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

May 18, 2020 – 05:00 am BST

| | | |
|---|---|---|
| PDB ID | : | 6XWV |
| Title | : | Crystal structure of drosophila melanogaster CENP-C bound to CAL1 |
| Authors | : | Jeyaprakash, A.A.; Medina-Pritchard, B.; Lazou, V.; Zou, J.; Byron, O.; Abad, M.A.; Rappsilber, J.; Heun, P. |
| Deposited on | : | 2020-01-24 |
| Resolution | : | 2.27 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 following versions of software and data (see references (1)) were used in the production of this report:

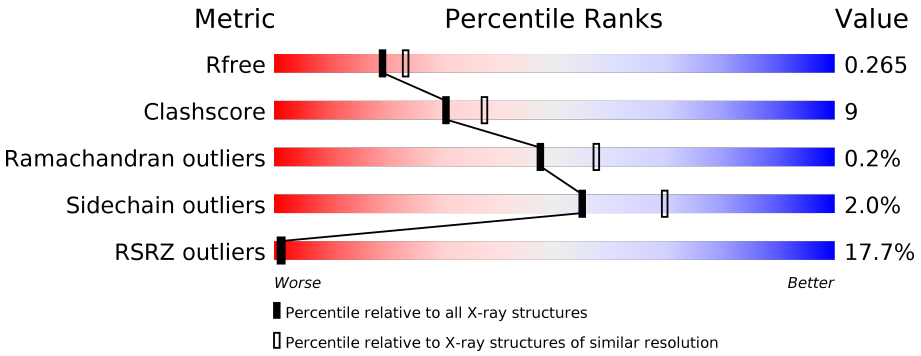
| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.11 |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac | : | 5.8.0158 |
| CCP4 | : | 7.0.044 (Gargrove) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.11 |

# 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 2.27 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 | 6980 (2.30-2.26) |
| Clashscore | 141614 | 7711 (2.30-2.26) |
| Ramachandran outliers | 138981 | 7597 (2.30-2.26) |
| Sidechain outliers | 138945 | 7598 (2.30-2.26) |
| RSRZ outliers | 127900 | 6849 (2.30-2.26) |

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 on 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 | 1411 | 2% 7% 91% |
| 1 | B | 1411 | % 7% 91% |
| 1 | C | 1411 | % 8% 91% |
| 1 | D | 1411 | 2% 7% 91% |
| 2 | E | 979 | % 98% |

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4229 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 Calmodulin.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 133 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 1041 | 659 | 178 | 197 | 7 | | | |
| 1 | B | 125 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 985 | 625 | 165 | 188 | 7 | | | |
| 1 | C | 131 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 1025 | 650 | 175 | 193 | 7 | | | |
| 1 | D | 123 | Total | C | N | O | S | 0 | 0 | 0 |
| | | | 969 | 617 | 160 | 185 | 7 | | | |

- Molecule 2 is a protein called Ryanodine Receptor 2.

| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 2 | E | 24 | Total | C | N | O | 0 | 0 | 0 |
| | | | 191 | 126 | 35 | 30 | | | |

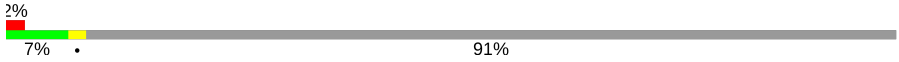
- Molecule 3 is water.

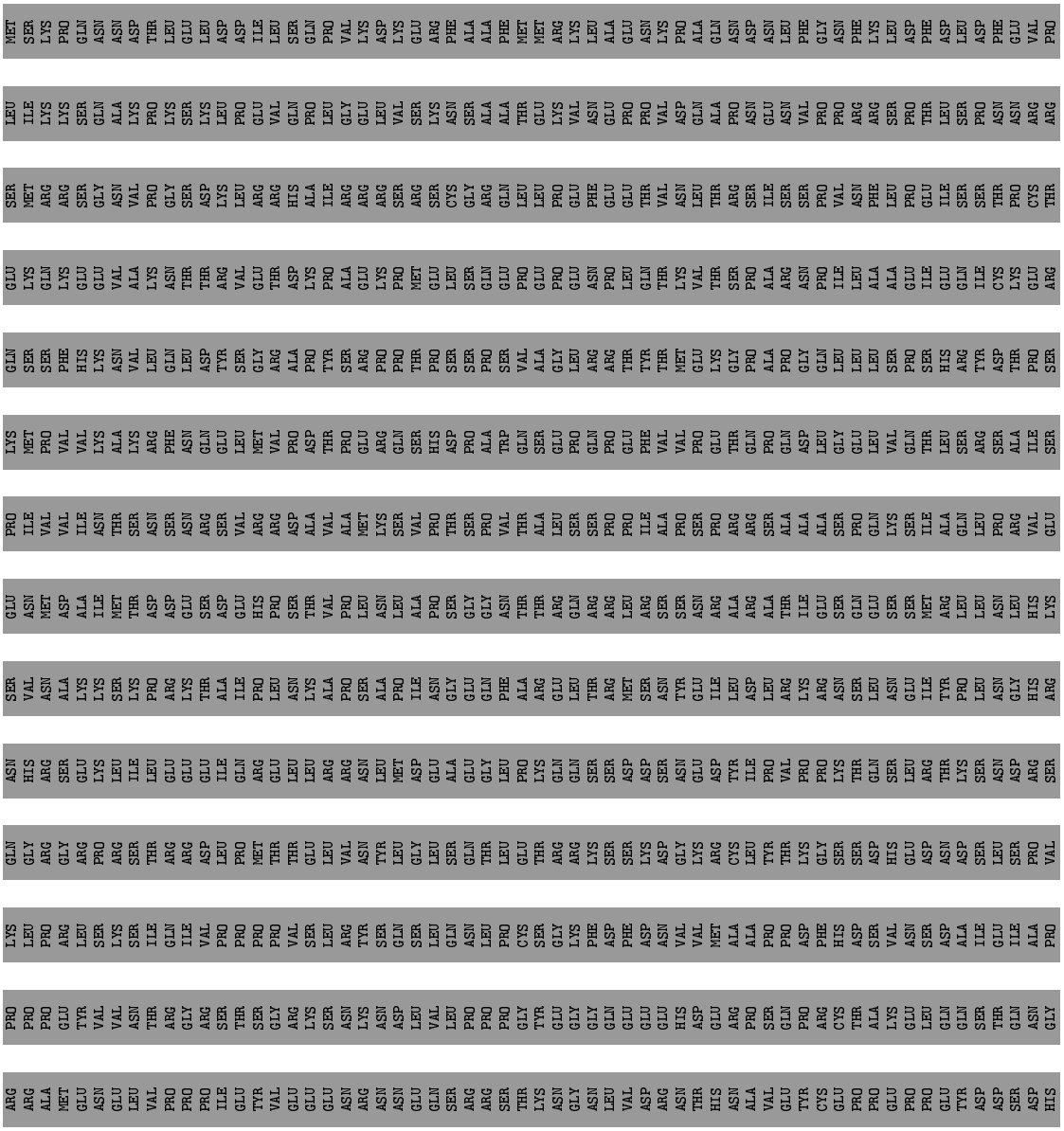
| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|
| 3 | A | 6 | Total | O | 0 | 0 |
| | | | 6 | 6 | | |
| 3 | E | 1 | Total | O | 0 | 0 |
| | | | 1 | 1 | | |
| 3 | B | 3 | Total | O | 0 | 0 |
| | | | 3 | 3 | | |
| 3 | C | 3 | Total | O | 0 | 0 |
| | | | 3 | 3 | | |
| 3 | D | 5 | Total | O | 0 | 0 |
| | | | 5 | 5 | | |

