



wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 26, 2021 – 10:06 pm BST

PDB ID : 7NPI
Title : Crystal structure of Mindy2 (C266A) in complex with Lys48-linked penta-ubiquitin (K48-Ub5)
Authors : Lange, S.M.; Armstrong, L.A.; Kulathu, Y.
Deposited on : 2021-02-26
Resolution : 2.81 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtrriage (Phenix) : 1.13
EDS : **FAILED**
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) : 2.23.2

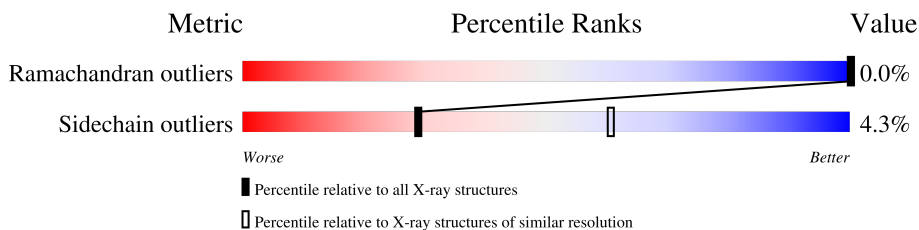
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.81 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)) |
|-----------------------|-----------------------------|---|
| Ramachandran outliers | 138981 | 3978 (2.84-2.80) |
| Sidechain outliers | 138945 | 3980 (2.84-2.80) |

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 failed to run properly.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1 | A | 273 | 93% . . |
| 1 | G | 273 | 91% 5% . . |
| 1 | M | 273 | 94% . . |
| 1 | S | 273 | 94% . . |
| 1 | Y | 273 | 92% . . |
| 1 | e | 273 | 91% 5% . |
| 1 | k | 273 | 93% . . |
| 2 | B | 76 | 93% . . |
| 2 | C | 76 | 100% |







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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 2 | D | 76 | 99% |
| 2 | E | 76 | 97% |
| 2 | F | 76 | 95% |
| 2 | H | 76 | 91% |
| 2 | I | 76 | 97% |
| 2 | J | 76 | 97% |
| 2 | K | 76 | 96% |
| 2 | L | 76 | 97% |
| 2 | N | 76 | 92% |
| 2 | O | 76 | 97% |
| 2 | P | 76 | 100% |
| 2 | Q | 76 | 91% |
| 2 | R | 76 | 95% |
| 2 | T | 76 | 93% |
| 2 | U | 76 | 100% |
| 2 | V | 76 | 100% |
| 2 | W | 76 | 88% |
| 2 | X | 76 | 95% |
| 2 | Z | 76 | 92% |
| 2 | a | 76 | 100% |
| 2 | b | 76 | 96% |
| 2 | c | 76 | 96% |
| 2 | d | 76 | 93% |
| 2 | f | 76 | 89% |
| 2 | g | 76 | 95% |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|--|
| 2 | h | 76 |  100% |
| 2 | i | 76 |  91% 5% . |
| 2 | j | 76 |  100% |
| 2 | l | 76 |  91% 5% . |
| 2 | m | 76 |  95% 5% |
| 2 | n | 76 |  95% . . |
| 2 | o | 76 |  88% 7% 5% |
| 2 | p | 76 |  99% . |

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 33767 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 Ubiquitin carboxyl-terminal hydrolase MINDY-2.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|---------|-------|
| | | | Total | C | N | O | S | | | |
| 1 | A | 262 | 2083 | 1335 | 337 | 398 | 13 | 0 | 0 | 0 |
| 1 | G | 262 | 2064 | 1322 | 335 | 394 | 13 | 0 | 0 | 0 |
| 1 | M | 263 | 2055 | 1316 | 331 | 395 | 13 | 0 | 0 | 0 |
| 1 | S | 263 | 2053 | 1315 | 328 | 398 | 12 | 12 | 0 | 0 |
| 1 | Y | 263 | 2072 | 1327 | 335 | 397 | 13 | 0 | 0 | 0 |
| 1 | e | 263 | 2062 | 1322 | 335 | 392 | 13 | 0 | 0 | 0 |
| 1 | k | 263 | 2077 | 1331 | 336 | 397 | 13 | 0 | 0 | 0 |

