Full wwPDB/EMDataBank EM Map/Model Validation Report

Sep 19, 2018 – 10:18 AM EDT

PDB ID : 5ZEU
EMDB ID: : EMD-6923
Title : M. smegmatis P/P state 30S ribosomal subunit
Authors : Mishra, S.; Ahmed, T.; Tyagi, A.; Shi, J.; Bhushan, S.
Deposited on : 2018-02-28
Resolution : 3.70 Å (reported)

This is a Full wwPDB/EMDataBank EM Map/Model Validation Report for a publicly released PDB/EMDB 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 symbol.

MolProbity : 4.02b-467
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20031172
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

**ELECTRON MICROSCOPY**

The reported resolution of this entry is 3.70 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.

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. 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%

---

**Metric**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Whole archive (#Entries)</th>
<th>EM structures (#Entries)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clashscore</td>
<td>136327</td>
<td>1886</td>
</tr>
<tr>
<td>Ramachandran outliers</td>
<td>132723</td>
<td>1663</td>
</tr>
<tr>
<td>Sidechain outliers</td>
<td>132532</td>
<td>1531</td>
</tr>
<tr>
<td>RNA backbone</td>
<td>3747</td>
<td>458</td>
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</table>

---

**Metric**

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Length</th>
<th>Quality of chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>a</td>
<td>1528</td>
<td>68% 27%</td>
</tr>
<tr>
<td>2</td>
<td>c</td>
<td>275</td>
<td>69% 24%</td>
</tr>
<tr>
<td>3</td>
<td>e</td>
<td>214</td>
<td>88% 7%</td>
</tr>
<tr>
<td>4</td>
<td>g</td>
<td>156</td>
<td>96%</td>
</tr>
<tr>
<td>5</td>
<td>h</td>
<td>132</td>
<td>93% 5%</td>
</tr>
<tr>
<td>6</td>
<td>i</td>
<td>150</td>
<td>79% 5% 16%</td>
</tr>
<tr>
<td>7</td>
<td>j</td>
<td>101</td>
<td>89% 7%</td>
</tr>
<tr>
<td>8</td>
<td>k</td>
<td>138</td>
<td>78% 7% 15%</td>
</tr>
</tbody>
</table>

Continued on next page...
Continued from previous page...

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Length</th>
<th>Quality of chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>l</td>
<td>124</td>
<td>92%</td>
</tr>
<tr>
<td>10</td>
<td>o</td>
<td>89</td>
<td>97%</td>
</tr>
<tr>
<td>11</td>
<td>q</td>
<td>98</td>
<td>92%</td>
</tr>
<tr>
<td>12</td>
<td>r</td>
<td>84</td>
<td>76% 24%</td>
</tr>
<tr>
<td>13</td>
<td>s</td>
<td>93</td>
<td>80% 16%</td>
</tr>
<tr>
<td>14</td>
<td>t</td>
<td>86</td>
<td>91% 6%</td>
</tr>
<tr>
<td>15</td>
<td>v</td>
<td>77</td>
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<td>16</td>
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<td>61</td>
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<td>17</td>
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<td>81% 18%</td>
</tr>
<tr>
<td>18</td>
<td>d</td>
<td>201</td>
<td>99%</td>
</tr>
<tr>
<td>19</td>
<td>f</td>
<td>96</td>
<td>98%</td>
</tr>
<tr>
<td>20</td>
<td>m</td>
<td>124</td>
<td>94% 6%</td>
</tr>
<tr>
<td>21</td>
<td>p</td>
<td>156</td>
<td>72% 28%</td>
</tr>
<tr>
<td>22</td>
<td>u</td>
<td>33</td>
<td>76% 21%</td>
</tr>
</tbody>
</table>
2 Entry composition

There are 22 unique types of molecules in this entry. The entry contains 52954 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 RNA chain called 16S rRNA.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>a</td>
<td>1506</td>
<td>Total C N O P</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32341 14404 5921 10510 1506</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 2 is a protein called 30S ribosomal protein S3.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>c</td>
<td>210</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1672 1043 324 300 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 3 is a protein called 30S ribosomal protein S5.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>e</td>
<td>198</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1433 885 282 262 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 4 is a protein called 30S ribosomal protein S7.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>g</td>
<td>156</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1240 773 242 222 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 5 is a protein called 30S ribosomal protein S8.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>h</td>
<td>130</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1003 629 188 185 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 6 is a protein called 30S ribosomal protein S9.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>i</td>
<td>126</td>
<td>Total C N O</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>994 630 194 170</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- Molecule 7 is a protein called 30S ribosomal protein S10.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>j</td>
<td>97</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>775 488 143 141 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 8 is a protein called 30S ribosomal protein S11.

