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

Nov 7, 2023 – 01:53 PM EST

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|---|---|---|
| PDB ID | : | 2QUJ |
| Title | : | Crystal structures of human tryptophanyl-tRNA synthetase in complex with TrpAMP |
| Authors | : | Shen, N.; Ding, J.P. |
| Deposited on | : | 2007-08-05 |
| Resolution | : | 2.42 Å(reported) |

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

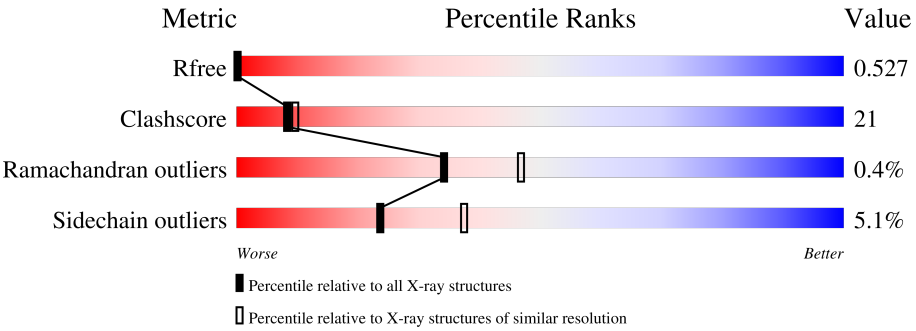
| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.36 |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac | : | 5.8.0158 |
| CCP4 | : | 7.0.044 (Gargrove) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.36 |

# 1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.42 Å.

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




| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|---|---|---|
| $R_{free}$ | 130704 | 4647 (2.44-2.40) |
| Clashscore | 141614 | 5161 (2.44-2.40) |
| Ramachandran outliers | 138981 | 5073 (2.44-2.40) |
| Sidechain outliers | 138945 | 5074 (2.44-2.40) |

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%

| Mol | Chain | Length | Quality of chain |
|---|---|---|---|
| 1 | A | 477 | . 75% . 19% |
| 1 | B | 477 | 13% 63% . 21% |

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 |
|---|---|---|---|---|---|---|---|
| 2 | CL | A | 802 | - | - | X | - |
| 2 | CL | A | 804 | - | - | X | - |
| 2 | CL | A | 805 | - | - | X | - |

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| Mol | Type | Chain | Res | Chirality | Geometry | Clashes | Electron density |
|---|---|---|---|---|---|---|---|
| 2 | CL | A | 807 | - | - | X | - |
| 2 | CL | B | 808 | - | - | X | - |
| 4 | GOL | A | 813 | - | X | X | - |
| 4 | GOL | A | 814 | - | X | X | - |
| 4 | GOL | B | 812 | - | X | X | - |
| 4 | GOL | B | 815 | - | X | X | - |
| 5 | TRP | B | 817 | - | - | X | - |

# 2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 6422 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 Tryptophanyl-tRNA synthetase.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 388 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 3106 | 1988 | 533 | 570 | 15 | | | |
| 1 | B | 378 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 3033 | 1947 | 511 | 560 | 15 | | | |