There are 70 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------------------|------------|
| A | 232 | GLY | - | expression tag | UNP Q8NBR6 |
| A | 233 | PRO | - | expression tag | UNP Q8NBR6 |
| A | 234 | LEU | - | expression tag | UNP Q8NBR6 |
| A | 235 | GLY | - | expression tag | UNP Q8NBR6 |
| A | 236 | SER | - | expression tag | UNP Q8NBR6 |
| A | 237 | PRO | - | expression tag | UNP Q8NBR6 |
| A | 238 | GLU | - | expression tag | UNP Q8NBR6 |
| A | 239 | PHE | - | expression tag | UNP Q8NBR6 |
| A | 240 | MET | - | expression tag | UNP Q8NBR6 |
| A | 266 | ALA | CYS | engineered mutation | UNP Q8NBR6 |
| G | 232 | GLY | - | expression tag | UNP Q8NBR6 |
| G | 233 | PRO | - | expression tag | UNP Q8NBR6 |
| G | 234 | LEU | - | expression tag | UNP Q8NBR6 |
| G | 235 | GLY | - | expression tag | UNP Q8NBR6 |
| G | 236 | SER | - | expression tag | UNP Q8NBR6 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------------------|------------|
| G | 237 | PRO | - | expression tag | UNP Q8NBR6 |
| G | 238 | GLU | - | expression tag | UNP Q8NBR6 |
| G | 239 | PHE | - | expression tag | UNP Q8NBR6 |
| G | 240 | MET | - | expression tag | UNP Q8NBR6 |
| G | 266 | ALA | CYS | engineered mutation | UNP Q8NBR6 |
| M | 232 | GLY | - | expression tag | UNP Q8NBR6 |
| M | 233 | PRO | - | expression tag | UNP Q8NBR6 |
| M | 234 | LEU | - | expression tag | UNP Q8NBR6 |
| M | 235 | GLY | - | expression tag | UNP Q8NBR6 |
| M | 236 | SER | - | expression tag | UNP Q8NBR6 |
| M | 237 | PRO | - | expression tag | UNP Q8NBR6 |
| M | 238 | GLU | - | expression tag | UNP Q8NBR6 |
| M | 239 | PHE | - | expression tag | UNP Q8NBR6 |
| M | 240 | MET | - | expression tag | UNP Q8NBR6 |
| M | 266 | ALA | CYS | engineered mutation | UNP Q8NBR6 |
| S | 232 | GLY | - | expression tag | UNP Q8NBR6 |
| S | 233 | PRO | - | expression tag | UNP Q8NBR6 |
| S | 234 | LEU | - | expression tag | UNP Q8NBR6 |
| S | 235 | GLY | - | expression tag | UNP Q8NBR6 |
| S | 236 | SER | - | expression tag | UNP Q8NBR6 |
| S | 237 | PRO | - | expression tag | UNP Q8NBR6 |
| S | 238 | GLU | - | expression tag | UNP Q8NBR6 |
| S | 239 | PHE | - | expression tag | UNP Q8NBR6 |
| S | 240 | MET | - | expression tag | UNP Q8NBR6 |
| S | 266 | ALA | CYS | engineered mutation | UNP Q8NBR6 |
| Y | 232 | GLY | - | expression tag | UNP Q8NBR6 |
| Y | 233 | PRO | - | expression tag | UNP Q8NBR6 |
| Y | 234 | LEU | - | expression tag | UNP Q8NBR6 |
| Y | 235 | GLY | - | expression tag | UNP Q8NBR6 |
| Y | 236 | SER | - | expression tag | UNP Q8NBR6 |
| Y | 237 | PRO | - | expression tag | UNP Q8NBR6 |
| Y | 238 | GLU | - | expression tag | UNP Q8NBR6 |
| Y | 239 | PHE | - | expression tag | UNP Q8NBR6 |
| Y | 240 | MET | - | expression tag | UNP Q8NBR6 |
| Y | 266 | ALA | CYS | engineered mutation | UNP Q8NBR6 |
| e | 232 | GLY | - | expression tag | UNP Q8NBR6 |
| e | 233 | PRO | - | expression tag | UNP Q8NBR6 |
| e | 234 | LEU | - | expression tag | UNP Q8NBR6 |
| e | 235 | GLY | - | expression tag | UNP Q8NBR6 |
| e | 236 | SER | - | expression tag | UNP Q8NBR6 |
| e | 237 | PRO | - | expression tag | UNP Q8NBR6 |
| e | 238 | GLU | - | expression tag | UNP Q8NBR6 |

