.82) |
| Sidechain outliers | 138945 | 3351 (2.90-2.82) |
| RSRZ outliers | 127900 | 3103 (2.90-2.82) |

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

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 355 | 84%   8% · 7% |
| 1 | B | 355 | 84%   8% ·· 6% |
| 1 | C | 355 | 83%   10% · 7% |
| 1 | K | 355 | 82%   10% · 7% |
| 1 | N | 355 | 85%   8% · 7% |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 2 | D | 355 | %    83%    9%  ·  7% |
| 2 | L | 355 | 4%    85%    8%  ·  7% |
| 3 | E | 355 | 3%    85%    8%  ·  7% |
| 4 | F | 355 | 4%    81%    11%  ·  7% |
| 4 | J | 355 | %    84%    8%  ·  7% |
| 4 | O | 355 | %    83%    9%  ·  7% |
| 5 | G | 355 | %    84%    9%  ·  7% |
| 6 | H | 355 | %    85%    7%  ·  7% |
| 7 | I | 355 | %    83%    8%  ·  7% |
| 8 | M | 355 | 83%    8%  ·  7% |
| 9 | P | 355 | 3%    85%    7%  ·  7% |

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

| Mol | Type | Chain | Res | Chirality | Geometry | Clashes | Electron density |
|-----|------|-------|-----|-----------|----------|---------|------------------|
| 12 | PO4 | A | 407 | - | - | X | - |
| 12 | PO4 | B | 409 | - | X | - | - |
| 9 | SCY | P | 150 | - | - | X | - |

# 2 Entry composition ⓘ

There are 20 unique types of molecules in this entry. The entry contains 41155 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 Glyceraldehyde-3-phosphate dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 331 | Total | C | N | O | S | 0 | 1 | 0 |
| | | | 2509 | 1576 | 435 | 487 | 11 | | | |
| 1 | B | 332 | Total | C | N | O | S | 0 | 1 | 0 |
| | | | 2514 | 1579 | 436 | 488 | 11 | | | |
| 1 | C | 331 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 2499 | 1570 | 432 | 486 | 11 | | | |
| 1 | K | 331 | Total | C | N | O | S | 0 | 1 | 0 |
| | | | 2509 | 1576 | 435 | 487 | 11 | | | |
| 1 | N | 331 | Total | C | N | O | S | 0 | 1 | 0 |
| | | | 2509 | 1576 | 435 | 487 | 11 | | | |

There are 120 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | -23 | MET | - | expression tag | UNP C9QTS9 |
| A | -22 | HIS | - | expression tag | UNP C9QTS9 |
| A | -21 | HIS | - | expression tag | UNP C9QTS9 |
| A | -20 | HIS | - | expression tag | UNP C9QTS9 |
| A | -19 | HIS | - | expression tag | UNP C9QTS9 |
| A | -18 | HIS | - | expression tag | UNP C9QTS9 |
| A | -17 | HIS | - | expression tag | UNP C9QTS9 |
| A | -16 | SER | - | expression tag | UNP C9QTS9 |
| A | -15 | SER | - | expression tag | UNP C9QTS9 |
| A | -14 | GLY | - | expression tag | UNP C9QTS9 |
| A | -13 | VAL | - | expression tag | UNP C9QTS9 |
| A | -12 | ASP | - | expression tag | UNP C9QTS9 |
| A | -11 | LEU | - | expression tag | UNP C9QTS9 |
| A | -10 | GLY | - | expression tag | UNP C9QTS9 |
| A | -9 | THR | - | expression tag | UNP C9QTS9 |
| A | -8 | GLU | - | expression tag | UNP C9QTS9 |
| A | -7 | ASN | - | expression tag | UNP C9QTS9 |
| A | -6 | LEU | - | expression tag | UNP C9QTS9 |
| A | -5 | TYR | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| A | -4 | PHE | - | expression tag | UNP C9QTS9 |
| A | -3 | GLN | - | expression tag | UNP C9QTS9 |
| A | -2 | SER | - | expression tag | UNP C9QTS9 |
| A | -1 | ASN | - | expression tag | UNP C9QTS9 |
| A | 0 | ALA | - | expression tag | UNP C9QTS9 |
| B | -23 | MET | - | expression tag | UNP C9QTS9 |
| B | -22 | HIS | - | expression tag | UNP C9QTS9 |
| B | -21 | HIS | - | expression tag | UNP C9QTS9 |
| B | -20 | HIS | - | expression tag | UNP C9QTS9 |
| B | -19 | HIS | - | expression tag | UNP C9QTS9 |
| B | -18 | HIS | - | expression tag | UNP C9QTS9 |
| B | -17 | HIS | - | expression tag | UNP C9QTS9 |
| B | -16 | SER | - | expression tag | UNP C9QTS9 |
| B | -15 | SER | - | expression tag | UNP C9QTS9 |
| B | -14 | GLY | - | expression tag | UNP C9QTS9 |
| B | -13 | VAL | - | expression tag | UNP C9QTS9 |
| B | -12 | ASP | - | expression tag | UNP C9QTS9 |
| B | -11 | LEU | - | expression tag | UNP C9QTS9 |
| B | -10 | GLY | - | expression tag | UNP C9QTS9 |
| B | -9 | THR | - | expression tag | UNP C9QTS9 |
| B | -8 | GLU | - | expression tag | UNP C9QTS9 |
| B | -7 | ASN | - | expression tag | UNP C9QTS9 |
| B | -6 | LEU | - | expression tag | UNP C9QTS9 |
| B | -5 | TYR | - | expression tag | UNP C9QTS9 |
| B | -4 | PHE | - | expression tag | UNP C9QTS9 |
| B | -3 | GLN | - | expression tag | UNP C9QTS9 |
| B | -2 | SER | - | expression tag | UNP C9QTS9 |
| B | -1 | ASN | - | expression tag | UNP C9QTS9 |
| B | 0 | ALA | - | expression tag | UNP C9QTS9 |
| C | -23 | MET | - | expression tag | UNP C9QTS9 |
| C | -22 | HIS | - | expression tag | UNP C9QTS9 |
| C | -21 | HIS | - | expression tag | UNP C9QTS9 |
| C | -20 | HIS | - | expression tag | UNP C9QTS9 |
| C | -19 | HIS | - | expression tag | UNP C9QTS9 |
| C | -18 | HIS | - | expression tag | UNP C9QTS9 |
| C | -17 | HIS | - | expression tag | UNP C9QTS9 |
| C | -16 | SER | - | expression tag | UNP C9QTS9 |
| C | -15 | SER | - | expression tag | UNP C9QTS9 |
| C | -14 | GLY | - | expression tag | UNP C9QTS9 |
| C | -13 | VAL | - | expression tag | UNP C9QTS9 |
| C | -12 | ASP | - | expression tag | UNP C9QTS9 |
| C | -11 | LEU | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| C | -10 | GLY | - | expression tag | UNP C9QTS9 |
| C | -9 | THR | - | expression tag | UNP C9QTS9 |
| C | -8 | GLU | - | expression tag | UNP C9QTS9 |
| C | -7 | ASN | - | expression tag | UNP C9QTS9 |
| C | -6 | LEU | - | expression tag | UNP C9QTS9 |
| C | -5 | TYR | - | expression tag | UNP C9QTS9 |
| C | -4 | PHE | - | expression tag | UNP C9QTS9 |
| C | -3 | GLN | - | expression tag | UNP C9QTS9 |
| C | -2 | SER | - | expression tag | UNP C9QTS9 |
| C | -1 | ASN | - | expression tag | UNP C9QTS9 |
| C | 0 | ALA | - | expression tag | UNP C9QTS9 |
| K | -23 | MET | - | expression tag | UNP C9QTS9 |
| K | -22 | HIS | - | expression tag | UNP C9QTS9 |
| K | -21 | HIS | - | expression tag | UNP C9QTS9 |
| K | -20 | HIS | - | expression tag | UNP C9QTS9 |
| K | -19 | HIS | - | expression tag | UNP C9QTS9 |
| K | -18 | HIS | - | expression tag | UNP C9QTS9 |
| K | -17 | HIS | - | expression tag | UNP C9QTS9 |
| K | -16 | SER | - | expression tag | UNP C9QTS9 |
| K | -15 | SER | - | expression tag | UNP C9QTS9 |
| K | -14 | GLY | - | expression tag | UNP C9QTS9 |
| K | -13 | VAL | - | expression tag | UNP C9QTS9 |
| K | -12 | ASP | - | expression tag | UNP C9QTS9 |
| K | -11 | LEU | - | expression tag | UNP C9QTS9 |
| K | -10 | GLY | - | expression tag | UNP C9QTS9 |
| K | -9 | THR | - | expression tag | UNP C9QTS9 |
| K | -8 | GLU | - | expression tag | UNP C9QTS9 |
| K | -7 | ASN | - | expression tag | UNP C9QTS9 |
| K | -6 | LEU | - | expression tag | UNP C9QTS9 |
| K | -5 | TYR | - | expression tag | UNP C9QTS9 |
| K | -4 | PHE | - | expression tag | UNP C9QTS9 |
| K | -3 | GLN | - | expression tag | UNP C9QTS9 |
| K | -2 | SER | - | expression tag | UNP C9QTS9 |
| K | -1 | ASN | - | expression tag | UNP C9QTS9 |
| K | 0 | ALA | - | expression tag | UNP C9QTS9 |
| N | -23 | MET | - | expression tag | UNP C9QTS9 |
| N | -22 | HIS | - | expression tag | UNP C9QTS9 |
| N | -21 | HIS | - | expression tag | UNP C9QTS9 |
| N | -20 | HIS | - | expression tag | UNP C9QTS9 |
| N | -19 | HIS | - | expression tag | UNP C9QTS9 |
| N | -18 | HIS | - | expression tag | UNP C9QTS9 |
| N | -17 | HIS | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| N | -16 | SER | - | expression tag | UNP C9QTS9 |
| N | -15 | SER | - | expression tag | UNP C9QTS9 |
| N | -14 | GLY | - | expression tag | UNP C9QTS9 |
| N | -13 | VAL | - | expression tag | UNP C9QTS9 |
| N | -12 | ASP | - | expression tag | UNP C9QTS9 |
| N | -11 | LEU | - | expression tag | UNP C9QTS9 |
| N | -10 | GLY | - | expression tag | UNP C9QTS9 |
| N | -9 | THR | - | expression tag | UNP C9QTS9 |
| N | -8 | GLU | - | expression tag | UNP C9QTS9 |
| N | -7 | ASN | - | expression tag | UNP C9QTS9 |
| N | -6 | LEU | - | expression tag | UNP C9QTS9 |
| N | -5 | TYR | - | expression tag | UNP C9QTS9 |
| N | -4 | PHE | - | expression tag | UNP C9QTS9 |
| N | -3 | GLN | - | expression tag | UNP C9QTS9 |
| N | -2 | SER | - | expression tag | UNP C9QTS9 |
| N | -1 | ASN | - | expression tag | UNP C9QTS9 |
| N | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 2 is a protein called Glyceraldehyde-3-phosphate dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|---------|-------|
| 2 | D | 331 | Total 2514 | C 1578 | N 437 | O 488 | S 11 | 0 | 2 | 0 |
| 2 | L | 331 | Total 2506 | C 1574 | N 435 | O 486 | S 11 | 0 | 1 | 0 |

There are 48 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| D | -23 | MET | - | expression tag | UNP C9QTS9 |
| D | -22 | HIS | - | expression tag | UNP C9QTS9 |
| D | -21 | HIS | - | expression tag | UNP C9QTS9 |
| D | -20 | HIS | - | expression tag | UNP C9QTS9 |
| D | -19 | HIS | - | expression tag | UNP C9QTS9 |
| D | -18 | HIS | - | expression tag | UNP C9QTS9 |
| D | -17 | HIS | - | expression tag | UNP C9QTS9 |
| D | -16 | SER | - | expression tag | UNP C9QTS9 |
| D | -15 | SER | - | expression tag | UNP C9QTS9 |
| D | -14 | GLY | - | expression tag | UNP C9QTS9 |
| D | -13 | VAL | - | expression tag | UNP C9QTS9 |
| D | -12 | ASP | - | expression tag | UNP C9QTS9 |
| D | -11 | LEU | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| D | -10 | GLY | - | expression tag | UNP C9QTS9 |
| D | -9 | THR | - | expression tag | UNP C9QTS9 |
| D | -8 | GLU | - | expression tag | UNP C9QTS9 |
| D | -7 | ASN | - | expression tag | UNP C9QTS9 |
| D | -6 | LEU | - | expression tag | UNP C9QTS9 |
| D | -5 | TYR | - | expression tag | UNP C9QTS9 |
| D | -4 | PHE | - | expression tag | UNP C9QTS9 |
| D | -3 | GLN | - | expression tag | UNP C9QTS9 |
| D | -2 | SER | - | expression tag | UNP C9QTS9 |
| D | -1 | ASN | - | expression tag | UNP C9QTS9 |
| D | 0 | ALA | - | expression tag | UNP C9QTS9 |
| L | -23 | MET | - | expression tag | UNP C9QTS9 |
| L | -22 | HIS | - | expression tag | UNP C9QTS9 |
| L | -21 | HIS | - | expression tag | UNP C9QTS9 |
| L | -20 | HIS | - | expression tag | UNP C9QTS9 |
| L | -19 | HIS | - | expression tag | UNP C9QTS9 |
| L | -18 | HIS | - | expression tag | UNP C9QTS9 |
| L | -17 | HIS | - | expression tag | UNP C9QTS9 |
| L | -16 | SER | - | expression tag | UNP C9QTS9 |
| L | -15 | SER | - | expression tag | UNP C9QTS9 |
| L | -14 | GLY | - | expression tag | UNP C9QTS9 |
| L | -13 | VAL | - | expression tag | UNP C9QTS9 |
| L | -12 | ASP | - | expression tag | UNP C9QTS9 |
| L | -11 | LEU | - | expression tag | UNP C9QTS9 |
| L | -10 | GLY | - | expression tag | UNP C9QTS9 |
| L | -9 | THR | - | expression tag | UNP C9QTS9 |
| L | -8 | GLU | - | expression tag | UNP C9QTS9 |
| L | -7 | ASN | - | expression tag | UNP C9QTS9 |
| L | -6 | LEU | - | expression tag | UNP C9QTS9 |
| L | -5 | TYR | - | expression tag | UNP C9QTS9 |
| L | -4 | PHE | - | expression tag | UNP C9QTS9 |
| L | -3 | GLN | - | expression tag | UNP C9QTS9 |
| L | -2 | SER | - | expression tag | UNP C9QTS9 |
| L | -1 | ASN | - | expression tag | UNP C9QTS9 |
| L | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 3 is a protein called Glyceraldehyde-3-phosphate Dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 3 | E | 331 | 2520 | 1582 | 434 | 493 | 11 | 0 | 2 | 0 |

There are 24 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| E | -23 | MET | - | expression tag | UNP C9QTS9 |
| E | -22 | HIS | - | expression tag | UNP C9QTS9 |
| E | -21 | HIS | - | expression tag | UNP C9QTS9 |
| E | -20 | HIS | - | expression tag | UNP C9QTS9 |
| E | -19 | HIS | - | expression tag | UNP C9QTS9 |
| E | -18 | HIS | - | expression tag | UNP C9QTS9 |
| E | -17 | HIS | - | expression tag | UNP C9QTS9 |
| E | -16 | SER | - | expression tag | UNP C9QTS9 |
| E | -15 | SER | - | expression tag | UNP C9QTS9 |
| E | -14 | GLY | - | expression tag | UNP C9QTS9 |
| E | -13 | VAL | - | expression tag | UNP C9QTS9 |
| E | -12 | ASP | - | expression tag | UNP C9QTS9 |
| E | -11 | LEU | - | expression tag | UNP C9QTS9 |
| E | -10 | GLY | - | expression tag | UNP C9QTS9 |
| E | -9 | THR | - | expression tag | UNP C9QTS9 |
| E | -8 | GLU | - | expression tag | UNP C9QTS9 |
| E | -7 | ASN | - | expression tag | UNP C9QTS9 |
| E | -6 | LEU | - | expression tag | UNP C9QTS9 |
| E | -5 | TYR | - | expression tag | UNP C9QTS9 |
| E | -4 | PHE | - | expression tag | UNP C9QTS9 |
| E | -3 | GLN | - | expression tag | UNP C9QTS9 |
| E | -2 | SER | - | expression tag | UNP C9QTS9 |
| E | -1 | ASN | - | expression tag | UNP C9QTS9 |
| E | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 4 is a protein called Glyceraldehyde-3-phosphate Dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|---------|-------|
| 4 | F | 331 | Total 2531 | C 1588 | N 440 | O 492 | S 11 | 0 | 3 | 0 |
| 4 | J | 330 | Total 2504 | C 1573 | N 434 | O 487 | S 10 | 0 | 1 | 0 |
| 4 | O | 331 | Total 2502 | C 1572 | N 432 | O 487 | S 11 | 0 | 0 | 0 |

