

# wwPDB EM Validation Summary Report (i)

#### Oct 2, 2024 – 04:45 PM JST

| PDB ID       | : | 8XJV   |
|--------------|---|--|
| EMDB ID      | : | EMD-38407  |
| Title        | : | Structural basis for the linker histone H5-nucleosome binding and chromatin compaction |
| Authors      | : | Li, W.Y.; Song, F.; Zhu, P.  |
| Deposited on | : | 2023-12-22   |
| Resolution   | : | 3.60  Å(reported)  |
|              |   |  |

This is a wwPDB EM 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/EMValidationReportHelp 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.

The following versions of software and data (see references (1)) were used in the production of this report:

| EMDB validation analysis       | : | 0.0.1.dev113   |
|--------------------------------|---|--|
| MolProbity                     | : | 4.02b-467  |
| Percentile statistics          | : | 20231227.v01 (using entries in the PDB archive December 27th 2023) |
| $\operatorname{MapQ}$          | : | 1.9.13   |
| Ideal geometry (proteins)      | : | Engh & Huber (2001)  |
| Ideal geometry (DNA, RNA)      | : | Parkinson et al. (1996)  |
| Validation Pipeline (wwPDB-VP) | : | 2.39   |

# 1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:  $ELECTRON\ MICROSCOPY$ 

The reported resolution of this entry is 3.60 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<br>(#Entries) | ${f EM} {f structures} \ (\#{f Entries})$ |
|-----------------------|-----------------------------|---|
| Clashscore            | 210492                      | 15764                                     |
| Ramachandran outliers | 207382                      | 16835                                     |
| Sidechain outliers    | 206894                      | 16415                                     |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |     |    |
|-----|-------|--------|------------------|-----|----|
| 1   | Au    | 2124   | 99%              |     | _  |
| 2   | Av    | 2124   | 99%              |     | •  |
| 3   | А     | 130    | 86%              | 8%  | 6% |
| 3   | Ae    | 130    | 93%              |     | 6% |
| 3   | В     | 130    | 83%              | 14% | ·  |
| 3   | С     | 130    | 79%              | 20% | •  |
| 3   | D     | 130    | 88%              | 6%  | 5% |
| 3   | Е     | 130    | <b>▲</b> 86%     | 12% | •  |



| Mol | Chain | Length | Quality of chain |         |
|-----|-------|--------|------------------|---------|
| 3   | F     | 130    | 84%              | 7% • 8% |
| 3   | G     | 130    | 85%              | 14% ••  |
| 3   | Н     | 130    | 80%              | 16% •   |
| 3   | Ι     | 130    | 91%              | 8% •    |
| 3   | K     | 130    | 83%              | 13% ••  |
| 3   | L     | 130    | 85%              | 15% ·   |
| 3   | aj    | 130    | 92%              | • 5%    |
| 3   | ak    | 130    | 91%              | • 5%    |
| 3   | al    | 130    | 85%              | 15%     |
| 3   | am    | 130    | 95%              |         |
| 3   | an    | 130    | 94%              |         |
| 3   | ao    | 130    | 95%              | 5%      |
| 3   | ар    | 130    | 98%              |         |
| 3   | aq    | 130    | 89%              | • 10%   |
| 3   | ar    | 130    | 98%              |         |
| 3   | as    | 130    | 92%              | 8%      |
| 3   | at    | 130    | 96%              |         |
| 3   | au    | 130    | <b>●</b> 85%     | • 15%   |
| 4   | Aa    | 123    | 82%              | • 16%   |
| 4   | Ab    | 123    | 99%              | •       |
| 4   | Ac    | 123    | 80% •            | 19%     |
| 4   | Ad    | 123    | 83%              | 17%     |
| 4   | Af    | 123    | 78%              | 21%     |
| 4   | Ag    | 123    | 83%              | • 15%   |
| 4   | At    | 123    | 96%              |         |



| Contr | nuea jron    | n previous | page             |     |       |
|-------|--------------|------------|------------------|-----|-------|
| Mol   | Chain        | Length     | Quality of chain |     |       |
| 4     | J            | 123        | 72%              | 11% | • 16% |
| 4     | М            | 123        | 85%              |     | 15%   |
| 4     | Ν            | 123        | 66%              | 19% | • 15% |
| 4     | Ο            | 123        | 67%              | 16% | 16%   |
| 4     | Р            | 123        | 76%              | 99  | % 15% |
| 4     | Q            | 123        | 86%              |     | 13% • |
| 4     | R            | 123        | 69%              | 12% | 19%   |
| 4     | $\mathbf{S}$ | 123        | 80%              |     | 20%   |
| 4     | Т            | 123        | <b>•</b><br>84%  |     | 16%   |
| 4     | U            | 123        | •<br>89%         |     | 10% • |
| 4     | V            | 123        | 80%              |     | 20% • |
| 4     | W            | 123        | 73%              |     | 26% • |
| 4     | av           | 123        | 83%              |     | • 16% |
| 4     | aw           | 123        | 98%              |     | ·     |
| 4     | ax           | 123        | 98%              |     |       |
| 4     | ay           | 123        | 98%              |     | ·     |
| 4     | az           | 123        | 80%              |     | 19%   |
| 5     | Х            | 136        | <b>6</b> 9%      | 13% | 18%   |
| 5     | Y            | 136        | 72%              | 9%  | • 18% |
| 5     | Ζ            | 136        | 54% 12%          |     | 34%   |
| 5     | a            | 136        | 89%              |     | • 8%  |
| 5     | b            | 136        | 73%              | •   | 26%   |
| 5     | с            | 136        | 76%              | •   | 22%   |
| 5     | d            | 136        | 72%              |     | 28%   |
| 5     | е            | 136        | 68%              |     | 31%   |



| Mol | Chain | Length | Quality of chain |                 |
|-----|-------|--------|------------------|-----------------|
| 5   | f     | 136    | 72%              | 28%             |
| 5   | g     | 136    | 74%              | • 25%           |
| 5   | h     | 136    | 69%              | • 29%           |
| 5   | i     | 136    | 71%              | • 27%           |
| 5   | j     | 136    | <b>•</b> 76%     | • 23%           |
| 5   | k     | 136    | 72%              | • 27%           |
| 5   | 1     | 136    | <b>•</b> 81%     | • 16%           |
| 5   | m     | 136    | 69%              | • 28%           |
| 5   | n     | 136    | 82%              | • 17%           |
| 5   | 0     | 136    | 79%              | • 20%           |
| 5   | р     | 136    | 74%              | • 25%           |
| 5   | q     | 136    | <b>●</b>         | • 19%           |
| 5   | r     | 136    | 75%              | • 22%           |
| 5   | s     | 136    | 70%              | 30%             |
| 5   | t     | 136    | <b>•</b><br>80%  | • 19%           |
| 5   | u     | 136    | 90%              | • 7%            |
| 6   | 0     | 103    | 78%              | 13% • 9%        |
| 6   | 1     | 103    | 8%               | 10% 16%         |
| 6   | 2     | 103    | <b></b> 76%      | <b>16% • 8%</b> |
| 6   | 3     | 103    | 79%              | 12% 10%         |
| 6   | 4     | 103    | <b>•</b> 74%     | 11% 16%         |
| 6   | 5     | 103    | 83%              | 10% 8%          |
| 6   | 6     | 103    | 72%              | 11% 17%         |
| 6   | 7     | 103    | 77%              | 20% ••          |
| 6   | 8     | 103    | 65%              | 18% 17%         |



| 6       9       103       77%       22% $6$ $CD$ $103$ 75% $17%$ $17%$ $6$ $a2$ $103$ $96%$ $17%$ $17%$ $6$ $a2$ $103$ $96%$ $16%$ $103$ $96%$ $16%$ $6$ $a3$ $103$ $83%$ $16%$ $16%$ $6$ $a4$ $103$ $92%$ $12%$ $6$ $a6$ $103$ $97%$ $12%$ $6$ $a6$ $103$ $97%$ $12%$ $6$ $a8$ $103$ $88%$ $12%$ $6$ $a8$ $103$ $82%$ $16%$ $6$ $a9$ $103$ $93%$ $13%$ $6$ $v$ $103$ $93%$ $13%$   | •<br>• •<br>7%<br>•<br>•<br>•<br>•<br>• |
|---|---|
| 6       CD $103$ $75%$ $17%$ $6$ $a2$ $103$ $96%$ $6$ $a3$ $103$ $92%$ $16%$ $6$ $a4$ $103$ $92%$ $12%$ $6$ $a5$ $103$ $88%$ $12%$ $6$ $a6$ $103$ $97%$ $10%$ $6$ $a7$ $103$ $99%$ $10%$ $6$ $a8$ $103$ $82%$ $16%$ $6$ $a9$ $103$ $82%$ $13%$ $6$ $v$ $103$ $93%$ $33%$ $6$ $v$ $103$ $93%$ $33%$  | 6%<br>•••<br>7%<br>••<br>••             |
| $6$ $a2$ $103$ 96% $6$ $a3$ $103$ $83\%$ $16\%$ $6$ $a4$ $103$ $92\%$ $.$ $6$ $a5$ $103$ $7\%$ $88\%$ $12^\circ$ $6$ $a6$ $103$ $97\%$ $.$ $.$ $6$ $a6$ $103$ $97\%$ $.$ $.$ $6$ $a7$ $103$ $.$ $.$ $.$ $6$ $a8$ $103$ $.$ $.$ $.$ $6$ $a9$ $103$ $.$ $.$ $.$ $.$ $6$ $v$ $103$ $.$ | · · ·<br>7%<br>6<br>· ·                 |
| $6$ $a3$ $103$ $83\%$ $16\%$ $6$ $a4$ $103$ $92\%$ $.$ $6$ $a5$ $103$ $7\%$ $88\%$ $12^{\circ}$ $6$ $a6$ $103$ $7\%$ $88\%$ $12^{\circ}$ $6$ $a6$ $103$ $7\%$ $88\%$ $12^{\circ}$ $6$ $a6$ $103$ $7\%$ $88\%$ $12^{\circ}$ $6$ $a7$ $103$ $7\%$ $88\%$ $12^{\circ}$ $6$ $a8$ $103$ $6\%$ $82\%$ $.16\%$ $6$ $a9$ $103$ $6\%$ $85\%$ $.13\%$ $6$ $v$ $103$ $93\%$ $.$ $93\%$ $.$ $6$ $w$ $103$ $93\%$ $.$ $93\%$ $.$                       | 7%<br>6<br>• • •                        |
| $6$ $a4$ $103$ $92\%$ $\cdot$ $6$ $a5$ $103$ $7\%$ $88\%$ $12'$ $6$ $a6$ $103$ $97\%$ $6$ $a6$ $103$ $97\%$ $6$ $a7$ $103$ $99\%$ $6$ $a8$ $103$ $82\%$ $.66\%$ $6$ $a9$ $103$ $6\%$ $85\%$ $.139$ $6$ $v$ $103$ $6\%$ $.139$ $6$ $v$ $103$ $.139$ $6$ $v$ $103$ $.99\%$ $.139$   | 7%<br>6<br>••                           |
| 6 $a5$ $103$ $7%$ $88%$ $12$ $6$ $a6$ $103$ $97%$ $97%$ $6$ $a7$ $103$ $99%$ $6$ $6$ $a8$ $103$ $82%$ $16%$ $6$ $a9$ $103$ $6%$ $85%$ $13%$ $6$ $v$ $103$ $93%$ $.$ $13%$ $6$ $v$ $103$ $93%$ $.$ $13%$   | 6<br>•••                                |
| 6 $a6$ $103$ $97%$ $6$ $a7$ $103$ $99%$ $6$ $a8$ $103$ $82%$ $16%$ $6$ $a8$ $103$ $82%$ $16%$ $6$ $a9$ $103$ $85%$ $13%$ $6$ $v$ $103$ $85%$ $13%$ $6$ $v$ $103$ $93%$ $.$  | •••                                     |
| 6 $a0$ $103$ $97%$ $6$ $a7$ $103$ $99%$ $6$ $a8$ $103$ $82%$ $16%$ $6$ $a9$ $103$ $85%$ $13%$ $6$ $v$ $103$ $93%$ $09%$   | <br>                                    |
| 6 $a7$ $103$ $99%$ $6$ $a8$ $103$ $82%$ $16%$ $6$ $a9$ $103$ $6%$ $35%$ $13%$ $6$ $v$ $103$ $93%$ $09%$ $6$ $w$ $103$ $93%$ $09%$   | •                                       |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$  |   |
| 6     a9     103     85%     139       6     v     103     93%     .       6     w     103     93%     .  |   |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$   | )                                       |
| 6 w 103   | 5%                                      |
|   | <b>—</b> .                              |
| 6 x 103 96%   | <b>.</b>                                |
| 6 y 103 99%   | -                                       |
| 6 z 103 81% · 18%   | _                                       |
| 7 Ah 196 64% · 34%  |   |
| 7 Ai 196 5% . 139   | )                                       |
| 7 Aj 196 49% · 47%  | _                                       |
| 7 Ak 196 64% · 34%  | _                                       |
| 7 Al 196 52% · 45%  | _                                       |
| 7 Am 196 . 11   | %                                       |
| 7 An 196 61% · 35%  | _                                       |
| 7 Ao 196  | _                                       |
| 7 Ap 196  |   |
| 7 Ag 196 6%   |   |



| Mol | Chain | Length | Quality of chain  |   |    |
|-----|-------|--------|-------------------|---|----|
| 7   | Ar    | 196    | 88%               | • | 8% |
| 7   | As    | 196    | <b>62%</b> 5% 33% |   |    |



# 2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 181715 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 DNA chain called DNA.

| Mol | Chain | Residues |                | 1          | Atoms     |            |           | AltConf | Trace |
|-----|-------|----------|----------------|------------|-----------|------------|-----------|---------|-------|
| 1   | Au    | 2116     | Total<br>43052 | C<br>20433 | N<br>7794 | O<br>12709 | Р<br>2116 | 0       | 0     |

• Molecule 2 is a DNA chain called DNA.

| Mol | Chain | Residues |                | I          | Atoms     |            |           | AltConf | Trace |
|-----|-------|----------|----------------|------------|-----------|------------|-----------|---------|-------|
| 2   | Av    | 2112     | Total<br>43620 | C<br>20607 | N<br>8241 | O<br>12660 | Р<br>2112 | 0       | 0     |

• Molecule 3 is a protein called Histone H2A.

| Mol | Chain | Residues | Atoms   | AltConf | Trace |
|-----|-------|----------|---|---------|-------|
| 3   | А     | 122      | Total C N O<br>936 585 184 167  | 0       | 0     |
| 3   | В     | 126      | Total         C         N         O           962         600         190         172                     | 0       | 0     |
| 3   | С     | 129      | Total C N O<br>983 611 196 176  | 0       | 0     |
| 3   | D     | 123      | Total C N O<br>940 587 185 168  | 0       | 0     |
| 3   | Е     | 128      | Total C N O<br>973 605 194 174  | 0       | 0     |
| 3   | F     | 119      | Total C N O<br>916 573 180 163  | 0       | 0     |
| 3   | G     | 129      | Total C N O<br>983 611 196 176  | 0       | 0     |
| 3   | Н     | 125      | Total C N O<br>958 598 189 171  | 0       | 0     |
| 3   | Ι     | 129      | Total C N O<br>983 611 196 176  | 0       | 0     |
| 3   | K     | 128      | Total C N O<br>977 608 195 174  | 0       | 0     |
| 3   | L     | 130      | Total         C         N         O         S           991         616         197         177         1 | 0       | 0     |



| Mol | Chain | Residues | Atoms                 | AltConf | Trace |
|-----|-------|----------|-----------------------|---------|-------|
| 3   | aj    | 123      | Total C N O           | 0       | 0     |
|     |       |          | 940 587 185 168       |         |       |
| 3   | ak    | 123      | Total C N O           | 0       | 0     |
|     |       |          | 940 587 185 168       |         |       |
| 3   | al    | 111      | Total C N O           | 0       | 0     |
|     |       |          | 851 533 169 149       |         |       |
| 3   | am    | 127      | Total C N O           | 0       | 0     |
|     |       |          | 973 606 194 173       |         |       |
| 3   | an    | 125      | Total C N O           | 0       | 0     |
|     |       | 120      | 958 $598$ $189$ $171$ | 0       | 0     |
| 3   | 20    | 194      | Total C N O           | 0       | 0     |
| 0   | 40    | 127      | 949  592  187  170    | 0       | 0     |
| 3   | an    | 197      | Total C N O           | 0       | 0     |
| 0   | ар    | 121      | 973  606  194  173    | 0       | 0     |
| 3   | an    | 117      | Total C N O           | 0       | 0     |
| 0   | aq    | 111      | 900  564  175  161    | 0       | 0     |
| 3   | ər    | 120      | Total C N O           | 0       | 0     |
| 0   | ai    | 129      | 983  611  196  176    | 0       | 0     |
| 3   | 95    | 110      | Total C N O           | 0       | 0     |
| 0   | as    | 119      | 916 573 180 163       | 0       | 0     |
| 2   | ot    | 196      | Total C N O           | 0       | 0     |
| 0   | at    | 120      | 962  600  190  172    | 0       | 0     |
| 3   | 011   | 111      | Total C N O           | 0       | 0     |
| 0   | au    |          | 859  540  169  150    | 0       | 0     |
| 9   | Δο    | 199      | Total C N O           | 0       | 0     |
| 0   | не    |          | 936 $585$ $184$ $167$ | U       | U     |

• Molecule 4 is a protein called Histone H2B 1.1.

| Mol | Chain | Residues |       | At  | oms |     |              | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|--------------|---------|-------|
| 4   | т     | 103      | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 4   | J     | 105      | 814   | 510 | 152 | 150 | 2            | 0       | 0     |
| 4   | М     | 193      | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 4   | 111   | 123      | 956   | 599 | 179 | 175 | 3            | 0       | 0     |
| 4   | N     | 105      | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 4   | IN    | 105      | 830   | 519 | 155 | 154 | 2            | 0       | 0     |
| 4   | 0     | 103      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 4   | 0     | 105      | 814   | 510 | 152 | 150 | 2            | 0       | 0     |
| 4   | P     | 105      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 4   | I     | 105      | 830   | 519 | 155 | 154 | 2            | 0       | 0     |
|     | 0     | 193      | Total | С   | N   | 0   | S            | 0       | 0     |
| ±   | Q     | 123      | 956   | 599 | 179 | 175 | 3            | 0       | 0     |