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| Chain | Residue | Modelled | Actual | Comment | Reference |
|-------|---------|----------|--------|---------------------|------------|
| e | 239 | PHE | - | expression tag | UNP Q8NBR6 |
| e | 240 | MET | - | expression tag | UNP Q8NBR6 |
| e | 266 | ALA | CYS | engineered mutation | UNP Q8NBR6 |
| k | 232 | GLY | - | expression tag | UNP Q8NBR6 |
| k | 233 | PRO | - | expression tag | UNP Q8NBR6 |
| k | 234 | LEU | - | expression tag | UNP Q8NBR6 |
| k | 235 | GLY | - | expression tag | UNP Q8NBR6 |
| k | 236 | SER | - | expression tag | UNP Q8NBR6 |
| k | 237 | PRO | - | expression tag | UNP Q8NBR6 |
| k | 238 | GLU | - | expression tag | UNP Q8NBR6 |
| k | 239 | PHE | - | expression tag | UNP Q8NBR6 |
| k | 240 | MET | - | expression tag | UNP Q8NBR6 |
| k | 266 | ALA | CYS | engineered mutation | UNP Q8NBR6 |

- Molecule 2 is a protein called Polyubiquitin-C.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|---------|-------|
| 2 | B | 73 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 582 | 368 | 99 | 114 | 1 | | | |
| 2 | C | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 595 | 375 | 102 | 117 | 1 | | | |
| 2 | D | 76 | Total | C | N | O | | 207 | 0 | 0 |
| | | | 445 | 273 | 91 | 81 | | | | |
| 2 | E | 75 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 578 | 364 | 97 | 116 | 1 | | | |
| 2 | F | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 589 | 372 | 103 | 113 | 1 | | | |
| 2 | H | 73 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 579 | 365 | 99 | 114 | 1 | | | |
| 2 | I | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 591 | 372 | 101 | 117 | 1 | | | |
| 2 | J | 76 | Total | C | N | O | | 5 | 0 | 0 |
| | | | 492 | 303 | 94 | 95 | | | | |
| 2 | K | 74 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 562 | 355 | 94 | 112 | 1 | | | |
| 2 | L | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 593 | 372 | 103 | 117 | 1 | | | |
| 2 | N | 73 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 582 | 368 | 99 | 114 | 1 | | | |
| 2 | O | 76 | Total | C | N | O | S | 4 | 0 | 0 |
| | | | 589 | 371 | 101 | 116 | 1 | | | |
| 2 | P | 76 | Total | C | N | O | | 127 | 0 | 0 |
| | | | 441 | 266 | 90 | 85 | | | | |

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| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|---------|-------|
| 2 | Q | 71 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 545 | 345 | 92 | 107 | 1 | | | |
| 2 | R | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 555 | 349 | 99 | 106 | 1 | | | |
| 2 | T | 73 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 582 | 368 | 99 | 114 | 1 | | | |
| 2 | U | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 595 | 375 | 102 | 117 | 1 | | | |
| 2 | V | 76 | Total | C | N | O | S | 179 | 0 | 0 |
| | | | 421 | 256 | 85 | 79 | 1 | | | |
| 2 | W | 72 | Total | C | N | O | | 0 | 0 | 0 |
| | | | 555 | 351 | 91 | 113 | | | | |
| 2 | X | 76 | Total | C | N | O | | 0 | 0 | 0 |
| | | | 565 | 352 | 100 | 113 | | | | |
| 2 | Z | 73 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 578 | 365 | 98 | 114 | 1 | | | |
| 2 | a | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 593 | 373 | 104 | 115 | 1 | | | |
| 2 | b | 76 | Total | C | N | O | | 68 | 0 | 0 |
| | | | 464 | 284 | 93 | 87 | | | | |
| 2 | c | 73 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 566 | 354 | 97 | 114 | 1 | | | |
| 2 | d | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 585 | 368 | 103 | 113 | 1 | | | |
| 2 | f | 73 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 569 | 359 | 97 | 112 | 1 | | | |
| 2 | g | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 599 | 377 | 105 | 116 | 1 | | | |
| 2 | h | 76 | Total | C | N | O | | 91 | 0 | 0 |
| | | | 439 | 267 | 89 | 83 | | | | |
| 2 | i | 73 | Total | C | N | O | | 0 | 0 | 0 |
| | | | 522 | 329 | 91 | 102 | | | | |
| 2 | j | 76 | Total | C | N | O | | 0 | 0 | 0 |
| | | | 552 | 345 | 100 | 107 | | | | |
| 2 | l | 73 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 578 | 365 | 98 | 114 | 1 | | | |
| 2 | m | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 596 | 375 | 104 | 116 | 1 | | | |
| 2 | n | 75 | Total | C | N | O | | 56 | 0 | 0 |
| | | | 458 | 274 | 89 | 95 | | | | |
| 2 | o | 72 | Total | C | N | O | | 0 | 0 | 0 |
| | | | 545 | 344 | 91 | 110 | | | | |