There are 72 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| F | -23 | MET | - | expression tag | UNP C9QTS9 |
| F | -22 | HIS | - | expression tag | UNP C9QTS9 |
| F | -21 | HIS | - | expression tag | UNP C9QTS9 |
| F | -20 | HIS | - | expression tag | UNP C9QTS9 |
| F | -19 | HIS | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| F | -18 | HIS | - | expression tag | UNP C9QTS9 |
| F | -17 | HIS | - | expression tag | UNP C9QTS9 |
| F | -16 | SER | - | expression tag | UNP C9QTS9 |
| F | -15 | SER | - | expression tag | UNP C9QTS9 |
| F | -14 | GLY | - | expression tag | UNP C9QTS9 |
| F | -13 | VAL | - | expression tag | UNP C9QTS9 |
| F | -12 | ASP | - | expression tag | UNP C9QTS9 |
| F | -11 | LEU | - | expression tag | UNP C9QTS9 |
| F | -10 | GLY | - | expression tag | UNP C9QTS9 |
| F | -9 | THR | - | expression tag | UNP C9QTS9 |
| F | -8 | GLU | - | expression tag | UNP C9QTS9 |
| F | -7 | ASN | - | expression tag | UNP C9QTS9 |
| F | -6 | LEU | - | expression tag | UNP C9QTS9 |
| F | -5 | TYR | - | expression tag | UNP C9QTS9 |
| F | -4 | PHE | - | expression tag | UNP C9QTS9 |
| F | -3 | GLN | - | expression tag | UNP C9QTS9 |
| F | -2 | SER | - | expression tag | UNP C9QTS9 |
| F | -1 | ASN | - | expression tag | UNP C9QTS9 |
| F | 0 | ALA | - | expression tag | UNP C9QTS9 |
| J | -23 | MET | - | expression tag | UNP C9QTS9 |
| J | -22 | HIS | - | expression tag | UNP C9QTS9 |
| J | -21 | HIS | - | expression tag | UNP C9QTS9 |
| J | -20 | HIS | - | expression tag | UNP C9QTS9 |
| J | -19 | HIS | - | expression tag | UNP C9QTS9 |
| J | -18 | HIS | - | expression tag | UNP C9QTS9 |
| J | -17 | HIS | - | expression tag | UNP C9QTS9 |
| J | -16 | SER | - | expression tag | UNP C9QTS9 |
| J | -15 | SER | - | expression tag | UNP C9QTS9 |
| J | -14 | GLY | - | expression tag | UNP C9QTS9 |
| J | -13 | VAL | - | expression tag | UNP C9QTS9 |
| J | -12 | ASP | - | expression tag | UNP C9QTS9 |
| J | -11 | LEU | - | expression tag | UNP C9QTS9 |
| J | -10 | GLY | - | expression tag | UNP C9QTS9 |
| J | -9 | THR | - | expression tag | UNP C9QTS9 |
| J | -8 | GLU | - | expression tag | UNP C9QTS9 |
| J | -7 | ASN | - | expression tag | UNP C9QTS9 |
| J | -6 | LEU | - | expression tag | UNP C9QTS9 |
| J | -5 | TYR | - | expression tag | UNP C9QTS9 |
| J | -4 | PHE | - | expression tag | UNP C9QTS9 |
| J | -3 | GLN | - | expression tag | UNP C9QTS9 |
| J | -2 | SER | - | expression tag | UNP C9QTS9 |
| J | -1 | ASN | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| J | 0 | ALA | - | expression tag | UNP C9QTS9 |
| O | -23 | MET | - | expression tag | UNP C9QTS9 |
| O | -22 | HIS | - | expression tag | UNP C9QTS9 |
| O | -21 | HIS | - | expression tag | UNP C9QTS9 |
| O | -20 | HIS | - | expression tag | UNP C9QTS9 |
| O | -19 | HIS | - | expression tag | UNP C9QTS9 |
| O | -18 | HIS | - | expression tag | UNP C9QTS9 |
| O | -17 | HIS | - | expression tag | UNP C9QTS9 |
| O | -16 | SER | - | expression tag | UNP C9QTS9 |
| O | -15 | SER | - | expression tag | UNP C9QTS9 |
| O | -14 | GLY | - | expression tag | UNP C9QTS9 |
| O | -13 | VAL | - | expression tag | UNP C9QTS9 |
| O | -12 | ASP | - | expression tag | UNP C9QTS9 |
| O | -11 | LEU | - | expression tag | UNP C9QTS9 |
| O | -10 | GLY | - | expression tag | UNP C9QTS9 |
| O | -9 | THR | - | expression tag | UNP C9QTS9 |
| O | -8 | GLU | - | expression tag | UNP C9QTS9 |
| O | -7 | ASN | - | expression tag | UNP C9QTS9 |
| O | -6 | LEU | - | expression tag | UNP C9QTS9 |
| O | -5 | TYR | - | expression tag | UNP C9QTS9 |
| O | -4 | PHE | - | expression tag | UNP C9QTS9 |
| O | -3 | GLN | - | expression tag | UNP C9QTS9 |
| O | -2 | SER | - | expression tag | UNP C9QTS9 |
| O | -1 | ASN | - | expression tag | UNP C9QTS9 |
| O | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 5 is a protein called Glyceraldehyde-3-phosphate Dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | C | N | O | S | | | |
| 5 | G | 331 | 2520 | 1582 | 437 | 490 | 11 | 0 | 2 | 0 |

There are 24 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| G | -23 | MET | - | expression tag | UNP C9QTS9 |
| G | -22 | HIS | - | expression tag | UNP C9QTS9 |
| G | -21 | HIS | - | expression tag | UNP C9QTS9 |
| G | -20 | HIS | - | expression tag | UNP C9QTS9 |
| G | -19 | HIS | - | expression tag | UNP C9QTS9 |
| G | -18 | HIS | - | expression tag | UNP C9QTS9 |
| G | -17 | HIS | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| G | -16 | SER | - | expression tag | UNP C9QTS9 |
| G | -15 | SER | - | expression tag | UNP C9QTS9 |
| G | -14 | GLY | - | expression tag | UNP C9QTS9 |
| G | -13 | VAL | - | expression tag | UNP C9QTS9 |
| G | -12 | ASP | - | expression tag | UNP C9QTS9 |
| G | -11 | LEU | - | expression tag | UNP C9QTS9 |
| G | -10 | GLY | - | expression tag | UNP C9QTS9 |
| G | -9 | THR | - | expression tag | UNP C9QTS9 |
| G | -8 | GLU | - | expression tag | UNP C9QTS9 |
| G | -7 | ASN | - | expression tag | UNP C9QTS9 |
| G | -6 | LEU | - | expression tag | UNP C9QTS9 |
| G | -5 | TYR | - | expression tag | UNP C9QTS9 |
| G | -4 | PHE | - | expression tag | UNP C9QTS9 |
| G | -3 | GLN | - | expression tag | UNP C9QTS9 |
| G | -2 | SER | - | expression tag | UNP C9QTS9 |
| G | -1 | ASN | - | expression tag | UNP C9QTS9 |
| G | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 6 is a protein called Glyceraldehyde-3-phosphate Dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 6 | H | 331 | 2505 | 1574 | 432 | 488 | 11 | 0 | 0 | 0 |

There are 24 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| H | -23 | MET | - | expression tag | UNP C9QTS9 |
| H | -22 | HIS | - | expression tag | UNP C9QTS9 |
| H | -21 | HIS | - | expression tag | UNP C9QTS9 |
| H | -20 | HIS | - | expression tag | UNP C9QTS9 |
| H | -19 | HIS | - | expression tag | UNP C9QTS9 |
| H | -18 | HIS | - | expression tag | UNP C9QTS9 |
| H | -17 | HIS | - | expression tag | UNP C9QTS9 |
| H | -16 | SER | - | expression tag | UNP C9QTS9 |
| H | -15 | SER | - | expression tag | UNP C9QTS9 |
| H | -14 | GLY | - | expression tag | UNP C9QTS9 |
| H | -13 | VAL | - | expression tag | UNP C9QTS9 |
| H | -12 | ASP | - | expression tag | UNP C9QTS9 |
| H | -11 | LEU | - | expression tag | UNP C9QTS9 |
| H | -10 | GLY | - | expression tag | UNP C9QTS9 |
| H | -9 | THR | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|:---:|:---:|:---:|:---:|:---:|:---:|
| H | -8 | GLU | - | expression tag | UNP C9QTS9 |
| H | -7 | ASN | - | expression tag | UNP C9QTS9 |
| H | -6 | LEU | - | expression tag | UNP C9QTS9 |
| H | -5 | TYR | - | expression tag | UNP C9QTS9 |
| H | -4 | PHE | - | expression tag | UNP C9QTS9 |
| H | -3 | GLN | - | expression tag | UNP C9QTS9 |
| H | -2 | SER | - | expression tag | UNP C9QTS9 |
| H | -1 | ASN | - | expression tag | UNP C9QTS9 |
| H | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 7 is a protein called Glyceraldehyde-3-phosphate Dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| | | | Total | C | N | O | S | | | |
| 7 | I | 330 | 2507 | 1575 | 434 | 488 | 10 | 0 | 1 | 0 |

There are 24 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|:---:|:---:|:---:|:---:|:---:|:---:|
| I | -23 | MET | - | expression tag | UNP C9QTS9 |
| I | -22 | HIS | - | expression tag | UNP C9QTS9 |
| I | -21 | HIS | - | expression tag | UNP C9QTS9 |
| I | -20 | HIS | - | expression tag | UNP C9QTS9 |
| I | -19 | HIS | - | expression tag | UNP C9QTS9 |
| I | -18 | HIS | - | expression tag | UNP C9QTS9 |
| I | -17 | HIS | - | expression tag | UNP C9QTS9 |
| I | -16 | SER | - | expression tag | UNP C9QTS9 |
| I | -15 | SER | - | expression tag | UNP C9QTS9 |
| I | -14 | GLY | - | expression tag | UNP C9QTS9 |
| I | -13 | VAL | - | expression tag | UNP C9QTS9 |
| I | -12 | ASP | - | expression tag | UNP C9QTS9 |
| I | -11 | LEU | - | expression tag | UNP C9QTS9 |
| I | -10 | GLY | - | expression tag | UNP C9QTS9 |
| I | -9 | THR | - | expression tag | UNP C9QTS9 |
| I | -8 | GLU | - | expression tag | UNP C9QTS9 |
| I | -7 | ASN | - | expression tag | UNP C9QTS9 |
| I | -6 | LEU | - | expression tag | UNP C9QTS9 |
| I | -5 | TYR | - | expression tag | UNP C9QTS9 |
| I | -4 | PHE | - | expression tag | UNP C9QTS9 |
| I | -3 | GLN | - | expression tag | UNP C9QTS9 |
| I | -2 | SER | - | expression tag | UNP C9QTS9 |
| I | -1 | ASN | - | expression tag | UNP C9QTS9 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| I | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 8 is a protein called Glyceraldehyde-3-phosphate Dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 8 | M | 331 | 2508 | 1575 | 433 | 489 | 11 | 0 | 1 | 0 |

There are 24 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------|-----------|
| M | -23 | MET | - | expression tag | UNP C9QTS9 |
| M | -22 | HIS | - | expression tag | UNP C9QTS9 |
| M | -21 | HIS | - | expression tag | UNP C9QTS9 |
| M | -20 | HIS | - | expression tag | UNP C9QTS9 |
| M | -19 | HIS | - | expression tag | UNP C9QTS9 |
| M | -18 | HIS | - | expression tag | UNP C9QTS9 |
| M | -17 | HIS | - | expression tag | UNP C9QTS9 |
| M | -16 | SER | - | expression tag | UNP C9QTS9 |
| M | -15 | SER | - | expression tag | UNP C9QTS9 |
| M | -14 | GLY | - | expression tag | UNP C9QTS9 |
| M | -13 | VAL | - | expression tag | UNP C9QTS9 |
| M | -12 | ASP | - | expression tag | UNP C9QTS9 |
| M | -11 | LEU | - | expression tag | UNP C9QTS9 |
| M | -10 | GLY | - | expression tag | UNP C9QTS9 |
| M | -9 | THR | - | expression tag | UNP C9QTS9 |
| M | -8 | GLU | - | expression tag | UNP C9QTS9 |
| M | -7 | ASN | - | expression tag | UNP C9QTS9 |
| M | -6 | LEU | - | expression tag | UNP C9QTS9 |
| M | -5 | TYR | - | expression tag | UNP C9QTS9 |
| M | -4 | PHE | - | expression tag | UNP C9QTS9 |
| M | -3 | GLN | - | expression tag | UNP C9QTS9 |
| M | -2 | SER | - | expression tag | UNP C9QTS9 |
| M | -1 | ASN | - | expression tag | UNP C9QTS9 |
| M | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 9 is a protein called Glyceraldehyde-3-phosphate Dehydrogenase A.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|---|---|---|---|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 9 | P | 330 | 2507 | 1575 | 434 | 488 | 10 | 0 | 1 | 0 |

There are 24 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|:-----:|:-------:|:--------:|:------:|:-------:|:---------:|
| P | -23 | MET | - | expression tag | UNP C9QTS9 |
| P | -22 | HIS | - | expression tag | UNP C9QTS9 |
| P | -21 | HIS | - | expression tag | UNP C9QTS9 |
| P | -20 | HIS | - | expression tag | UNP C9QTS9 |
| P | -19 | HIS | - | expression tag | UNP C9QTS9 |
| P | -18 | HIS | - | expression tag | UNP C9QTS9 |
| P | -17 | HIS | - | expression tag | UNP C9QTS9 |
| P | -16 | SER | - | expression tag | UNP C9QTS9 |
| P | -15 | SER | - | expression tag | UNP C9QTS9 |
| P | -14 | GLY | - | expression tag | UNP C9QTS9 |
| P | -13 | VAL | - | expression tag | UNP C9QTS9 |
| P | -12 | ASP | - | expression tag | UNP C9QTS9 |
| P | -11 | LEU | - | expression tag | UNP C9QTS9 |
| P | -10 | GLY | - | expression tag | UNP C9QTS9 |
| P | -9 | THR | - | expression tag | UNP C9QTS9 |
| P | -8 | GLU | - | expression tag | UNP C9QTS9 |
| P | -7 | ASN | - | expression tag | UNP C9QTS9 |
| P | -6 | LEU | - | expression tag | UNP C9QTS9 |
| P | -5 | TYR | - | expression tag | UNP C9QTS9 |
| P | -4 | PHE | - | expression tag | UNP C9QTS9 |
| P | -3 | GLN | - | expression tag | UNP C9QTS9 |
| P | -2 | SER | - | expression tag | UNP C9QTS9 |
| P | -1 | ASN | - | expression tag | UNP C9QTS9 |
| P | 0 | ALA | - | expression tag | UNP C9QTS9 |

- Molecule 10 is SODIUM ION (three-letter code: NA) (formula: Na).

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|:---:|:-----:|:--------:|:-----:|:---:|:-------:|:-------:|
| 10 | A | 1 | Total 1 | Na 1 | 0 | 0 |
| 10 | B | 2 | Total 2 | Na 2 | 0 | 0 |
| 10 | C | 1 | Total 1 | Na 1 | 0 | 0 |
| 10 | D | 1 | Total 1 | Na 1 | 0 | 0 |
| 10 | E | 1 | Total 1 | Na 1 | 0 | 0 |
| 10 | G | 1 | Total 1 | Na 1 | 0 | 0 |
| 10 | H | 1 | Total 1 | Na 1 | 0 | 0 |

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| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---------|---------|
| 10 | I | 1 | Total 1 | Na 1 | 0 | 0 |
| 10 | K | 1 | Total 1 | Na 1 | 0 | 0 |
| 10 | M | 1 | Total 1 | Na 1 | 0 | 0 |
| 10 | N | 1 | Total 1 | Na 1 | 0 | 0 |

- Molecule 11 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---------|---------|
| 11 | A | 4 | Total 4 | Cl 4 | 0 | 0 |
| 11 | B | 6 | Total 6 | Cl 6 | 0 | 0 |
| 11 | C | 5 | Total 5 | Cl 5 | 0 | 0 |
| 11 | D | 5 | Total 5 | Cl 5 | 0 | 0 |
| 11 | E | 5 | Total 5 | Cl 5 | 0 | 0 |
| 11 | F | 1 | Total 1 | Cl 1 | 0 | 0 |
| 11 | G | 4 | Total 4 | Cl 4 | 0 | 0 |
| 11 | H | 1 | Total 1 | Cl 1 | 0 | 0 |
| 11 | I | 2 | Total 2 | Cl 2 | 0 | 0 |
| 11 | J | 2 | Total 2 | Cl 2 | 0 | 0 |
| 11 | K | 6 | Total 6 | Cl 6 | 0 | 0 |
| 11 | L | 1 | Total 1 | Cl 1 | 0 | 0 |
| 11 | M | 2 | Total 2 | Cl 2 | 0 | 0 |
| 11 | N | 1 | Total 1 | Cl 1 | 0 | 0 |
| 11 | O | 2 | Total 2 | Cl 2 | 0 | 0 |

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| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---------|---------|
| 11 | P | 2 | Total Cl<br>2 2 | | 0 | 0 |

- Molecule 12 is PHOSPHATE ION (three-letter code: PO4) (formula: O$_4$P).
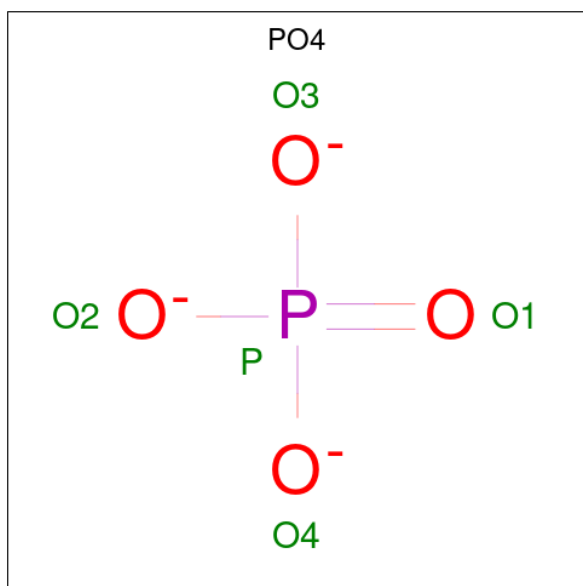


| Mol | Chain | Residues | Atoms | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---------|---------|
| 12 | A | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | A | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | A | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | B | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | D | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | D | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | E | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | F | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | H | 1 | Total 5 | O 4 | P 1 | 0 | 0 |
| 12 | I | 1 | Total 5 | O 4 | P 1 | 0 | 0 |

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| Mol | Chain | Residues | Atoms | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---------|---------|
| 12 | J | 1 | Total O P | | | 0 | 0 |
| | | | 5 | 4 | 1 | | |
| 12 | J | 1 | Total O P | | | 0 | 0 |
| | | | 5 | 4 | 1 | | |
| 12 | L | 1 | Total O P | | | 0 | 0 |
| | | | 5 | 4 | 1 | | |
| 12 | P | 1 | Total O P | | | 0 | 0 |
| | | | 5 | 4 | 1 | | |
| 12 | P | 1 | Total O P | | | 0 | 0 |
| | | | 5 | 4 | 1 | | |

- Molecule 13 is PYROPHOSPHATE 2- (three-letter code: POP) (formula: $H_2O_7P_2$).
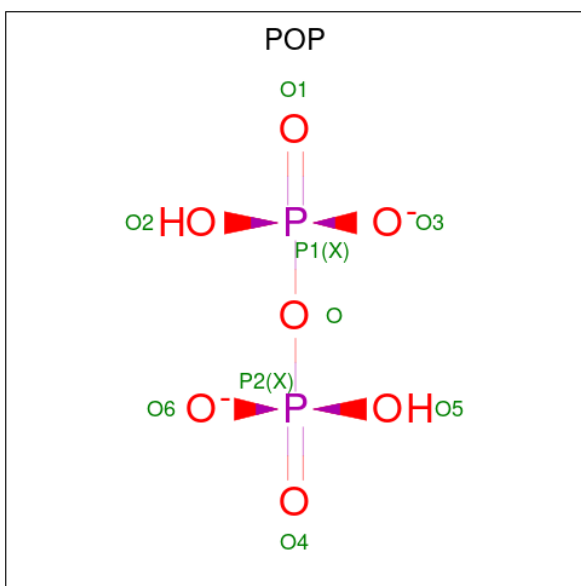


| Mol | Chain | Residues | Atoms | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---------|---------|
| 13 | A | 1 | Total O P | | | 0 | 0 |
| | | | 9 | 7 | 2 | | |
| 13 | B | 1 | Total O P | | | 0 | 0 |
| | | | 9 | 7 | 2 | | |
| 13 | F | 1 | Total O P | | | 0 | 0 |
| | | | 9 | 7 | 2 | | |
| 13 | G | 1 | Total O P | | | 0 | 0 |
| | | | 9 | 7 | 2 | | |
| 13 | J | 1 | Total O P | | | 0 | 0 |
| | | | 9 | 7 | 2 | | |
| 13 | M | 1 | Total O P | | | 0 | 0 |
| | | | 9 | 7 | 2 | | |

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



NAD

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|---|
| 14 | C | 1 | Total | C | N | O | P | 0 | 0 |
|    |   |   | 44 | 21 | 7 | 14 | 2 |   |   |
| 14 | D | 1 | Total | C | N | O | P | 0 | 0 |
|    |   |   | 44 | 21 | 7 | 14 | 2 |   |   |
| 14 | E | 1 | Total | C | N | O | P | 0 | 0 |
|    |   |   | 44 | 21 | 7 | 14 | 2 |   |   |
| 14 | I | 1 | Total | C | N | O | P | 0 | 0 |
|    |   |   | 44 | 21 | 7 | 14 | 2 |   |   |
| 14 | K | 1 | Total | C | N | O | P | 0 | 0 |
|    |   |   | 44 | 21 | 7 | 14 | 2 |   |   |
| 14 | O | 1 | Total | C | N | O | P | 0 | 0 |
|    |   |   | 44 | 21 | 7 | 14 | 2 |   |   |
| 14 | P | 1 | Total | C | N | O | P | 0 | 0 |
|    |   |   | 44 | 21 | 7 | 14 | 2 |   |   |

- Molecule 15 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).