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| Mol | Chain | Residues |       | At  | oms |     |              | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|--------------|---------|-------|
| 4   | B     | 100      | Total | С   | Ν   | 0   | S            | 0       | 0     |
|     | 10    | 100      | 788   | 494 | 147 | 145 | 2            | 0       | 0     |
| 4   | S     | 123      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     | 5     | 120      | 956   | 599 | 179 | 175 | 3            | 0       | 0     |
| 4   | Т     | 123      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     | 1     | 120      | 956   | 599 | 179 | 175 | 3            | 0       | 0     |
| 4   | U     | 123      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     | Ŭ     | 120      | 956   | 599 | 179 | 175 | 3            | 0       |       |
| 4   | V     | 123      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     | •     | 120      | 956   | 599 | 179 | 175 | 3            | Ŭ       |       |
| 4   | W     | 123      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       | 120      | 956   | 599 | 179 | 175 | 3            | Ŭ       |       |
| 4   | av    | 103      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       | 100      | 814   | 510 | 152 | 150 | 2            | Ŭ       |       |
| 4   | aw    | 123      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| -   |       | 120      | 956   | 599 | 179 | 175 | 3            | Ŭ       |       |
| 4   | ax    | 123      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| -   |       | 120      | 956   | 599 | 179 | 175 | 3            | Ŭ       |       |
| 4   | av    | 123      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     | ay    | 120      | 956   | 599 | 179 | 175 | 3            | Ŭ       |       |
| 4   | az    | 100      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       | 100      | 788   | 494 | 147 | 145 | 2            | Ŭ       |       |
| 4   | Aa    | 103      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       | 100      | 814   | 510 | 152 | 150 | 2            | Ŭ       |       |
| 4   | Ab    | 123      | Total | С   | Ν   | 0   | S            | 0       | 0     |
|     |       |          | 956   | 599 | 179 | 175 | 3            | Ŭ       |       |
| 4   | Ac    | 100      | Total | С   | Ν   | 0   | S            | 0       | 0     |
|     |       |          | 788   | 494 | 147 | 145 | 2            | Ŭ       |       |
| 4   | Ad    | 102      | Total | С   | Ν   | Ο   | S            | 0       | 0     |
|     |       | 102      | 805   | 504 | 150 | 149 | 2            | Ŭ       |       |
| 4   | Af    | 97       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       |          | 766   | 480 | 142 | 142 | 2            | Ŭ       |       |
| 4   | Ag    | 104      | Total | С   | Ν   | Ο   | S            | 0       | 0     |
|     | 0     |          | 823   | 515 | 154 | 152 | 2            |         |       |
| 4   | At    | 123      | Total | С   | Ν   | Ο   | S            | 0       | 0     |
|     | 110   | 120      | 956   | 599 | 179 | 175 | 3            |         |       |

There are 24 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment               | Reference  |
|-------|---------|----------|--------|-----------------------|------------|
| J     | 1948    | MET      | -      | initiating methionine | UNP P02281 |
| М     | 0       | MET      | -      | initiating methionine | UNP P02281 |
| N     | 105     | MET      | -      | initiating methionine | UNP P02281 |



| Chain | Residue | Modelled | Actual | Comment               | Reference  |
|-------|---------|----------|--------|-----------------------|------------|
| 0     | 375     | MET      | -      | initiating methionine | UNP P02281 |
| Р     | 480     | MET      | -      | initiating methionine | UNP P02281 |
| Q     | 603     | MET      | -      | initiating methionine | UNP P02281 |
| R     | 230     | MET      | -      | initiating methionine | UNP P02281 |
| S     | 849     | MET      | -      | initiating methionine | UNP P02281 |
| Т     | 2736    | MET      | -      | initiating methionine | UNP P02281 |
| U     | 1838    | MET      | -      | initiating methionine | UNP P02281 |
| V     | 976     | MET      | -      | initiating methionine | UNP P02281 |
| W     | 2859    | MET      | -      | initiating methionine | UNP P02281 |
| av    | 0       | MET      | -      | initiating methionine | UNP P02281 |
| aw    | 123     | MET      | -      | initiating methionine | UNP P02281 |
| ax    | 246     | MET      | -      | initiating methionine | UNP P02281 |
| ay    | 369     | MET      | -      | initiating methionine | UNP P02281 |
| az    | 469     | MET      | -      | initiating methionine | UNP P02281 |
| Aa    | 572     | MET      | -      | initiating methionine | UNP P02281 |
| Ab    | 695     | MET      | -      | initiating methionine | UNP P02281 |
| Ac    | 795     | MET      | -      | initiating methionine | UNP P02281 |
| Ad    | 2843    | MET      | -      | initiating methionine | UNP P02281 |
| Af    | 1074    | MET      | -      | initiating methionine | UNP P02281 |
| Ag    | 3069    | MET      | -      | initiating methionine | UNP P02281 |
| At    | 0       | MET      | -      | initiating methionine | UNP P02281 |

• Molecule 5 is a protein called Histone H3.

| Mol | Chain | Residues |       | At  | oms |     |              | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|--------------|---------|-------|
| 5   | v     | 119      | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 0   | Λ     | 112      | 901   | 566 | 176 | 156 | 3            | 0       | 0     |
| 5   | v     | 111      | Total | С   | Ν   | Ο   | S            | 0       | 0     |
| 0   | 1     | 111      | 896   | 563 | 175 | 155 | 3            | 0       | 0     |
| 5   | 7     | 00       | Total | С   | Ν   | Ο   | S            | 0       | 0     |
| 0   |       | 90       | 739   | 466 | 140 | 130 | 3            | 0       | 0     |
| 5   | 0     | 195      | Total | С   | Ν   | Ο   | S            | 0       | 0     |
| 0   | a     | 120      | 995   | 624 | 196 | 172 | 3            | 0       | 0     |
| 5   | h     | 101      | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 0   | D     | 101      | 833   | 526 | 161 | 143 | 3            | 0       | 0     |
| 5   | 0     | 106      | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 0   | C     | 100      | 860   | 542 | 166 | 149 | 3            | 0       | 0     |
| 5   | d     | 08       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 0   | u     | 90       | 808   | 509 | 156 | 140 | 3            | 0       | 0     |
| 5   | 0     | 04       | Total | С   | Ν   | Ο   | S            | 0       | 0     |
|     | е     | 54       | 768   | 483 | 147 | 135 | 3            |         |       |
| 5   | f     | 08       | Total | С   | Ν   | 0   | S            | 0       | 0     |
|     | L     | 90       | 808   | 509 | 156 | 140 | 3            | 0       | U     |



| $\operatorname{Mol}$ | Chain | Residues |       | $\mathbf{At}$ | $\mathbf{oms}$ |     |              | AltConf | Trace |
|----------------------|-------|----------|-------|---------------|----------------|-----|--------------|---------|-------|
| 5                    | ď     | 102      | Total | С             | Ν              | 0   | S            | 0       | 0     |
| 0                    | 5     | 102      | 837   | 528           | 162            | 144 | 3            | 0       | 0     |
| 5                    | h     | 07       | Total | С             | Ν              | Ο   | $\mathbf{S}$ | 0       | 0     |
| 5                    | 11    | 91       | 801   | 504           | 155            | 139 | 3            | 0       | 0     |
| ĸ                    | ;     | 00       | Total | С             | Ν              | 0   | S            | 0       | 0     |
| 5                    | 1     | 99       | 817   | 515           | 158            | 141 | 3            | 0       | 0     |
| K                    | ;     | 105      | Total | С             | Ν              | 0   | S            | 0       | 0     |
| 5                    | J     | 105      | 853   | 537           | 165            | 148 | 3            | 0       | 0     |
| ĸ                    | 1.    | 00       | Total | С             | Ν              | 0   | S            | 0       | 0     |
| 5                    | K     | 99       | 817   | 515           | 158            | 141 | 3            | 0       | 0     |
| Б                    | 1     | 114      | Total | С             | Ν              | 0   | S            | 0       | 0     |
| 5                    | 1     | 114      | 917   | 576           | 179            | 159 | 3            | 0       | 0     |
| Б                    | m     | 08       | Total | С             | Ν              | 0   | S            | 0       | 0     |
| 0                    | 111   | 90       | 808   | 509           | 156            | 140 | 3            | 0       | 0     |
| 5                    | n     | 112      | Total | С             | Ν              | 0   | S            | 0       | 0     |
| 9                    | 11    | 115      | 910   | 572           | 178            | 157 | 3            | 0       | 0     |
| 5                    | 0     | 100      | Total | С             | Ν              | Ο   | S            | 0       | 0     |
| 0                    | 0     | 103      | 880   | 554           | 170            | 153 | 3            | 0       | 0     |
| 5                    | n     | 102      | Total | С             | Ν              | Ο   | $\mathbf{S}$ | 0       | Ο     |
| 0                    | р     | 102      | 837   | 528           | 162            | 144 | 3            | 0       | 0     |
| 5                    | a     | 110      | Total | С             | Ν              | Ο   | $\mathbf{S}$ | 0       | Ο     |
| 0                    | Ч     | 110      | 891   | 560           | 174            | 154 | 3            | 0       | 0     |
| 5                    | r     | 106      | Total | С             | Ν              | Ο   | $\mathbf{S}$ | 0       | Ο     |
| 0                    | 1     | 100      | 860   | 542           | 166            | 149 | 3            | 0       | 0     |
| 5                    | q     | 95       | Total | С             | Ν              | Ο   | $\mathbf{S}$ | 0       | Ο     |
| 0                    | a     | 50       | 780   | 492           | 148            | 137 | 3            | 0       | 0     |
| 5                    | +     | 110      | Total | С             | Ν              | Ο   | $\mathbf{S}$ | 0       | Ο     |
| 0                    | U     | 110      | 890   | 560           | 174            | 153 | 3            | U       | 0     |
| 5                    | 11    | 126      | Total | $\mathbf{C}$  | Ν              | Ο   | S            | 0       | 0     |
| 0                    | u     | 120      | 1001  | 627           | 197            | 174 | 3            | 0       | 0     |

• Molecule 6 is a protein called Histone H4.

| Mol | Chain | Residues |       | At  | oms |     | AltConf | Trace |   |
|-----|-------|----------|-------|-----|-----|-----|---------|-------|---|
| 6   | 17    | 08       | Total | С   | Ν   | 0   | S       | 0     | 0 |
| 0   | v     | 90       | 767   | 481 | 156 | 129 | 1       | 0     | 0 |
| 6   |       | 102      | Total | С   | Ν   | 0   | S       | 0     | 0 |
| 0   | W     | 105      | 800   | 499 | 164 | 135 | 2       | 0     | 0 |
| 6   |       | 00       | Total | С   | Ν   | 0   | S       | 0     | 0 |
| 0   | X     | 99       | 771   | 483 | 157 | 130 | 1       | 0     | 0 |
| 6   | 17    | 102      | Total | С   | Ν   | 0   | S       | 0     | 0 |
| 0   | У     | 102      | 792   | 494 | 163 | 134 | 1       | 0     | 0 |



Continued from previous page...

| Mol | Chain | Residues |       | At  | oms |     |              | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|--------------|---------|-------|
| 6   | -     | 0.1      | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 0   | Z     | 04       | 673   | 424 | 133 | 115 | 1            | 0       | 0     |
| 6   | 0     | 0.4      | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 0   | 0     | 94       | 741   | 465 | 150 | 125 | 1            | 0       | 0     |
| 6   | 1     | 87       | Total | С   | Ν   | 0   | S            | 0       | 0     |
| 0   | T     | 01       | 703   | 442 | 142 | 118 | 1            | 0       | 0     |
| 6   | 2     | 95       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 0   | 2     | 90       | 750   | 471 | 152 | 126 | 1            | 0       | 0     |
| 6   | 3     | 93       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 0   | 0     | 50       | 736   | 463 | 149 | 123 | 1            | 0       | 0     |
| 6   | 4     | 87       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 0   | Т     | 01       | 703   | 442 | 142 | 118 | 1            | 0       | 0     |
| 6   | 5     | 95       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 0   | 0     | 50       | 750   | 471 | 152 | 126 | 1            | 0       | 0     |
| 6   | 6     | 85       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 0   | 0     | 00       | 688   | 432 | 140 | 115 | 1            | 0       | 0     |
| 6   | 7     | 101      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 0   | •     | 101      | 786   | 491 | 162 | 132 | 1            | 0       | 0     |
| 6   | 8     | 86       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     | 0     |          | 694   | 436 | 140 | 117 | 1            | 0       | 0     |
| 6   | 9     | 102      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       | 102      | 792   | 494 | 163 | 134 | 1            | Ŭ       |       |
| 6   | CD    | 97       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       |          | 762   | 479 | 155 | 127 | 1            | Ŭ       |       |
| 6   | a2    | 100      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       | 100      | 782   | 489 | 161 | 131 | 1            | Ŭ       |       |
| 6   | a3    | 87       | Total | С   | Ν   | Ο   | S            | 0       | 0     |
|     |       |          | 703   | 442 | 142 | 118 | 1            | Ŭ       |       |
| 6   | a4    | 96       | Total | С   | Ν   | 0   | S            | 0       | 0     |
|     |       |          | 754   | 473 | 153 | 127 | 1            | Ŭ       |       |
| 6   | а5    | 91       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       |          | 725   | 455 | 147 | 122 | 1            | Ŭ       |       |
| 6   | a6    | 101      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       | 101      | 786   | 491 | 162 | 132 | 1            | Ŭ       |       |
| 6   | а7    | 102      | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       | 102      | 792   | 494 | 163 | 134 | 1            |         |       |
| 6   | a8    | 87       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     |       |          | 703   | 442 | 142 | 118 | 1            |         |       |
| 6   | 90    | 90       | Total | С   | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|     | aJ    | 50       | 716   | 449 | 145 | 121 | 1            | 0       |       |

• Molecule 7 is a protein called Histone H5.



| Mol     | Chain | Residues |       | At           | oms |     |              | AltConf | Trace |
|---------|-------|----------|-------|--------------|-----|-----|--------------|---------|-------|
| 7       | Ab    | 120      | Total | С            | Ν   | Ο   | S            | 0       | 0     |
| 1       | All   | 130      | 992   | 613          | 206 | 171 | 2            | 0       | 0     |
| 7       | Δį    | 170      | Total | С            | Ν   | Ο   | S            | 0       | 0     |
| 1       | AI    | 170      | 1298  | 805          | 274 | 217 | 2            | 0       | 0     |
| 7       | Δi    | 103      | Total | С            | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 1       | лj    | 105      | 780   | 485          | 154 | 139 | 2            | 0       | 0     |
| 7       | Δk    | 120      | Total | С            | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 1       | ЛК    | 125      | 986   | 610          | 205 | 169 | 2            | 0       | 0     |
| 7       | Δ1    | 107      | Total | С            | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 1       | 111   | 107      | 808   | 501          | 161 | 144 | 2            | 0       | 0     |
| 7       | Δm    | 175      | Total | С            | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
|         | ЛШ    | 110      | 1340  | 831          | 284 | 223 | 2            | 0       | 0     |
| 7       | Δn    | 128      | Total | С            | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| · ·     | ЛП    | 120      | 975   | 604          | 201 | 168 | 2            | 0       | 0     |
| 7       | Δο    | 150      | Total | С            | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| · ·     | 110   | 105      | 1215  | 754          | 255 | 204 | 2            | 0       | 0     |
| 7       | Δn    | 73       | Total | $\mathbf{C}$ | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| ·       | mp    | 10       | 555   | 346          | 109 | 99  | 1            | 0       | 0     |
| 7       | Δα    | 100      | Total | С            | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 1       | nq    | 150      | 1456  | 903          | 311 | 240 | 2            | 0       | 0     |
| 7       | Δr    | 180      | Total | С            | Ν   | Ο   | $\mathbf{S}$ | 0       | 0     |
| 1       | 111   | 100      | 1375  | 852          | 295 | 226 | 2            | 0       | 0     |
| 7       | As    | 131      | Total | $\mathbf{C}$ | Ν   | Ο   | S            | 0       | 0     |
| <b></b> | 110   | 101      | 999   | 618          | 207 | 172 | 2            | 0       |       |

There are 72 discrepancies between the modelled and reference sequences:

| Chain | Residue | Modelled | Actual | Comment        | Reference  |
|-------|---------|----------|--------|----------------|------------|
| Ah    | 541     | HIS      | -      | expression tag | UNP P02259 |
| Ah    | 542     | HIS      | -      | expression tag | UNP P02259 |
| Ah    | 543     | HIS      | -      | expression tag | UNP P02259 |
| Ah    | 544     | HIS      | -      | expression tag | UNP P02259 |
| Ah    | 545     | HIS      | -      | expression tag | UNP P02259 |
| Ah    | 546     | HIS      | -      | expression tag | UNP P02259 |
| Ai    | 190     | HIS      | -      | expression tag | UNP P02259 |
| Ai    | 191     | HIS      | -      | expression tag | UNP P02259 |
| Ai    | 192     | HIS      | -      | expression tag | UNP P02259 |
| Ai    | 193     | HIS      | -      | expression tag | UNP P02259 |
| Ai    | 194     | HIS      | -      | expression tag | UNP P02259 |
| Ai    | 195     | HIS      | -      | expression tag | UNP P02259 |
| Aj    | 323     | HIS      | -      | expression tag | UNP P02259 |
| Aj    | 324     | HIS      | -      | expression tag | UNP P02259 |
| Aj    | 325     | HIS      | -      | expression tag | UNP P02259 |
| Aj    | 326     | HIS      | -      | expression tag | UNP P02259 |



| Continu | lea from pre | vious page |        |                |            |
|---------|--------------|------------|--------|----------------|------------|
| Chain   | Residue      | Modelled   | Actual | Comment        | Reference  |
| Aj      | 327          | HIS        | -      | expression tag | UNP P02259 |
| Aj      | 328          | HIS        | -      | expression tag | UNP P02259 |
| Ak      | 674          | HIS        | -      | expression tag | UNP P02259 |
| Ak      | 675          | HIS        | -      | expression tag | UNP P02259 |
| Ak      | 676          | HIS        | -      | expression tag | UNP P02259 |
| Ak      | 677          | HIS        | -      | expression tag | UNP P02259 |
| Ak      | 678          | HIS        | -      | expression tag | UNP P02259 |
| Ak      | 679          | HIS        | -      | expression tag | UNP P02259 |
| Al      | 431          | HIS        | -      | expression tag | UNP P02259 |
| Al      | 432          | HIS        | -      | expression tag | UNP P02259 |
| Al      | 433          | HIS        | -      | expression tag | UNP P02259 |
| Al      | 434          | HIS        | -      | expression tag | UNP P02259 |
| Al      | 435          | HIS        | -      | expression tag | UNP P02259 |
| Al      | 436          | HIS        | -      | expression tag | UNP P02259 |
| Am      | 190          | HIS        | -      | expression tag | UNP P02259 |
| Am      | 191          | HIS        | -      | expression tag | UNP P02259 |
| Am      | 192          | HIS        | -      | expression tag | UNP P02259 |
| Am      | 193          | HIS        | -      | expression tag | UNP P02259 |
| Am      | 194          | HIS        | -      | expression tag | UNP P02259 |
| Am      | 195          | HIS        | -      | expression tag | UNP P02259 |
| An      | 190          | HIS        | -      | expression tag | UNP P02259 |
| An      | 191          | HIS        | -      | expression tag | UNP P02259 |
| An      | 192          | HIS        | -      | expression tag | UNP P02259 |
| An      | 193          | HIS        | -      | expression tag | UNP P02259 |
| An      | 194          | HIS        | -      | expression tag | UNP P02259 |
| An      | 195          | HIS        | -      | expression tag | UNP P02259 |
| Ao      | 190          | HIS        | -      | expression tag | UNP P02259 |
| Ao      | 191          | HIS        | -      | expression tag | UNP P02259 |
| Ao      | 192          | HIS        | -      | expression tag | UNP P02259 |
| Ao      | 193          | HIS        | -      | expression tag | UNP P02259 |
| Ao      | 194          | HIS        | -      | expression tag | UNP P02259 |
| Ao      | 195          | HIS        | -      | expression tag | UNP P02259 |
| Ap      | 190          | HIS        | -      | expression tag | UNP P02259 |
| Ap      | 191          | HIS        | -      | expression tag | UNP P02259 |
| Ap      | 192          | HIS        | -      | expression tag | UNP P02259 |
| Ap      | 193          | HIS        | -      | expression tag | UNP P02259 |
| Ap      | 194          | HIS        | -      | expression tag | UNP P02259 |
| Ap      | 195          | HIS        | -      | expression tag | UNP P02259 |
| Aq      | 190          | HIS        | -      | expression tag | UNP P02259 |
| Aq      | 191          | HIS        | -      | expression tag | UNP P02259 |
| Aq      | 192          | HIS        | -      | expression tag | UNP P02259 |
| Aq      | 193          | HIS        | -      | expression tag | UNP P02259 |

