



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 4, 2024 – 10:04 PM EST

PDB ID : 2DZN
Title : Crystal structure analysis of yeast Nas6p complexed with the proteasome subunit, rpt3
Authors : Yokoyama, S.; Padmanabhan, B.; RIKEN Structural Genomics/Proteomics Initiative (RSGI)
Deposited on : 2006-09-29
Resolution : 2.20 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 ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

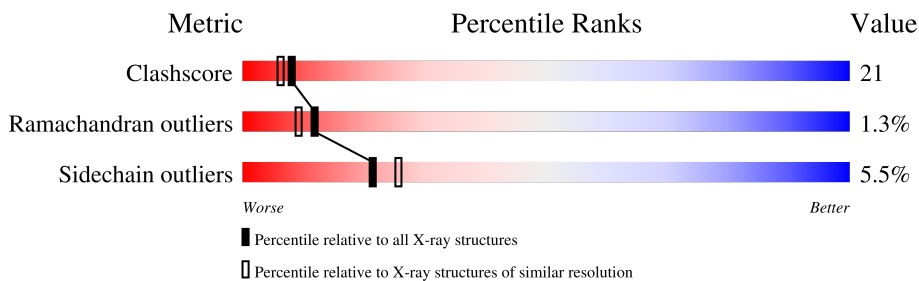
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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)) |
|-----------------------|-----------------------------|---|
| Clashscore | 141614 | 5594 (2.20-2.20) |
| Ramachandran outliers | 138981 | 5503 (2.20-2.20) |
| Sidechain outliers | 138945 | 5504 (2.20-2.20) |

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

Note EDS was not executed.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1 | A | 228 | 74% 21% .. |
| 1 | C | 228 | 71% 23% 5% |
| 1 | E | 228 | 71% 27% . |
| 2 | B | 82 | 40% 23% 6% 30% |
| 2 | D | 82 | 43% 30% 9% 18% |
| 2 | F | 82 | 43% 34% 6% . 16% |

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 7346 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 Probable 26S proteasome regulatory subunit p28.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|---------------|-----------|----------|----------|--------|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 1 | A | 226 | Total 1794 | C 1151 | N 305 | O 332 | S 6 | 0 | 0 | 0 |
| 1 | C | 227 | Total 1800 | C 1154 | N 306 | O 334 | S 6 | 0 | 0 | 0 |
| 1 | E | 227 | Total 1800 | C 1154 | N 306 | O 334 | S 6 | 0 | 0 | 0 |

- Molecule 2 is a protein called 26S protease regulatory subunit 6B homolog.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|--------------|----------|---------|----------|--------|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 2 | B | 57 | Total 434 | C 270 | N 76 | O 86 | S 2 | 0 | 0 | 0 |
| 2 | D | 67 | Total 515 | C 321 | N 92 | O 100 | S 2 | 0 | 0 | 0 |
| 2 | F | 69 | Total 531 | C 332 | N 95 | O 102 | S 2 | 0 | 0 | 0 |

There are 3 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|-----------------------|------------|
| B | 347 | MET | - | initiating methionine | UNP P33298 |
| D | 347 | MET | - | initiating methionine | UNP P33298 |
| F | 347 | MET | - | initiating methionine | UNP P33298 |

- Molecule 3 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|--------------|----------|---------|---------|
| 3 | A | 142 | Total 142 | O 142 | 0 | 0 |
| 3 | B | 27 | Total 27 | O 27 | 0 | 0 |

Continued on next page...

Continued from previous page...

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|------------|--------------|-----------------|--------------|----------|----------------|----------------|
| 3 | C | 132 | Total 132 | O 132 | 0 | 0 |
| 3 | D | 35 | Total 35 | O 35 | 0 | 0 |
| 3 | E | 125 | Total 125 | O 125 | 0 | 0 |
| 3 | F | 11 | Total 11 | O 11 | 0 | 0 |

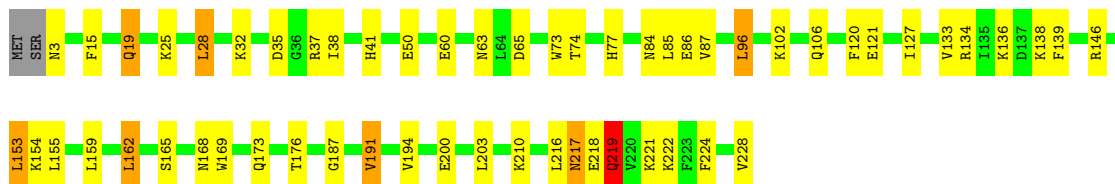
3 Residue-property plots [i](#)

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.