ACT

OXT

O⁻

C

CH3

O

O

| Mol | Chain | Residues | Atoms | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---------|---------|
| 15 | H | 1 | Total | C | O | 0 | 0 |
| | | | 4 | 2 | 2 | | |

- Molecule 16 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: $C_6H_{14}O_4$).

PGE

O4
OH

C5

C6

C4

O
O3

O2
O

C3

C1

C2

HO
O1
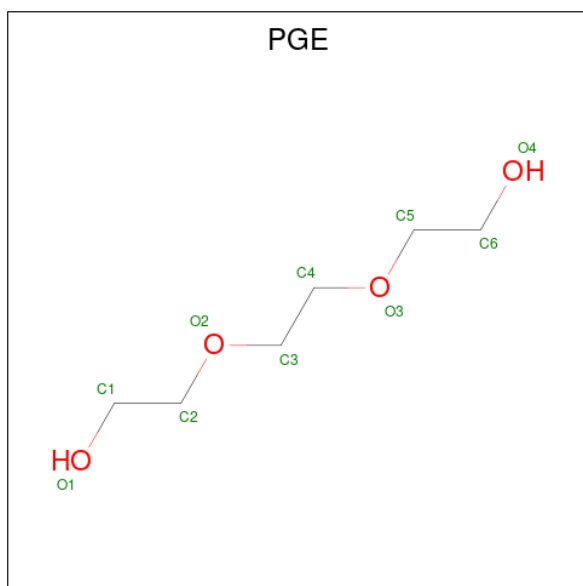
| Mol | Chain | Residues | Atoms | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---------|---------|
| 16 | H | 1 | Total | C | O | 0 | 0 |
| | | | 10 | 6 | 4 | | |

- Molecule 17 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).

| Mol | Chain | Residues | Atoms | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---------|---------|
| 17 | H | 1 | Total 7 | C 4 | O 3 | 0 | 0 |

- Molecule 18 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$).
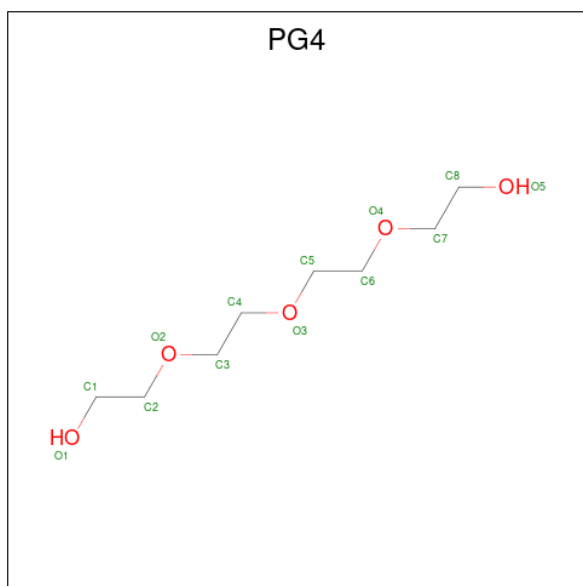


| Mol | Chain | Residues | Atoms | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---|---------|---------|
| 18 | J | 1 | Total 13 | C 8 | O 5 | 0 | 0 |

- Molecule 19 is ACETYLPHOSPHATE (three-letter code: UVW) (formula: $C_2H_5O_5P$).

UVW

O2P

OH

O2

O1P

P

C1

C1M

OH

O3P

O

O1
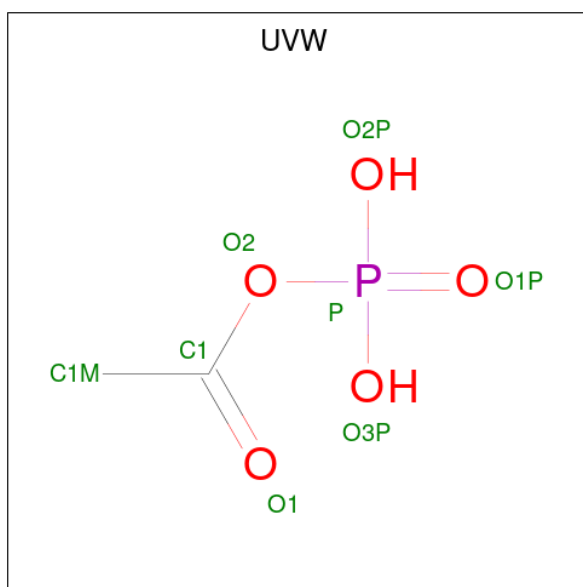
| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|
| 19 | M | 1 | Total 8 | C 2 | O 5 | P 1 | 0 | 0 |

- Molecule 20 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 20 | A | 39 | Total 39 | O 39 | 0 | 0 |
| 20 | B | 35 | Total 38 | O 38 | 0 | 3 |
| 20 | C | 61 | Total 61 | O 61 | 0 | 0 |
| 20 | D | 37 | Total 38 | O 38 | 0 | 1 |
| 20 | E | 23 | Total 23 | O 23 | 0 | 0 |
| 20 | F | 27 | Total 27 | O 27 | 0 | 0 |
| 20 | G | 33 | Total 35 | O 35 | 0 | 2 |
| 20 | H | 21 | Total 22 | O 22 | 0 | 1 |
| 20 | I | 22 | Total 23 | O 23 | 0 | 1 |
| 20 | J | 28 | Total 28 | O 28 | 0 | 0 |
| 20 | K | 26 | Total 26 | O 26 | 0 | 0 |

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| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---------|---------|
| 20 | L | 20 | Total 20 | O 20 | 0 | 0 |
| 20 | M | 24 | Total 24 | O 24 | 0 | 0 |
| 20 | N | 11 | Total 11 | O 11 | 0 | 0 |
| 20 | O | 20 | Total 20 | O 20 | 0 | 0 |
| 20 | P | 16 | Total 16 | O 16 | 0 | 0 |

# 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: Glyceraldehyde-3-phosphate dehydrogenase A
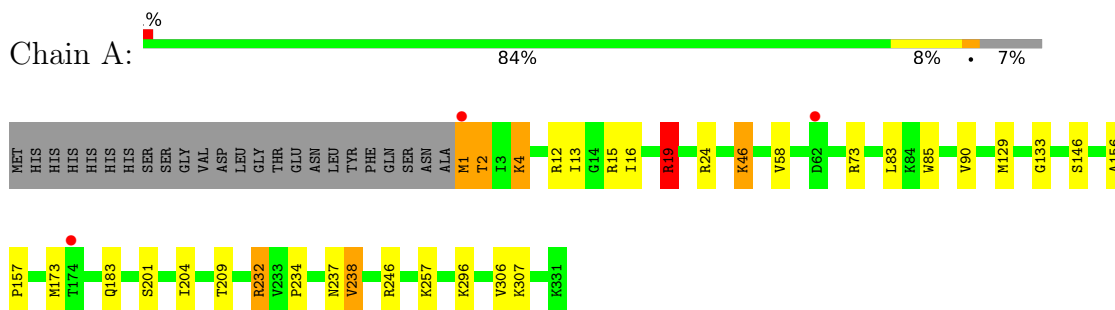
Chain A:

• Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase A
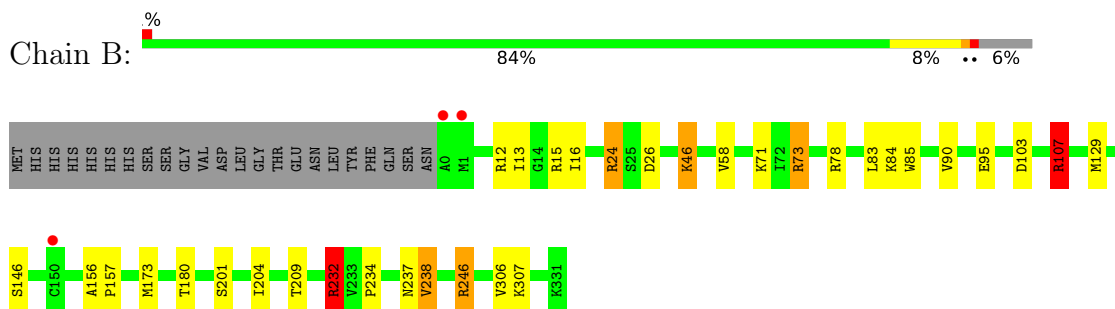
Chain B:

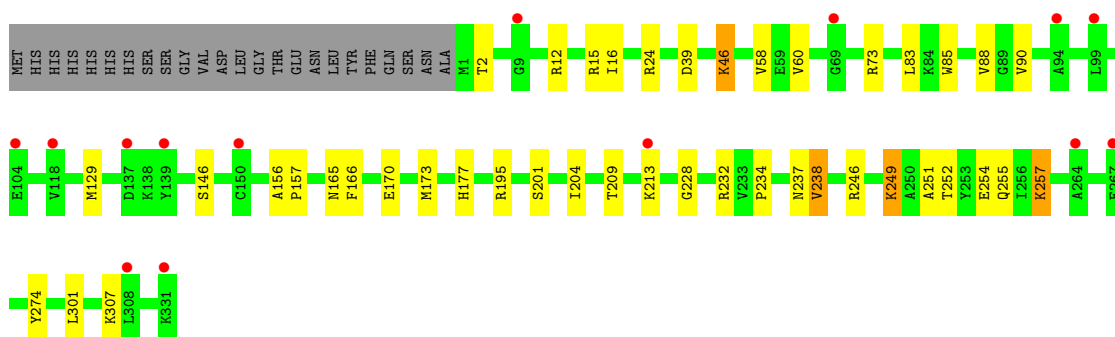• Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase A

Chain C:

• Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase A
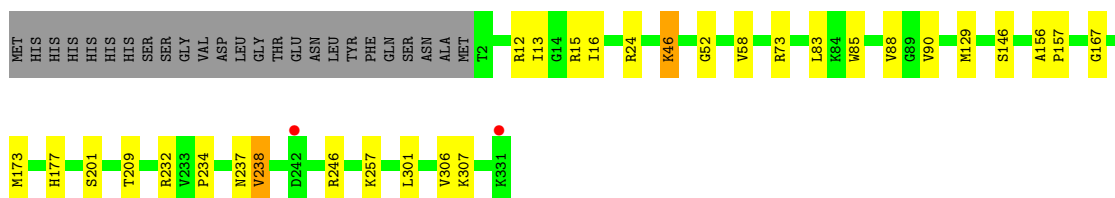
Chain K:

- Molecule 1: Glyceraldehyde-3-phosphate dehydrogenase A



Chain N:
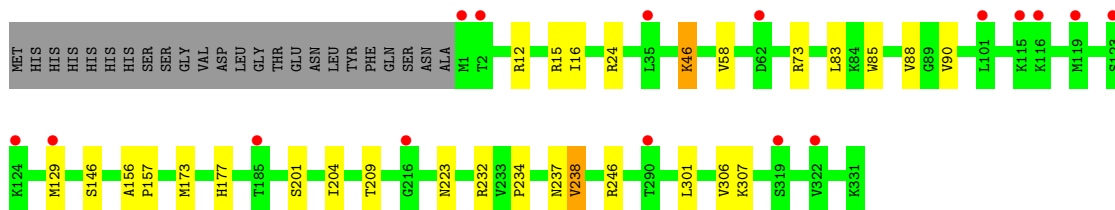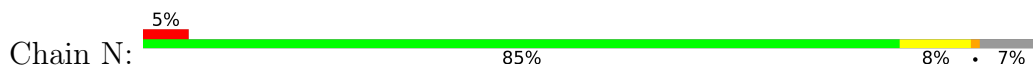


- Molecule 2: Glyceraldehyde-3-phosphate dehydrogenase A
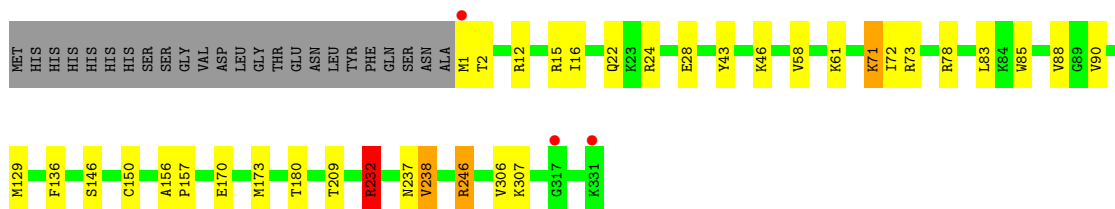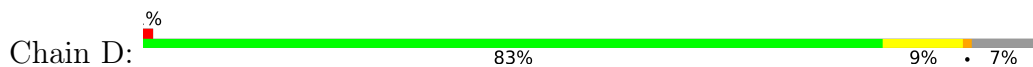


Chain D:



- Molecule 2: Glyceraldehyde-3-phosphate dehydrogenase A
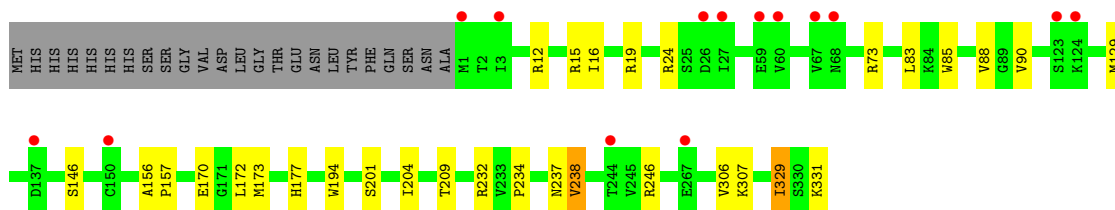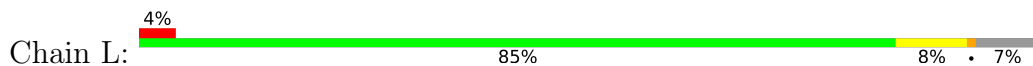


Chain L:



- Molecule 3: Glyceraldehyde-3-phosphate Dehydrogenase A
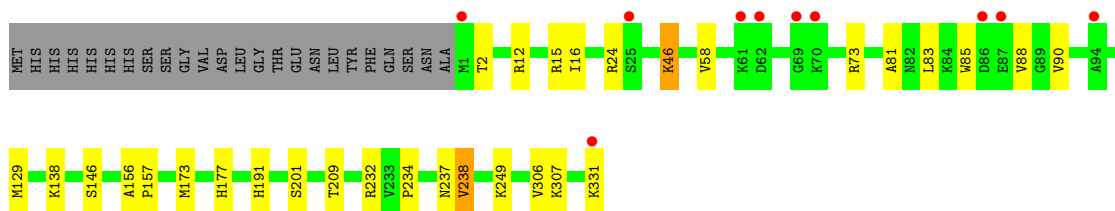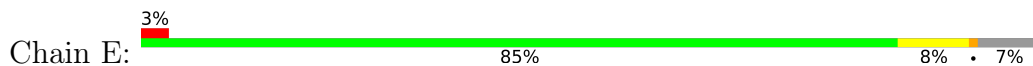


Chain E:

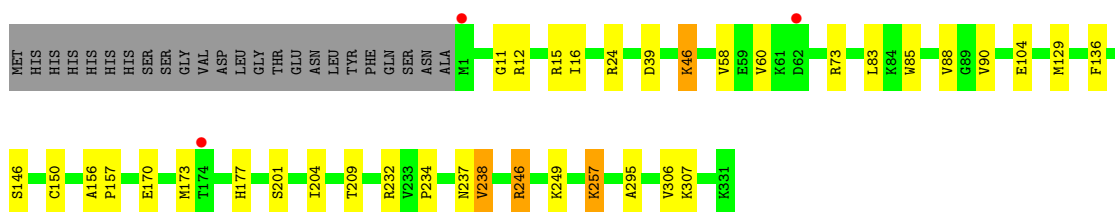• Molecule 4: Glyceraldehyde-3-phosphate Dehydrogenase A

Chain F:



• Molecule 4: Glyceraldehyde-3-phosphate Dehydrogenase A

Chain J:



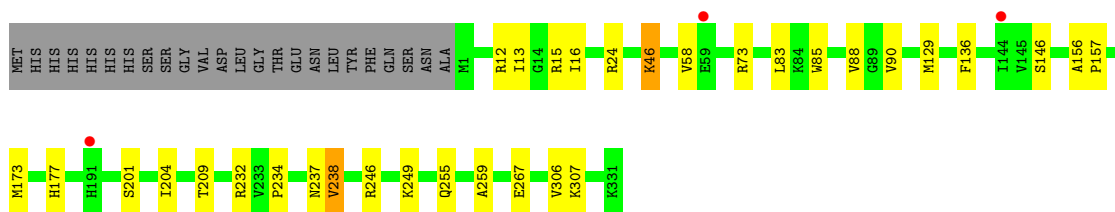• Molecule 4: Glyceraldehyde-3-phosphate Dehydrogenase A

Chain O:



• Molecule 5: Glyceraldehyde-3-phosphate Dehydrogenase A

Chain G:



• Molecule 6: Glyceraldehyde-3-phosphate Dehydrogenase A

Chain H:

MET HIS HIS HIS HIS HIS SER SER GLY VAL ASP LEU GLY THR GLU ASN LEU TYR PHE GLN SER ASN ALA **M1** R12 I13 G14 R15 I16 R24 K46 V58 R73 L83 K84 W85 V90 M129 S146 C150 A156 P157 E170 G171 L172 M173

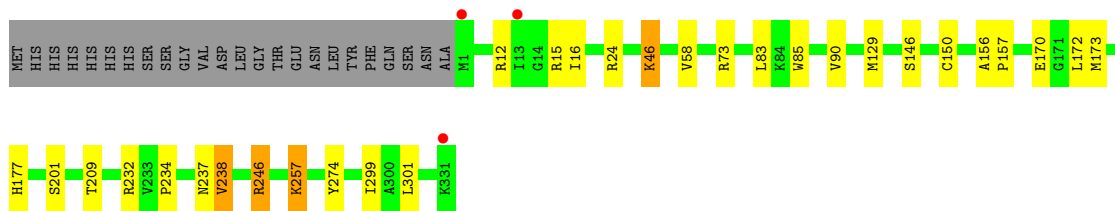H177 S201 T209 R232 V233 P234 N237 V238 R246 K257 Y274 I299 A300 L301 K331