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|       |         |          |        |                | Df         |
|-------|---------|----------|--------|----------------|------------|
| Chain | Residue | Modelled | Actual | Comment        | Reference  |
| Aq    | 194     | HIS      | -      | expression tag | UNP P02259 |
| Aq    | 195     | HIS      | -      | expression tag | UNP P02259 |
| Ar    | 190     | HIS      | -      | expression tag | UNP P02259 |
| Ar    | 191     | HIS      | -      | expression tag | UNP P02259 |
| Ar    | 192     | HIS      | -      | expression tag | UNP P02259 |
| Ar    | 193     | HIS      | -      | expression tag | UNP P02259 |
| Ar    | 194     | HIS      | -      | expression tag | UNP P02259 |
| Ar    | 195     | HIS      | -      | expression tag | UNP P02259 |
| As    | 190     | HIS      | -      | expression tag | UNP P02259 |
| As    | 191     | HIS      | -      | expression tag | UNP P02259 |
| As    | 192     | HIS      | -      | expression tag | UNP P02259 |
| As    | 193     | HIS      | -      | expression tag | UNP P02259 |
| As    | 194     | HIS      | -      | expression tag | UNP P02259 |
| As    | 195     | HIS      | -      | expression tag | UNP P02259 |



# 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 and atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: DNA





| Chain D:  | 88%   | 6% 5%   |
|---|---|---------|
| MET<br>SER<br>CLY<br>CLY<br>ARG<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>145<br>D450<br>D450<br>D450<br>D450<br>D450<br>D450<br>D450<br>T471<br>CL471<br>CL471<br>CL471<br>CL471<br>CL471<br>CL472<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY  | E 439   |         |
| • Molecule 3: Histone H2A   |   |         |
| Chain E:  | 86%   | 12% •   |
| MET<br>8508<br>K516<br>7517<br>A519<br>A519<br>A519<br>A519<br>A519<br>C531<br>L541<br>L541<br>L562<br>E563<br>E563<br>E563<br>L570   | H589<br>E599<br>L604<br>R605<br>S635<br>LYS<br>LYS  |         |
| • Molecule 3: Histone H2A   |   |         |
| Chain F:  | 84%   | 7% • 8% |
| MET<br>SER<br>GLY<br>GLY<br>ARG<br>CLY<br>CLY<br>CLY<br>GLY<br>GLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>C  | 8747<br>8748<br>8760<br>8760<br>8760<br>8764<br>8764  |         |
| • Molecule 3: Histone H2A   |   |         |
| Chain G:  | 85%   | 14% ••  |
| MET<br>8755<br>6756<br>6756<br>8757<br>6758<br>6758<br>4775<br>1764<br>4775<br>1764<br>4775<br>1764<br>4775<br>1764<br>1775<br>1764<br>1775<br>1764<br>1775<br>1764<br>1775<br>1764<br>1775<br>1764<br>1775<br>1764<br>1775<br>1764<br>1775<br>1764<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1766<br>1775<br>1767<br>1767   | P834<br>1865<br>1865<br>1865<br>1865<br>1866<br>1866<br>1866<br>1870<br>1870<br>1870<br>1870<br>1870  |         |
| • Molecule 3: Histone H2A   |   |         |
| Chain H:  | 80%   | 16% •   |
| MET<br>SER<br>CLY<br>AKG<br>CLY<br>K6140<br>K6140<br>R6175<br>R6175<br>R6175<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R61777<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R6177<br>R61777<br>R61777<br>R61777<br>R61777<br>R61777<br>R61777<br>R61777<br>R61777<br>R61777<br>R61777<br>R61777<br>R61777<br>R617777<br>R617777<br>R617777<br>R6177777<br>R617777777777 | H5217<br>L5218<br>Q5219<br>R5233<br>R5234<br>R5234<br>R5234<br>G5241<br>K5254<br>T5255<br>S5255<br>S5255<br>S5255<br>K5259<br>K5263<br>K5263<br>K5263 |         |
| • Molecule 3: Histone H2A   |   |         |
| Chain I:  | 91%   | 8% •    |
| MET 22463<br>82463<br>82473<br>82479<br>82479<br>22487<br>82487<br>82487<br>82481<br>82481<br>82481<br>82481<br>82481<br>82481<br>82481<br>82481<br>12517<br>12540  | 20 <mark>91</mark>  |         |
| • Molecule 3: Histone H2A   |   |         |
| Chain K:  | 83%   | 13% ••  |
| MET<br>SER<br>SER<br>S265<br>65265<br>65284<br>05285<br>L5286<br>L5286<br>L5286<br>L5286<br>L5326<br>L5326<br>L5326<br>L5326<br>L5326   | 45332<br>N5336<br>N5336<br>R5340<br>15341<br>15343<br>R5344<br>A5349<br>L5359<br>L5359<br>L5359<br>L5356<br>R5366<br>A5366<br>A5366                   |         |

• Molecule 3: Histone H2A



| Chain L:  | 85%   | 15% • |
|---|---|-------|
| M5393<br>R5404<br>A5406<br>K5408<br>R5408<br>R5425<br>R5435                   | L5456<br>L5466<br>L5466<br>L5466<br>L5466<br>L5469<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483<br>N5483 |       |
| • Molecule 3:   | Histone H2A   |       |
| Chain aj:   | 92%   | • 5%  |
| MET<br>SER<br>GLY<br>GLY<br>GLN<br>GLN<br>F91                                 | S113<br>S113<br>S128<br>K129  |       |
| • Molecule 3:   | Histone H2A   |       |
| Chain ak:   | 91%   | • 5%  |
| MET<br>SER<br>GLY<br>GLY<br>CLY<br>CLN<br>CLN<br>CLN<br>CLN                   | E214<br>E214<br>1238<br>1238<br>1238<br>1238  |       |
| • Molecule 3:   | Histone H2A   |       |
| Chain al:   | 85%   | 15%   |
| MET<br>SER<br>GLY<br>ARG<br>GLY<br>LYS<br>LYS<br><b>Q675</b><br>L785          | LYS<br>LYS<br>GLU<br>GLU<br>SER<br>SER<br>LYS<br>SER<br>LYS<br>LYS<br>LYS   |       |
| • Molecule 3:   | Histone H2A   |       |
| Chain am:   | 95%   | ••    |
| MET<br>SER<br>GLY<br>R786<br>A797<br>K798<br>T799<br>T799                     |   |       |
| • Molecule 3:   | Histone H2A   |       |
| Chain an:   | 94%   | • •   |
| MET<br>SER<br>GLY<br>GLY<br>GLY<br>GLY<br><b>K913</b><br>S926<br>S926<br>S926 |   |       |
| • Molecule 3:   | Histone H2A   |       |
| Chain ao:   | 95%   | 5%    |
| MET<br>SER<br>GLY<br>GLY<br>GLY<br>CLYS<br>Q1038<br>M1161                     |   |       |

• Molecule 3: Histone H2A



| Chain ap:   | 98%   | ·     |
|---|---|-------|
| MET<br>SER<br>GLY<br>R4003<br>K4129<br>K4129  |   |       |
| • Molecule 3: Histone H2A   |   |       |
| Chain aq:   | 89%   | • 10% |
| MET<br>SER<br>GLY<br>GLY<br>GLY<br>ARG<br>GLY<br>CLN<br>GLY<br>GLY<br>CLY<br>GLY<br>CLY<br>CLY<br>GLY<br>ARG<br>ARG<br>ARG<br>ARG<br>ARG<br>ARG<br>ARG<br>ARG<br>ARG<br>ARG |   |       |
| • Molecule 3: Histone H2A   |   |       |
| Chain ar:   | 98%   |       |
| MET<br>25598<br>72606<br>12607<br>K2726   |   |       |
| • Molecule 3: Histone H2A   |   |       |
| Chain as:   | 92%   | 8%    |
| MET<br>SER<br>GLY<br>CLY<br>ARG<br>CLY<br>CLY<br>CLY<br>CLY<br>FHR<br>M1718<br>M136   |   |       |
| • Molecule 3: Histone H2A   |   |       |
| Chain at:   | 96%   | •••   |
| MET<br>SER<br>GLY<br>ARG<br>04247<br>14252<br>14252<br>14252<br>14252<br>14252<br>14252<br>14252<br>14252<br>14372  |   |       |
| • Molecule 3: Histone H2A   |   |       |
| Chain au:   | 85%   | • 15% |
| MET<br>SER<br>GLY<br>GLY<br>GLY<br>ARG<br>CLY<br>CLN<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY  | SER<br>SER<br>ALA<br>LYS<br>SER<br>LYS<br>LYS |       |
| • Molecule 3: Histone H2A   |   |       |
| Chain Ae:   | 93%   | • 6%  |
| MET<br>SER<br>GLY<br>GLY<br>GLY<br>GLY<br>GLN<br>GLN<br>K2966<br>K2966<br>K2966   |   |       |



| • Molecule 4: Histone H2   | B 1.1   |  |  |      |
|--|---|--|--|------|
| Chain J:   | 72%   | 11% •  | 16%  |      |
| MET<br>LYS<br>SFR<br>SFR<br>SFR<br>ALA<br>ALA<br>ALA<br>ALA<br>LYS<br>CLY<br>SFR<br>LYS<br>ALA<br>ALA<br>VAL<br>VALA<br>THR<br>THR   | GLN<br>61.0<br>11970<br>01970<br>01971<br>01971<br>01971<br>11975<br>11975<br>11975<br>11975<br>11976<br>11972<br>12006<br>12006<br>12006<br>12006<br>12006<br>12006<br>12006<br>12006<br>12006<br>12006<br>12006<br>12006<br>12007<br>12006<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>12007<br>10007<br>10007<br>10007<br>10000000000 | L2045<br>L2046<br>L2047<br>K2070   |  |      |
| • Molecule 4: Histone H2   | B 1.1   |  |  |      |
| Chain M:   | 85%   |  | 15%  |      |
| M0<br>P5<br>A6<br>A6<br>A6<br>K12<br>K12<br>K13<br>A14<br>A14<br>K20<br>K20<br>K20<br>K20<br>K20<br>K20<br>K20<br>K20  | 151<br>151<br>552<br>553<br>553<br>553<br>553<br>863<br>861<br>185<br>186<br>786<br>788<br>888<br>888<br>888<br>888<br>888<br>888<br>888<br>8   | K122   |  |      |
| • Molecule 4: Histone H2   | B 1.1   |  |  |      |
| Chain N:   | 66%   | 19%  | • 15%  |      |
| MET<br>ALA<br>LYS<br>SER<br>ALA<br>ALA<br>ALA<br>PRO<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>VAL<br>THR<br>THR  | 1147<br>1147<br>1147<br>1163<br>1163<br>1163<br>1163<br>1163<br>1192<br>1192<br>1192<br>1192<br>1192<br>1192<br>1192<br>1106<br>1197  | A205<br>K210<br>H211<br>A212<br>V213<br>S214<br>E215<br>G216<br>G216<br>T217<br>K218 | A219<br>V220<br>K222<br>Y223<br>T224<br>K227<br>K227 |      |
| • Molecule 4: Histone H2   | B 1.1   |  |  |      |
| Chain O:   | 67%   | 16%  | 16%  |      |
| MET<br>LYS<br>SFR<br>SFR<br>SFR<br>ALA<br>ALA<br>ALA<br>LYS<br>CLY<br>SFR<br>LYS<br>CLY<br>ALA<br>ALA<br>ALA<br>THR<br>THR   | GLN<br>Kap5<br>Kap6<br>Kap6<br>Fap7<br>Yap9<br>Yap9<br>Yap9<br>Yap9<br>Yap9<br>Yap9<br>Yap9<br>Yap9   | K429<br>K429<br>A430<br>K431<br>S432<br>I433<br>V441<br>V441                         | 1466<br>V470<br>L474<br>K480                         | K497 |
| • Molecule 4: Histone H2   | B 1.1   |  |  |      |
| Chain P:   | 76%   | 9%   | 15%  |      |
| MET<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>PRO<br>PRO<br>PRO<br>CLY<br>CLYS<br>CLYS<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>AL   | R606<br>E512<br>1531<br>1531<br>1531<br>1533<br>1536<br>1576<br>11577<br>11577<br>11579<br>11579<br>11579<br>11579  | 800<br>800<br>800  |  |      |
| • Molecule 4: Histone H2   | B 1.1   | _  |  |      |
| Chain Q:   | 86%   |  | 13% •  |      |
| M603         A603           A605         A           A605 | R679<br>1689<br>7690<br>7690<br>7690<br>7690<br>8698<br>1700<br>1700<br>1700<br>1700<br>1700<br>1700<br>1702<br>1702  |  |  |      |
| • Molecule 4: Histone H2   | B 1.1   |  |  |      |
| Chain R:   | 69%   | 12%  | 19%  |      |
| MET<br>ALA<br>ALA<br>ALA<br>ALA<br>SER<br>PRO<br>PRO<br>CLYS<br>CLYS<br>SER<br>LYS<br>CLYS<br>SER<br>LYS<br>LYS<br>THR<br>THR<br>THR   | GLN:<br>GLN:<br>LYS<br>LYS<br>ASP<br>ASP<br>ASP<br>C253<br>C256<br>C273<br>C275<br>C275<br>C275<br>C275<br>C275<br>C275<br>C275<br>C275   | 1316<br>1316<br>1318<br>1323<br>1323<br>1323<br>1323<br>1346<br>K347                 | Y348<br>T349<br>8350<br>A351<br>K352                 |      |
| • Molecule 4: Histone H2   | B 1.1   |  |  |      |



| Chain S:  | 80%  | 20%  |
|---|--|--|
| M849<br>P854<br>V886<br>V886<br>P897<br>P897<br>M905<br>M905<br>M905<br>M905<br>M908<br>M905<br>M912<br>N912<br>N912<br>N912        | R918<br>8921<br>8921<br>8925<br>1935<br>1935<br>1935<br>1943<br>8939<br>1944<br>1945<br>1945<br>1945<br>1945<br>1946   | <b>1960</b><br><b>1961</b><br>1962<br>1968<br>1968<br>8969<br><b>1968</b><br><b>1968</b><br><b>1970</b>  |
| • Molecule 4: Histone   | H2B 1.1  |  |
| Chain T:  | 84%  | 16%  |
| M2736<br>A2745<br>K2745<br>K2748<br>K2749<br>K2749<br>T2752<br>K2753<br>D2758<br>D2758  | N2 / / 9<br>P2 783<br>P2 783<br>P2 783<br>P2 783<br>P2 783<br>P2 783<br>P2 783<br>P2 825<br>P2 825 | K2858  |
| • Molecule 4: Histone   | H2B 1.1  |  |
| Chain U:  | 89%  | 10% •  |
| M1838<br>A1839<br>K1840<br>A1842<br>A1842<br>K1846<br>K1862<br>K1862<br>K1862<br>M1894<br>M1894                                     | T1925<br>S1926<br>A1929<br>A1932<br>L1935<br>E1940   |  |
| • Molecule 4: Histone   | H2B 1.1  |  |
| Chain V:  | 80%  | 20% •  |
| M976<br>A977<br>K938<br>K938<br>K1993<br>K1900<br>K1000<br>B1003<br>€1008   | L1018<br>S1028<br>S1028<br>L1034<br>M1035<br>T1063<br>T1063<br>T1065<br>T1066<br>A1077<br>L1073<br>L1074<br>L1074<br>L1074<br>L1074  | 6107/<br>61079<br>A1080<br>V1084<br>Y1094<br>K1098   |
| • Molecule 4: Histone   | H2B 1.1  |  |
| Chain W:  | 73%  | 26% •  |
| N2859<br>22865<br>72877<br>72877<br>72877<br>72877<br>72880<br>72880<br>72882<br>72882<br>72882<br>72882<br>72882<br>72882<br>72882 | L2901<br>22909<br>72909<br>72914<br>12917<br>72921<br>72928<br>72928<br>72928<br>72928<br>72938<br>12938<br>12938<br>12938<br>12938<br>12938<br>12938  | 12944<br>12945<br>12946<br>22947<br>12965<br>12965<br>12966<br>12966<br>12966<br>12966<br>12978<br>18978 |
| • Molecule 4: Histone   | H2B 1.1  |  |
| Chain av:   | 83%  | • 16%  |
| MET<br>ALA<br>LYS<br>SER<br>SER<br>ALA<br>ALA<br>ALA<br>CLYS<br>GLY<br>GLY<br>CLYS<br>CLYS<br>CLYS<br>TLYS<br>TLYS<br>TALA          |  |  |
| • Molecule 4: Histone   | H2B 1.1  |  |
| Chain aw:   | 98%  |  |
| M123<br>K131<br>M179<br>K245  |  |  |
| • Molecule 4: Histone   | H2B 1.1  |  |



| Chain ax:  | 98%        | •     |
|--|------------|-------|
| 12.15<br>255<br>1255<br>1255<br>1255<br>1255<br>1255<br>1255   |            |       |
| • Molecule 4: Histone H2B 1.1  |            |       |
| Chain ay:  | 98%        | •     |
| 1389<br>14377<br>1412<br>14451<br>14451  |            |       |
| • Molecule 4: Histone H2B 1.1  |            |       |
| Chain az:  | 80%        | • 19% |
| MET<br>LYS<br>SER<br>SER<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>LYS<br>LYS<br>CLY<br>CLYS<br>CLY<br>CLYS<br>CLY<br>CLYS<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN | K691       |       |
| • Molecule 4: Histone H2B 1.1  |            |       |
| Chain Aa:  | 82%        | • 16% |
| MET<br>ALA<br>LYS<br>SER<br>ALA<br>ALA<br>ALA<br>ALA<br>LYS<br>LYS<br>LYS<br>CLY<br>SER<br>LYS<br>THR<br>THR<br>THR<br>THR<br>THR<br>THR<br>CLN<br>CLN                                       |            |       |
| • Molecule 4: Histone H2B 1.1  |            |       |
| Chain Ab:  | 99%        |       |
| A71<br>A771<br>K817  |            |       |
| • Molecule 4: Histone H2B 1.1  |            |       |
| Chain Ac:  | 80%        | • 19% |
| MET<br>LYS<br>SER<br>SER<br>SER<br>ALA<br>ALA<br>PRO<br>PRO<br>PRO<br>LYS<br>LYS<br>LYS<br>CLYS<br>SER<br>LYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS                        | 1854<br>17 |       |
| • Molecule 4: Histone H2B 1.1  |            |       |
| Chain Ad:  | 83%        | 17%   |
| MET<br>LYS<br>SER<br>ALA<br>ALA<br>ALA<br>PRO<br>LYS<br>LYS<br>LYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CL   |            |       |
| • Molecule 4: Histone H2B 1.1  |            |       |