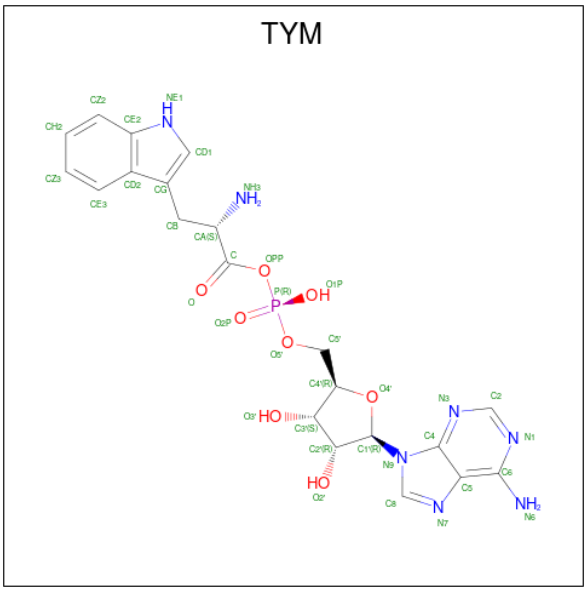
There are 12 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|---|---|---|---|---|---|
| A | 472 | HIS | - | expression tag | UNP P23381 |
| A | 473 | HIS | - | expression tag | UNP P23381 |
| A | 474 | HIS | - | expression tag | UNP P23381 |
| A | 475 | HIS | - | expression tag | UNP P23381 |
| A | 476 | HIS | - | expression tag | UNP P23381 |
| A | 477 | HIS | - | expression tag | UNP P23381 |
| B | 472 | HIS | - | expression tag | UNP P23381 |
| B | 473 | HIS | - | expression tag | UNP P23381 |
| B | 474 | HIS | - | expression tag | UNP P23381 |
| B | 475 | HIS | - | expression tag | UNP P23381 |
| B | 476 | HIS | - | expression tag | UNP P23381 |
| B | 477 | HIS | - | expression tag | UNP P23381 |

- Molecule 2 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

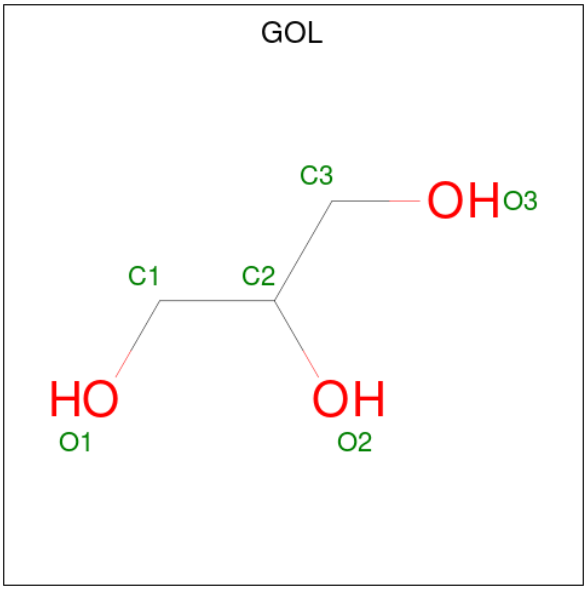
| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 2 | A | 5 | Total | Cl | 0 | 0 |
| | | | 5 | 5 | | |
| 2 | B | 4 | Total | Cl | 0 | 0 |
| | | | 4 | 4 | | |

- Molecule 3 is TRYPTOPHANYL-5'AMP (three-letter code: TYM) (formula: $C_{21}H_{24}N_7O_8P$).




| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|---|
| 3 | A | 1 | Total | C | N | O | P | 0 | 0 |
| | | | 37 | 21 | 7 | 8 | 1 | | |

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).




| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|
| 4 | A | 1 | Total | C | O | | 0 | 0 |
| | | | 6 | 3 | 3 | | | |
| 4 | A | 1 | Total | C | O | | 0 | 0 |
| | | | 6 | 3 | 3 | | | |
| 4 | B | 1 | Total | C | O | | 0 | 0 |
| | | | 6 | 3 | 3 | | | |

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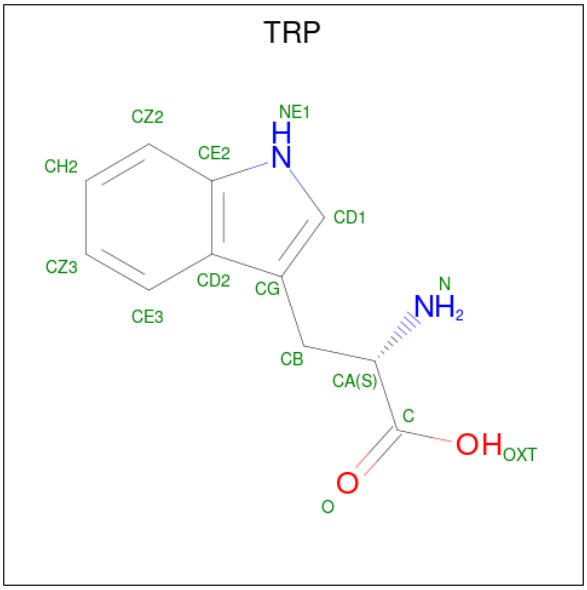
| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 4 | B | 1 | Total C O<br>6 3 3 | 0 | 0 |

- Molecule 5 is TRYPTOPHAN (three-letter code: TRP) (formula: $C_{11}H_{12}N_2O_2$).




| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 5 | B | 1 | Total C N O<br>15 11 2 2 | 0 | 0 |

- Molecule 6 is water.