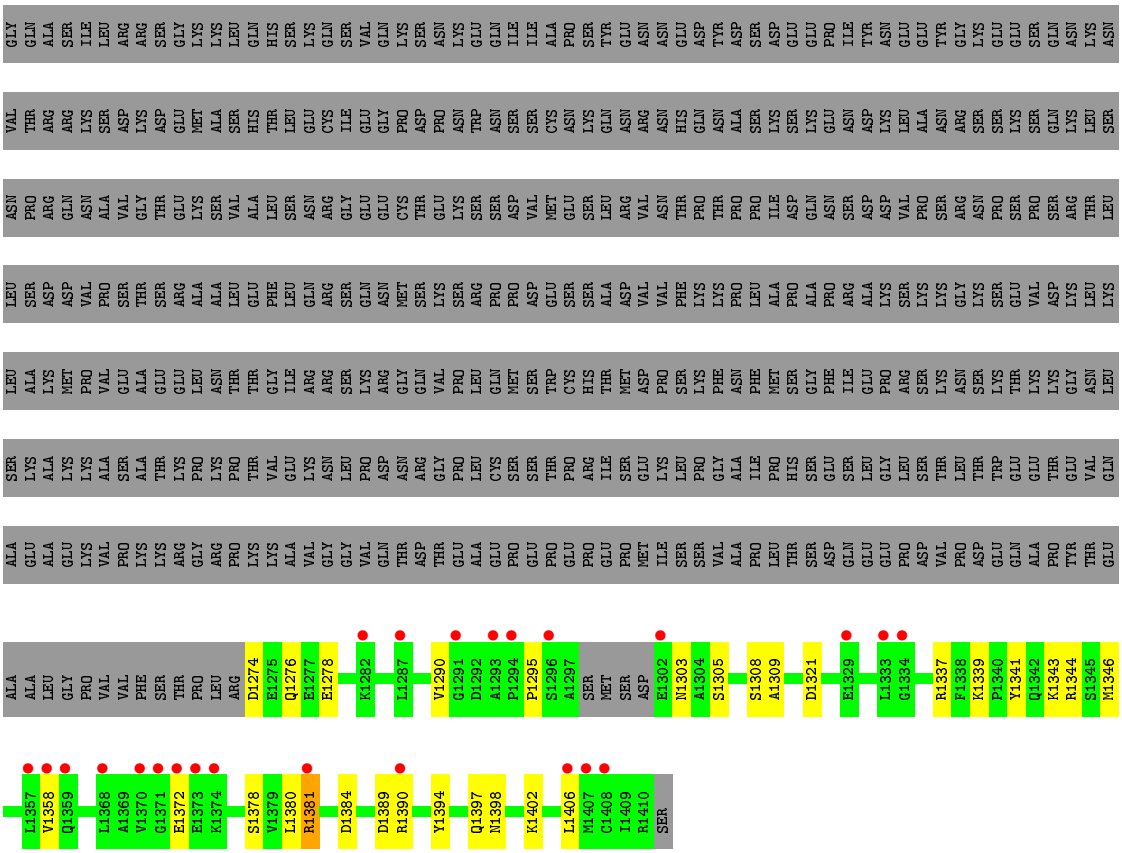
# 3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA 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: Calmodulin

Chain A: 