Note EDS was not executed.

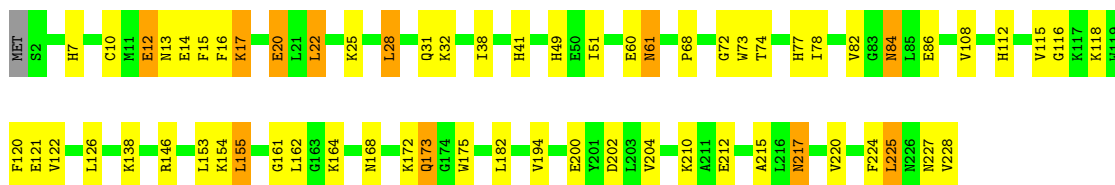
- Molecule 1: Probable 26S proteasome regulatory subunit p28

Chain A: 



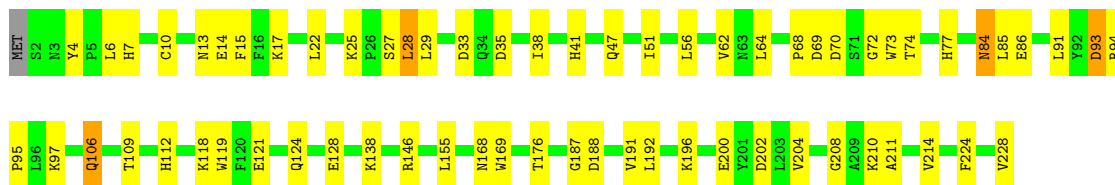
- Molecule 1: Probable 26S proteasome regulatory subunit p28

Chain C: 



- Molecule 1: Probable 26S proteasome regulatory subunit p28

Chain E: 



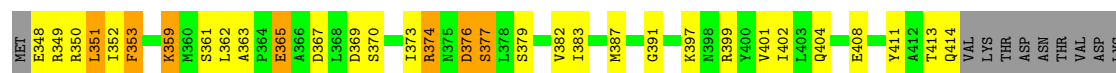
- Molecule 2: 26S protease regulatory subunit 6B homolog

Chain B: 



- Molecule 2: 26S protease regulatory subunit 6B homolog

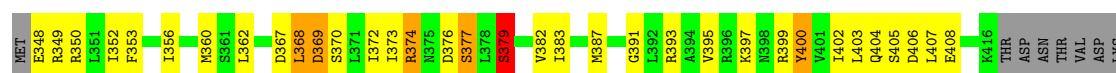
Chain D:  43% 30% 9% 18%



PHE
ASP
PHE
TYR
LYS

- Molecule 2: 26S protease regulatory subunit 6B homolog

Chain F:  43% 34% 6% 16%



PHE
ASP
PHE
TYR
LYS

4 Data and refinement statistics

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

| Property | Value | Source |
|--|---|-----------|
| Space group | P 1 21 1 | Depositor |
| Cell constants a, b, c, α , β , γ | 60.38Å 100.22Å 72.20Å 90.00° 94.70° 90.00° | Depositor |
| Resolution (Å) | 20.00 – 2.20 | Depositor |
| % Data completeness (in resolution range) | 98.1 (20.00-2.20) | Depositor |
| R_{merge} | 0.06 | Depositor |
| R_{sym} | (Not available) | Depositor |
| Refinement program | CNS 1.1 | Depositor |
| R, R_{free} | 0.197 , 0.265 | Depositor |
| Estimated twinning fraction | No twinning to report. | Xtrriage |
| Total number of atoms | 7346 | wwPDB-VP |
| Average B, all atoms (Å ²) | 38.0 | wwPDB-VP |

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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 | 0.48 | 0/1837 | 0.69 | 3/2488 (0.1%) |
| 1 | C | 0.46 | 0/1843 | 0.65 | 0/2496 |
| 1 | E | 0.43 | 0/1843 | 0.63 | 0/2496 |
| 2 | B | 0.41 | 0/436 | 0.68 | 0/588 |
| 2 | D | 0.43 | 0/518 | 0.75 | 1/697 (0.1%) |
| 2 | F | 0.38 | 0/534 | 0.66 | 1/718 (0.1%) |
| All | All | 0.44 | 0/7011 | 0.67 | 5/9483 (0.1%) |

There are no bond length outliers.