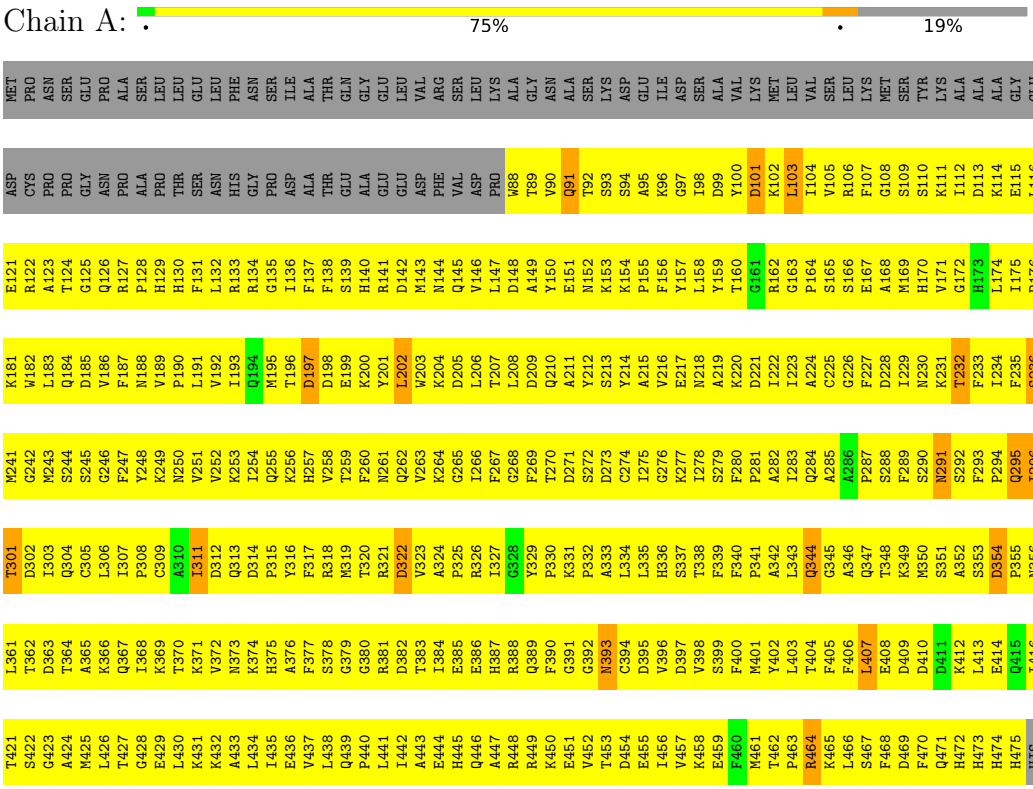
| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf |
|---|---|---|---|---|---|
| 6 | A | 98 | Total O<br>98 98 | 0 | 0 |
| 6 | B | 100 | Total O<br>100 100 | 0 | 0 |