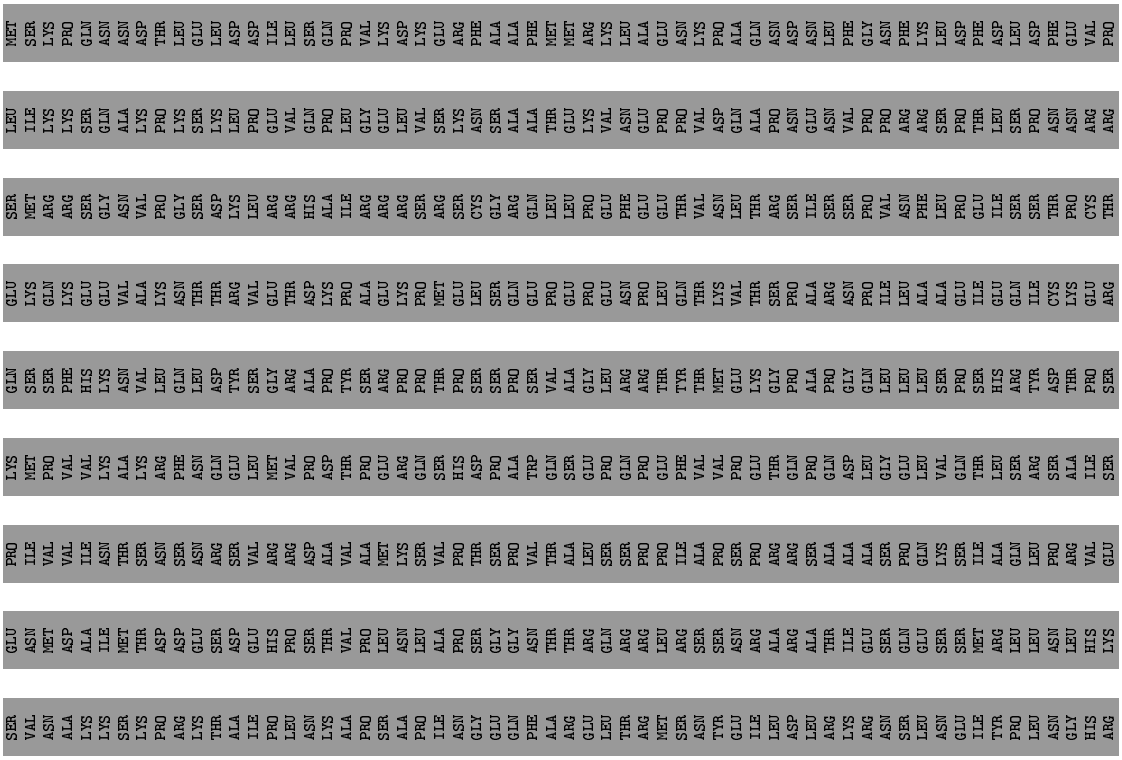


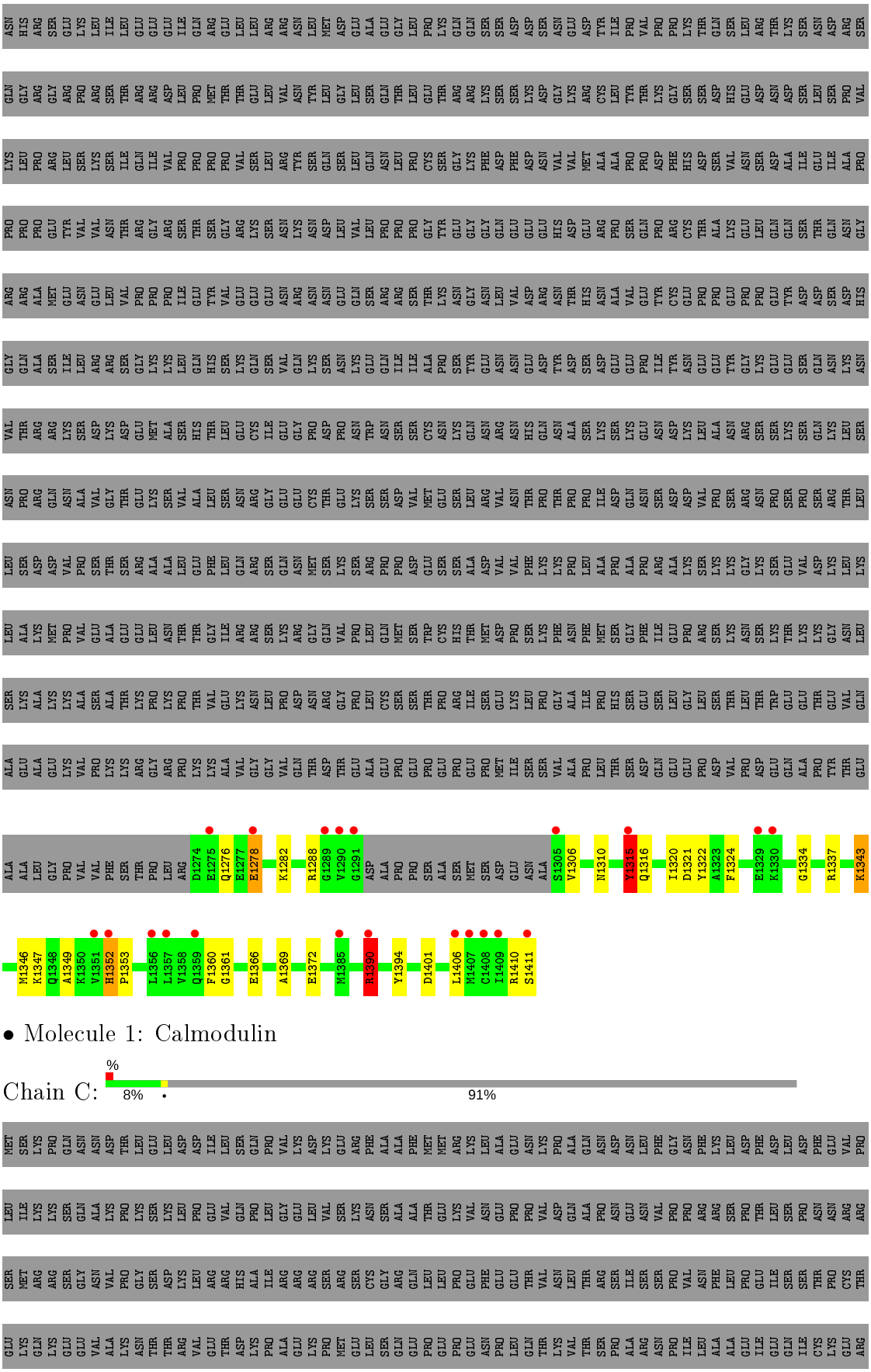




- Molecule 1: Calmodulin

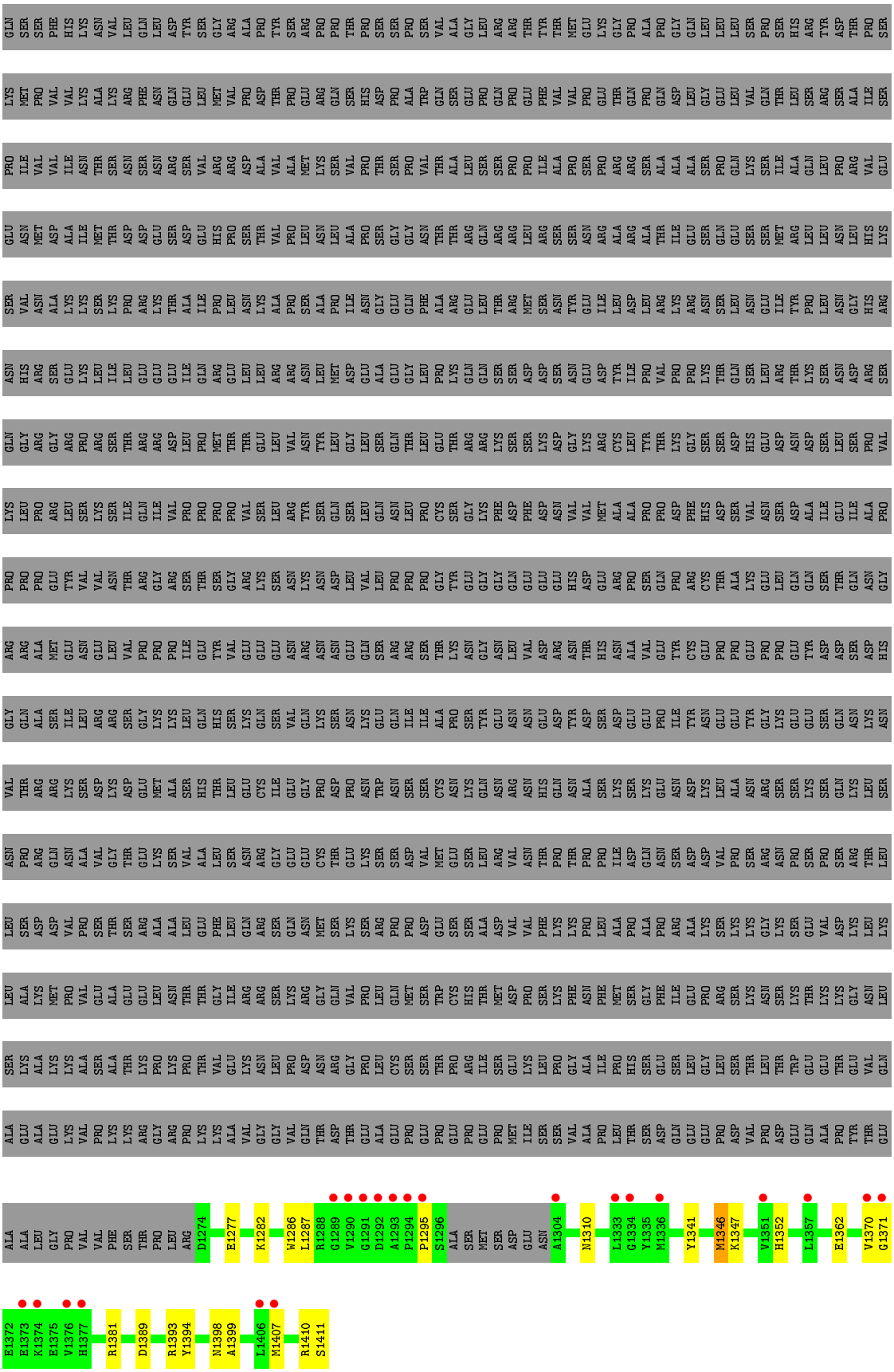
Chain B:




- Molecule 1: Calmodulin

Chain C:




- Molecule 1: Calmodulin

Chain D:


MET SER LYS PRO GLN ASN ASN ASP THR LEU GLU LEU ASP ASP ILE LEU SER GLN PRO VAL LYS ASP LYS GLU ARG PHE ALA ALA PHE MET MET ARG LYS LEU ALA GLU ASN LYS PRO ALA GLN ASN ASP ASN LEU PHE GLY ASN PHE LYS LEU ASP PHE ASP LEU ASP PHE GLU VAL PRO

LEU ILE LYS LYS SER GLN ALA LYS PRO LYS SER LYS SER LEU PRO GLU VAL GLN PRO LEU GLY GLU LEU VAL SER LYS ASN SER ALA ALA THR GLU LYS VAL ASN GLU PRO PRO VAL ASP GLN ALA PRO ASN GLU ASN VAL PRO PRO ARG ARG SER PRO THR LEU SER PRO ASN ASN ARG ARG