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| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|---------|-------|
| 2 | p | 76 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 601 | 378 | 105 | 117 | 1 | | | |

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---------|---------|
| 3 | A | 2 | Total | Cl | 0 | 0 |
| | | | 2 | 2 | | |

- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---------|---------|
| 4 | A | 1 | Total | Na | 0 | 0 |
| | | | 1 | 1 | | |
| 4 | S | 1 | Total | Na | 0 | 0 |
| | | | 1 | 1 | | |

- Molecule 5 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---------|---------|
| 5 | A | 4 | Total | O | 0 | 0 |
| | | | 4 | 4 | | |
| 5 | E | 1 | Total | O | 0 | 0 |
| | | | 1 | 1 | | |
| 5 | G | 3 | Total | O | 0 | 0 |
| | | | 3 | 3 | | |
| 5 | M | 2 | Total | O | 0 | 0 |
| | | | 2 | 2 | | |
| 5 | T | 2 | Total | O | 0 | 0 |
| | | | 2 | 2 | | |
| 5 | Y | 1 | Total | O | 0 | 0 |
| | | | 1 | 1 | | |
| 5 | Z | 1 | Total | O | 0 | 0 |
| | | | 1 | 1 | | |
| 5 | e | 1 | Total | O | 0 | 0 |
| | | | 1 | 1 | | |
| 5 | m | 1 | Total | O | 0 | 0 |
| | | | 1 | 1 | | |

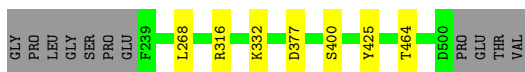
3 Residue-property plots [i](#)

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 failed to run properly.

- Molecule 1: Ubiquitin carboxyl-terminal hydrolase MINDY-2

Chain A:  93%



- Molecule 1: Ubiquitin carboxyl-terminal hydrolase MINDY-2

Chain G:  91%



- Molecule 1: Ubiquitin carboxyl-terminal hydrolase MINDY-2

Chain M:  94%



- Molecule 1: Ubiquitin carboxyl-terminal hydrolase MINDY-2

Chain S:  94%

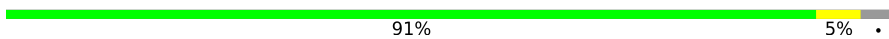


- Molecule 1: Ubiquitin carboxyl-terminal hydrolase MINDY-2

Chain Y:  92%



- Molecule 1: Ubiquitin carboxyl-terminal hydrolase MINDY-2

Chain e:  91% 5%



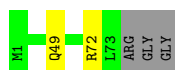
- Molecule 1: Ubiquitin carboxyl-terminal hydrolase MINDY-2

Chain k:  93%



- Molecule 2: Polyubiquitin-C

Chain B:  93%



- Molecule 2: Polyubiquitin-C

Chain C:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: Polyubiquitin-C

Chain D:  99%



- Molecule 2: Polyubiquitin-C

Chain E:  97%



- Molecule 2: Polyubiquitin-C

Chain F:  95% 5%



- Molecule 2: Polyubiquitin-C

Chain H:  91% 5%



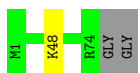
- Molecule 2: Polyubiquitin-C



- Molecule 2: Polyubiquitin-C



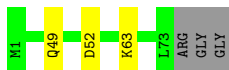
- Molecule 2: Polyubiquitin-C



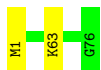
- Molecule 2: Polyubiquitin-C



- Molecule 2: Polyubiquitin-C



- Molecule 2: Polyubiquitin-C




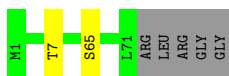
- Molecule 2: Polyubiquitin-C



There are no outlier residues recorded for this chain.