# 3 Residue-property plots (i)

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

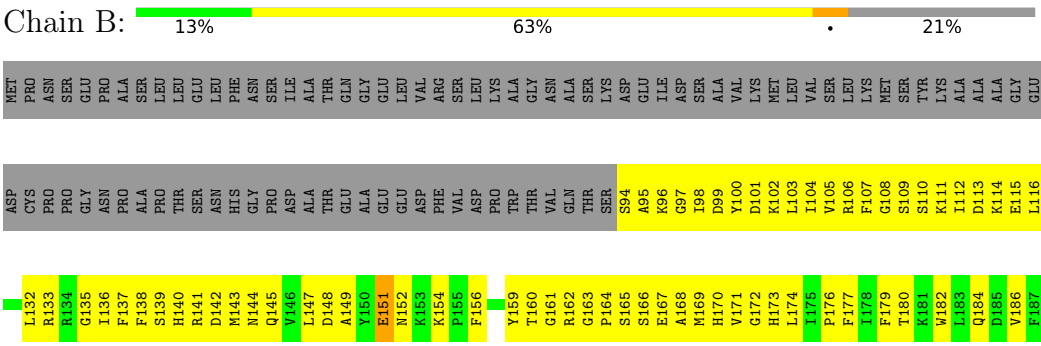
• Molecule 1: Tryptophanyl-tRNA synthetase

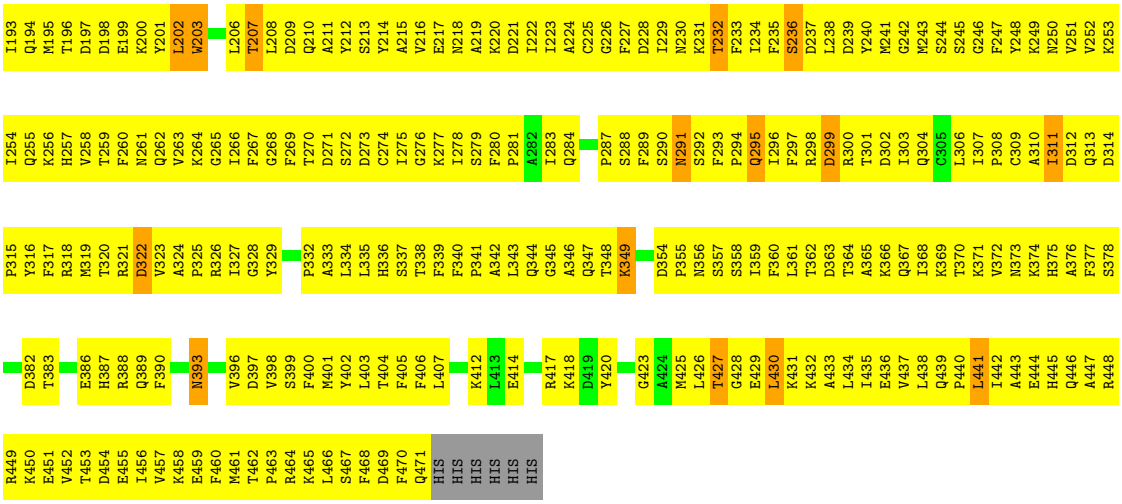
Chain A:




• Molecule 1: Tryptophanyl-tRNA synthetase

Chain B:




I193 Q194 M195 T196 D197 D198 E199 K200 Y201 L202 W203 L206 T207 L208 D209 Q210 A211 Y212 S213 Y214 A215 V216 E217 N218 A219 K220 D221 I222 I223 A224 C225 G226 F227 D228 I229 N230 K231 T232 F233 I234 F235 S236 D237 L238 D239 Y240 M241 G242 M243 S244 S245 G246 F247 Y248 K249 N250 V251 V252 K253
I264 Q255 K256 H257 V258 T259 F260 N261 Q262 V263 K264 G265 I266 F267 G268 F269 T270 D271 S272 D273 C274 I275 G276 K277 I278 S279 F280 P281 A282 I283 Q284 P287 S288 F289 S290 N291 S292 F293 P294 Q295 I296 F297 R298 D299 R300 T301 D302 I303 Q304 C305 L306 I307 P308 C309 A310 I311 D312 Q313 D314
P315 Y316 F317 R318 M319 T320 R321 D322 V323 A324 P325 R326 I327 G328 Y329 P332 A333 L334 L335 H336 S337 T338 F339 F340 P341 A342 L343 Q344 G345 A346 Q347 T348 K349 D354 P355 N356 S357 S358 I359 F360 L361 T362 D363 T364 A365 K366 Q367 I368 K369 T370 K371 V372 N373 K374 H375 A376 F377 S378
D382 T383 E386 H387 R388 Q389 F390 N393 V396 D397 V398 S399 F400 M401 Y402 L403 T404 F405 F406 L407 K412 L413 E414 R417 K418 D419 Y420 G423 A424 M425 L426 T427 G428 E429 L430 K431 K432 A433 L434 I435 E436 V437 L438 Q439 P440 L441 I442 A443 E444 H445 Q446 A447 R448
R449 K450 E451 V452 T453 D454 E455 I456 V457 K458 E459 F460 M461 T462 P463 R464 K465 L466 S467 F468 D469 F470 Q471 HIS HIS HIS HIS HIS HIS

# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | P 4 2 2 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 80.00Å 80.00Å 383.00Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 50.00 – 2.42<br>49.90 – 2.42 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 87.9 (50.00-2.42)<br>88.1 (49.90-2.42) | Depositor<br>EDS |
| $R_{merge}$ | 0.07 | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 3.70 (at 2.42Å) | Xtriage |
| Refinement program | CNS 1.1 | Depositor |
| R, $R_{free}$ | 0.214 , 0.238<br>0.515 , 0.527 | Depositor<br>DCC |
| $R_{free}$ test set | 2190 reflections (5.07%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 41.9 | Xtriage |
| Anisotropy | 0.507 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.27 , 42.3 | 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 | 0.52 | EDS |
| Total number of atoms | 6422 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 47.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.03% 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: CL, GOL, TYM

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 | 0.37 | 0/3184 | 0.60 | 0/4296 |
| 1 | B | 0.39 | 0/3107 | 0.61 | 0/4195 |
| All | All | 0.38 | 0/6291 | 0.61 | 0/8491 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 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 | 3106 | 0 | 3024 | 145 | 5477 |
| 1 | B | 3033 | 0 | 2971 | 120 | 3728 |
| 2 | A | 5 | 0 | 0 | 0 | 12 |
| 2 | B | 4 | 0 | 0 | 2 | 5 |
| 3 | A | 37 | 0 | 23 | 5 | 7 |
| 4 | A | 12 | 0 | 8 | 2 | 32 |
| 4 | B | 12 | 0 | 8 | 1 | 36 |
| 5 | B | 15 | 0 | 9 | 0 | 25 |
| 6 | A | 98 | 0 | 0 | 1 | 283 |
| 6 | B | 100 | 0 | 0 | 1 | 123 |
| All | All | 6422 | 0 | 6043 | 258 | 7242 |

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 21.

The worst 5 of 258 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:344:GLN:HE22 | 1:A:357:SER:HA | 1.12 | 1.08 |
| 1:B:95:ALA:HA | 1:B:347:GLN:HE21 | 1.19 | 1.06 |
| 1:B:207:THR:HG22 | 1:B:210:GLN:H | 1.18 | 1.05 |
| 1:A:250:ASN:HD21 | 1:A:291:ASN:ND2 | 1.57 | 1.01 |
| 1:A:250:ASN:HD21 | 1:A:291:ASN:HD21 | 1.18 | 0.88 |

The worst 5 of 7242 symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:102:LYS:C | 1:B:401:MET:C[3_675] | 0.07 | 2.13 |
| 1:A:112:ILE:CG1 | 1:A:275:ILE:N[8_664] | 0.10 | 2.10 |
| 1:A:117:ILE:C | 1:B:262:GLN:CA[8_664] | 0.13 | 2.07 |
| 1:A:157:TYR:C | 1:B:239:ASP:N[5_454] | 0.14 | 2.06 |
| 1:A:123:ALA:N | 1:B:177:PHE:CZ[5_454] | 0.19 | 2.01 |

## 5.3 Torsion angles (i)

### 5.3.1 Protein backbone (i)

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

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

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 1 | A | 386/477 (81%) | 370 (96%) | 15 (4%) | 1 (0%) | 41 | 54 |
| 1 | B | 376/477 (79%) | 362 (96%) | 12 (3%) | 2 (0%) | 29 | 40 |
| All | All | 762/954 (80%) | 732 (96%) | 27 (4%) | 3 (0%) | 34 | 47 |