SER MET ARG ARG SER GLY ASN VAL PRO GLY SER ASP LYS LEU ARG ARG HIS ALA ILE ARG ARG ARG SER SER ARG SER CYS GLY ARG GLN LEU LEU PRO GLU PHE GLU GLU THR VAL ASN LEU THR ARG SER ILE SER SER PRO VAL ASN PHE LEU PRO GLU ILE SER SER THR PRO CYS THR

GLU LYS GLN LYS GLU GLU VAL ALA LYS ASN THR THR ARG VAL GLU THR ASP LYS PRO ALA GLU LYS PRO PRO MET GLU LEU SER GLN GLU PRO GLU ASN PRO LEU GLN THR LYS VAL THR SER PRO ALA ARG ASN PRO ILE LEU LEU ALA ALA GLU ILE GLU GLN ILE CYS LYS GLU ARG

GLN SER SER PHE HIS LYS ASN VAL LEU GLN LEU ASP TYR SER GLY ARG ALA PRO TYR SER ARG PRO PRO PRO THR PRO SER SER SER PRO SER VAL ALA GLY LEU ARG ARG THR TYR THR MET GLU LYS GLY PRO ALA PRO GLY GLN LEU LEU LEU LEU SER PRO SER HIS ARG TYR ASP THR SER

LYS MET PRO VAL VAL LYS ALA LYS ARG PHE ASN GLN GLU LEU MET VAL PRO ASP THR PRO GLU ARG GLN SER HIS ASP PRO ALA THR GLN SER GLU PRO GLN PRO GLU PHE VAL VAL PRO GLU THR GLN PRO GLN GLN ASP LEU GLY GLU GLU LEU VAL GLN THR LEU SER ARG SER ALA ILE SER

PRO ILE VAL VAL ILE ASN THR SER ASN SER ASN ARG SER VAL ARG ARG ASP ALA ALA VAL ALA MET LYS SER VAL PRO THR SER PRO VAL THR ALA LEU SER SER PRO PRO ILE ALA PRO SER PRO ARG ARG SER ALA ALA ALA SER PRO GLN LYS SER ILE ALA GLN LEU PRO ARG ILE VAL

GLU ASN MET ASP ALA ILE MET THR ASP ASP GLU SER ASP GLU HIS PRO SER THR VAL PRO LEU ASN LEU ALA PRO SER GLY GLY ASN THR THR ARG GLN ARG ARG LEU ARG SER SER ASN ARG ALA ARG SER ALA THR ILE GLU SER GLN GLU SER MET ARG LEU LEU ASN LEU HIS LYS

SER VAL ASN ALA LYS LYS SER LYS PRO ARG LYS THR ALA ILE PRO LEU ASN LYS ALA PRO SER ALA PRO PRO ILE ASN GLY GLU GLN PHE ALA ARG GLU LEU THR ARG MET SER ASN TYR GLU ILE LEU ASP LEU ARG LYS GLU ASN SER LEU ASN GLU ILE TYR PRO LEU ASN GLY HIS ARG

ASN HIS ARG SER GLU LYS LEU ILE LEU GLU GLU GLU GLU ILE GLN ARG GLU LEU LEU ARG ARG ASN LEU MET MET ASP GLU ALA GLU GLY PRO LYS GLN GLN SER ASP ASP SER ASN GLU ASP TYR ILE PRO VAL PRO PRO LYS THR GLN SER LEU ARG THR LYS SER ASN ASP ARG SER

GLN GLY ARG GLY ARG PRO ARG SER THR ARG ARG ASP LEU PRO MET THR THR GLU LEU VAL ASN TYR LEU GLY LEU SER GLN THR LEU GLU THR ARG ARG LYS SER SER LYS ASP GLY LYS ARG CYS LEU TYR THR LYS GLY SER SER ASP HIS GLU ASP ASN ASP SER LEU SER PRO VAL

LYS LEU PRO ARG LEU SER LYS SER ILE GLN ILE VAL PRO PRO PRO PRO VAL SER LEU GLN LEU ARG TYR SER GLN SER LEU GLN ASN LEU PRO PRO CYS SER GLY LYS PHE ASP PHE ASP ASN VAL VAL MET ALA ALA PRO PRO ASP PHE HIS ASP SER VAL ASN SER ASP ALA ILE GLU ILE ALA PRO

PRO PRO PRO GLU TYR VAL VAL ASN THR ARG GLY ARG SER THR SER GLY ARG LYS SER ASN LYS ASN ASP LEU VAL LEU PRO PRO PRO GLY TYR GLU GLY GLY GLY GLN GLU GLU GLU HIS ASP GLU ARG PRO SER GLN PRO ARG CYS THR ALA LYS GLU LEU GLN GLN SER THR ASN GLY

ARG ARG ALA MET GLU ASN GLU LEU VAL PRO PRO PRO ILE GLU GLY TYR GLU GLU GLU ASN ASN ARG ARG SER THR LYS ASN GLY ASN LEU VAL ASP ARG ASN THR HIS ASN ALA VAL GLU TYR CYS GLU PRO PRO GLU PRO PRO GLU TYR ASP ASP SER ASP HIS

GLY GLN ALA SER ILE LEU ARG ARG SER GLY LYS LYS LEU GLN HIS SER LYS GLN SER VAL GLN LYS SER ASN LYS GLU GLN ILE ILE ALA PRO SER TYR GLU ASN ASN GLU ASP TYR ASP SER ASP GLU GLU PRO ILE TYR ASN GLU GLU GLU TYR GLY LYS GLU GLU SER GLN ASN LYS ASN