- Molecule 2: Polyubiquitin-C

Chain Q:  91% 7%



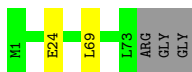
- Molecule 2: Polyubiquitin-C

Chain R:  95% 5%



- Molecule 2: Polyubiquitin-C

Chain T:  93%



- Molecule 2: Polyubiquitin-C

Chain U:  100%

There are no outlier residues recorded for this chain.

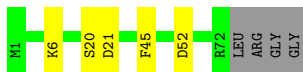
- Molecule 2: Polyubiquitin-C

Chain V:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: Polyubiquitin-C

Chain W:  88% 7% 5%



- Molecule 2: Polyubiquitin-C

Chain X:  95% 5%



- Molecule 2: Polyubiquitin-C

Chain Z:  92%



- Molecule 2: Polyubiquitin-C

Chain a: 100%

There are no outlier residues recorded for this chain.

- Molecule 2: Polyubiquitin-C

Chain b: 96%



- Molecule 2: Polyubiquitin-C

Chain c: 96%



- Molecule 2: Polyubiquitin-C

Chain d: 93%



- Molecule 2: Polyubiquitin-C

Chain f: 89%



- Molecule 2: Polyubiquitin-C

Chain g: 95%




- Molecule 2: Polyubiquitin-C

Chain h: 100%

There are no outlier residues recorded for this chain.

- Molecule 2: Polyubiquitin-C

Chain i:  91% 5%




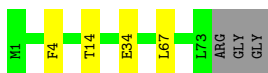
- Molecule 2: Polyubiquitin-C

Chain j:  100%

There are no outlier residues recorded for this chain.

- Molecule 2: Polyubiquitin-C

Chain l:  91% 5%



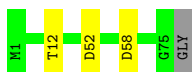
- Molecule 2: Polyubiquitin-C

Chain m:  95% 5%




- Molecule 2: Polyubiquitin-C

Chain n:  95%



- Molecule 2: Polyubiquitin-C

Chain o:  88% 7% 5%



- Molecule 2: Polyubiquitin-C

Chain p:  99%



4 Data and refinement statistics i

EDS failed to run properly - this section is therefore incomplete.

| Property | Value | Source |
|--|---|-----------|
| Space group | C 1 2 1 | Depositor |
| Cell constants a, b, c, α , β , γ | 162.06Å 203.07Å 265.04Å 90.00° 107.14° 90.00° | Depositor |
| Resolution (Å) | 126.63 – 2.81 | Depositor |
| % Data completeness (in resolution range) | 44.2 (126.63-2.81) | Depositor |
| R_{merge} | (Not available) | Depositor |
| R_{sym} | (Not available) | Depositor |
| $\langle I/\sigma(I) \rangle$ ¹ | 0.97 (at 2.82Å) | Xtrriage |
| Refinement program | PHENIX 1.19rc7_4070 | Depositor |
| R, R_{free} | 0.228 , 0.288 | Depositor |
| Wilson B-factor (Å ²) | 44.7 | Xtrriage |
| Anisotropy | 0.249 | Xtrriage |
| L-test for twinning ² | $\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$ | Xtrriage |
| Estimated twinning fraction | 0.018 for h,-k,-h-l | Xtrriage |
| Total number of atoms | 33767 | wwPDB-VP |
| Average B, all atoms (Å ²) | 68.0 | wwPDB-VP |

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.33% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NA, CL