• Molecule 7: Glyceraldehyde-3-phosphate Dehydrogenase A

Chain I:

83%　　　　8%　・　7%

MET HIS HIS HIS HIS HIS SER SER GLY VAL ASP LEU GLY THR GLU ASN LEU TYR PHE GLN SER ASN ALA MET **T2** R12 R15 I16 K23 R24 K46 V58 R73 L83 K84 W85 V88 G89 V90 E104 M129 S146 A156 P157 M173

H177 Q183 S201 I204 T209 R232 V233 P234 N237 V238 R246 K249 K257 A295 L301 V306 K307 L323 S330 K331

• Molecule 8: Glyceraldehyde-3-phosphate Dehydrogenase A

Chain M:

83%　　　　8%　・　7%

MET HIS HIS HIS HIS HIS SER SER GLY VAL ASP LEU GLY THR GLU ASN LEU TYR PHE GLN SER ASN ALA **M1** R12 R15 I16 R24 K46 V58 R73 L83 K84 W85 V88 G89 V90 R107 M129 S146 C150 A156 P157 M173

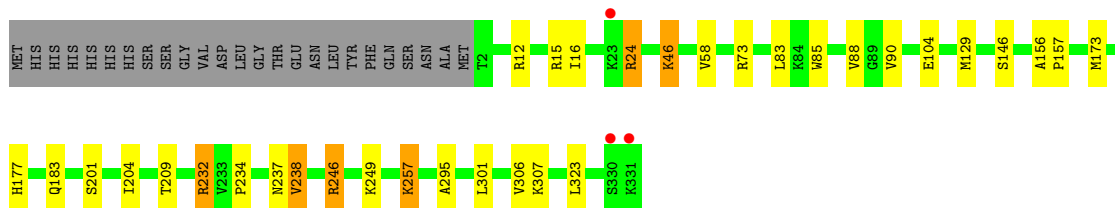V176 H177 H191 S201 I204 T209 R232 V233 P234 N237 V238 L243 T244 V245 R246 K257 L301 V306 K307 K331
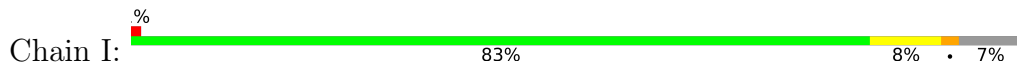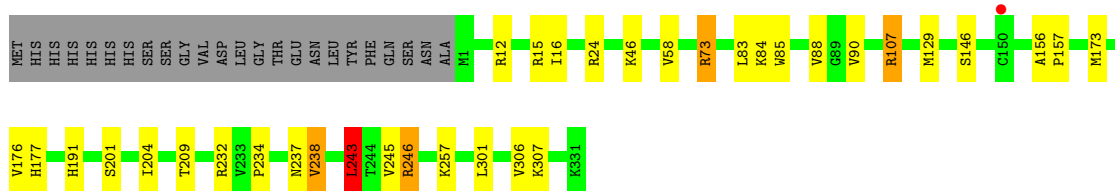
• Molecule 9: Glyceraldehyde-3-phosphate Dehydrogenase A

Chain P:
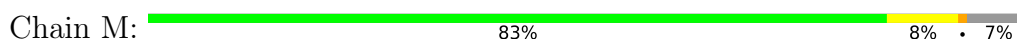
3%

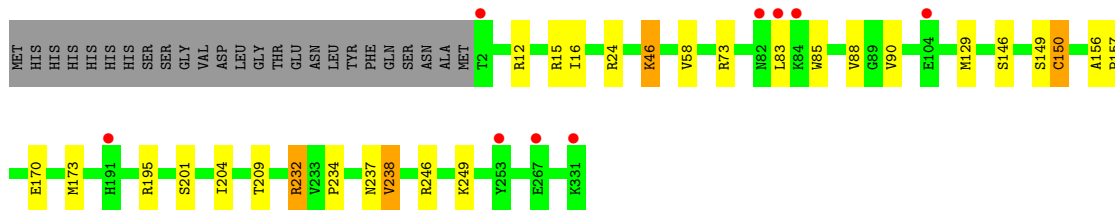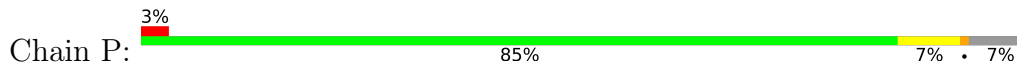85%　　　　7%　・　7%

MET HIS HIS HIS HIS HIS SER SER GLY VAL ASP LEU GLY THR GLU ASN LEU TYR PHE GLN SER ASN ALA MET **T2** R12 R15 I16 R24 K46 V58 R73 N82 L83 K84 W85 V88 G89 V90 E104 M129 S146 S149 C150 A156 P157

E170 M173 H191 R195 S201 I204 T209 R232 V233 P234 N237 V238 R246 K249 Y253 E267 K331

# 4 Data and refinement statistics ⓘ

| Property | Value | Source |
|----------|-------|--------|
| Space group | P 1 21 1 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 145.88Å    69.69Å    271.92Å<br>90.00°    98.80°    90.00° | Depositor |
| Resolution (Å) | 29.91  –   2.85<br>29.91  –   2.85 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 99.8 (29.91-2.85)<br>99.9 (29.91-2.85) | Depositor<br>EDS |
| $R_{merge}$ | 0.09 | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 2.21 (at 2.85Å) | Xtriage |
| Refinement program | REFMAC 5.8.0046 | Depositor |
| R, $R_{free}$ | 0.186  ,   0.224<br>0.183  ,   0.221 | Depositor<br>DCC |
| $R_{free}$ test set | 6389 reflections (5.03%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 64.0 | Xtriage |
| Anisotropy | 0.258 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.28 , 56.5 | EDS |
| L-test for twinning[2] | $< |L| > = 0.50, < L^2 > = 0.33$ | Xtriage |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| $F_o,F_c$ correlation | 0.95 | EDS |
| Total number of atoms | 41155 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 74.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.16% of the height of the origin peak. No significant pseudotranslation is detected.*

---

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

# 5 Model quality ⓘ

## 5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: UVW, PO4, PEG, NA, SCY, PG4, CL, PGE, ALY, POP, NAD, ACT

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths | | Bond angles | |
|-----|-------|------|--------|------|--------|
| | | RMSZ | #$|Z|$ >5 | RMSZ | #$|Z|$ >5 |
| 1 | A | 0.69 | 2/2536 (0.1%) | 1.90 | 18/3432 (0.5%) |
| 1 | B | 0.73 | 2/2541 (0.1%) | 1.70 | 19/3439 (0.6%) |
| 1 | C | 0.71 | 0/2525 | 0.91 | 9/3417 (0.3%) |
| 1 | K | 0.67 | 3/2536 (0.1%) | 1.57 | 12/3432 (0.3%) |
| 1 | N | 0.52 | 0/2536 | 0.87 | 9/3432 (0.3%) |
| 2 | D | 0.68 | 2/2554 (0.1%) | 1.33 | 17/3457 (0.5%) |
| 2 | L | 0.57 | 0/2546 | 0.91 | 10/3446 (0.3%) |
| 3 | E | 0.64 | 0/2533 | 0.91 | 9/3427 (0.3%) |
| 4 | F | 0.58 | 0/2545 | 0.89 | 7/3443 (0.2%) |
| 4 | J | 0.59 | 0/2518 | 0.89 | 6/3408 (0.2%) |
| 4 | O | 0.57 | 0/2515 | 0.89 | 8/3403 (0.2%) |
| 5 | G | 0.59 | 0/2537 | 0.88 | 8/3432 (0.2%) |
| 6 | H | 0.59 | 0/2508 | 0.89 | 7/3392 (0.2%) |
| 7 | I | 0.59 | 0/2508 | 1.02 | 10/3394 (0.3%) |
| 8 | M | 0.64 | 0/2534 | 1.44 | 14/3429 (0.4%) |
| 9 | P | 0.55 | 0/2511 | 0.97 | 14/3397 (0.4%) |
| All | All | 0.62 | 9/40483 (0.0%) | 1.17 | 177/54780 (0.3%) |

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 | 1 |

The worst 5 of 9 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|-----|-------------|----------|
| 1 | K | 24 | ARG | CZ-NH1 | -8.54 | 1.22 | 1.33 |
| 1 | K | 24 | ARG | CD-NE | -7.65 | 1.33 | 1.46 |

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| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|---|-------------|----------|
| 1 | B | 107 | ARG | CZ-NH1 | -6.57 | 1.24 | 1.33 |
| 1 | A | 19 | ARG | CD-NE | -6.46 | 1.35 | 1.46 |
| 1 | K | 24 | ARG | CZ-NH2 | 6.18 | 1.41 | 1.33 |

The worst 5 of 177 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|---|----------------|-------------|
| 1 | A | 19 | ARG | NE-CZ-NH1 | -56.88 | 91.86 | 120.30 |
| 1 | K | 24 | ARG | NE-CZ-NH1 | -56.64 | 91.98 | 120.30 |
| 1 | K | 24 | ARG | NE-CZ-NH2 | 49.91 | 145.26 | 120.30 |
| 1 | A | 19 | ARG | NE-CZ-NH2 | 48.79 | 144.69 | 120.30 |
| 1 | B | 15 | ARG | NE-CZ-NH1 | -39.45 | 100.57 | 120.30 |

There are no chirality outliers.

All (1) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|-----|-------|-----|------|-------|
| 1 | A | 19 | ARG | Sidechain |

## 5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | A | 2509 | 0 | 2522 | 20 | 0 |
| 1 | B | 2514 | 0 | 2527 | 21 | 0 |
| 1 | C | 2499 | 0 | 2516 | 24 | 0 |
| 1 | K | 2509 | 0 | 2522 | 25 | 0 |
| 1 | N | 2509 | 0 | 2522 | 14 | 0 |
| 2 | D | 2514 | 0 | 2526 | 22 | 0 |
| 2 | L | 2506 | 0 | 2521 | 15 | 0 |
| 3 | E | 2520 | 0 | 2526 | 13 | 0 |
| 4 | F | 2531 | 0 | 2538 | 29 | 0 |
| 4 | J | 2504 | 0 | 2511 | 16 | 0 |
| 4 | O | 2502 | 0 | 2517 | 24 | 0 |
| 5 | G | 2520 | 0 | 2529 | 19 | 0 |
| 6 | H | 2505 | 0 | 2519 | 19 | 0 |
| 7 | I | 2507 | 0 | 2510 | 22 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 8 | M | 2508 | 0 | 2521 | 19 | 0 |
| 9 | P | 2507 | 0 | 2512 | 16 | 0 |
| 10 | A | 1 | 0 | 0 | 0 | 0 |
| 10 | B | 2 | 0 | 0 | 0 | 0 |
| 10 | C | 1 | 0 | 0 | 0 | 0 |
| 10 | D | 1 | 0 | 0 | 0 | 0 |
| 10 | E | 1 | 0 | 0 | 0 | 0 |
| 10 | G | 1 | 0 | 0 | 0 | 0 |
| 10 | H | 1 | 0 | 0 | 0 | 0 |
| 10 | I | 1 | 0 | 0 | 0 | 0 |
| 10 | K | 1 | 0 | 0 | 0 | 0 |
| 10 | M | 1 | 0 | 0 | 0 | 0 |
| 10 | N | 1 | 0 | 0 | 0 | 0 |
| 11 | A | 4 | 0 | 0 | 2 | 0 |
| 11 | B | 6 | 0 | 0 | 0 | 0 |
| 11 | C | 5 | 0 | 0 | 1 | 0 |
| 11 | D | 5 | 0 | 0 | 1 | 0 |
| 11 | E | 5 | 0 | 0 | 0 | 0 |
| 11 | F | 1 | 0 | 0 | 0 | 0 |
| 11 | G | 4 | 0 | 0 | 1 | 0 |
| 11 | H | 1 | 0 | 0 | 0 | 0 |
| 11 | I | 2 | 0 | 0 | 0 | 0 |
| 11 | J | 2 | 0 | 0 | 0 | 0 |
| 11 | K | 6 | 0 | 0 | 0 | 0 |
| 11 | L | 1 | 0 | 0 | 0 | 0 |
| 11 | M | 2 | 0 | 0 | 0 | 0 |
| 11 | N | 1 | 0 | 0 | 0 | 0 |
| 11 | O | 2 | 0 | 0 | 1 | 0 |
| 11 | P | 2 | 0 | 0 | 0 | 0 |
| 12 | A | 15 | 0 | 0 | 2 | 0 |
| 12 | B | 5 | 0 | 0 | 0 | 0 |
| 12 | D | 10 | 0 | 0 | 2 | 0 |
| 12 | E | 5 | 0 | 0 | 0 | 0 |
| 12 | F | 5 | 0 | 0 | 0 | 0 |
| 12 | H | 5 | 0 | 0 | 0 | 0 |
| 12 | I | 5 | 0 | 0 | 0 | 0 |
| 12 | J | 10 | 0 | 0 | 0 | 0 |
| 12 | L | 5 | 0 | 0 | 0 | 0 |
| 12 | P | 10 | 0 | 0 | 0 | 0 |
| 13 | A | 9 | 0 | 0 | 2 | 0 |
| 13 | B | 9 | 0 | 0 | 2 | 0 |
| 13 | F | 9 | 0 | 0 | 1 | 0 |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 13 | G | 9 | 0 | 0 | 1 | 0 |
| 13 | J | 9 | 0 | 0 | 1 | 0 |
| 13 | M | 9 | 0 | 0 | 1 | 0 |
| 14 | C | 44 | 0 | 26 | 4 | 0 |
| 14 | D | 44 | 0 | 26 | 3 | 0 |
| 14 | E | 44 | 0 | 26 | 1 | 0 |
| 14 | I | 44 | 0 | 26 | 0 | 0 |
| 14 | K | 44 | 0 | 26 | 5 | 0 |
| 14 | O | 44 | 0 | 26 | 6 | 0 |
| 14 | P | 44 | 0 | 26 | 2 | 0 |
| 15 | H | 4 | 0 | 3 | 0 | 0 |
| 16 | H | 10 | 0 | 14 | 0 | 0 |
| 17 | H | 7 | 0 | 10 | 0 | 0 |
| 18 | J | 13 | 0 | 18 | 0 | 0 |
| 19 | M | 8 | 0 | 3 | 0 | 0 |
| 20 | A | 39 | 0 | 0 | 1 | 0 |
| 20 | B | 38 | 0 | 0 | 1 | 0 |
| 20 | C | 61 | 0 | 0 | 3 | 0 |
| 20 | D | 38 | 0 | 0 | 1 | 0 |
| 20 | E | 23 | 0 | 0 | 1 | 0 |
| 20 | F | 27 | 0 | 0 | 2 | 0 |
| 20 | G | 35 | 0 | 0 | 2 | 0 |
| 20 | H | 22 | 0 | 0 | 0 | 0 |
| 20 | I | 23 | 0 | 0 | 1 | 0 |
| 20 | J | 28 | 0 | 0 | 0 | 0 |
| 20 | K | 26 | 0 | 0 | 4 | 0 |
| 20 | L | 20 | 0 | 0 | 1 | 0 |
| 20 | M | 24 | 0 | 0 | 0 | 0 |
| 20 | N | 11 | 0 | 0 | 1 | 0 |
| 20 | O | 20 | 0 | 0 | 2 | 0 |
| 20 | P | 16 | 0 | 0 | 0 | 0 |
| All | All | 41155 | 0 | 40569 | 299 | 0 |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

The worst 5 of 299 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) |
|--------|--------|--------------------------|-------------------|
| 7:I:104:GLU:OE2 | 4:O:104:GLU:OE2 | 1.85 | 0.94 |
| 13:A:409:POP:O2 | 13:A:409:POP:O4 | 1.85 | 0.93 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 13:M:405:POP:O6 | 13:M:405:POP:O2 | 1.91 | 0.88 |
| 1:K:71:LYS:HE3 | 20:K:522:HOH:O | 1.76 | 0.83 |
| 8:M:243:LEU:HD22 | 8:M:245:VAL:HG13 | 1.61 | 0.82 |

There are no symmetry-related clashes.