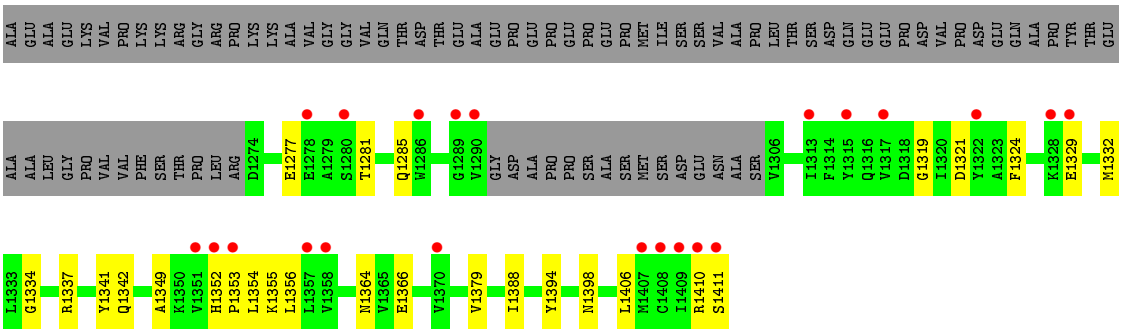
VAL THR ARG ARG LYS SER ASP LYS ASP GLU MET ALA SER HIS THR LEU GLU CYS ILE GLU GLU GLY PRO ASP PRO ASN TRP ASN SER SER CYS ASN LYS SER GLN ASN ARG ASN HIS GLN ASN ALA SER LYS SER LYS GLU ASN ASP LYS LEU GLU SER LYS SER GLN LYS LEU SER

ASN PRO ARG GLN ASN ALA VAL GLY THR GLU LYS SER VAL ALA LEU GLU CYS THR GLU LYS SER SER ASP VAL MET GLU SER LEU ARG VAL ASN ASN THR PRO PRO ILE ASP GLN ASN SER ASP ASP VAL PRO SER ARG ASN PRO SER PRO SER ARG THR LEU

LEU SER ASP ASP VAL PRO SER THR SER ARG ALA ALA LEU GLU PHE LEU GLN ARG SER GLN ASN MET SER LYS SER ARG PRO PRO ASP GLU SER SER ALA ASP VAL VAL PHE LYS LYS PRO LEU ALA PRO ALA PRO ARG ALA LYS SER LYS GLY LYS SER GLU VAL ASP LYS LEU LYS

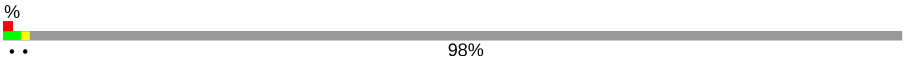
LEU ALA LYS MET PRO VAL GLU GLU LEU ASN THR THR GLY ILE ARG ARG SER LYS ARG GLY GLN VAL PRO LEU GLN MET SER TRP CYS HIS THR MET ASP PRO SER LYS PHE ASN PHE MET SER GLY PHE ILE GLU PRO ARG SER LYS SER ASN SER LYS THR LYS LYS GLY ASN LEU

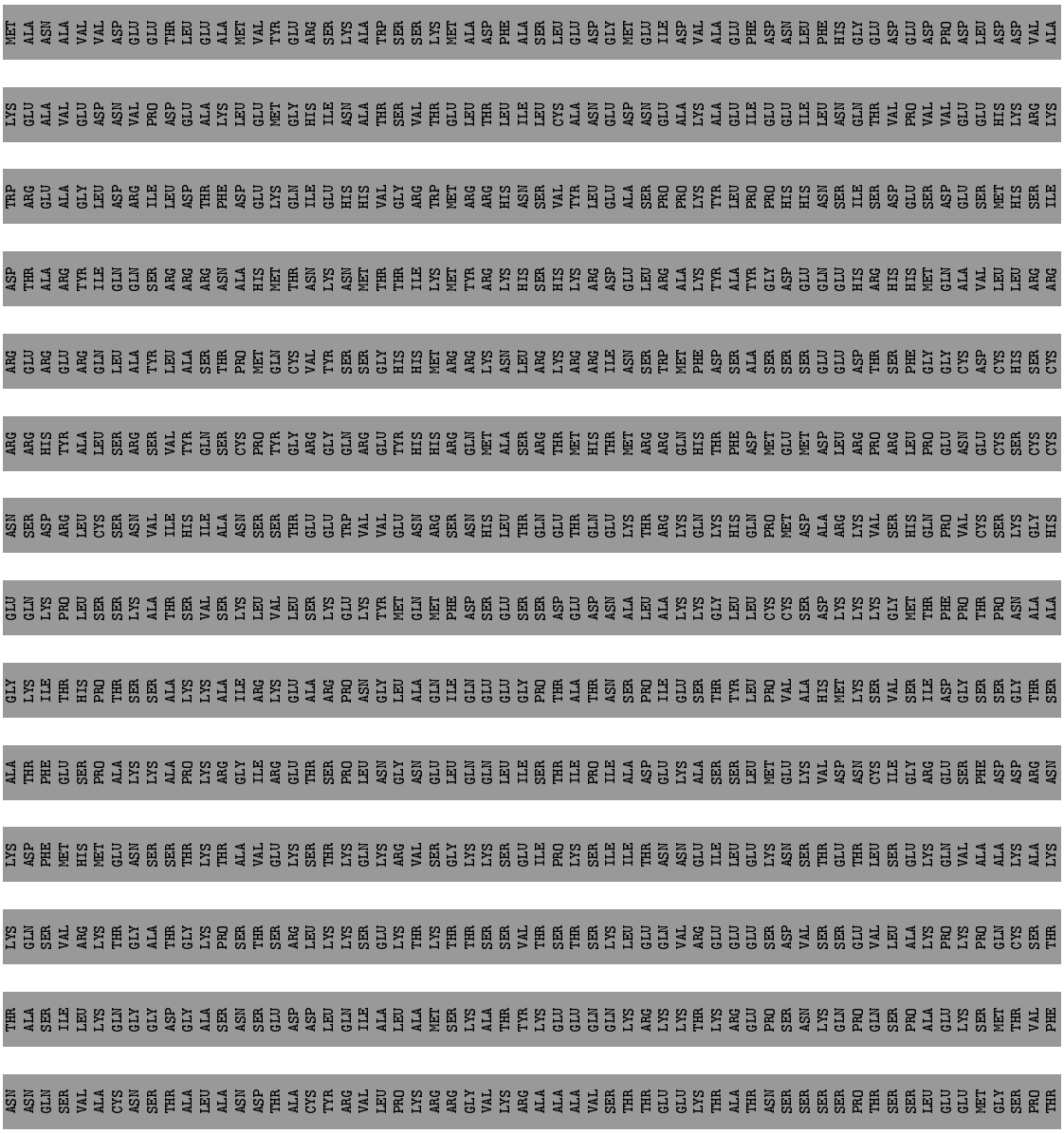
SER LYS ALA LYS LYS ALA SER ALA THR LYS PRO THR VAL GLU LYS ASN LEU PRO ASP ASN ARG GLY PRO LEU CYS SER SER THR PRO ARG ILE SER GLU LYS LEU PRO GLY ALA ILE PRO HIS SER GLU SER LEU GLY LEU SER SER THR LEU THR TRP GLU GLU THR GLU VAL GLN