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 | 0.24 | 0/2131 | 0.43 | 0/2903 |
| 1 | G | 0.25 | 0/2112 | 0.45 | 0/2880 |
| 1 | M | 0.25 | 0/2103 | 0.47 | 0/2871 |
| 1 | S | 0.26 | 0/2101 | 0.46 | 0/2871 |
| 1 | Y | 0.26 | 0/2120 | 0.47 | 0/2893 |
| 1 | e | 0.26 | 0/2109 | 0.50 | 0/2877 |
| 1 | k | 0.25 | 0/2125 | 0.46 | 0/2897 |
| 2 | B | 0.25 | 0/588 | 0.50 | 0/792 |
| 2 | C | 0.24 | 0/601 | 0.49 | 0/809 |
| 2 | D | 0.24 | 0/449 | 0.49 | 0/616 |
| 2 | E | 0.24 | 0/584 | 0.47 | 0/789 |
| 2 | F | 0.24 | 0/595 | 0.50 | 0/802 |
| 2 | H | 0.25 | 0/585 | 0.49 | 0/788 |
| 2 | I | 0.25 | 0/597 | 0.50 | 0/805 |
| 2 | J | 0.24 | 0/497 | 0.47 | 0/679 |
| 2 | K | 0.24 | 0/568 | 0.51 | 0/770 |
| 2 | L | 0.24 | 0/599 | 0.51 | 0/808 |
| 2 | N | 0.24 | 0/588 | 0.50 | 0/792 |
| 2 | O | 0.24 | 0/595 | 0.51 | 0/802 |
| 2 | P | 0.22 | 0/444 | 0.49 | 0/611 |
| 2 | Q | 0.24 | 0/551 | 0.50 | 0/745 |
| 2 | R | 0.24 | 0/561 | 0.49 | 0/761 |
| 2 | T | 0.24 | 0/588 | 0.49 | 0/792 |
| 2 | U | 0.24 | 0/601 | 0.46 | 0/809 |
| 2 | V | 0.23 | 0/423 | 0.50 | 0/584 |
| 2 | W | 0.25 | 0/561 | 0.50 | 0/760 |
| 2 | X | 0.24 | 0/570 | 0.50 | 0/773 |
| 2 | Z | 0.24 | 0/584 | 0.53 | 0/788 |
| 2 | a | 0.24 | 0/599 | 0.52 | 0/807 |
| 2 | b | 0.26 | 0/468 | 0.56 | 0/641 |
| 2 | c | 0.24 | 0/572 | 0.49 | 0/773 |
| 2 | d | 0.23 | 0/591 | 0.50 | 0/798 |

| Mol | Chain | Bond lengths | | Bond angles | |
|-----|-------|--------------|---------|-------------|---------|
| | | RMSZ | # Z >5 | RMSZ | # Z >5 |
| 2 | f | 0.35 | 0/575 | 0.59 | 0/777 |
| 2 | g | 0.24 | 0/605 | 0.49 | 0/813 |
| 2 | h | 0.25 | 0/443 | 0.51 | 0/609 |
| 2 | i | 0.24 | 0/528 | 0.48 | 0/719 |
| 2 | j | 0.24 | 0/558 | 0.54 | 0/757 |
| 2 | l | 0.24 | 0/584 | 0.49 | 0/788 |
| 2 | m | 0.24 | 0/602 | 0.53 | 0/811 |
| 2 | n | 0.23 | 0/461 | 0.50 | 0/636 |
| 2 | o | 0.24 | 0/551 | 0.49 | 0/749 |
| 2 | p | 0.24 | 0/607 | 0.51 | 0/816 |
| All | All | 0.25 | 0/34274 | 0.49 | 0/46561 |

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 [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