## 5.3  Torsion angles  ⓘ

### 5.3.1  Protein backbone  ⓘ

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

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 1 | A | 329/355 (93%) | 314 (95%) | 14 (4%) | 1 (0%) | 41 | 68 |
| 1 | B | 330/355 (93%) | 316 (96%) | 13 (4%) | 1 (0%) | 41 | 68 |
| 1 | C | 328/355 (92%) | 315 (96%) | 12 (4%) | 1 (0%) | 41 | 68 |
| 1 | K | 329/355 (93%) | 314 (95%) | 14 (4%) | 1 (0%) | 41 | 68 |
| 1 | N | 329/355 (93%) | 315 (96%) | 13 (4%) | 1 (0%) | 41 | 68 |
| 2 | D | 331/355 (93%) | 317 (96%) | 13 (4%) | 1 (0%) | 41 | 68 |
| 2 | L | 330/355 (93%) | 315 (96%) | 14 (4%) | 1 (0%) | 41 | 68 |
| 3 | E | 329/355 (93%) | 314 (95%) | 14 (4%) | 1 (0%) | 41 | 68 |
| 4 | F | 330/355 (93%) | 316 (96%) | 13 (4%) | 1 (0%) | 41 | 68 |
| 4 | J | 327/355 (92%) | 313 (96%) | 12 (4%) | 2 (1%) | 25 | 53 |
| 4 | O | 327/355 (92%) | 312 (95%) | 14 (4%) | 1 (0%) | 41 | 68 |
| 5 | G | 329/355 (93%) | 315 (96%) | 13 (4%) | 1 (0%) | 41 | 68 |
| 6 | H | 326/355 (92%) | 311 (95%) | 14 (4%) | 1 (0%) | 41 | 68 |
| 7 | I | 326/355 (92%) | 311 (95%) | 14 (4%) | 1 (0%) | 41 | 68 |
| 8 | M | 329/355 (93%) | 313 (95%) | 15 (5%) | 1 (0%) | 41 | 68 |
| 9 | P | 326/355 (92%) | 312 (96%) | 13 (4%) | 1 (0%) | 41 | 68 |
| All | All | 5255/5680 (92%) | 5023 (96%) | 215 (4%) | 17 (0%) | 41 | 68 |

5 of 17 Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | C | 238 | VAL |
| 1 | A | 238 | VAL |
| 1 | B | 238 | VAL |
| 2 | D | 238 | VAL |
| 3 | E | 238 | VAL |

### 5.3.2 Protein sidechains ⓘ

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

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

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|-----|-------|----------|-----------|----------|-------------|---|
| 1 | A | 266/286 (93%) | 261 (98%) | 5 (2%) | 57 | 81 |
| 1 | B | 266/286 (93%) | 262 (98%) | 4 (2%) | 65 | 86 |
| 1 | C | 265/286 (93%) | 263 (99%) | 2 (1%) | 81 | 93 |
| 1 | K | 266/286 (93%) | 264 (99%) | 2 (1%) | 81 | 93 |
| 1 | N | 266/286 (93%) | 265 (100%) | 1 (0%) | 91 | 96 |
| 2 | D | 268/287 (93%) | 265 (99%) | 3 (1%) | 73 | 90 |
| 2 | L | 267/287 (93%) | 264 (99%) | 3 (1%) | 73 | 90 |
| 3 | E | 266/285 (93%) | 263 (99%) | 3 (1%) | 73 | 90 |
| 4 | F | 267/285 (94%) | 263 (98%) | 4 (2%) | 65 | 86 |
| 4 | J | 264/285 (93%) | 263 (100%) | 1 (0%) | 91 | 96 |
| 4 | O | 264/285 (93%) | 263 (100%) | 1 (0%) | 91 | 96 |
| 5 | G | 266/285 (93%) | 265 (100%) | 1 (0%) | 91 | 96 |
| 6 | H | 263/284 (93%) | 262 (100%) | 1 (0%) | 91 | 96 |
| 7 | I | 263/284 (93%) | 262 (100%) | 1 (0%) | 91 | 96 |
| 8 | M | 266/286 (93%) | 263 (99%) | 3 (1%) | 73 | 90 |
| 9 | P | 263/284 (93%) | 261 (99%) | 2 (1%) | 81 | 93 |
| All | All | 4246/4567 (93%) | 4209 (99%) | 37 (1%) | 78 | 92 |

5 of 37 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | L | 329 | ILE |
| 9 | P | 173 | MET |
| 2 | L | 331 | LYS |
| 8 | M | 243 | LEU |
| 2 | D | 173 | MET |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | K | 82 | ASN |
| 8 | M | 191 | HIS |

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

25 non-standard protein/DNA/RNA residues 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 | $\#|Z| > 2$ |
| 6 | SCY | H | 150 | 6 | 7,8,9 | 1.02 | 0 | 3,9,11 | 1.41 | 1 (33%) |
| 1 | ALY | C | 46 | 1 | 10,11,12 | 1.41 | 1 (10%) | 7,12,14 | 3.82 | 3 (42%) |
| 4 | ALY | J | 46 | 4 | 10,11,12 | 1.28 | 1 (10%) | 7,12,14 | 3.50 | 3 (42%) |
| 9 | ALY | P | 46 | 9 | 10,11,12 | 1.06 | 1 (10%) | 7,12,14 | 3.41 | 3 (42%) |
| 7 | ALY | I | 46 | 7 | 10,11,12 | 1.39 | 2 (20%) | 7,12,14 | 3.69 | 3 (42%) |
| 9 | ALY | P | 249 | 9 | 10,11,12 | 0.42 | 0 | 7,12,14 | 3.13 | 2 (28%) |
| 1 | ALY | B | 46 | 1 | 10,11,12 | 1.35 | 2 (20%) | 7,12,14 | 3.77 | 3 (42%) |
| 4 | ALY | F | 257 | 4 | 10,11,12 | 1.54 | 2 (20%) | 7,12,14 | 5.84 | 3 (42%) |
| 6 | ALY | H | 46 | 6 | 10,11,12 | 1.50 | 2 (20%) | 7,12,14 | 2.97 | 3 (42%) |
| 9 | SCY | P | 150 | 9 | 7,8,9 | 1.12 | 1 (14%) | 3,9,11 | 1.04 | 0 |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | #\|Z\| > 2 | Counts | RMSZ | #\|Z\| > 2 |
| 4 | ALY | F | 46 | 4 | 10,11,12 | 0.95 | 0 | 7,12,14 | 3.57 | 3 (42%) |
| 1 | ALY | N | 46 | 1 | 10,11,12 | 1.17 | 1 (10%) | 7,12,14 | 3.24 | 3 (42%) |
| 5 | ALY | G | 46 | 5 | 10,11,12 | 1.03 | 0 | 7,12,14 | 3.42 | 3 (42%) |
| 7 | ALY | I | 249 | 7 | 10,11,12 | 0.61 | 0 | 7,12,14 | 2.71 | 3 (42%) |
| 4 | ALY | O | 46 | 4 | 10,11,12 | 0.88 | 0 | 7,12,14 | 3.46 | 3 (42%) |
| 4 | ALY | J | 257 | 4 | 10,11,12 | 1.39 | 1 (10%) | 7,12,14 | 6.97 | 5 (71%) |
| 7 | ALY | I | 257 | 7 | 10,11,12 | 1.40 | 2 (20%) | 7,12,14 | 6.43 | 5 (71%) |
| 3 | ALY | E | 46 | 3 | 10,11,12 | 1.10 | 0 | 7,12,14 | 3.71 | 3 (42%) |
| 1 | ALY | A | 46 | 1 | 10,11,12 | 1.20 | 1 (10%) | 7,12,14 | 3.52 | 3 (42%) |
| 1 | ALY | K | 46 | 1 | 10,11,12 | 1.05 | 0 | 7,12,14 | 3.40 | 3 (42%) |
| 4 | ALY | O | 257 | 4 | 10,11,12 | 1.33 | 2 (20%) | 7,12,14 | 6.22 | 5 (71%) |
| 8 | ALY | M | 257 | 8 | 10,11,12 | 1.57 | 2 (20%) | 7,12,14 | 6.31 | 5 (71%) |
| 6 | ALY | H | 257 | 6 | 10,11,12 | 1.32 | 3 (30%) | 7,12,14 | 5.79 | 3 (42%) |
| 3 | ALY | E | 249 | 3 | 10,11,12 | 0.65 | 0 | 7,12,14 | 3.12 | 2 (28%) |
| 5 | SCY | G | 150 | 5 | 7,8,9 | 0.96 | 0 | 3,9,11 | 1.14 | 0 |

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 |
|---|---|---|---|---|---|---|---|
| 6 | SCY | H | 150 | 6 | - | 2/5/7/9 | - |
| 1 | ALY | C | 46 | 1 | - | 4/9/10/12 | - |
| 4 | ALY | J | 46 | 4 | - | 4/9/10/12 | - |
| 9 | ALY | P | 46 | 9 | - | 4/9/10/12 | - |
| 7 | ALY | I | 46 | 7 | - | 4/9/10/12 | - |
| 9 | ALY | P | 249 | 9 | - | 4/9/10/12 | - |
| 1 | ALY | B | 46 | 1 | - | 4/9/10/12 | - |
| 4 | ALY | F | 257 | 4 | - | 5/9/10/12 | - |
| 6 | ALY | H | 46 | 6 | - | 4/9/10/12 | - |
| 9 | SCY | P | 150 | 9 | - | 3/5/7/9 | - |
| 4 | ALY | F | 46 | 4 | - | 4/9/10/12 | - |
| 1 | ALY | N | 46 | 1 | - | 4/9/10/12 | - |
| 5 | ALY | G | 46 | 5 | - | 4/9/10/12 | - |
| 7 | ALY | I | 249 | 7 | - | 3/9/10/12 | - |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|-----|------|-------|-----|------|---------|----------|-------|
| 4 | ALY | O | 46 | 4 | - | 4/9/10/12 | - |
| 4 | ALY | J | 257 | 4 | - | 2/9/10/12 | - |
| 7 | ALY | I | 257 | 7 | - | 2/9/10/12 | - |
| 3 | ALY | E | 46 | 3 | - | 4/9/10/12 | - |
| 1 | ALY | A | 46 | 1 | - | 4/9/10/12 | - |
| 1 | ALY | K | 46 | 1 | - | 4/9/10/12 | - |
| 4 | ALY | O | 257 | 4 | - | 2/9/10/12 | - |
| 8 | ALY | M | 257 | 8 | - | 2/9/10/12 | - |
| 6 | ALY | H | 257 | 6 | - | 5/9/10/12 | - |
| 3 | ALY | E | 249 | 3 | - | 4/9/10/12 | - |
| 5 | SCY | G | 150 | 5 | - | 2/5/7/9 | - |

The worst 5 of 24 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|---|-------------|----------|
| 8 | M | 257 | ALY | CE-NZ | 3.19 | 1.53 | 1.46 |
| 4 | J | 257 | ALY | CE-NZ | 3.16 | 1.53 | 1.46 |
| 6 | H | 46 | ALY | CE-NZ | 3.09 | 1.53 | 1.46 |
| 4 | F | 257 | ALY | CE-NZ | 3.09 | 1.53 | 1.46 |
| 7 | I | 46 | ALY | CE-NZ | 2.84 | 1.52 | 1.46 |

The worst 5 of 73 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|---|----------------|-------------|
| 7 | I | 257 | ALY | CE-NZ-CH | 15.33 | 146.13 | 122.56 |
| 4 | J | 257 | ALY | CE-NZ-CH | 15.28 | 146.05 | 122.56 |
| 4 | O | 257 | ALY | CE-NZ-CH | 14.86 | 145.41 | 122.56 |
| 4 | F | 257 | ALY | CE-NZ-CH | 14.41 | 144.72 | 122.56 |
| 6 | H | 257 | ALY | CE-NZ-CH | 14.21 | 144.41 | 122.56 |

There are no chirality outliers.

5 of 88 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 4 | F | 257 | ALY | C-CA-CB-CG |
| 5 | G | 150 | SCY | OCD-CD-SG-CB |
| 5 | G | 150 | SCY | CE-CD-SG-CB |
| 6 | H | 150 | SCY | OCD-CD-SG-CB |
| 6 | H | 150 | SCY | CE-CD-SG-CB |

There are no ring outliers.

18 monomers are involved in 22 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 1 | C | 46 | ALY | 1 | 0 |
| 4 | J | 46 | ALY | 1 | 0 |
| 9 | P | 46 | ALY | 1 | 0 |
| 7 | I | 46 | ALY | 1 | 0 |
| 1 | B | 46 | ALY | 1 | 0 |
| 4 | F | 257 | ALY | 1 | 0 |
| 6 | H | 46 | ALY | 1 | 0 |
| 9 | P | 150 | SCY | 5 | 0 |
| 4 | F | 46 | ALY | 1 | 0 |
| 1 | N | 46 | ALY | 1 | 0 |
| 5 | G | 46 | ALY | 1 | 0 |
| 4 | O | 46 | ALY | 1 | 0 |
| 7 | I | 257 | ALY | 1 | 0 |
| 3 | E | 46 | ALY | 1 | 0 |
| 1 | A | 46 | ALY | 1 | 0 |
| 1 | K | 46 | ALY | 1 | 0 |
| 4 | O | 257 | ALY | 1 | 0 |
| 6 | H | 257 | ALY | 1 | 0 |

## 5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

## 5.6 Ligand geometry ⓘ

Of 94 ligands modelled in this entry, 61 are monoatomic - leaving 33 for Mogul analysis.

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 | $\#|Z| > 2$ |
| 14 | NAD | I | 401 | - | 42,48,48 | 1.05 | 4 (9%) | 50,73,73 | 1.14 | 4 (8%) |
| 13 | POP | A | 409 | - | 6,8,8 | 0.87 | 0 | 13,13,13 | 1.91 | 4 (30%) |
| 18 | PG4 | J | 405 | - | 12,12,12 | 0.62 | 0 | 11,11,11 | 0.25 | 0 |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Counts | RMSZ | #\|Z\| > 2 | Counts | RMSZ | #\|Z\| > 2 |
| 12 | PO4 | J | 403 | - | 4,4,4 | 0.84 | 0 | 6,6,6 | 0.68 | 0 |
| 12 | PO4 | A | 407 | - | 4,4,4 | 1.05 | 0 | 6,6,6 | 0.97 | 0 |
| 15 | ACT | H | 404 | - | 3,3,3 | 0.87 | 0 | 3,3,3 | 0.70 | 0 |
| 17 | PEG | H | 406 | - | 6,6,6 | 0.52 | 0 | 5,5,5 | 0.65 | 0 |
| 14 | NAD | K | 401 | - | 42,48,48 | 1.10 | 4 (9%) | 50,73,73 | 1.43 | 8 (16%) |
| 13 | POP | G | 406 | - | 6,8,8 | 1.10 | 0 | 13,13,13 | 0.94 | 0 |
| 13 | POP | M | 405 | - | 6,8,8 | 0.46 | 0 | 13,13,13 | 1.89 | 5 (38%) |
| 12 | PO4 | D | 409 | - | 4,4,4 | 1.19 | 0 | 6,6,6 | 0.59 | 0 |
| 12 | PO4 | L | 402 | - | 4,4,4 | 0.76 | 0 | 6,6,6 | 0.66 | 0 |
| 13 | POP | J | 406 | - | 6,8,8 | 0.95 | 0 | 13,13,13 | 1.33 | 1 (7%) |
| 13 | POP | F | 403 | - | 6,8,8 | 0.71 | 0 | 13,13,13 | 1.53 | 1 (7%) |
| 14 | NAD | D | 401 | - | 42,48,48 | 1.02 | 3 (7%) | 50,73,73 | 1.46 | 10 (20%) |
| 12 | PO4 | D | 408 | - | 4,4,4 | 1.49 | 1 (25%) | 6,6,6 | 1.22 | 1 (16%) |
| 12 | PO4 | H | 403 | - | 4,4,4 | 0.92 | 0 | 6,6,6 | 0.81 | 0 |
| 12 | PO4 | J | 404 | - | 4,4,4 | 1.03 | 0 | 6,6,6 | 0.56 | 0 |
| 12 | PO4 | I | 405 | - | 4,4,4 | 0.94 | 0 | 6,6,6 | 0.80 | 0 |
| 16 | PGE | H | 405 | - | 9,9,9 | 0.71 | 0 | 8,8,8 | 0.37 | 0 |
| 12 | PO4 | P | 405 | - | 4,4,4 | 1.09 | 0 | 6,6,6 | 0.98 | 0 |
| 12 | PO4 | E | 408 | - | 4,4,4 | 0.40 | 0 | 6,6,6 | 1.07 | 1 (16%) |
| 12 | PO4 | B | 409 | - | 4,4,4 | 0.95 | 0 | 6,6,6 | 2.27 | 4 (66%) |
| 14 | NAD | O | 401 | - | 42,48,48 | 0.85 | 2 (4%) | 50,73,73 | 1.56 | 7 (14%) |
| 14 | NAD | E | 401 | - | 42,48,48 | 0.96 | 2 (4%) | 50,73,73 | 1.66 | 9 (18%) |
| 19 | UVW | M | 404 | - | 6,7,7 | 1.50 | 1 (16%) | 7,10,10 | 1.26 | 1 (14%) |
| 12 | PO4 | P | 404 | - | 4,4,4 | 0.67 | 0 | 6,6,6 | 0.87 | 0 |
| 12 | PO4 | A | 408 | - | 4,4,4 | 0.61 | 0 | 6,6,6 | 0.85 | 0 |
| 14 | NAD | C | 401 | - | 42,48,48 | 1.39 | 6 (14%) | 50,73,73 | 1.28 | 6 (12%) |
| 12 | PO4 | A | 406 | - | 4,4,4 | 0.48 | 0 | 6,6,6 | 1.89 | 1 (16%) |
| 14 | NAD | P | 401 | - | 42,48,48 | 1.08 | 3 (7%) | 50,73,73 | 1.38 | 6 (12%) |
| 13 | POP | B | 410 | - | 6,8,8 | 0.77 | 0 | 13,13,13 | 1.42 | 2 (15%) |
| 12 | PO4 | F | 402 | - | 4,4,4 | 0.86 | 0 | 6,6,6 | 0.54 | 0 |

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 |
|---|---|---|---|---|---|---|---|
| 14 | NAD | D | 401 | - | - | 17/26/62/62 | 0/5/5/5 |
| 14 | NAD | O | 401 | - | - | 18/26/62/62 | 0/5/5/5 |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 17 | PEG | H | 406 | - | - | 2/4/4/4 | - |
| 19 | UVW | M | 404 | - | - | 0/3/5/5 | - |
| 14 | NAD | K | 401 | - | - | 8/26/62/62 | 0/5/5/5 |
| 14 | NAD | I | 401 | - | - | 17/26/62/62 | 0/5/5/5 |
| 13 | POP | G | 406 | - | - | 0/6/6/6 | - |
| 13 | POP | M | 405 | - | - | 3/6/6/6 | - |
| 16 | PGE | H | 405 | - | - | 0/7/7/7 | - |
| 14 | NAD | C | 401 | - | - | 11/26/62/62 | 0/5/5/5 |
| 13 | POP | A | 409 | - | - | 3/6/6/6 | - |
| 18 | PG4 | J | 405 | - | - | 5/10/10/10 | - |
| 14 | NAD | P | 401 | - | - | 18/26/62/62 | 0/5/5/5 |
| 13 | POP | B | 410 | - | - | 3/6/6/6 | - |
| 13 | POP | J | 406 | - | - | 1/6/6/6 | - |
| 14 | NAD | E | 401 | - | - | 11/26/62/62 | 0/5/5/5 |
| 13 | POP | F | 403 | - | - | 2/6/6/6 | - |

The worst 5 of 26 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 14 | C | 401 | NAD | O4D-C1D | 4.02 | 1.46 | 1.41 |
| 14 | P | 401 | NAD | O4D-C1D | 3.71 | 1.46 | 1.41 |
| 14 | K | 401 | NAD | O4D-C1D | 3.66 | 1.46 | 1.41 |
| 14 | C | 401 | NAD | C2A-N3A | 3.42 | 1.37 | 1.32 |
| 14 | I | 401 | NAD | O4D-C1D | 3.40 | 1.45 | 1.41 |

The worst 5 of 71 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 14 | E | 401 | NAD | PN-O3-PA | -5.40 | 114.30 | 132.83 |
| 14 | D | 401 | NAD | PN-O3-PA | -4.28 | 118.12 | 132.83 |
| 14 | O | 401 | NAD | N3A-C2A-N1A | -4.27 | 122.01 | 128.68 |
| 14 | C | 401 | NAD | C4A-C5A-N7A | -4.17 | 105.06 | 109.40 |
| 14 | E | 401 | NAD | N3A-C2A-N1A | -4.14 | 122.21 | 128.68 |

There are no chirality outliers.

5 of 119 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 13 | A | 409 | POP | P2-O-P1-O2 |

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| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 13 | B | 410 | POP | P1-O-P2-O5 |
| 13 | F | 403 | POP | P2-O-P1-O3 |
| 13 | M | 405 | POP | P2-O-P1-O2 |
| 13 | M | 405 | POP | P1-O-P2-O6 |

There are no ring outliers.