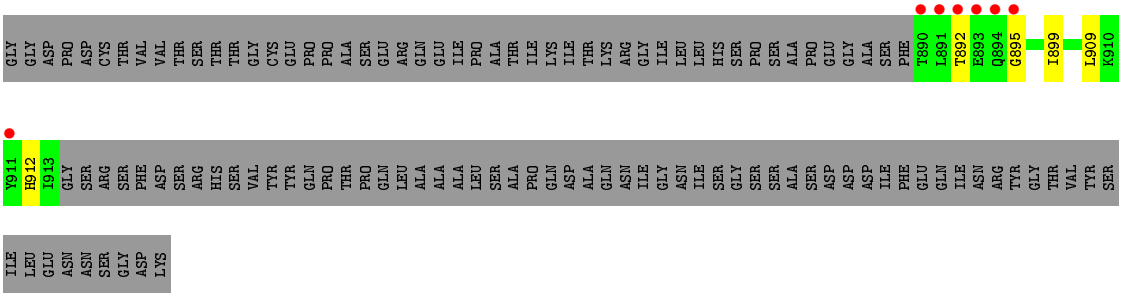



- Molecule 2: Ryanodine Receptor 2

Chain E:




GLY GLY ASP PRO ASP CYS THR VAL VAL THR SER THR THR GLY CYS GLU PRO PRO ALA SER GLU ARG GLN GLU ILE PRO ALA THR ILE LYS ILE THR LYS ARG GLY ILE LEU LEU HIS SER PRO SER ALA PRO GLU GLY ALA SER PHE T890 L891 T892 E893 Q894 G895 I899 L909 K910
Y911 H912 I913 GLY SER ARG SER PHE ASP SER ARG HIS SER VAL TYR TYR GLN PRO THR PRO GLN LEU ALA ALA ALA LEU SER ALA PRO GLN ASP ALA GLN ASN ILE GLY ASN ILE SER GLY SER SER ALA SER ASP ASP ILE PHE GLU GLN ILE ASN ARG TYR GLY THR VAL TYR SER
ILE LEU GLU ASN ASN SER GLY ASP LYS

# 4 Data and refinement statistics (i)

| Property | Value | Source |
|---|---|---|
| Space group | P 21 21 21 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 86.27Å 86.44Å 88.46Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 29.08 – 2.27<br>29.10 – 2.27 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 98.4 (29.08-2.27)<br>92.1 (29.10-2.27) | Depositor<br>EDS |
| $R_{merge}$ | 0.08 | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 1.57 (at 2.26Å) | Xtriage |
| Refinement program | PHENIX 1.17.1_3660 | Depositor |
| R, $R_{free}$ | 0.237 , 0.266<br>0.237 , 0.265 | Depositor<br>DCC |
| $R_{free}$ test set | 1961 reflections (6.33%) | wwPDB-VP |
| Wilson B-factor (Å$^2$) | 40.5 | Xtriage |
| Anisotropy | 1.016 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å$^3$), $B_{sol}$(Å$^2$) | 0.33 , 49.6 | EDS |
| L-test for twinning[2] | $< \|L\| > = 0.47$, $< L^2 > = 0.30$ | Xtriage |
| Estimated twinning fraction | 0.000 for -h,l,k<br>0.000 for -l,-k,-h<br>0.000 for k,h,-l<br>0.000 for k,l,h<br>0.000 for l,h,k | Xtriage |
| $F_o$,$F_c$ correlation | 0.94 | EDS |
| Total number of atoms | 4229 | wwPDB-VP |
| Average B, all atoms (Å$^2$) | 71.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 42.84 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.9248e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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

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 | 0.36 | 0/1058 | 0.71 | 4/1425 (0.3%) |
| 1 | B | 0.48 | 1/1000 (0.1%) | 0.82 | 6/1345 (0.4%) |
| 1 | C | 0.36 | 0/1042 | 0.56 | 1/1403 (0.1%) |
| 1 | D | 0.36 | 0/984 | 0.67 | 1/1325 (0.1%) |
| 2 | E | 0.24 | 0/195 | 0.42 | 0/262 |
| All | All | 0.39 | 1/4279 (0.0%) | 0.69 | 12/5760 (0.2%) |