All (3) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 91 | GLN |
| 1 | B | 299 | ASP |
| 1 | B | 467 | SER |

### 5.3.2 Protein sidechains (i)

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

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

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|---|---|---|---|---|---|---|
| 1 | A | 335/416 (80%) | 317 (95%) | 18 (5%) | 22 | 34 |
| 1 | B | 329/416 (79%) | 313 (95%) | 16 (5%) | 25 | 39 |
| All | All | 664/832 (80%) | 630 (95%) | 34 (5%) | 24 | 37 |

5 of 34 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 322 | ASP |
| 1 | B | 349 | LYS |
| 1 | B | 430 | LEU |
| 1 | A | 322 | ASP |
| 1 | A | 311 | ILE |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 27 such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 393 | ASN |
| 1 | B | 170 | HIS |
| 1 | B | 347 | GLN |
| 1 | B | 140 | HIS |
| 1 | B | 257 | HIS |

### 5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry (i)

Of 15 ligands modelled in this entry, 9 are monoatomic - leaving 6 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 | $\#\|Z\| > 2$ |
| 3 | TYM | A | 810 | - | 36,41,41 | 1.75 | 7 (19%) | 39,61,61 | 1.43 | 5 (12%) |
| 4 | GOL | B | 815 | - | 5,5,5 | 4.32 | 5 (100%) | 5,5,5 | 5.49 | 3 (60%) |
| 4 | GOL | B | 812 | - | 5,5,5 | 4.31 | 5 (100%) | 5,5,5 | 5.53 | 3 (60%) |
| 5 | TRP | B | 817 | - | 14,16,16 | 1.22 | 1 (7%) | 16,22,22 | 0.98 | 1 (6%) |
| 4 | GOL | A | 814 | - | 5,5,5 | 4.43 | 5 (100%) | 5,5,5 | 5.52 | 3 (60%) |
| 4 | GOL | A | 813 | - | 5,5,5 | 4.35 | 5 (100%) | 5,5,5 | 5.54 | 3 (60%) |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|---|---|---|---|---|---|---|---|
| 3 | TYM | A | 810 | - | - | 1/16/39/39 | 0/5/5/5 |
| 4 | GOL | B | 815 | - | - | 2/4/4/4 | - |
| 4 | GOL | B | 812 | - | - | 2/4/4/4 | - |
| 5 | TRP | B | 817 | - | - | 0/7/8/8 | 0/2/2/2 |
| 4 | GOL | A | 814 | - | - | 3/4/4/4 | - |
| 4 | GOL | A | 813 | - | - | 3/4/4/4 | - |

The worst 5 of 28 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 4 | A | 814 | GOL | C3-C2 | -7.46 | 1.21 | 1.51 |
| 4 | B | 812 | GOL | C3-C2 | -7.19 | 1.22 | 1.51 |
| 4 | B | 815 | GOL | C3-C2 | -7.17 | 1.22 | 1.51 |
| 4 | A | 813 | GOL | C3-C2 | -7.13 | 1.22 | 1.51 |
| 3 | A | 810 | TYM | P-OPP | 6.26 | 1.73 | 1.60 |

The worst 5 of 18 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 4 | A | 813 | GOL | O3-C3-C2 | 9.52 | 155.86 | 110.20 |
| 4 | B | 812 | GOL | O3-C3-C2 | 9.49 | 155.69 | 110.20 |
| 4 | A | 814 | GOL | O3-C3-C2 | 9.48 | 155.67 | 110.20 |
| 4 | B | 815 | GOL | O3-C3-C2 | 9.38 | 155.19 | 110.20 |
| 4 | B | 812 | GOL | O2-C2-C3 | 7.24 | 140.99 | 109.12 |

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|---|---|---|---|---|
| 4 | A | 813 | GOL | O1-C1-C2-C3 |
| 4 | A | 813 | GOL | C1-C2-C3-O3 |
| 4 | A | 814 | GOL | O1-C1-C2-C3 |
| 4 | A | 814 | GOL | C1-C2-C3-O3 |
| 4 | B | 812 | GOL | C1-C2-C3-O3 |

There are no ring outliers.