15 monomers are involved in 33 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 13 | A | 409 | POP | 2 | 0 |
| 12 | A | 407 | PO4 | 2 | 0 |
| 14 | K | 401 | NAD | 5 | 0 |
| 13 | G | 406 | POP | 1 | 0 |
| 13 | M | 405 | POP | 1 | 0 |
| 12 | D | 409 | PO4 | 1 | 0 |
| 13 | J | 406 | POP | 1 | 0 |
| 13 | F | 403 | POP | 1 | 0 |
| 14 | D | 401 | NAD | 3 | 0 |
| 12 | D | 408 | PO4 | 1 | 0 |
| 14 | O | 401 | NAD | 6 | 0 |
| 14 | E | 401 | NAD | 1 | 0 |
| 14 | C | 401 | NAD | 4 | 0 |
| 14 | P | 401 | NAD | 2 | 0 |
| 13 | B | 410 | POP | 2 | 0 |

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

## Ligand NAD I 401



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAD K 401



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAD D 401



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAD O 401



Bond lengths

Bond angles

Torsions

Rings

## Ligand NAD E 401



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAD C 401



Bond lengths



Bond angles



Torsions



Rings

**Ligand NAD P 401**



Bond lengths

Bond angles

Torsions

Rings
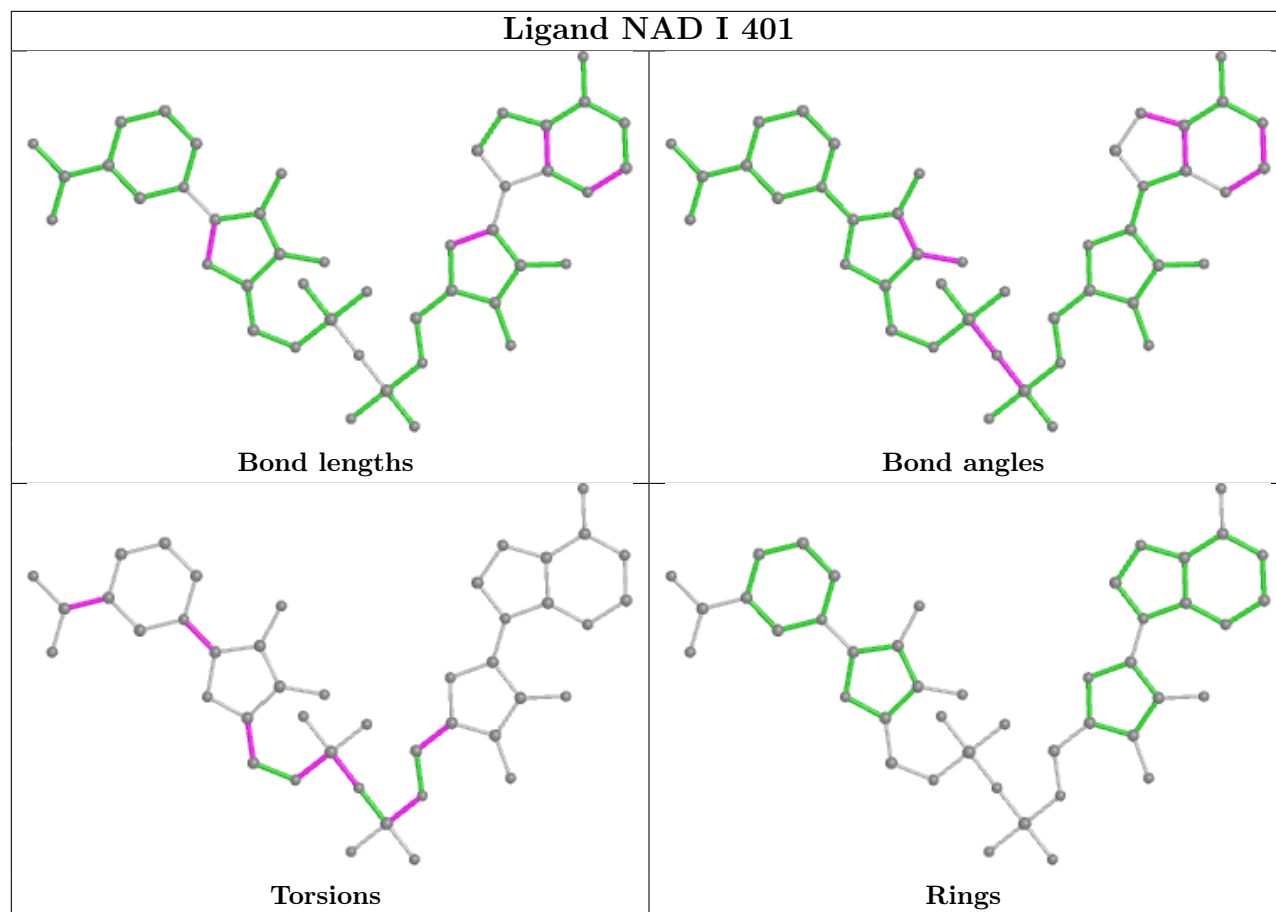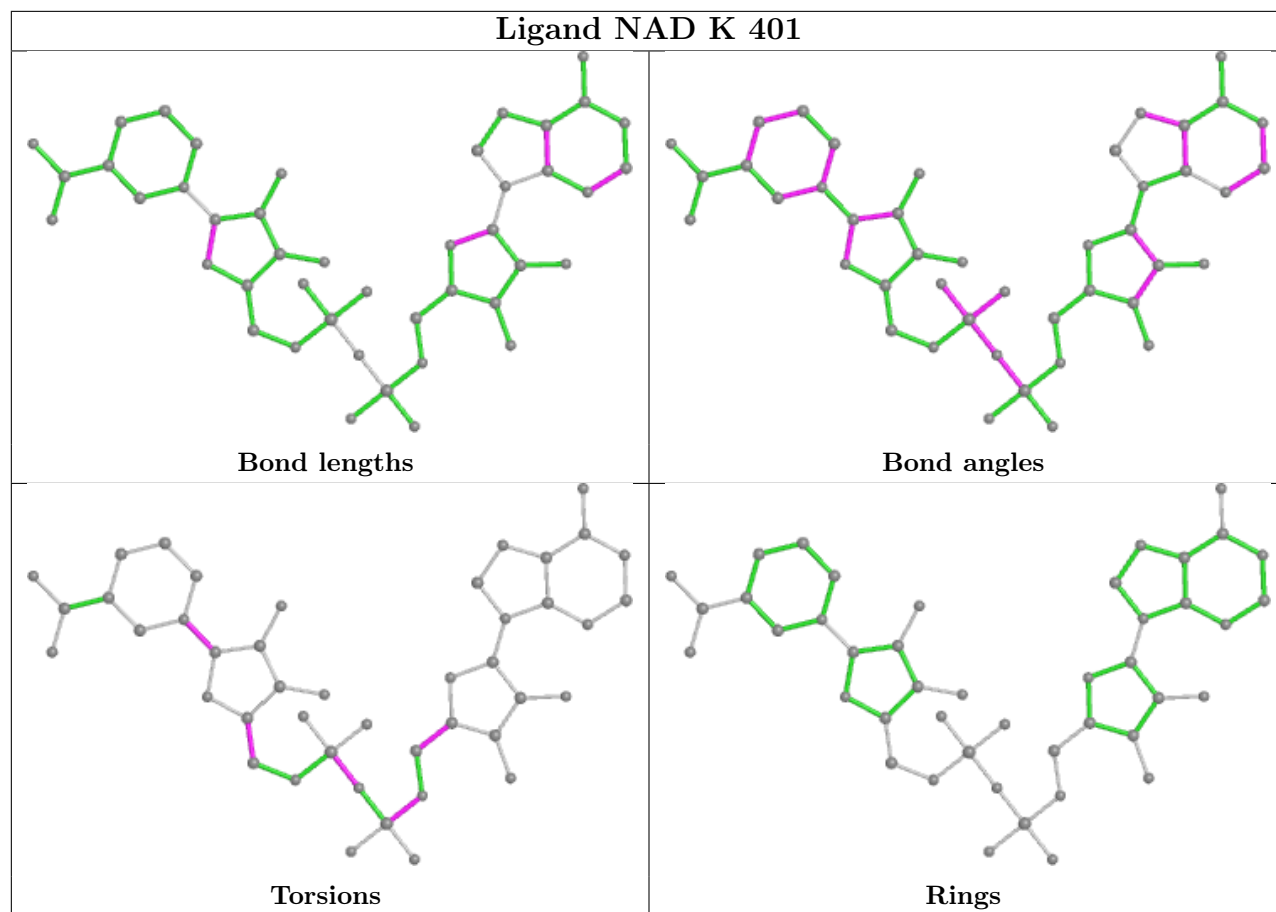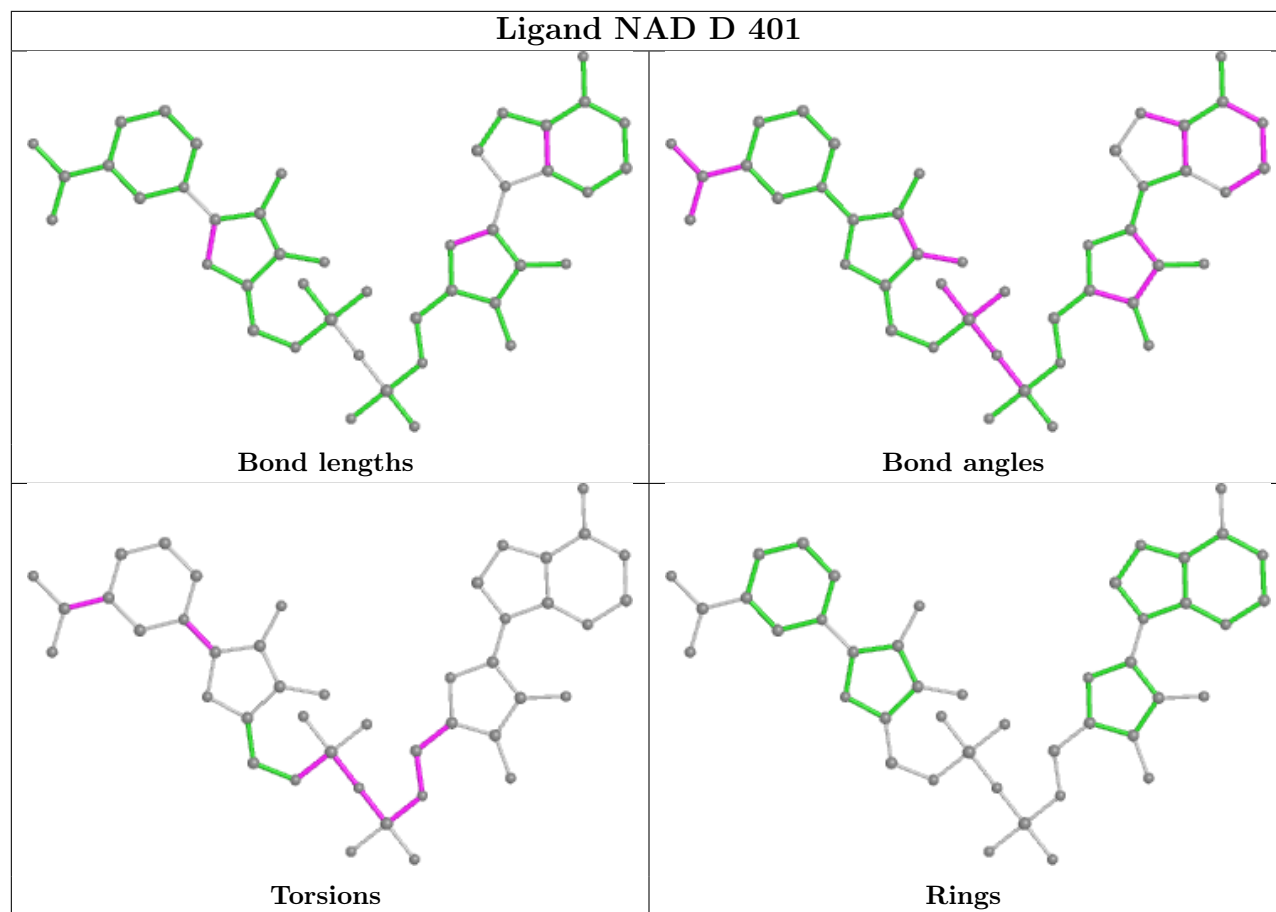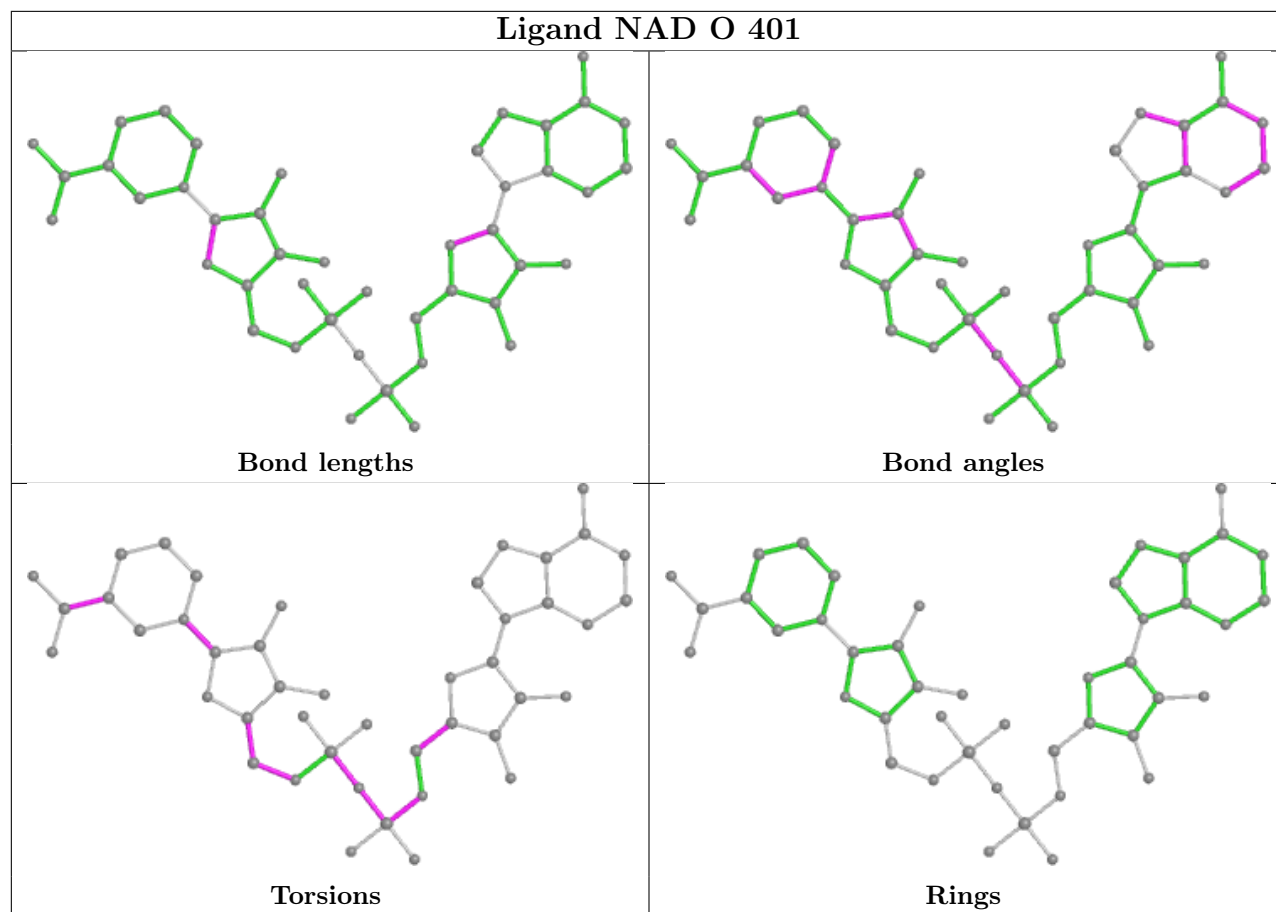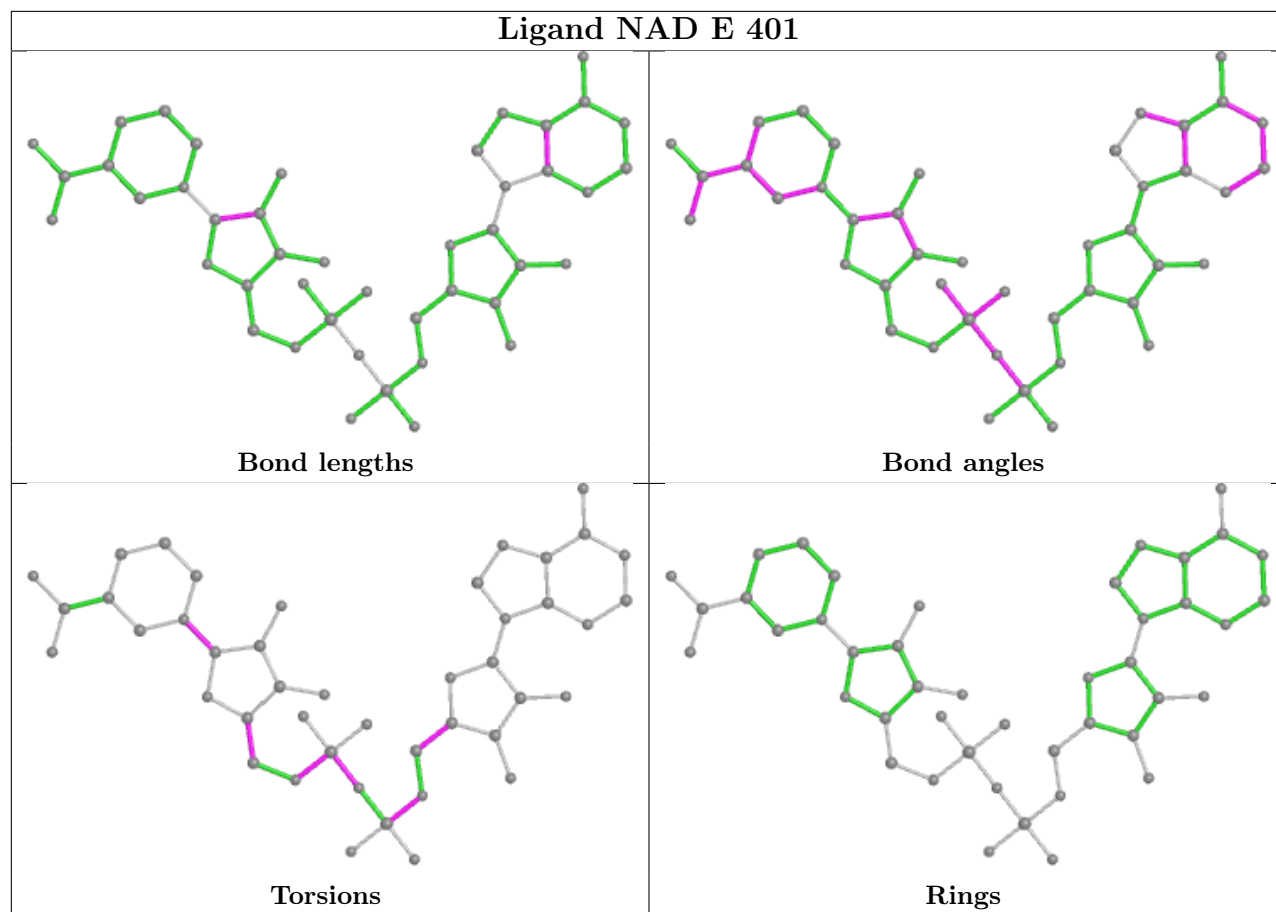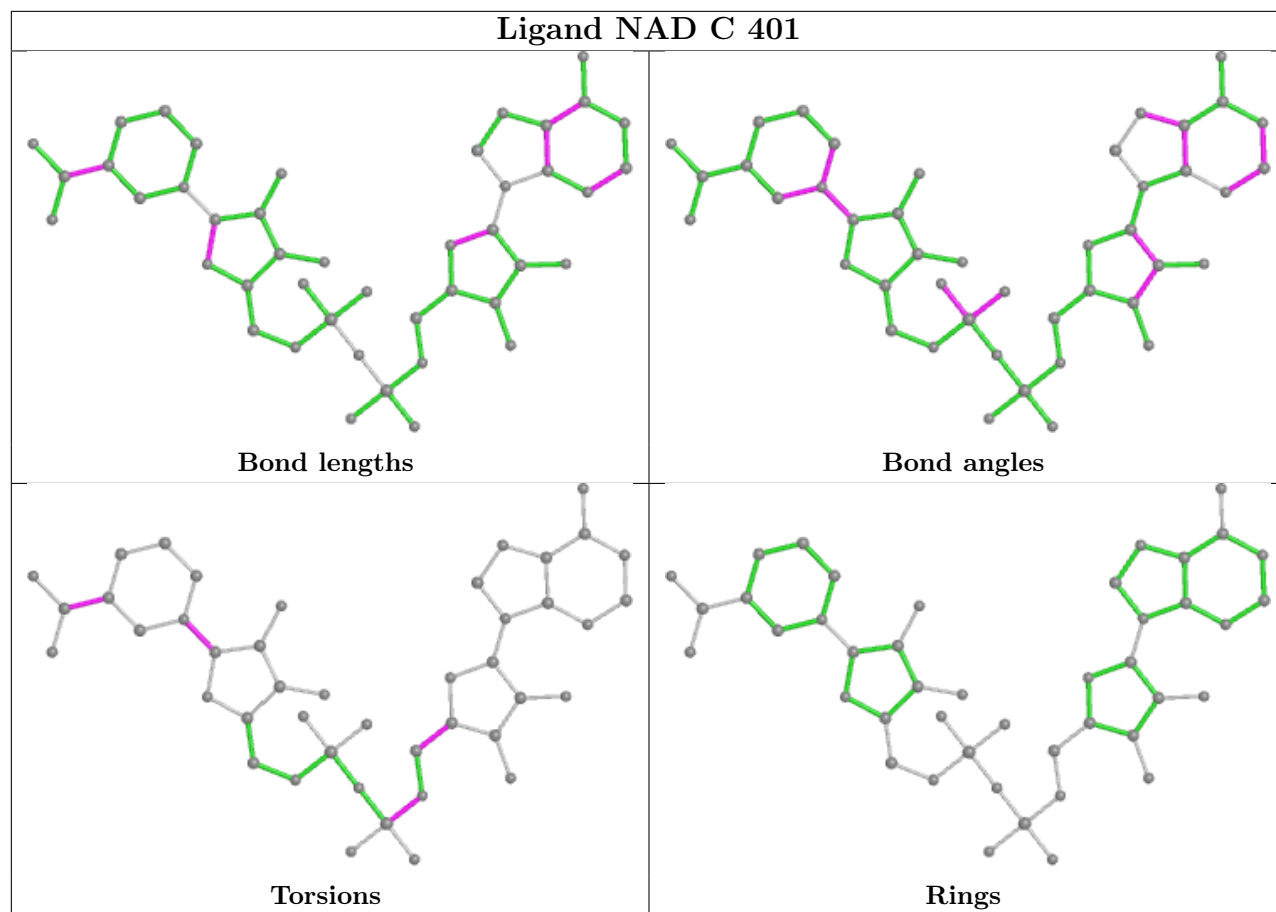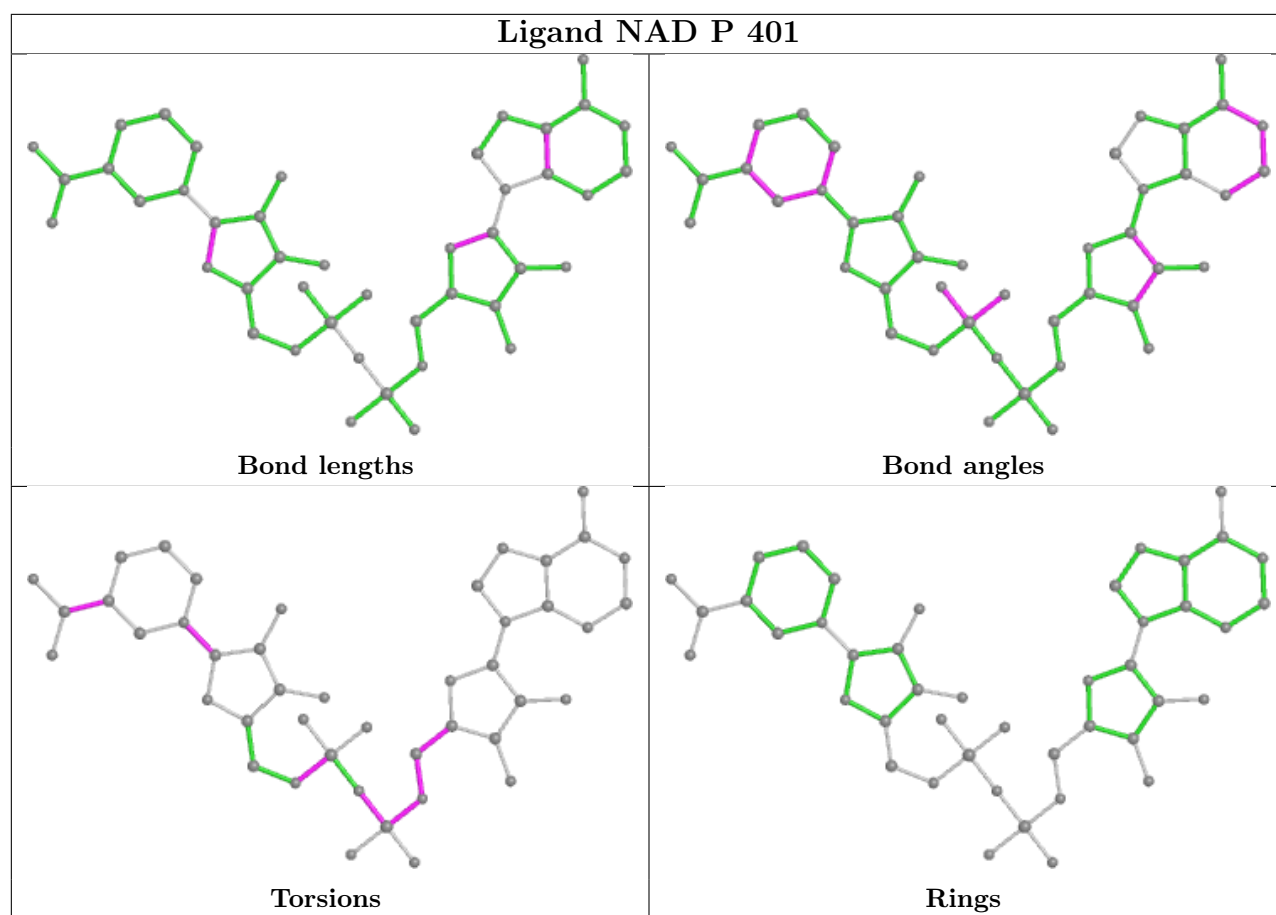
## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