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 | 260/273 (95%) | 251 (96%) | 9 (4%) | 0 | 100 | 100 |
| 1 | G | 260/273 (95%) | 240 (92%) | 20 (8%) | 0 | 100 | 100 |
| 1 | M | 261/273 (96%) | 245 (94%) | 15 (6%) | 1 (0%) | 34 | 64 |
| 1 | S | 261/273 (96%) | 248 (95%) | 13 (5%) | 0 | 100 | 100 |
| 1 | Y | 261/273 (96%) | 246 (94%) | 15 (6%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|-----|-------|---------------|-----------|---------|----------|-------------|-----|
| 1 | e | 261/273 (96%) | 248 (95%) | 12 (5%) | 1 (0%) | 34 | 64 |
| 1 | k | 261/273 (96%) | 244 (94%) | 17 (6%) | 0 | 100 | 100 |
| 2 | B | 71/76 (93%) | 70 (99%) | 1 (1%) | 0 | 100 | 100 |
| 2 | C | 74/76 (97%) | 71 (96%) | 3 (4%) | 0 | 100 | 100 |
| 2 | D | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | E | 73/76 (96%) | 71 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | F | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | H | 71/76 (93%) | 71 (100%) | 0 | 0 | 100 | 100 |
| 2 | I | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | J | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | K | 72/76 (95%) | 70 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | L | 74/76 (97%) | 70 (95%) | 4 (5%) | 0 | 100 | 100 |
| 2 | N | 71/76 (93%) | 71 (100%) | 0 | 0 | 100 | 100 |
| 2 | O | 74/76 (97%) | 73 (99%) | 1 (1%) | 0 | 100 | 100 |
| 2 | P | 74/76 (97%) | 74 (100%) | 0 | 0 | 100 | 100 |
| 2 | Q | 69/76 (91%) | 67 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | R | 74/76 (97%) | 70 (95%) | 4 (5%) | 0 | 100 | 100 |
| 2 | T | 71/76 (93%) | 71 (100%) | 0 | 0 | 100 | 100 |
| 2 | U | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | V | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | W | 70/76 (92%) | 65 (93%) | 5 (7%) | 0 | 100 | 100 |
| 2 | X | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | Z | 71/76 (93%) | 69 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | a | 74/76 (97%) | 73 (99%) | 1 (1%) | 0 | 100 | 100 |
| 2 | b | 74/76 (97%) | 69 (93%) | 5 (7%) | 0 | 100 | 100 |
| 2 | c | 71/76 (93%) | 71 (100%) | 0 | 0 | 100 | 100 |
| 2 | d | 74/76 (97%) | 73 (99%) | 1 (1%) | 0 | 100 | 100 |
| 2 | f | 71/76 (93%) | 64 (90%) | 7 (10%) | 0 | 100 | 100 |
| 2 | g | 74/76 (97%) | 74 (100%) | 0 | 0 | 100 | 100 |
| 2 | h | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | i | 71/76 (93%) | 66 (93%) | 5 (7%) | 0 | 100 | 100 |

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| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|-----|-------|-----------------|------------|----------|----------|-------------|-----|
| 2 | j | 74/76 (97%) | 71 (96%) | 3 (4%) | 0 | 100 | 100 |
| 2 | l | 71/76 (93%) | 69 (97%) | 2 (3%) | 0 | 100 | 100 |
| 2 | m | 74/76 (97%) | 70 (95%) | 4 (5%) | 0 | 100 | 100 |
| 2 | n | 73/76 (96%) | 72 (99%) | 1 (1%) | 0 | 100 | 100 |
| 2 | o | 70/76 (92%) | 69 (99%) | 1 (1%) | 0 | 100 | 100 |
| 2 | p | 74/76 (97%) | 72 (97%) | 2 (3%) | 0 | 100 | 100 |
| All | All | 4371/4571 (96%) | 4194 (96%) | 175 (4%) | 2 (0%) | 100 | 100 |

All (2) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | M | 284 | PRO |
| 1 | e | 266 | ALA |

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 | 231/248 (93%) | 224 (97%) | 7 (3%) | 41 | 73 |
| 1 | G | 225/248 (91%) | 211 (94%) | 14 (6%) | 18 | 45 |
| 1 | M | 222/248 (90%) | 216 (97%) | 6 (3%) | 44 | 77 |
| 1 | S | 221/248 (89%) | 214 (97%) | 7 (3%) | 39 | 71 |
| 1 | Y | 227/248 (92%) | 216 (95%) | 11 (5%) | 25 | 56 |
| 1 | e | 224/248 (90%) | 210 (94%) | 14 (6%) | 18 | 44 |
| 1 | k | 227/248 (92%) | 217 (96%) | 10 (4%) | 28 | 60 |
| 2 | B | 67/68 (98%) | 65 (97%) | 2 (3%) | 41 | 73 |
| 2 | C | 67/68 (98%) | 67 (100%) | 0 | 100 | 100 |
| 2 | D | 20/68 (29%) | 19 (95%) | 1 (5%) | 24 | 55 |
| 2 | E | 64/68 (94%) | 63 (98%) | 1 (2%) | 62 | 87 |
| 2 | F | 64/68 (94%) | 60 (94%) | 4 (6%) | 18 | 44 |