| Chain Af:   | 789   | %   | ·  | 21%                                  |                      |
|---|---|---|--|--------------------------------------|----------------------|
|   | 8   | 8 8 8 <mark>8</mark>  |  |                                      |                      |
| MET<br>ALAA<br>ALAA<br>ALAA<br>ALAA<br>ALAA<br>ALAA<br>ALAA<br>AL                       | LYSS<br>LYSS<br>LYSS<br>ALA<br>ALA<br>ALA<br>ALA<br>CYSS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS                                  |   |  |                                      |                      |
| • Molecule 4: H   | listone H2B 1.1   |   |  |                                      |                      |
| Chain Ag:   |   | 83%   |  | 15%                                  | -                    |
| MET<br>ALA<br>ALA<br>SER<br>ALA<br>PRO<br>PRO<br>LYS<br>CLYS<br>SER<br>SER              | 172<br>173<br>174<br>174<br>174<br>174<br>174<br>174<br>174<br>173<br>173<br>174<br>174<br>174<br>174<br>174<br>174<br>174<br>174<br>174<br>174   |   |  |                                      |                      |
| • Moloculo 4: H   | fistono H2B 1 1   |   |  |                                      |                      |
| • Molecule 4. II  | listone fizb 1.1  |   |  |                                      |                      |
| Chain At:   |   | 96%   |  | •                                    |                      |
| M0<br>A1<br>K2<br>K20<br>K31<br>K31<br>R83<br>G101                                      | K122  |   |  |                                      |                      |
| • Molecule 5: H   | listone H3  |   |  |                                      |                      |
| Chain X:  | 69%   |   | 13%  | 18%                                  |                      |
| MET<br>ALA<br>ALA<br>ARG<br>THR<br>LYS<br>GLN<br>ALA<br>ARG<br>ARG<br>SER<br>SER<br>THR | GLY<br>GLY<br>LYS<br>ALA<br>ARA<br>PRO<br>PRO<br>PRO<br>PRO<br>PRO<br>CLY<br>CLU<br>CLU<br>CLO<br>LOO<br>LOO                                      | 68<br>R69<br>K79<br>E94<br>E94<br>E103<br>L103<br>A111  | 1112<br>R116<br>1119<br>D123<br>1124<br>0125                           | L126<br>A127<br>R128<br>R129<br>I130 | E133<br>R134<br>A135 |
| • Molecule 5: H   | listone H3  |   |  |                                      |                      |
| Chain Y:  | 72%   |   | 9% •   | 18%                                  |                      |
| MET<br>ALA<br>ARG<br>THR<br>LYS<br>GLN<br>THR<br>ALA<br>ARG<br>SER<br>SER<br>THR        | GLY<br>GLY<br>GLY<br>GLY<br>PRO<br>PRO<br>PRO<br>PRO<br>PRO<br>PRO<br>CLYS<br>GLN<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS | A140<br>P149<br>R153<br>L171<br>L171<br>L171<br>L172<br>R174<br>K175  | q204<br>L214<br>R227<br>D234   | A246                                 |                      |
| • Molecule 5: H   | listone H3  |   |  |                                      |                      |
| Chain Z:  | 54%   | 12%   | 34%  |                                      |                      |
| MET<br>ALA<br>ARG<br>ARG<br>LYS<br>CLN<br>CLN<br>ARG<br>ARG<br>LYS<br>SER<br>SER<br>THR | GILY<br>GLY<br>GLY<br>LLYS<br>ALA<br>PRO<br>ALA<br>CLN<br>CLN<br>CLN<br>ALA<br>ALA<br>ALA<br>ALA<br>ARG   | LYS<br>SER<br>ALA<br>ALA<br>PRO<br>GLY<br>GLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>STR<br>CLY<br>ARG<br>ARG | TYR<br>TYR<br>ARG<br>PRO<br>GLY<br>THR<br>V247<br>A248<br>L249<br>L249 | 1252<br>R253<br>R254<br>S258         | 1263<br>R264<br>P267 |
| A276<br>1282<br>1283<br>1283<br>1283<br>1284<br>7284<br>7284<br>7294<br>7317            | D324<br>B324<br>B335<br>A336<br>A336  |   |  |                                      |                      |
| • Molecule 5. H   | listone H3  |   |  |                                      |                      |
|   |   |   |  |                                      |                      |
| Chain a:  |   | 89%   |  | • 8%                                 |                      |
|   |   |   |  |                                      |                      |







| MET<br>ARG<br>ARG<br>ARG<br>LYS<br>CLW<br>ALA<br>ARG<br>CLW<br>CLY<br>CLYS<br>ARG<br>CLY<br>CLYS<br>CLY<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>CLYS<br>C                               | LEU<br>LEU<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>AL                             | LYS<br>LYS<br>PRO<br>H1314<br>H1314<br>R1317<br>S1361<br>S1361<br>R1404 | A1410 |
|--|---|---|-------|
| • Molecule 5: Histone H3   |   |   |       |
| Chain i:   | 71%   | ·   | 27%   |
| MET<br>ALA<br>ALA<br>ALA<br>ALA<br>CLY<br>CLY<br>CLN<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CCL  | LEU<br>LEU<br>LYS<br>LYS<br>LYS<br>LYS<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>AL | LYS<br>K3187<br>S3236<br>M3270<br>R3281<br>R3285                        |       |
| • Molecule 5: Histone H3   |   |   |       |
| Chain j:   | 76%   | ·   | 23%   |
| MET<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ARG<br>CLY<br>SER<br>CLY<br>SER<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY   | L CEUR<br>L CEUR<br>ALLA<br>ALLA<br>ALLA<br>ALLA<br>ALLA<br>ALLA<br>ALLA<br>AL                              | 131<br>134<br>135   |       |
| • Molecule 5: Histone H3   |   |   |       |
| Chain k:   | 72%   | ·   | 27%   |
| MET<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>CLY<br>CLY<br>SER<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY  | LEU<br>LEU<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>PRO<br>ALA<br>ALA<br>CLY<br>VAL       | LYS<br>K136<br>F183<br>A234   |       |
| • Molecule 5: Histone H3   |   |   |       |
| Chain l:   | 81%   |   | • 16% |
| MET<br>ALA<br>ALA<br>ALA<br>ARG<br>CTY<br>CLN<br>CLN<br>CLN<br>ALA<br>ALA<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY                                    | LEU<br>LEU<br>1235<br>1235<br>1235<br>1235<br>1235<br>1235<br>1235<br>1235                                  | A348  |       |
| • Molecule 5: Histone H3   |   |   |       |
| Chain m:   | 69%   | ·   | 28%   |
| MET<br>ARG<br>ARG<br>LYS<br>LYS<br>LYS<br>CLN<br>ALA<br>ARG<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY  | LEU<br>LEU<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>AL                             | LYS<br>LYS<br>P349<br>7352<br>R352<br>R353<br>8368<br>8368              | A446  |
| • Molecule 5: Histone H3   |   |   |       |
| Chain n:   | 82%   |   | • 17% |
| MET<br>ALA<br>ALA<br>ARG<br>THR<br>CVS<br>GLN<br>GLN<br>ALA<br>ALA<br>CLY<br>GLY<br>GLY<br>ALA<br>PRO<br>PRO<br>CVS<br>CVS<br>CVS<br>CVS<br>CVS<br>CVS<br>CVS<br>CVS<br>CVS<br>CVS | LEU<br>LEU<br>ALA<br>F508<br>A559<br>A559   |   |       |
| • Molecule 5: Histone H3   |   |   |       |
| Chain o:   | 79%   | ·   | 20%   |

WORLDWIDE PROTEIN DATA BANK

| MET<br>ALA<br>ARG<br>THR<br>LYS<br>GLN<br>ARG<br>LYS<br>SER<br>THR<br>CLY<br>GLY   | LYS<br>ALA<br>PALA<br>PALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>A   |                       |
|--|---|-----------------------|
| • Molecule 5: Histo  | one H3  |                       |
| Chain p:   | 74%   | • 25%                 |
| MET<br>ALA<br>ALA<br>ALA<br>ARG<br>LYS<br>CLN<br>CLN<br>ARG<br>CLN<br>SER<br>SER<br>SER<br>CLY<br>SER<br>CLY<br>SC         | LYS<br>ALA<br>ALA<br>ARD<br>ARD<br>ARD<br>ARD<br>ALA<br>ALA<br>ARA<br>ARA<br>ARA<br>ARA<br>ARA<br>ARA<br>ARA<br>ARA   |                       |
| • Molecule 5: Histo  | one H3  |                       |
| Chain q:   | 79%   | • 19%                 |
| MET<br>ALA<br>ARG<br>TARG<br>CLN<br>CLNS<br>GLN<br>ALA<br>ARG<br>ARG<br>CLY<br>GLY<br>GLY                                  | LYS<br>PALA<br>PALA<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN<br>CLN   |                       |
| • Molecule 5: Histo  | one H3  |                       |
| Chain r:   | 75%   | • 22%                 |
| NET<br>ALA<br>ALA<br>ALA<br>ARG<br>LYS<br>CLN<br>THR<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>CLY<br>SER<br>SLY<br>SCT<br>CLY | LYS<br>ALA<br>ALA<br>ALA<br>ALA<br>ARG<br>LYS<br>CLN<br>LLSU<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>AL   | CTO CAL               |
| • Molecule 5: Histo  | one H3  |                       |
| Chain s:   | 70%   | 30%                   |
| MET<br>ALA<br>ARG<br>TTHR<br>LYS<br>GLN<br>ARG<br>CLY<br>SSER<br>SSER<br>CLY<br>CLY<br>SSER<br>CLY                         | LYS<br>ALA<br>ALA<br>ARG<br>CLYS<br>CLYS<br>ARG<br>CLY<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>CLYS<br>CLY<br>CLYS<br>CLY<br>CLYS<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>FRO<br>CLY<br>FRO<br>CLY<br>FRO<br>FRO<br>FRO<br>FRO<br>FRO<br>FRO<br>FRO<br>FRO<br>FRO<br>FRO | ARG<br>Y2072<br>A2166 |
| • Molecule 5: Histo  | one H3  |                       |
| Chain t:   | 80%   | • 19%                 |
| MET<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>CLY<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>ALA<br>CLY<br>CLY<br>CLY<br>CLY        | LYS<br>RIA<br>PRO<br>PRO<br>ARG<br>CIN<br>CIYS<br>GLN<br>LYS<br>CIN<br>LYS<br>AIA<br>AIA<br>AIA<br>DI 269<br>AIA<br>AIA<br>AIA  |                       |
| • Molecule 5: Histo  | one H3  |                       |
| Chain u:   | 90%   | • 7%                  |
| MET<br>ALA<br>ALA<br>ARG<br>LYS<br>CLYS<br>CLYS<br>ARG<br>ARG<br>LYS<br>ARG<br>LYS<br>CS083                                | R3087 ←<br>L3090 ←<br>R3096 ←<br>R3096 ←<br>R3106<br>R3110<br>R3110<br>R3110<br>A3205   |                       |
| • Molecule 6: Histo  | one H4  |                       |
| Chain v:   | 93%   | • 5%                  |
|  |   |                       |



• Molecule 6: Histone H4

| Chain w:                                      | 99%   |      |      |
|---|---|------|------|
| M103<br>L113<br>G205                          |   |      |      |
| • Molecul                                     | e 6: Histone H4   |      |      |
| Chain x:                                      | 96%   |      | ·    |
| MET<br>SER<br>GLY<br>ARG<br>G206<br>G304      |   |      |      |
| • Molecul                                     | e 6: Histone H4   |      |      |
| Chain y:                                      | 99%   |      |      |
| MET<br>S305<br>G406                           |   |      |      |
| • Molecul                                     | e 6: Histone H4   |      |      |
| Chain z:                                      | 81%   | ·    | 18%  |
| MET<br>SER<br>GLY<br>ARG<br>GLY<br>LYS<br>GLY | GLY<br>LIYS<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>ALA<br>ALA<br>ALA<br>ALA<br>AL2<br>C490<br>C490  |      |      |
| • Molecul                                     | e 6: Histone H4   |      |      |
| Chain 0:                                      | 78%   | 13%  | • 9% |
| MET<br>SER<br>GLY<br>GLY<br>LYS<br>GLY<br>GLY | DIX<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X<br>101X |      |      |
| • Molecul                                     | e 6: Histone H4   |      |      |
| Chain 1:                                      | 75%   | )%   | 16%  |
| MET<br>SER<br>GLY<br>ARG<br>GLY<br>GLY<br>GLY | CICY<br>CICY<br>CICY<br>CICY<br>CICY<br>CICY<br>CICY<br>CICY  | G671 |      |
| • Molecul                                     | e 6: Histone H4   |      |      |
| Chain 2:                                      | •<br>76%  | 16%  | • 8% |





| MET<br>MET<br>(190<br>(190<br>(197<br>(197<br>(197<br>(197<br>(197<br>(197<br>(197<br>(197  | 1250<br>1250<br>1250<br>1250<br>1250<br>1250<br>1250<br>1270<br>1277<br>1277<br>1277<br>1277<br>1277<br>1277<br>127 |          |
|---|---|----------|
| • Molecule 6: Histone H4  |   |          |
| Chain CD:   | 75%   | 17% • 6% |
| MET<br>SER<br>GLY<br>GLY<br>ARG<br>GLY<br>K291<br>C292<br>C293<br>K296<br>K296<br>K296<br>K296<br>K296<br>K296<br>K296<br>K296  | 1310<br>1320<br>1320<br>1320<br>1325<br>1325<br>1376<br>1376<br>1376<br>1376<br>1376<br>1376<br>1376<br>1376        |          |
| • Molecule 6: Histone H4  |   |          |
| Chain a2:   | 96%   |          |
| MET<br>SISA<br>RISE<br>RISE<br>RISE<br>RISE<br>RISE<br>RISE<br>RISE<br>RISE   |   |          |
| • Molecule 6: Histone H4  |   |          |
| Chain a3:   | 83%   | • 16%    |
| MET<br>SER<br>GLY<br>GLY<br>ARG<br>ARG<br>ALY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>CLY<br>C   |   |          |
| • Molecule 6: Histone H4  |   |          |
| Chain a4:   | 92%   | • 7%     |
| MET<br>BER<br>GLY<br>GLY<br>LYS<br>GLY<br>GLY<br>GLY<br>GF7<br>GF7  |   |          |
| • Molecule 6: Histone H4  |   |          |
| Chain a5:   | 88%   | 12%      |
| MET<br>SER<br>GLY<br>GLY<br>ARG<br>GLY<br>CLY<br>GLY<br>GLY<br>GLY<br>GLY<br>GLY<br>GLY<br>GLY<br>CLY<br>GLY<br>GLY<br>GF73<br>GF73<br>GF73<br>GF74<br>HG52<br>GF73<br>GF73<br>GF73<br>GF74<br>GF75<br>GF73<br>GF76<br>GF76<br>GF76<br>GF76<br>GF76<br>GF76<br>GF76<br>GF76 | 6684<br>C162<br>  |          |
| • Molecule 6: Histone H4  |   |          |
| Chain a6:   | 97%   |          |
| MET<br>SIBA<br>03194<br>R3264<br>R3264<br>03294   |   |          |
| • Molecule 6: Histone H4  |   |          |
| Chain a7:   | 99%   | ·        |















# 4 Experimental information (i)

| Property                           | Value                        | Source    |
|------------------------------------|------------------------------|-----------|
| EM reconstruction method           | SINGLE PARTICLE              | Depositor |
| Imposed symmetry                   | POINT, C1                    | Depositor |
| Number of particles used           | 13670                        | Depositor |
| Resolution determination method    | FSC 0.143 CUT-OFF            | Depositor |
| CTF correction method              | PHASE FLIPPING AND AMPLITUDE | Depositor |
|                                    | CORRECTION                   |           |
| Microscope                         | FEI TITAN KRIOS              | Depositor |
| Voltage (kV)                       | 300                          | Depositor |
| Electron dose $(e^-/\text{\AA}^2)$ | 60                           | Depositor |
| Minimum defocus (nm)               | 2000                         | Depositor |
| Maximum defocus (nm)               | 3000                         | Depositor |
| Magnification                      | 47000                        | Depositor |
| Image detector                     | FEI FALCON II $(4k \ge 4k)$  | Depositor |
| Maximum map value                  | 0.183                        | Depositor |
| Minimum map value                  | -0.051                       | Depositor |
| Average map value                  | 0.001                        | Depositor |
| Map value standard deviation       | 0.007                        | Depositor |
| Recommended contour level          | 0.0293                       | Depositor |
| Map size (Å)                       | 506.88, 506.88, 506.88       | wwPDB     |
| Map dimensions                     | 288, 288, 288                | wwPDB     |
| Map angles (°)                     | 90.0, 90.0, 90.0             | wwPDB     |
| Pixel spacing (Å)                  | 1.76, 1.76, 1.76             | Depositor |



# 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).

| Mal | Chain | B    | ond lengths    | Bond angles |                |
|-----|-------|------|----------------|-------------|----------------|
|     | Unam  | RMSZ | # Z  > 5       | RMSZ        | # Z  > 5       |
| 1   | Au    | 0.54 | 1/48227~(0.0%) | 0.92        | 2/74345~(0.0%) |
| 2   | Av    | 0.52 | 0/49010        | 0.90        | 5/75728~(0.0%) |
| 3   | А     | 0.24 | 0/946          | 0.53        | 0/1269         |
| 3   | Ae    | 0.23 | 0/946          | 0.48        | 0/1269         |
| 3   | В     | 0.23 | 0/972          | 0.50        | 0/1302         |
| 3   | С     | 0.28 | 0/993          | 0.58        | 1/1329~(0.1%)  |
| 3   | D     | 0.25 | 0/950          | 0.53        | 0/1274         |
| 3   | Е     | 0.24 | 0/983          | 0.52        | 0/1318         |
| 3   | F     | 0.23 | 0/926          | 0.50        | 0/1243         |
| 3   | G     | 0.23 | 0/993          | 0.52        | 0/1329         |
| 3   | Н     | 0.24 | 0/968          | 0.50        | 0/1297         |
| 3   | Ι     | 0.24 | 0/993          | 0.50        | 0/1329         |
| 3   | Κ     | 0.54 | 2/987~(0.2%)   | 0.70        | 5/1321~(0.4%)  |
| 3   | L     | 0.42 | 2/1001~(0.2%)  | 0.55        | 0/1339         |
| 3   | aj    | 0.28 | 0/950          | 0.53        | 0/1274         |
| 3   | ak    | 0.23 | 0/950          | 0.54        | 0/1274         |
| 3   | al    | 0.23 | 0/860          | 0.49        | 0/1158         |
| 3   | am    | 0.32 | 0/983          | 0.54        | 0/1316         |
| 3   | an    | 0.24 | 0/968          | 0.52        | 0/1297         |
| 3   | ao    | 0.23 | 0/959          | 0.51        | 0/1286         |
| 3   | ар    | 0.23 | 0/983          | 0.51        | 0/1316         |
| 3   | aq    | 0.25 | 0/910          | 0.52        | 0/1222         |
| 3   | ar    | 0.23 | 0/993          | 0.53        | 0/1329         |
| 3   | as    | 0.24 | 0/926          | 0.51        | 0/1243         |
| 3   | at    | 0.24 | 0/972          | 0.53        | 0/1302         |
| 3   | au    | 0.23 | 0/869          | 0.51        | 0/1171         |
| 4   | Aa    | 0.24 | 0/825          | 0.49        | 0/1101         |
| 4   | Ab    | 0.23 | 0/969          | 0.46        | 0/1292         |
| 4   | Ac    | 0.23 | 0/799          | 0.47        | 0/1068         |
| 4   | Ad    | 0.24 | 0/816          | 0.47        | 0/1090         |
| 4   | Af    | 0.23 | 0/777          | 0.46        | 0/1041         |
| 4   | Ag    | 0.23 | 0/834          | 0.46        | 0/1113         |
| 4   | At    | 0.35 | 0/969          | 0.55        | 0/1292         |
| 4   | J     | 0.23 | 0/825          | 0.49        | 0/1101         |