All (5) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|---------|-------|-------------|----------|
| 1 | A | 134 | ARG | N-CA-C | 7.38 | 130.93 | 111.00 |
| 2 | D | 376 | ASP | N-CA-C | 7.12 | 130.22 | 111.00 |
| 1 | A | 134 | ARG | N-CA-CB | -5.65 | 100.43 | 110.60 |
| 1 | A | 219 | GLN | N-CA-C | -5.48 | 96.20 | 111.00 |
| 2 | F | 379 | SER | N-CA-C | 5.47 | 125.77 | 111.00 |

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | A | 1794 | 0 | 1775 | 57 | 0 |
| 1 | C | 1800 | 0 | 1780 | 66 | 0 |

Continued on next page...

Continued from previous page...

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | E | 1800 | 0 | 1780 | 59 | 0 |
| 2 | B | 434 | 0 | 447 | 29 | 0 |
| 2 | D | 515 | 0 | 532 | 43 | 0 |
| 2 | F | 531 | 0 | 554 | 55 | 0 |
| 3 | A | 142 | 0 | 0 | 8 | 0 |
| 3 | B | 27 | 0 | 0 | 2 | 0 |
| 3 | C | 132 | 0 | 0 | 14 | 0 |
| 3 | D | 35 | 0 | 0 | 7 | 0 |
| 3 | E | 125 | 0 | 0 | 10 | 0 |
| 3 | F | 11 | 0 | 0 | 1 | 0 |
| All | All | 7346 | 0 | 6868 | 293 | 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 21.

The worst 5 of 293 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-----------------|--------------------------|-------------------|
| 2:F:349:ARG:NH2 | 2:F:377:SER:OG | 1.66 | 1.26 |
| 2:F:349:ARG:NE | 2:F:377:SER:HA | 1.46 | 1.26 |
| 2:F:349:ARG:CZ | 2:F:377:SER:HA | 1.81 | 1.09 |
| 2:B:367:ASP:H | 2:B:404:GLN:NE2 | 1.56 | 1.04 |
| 1:E:25:LYS:HE3 | 1:E:28:LEU:HD21 | 1.50 | 0.93 |

There are no symmetry-related clashes.

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 | 224/228 (98%) | 217 (97%) | 7 (3%) | 0 | 100 100 |
| 1 | C | 225/228 (99%) | 214 (95%) | 8 (4%) | 3 (1%) | 12 9 |

Continued on next page...

Continued from previous page...

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|-----|-------|---------------|-----------|---------|----------|-------------|----|
| 1 | E | 225/228 (99%) | 211 (94%) | 13 (6%) | 1 (0%) | 34 | 37 |
| 2 | B | 55/82 (67%) | 46 (84%) | 7 (13%) | 2 (4%) | 3 | 1 |
| 2 | D | 65/82 (79%) | 58 (89%) | 4 (6%) | 3 (5%) | 2 | 1 |
| 2 | F | 67/82 (82%) | 58 (87%) | 7 (10%) | 2 (3%) | 4 | 2 |
| All | All | 861/930 (93%) | 804 (93%) | 46 (5%) | 11 (1%) | 12 | 9 |

5 of 11 Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | B | 377 | SER |
| 2 | F | 374 | ARG |
| 2 | F | 379 | SER |
| 2 | B | 376 | ASP |
| 1 | C | 17 | LYS |

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 | 196/198 (99%) | 185 (94%) | 11 (6%) | 21 | 25 |
| 1 | C | 197/198 (100%) | 183 (93%) | 14 (7%) | 14 | 16 |
| 1 | E | 197/198 (100%) | 192 (98%) | 5 (2%) | 47 | 60 |
| 2 | B | 46/69 (67%) | 43 (94%) | 3 (6%) | 17 | 19 |
| 2 | D | 54/69 (78%) | 51 (94%) | 3 (6%) | 21 | 25 |
| 2 | F | 56/69 (81%) | 51 (91%) | 5 (9%) | 9 | 9 |
| All | All | 746/801 (93%) | 705 (94%) | 41 (6%) | 21 | 26 |

5 of 41 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | D | 353 | PHE |
| 1 | E | 106 | GLN |

Continued on next page...

Continued from previous page...

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | D | 359 | LYS |
| 1 | E | 28 | LEU |
| 2 | F | 369 | ASP |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 45 such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | D | 388 | GLN |
| 1 | E | 77 | HIS |
| 2 | D | 404 | GLN |
| 1 | E | 19 | GLN |
| 1 | E | 106 | GLN |

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.