# 6 Fit of model and data ⓘ

## 6.1 Protein, DNA and RNA chains ⓘ

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

| Mol | Chain | Analysed | <RSRZ> | #RSRZ>2 | | | OWAB(Å²) | Q<0.9 |
|-----|-------|----------|--------|---------|------|------|----------|-------|
| 1 | A | 330/355 (92%) | -0.40 | 3 (0%) | 84 | 84 | 35, 59, 92, 123 | 0 |
| 1 | B | 331/355 (93%) | -0.45 | 3 (0%) | 84 | 84 | 36, 58, 93, 134 | 0 |
| 1 | C | 330/355 (92%) | -0.52 | 2 (0%) | 89 | 89 | 30, 47, 80, 126 | 0 |
| 1 | K | 330/355 (92%) | -0.42 | 5 (1%) | 73 | 72 | 34, 59, 93, 116 | 0 |
| 1 | N | 330/355 (92%) | 0.17 | 16 (4%) | 30 | 26 | 54, 97, 150, 182 | 0 |
| 2 | D | 331/355 (93%) | -0.29 | 3 (0%) | 84 | 84 | 27, 65, 97, 153 | 1 (0%) |
| 2 | L | 331/355 (93%) | 0.06 | 14 (4%) | 36 | 31 | 43, 97, 163, 193 | 0 |
| 3 | E | 329/355 (92%) | -0.36 | 10 (3%) | 50 | 45 | 39, 62, 115, 160 | 0 |
| 4 | F | 329/355 (92%) | 0.08 | 14 (4%) | 35 | 30 | 45, 86, 124, 159 | 0 |
| 4 | J | 328/355 (92%) | -0.26 | 2 (0%) | 89 | 89 | 35, 80, 126, 158 | 0 |
| 4 | O | 329/355 (92%) | -0.31 | 3 (0%) | 84 | 84 | 42, 66, 106, 126 | 0 |
| 5 | G | 329/355 (92%) | -0.38 | 3 (0%) | 84 | 84 | 40, 63, 102, 133 | 0 |
| 6 | H | 328/355 (92%) | -0.29 | 3 (0%) | 84 | 84 | 43, 70, 102, 134 | 0 |
| 7 | I | 327/355 (92%) | -0.26 | 3 (0%) | 84 | 84 | 34, 80, 123, 158 | 0 |
| 8 | M | 330/355 (92%) | -0.42 | 1 (0%) | 94 | 94 | 40, 59, 98, 129 | 0 |
| 9 | P | 327/355 (92%) | -0.16 | 9 (2%) | 53 | 48 | 45, 83, 123, 159 | 0 |
| All | All | 5269/5680 (92%) | -0.26 | 94 (1%) | 68 | 66 | 27, 69, 124, 193 | 1 (0%) |

The worst 5 of 94 RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 3 | E | 62 | ASP | 6.1 |
| 9 | P | 82 | ASN | 5.9 |
| 1 | N | 124 | LYS | 4.8 |
| 1 | K | 191[A] | HIS | 4.5 |
| 1 | N | 2 | THR | 4.4 |

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

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

| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors($\text{Å}^2$) | Q<0.9 |
|---|---|---|---|---|---|---|---|---|
| 4 | ALY | J | 257 | 12/13 | 0.88 | 0.17 | 88,97,100,100 | 0 |
| 9 | ALY | P | 249 | 12/13 | 0.88 | 0.33 | 98,125,137,140 | 0 |
| 1 | ALY | N | 46 | 12/13 | 0.90 | 0.23 | 59,65,74,75 | 0 |
| 4 | ALY | F | 257 | 12/13 | 0.92 | 0.17 | 56,79,84,84 | 0 |
| 6 | SCY | H | 150 | 9/10 | 0.92 | 0.38 | 58,73,109,115 | 0 |
| 7 | ALY | I | 249 | 12/13 | 0.92 | 0.25 | 107,139,150,153 | 0 |
| 3 | ALY | E | 249 | 12/13 | 0.93 | 0.25 | 60,78,121,128 | 0 |
| 1 | ALY | K | 46 | 12/13 | 0.93 | 0.24 | 54,62,68,71 | 0 |
| 6 | ALY | H | 257 | 12/13 | 0.93 | 0.20 | 70,75,80,85 | 0 |
| 9 | SCY | P | 150 | 9/10 | 0.93 | 0.23 | 68,81,91,105 | 0 |
| 5 | ALY | G | 46 | 12/13 | 0.93 | 0.16 | 56,63,75,75 | 0 |
| 8 | ALY | M | 257 | 12/13 | 0.94 | 0.16 | 55,61,82,86 | 0 |
| 7 | ALY | I | 257 | 12/13 | 0.94 | 0.19 | 80,94,97,97 | 0 |
| 4 | ALY | O | 46 | 12/13 | 0.94 | 0.19 | 63,70,90,91 | 0 |
| 4 | ALY | O | 257 | 12/13 | 0.94 | 0.23 | 61,67,88,91 | 0 |
| 7 | ALY | I | 46 | 12/13 | 0.94 | 0.19 | 49,59,62,63 | 0 |
| 5 | SCY | G | 150 | 9/10 | 0.94 | 0.30 | 52,58,94,96 | 0 |
| 1 | ALY | A | 46 | 12/13 | 0.95 | 0.14 | 55,60,66,67 | 0 |
| 6 | ALY | H | 46 | 12/13 | 0.95 | 0.19 | 41,48,56,58 | 0 |
| 4 | ALY | F | 46 | 12/13 | 0.95 | 0.13 | 58,66,79,79 | 0 |
| 9 | ALY | P | 46 | 12/13 | 0.95 | 0.24 | 46,51,60,66 | 0 |
| 1 | ALY | C | 46 | 12/13 | 0.95 | 0.16 | 35,42,49,52 | 0 |
| 3 | ALY | E | 46 | 12/13 | 0.95 | 0.23 | 53,65,80,84 | 0 |
| 4 | ALY | J | 46 | 12/13 | 0.96 | 0.13 | 35,49,57,60 | 0 |
| 1 | ALY | B | 46 | 12/13 | 0.96 | 0.17 | 34,39,55,60 | 0 |

## 6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

## 6.4 Ligands ⓘ

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

| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å²) | Q<0.9 |
|---|---|---|---|---|---|---|---|---|
| 15 | ACT | H | 404 | 4/4 | 0.66 | 0.37 | 65,67,79,80 | 4 |
| 10 | NA | N | 401 | 1/1 | 0.71 | 0.09 | 89,89,89,89 | 0 |
| 10 | NA | G | 401 | 1/1 | 0.73 | 0.11 | 78,78,78,78 | 0 |
| 12 | PO4 | J | 404 | 5/5 | 0.75 | 0.23 | 40,42,49,65 | 5 |
| 12 | PO4 | F | 402 | 5/5 | 0.75 | 0.28 | 49,52,67,76 | 5 |
| 12 | PO4 | A | 408 | 5/5 | 0.77 | 0.31 | 45,48,51,75 | 5 |
| 11 | CL | C | 407 | 1/1 | 0.78 | 0.28 | 54,54,54,54 | 1 |
| 12 | PO4 | H | 403 | 5/5 | 0.79 | 0.19 | 53,56,60,80 | 5 |
| 12 | PO4 | P | 405 | 5/5 | 0.81 | 0.22 | 45,52,58,76 | 5 |
| 10 | NA | E | 402 | 1/1 | 0.81 | 0.16 | 79,79,79,79 | 0 |
| 11 | CL | A | 404 | 1/1 | 0.82 | 0.28 | 91,91,91,91 | 0 |
| 14 | NAD | K | 401 | 44/44 | 0.82 | 0.34 | 38,53,63,66 | 44 |
| 11 | CL | K | 407 | 1/1 | 0.82 | 0.15 | 38,38,38,38 | 1 |
| 16 | PGE | H | 405 | 10/10 | 0.82 | 0.45 | 77,98,114,121 | 0 |
| 13 | POP | G | 406 | 9/9 | 0.83 | 0.51 | 37,49,59,68 | 9 |
| 11 | CL | B | 405 | 1/1 | 0.83 | 0.16 | 82,82,82,82 | 0 |
| 12 | PO4 | P | 404 | 5/5 | 0.83 | 0.41 | 43,45,46,69 | 5 |
| 11 | CL | D | 404 | 1/1 | 0.83 | 0.20 | 70,70,70,70 | 0 |
| 18 | PG4 | J | 405 | 13/13 | 0.83 | 0.30 | 79,101,107,118 | 0 |
| 12 | PO4 | E | 408 | 5/5 | 0.84 | 0.17 | 49,68,77,104 | 5 |
| 14 | NAD | C | 401 | 44/44 | 0.84 | 0.27 | 52,86,101,113 | 0 |
| 11 | CL | K | 408 | 1/1 | 0.84 | 0.11 | 86,86,86,86 | 0 |
| 14 | NAD | O | 401 | 44/44 | 0.85 | 0.37 | 34,58,85,88 | 44 |
| 13 | POP | J | 406 | 9/9 | 0.85 | 0.30 | 28,40,44,48 | 9 |
| 12 | PO4 | I | 405 | 5/5 | 0.85 | 0.15 | 32,39,46,66 | 5 |
| 12 | PO4 | J | 403 | 5/5 | 0.85 | 0.15 | 52,58,65,92 | 5 |
| 19 | UVW | M | 404 | 8/8 | 0.85 | 0.23 | 83,101,127,139 | 0 |
| 14 | NAD | D | 401 | 44/44 | 0.86 | 0.34 | 40,56,69,76 | 44 |
| 13 | POP | B | 410 | 9/9 | 0.87 | 0.27 | 54,91,117,118 | 0 |
| 14 | NAD | E | 401 | 44/44 | 0.87 | 0.43 | 38,55,72,83 | 44 |
| 13 | POP | M | 405 | 9/9 | 0.87 | 0.35 | 30,41,54,56 | 9 |
| 13 | POP | A | 409 | 9/9 | 0.87 | 0.30 | 31,41,46,47 | 9 |
| 11 | CL | C | 405 | 1/1 | 0.88 | 0.14 | 70,70,70,70 | 0 |
| 10 | NA | M | 401 | 1/1 | 0.88 | 0.10 | 85,85,85,85 | 0 |
| 14 | NAD | P | 401 | 44/44 | 0.88 | 0.34 | 34,51,58,62 | 44 |
| 12 | PO4 | A | 406 | 5/5 | 0.88 | 0.15 | 62,75,83,121 | 0 |
| 10 | NA | I | 402 | 1/1 | 0.88 | 0.08 | 91,91,91,91 | 0 |
| 11 | CL | G | 402 | 1/1 | 0.88 | 0.26 | 87,87,87,87 | 0 |
| 14 | NAD | I | 401 | 44/44 | 0.88 | 0.39 | 32,49,62,69 | 44 |
| 11 | CL | D | 407 | 1/1 | 0.89 | 0.08 | 66,66,66,66 | 0 |
| 11 | CL | A | 402 | 1/1 | 0.89 | 0.14 | 66,66,66,66 | 0 |
| 11 | CL | A | 405 | 1/1 | 0.90 | 0.22 | 70,70,70,70 | 0 |
| 11 | CL | J | 402 | 1/1 | 0.90 | 0.13 | 69,69,69,69 | 0 |