|       | Chain | B    | ond lengths                  | E    | Sond angles         |
|-------|-------|------|------------------------------|------|---------------------|
| IVI01 | Chain | RMSZ | # Z  > 5                     | RMSZ | # Z  > 5            |
| 4     | М     | 0.25 | 0/969                        | 0.47 | 0/1292              |
| 4     | Ν     | 0.37 | 0/841                        | 0.53 | 0/1123              |
| 4     | 0     | 0.23 | 0/825                        | 0.50 | 0/1101              |
| 4     | Р     | 0.23 | 0/841                        | 0.45 | 0/1123              |
| 4     | Q     | 0.24 | 0/969                        | 0.47 | 0/1292              |
| 4     | R     | 0.23 | 0/799                        | 0.45 | 0/1068              |
| 4     | S     | 0.25 | 0/969                        | 0.52 | 1/1292~(0.1%)       |
| 4     | Т     | 0.23 | 0/969                        | 0.48 | 0/1292              |
| 4     | U     | 0.24 | 0/969                        | 0.50 | 0/1292              |
| 4     | V     | 0.26 | 0/969                        | 0.48 | 0/1292              |
| 4     | W     | 0.37 | 1/969~(0.1%)                 | 0.47 | 0/1292              |
| 4     | av    | 0.24 | 0/825                        | 0.50 | 0/1101              |
| 4     | aw    | 0.24 | 0/969                        | 0.48 | 0/1292              |
| 4     | ax    | 0.25 | 0/969                        | 0.50 | 1/1292~(0.1%)       |
| 4     | ay    | 0.34 | 1/969~(0.1%)                 | 0.54 | 0/1292              |
| 4     | az    | 0.23 | 0/799                        | 0.45 | 0/1068              |
| 5     | Х     | 0.24 | 0/914                        | 0.53 | 0/1225              |
| 5     | Y     | 0.25 | 0/909                        | 0.57 | 1/1218~(0.1%)       |
| 5     | Ζ     | 0.23 | 0/747                        | 0.50 | 0/1000              |
| 5     | a     | 0.26 | 0/1009                       | 0.58 | 1/1351~(0.1%)       |
| 5     | b     | 0.23 | 0/845                        | 0.53 | 0/1132              |
| 5     | С     | 0.23 | 0/873                        | 0.51 | 0/1170              |
| 5     | d     | 0.23 | 0/820                        | 0.51 | 0/1099              |
| 5     | е     | 0.24 | 0/777                        | 0.52 | 0/1041              |
| 5     | f     | 0.23 | 0/820                        | 0.50 | 0/1099              |
| 5     | g     | 0.23 | 0/849                        | 0.51 | 0/1137              |
| 5     | h     | 0.24 | 0/812                        | 0.52 | 0/1088              |
| 5     | i     | 0.23 | 0/829                        | 0.52 | 0/1111              |
| 5     | j     | 0.24 | 0/865                        | 0.54 | 0/1159              |
| 5     | k     | 0.23 | 0/829                        | 0.52 | 0/1111              |
| 5     | 1     | 0.25 | 0/930                        | 0.58 | 1/1246~(0.1%)       |
| 5     | m     | 0.25 | 0/820                        | 0.58 | 1/1099~(0.1%)       |
| 5     | n     | 0.23 | 0/923                        | 0.52 | 0/1236              |
| 5     | 0     | 0.24 | 0/893                        | 0.52 | $\overline{0/1197}$ |
| 5     | р     | 0.23 | 0/849                        | 0.53 | $0/1\overline{137}$ |
| 5     | q     | 0.27 | 0/904                        | 0.52 | $0/1\overline{211}$ |
| 5     | r     | 0.23 | 0/873                        | 0.50 | 0/1170              |
| 5     | s     | 0.23 | 0/790                        | 0.50 | 0/1059              |
| 5     | t     | 0.23 | 0/903                        | 0.52 | 0/1211              |
| 5     | u     | 0.24 | 0/1015                       | 0.55 | 0/1359              |
| 6     | 0     | 0.23 | 0/749                        | 0.56 | 0/997               |
| 6     | 1     | 0.23 | 0/711                        | 0.56 | 0/948               |
| 6     | 2     | 0.43 | $1/758 \ \overline{(0.1\%)}$ | 0.88 | 3/1008~(0.3%)       |



| Mal | Chain | B    | ond lengths                    | Bond angles |                  |
|-----|-------|------|--------------------------------|-------------|------------------|
|     | Chain | RMSZ | # Z  > 5                       | RMSZ        | # Z  > 5         |
| 6   | 3     | 0.24 | 0/744                          | 0.56        | 0/992            |
| 6   | 4     | 0.23 | 0/711                          | 0.55        | 0/948            |
| 6   | 5     | 0.23 | 0/758                          | 0.56        | 0/1008           |
| 6   | 6     | 0.23 | 0/695                          | 0.57        | 0/929            |
| 6   | 7     | 0.25 | 0/794                          | 0.58        | 0/1053           |
| 6   | 8     | 0.24 | 0/702                          | 0.58        | 0/937            |
| 6   | 9     | 0.23 | 0/800                          | 0.56        | 0/1061           |
| 6   | CD    | 0.25 | 0/770                          | 0.59        | 0/1024           |
| 6   | a2    | 0.24 | 0/790                          | 0.57        | 0/1048           |
| 6   | a3    | 0.23 | 0/711                          | 0.54        | 0/948            |
| 6   | a4    | 0.23 | 0/762                          | 0.54        | 0/1013           |
| 6   | a5    | 0.24 | 0/733                          | 0.56        | 0/976            |
| 6   | a6    | 0.24 | 0/794                          | 0.58        | 0/1053           |
| 6   | a7    | 0.23 | 0/800                          | 0.55        | 0/1061           |
| 6   | a8    | 0.24 | 0/711                          | 0.54        | 0/948            |
| 6   | a9    | 0.24 | 0/724                          | 0.57        | 0/965            |
| 6   | V     | 0.24 | 0/775                          | 0.59        | 0/1029           |
| 6   | W     | 0.24 | 0/808                          | 0.55        | 0/1071           |
| 6   | Х     | 0.23 | 0/779                          | 0.55        | 0/1034           |
| 6   | У     | 0.24 | 0/800                          | 0.55        | 0/1061           |
| 6   | Z     | 0.24 | 0/680                          | 0.58        | 0/908            |
| 7   | Ah    | 0.26 | 0/1005                         | 0.63        | 0/1335           |
| 7   | Ai    | 0.25 | 0/1315                         | 0.65        | 0/1740           |
| 7   | Aj    | 0.58 | 3/790~(0.4%)                   | 1.17        | 6/1053~(0.6%)    |
| 7   | Ak    | 0.27 | 0/999                          | 0.67        | 1/1327~(0.1%)    |
| 7   | Al    | 0.27 | 0/819                          | 0.63        | 0/1092           |
| 7   | Am    | 0.26 | 0/1357                         | 0.64        | 0/1794           |
| 7   | An    | 0.27 | 0/988                          | 0.67        | 2/1313~(0.2%)    |
| 7   | Ao    | 0.25 | 0/1232                         | 0.63        | 0/1634           |
| 7   | Ap    | 0.26 | 0/562                          | 0.61        | 0/749            |
| 7   | Aq    | 0.26 | 0/1475                         | 0.62        | 0/1947           |
| 7   | Ar    | 0.26 | 0/1390                         | 0.65        | 1/1830~(0.1%)    |
| 7   | As    | 0.30 | 0/1013                         | 0.75        | 3/1347~(0.2%)    |
| All | All   | 0.42 | $11\overline{/193454}~(0.0\%)$ | 0.77        | 35/278529~(0.0%) |

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 |
|-----|-------|---------------------|---------------------|
| 3   | Κ     | 0                   | 1                   |



| Mol | Chain | Res  | Type | Atoms | Z      | Observed(Å) | Ideal(Å) |
|-----|-------|------|------|-------|--------|-------------|----------|
| 3   | Κ     | 5284 | ALA  | C-N   | 12.67  | 1.55        | 1.33     |
| 7   | Aj    | 143  | PRO  | CB-CG | -10.93 | 0.95        | 1.50     |
| 6   | 2     | 696  | PRO  | CG-CD | -9.43  | 1.19        | 1.50     |
| 4   | W     | 2976 | LYS  | C-N   | 7.70   | 1.51        | 1.34     |
| 3   | Κ     | 5285 | GLY  | C-N   | 7.39   | 1.51        | 1.34     |

The worst 5 of 11 bond length outliers are listed below:

The worst 5 of 35 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms    | Z      | $Observed(^{o})$ | $Ideal(^{o})$ |
|-----|-------|-----|------|----------|--------|------------------|---------------|
| 7   | Aj    | 143 | PRO  | CA-N-CD  | -17.36 | 87.20            | 111.50        |
| 7   | Aj    | 143 | PRO  | N-CD-CG  | -15.91 | 79.33            | 103.20        |
| 6   | 2     | 696 | PRO  | N-CD-CG  | -15.83 | 79.45            | 103.20        |
| 7   | Aj    | 143 | PRO  | CA-CB-CG | -15.53 | 74.50            | 104.00        |
| 7   | As    | 130 | PRO  | CA-N-CD  | -12.89 | 93.45            | 111.50        |

There are no chirality outliers.

All (1) planarity outliers are listed below:

| Mol | Chain | Res  | Type | Group     |
|-----|-------|------|------|-----------|
| 3   | Κ     | 5285 | GLY  | Mainchain |

### 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   | Au    | 43052 | 0        | 23722    | 0       | 0            |
| 2   | Av    | 43620 | 0        | 23665    | 0       | 0            |
| 3   | А     | 936   | 0        | 1008     | 8       | 0            |
| 3   | Ae    | 936   | 0        | 1008     | 0       | 0            |
| 3   | В     | 962   | 0        | 1035     | 17      | 0            |
| 3   | С     | 983   | 0        | 1056     | 28      | 0            |
| 3   | D     | 940   | 0        | 1011     | 6       | 0            |
| 3   | Е     | 973   | 0        | 1043     | 11      | 0            |
| 3   | F     | 916   | 0        | 985      | 5       | 0            |
| 3   | G     | 983   | 0        | 1056     | 15      | 0            |
| 3   | Н     | 958   | 0        | 1032     | 12      | 0            |



| Conti | nuea from | <i>i previous</i> | page     |          |         |              |
|-------|-----------|-------------------|----------|----------|---------|--------------|
| Mol   | Chain     | Non-H             | H(model) | H(added) | Clashes | Symm-Clashes |
| 3     | I         | 983               | 0        | 1056     | 7       | 0            |
| 3     | K         | 977               | 0        | 1051     | 14      | 0            |
| 3     | L         | 991               | 0        | 1065     | 17      | 0            |
| 3     | aj        | 940               | 0        | 1011     | 0       | 0            |
| 3     | ak        | 940               | 0        | 1011     | 0       | 0            |
| 3     | al        | 851               | 0        | 909      | 0       | 0            |
| 3     | am        | 973               | 0        | 1048     | 0       | 0            |
| 3     | an        | 958               | 0        | 1032     | 0       | 0            |
| 3     | ao        | 949               | 0        | 1019     | 0       | 0            |
| 3     | ар        | 973               | 0        | 1048     | 0       | 0            |
| 3     | aq        | 900               | 0        | 967      | 0       | 0            |
| 3     | ar        | 983               | 0        | 1056     | 0       | 0            |
| 3     | as        | 916               | 0        | 985      | 0       | 0            |
| 3     | at        | 962               | 0        | 1035     | 0       | 0            |
| 3     | au        | 859               | 0        | 921      | 0       | 0            |
| 4     | Aa        | 814               | 0        | 856      | 0       | 0            |
| 4     | Ab        | 956               | 0        | 1021     | 0       | 0            |
| 4     | Ac        | 788               | 0        | 826      | 0       | 0            |
| 4     | Ad        | 805               | 0        | 843      | 0       | 0            |
| 4     | Af        | 766               | 0        | 797      | 0       | 0            |
| 4     | Ag        | 823               | 0        | 864      | 0       | 0            |
| 4     | At        | 956               | 0        | 1024     | 0       | 0            |
| 4     | J         | 814               | 0        | 856      | 10      | 0            |
| 4     | М         | 956               | 0        | 1024     | 15      | 0            |
| 4     | N         | 830               | 0        | 871      | 22      | 0            |
| 4     | 0         | 814               | 0        | 856      | 27      | 0            |
| 4     | Р         | 830               | 0        | 871      | 7       | 0            |
| 4     | Q         | 956               | 0        | 1021     | 12      | 0            |
| 4     | R         | 788               | 0        | 826      | 10      | 0            |
| 4     | S         | 956               | 0        | 1021     | 17      | 0            |
| 4     | Т         | 956               | 0        | 1021     | 14      | 0            |
| 4     | U         | 956               | 0        | 1021     | 8       | 0            |
| 4     | V         | 956               | 0        | 1021     | 19      | 0            |
| 4     | W         | 956               | 0        | 1021     | 25      | 0            |
| 4     | av        | 814               | 0        | 856      | 0       | 0            |
| 4     | aw        | 956               | 0        | 1021     | 0       | 0            |
| 4     | ax        | 956               | 0        | 1021     | 0       | 0            |
| 4     | ay        | 956               | 0        | 1021     | 0       | 0            |
| 4     | az        | 788               | 0        | 826      | 0       | 0            |
| 5     | X         | 901               | 0        | 951      | 9       | 0            |
| 5     | Y         | 896               | 0        | 946      | 7       | 0            |
| 5     | Z         | 739               | 0        | 779      | 9       | 0            |



|     | nueu jion | <i>i previous</i> | page     |          |         |              |
|-----|-----------|-------------------|----------|----------|---------|--------------|
| Mol | Chain     | Non-H             | H(model) | H(added) | Clashes | Symm-Clashes |
| 5   | a         | 995               | 0        | 1059     | 0       | 0            |
| 5   | b         | 833               | 0        | 880      | 0       | 0            |
| 5   | с         | 860               | 0        | 906      | 0       | 0            |
| 5   | d         | 808               | 0        | 846      | 0       | 0            |
| 5   | е         | 768               | 0        | 809      | 0       | 0            |
| 5   | f         | 808               | 0        | 846      | 0       | 0            |
| 5   | g         | 837               | 0        | 883      | 0       | 0            |
| 5   | h         | 801               | 0        | 838      | 0       | 0            |
| 5   | i         | 817               | 0        | 858      | 0       | 0            |
| 5   | j         | 853               | 0        | 898      | 0       | 0            |
| 5   | k         | 817               | 0        | 858      | 0       | 0            |
| 5   | 1         | 917               | 0        | 971      | 0       | 0            |
| 5   | m         | 808               | 0        | 846      | 0       | 0            |
| 5   | n         | 910               | 0        | 964      | 0       | 0            |
| 5   | 0         | 880               | 0        | 928      | 0       | 0            |
| 5   | р         | 837               | 0        | 883      | 0       | 0            |
| 5   | q         | 891               | 0        | 941      | 0       | 0            |
| 5   | r         | 860               | 0        | 906      | 0       | 0            |
| 5   | S         | 780               | 0        | 818      | 0       | 0            |
| 5   | t         | 890               | 0        | 941      | 0       | 0            |
| 5   | u         | 1001              | 0        | 1064     | 0       | 0            |
| 6   | 0         | 741               | 0        | 796      | 7       | 0            |
| 6   | 1         | 703               | 0        | 755      | 6       | 0            |
| 6   | 2         | 750               | 0        | 809      | 14      | 0            |
| 6   | 3         | 736               | 0        | 793      | 7       | 0            |
| 6   | 4         | 703               | 0        | 755      | 7       | 0            |
| 6   | 5         | 750               | 0        | 809      | 7       | 0            |
| 6   | 6         | 688               | 0        | 745      | 6       | 0            |
| 6   | 7         | 786               | 0        | 847      | 12      | 0            |
| 6   | 8         | 694               | 0        | 742      | 13      | 0            |
| 6   | 9         | 792               | 0        | 852      | 14      | 0            |
| 6   | CD        | 762               | 0        | 825      | 15      | 0            |
| 6   | a2        | 782               | 0        | 844      | 0       | 0            |
| 6   | a3        | 703               | 0        | 755      | 0       | 0            |
| 6   | a4        | 754               | 0        | 812      | 0       | 0            |
| 6   | a5        | 725               | 0        | 779      | 0       | 0            |
| 6   | a6        | 786               | 0        | 847      | 0       | 0            |
| 6   | a7        | 792               | 0        | 852      | 0       | 0            |
| 6   | a8        | 703               | 0        | 755      | 0       | 0            |
| 6   | a9        | 716               | 0        | 766      | 0       | 0            |
| 6   | v         | 767               | 0        | 828      | 0       | 0            |
| 6   | W         | 800               | 0        | 861      | 0       | 0            |



| Mol | Chain | Non-H  | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|--------|----------|----------|---------|--------------|
| 6   | Х     | 771    | 0        | 831      | 0       | 0            |
| 6   | У     | 792    | 0        | 852      | 0       | 0            |
| 6   | Z     | 673    | 0        | 722      | 0       | 0            |
| 7   | Ah    | 992    | 0        | 1087     | 0       | 0            |
| 7   | Ai    | 1298   | 0        | 1466     | 0       | 0            |
| 7   | Aj    | 780    | 0        | 838      | 0       | 0            |
| 7   | Ak    | 986    | 0        | 1082     | 0       | 0            |
| 7   | Al    | 808    | 0        | 866      | 0       | 0            |
| 7   | Am    | 1340   | 0        | 1519     | 0       | 0            |
| 7   | An    | 975    | 0        | 1072     | 0       | 0            |
| 7   | Ao    | 1215   | 0        | 1363     | 0       | 0            |
| 7   | Ap    | 555    | 0        | 584      | 0       | 0            |
| 7   | Aq    | 1456   | 0        | 1660     | 0       | 0            |
| 7   | Ar    | 1375   | 0        | 1585     | 0       | 0            |
| 7   | As    | 999    | 0        | 1097     | 0       | 0            |
| All | All   | 181715 | 0        | 149311   | 363     | 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 12.

The worst 5 of 363 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1           | Atom-2          | Interatomic<br>distance (Å) | Clash<br>overlap (Å) |
|------------------|-----------------|-----------------------------|----------------------|
| 3:C:279:GLN:HE22 | 4:O:419:GLN:CD  | 1.10                        | 1.51                 |
| 3:C:279:GLN:NE2  | 4:O:419:GLN:NE2 | 1.80                        | 1.28                 |
| 3:C:279:GLN:NE2  | 4:0:419:GLN:CD  | 1.92                        | 1.22                 |
| 3:C:279:GLN:HE22 | 4:O:419:GLN:NE2 | 1.38                        | 1.18                 |
| 3:C:279:GLN:NE2  | 4:O:419:GLN:OE1 | 1.80                        | 1.11                 |

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 PDB entries followed by that with respect to all EM entries.