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 | B | 0 | 1 |

All (1) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|---|---|---|---|---|---|---|---|
| 1 | B | 1390 | ARG | CZ-NH1 | 5.92 | 1.40 | 1.33 |

The worst 5 of 12 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|---|---|---|---|---|---|---|---|
| 1 | B | 1390 | ARG | NE-CZ-NH2 | -11.31 | 114.64 | 120.30 |
| 1 | A | 1381 | ARG | CG-CD-NE | 9.18 | 131.08 | 111.80 |
| 1 | A | 1339 | LYS | CA-CB-CG | 8.01 | 131.02 | 113.40 |
| 1 | B | 1278 | GLU | CB-CA-C | 6.60 | 123.60 | 110.40 |
| 1 | B | 1315 | TYR | CA-CB-CG | 6.33 | 125.42 | 113.40 |

There are no chirality outliers.

All (1) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group |
|---|---|---|---|---|
| 1 | B | 1390 | 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 | 1041 | 0 | 1021 | 18 | 0 |
| 1 | B | 985 | 0 | 962 | 24 | 0 |
| 1 | C | 1025 | 0 | 1009 | 12 | 0 |
| 1 | D | 969 | 0 | 943 | 22 | 0 |
| 2 | E | 191 | 0 | 192 | 5 | 0 |
| 3 | A | 6 | 0 | 0 | 0 | 0 |
| 3 | B | 3 | 0 | 0 | 0 | 0 |
| 3 | C | 3 | 0 | 0 | 0 | 0 |
| 3 | D | 5 | 0 | 0 | 0 | 0 |
| 3 | E | 1 | 0 | 0 | 0 | 0 |
| All | All | 4229 | 0 | 4127 | 77 | 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 9.

The worst 5 of 77 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:B:1352:HIS:HE1 | 1:B:1411:SER:N | 1.74 | 0.86 |
| 1:B:1352:HIS:HE1 | 1:B:1411:SER:H | 1.27 | 0.80 |
| 1:D:1352:HIS:CD2 | 1:D:1353:PRO:HD2 | 2.22 | 0.75 |
| 1:D:1352:HIS:ND1 | 1:D:1410:ARG:HB3 | 2.04 | 0.73 |
| 1:B:1352:HIS:CE1 | 1:B:1411:SER:N | 2.57 | 0.73 |

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 | 129/1411 (9%) | 124 (96%) | 4 (3%) | 1 (1%) | 19 22 |
| 1 | B | 121/1411 (9%) | 119 (98%) | 2 (2%) | 0 | 100 100 |
| 1 | C | 127/1411 (9%) | 121 (95%) | 6 (5%) | 0 | 100 100 |
| 1 | D | 119/1411 (8%) | 117 (98%) | 2 (2%) | 0 | 100 100 |
| 2 | E | 22/979 (2%) | 22 (100%) | 0 | 0 | 100 100 |
| All | All | 518/6623 (8%) | 503 (97%) | 14 (3%) | 1 (0%) | 47 57 |

All (1) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 1372 | GLU |

### 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 | 110/1275 (9%) | 107 (97%) | 3 (3%) | 44 59 |
| 1 | B | 105/1275 (8%) | 102 (97%) | 3 (3%) | 42 56 |
| 1 | C | 109/1275 (8%) | 106 (97%) | 3 (3%) | 43 57 |
| 1 | D | 103/1275 (8%) | 103 (100%) | 0 | 100 100 |
| 2 | E | 17/861 (2%) | 17 (100%) | 0 | 100 100 |
| All | All | 444/5961 (7%) | 435 (98%) | 9 (2%) | 55 70 |

5 of 9 residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 1315 | TYR |
| 1 | C | 1389 | ASP |
| 1 | C | 1282 | LYS |
| 1 | A | 1389 | ASP |
| 1 | B | 1343 | LYS |

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | B | 1352 | HIS |
| 1 | C | 1316 | GLN |
| 1 | D | 1397 | GLN |

#### 5.3.3 RNA

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates

There are no carbohydrates in this entry.

### 5.6 Ligand geometry

There are no ligands in this entry.

### 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(Å$^2$) | Q<0.9 |
|---|---|---|---|---|---|---|---|---|
| 1 | A | 133/1411 (9%) | 1.00 | 24 (18%) | 1 | 1 | 39, 62, 111, 152 | 0 |
| 1 | B | 125/1411 (8%) | 0.99 | 21 (16%) | 1 | 2 | 41, 67, 114, 141 | 0 |
| 1 | C | 131/1411 (9%) | 1.03 | 21 (16%) | 1 | 2 | 41, 64, 126, 147 | 0 |
| 1 | D | 123/1411 (8%) | 1.07 | 22 (17%) | 1 | 1 | 43, 74, 123, 154 | 0 |
| 2 | E | 24/979 (2%) | 1.10 | 7 (29%) | 0 | 0 | 48, 61, 83, 114 | 0 |
| All | All | 536/6623 (8%) | 1.03 | 95 (17%) | 1 | 1 | 39, 67, 118, 154 | 0 |

The worst 5 of 95 RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|---|---|---|---|---|
| 1 | C | 1293 | ALA | 8.8 |
| 1 | B | 1315 | TYR | 8.6 |
| 1 | D | 1352 | HIS | 8.0 |
| 1 | C | 1292 | ASP | 7.9 |
| 1 | A | 1373 | GLU | 6.4 |

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

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

## 6.3 Carbohydrates

There are no carbohydrates in this entry.

## 6.4 Ligands

There are no ligands in this entry.

## 6.5 Other polymers (i)

There are no such residues in this entry.