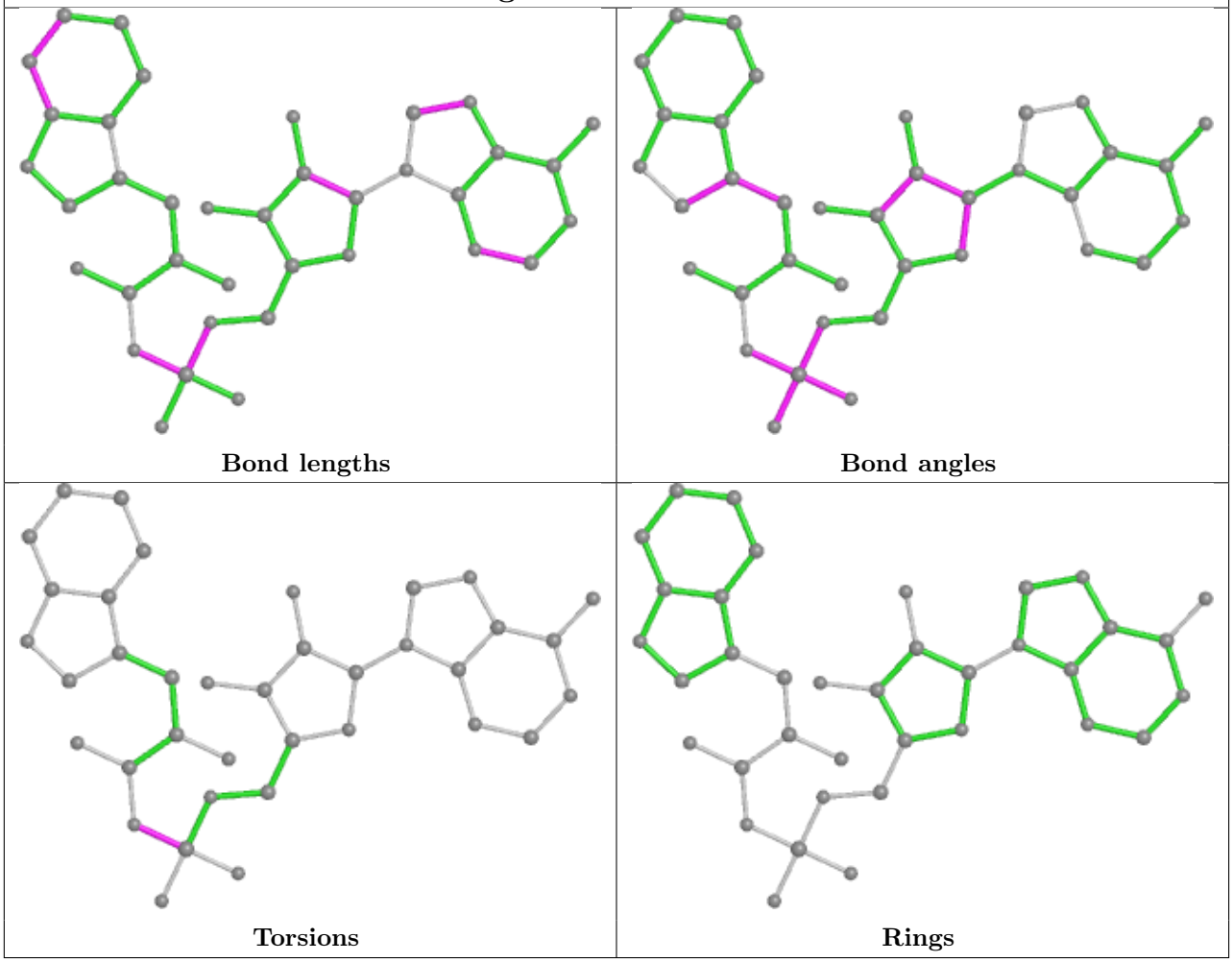
6 monomers are involved in 108 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|---|---|---|---|---|---|
| 3 | A | 810 | TYM | 5 | 7 |
| 4 | B | 815 | GOL | 1 | 3 |
| 4 | B | 812 | GOL | 0 | 33 |
| 5 | B | 817 | TRP | 0 | 25 |
| 4 | A | 814 | GOL | 2 | 28 |
| 4 | A | 813 | GOL | 0 | 4 |