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 | Perce | ntiles |
|-----|-------|---------------|-----------|---------|----------|-------|--------|
| 3   | А     | 120/130~(92%) | 110 (92%) | 10 (8%) | 0        | 100   | 100    |
| 3   | Ae    | 120/130~(92%) | 113~(94%) | 7~(6%)  | 0        | 100   | 100    |
| 3   | В     | 124/130~(95%) | 115~(93%) | 9~(7%)  | 0        | 100   | 100    |
| 3   | С     | 127/130~(98%) | 115~(91%) | 12 (9%) | 0        | 100   | 100    |
| 3   | D     | 121/130~(93%) | 115~(95%) | 6 (5%)  | 0        | 100   | 100    |
| 3   | Ε     | 126/130~(97%) | 121 (96%) | 5 (4%)  | 0        | 100   | 100    |
| 3   | F     | 117/130~(90%) | 110 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 3   | G     | 127/130~(98%) | 122 (96%) | 5 (4%)  | 0        | 100   | 100    |
| 3   | Н     | 123/130~(95%) | 119 (97%) | 4 (3%)  | 0        | 100   | 100    |
| 3   | Ι     | 127/130~(98%) | 121 (95%) | 6 (5%)  | 0        | 100   | 100    |
| 3   | K     | 126/130~(97%) | 119 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 3   | L     | 128/130~(98%) | 124 (97%) | 4 (3%)  | 0        | 100   | 100    |
| 3   | aj    | 121/130~(93%) | 111 (92%) | 10 (8%) | 0        | 100   | 100    |
| 3   | ak    | 121/130~(93%) | 114 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 3   | al    | 109/130~(84%) | 106 (97%) | 3 (3%)  | 0        | 100   | 100    |
| 3   | am    | 125/130~(96%) | 115 (92%) | 9 (7%)  | 1 (1%)   | 16    | 51     |
| 3   | an    | 123/130~(95%) | 112 (91%) | 11 (9%) | 0        | 100   | 100    |
| 3   | ao    | 122/130~(94%) | 115 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 3   | ар    | 125/130~(96%) | 119 (95%) | 6 (5%)  | 0        | 100   | 100    |
| 3   | aq    | 115/130~(88%) | 111 (96%) | 4 (4%)  | 0        | 100   | 100    |
| 3   | ar    | 127/130~(98%) | 119 (94%) | 8 (6%)  | 0        | 100   | 100    |
| 3   | as    | 117/130~(90%) | 113 (97%) | 4 (3%)  | 0        | 100   | 100    |
| 3   | at    | 124/130~(95%) | 114 (92%) | 10 (8%) | 0        | 100   | 100    |
| 3   | au    | 109/130~(84%) | 104 (95%) | 5 (5%)  | 0        | 100   | 100    |
| 4   | Aa    | 101/123~(82%) | 97~(96%)  | 4 (4%)  | 0        | 100   | 100    |
| 4   | Ab    | 121/123~(98%) | 114 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 4   | Ac    | 98/123~(80%)  | 98 (100%) | 0       | 0        | 100   | 100    |
| 4   | Ad    | 100/123~(81%) | 97~(97%)  | 3 (3%)  | 0        | 100   | 100    |
| 4   | Af    | 95/123~(77%)  | 92 (97%)  | 3 (3%)  | 0        | 100   | 100    |
| 4   | Ag    | 102/123~(83%) | 99~(97%)  | 3 (3%)  | 0        | 100   | 100    |
| 4   | At    | 121/123~(98%) | 112 (93%) | 7 (6%)  | 2 (2%)   | 7     | 37     |
| 4   | J     | 101/123~(82%) | 95 (94%)  | 6 (6%)  | 0        | 100   | 100    |



| $\alpha$ $\cdots$ $1$     | C    |          |      |
|---------------------------|------|----------|------|
| Continued                 | trom | previous | page |
| • • • • • • • • • • • • • |      | P        | 1    |

| Mol | Chain | Analysed      | Favoured  | Allowed  | Outliers | Perce | ntiles |
|-----|-------|---------------|-----------|----------|----------|-------|--------|
| 4   | М     | 121/123~(98%) | 113 (93%) | 8 (7%)   | 0        | 100   | 100    |
| 4   | Ν     | 103/123~(84%) | 97~(94%)  | 5 (5%)   | 1 (1%)   | 13    | 46     |
| 4   | Ο     | 101/123~(82%) | 94 (93%)  | 7 (7%)   | 0        | 100   | 100    |
| 4   | Р     | 103/123~(84%) | 101 (98%) | 2 (2%)   | 0        | 100   | 100    |
| 4   | Q     | 121/123~(98%) | 109 (90%) | 12 (10%) | 0        | 100   | 100    |
| 4   | R     | 98/123~(80%)  | 94 (96%)  | 4 (4%)   | 0        | 100   | 100    |
| 4   | S     | 121/123~(98%) | 110 (91%) | 11 (9%)  | 0        | 100   | 100    |
| 4   | Т     | 121/123~(98%) | 114 (94%) | 7 (6%)   | 0        | 100   | 100    |
| 4   | U     | 121/123~(98%) | 110 (91%) | 11 (9%)  | 0        | 100   | 100    |
| 4   | V     | 121/123~(98%) | 110 (91%) | 11 (9%)  | 0        | 100   | 100    |
| 4   | W     | 121/123~(98%) | 114 (94%) | 7 (6%)   | 0        | 100   | 100    |
| 4   | av    | 101/123~(82%) | 96 (95%)  | 5 (5%)   | 0        | 100   | 100    |
| 4   | aw    | 121/123~(98%) | 108 (89%) | 13 (11%) | 0        | 100   | 100    |
| 4   | ax    | 121/123~(98%) | 114 (94%) | 6 (5%)   | 1 (1%)   | 16    | 51     |
| 4   | ay    | 121/123~(98%) | 115 (95%) | 6 (5%)   | 0        | 100   | 100    |
| 4   | az    | 98/123~(80%)  | 96 (98%)  | 2 (2%)   | 0        | 100   | 100    |
| 5   | Х     | 110/136~(81%) | 105 (96%) | 5 (4%)   | 0        | 100   | 100    |
| 5   | Y     | 109/136~(80%) | 105 (96%) | 4 (4%)   | 0        | 100   | 100    |
| 5   | Ζ     | 88/136~(65%)  | 87 (99%)  | 1 (1%)   | 0        | 100   | 100    |
| 5   | a     | 123/136~(90%) | 116 (94%) | 7 (6%)   | 0        | 100   | 100    |
| 5   | b     | 99/136~(73%)  | 97~(98%)  | 2 (2%)   | 0        | 100   | 100    |
| 5   | с     | 104/136~(76%) | 101 (97%) | 3 (3%)   | 0        | 100   | 100    |
| 5   | d     | 96/136~(71%)  | 92 (96%)  | 4 (4%)   | 0        | 100   | 100    |
| 5   | е     | 92/136~(68%)  | 89 (97%)  | 3 (3%)   | 0        | 100   | 100    |
| 5   | f     | 96/136~(71%)  | 96 (100%) | 0        | 0        | 100   | 100    |
| 5   | g     | 100/136~(74%) | 98 (98%)  | 2 (2%)   | 0        | 100   | 100    |
| 5   | h     | 95/136~(70%)  | 95 (100%) | 0        | 0        | 100   | 100    |
| 5   | i     | 97/136~(71%)  | 95 (98%)  | 2 (2%)   | 0        | 100   | 100    |
| 5   | j     | 103/136~(76%) | 100 (97%) | 3 (3%)   | 0        | 100   | 100    |
| 5   | k     | 97/136~(71%)  | 96 (99%)  | 1 (1%)   | 0        | 100   | 100    |
| 5   | 1     | 112/136~(82%) | 108 (96%) | 4 (4%)   | 0        | 100   | 100    |