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| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|-----|-------|-----------------|------------|----------|-------------|-----|
| 2 | H | 66/68 (97%) | 62 (94%) | 4 (6%) | 18 | 46 |
| 2 | I | 66/68 (97%) | 64 (97%) | 2 (3%) | 41 | 73 |
| 2 | J | 35/68 (52%) | 33 (94%) | 2 (6%) | 20 | 49 |
| 2 | K | 61/68 (90%) | 60 (98%) | 1 (2%) | 62 | 87 |
| 2 | L | 66/68 (97%) | 64 (97%) | 2 (3%) | 41 | 73 |
| 2 | N | 67/68 (98%) | 64 (96%) | 3 (4%) | 27 | 59 |
| 2 | O | 65/68 (96%) | 63 (97%) | 2 (3%) | 40 | 72 |
| 2 | P | 20/68 (29%) | 20 (100%) | 0 | 100 | 100 |
| 2 | Q | 59/68 (87%) | 57 (97%) | 2 (3%) | 37 | 69 |
| 2 | R | 55/68 (81%) | 51 (93%) | 4 (7%) | 14 | 37 |
| 2 | T | 67/68 (98%) | 65 (97%) | 2 (3%) | 41 | 73 |
| 2 | U | 67/68 (98%) | 67 (100%) | 0 | 100 | 100 |
| 2 | V | 15/68 (22%) | 15 (100%) | 0 | 100 | 100 |
| 2 | W | 62/68 (91%) | 57 (92%) | 5 (8%) | 11 | 32 |
| 2 | X | 59/68 (87%) | 55 (93%) | 4 (7%) | 16 | 40 |
| 2 | Z | 66/68 (97%) | 63 (96%) | 3 (4%) | 27 | 59 |
| 2 | a | 66/68 (97%) | 66 (100%) | 0 | 100 | 100 |
| 2 | b | 26/68 (38%) | 23 (88%) | 3 (12%) | 5 | 17 |
| 2 | c | 62/68 (91%) | 62 (100%) | 0 | 100 | 100 |
| 2 | d | 64/68 (94%) | 59 (92%) | 5 (8%) | 12 | 33 |
| 2 | f | 63/68 (93%) | 58 (92%) | 5 (8%) | 12 | 33 |
| 2 | g | 67/68 (98%) | 63 (94%) | 4 (6%) | 19 | 47 |
| 2 | h | 18/68 (26%) | 18 (100%) | 0 | 100 | 100 |
| 2 | i | 49/68 (72%) | 45 (92%) | 4 (8%) | 11 | 31 |
| 2 | j | 54/68 (79%) | 54 (100%) | 0 | 100 | 100 |
| 2 | l | 66/68 (97%) | 62 (94%) | 4 (6%) | 18 | 46 |
| 2 | m | 66/68 (97%) | 62 (94%) | 4 (6%) | 18 | 46 |
| 2 | n | 29/68 (43%) | 26 (90%) | 3 (10%) | 7 | 21 |
| 2 | o | 59/68 (87%) | 54 (92%) | 5 (8%) | 10 | 30 |
| 2 | p | 68/68 (100%) | 67 (98%) | 1 (2%) | 65 | 88 |
| All | All | 3512/4116 (85%) | 3361 (96%) | 151 (4%) | 29 | 60 |

5 of 151 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | f | 67 | LEU |
| 2 | n | 52 | ASP |
| 2 | g | 57 | SER |
| 1 | k | 445 | ARG |
| 2 | p | 16 | GLU |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 20 such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2 | b | 41 | GLN |
| 2 | i | 60 | ASN |
| 2 | l | 62 | GLN |
| 1 | k | 340 | ASN |
| 1 | G | 263 | ASN |

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 4 ligands modelled in this entry, 4 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

EDS failed to run properly - this section is therefore empty.

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

EDS failed to run properly - this section is therefore empty.

6.3 Carbohydrates [i](#)

EDS failed to run properly - this section is therefore empty.

6.4 Ligands [i](#)

EDS failed to run properly - this section is therefore empty.

6.5 Other polymers [i](#)

EDS failed to run properly - this section is therefore empty.