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| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å$^2$) | Q<0.9 |
|-----|------|-------|-----|-------|------|-----|-------------------|-------|
| 11 | CL | D | 406 | 1/1 | 0.91 | 0.12 | 71,71,71,71 | 0 |
| 10 | NA | H | 401 | 1/1 | 0.91 | 0.15 | 69,69,69,69 | 0 |
| 11 | CL | L | 401 | 1/1 | 0.91 | 0.12 | 53,53,53,53 | 0 |
| 11 | CL | M | 402 | 1/1 | 0.91 | 0.08 | 57,57,57,57 | 0 |
| 12 | PO4 | L | 402 | 5/5 | 0.91 | 0.12 | 44,53,61,73 | 5 |
| 11 | CL | O | 403 | 1/1 | 0.91 | 0.09 | 61,61,61,61 | 0 |
| 11 | CL | B | 407 | 1/1 | 0.91 | 0.27 | 81,81,81,81 | 0 |
| 11 | CL | G | 403 | 1/1 | 0.91 | 0.09 | 74,74,74,74 | 0 |
| 12 | PO4 | B | 409 | 5/5 | 0.91 | 0.22 | 27,34,38,38 | 5 |
| 13 | POP | F | 403 | 9/9 | 0.91 | 0.46 | 41,57,65,74 | 9 |
| 17 | PEG | H | 406 | 7/7 | 0.91 | 0.20 | 80,97,114,116 | 0 |
| 11 | CL | J | 401 | 1/1 | 0.91 | 0.09 | 67,67,67,67 | 0 |
| 11 | CL | B | 408 | 1/1 | 0.91 | 0.12 | 67,67,67,67 | 0 |
| 10 | NA | A | 401 | 1/1 | 0.92 | 0.11 | 54,54,54,54 | 0 |
| 11 | CL | H | 402 | 1/1 | 0.92 | 0.26 | 76,76,76,76 | 0 |
| 10 | NA | D | 402 | 1/1 | 0.92 | 0.11 | 65,65,65,65 | 0 |
| 11 | CL | I | 403 | 1/1 | 0.93 | 0.08 | 88,88,88,88 | 0 |
| 10 | NA | C | 402 | 1/1 | 0.93 | 0.11 | 67,67,67,67 | 0 |
| 12 | PO4 | D | 408 | 5/5 | 0.93 | 0.47 | 24,24,34,51 | 5 |
| 11 | CL | P | 403 | 1/1 | 0.93 | 0.09 | 59,59,59,59 | 0 |
| 11 | CL | D | 403 | 1/1 | 0.93 | 0.10 | 71,71,71,71 | 0 |
| 10 | NA | B | 401 | 1/1 | 0.94 | 0.08 | 53,53,53,53 | 0 |
| 12 | PO4 | D | 409 | 5/5 | 0.95 | 0.52 | 62,75,97,102 | 0 |
| 11 | CL | K | 406 | 1/1 | 0.95 | 0.07 | 70,70,70,70 | 0 |
| 11 | CL | E | 403 | 1/1 | 0.95 | 0.09 | 60,60,60,60 | 0 |
| 11 | CL | F | 401 | 1/1 | 0.95 | 0.12 | 79,79,79,79 | 0 |
| 10 | NA | K | 402 | 1/1 | 0.95 | 0.07 | 59,59,59,59 | 0 |
| 11 | CL | D | 405 | 1/1 | 0.95 | 0.09 | 73,73,73,73 | 0 |
| 11 | CL | N | 402 | 1/1 | 0.95 | 0.12 | 65,65,65,65 | 0 |
| 11 | CL | O | 402 | 1/1 | 0.96 | 0.22 | 93,93,93,93 | 0 |
| 11 | CL | E | 404 | 1/1 | 0.96 | 0.07 | 73,73,73,73 | 0 |
| 11 | CL | C | 404 | 1/1 | 0.96 | 0.06 | 57,57,57,57 | 0 |
| 11 | CL | K | 405 | 1/1 | 0.96 | 0.06 | 59,59,59,59 | 0 |
| 12 | PO4 | A | 407 | 5/5 | 0.96 | 0.21 | 36,39,67,71 | 5 |
| 11 | CL | A | 403 | 1/1 | 0.96 | 0.07 | 71,71,71,71 | 0 |
| 11 | CL | C | 406 | 1/1 | 0.96 | 0.06 | 46,46,46,46 | 0 |
| 11 | CL | G | 404 | 1/1 | 0.96 | 0.07 | 75,75,75,75 | 0 |
| 11 | CL | B | 403 | 1/1 | 0.96 | 0.08 | 51,51,51,51 | 0 |
| 11 | CL | B | 404 | 1/1 | 0.96 | 0.10 | 71,71,71,71 | 0 |
| 11 | CL | M | 403 | 1/1 | 0.96 | 0.06 | 68,68,68,68 | 0 |
| 11 | CL | I | 404 | 1/1 | 0.96 | 0.08 | 67,67,67,67 | 0 |
| 11 | CL | E | 407 | 1/1 | 0.97 | 0.14 | 73,73,73,73 | 0 |

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| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å²) | Q<0.9 |
|-----|------|-------|-----|-------|------|-----|---------------|-------|
| 11 | CL | B | 406 | 1/1 | 0.97 | 0.09 | 80,80,80,80 | 0 |
| 11 | CL | K | 403 | 1/1 | 0.97 | 0.14 | 64,64,64,64 | 0 |
| 11 | CL | K | 404 | 1/1 | 0.97 | 0.06 | 51,51,51,51 | 0 |
| 11 | CL | P | 402 | 1/1 | 0.98 | 0.04 | 57,57,57,57 | 0 |
| 10 | NA | B | 402 | 1/1 | 0.98 | 0.52 | 71,71,71,71 | 0 |
| 11 | CL | E | 405 | 1/1 | 0.98 | 0.12 | 79,79,79,79 | 0 |
| 11 | CL | G | 405 | 1/1 | 0.98 | 0.08 | 46,46,46,46 | 0 |
| 11 | CL | E | 406 | 1/1 | 0.98 | 0.05 | 40,40,40,40 | 0 |
| 11 | CL | C | 403 | 1/1 | 1.00 | 0.07 | 52,52,52,52 | 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 NAD K 401:**

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative) and green (positive)
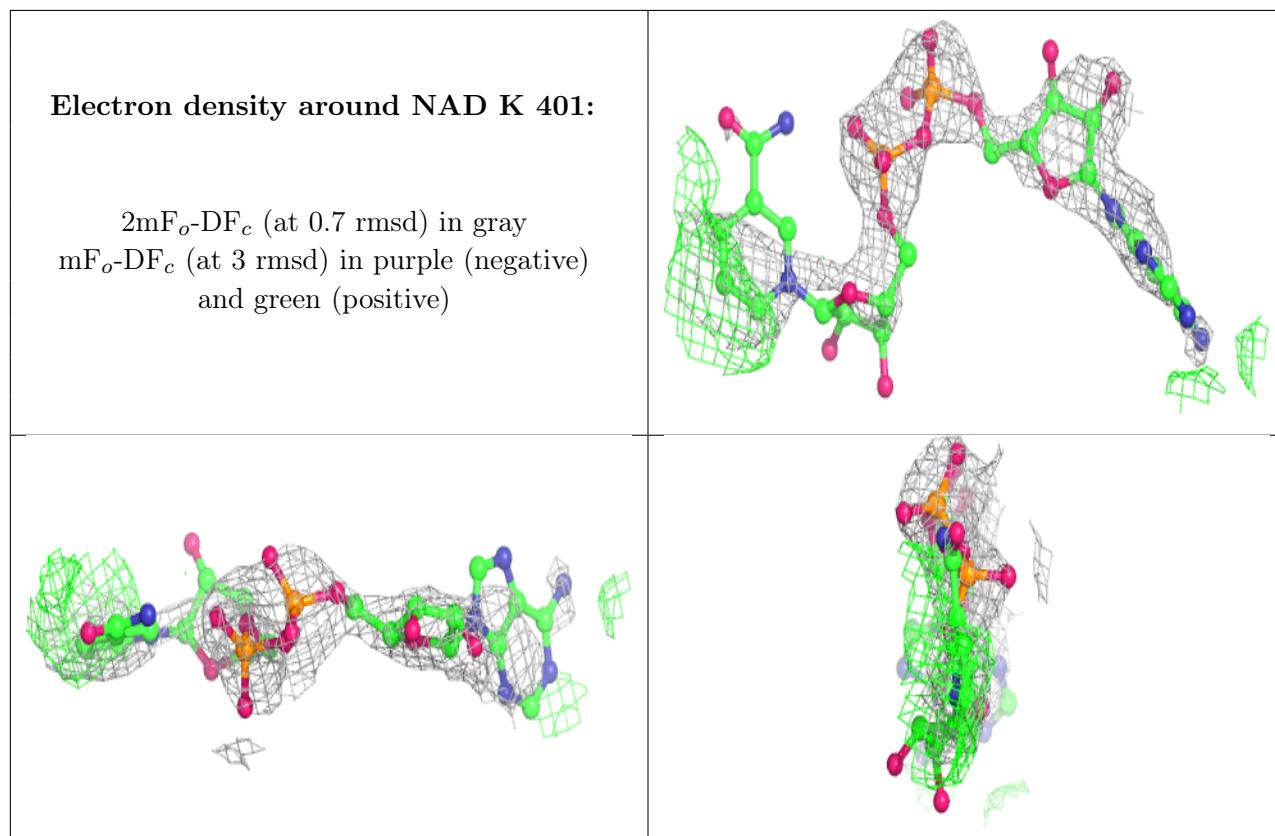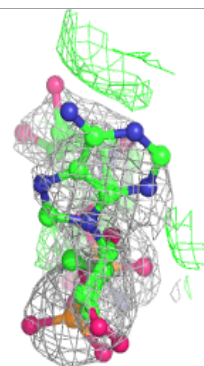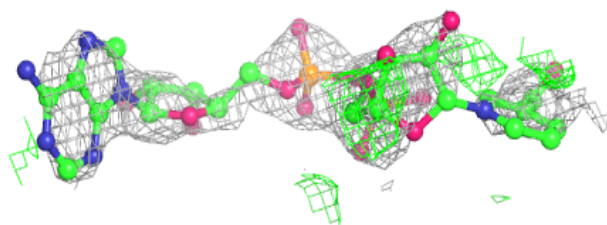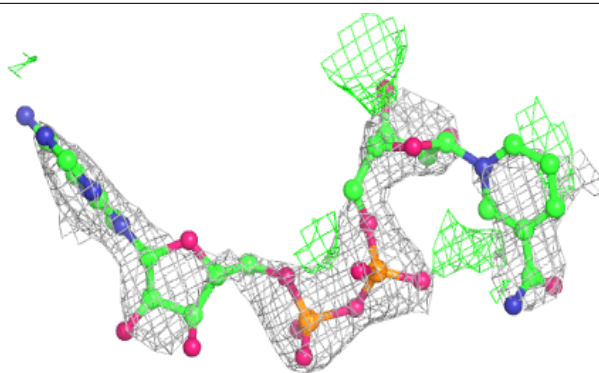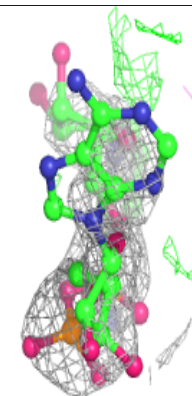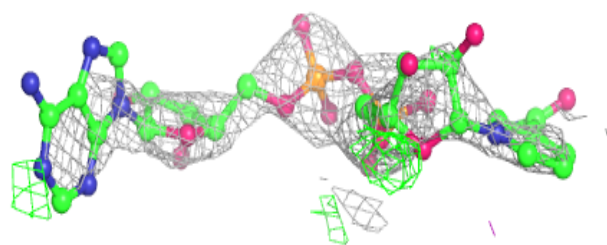
**Electron density around NAD C 401:**

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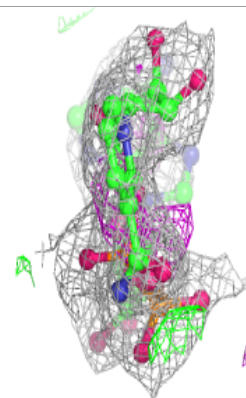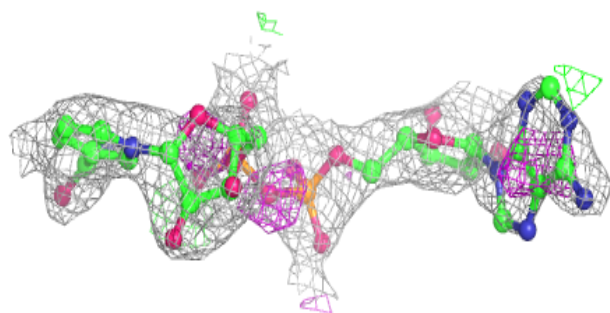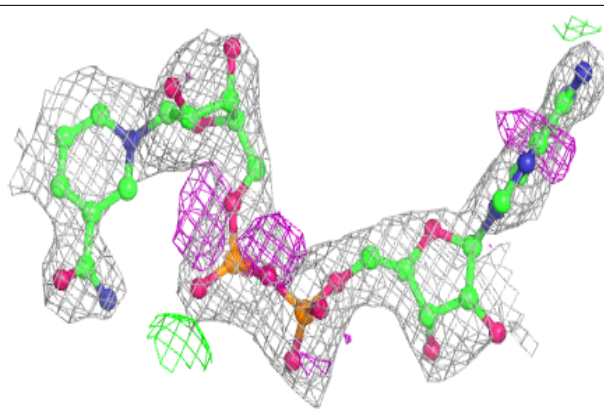


**Electron density around NAD O 401:**

$2mF_o$-$DF_c$ (at 0.7 rmsd) in gray
$mF_o$-$DF_c$ (at 3 rmsd) in purple (negative)
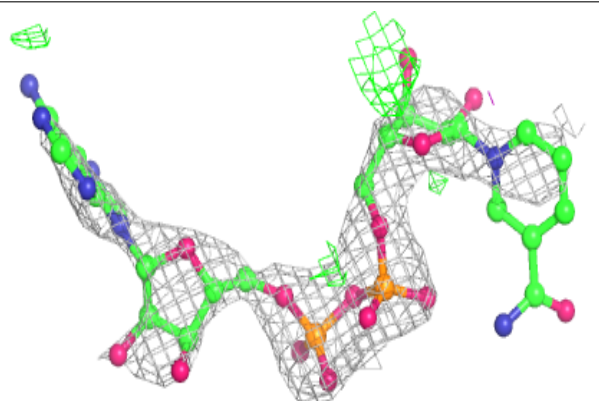and green (positive)
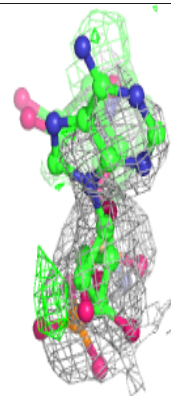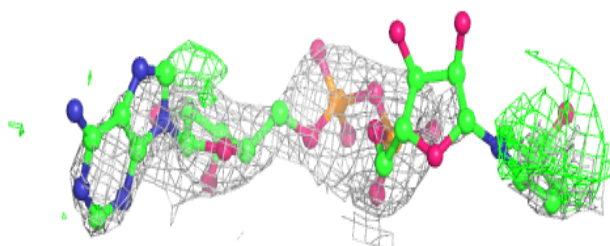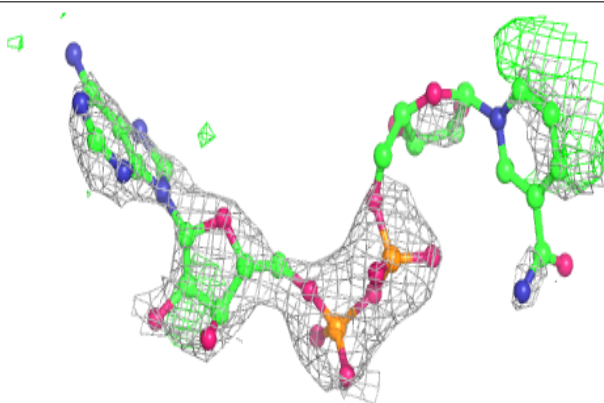
**Electron density around NAD D 401:**

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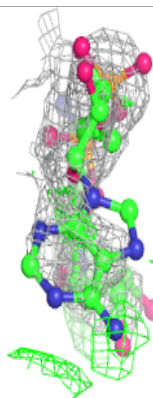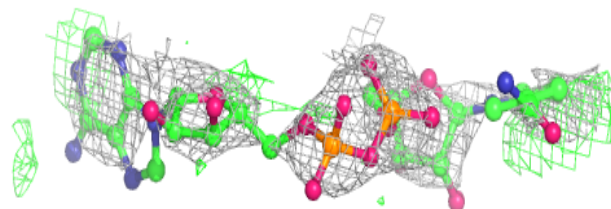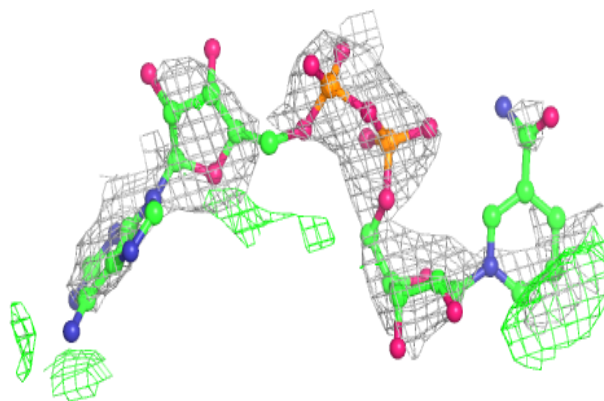


**Electron density around NAD E 401:**

$2mF_o$-$DF_c$ (at 0.7 rmsd) in gray
$mF_o$-$DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
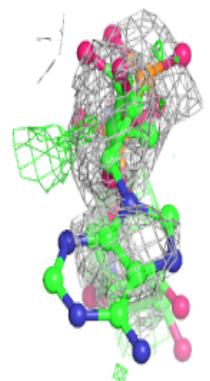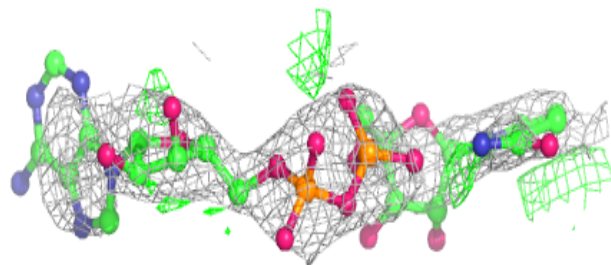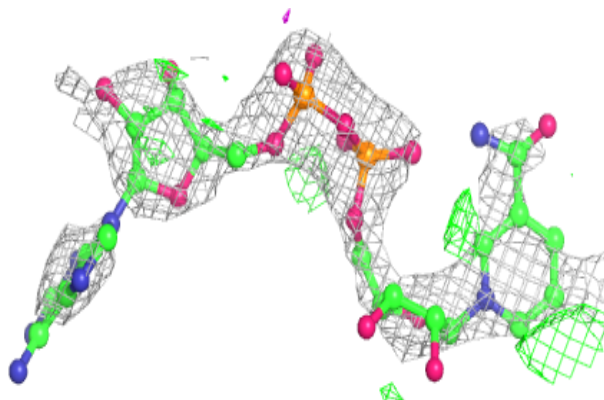
**Electron density around NAD P 401:**

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



**Electron density around NAD I 401:**

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

## 6.5 Other polymers ⓘ

There are no such residues in this entry.