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| 5m96/136 (71%)90 (94%)6 (6%)01001005n111/136 (82%)104 (94%)7 (6%)0.01001005o100/136 (74%)98 (98%)2 (2%)0.01001005q100/136 (74%)98 (98%)2 (2%)0.01001005q100/136 (76%)101 (94%)7 (6%)0.01001005r104/136 (76%)100 (96%)4 (4%)0.01001005s93/136 (68%)91 (98%)2 (2%)0.01001005s93/136 (68%)91 (98%)7 (6%)0.01001005s93/136 (68%)91 (98%)4 (3%)0.0100100610124/136 (91%)120 (97%)4 (3%)0.01001006092/103 (89%)90 (98%)1 (1%)1 (1%)1011006185/103 (82%)84 (99%)1 (1%)1001001006391/103 (88%)88 (97%)3 (3%)0.01001006485/103 (82%)84 (95%)4 (4%)0.01001006683/103 (81%)81 (98%)2 (2%)0.01001006684/103 (82%)85 (98%)2 (2%)0.01001006699/103 (96%)85 (98%)2 (2%)0.010010066<   | Mol | Chain | Analysed      | Favoured  | Allowed | Outliers | Perce | ntiles |
|--|-----|-------|---------------|-----------|---------|----------|-------|--------|
| 11111113610410476%01001000107/136100100989876%010010010100101989822%010010010010100101101989876%01001001001010110110110100 <td>5</td> <td>m</td> <td>96/136~(71%)</td> <td>90 (94%)</td> <td>6 (6%)</td> <td>0</td> <td>100</td> <td>100</td>   | 5   | m     | 96/136~(71%)  | 90 (94%)  | 6 (6%)  | 0        | 100   | 100    |
| 5o107/136 (79%)100 (94%)7 (6%)010105p100/136 (74%)98 (98%)2 (2%)0.010105q108/136 (79%)101 (94%)7 (6%)0.01001005r104/136 (76%)100 (96%)4 (4%)0.01001005s93/136 (68%)91 (98%)2 (2%)0.01001005t108/136 (79%)101 (94%)7 (6%)0.01001005u124/136 (91%)120 (97%)4 (3%)0.01001006092/103 (89%)90 (98%)1 (1%)1 (1%)1001006185/103 (82%)84 (99%)1 (1%)0.01001006391/103 (88%)88 (97%)3 (3%)0.01001001006391/103 (88%)88 (97%)3 (3%)0.01001001001006485/103 (82%)81 (95%)4 (4%)0.0100   | 5   | n     | 111/136~(82%) | 104 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 5p100/136 (74%)98 (98%)2 (2%)01001005q108/136 (79%)101 (94%)7 (6%)01001005r104/136 (76%)100 (96%)4 (4%)01001005s93/136 (68%)91 (98%)2 (2%)01001005t108/136 (79%)101 (94%)7 (6%)01001001005u124/136 (91%)120 (97%)4 (3%)01001001006092/103 (89%)90 (98%)1 (1%)01001001006185/103 (82%)84 (99%)1 (1%)01001001006391/103 (88%)88 (97%)3 (3%)01001001006485/103 (82%)88 (97%)3 (3%)01001001006391/103 (88%)88 (97%)3 (3%)01001001006485/103 (82%)88 (97%)3 (3%)01001001006683/103 (81%)88 (98%)2 (2%)01001001006799/103 (96%)95 (96%)4 (4%)01001001006884/103 (82%)82 (98%)2 (2%)010010010066395/103 (96%)96 (96%)1 (1%)01001001006  | 5   | О     | 107/136~(79%) | 100 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 5q108/136 (79%)101 (94%)7 (6%)01001005r104/136 (76%)100 (96%)4 (4%)01001005s93/136 (68%)91 (98%)2 (2%)01001005t108/136 (79%)101 (94%)7 (6%)01001001005u124/136 (91%)120 (97%)4 (3%)01001001006092/103 (89%)90 (98%)1 (1%)1 (1%)1246185/103 (82%)84 (99%)1 (1%)01001006293/103 (90%)85 (91%)8 (9%)01001006391/103 (88%)88 (97%)3 (3%)01001006485/103 (82%)81 (95%)4 (4%)01001006633/103 (90%)89 (96%)4 (4%)01001006683/103 (81%)81 (98%)2 (2%)01001006684/103 (82%)85 (90%)9 (10%)1 (1%)101006699/103 (96%)95 (95%)5 (5%)01001006a385/103 (82%)83 (98%)2 (2%)01001006a494/103 (91%)90 (96%)4 (4%)01001006a589/103 (66%)88 (99%)1 (1%)01001006a4 <td>5</td> <td>р</td> <td>100/136~(74%)</td> <td>98~(98%)</td> <td>2 (2%)</td> <td>0</td> <td>100</td> <td>100</td>   | 5   | р     | 100/136~(74%) | 98~(98%)  | 2 (2%)  | 0        | 100   | 100    |
| 5r104/136 (76%)100 (96%)4 (4%)01001005s93/136 (68%)91 (98%)2 (2%)01001005t108/136 (79%)101 (94%)7 (6%)01001005u124/136 (91%)120 (97%)4 (3%)01001001006092/103 (89%)90 (98%)1 (1%)1 (1%)12456185/103 (82%)84 (99%)1 (1%)01001001006293/103 (90%)85 (91%)8 (9%)01001001006391/103 (88%)88 (97%)3 (3%)01001001006485/103 (82%)81 (95%)4 (5%)01001001006683/103 (80%)89 (96%)4 (4%)01001001006683/103 (82%)82 (98%)2 (2%)01001001006799/103 (96%)95 (95%)5 (5%)010010010010068385/103 (82%)83 (98%)2 (2%)01001001001001006a494/103 (91%)90 (96%)4 (4%)0100 <td>5</td> <td>q</td> <td>108/136~(79%)</td> <td>101 (94%)</td> <td>7 (6%)</td> <td>0</td> <td>100</td> <td>100</td>   | 5   | q     | 108/136~(79%) | 101 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 5s93/136 (68%)91 (98%)2 (2%)01001005t108/136 (79%)101 (94%)7 (6%)01001005u124/136 (91%)120 (97%)4 (3%)01001006092/103 (89%)90 (98%)1 (1%)1 (1%)12456185/103 (82%)84 (99%)1 (1%)01001001006293/103 (90%)85 (91%)8 (9%)01001001006391/103 (88%)88 (97%)3 (3%)01001001006485/103 (82%)81 (95%)4 (5%)01001001006593/103 (90%)89 (96%)4 (4%)01001001006683/103 (81%)81 (98%)2 (2%)01001001006683/103 (82%)82 (98%)2 (2%)01001001001006799/103 (96%)95 (95%)5 (5%)01001001001001006638/103 (82%)83 (98%)2 (2%)0100 <td>5</td> <td>r</td> <td>104/136~(76%)</td> <td>100 (96%)</td> <td>4 (4%)</td> <td>0</td> <td>100</td> <td>100</td>  | 5   | r     | 104/136~(76%) | 100 (96%) | 4 (4%)  | 0        | 100   | 100    |
| 5t108/136 (79%)101 (94%)7 (6%)01001005u124/136 (91%)120 (97%)4 (3%)01001006092/103 (89%)90 (98%)1 (1%)1 (1%)12456185/103 (82%)84 (99%)1 (1%)01001001006293/103 (90%)85 (91%)8 (9%)01001001006391/103 (88%)88 (97%)3 (3%)01001001006485/103 (82%)81 (95%)4 (5%)01001001006593/103 (90%)89 (96%)4 (4%)01001001006683/103 (81%)81 (98%)2 (2%)01001001006799/103 (96%)95 (96%)4 (4%)01001001006884/103 (82%)82 (98%)2 (2%)01001001006695/103 (92%)85 (90%)9 (10%)1 (1%)1001001006698/103 (85%)94 (96%)4 (4%)01001001006689/103 (85%)88 (99%)1 (1%)01001001006689/103 (86%)88 (99%)1 (1%)01001001006689/103 (85%)88 (98%)2 (2%)01001001006 <td>5</td> <td>s</td> <td>93/136~(68%)</td> <td>91 (98%)</td> <td>2 (2%)</td> <td>0</td> <td>100</td> <td>100</td>   | 5   | s     | 93/136~(68%)  | 91 (98%)  | 2 (2%)  | 0        | 100   | 100    |
| 5u124/136 (91%)120 (97%)4 (3%)01001006092/103 (89%)90 (98%)1 (1%)1 (1%)1246185/103 (82%)84 (99%)1 (1%)01001006293/103 (90%)85 (91%)8 (9%)01001006391/103 (88%)88 (97%)3 (3%)01001006485/103 (82%)81 (95%)4 (5%)01001006593/103 (90%)89 (96%)4 (4%)01001006683/103 (81%)81 (98%)2 (2%)01001006799/103 (96%)95 (96%)4 (4%)01001006884/103 (82%)82 (98%)2 (2%)01001006884/103 (95%)95 (95%)5 (5%)01001006A298/103 (95%)94 (96%)4 (4%)01001006A385/103 (82%)83 (98%)2 (2%)01001006A49/103 (91%)90 (96%)4 (4%)01001006A385/103 (82%)83 (98%)2 (2%)01001006A49/103 (91%)96 (97%)3 (3%)01001006A589/103 (85%)83 (98%)2 (2%)01001006A699/103 (96%)91 (91%  | 5   | t     | 108/136~(79%) | 101 (94%) | 7 (6%)  | 0        | 100   | 100    |
| 6092/103 (89%)90 (98%)1 (1%)1 (1%)12456185/103 (82%)84 (99%)1 (1%)001001006293/103 (90%)85 (91%)8 (9%)001001006391/103 (88%)88 (97%)3 (3%)001001006485/103 (82%)81 (95%)4 (5%)001001006485/103 (82%)89 (96%)4 (4%)001001006683/103 (81%)81 (98%)2 (2%)001001006683/103 (82%)95 (96%)4 (4%)001001006799/103 (96%)95 (95%)5 (5%)01001006884/103 (82%)85 (90%)9 (10%)1 (1%)122456385/103 (92%)85 (90%)9 (10%)1 (1%)1001006a385/103 (92%)83 (98%)2 (2%)001001006a494/103 (91%)90 (96%)4 (4%)001001006a589/103 (86%)88 (98%)1 (1%)001001006a699/103 (96%)96 (97%)3 (3%)001001006a699/103 (97%)91 (91%)9 (99%)1 (1%)1001006a699/103 (96%)96 (97%)3 (3%)001001006a6 <t< td=""><td>5</td><td>u</td><td>124/136~(91%)</td><td>120 (97%)</td><td>4 (3%)</td><td>0</td><td>100</td><td>100</td></t<>  | 5   | u     | 124/136~(91%) | 120 (97%) | 4 (3%)  | 0        | 100   | 100    |
| 61 $85/103 (82%)$ $84 (99%)$ $1 (1%)$ $0$ $100$ $100$ $6$ 2 $93/103 (90%)$ $85 (91%)$ $8 (9%)$ $0$ $100$ $100$ $6$ 3 $91/103 (88%)$ $88 (97%)$ $3 (3%)$ $0$ $100$ $100$ $6$ 4 $85/103 (82%)$ $81 (95%)$ $4 (5%)$ $0$ $100$ $100$ $6$ $5$ $93/103 (90%)$ $89 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $6$ $83/103 (81%)$ $81 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $6$ $83/103 (81%)$ $81 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $7$ $99/103 (96%)$ $95 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $8$ $84/103 (82%)$ $82 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $9$ $100/103 (97%)$ $95 (95%)$ $5 (5%)$ $0$ $100$ $100$ $6$ $a2$ $98/103 (92%)$ $85 (90%)$ $9 (10%)$ $1 (1%)$ $100$ $6$ $a3$ $85/103 (82%)$ $83 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $a4$ $94/103 (91%)$ $90 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $a4$ $94/103 (91%)$ $90 (96%)$ $3 (3%)$ $0$ $100$ $100$ $6$ $a4$ $94/103 (91%)$ $90 (96%)$ $3 (3%)$ $0$ $100$ $100$ $6$ $a6$ $99/103 (96%)$ $83 (98%)$ <   | 6   | 0     | 92/103~(89%)  | 90 (98%)  | 1 (1%)  | 1 (1%)   | 12    | 45     |
| 6 $2$ $93/103 (90%)$ $85 (91%)$ $8 (9%)$ $0$ $100$ $100$ $6$ $3$ $91/103 (88%)$ $88 (97%)$ $3 (3%)$ $0$ $100$ $100$ $6$ $4$ $85/103 (82%)$ $81 (95%)$ $4 (5%)$ $0$ $100$ $100$ $6$ $5$ $93/103 (90%)$ $89 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $6$ $83/103 (81%)$ $81 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $6$ $83/103 (81%)$ $81 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $7$ $99/103 (96%)$ $95 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $8$ $84/103 (82%)$ $82 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $9$ $100/103 (97%)$ $95 (95%)$ $5 (5%)$ $0$ $100$ $100$ $6$ $a2$ $98/103 (95%)$ $94 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $a3$ $85/103 (82%)$ $83 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $a4$ $94/103 (91%)$ $90 (96%)$ $1(1%)$ $0$ $100$ $100$ $6$ $a6$ $99/103 (96%)$ $96 (97%)$ $3(3%)$ $0$ $100$ $100$ $6$ $a6$ $89/103 (85%)$ $83 (98%)$ $2(2%)$ $0$ $100$ $100$ $6$ $a6$ $85/103 (82%)$ $86 (98%)$ $2(2%)$ $0$ $100$ $100$ $6$ $a9$ $88/103 (85%)$ <t< td=""><td>6</td><td>1</td><td>85/103~(82%)</td><td>84 (99%)</td><td>1 (1%)</td><td>0</td><td>100</td><td>100</td></t<> | 6   | 1     | 85/103~(82%)  | 84 (99%)  | 1 (1%)  | 0        | 100   | 100    |
| $6$ $3$ $91/103 (88\%)$ $88 (97\%)$ $3 (3\%)$ $0$ $100$ $100$ $6$ $4$ $85/103 (82\%)$ $81 (95\%)$ $4 (5\%)$ $0$ $100$ $100$ $6$ $5$ $93/103 (90\%)$ $89 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $6$ $6$ $83/103 (81\%)$ $81 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $6$ $7$ $99/103 (96\%)$ $95 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $6$ $8$ $84/103 (82\%)$ $82 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $6$ $9$ $100/103 (97\%)$ $95 (95\%)$ $5 (5\%)$ $0$ $100$ $100$ $6$ $8$ $84/103 (82\%)$ $85 (90\%)$ $9(10\%)$ $1(1\%)$ $122$ $45^{10}$ $6$ $A2$ $98/103 (95\%)$ $94 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $6$ $a3$ $85/103 (82\%)$ $83 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $6$ $a4$ $94/103 (91\%)$ $90 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $6$ $a5$ $89/103 (86\%)$ $88 (99\%)$ $11(\%)$ $0$ $100$ $100$ $6$ $a6$ $99/103 (96\%)$ $91 (91\%)$ $9(9\%)$ $0$ $100$ $100$ $6$ $a6$ $88/103 (85\%)$ $88 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $6$ $a6$ $85/103 (82\%)$ $86 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $6$ $a9$ $88/103 (8$  | 6   | 2     | 93/103~(90%)  | 85 (91%)  | 8 (9%)  | 0        | 100   | 100    |
| 6 $4$ $85/103 (82%)$ $81 (95%)$ $4 (5%)$ $0$ $100$ $100$ $6$ $5$ $93/103 (90%)$ $89 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $6$ $83/103 (81%)$ $81 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $7$ $99/103 (96%)$ $95 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $8$ $84/103 (82%)$ $82 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $9$ $100/103 (97%)$ $95 (95%)$ $5 (5%)$ $0$ $100$ $100$ $6$ $A2$ $98/103 (95%)$ $94 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $a2$ $98/103 (95%)$ $94 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $a3$ $85/103 (82%)$ $83 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $a4$ $94/103 (91%)$ $90 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $a5$ $89/103 (86%)$ $88 (99%)$ $1 (1%)$ $0$ $100$ $100$ $6$ $a6$ $99/103 (96%)$ $96 (97%)$ $3 (3%)$ $0$ $100$ $100$ $6$ $a8$ $85/103 (82%)$ $83 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $a9$ $88/103 (85%)$ $86 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $a9$ $88/103 (85%)$ $86 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $x$ $96/103 (93%)$ <  | 6   | 3     | 91/103~(88%)  | 88 (97%)  | 3 (3%)  | 0        | 100   | 100    |
| $6$ $5$ $93/103 (90\%)$ $89 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $6$ $6$ $83/103 (81\%)$ $81 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $6$ $7$ $99/103 (96\%)$ $95 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $6$ $8$ $84/103 (82\%)$ $82 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $6$ $9$ $100/103 (97\%)$ $95 (95\%)$ $5 (5\%)$ $0$ $100$ $100$ $6$ $CD$ $95/103 (92\%)$ $85 (90\%)$ $9 (10\%)$ $1 (1\%)$ $12$ $45^{-1}$ $6$ $a2$ $98/103 (95\%)$ $94 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $100$ $6$ $a3$ $85/103 (82\%)$ $83 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $100$ $6$ $a4$ $94/103 (91\%)$ $90 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $100$ $6$ $a5$ $89/103 (86\%)$ $88 (99\%)$ $1 (1\%)$ $0$ $100$ $100$ $100$ $6$ $a4$ $94/103 (91\%)$ $90 (96\%)$ $3 (3\%)$ $0$ $100$ $100$ $100$ $100$ $100$ $6$ $a5$ $89/103 (86\%)$ $88 (99\%)$ $1 (1\%)$ $0$ $100$ $100$ $100$ $6$ $a6$ $99/103 (96\%)$ $91 (91\%)$ $9(\%)$ $0$ $100$ $100$ $100$ $6$ $a8$ $85/103 (85\%)$ $86 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $100$ $6$ $a$  | 6   | 4     | 85/103~(82%)  | 81 (95%)  | 4 (5%)  | 0        | 100   | 100    |
| 6683/103 (81%)81 (98%)2 (2%)01001006799/103 (96%)95 (96%)4 (4%)01001006884/103 (82%)82 (98%)2 (2%)010010069100/103 (97%)95 (95%)5 (5%)01001006CD95/103 (92%)85 (90%)9 (10%)1 (1%)12456a298/103 (95%)94 (96%)4 (4%)01001006a385/103 (82%)83 (98%)2 (2%)001001006a494/103 (91%)90 (96%)4 (4%)01001006a589/103 (86%)88 (99%)1 (1%)01001006a699/103 (96%)91 (91%)9 (9%)01001006a699/103 (96%)91 (91%)9 (9%)01001006a885/103 (82%)83 (98%)2 (2%)01001006a885/103 (85%)86 (98%)2 (2%)01001006a988/103 (85%)86 (98%)2 (2%)01001006a988/103 (85%)86 (98%)2 (2%)01001006w101/103 (98%)95 (99%)1 (1%)01001006w101/103 (98%)96 (99%)1 (1%)0100100796 (99%)1 (1%)  | 6   | 5     | 93/103~(90%)  | 89 (96%)  | 4 (4%)  | 0        | 100   | 100    |
| 6 $7$ $99/103 (96%)$ $95 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $8$ $84/103 (82%)$ $82 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $9$ $100/103 (97%)$ $95 (95%)$ $5 (5%)$ $0$ $100$ $100$ $6$ $CD$ $95/103 (92%)$ $85 (90%)$ $9 (10%)$ $1 (1%)$ $12$ $45$ $6$ $a2$ $98/103 (95%)$ $94 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $a3$ $85/103 (82%)$ $83 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $a4$ $94/103 (91%)$ $90 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $a5$ $89/103 (86%)$ $88 (99%)$ $1 (1%)$ $0$ $100$ $100$ $6$ $a6$ $99/103 (96%)$ $96 (97%)$ $3 (3%)$ $0$ $100$ $100$ $6$ $a6$ $88/103 (85%)$ $83 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $a8$ $85/103 (82%)$ $83 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $a9$ $88/103 (85%)$ $86 (98%)$ $2 (2%)$ $0$ $100$ $100$ $6$ $v$ $96/103 (93%)$ $95 (99%)$ $1 (1%)$ $0$ $100$ $100$ $6$ $w$ $101/103 (98%)$ $97 (96%)$ $4 (4%)$ $0$ $100$ $100$ $6$ $w$ $97/103 (94%)$ $96 (99%)$ $1 (1%)$ $0$ $100$ $100$  | 6   | 6     | 83/103 (81%)  | 81 (98%)  | 2 (2%)  | 0        | 100   | 100    |
| 6884/103 (82%)82 (98%)2 (2%)010010069100/103 (97%)95 (95%)5 (5%)01001006CD95/103 (92%)85 (90%)9 (10%)1 (1%)12 $45$ 6a298/103 (95%)94 (96%)4 (4%)01001006a385/103 (82%)83 (98%)2 (2%)01001006a494/103 (91%)90 (96%)4 (4%)01001006a589/103 (86%)88 (99%)1 (1%)01001006a699/103 (96%)96 (97%)3 (3%)01001006a7100/103 (97%)91 (91%)9 (9%)01001006a885/103 (82%)83 (98%)2 (2%)01001006a998/103 (95%)95 (99%)1 (1%)01001006a988/103 (85%)86 (98%)2 (2%)01001006w101/103 (93%)95 (99%)1 (1%)01001006w101/103 (98%)97 (96%)4 (4%)01001006x97/103 (94%)96 (99%)1 (1%)0100100  | 6   | 7     | 99/103~(96%)  | 95 (96%)  | 4 (4%)  | 0        | 100   | 100    |
| 69100/103 (97%)95 (95%)5 (5%)01001001006CD95/103 (92%)85 (90%)9 (10%)1 (1%)12 $45$ 6a298/103 (95%)94 (96%)4 (4%)001001006a385/103 (82%)83 (98%)2 (2%)001001006a494/103 (91%)90 (96%)4 (4%)001001006a589/103 (86%)88 (99%)1 (1%)001001006a699/103 (96%)96 (97%)3 (3%)001001006a7100/103 (97%)91 (91%)9 (9%)001001006a885/103 (82%)83 (98%)2 (2%)001001006a988/103 (85%)86 (98%)2 (2%)001001006w101/103 (93%)95 (99%)1 (1%)001001006w101/103 (98%)97 (96%)4 (4%)001001006w101/103 (98%)96 (99%)1 (1%)001001006x97/103 (94%)96 (99%)1 (1%)00100100  | 6   | 8     | 84/103~(82%)  | 82 (98%)  | 2 (2%)  | 0        | 100   | 100    |
| 6CD $95/103 (92\%)$ $85 (90\%)$ $9 (10\%)$ $1 (1\%)$ $12$ $45$ 6a2 $98/103 (95\%)$ $94 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $100$ 6a3 $85/103 (82\%)$ $83 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ $100$ 6a4 $94/103 (91\%)$ $90 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ $100$ 6a5 $89/103 (86\%)$ $90 (96\%)$ $1 (1\%)$ $0$ $100$ $100$ 6a6 $99/103 (96\%)$ $96 (97\%)$ $3 (3\%)$ $0$ $100$ $100$ 6a6 $99/103 (96\%)$ $91 (91\%)$ $9 (9\%)$ $0$ $100$ $100$ 6a8 $85/103 (82\%)$ $83 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ 6a9 $88/103 (85\%)$ $86 (98\%)$ $2 (2\%)$ $0$ $100$ $100$ 6w $101/103 (98\%)$ $95 (99\%)$ $1 (1\%)$ $0$ $100$ $100$ 6w $101/103 (98\%)$ $97 (96\%)$ $4 (4\%)$ $0$ $100$ $100$ 6w $101/103 (98\%)$ $97 (96\%)$ $1 (1\%)$ $0$ $100$ $100$   | 6   | 9     | 100/103~(97%) | 95~(95%)  | 5 (5%)  | 0        | 100   | 100    |
| 6a298/103 (95%)94 (96%)4 (4%)01001006a385/103 (82%)83 (98%)2 (2%)01001006a494/103 (91%)90 (96%)4 (4%)01001001006a589/103 (86%)88 (99%)1 (1%)01001001006a699/103 (96%)96 (97%)3 (3%)01001001006a7100/103 (97%)91 (91%)9 (9%)01001001006a885/103 (82%)83 (98%)2 (2%)01001001006a988/103 (85%)86 (98%)2 (2%)01001001006v96/103 (93%)95 (99%)1 (1%)01001001006w101/103 (98%)97 (96%)4 (4%)01001001006x97/103 (94%)96 (99%)1 (1%)0100100  | 6   | CD    | 95/103~(92%)  | 85 (90%)  | 9 (10%) | 1 (1%)   | 12    | 45     |
| 6a385/103 (82%)83 (98%)2 (2%)01001006a494/103 (91%)90 (96%)4 (4%)01001006a589/103 (86%)88 (99%)1 (1%)01001006a699/103 (96%)96 (97%)3 (3%)01001006a7100/103 (97%)91 (91%)9 (9%)01001006a885/103 (82%)83 (98%)2 (2%)01001006a988/103 (85%)86 (98%)2 (2%)01001006v96/103 (93%)95 (99%)1 (1%)01001006w101/103 (98%)97 (96%)4 (4%)01001006x97/103 (94%)96 (99%)1 (1%)0100100  | 6   | a2    | 98/103~(95%)  | 94 (96%)  | 4 (4%)  | 0        | 100   | 100    |
| 6a494/103 (91%)90 (96%)4 (4%)001001006a589/103 (86%)88 (99%)1 (1%)001001006a699/103 (96%)96 (97%)3 (3%)001001006a7100/103 (97%)91 (91%)9 (9%)001001006a885/103 (82%)83 (98%)2 (2%)001001006a988/103 (85%)86 (98%)2 (2%)01001006v96/103 (93%)95 (99%)1 (1%)01001006w101/103 (98%)97 (96%)4 (4%)01001006x97/103 (94%)96 (99%)1 (1%)0100100   | 6   | a3    | 85/103~(82%)  | 83~(98%)  | 2 (2%)  | 0        | 100   | 100    |
| 6a589/103 (86%)88 (99%)1 (1%)01001006a699/103 (96%)96 (97%)3 (3%)01001001006a7100/103 (97%)91 (91%)9 (9%)01001001006a885/103 (82%)83 (98%)2 (2%)01001001006a988/103 (85%)86 (98%)2 (2%)01001001006v96/103 (93%)95 (99%)1 (1%)01001001006x97/103 (94%)96 (99%)1 (1%)0100100100  | 6   | a4    | 94/103~(91%)  | 90 (96%)  | 4 (4%)  | 0        | 100   | 100    |
| 6a699/103 (96%)96 (97%)3 (3%)01001006a7100/103 (97%)91 (91%)9 (9%)01001001006a885/103 (82%)83 (98%)2 (2%)01001001006a988/103 (85%)86 (98%)2 (2%)01001001006v96/103 (93%)95 (99%)1 (1%)01001006w101/103 (98%)97 (96%)4 (4%)01001006x97/103 (94%)96 (99%)1 (1%)0100100   | 6   | a5    | 89/103~(86%)  | 88 (99%)  | 1 (1%)  | 0        | 100   | 100    |
| 6a7100/103 (97%)91 (91%)9 (9%)01001006a885/103 (82%)83 (98%)2 (2%)01001006a988/103 (85%)86 (98%)2 (2%)01001001006v96/103 (93%)95 (99%)1 (1%)01001001006w101/103 (98%)97 (96%)4 (4%)01001001006x97/103 (94%)96 (99%)1 (1%)0100100   | 6   | a6    | 99/103~(96%)  | 96~(97%)  | 3 (3%)  | 0        | 100   | 100    |
| 6a885/103 (82%)83 (98%)2 (2%)01001006a988/103 (85%)86 (98%)2 (2%)01001001006v96/103 (93%)95 (99%)1 (1%)01001001006w101/103 (98%)97 (96%)4 (4%)01001001006x97/103 (94%)96 (99%)1 (1%)0100100  | 6   | a7    | 100/103~(97%) | 91 (91%)  | 9 (9%)  | 0        | 100   | 100    |
| 6a988/103 (85%)86 (98%)2 (2%)01001006v96/103 (93%)95 (99%)1 (1%)01001006w101/103 (98%)97 (96%)4 (4%)01001006x97/103 (94%)96 (99%)1 (1%)0100100   | 6   | a8    | 85/103~(82%)  | 83 (98%)  | 2 (2%)  | 0        | 100   | 100    |
| 6       v       96/103 (93%)       95 (99%)       1 (1%)       0       100       100         6       w       101/103 (98%)       97 (96%)       4 (4%)       0       100       100         6       x       97/103 (94%)       96 (99%)       1 (1%)       0       100       100  | 6   | a9    | 88/103~(85%)  | 86 (98%)  | 2(2%)   | 0        | 100   | 100    |
| 6       w       101/103 (98%)       97 (96%)       4 (4%)       0       100       100         6       x       97/103 (94%)       96 (99%)       1 (1%)       0       100       100   | 6   | v     | 96/103~(93%)  | 95~(99%)  | 1 (1%)  | 0        | 100   | 100    |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$   | 6   | W     | 101/103~(98%) | 97 (96%)  | 4 (4%)  | 0        | 100   | 100    |
|  | 6   | x     | 97/103~(94%)  | 96 (99%)  | 1 (1%)  | 0        | 100   | 100    |



| Mol | Chain | Analysed          | Favoured    | Allowed  | Outliers | Perce | ntiles |
|-----|-------|-------------------|-------------|----------|----------|-------|--------|
| 6   | У     | 100/103~(97%)     | 95~(95%)    | 5 (5%)   | 0        | 100   | 100    |
| 6   | z     | 82/103~(80%)      | 79~(96%)    | 3 (4%)   | 0        | 100   | 100    |
| 7   | Ah    | 128/196~(65%)     | 119~(93%)   | 9~(7%)   | 0        | 100   | 100    |
| 7   | Ai    | 168/196~(86%)     | 147 (88%)   | 21 (12%) | 0        | 100   | 100    |
| 7   | Aj    | 101/196~(52%)     | 92 (91%)    | 9 (9%)   | 0        | 100   | 100    |
| 7   | Ak    | 127/196~(65%)     | 114 (90%)   | 13 (10%) | 0        | 100   | 100    |
| 7   | Al    | 105/196~(54%)     | 94 (90%)    | 11 (10%) | 0        | 100   | 100    |
| 7   | Am    | 173/196~(88%)     | 150 (87%)   | 23 (13%) | 0        | 100   | 100    |
| 7   | An    | 126/196~(64%)     | 110 (87%)   | 16 (13%) | 0        | 100   | 100    |
| 7   | Ao    | 157/196~(80%)     | 138 (88%)   | 18 (12%) | 1 (1%)   | 22    | 55     |
| 7   | Ap    | 71/196~(36%)      | 67~(94%)    | 4 (6%)   | 0        | 100   | 100    |
| 7   | Aq    | 188/196~(96%)     | 172 (92%)   | 16 (8%)  | 0        | 100   | 100    |
| 7   | Ar    | 176/196~(90%)     | 144 (82%)   | 32 (18%) | 0        | 100   | 100    |
| 7   | As    | 129/196~(66%)     | 111 (86%)   | 17 (13%) | 1 (1%)   | 16    | 51     |
| All | All   | 11912/14160 (84%) | 11227 (94%) | 676 (6%) | 9 (0%)   | 50    | 79     |

5 of 9 Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 4   | Ν     | 205 | PRO  |
| 6   | 0     | 499 | ARG  |
| 3   | am    | 797 | ALA  |
| 4   | At    | 20  | LYS  |
| 6   | CD    | 312 | ILE  |

#### 5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent side chain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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 |
|-----|-------|--------------|-----------|----------|-------------|
| 3   | А     | 97/102~(95%) | 96~(99%)  | 1 (1%)   | 73 85       |
| 3   | Ae    | 97/102~(95%) | 96~(99%)  | 1 (1%)   | 73 85       |



Continued from previous page...