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 TYM A 810**




## 5.7 Other polymers (i)

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

# 6 Fit of model and data

## 6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

## 6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

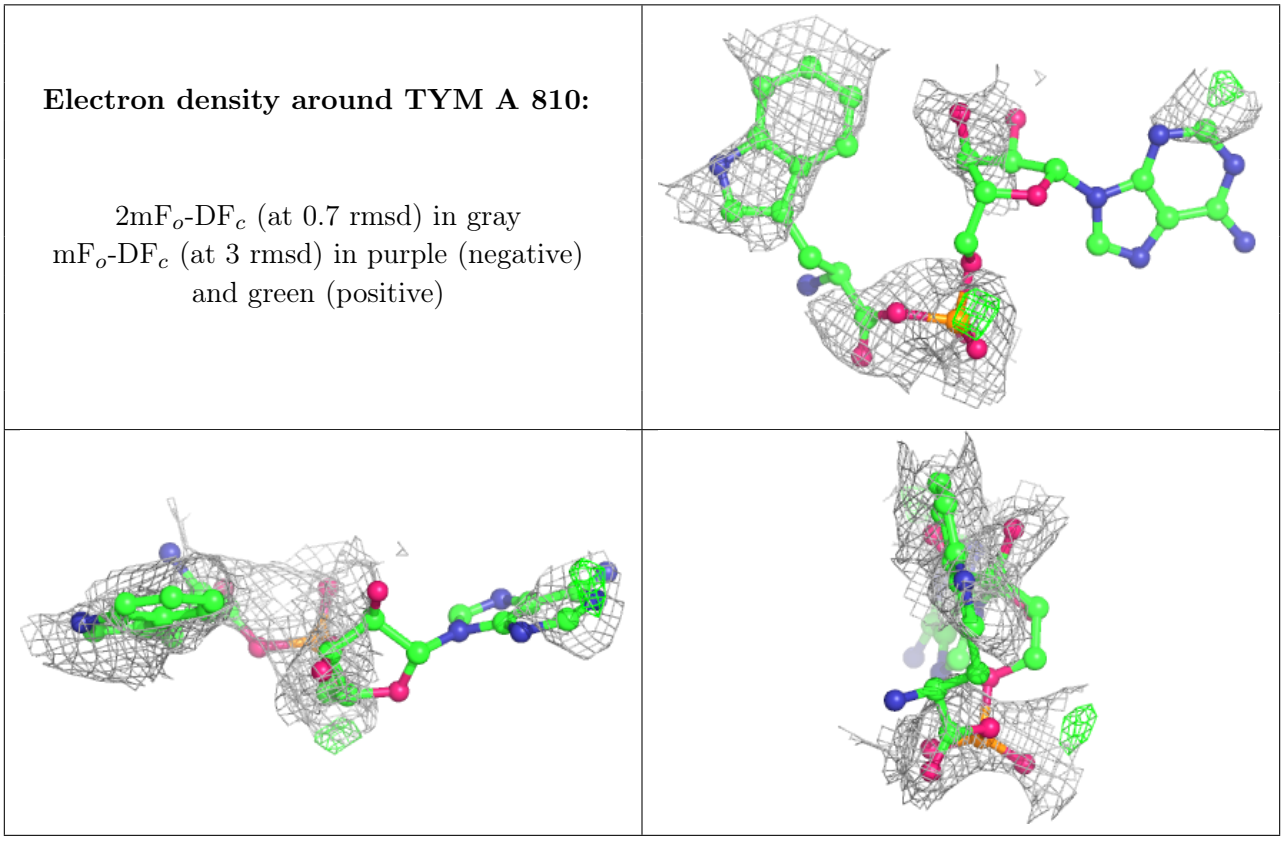
## 6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

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 TYM A 810:**

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



## 6.5 Other polymers (i)

Unable to reproduce the depositors R factor - this section is therefore empty.