| Mol | Chain | Analysed       | Rotameric  | Outliers | Perce | ntiles |
|-----|-------|----------------|------------|----------|-------|--------|
| 3   | В     | 99/102~(97%)   | 98~(99%)   | 1 (1%)   | 73    | 85     |
| 3   | С     | 101/102~(99%)  | 99~(98%)   | 2(2%)    | 50    | 72     |
| 3   | D     | 97/102~(95%)   | 95~(98%)   | 2(2%)    | 48    | 71     |
| 3   | Е     | 100/102~(98%)  | 99~(99%)   | 1 (1%)   | 73    | 85     |
| 3   | F     | 95/102~(93%)   | 94 (99%)   | 1 (1%)   | 70    | 83     |
| 3   | G     | 101/102~(99%)  | 100 (99%)  | 1 (1%)   | 73    | 85     |
| 3   | Н     | 99/102~(97%)   | 95~(96%)   | 4 (4%)   | 27    | 56     |
| 3   | Ι     | 101/102~(99%)  | 99~(98%)   | 2(2%)    | 50    | 72     |
| 3   | К     | 100/102~(98%)  | 100 (100%) | 0        | 100   | 100    |
| 3   | L     | 102/102~(100%) | 101 (99%)  | 1 (1%)   | 73    | 85     |
| 3   | aj    | 97/102~(95%)   | 94 (97%)   | 3 (3%)   | 35    | 62     |
| 3   | ak    | 97/102~(95%)   | 92~(95%)   | 5(5%)    | 19    | 49     |
| 3   | al    | 86/102 (84%)   | 86 (100%)  | 0        | 100   | 100    |
| 3   | am    | 100/102~(98%)  | 98~(98%)   | 2(2%)    | 50    | 72     |
| 3   | an    | 99/102~(97%)   | 96~(97%)   | 3 (3%)   | 36    | 63     |
| 3   | ao    | 98/102~(96%)   | 98 (100%)  | 0        | 100   | 100    |
| 3   | ар    | 100/102~(98%)  | 100 (100%) | 0        | 100   | 100    |
| 3   | aq    | 94/102~(92%)   | 93~(99%)   | 1 (1%)   | 70    | 83     |
| 3   | ar    | 101/102~(99%)  | 99~(98%)   | 2(2%)    | 50    | 72     |
| 3   | as    | 95/102~(93%)   | 95~(100%)  | 0        | 100   | 100    |
| 3   | at    | 99/102~(97%)   | 98~(99%)   | 1 (1%)   | 73    | 85     |
| 3   | au    | 88/102~(86%)   | 87~(99%)   | 1 (1%)   | 70    | 83     |
| 4   | Aa    | 88/103~(85%)   | 86~(98%)   | 2(2%)    | 45    | 68     |
| 4   | Ab    | 103/103~(100%) | 102~(99%)  | 1 (1%)   | 73    | 85     |
| 4   | Ac    | 85/103~(82%)   | 84 (99%)   | 1 (1%)   | 67    | 82     |
| 4   | Ad    | 87/103 (84%)   | 87 (100%)  | 0        | 100   | 100    |
| 4   | Af    | 83/103 (81%)   | 82~(99%)   | 1 (1%)   | 67    | 82     |
| 4   | Ag    | 89/103 (86%)   | 87~(98%)   | 2(2%)    | 47    | 69     |
| 4   | At    | 103/103~(100%) | 100 (97%)  | 3(3%)    | 37    | 63     |
| 4   | J     | 88/103 (85%)   | 87~(99%)   | 1 (1%)   | 70    | 83     |
| 4   | М     | 103/103~(100%) | 101 (98%)  | 2 (2%)   | 52    | 73     |



Continued from previous page...

| Mol | Chain | Analysed       | Rotameric  | Outliers | Perce | $\mathbf{ntiles}$ |
|-----|-------|----------------|------------|----------|-------|-------------------|
| 4   | Ν     | 90/103~(87%)   | 90 (100%)  | 0        | 100   | 100               |
| 4   | Ο     | 88/103~(85%)   | 86~(98%)   | 2(2%)    | 45    | 68                |
| 4   | Р     | 90/103~(87%)   | 88~(98%)   | 2(2%)    | 47    | 69                |
| 4   | Q     | 103/103~(100%) | 102~(99%)  | 1 (1%)   | 73    | 85                |
| 4   | R     | 85/103~(82%)   | 83~(98%)   | 2(2%)    | 44    | 67                |
| 4   | S     | 103/103~(100%) | 101~(98%)  | 2(2%)    | 52    | 73                |
| 4   | Т     | 103/103~(100%) | 102~(99%)  | 1 (1%)   | 73    | 85                |
| 4   | U     | 103/103~(100%) | 102~(99%)  | 1 (1%)   | 73    | 85                |
| 4   | V     | 103/103~(100%) | 101~(98%)  | 2(2%)    | 52    | 73                |
| 4   | W     | 103/103~(100%) | 103~(100%) | 0        | 100   | 100               |
| 4   | av    | 88/103~(85%)   | 87~(99%)   | 1 (1%)   | 70    | 83                |
| 4   | aw    | 103/103~(100%) | 101~(98%)  | 2(2%)    | 52    | 73                |
| 4   | ax    | 103/103~(100%) | 102~(99%)  | 1 (1%)   | 73    | 85                |
| 4   | ay    | 103/103~(100%) | 101~(98%)  | 2(2%)    | 52    | 73                |
| 4   | az    | 85/103~(82%)   | 84 (99%)   | 1 (1%)   | 67    | 82                |
| 5   | Х     | 93/111~(84%)   | 89~(96%)   | 4 (4%)   | 25    | 54                |
| 5   | Y     | 93/111~(84%)   | 92~(99%)   | 1 (1%)   | 70    | 83                |
| 5   | Ζ     | 78/111~(70%)   | 76~(97%)   | 2(3%)    | 41    | 65                |
| 5   | a     | 102/111~(92%)  | 99~(97%)   | 3~(3%)   | 37    | 63                |
| 5   | b     | 88/111~(79%)   | 86~(98%)   | 2(2%)    | 45    | 68                |
| 5   | с     | 90/111~(81%)   | 88~(98%)   | 2(2%)    | 47    | 69                |
| 5   | d     | 85/111~(77%)   | 85 (100%)  | 0        | 100   | 100               |
| 5   | е     | 81/111~(73%)   | 79~(98%)   | 2(2%)    | 42    | 66                |
| 5   | f     | 85/111~(77%)   | 85 (100%)  | 0        | 100   | 100               |
| 5   | g     | 88/111~(79%)   | 86~(98%)   | 2(2%)    | 45    | 68                |
| 5   | h     | 84/111~(76%)   | 81~(96%)   | 3~(4%)   | 30    | 59                |
| 5   | i     | 86/111 (78%)   | 83 (96%)   | 3 (4%)   | 31    | 60                |
| 5   | j     | 89/111 (80%)   | 87~(98%)   | 2 (2%)   | 47    | 69                |
| 5   | k     | 86/111 (78%)   | 85 (99%)   | 1 (1%)   | 67    | 82                |
| 5   | 1     | 95/111 (86%)   | 92~(97%)   | 3 (3%)   | 34    | 61                |
| 5   | m     | 85/111 (77%)   | 82 (96%)   | 3 (4%)   | 31    | 60                |



Continued from previous page...

| Mol | Chain | Analysed      | Rotameric | Outliers | Perce | ntiles |
|-----|-------|---------------|-----------|----------|-------|--------|
| 5   | n     | 94/111~(85%)  | 93~(99%)  | 1 (1%)   | 70    | 83     |
| 5   | О     | 92/111~(83%)  | 91 (99%)  | 1 (1%)   | 70    | 83     |
| 5   | р     | 88/111 (79%)  | 87~(99%)  | 1 (1%)   | 70    | 83     |
| 5   | q     | 93/111 (84%)  | 90~(97%)  | 3(3%)    | 34    | 61     |
| 5   | r     | 90/111 (81%)  | 86 (96%)  | 4 (4%)   | 24    | 53     |
| 5   | s     | 82/111 (74%)  | 82 (100%) | 0        | 100   | 100    |
| 5   | t     | 93/111 (84%)  | 92~(99%)  | 1 (1%)   | 70    | 83     |
| 5   | u     | 103/111 (93%) | 99~(96%)  | 4 (4%)   | 27    | 57     |
| 6   | 0     | 74/79~(94%)   | 73~(99%)  | 1 (1%)   | 62    | 79     |
| 6   | 1     | 72/79~(91%)   | 71 (99%)  | 1 (1%)   | 62    | 79     |
| 6   | 2     | 75/79~(95%)   | 74 (99%)  | 1 (1%)   | 65    | 81     |
| 6   | 3     | 74/79~(94%)   | 74 (100%) | 0        | 100   | 100    |
| 6   | 4     | 72/79~(91%)   | 71 (99%)  | 1 (1%)   | 62    | 79     |
| 6   | 5     | 75/79~(95%)   | 75 (100%) | 0        | 100   | 100    |
| 6   | 6     | 71/79~(90%)   | 70 (99%)  | 1 (1%)   | 62    | 79     |
| 6   | 7     | 77/79~(98%)   | 74 (96%)  | 3 (4%)   | 27    | 57     |
| 6   | 8     | 71/79~(90%)   | 69~(97%)  | 2(3%)    | 38    | 64     |
| 6   | 9     | 78/79~(99%)   | 76 (97%)  | 2 (3%)   | 41    | 65     |
| 6   | CD    | 76/79~(96%)   | 74 (97%)  | 2 (3%)   | 41    | 65     |
| 6   | a2    | 77/79~(98%)   | 76~(99%)  | 1 (1%)   | 65    | 81     |
| 6   | a3    | 72/79~(91%)   | 71 (99%)  | 1 (1%)   | 62    | 79     |
| 6   | a4    | 75/79~(95%)   | 74 (99%)  | 1 (1%)   | 65    | 81     |
| 6   | a5    | 73/79~(92%)   | 73 (100%) | 0        | 100   | 100    |
| 6   | a6    | 77/79~(98%)   | 76 (99%)  | 1 (1%)   | 65    | 81     |
| 6   | a7    | 78/79~(99%)   | 78 (100%) | 0        | 100   | 100    |
| 6   | a8    | 72/79~(91%)   | 69 (96%)  | 3 (4%)   | 25    | 54     |
| 6   | a9    | 72/79~(91%)   | 70 (97%)  | 2 (3%)   | 38    | 64     |
| 6   | V     | 76/79~(96%)   | 74 (97%)  | 2 (3%)   | 41    | 65     |
| 6   | W     | 79/79~(100%)  | 78~(99%)  | 1 (1%)   | 65    | 81     |
| 6   | х     | 76/79~(96%)   | 76 (100%) | 0        | 100   | 100    |
| 6   | У     | 78/79~(99%)   | 78 (100%) | 0        | 100   | 100    |



| Mol | Chain | Analysed         | Rotameric  | Outliers | Perce | ntiles |
|-----|-------|------------------|------------|----------|-------|--------|
| 6   | Z     | 69/79~(87%)      | 68~(99%)   | 1 (1%)   | 62    | 79     |
| 7   | Ah    | 104/158~(66%)    | 99~(95%)   | 5 (5%)   | 21    | 51     |
| 7   | Ai    | 135/158~(85%)    | 129~(96%)  | 6 (4%)   | 24    | 53     |
| 7   | Aj    | 82/158~(52%)     | 79~(96%)   | 3 (4%)   | 29    | 58     |
| 7   | Ak    | 103/158~(65%)    | 101 (98%)  | 2 (2%)   | 52    | 73     |
| 7   | Al    | 85/158~(54%)     | 80 (94%)   | 5 (6%)   | 16    | 45     |
| 7   | Am    | 140/158~(89%)    | 136~(97%)  | 4 (3%)   | 37    | 63     |
| 7   | An    | 102/158~(65%)    | 96~(94%)   | 6 (6%)   | 16    | 45     |
| 7   | Ao    | 127/158~(80%)    | 126~(99%)  | 1 (1%)   | 79    | 88     |
| 7   | Ap    | 57/158~(36%)     | 56~(98%)   | 1 (2%)   | 54    | 74     |
| 7   | Aq    | 152/158~(96%)    | 146 (96%)  | 6 (4%)   | 27    | 57     |
| 7   | Ar    | 144/158~(91%)    | 138 (96%)  | 6 (4%)   | 25    | 54     |
| 7   | As    | 105/158~(66%)    | 99~(94%)   | 6 (6%)   | 17    | 46     |
| All | All   | 9893/11376~(87%) | 9699~(98%) | 194 (2%) | 50    | 72     |

 $5~{\rm of}~194$  residues with a non-rotameric side chain are listed below:

| Mol | Chain | $\mathbf{Res}$ | Type |
|-----|-------|----------------|------|
| 3   | am    | 786            | ARG  |
| 7   | Ah    | 417            | LEU  |
| 3   | an    | 950            | ARG  |
| 4   | ay    | 451            | LYS  |
| 7   | Ai    | 157            | THR  |

Sometimes side chains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 92 such side chains are listed below:

| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 6   | 0     | 575  | GLN  |
| 3   | an    | 981  | ASN  |
| 6   | 2     | 739  | HIS  |
| 6   | a8    | 1481 | ASN  |
| 3   | aq    | 4141 | 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 oligosaccharides 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 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-38407. These allow visual inspection of the internal detail of the map and identification of artifacts.

Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

## 6.1 Orthogonal projections (i)

#### 6.1.1 Primary map



6.1.2 Raw map



The images above show the map projected in three orthogonal directions.



### 6.2 Central slices (i)

### 6.2.1 Primary map



X Index: 144



Y Index: 144



Z Index: 144

#### 6.2.2 Raw map



X Index: 144

Y Index: 144

Z Index: 144

The images above show central slices of the map in three orthogonal directions.



### 6.3 Largest variance slices (i)

#### 6.3.1 Primary map



X Index: 125





Z Index: 139

#### 6.3.2 Raw map



X Index: 125

Y Index: 154



The images above show the largest variance slices of the map in three orthogonal directions.



## 6.4 Orthogonal standard-deviation projections (False-color) (i)

#### 6.4.1 Primary map



#### 6.4.2 Raw map



The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.



## 6.5 Orthogonal surface views (i)

#### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0293. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

#### 6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

### 6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.



# 7 Map analysis (i)

This section contains the results of statistical analysis of the map.

## 7.1 Map-value distribution (i)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.



## 7.2 Volume estimate (i)



The volume at the recommended contour level is 1585  $\rm nm^3;$  this corresponds to an approximate mass of 1431 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.



## 7.3 Rotationally averaged power spectrum (i)



\*Reported resolution corresponds to spatial frequency of 0.278  ${\rm \AA^{-1}}$ 



# 8 Fourier-Shell correlation (i)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

#### 8.1 FSC (i)



\*Reported resolution corresponds to spatial frequency of 0.278  $\mathrm{\AA^{-1}}$ 



# 8.2 Resolution estimates (i)

| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | Estimation criterion (FSC cut-off) |      |          |
|--|------------------------------------|------|----------|
| Resolution estimate (A)                                | 0.143                              | 0.5  | Half-bit |
| Reported by author                                     | 3.60                               | -    | -        |
| Author-provided FSC curve                              | -                                  | -    | -        |
| Unmasked-calculated*                                   | -                                  | 5.30 | _        |

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.



# 9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-38407 and PDB model 8XJV. Per-residue inclusion information can be found in section 3 on page 17.

## 9.1 Map-model overlay (i)



The images above show the 3D surface view of the map at the recommended contour level 0.0293 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.



#### 9.2 Q-score mapped to coordinate model (i)



The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

#### 9.3 Atom inclusion mapped to coordinate model (i)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.0293).



### 9.4 Atom inclusion (i)



At the recommended contour level, 95% of all backbone atoms, 87% of all non-hydrogen atoms, are inside the map.



1.0

0.0 <0.0

## 9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.0293) and Q-score for the entire model and for each chain.

| $\mathbf{Chain}$ | Atom inclusion | Q-score |
|------------------|----------------|---------|
| All              | 0.8730         | 0.4240  |
| 0                | 0.9070         | 0.4750  |
| 1                | 0.8100         | 0.4720  |
| 2                | 0.8650         | 0.4430  |
| 3                | 0.8950         | 0.4770  |
| 4                | 0.9020         | 0.4890  |
| 5                | 0.8970         | 0.4900  |
| 6                | 0.9040         | 0.4700  |
| 7                | 0.8970         | 0.4640  |
| 8                | 0.8890         | 0.4680  |
| 9                | 0.8960         | 0.4720  |
| A                | 0.8140         | 0.4670  |
| Aa               | 0.8920         | 0.4720  |
| Ab               | 0.8650         | 0.4650  |
| Ac               | 0.8970         | 0.4690  |
| Ad               | 0.9080         | 0.4860  |
| Ae               | 0.8740         | 0.4860  |
| Af               | 0.9020         | 0.4770  |
| Ag               | 0.8810         | 0.4810  |
| Ah               | 0.7590         | 0.4280  |
| Ai               | 0.7400         | 0.4050  |
| Aj               | 0.8010         | 0.4340  |
| Ak               | 0.7830         | 0.4280  |
| Al               | 0.7160         | 0.4070  |
| Am               | 0.7550         | 0.4180  |
| An               | 0.7800         | 0.4260  |
| Ao               | 0.7500         | 0.4200  |
| Ap               | 0.7740         | 0.4140  |
| Aq               | 0.7420         | 0.4000  |
| Ar               | 0.7520         | 0.4060  |
| As               | 0.7480         | 0.3970  |
| At               | 0.8820         | 0.4810  |
| Au               | 0.8820         | 0.3730  |
| Av               | 0.8800         | 0.3760  |
| В                | 0.8900         | 0.5000  |



| Chain | Atom inclusion | Q-score |
|-------|----------------|---------|
| С     | 0.9000         | 0.5050  |
| CD    | 0.8740         | 0.4630  |
| D     | 0.8850         | 0.4740  |
| Е     | 0.8020         | 0.4670  |
| F     | 0.8990         | 0.4880  |
| G     | 0.8870         | 0.4880  |
| Н     | 0.8840         | 0.4740  |
| Ι     | 0.8830         | 0.4770  |
| J     | 0.9290         | 0.4860  |
| К     | 0.8780         | 0.4930  |
| L     | 0.8440         | 0.4840  |
| М     | 0.7980         | 0.4500  |
| N     | 0.9120         | 0.5040  |
| 0     | 0.8850         | 0.4940  |
| Р     | 0.9160         | 0.4930  |
| Q     | 0.8040         | 0.4750  |
| R     | 0.9020         | 0.4670  |
| S     | 0.8780         | 0.4620  |
| Т     | 0.8770         | 0.4580  |
| U     | 0.8710         | 0.4660  |
| V     | 0.8770         | 0.4790  |
| W     | 0.8770         | 0.4810  |
| Х     | 0.8570         | 0.4680  |
| Y     | 0.9040         | 0.4800  |
| Z     | 0.9370         | 0.4810  |
| a     | 0.8900         | 0.4630  |
| a2    | 0.8690         | 0.4540  |
| a3    | 0.8830         | 0.4850  |
| a4    | 0.9160         | 0.4870  |
| a5    | 0.8650         | 0.4720  |
| a6    | 0.9070         | 0.4910  |
| a7    | 0.8820         | 0.4840  |
| a8    | 0.8380         | 0.4770  |
| a9    | 0.8460         | 0.4730  |
| aj    | 0.8780         | 0.4850  |
| ak    | 0.8660         | 0.4950  |
| al    | 0.8980         | 0.5070  |
| am    | 0.8860         | 0.5050  |
| an    | 0.8570         | 0.4590  |
| ao    | 0.8730         | 0.4820  |
| ap    | 0.8900         | 0.4800  |
| aq    | 0.8590         | 0.4680  |



| Chain | Atom inclusion | Q-score |
|-------|----------------|---------|
| ar    | 0.8970         | 0.4910  |
| as    | 0.8770         | 0.4920  |
| at    | 0.8620         | 0.4880  |
| au    | 0.8650         | 0.4760  |
| av    | 0.9150         | 0.4830  |
| aw    | 0.8880         | 0.4820  |
| ax    | 0.8950         | 0.4850  |
| ay    | 0.8730         | 0.4890  |
| az    | 0.9200         | 0.4860  |
| b     | 0.8070         | 0.4510  |
| С     | 0.9090         | 0.4850  |
| d     | 0.9020         | 0.4740  |
| е     | 0.9110         | 0.4890  |
| f     | 0.9200         | 0.4770  |
| g     | 0.9120         | 0.4910  |
| h     | 0.9260         | 0.4800  |
| i     | 0.9330         | 0.4960  |
| j     | 0.9050         | 0.4690  |
| k     | 0.9060         | 0.4890  |
| 1     | 0.8790         | 0.4600  |
| m     | 0.9320         | 0.4970  |
| n     | 0.8690         | 0.4740  |
| 0     | 0.9080         | 0.4860  |
| р     | 0.9190         | 0.4920  |
| q     | 0.8860         | 0.4760  |
| r     | 0.8900         | 0.4740  |
| S     | 0.9110         | 0.4810  |
| t     | 0.9090         | 0.4670  |
| u     | 0.8680         | 0.4580  |
| V     | 0.8140         | 0.4370  |
| W     | 0.8920         | 0.4860  |
| х     | 0.9100         | 0.4910  |
| у     | 0.9130         | 0.4900  |
| Z     | 0.8190         | 0.4590  |