<table>
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<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>k</td>
<td>117</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>871 539 173 158 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 9 is a protein called 30S ribosomal protein S12.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>l</td>
<td>122</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>958 594 197 165 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 10 is a protein called 30S ribosomal protein S15.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>o</td>
<td>87</td>
<td>Total C N O</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>709 443 143 123</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 11 is a protein called 30S ribosomal protein S17.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>q</td>
<td>92</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>730 458 138 132 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 12 is a protein called 30S ribosomal protein S18 2.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>r</td>
<td>64</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>512 319 102 88 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 13 is a protein called 30S ribosomal protein S19.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>s</td>
<td>78</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>630 405 117 107 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Molecule 14 is a protein called 30S ribosomal protein S20.
<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>t</td>
<td>84</td>
<td>Total C N O 655 399 138 118</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 15 is a RNA chain called P-tRNAfMet.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>v</td>
<td>77</td>
<td>Total C N O P 1643 732 297 537 77</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 16 is a protein called 30S ribosomal protein S14 type Z.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>n</td>
<td>60</td>
<td>Total C N O S 477 302 97 73 5</td>
<td>0</td>
<td>0</td>
</tr>
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</table>

- Molecule 17 is a protein called 30S ribosomal protein S2.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>b</td>
<td>228</td>
<td>Total C N O S 1793 1132 322 330 9</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 18 is a protein called 30S ribosomal protein S4.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>d</td>
<td>200</td>
<td>Total C N O S 1641 1028 316 295 2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 19 is a protein called 30S ribosomal protein S6.

<table>
<thead>
<tr>
<th>Mol</th>
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<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>f</td>
<td>96</td>
<td>Total C N O S 771 486 138 145 2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 20 is a protein called 30S ribosomal protein S13.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>m</td>
<td>116</td>
<td>Total C N O S 935 572 191 169 3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 21 is a protein called 30S ribosomal protein S16.
Molecule 22 is a protein called Conserved domain protein.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>p</td>
<td>113</td>
<td>Total C N O</td>
<td>891 570 162 159</td>
<td>0</td>
</tr>
<tr>
<td>22</td>
<td>u</td>
<td>32</td>
<td>Total C N O S</td>
<td>280 172 71 36 1</td>
<td>0</td>
</tr>
</tbody>
</table>
3  Residue-property plots

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

- Molecule 1: 16S rRNA

Chain a:
- Molecule 2: 30S ribosomal protein S3
  
  Chain c:

- Molecule 3: 30S ribosomal protein S5
  
  Chain e:

- Molecule 4: 30S ribosomal protein S7
  
  Chain g:

- Molecule 5: 30S ribosomal protein S8
  
  Chain h:

- Molecule 6: 30S ribosomal protein S9
  
  Chain i:

- Molecule 7: 30S ribosomal protein S10
  
  Chain j:

- Molecule 8: 30S ribosomal protein S11
  
  Chain k:
• Molecule 9: 30S ribosomal protein S12

Chain l: 

• Molecule 10: 30S ribosomal protein S15

Chain o: 

• Molecule 11: 30S ribosomal protein S17

Chain q: 

• Molecule 12: 30S ribosomal protein S18

Chain r: 

• Molecule 13: 30S ribosomal protein S19

Chain s: 

• Molecule 14: 30S ribosomal protein S20

Chain t: 

• Molecule 15: P-tRNAfMet

Chain v:
- Molecule 16: 30S ribosomal protein S14 type Z

Chain n:

- Molecule 17: 30S ribosomal protein S2

Chain b:

- Molecule 18: 30S ribosomal protein S4

Chain d:

- Molecule 19: 30S ribosomal protein S6

Chain f:

- Molecule 20: 30S ribosomal protein S13

Chain m:

- Molecule 21: 30S ribosomal protein S16

Chain p:

- Molecule 22: Conserved domain protein

Chain u:
4 Experimental information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reconstruction method</td>
<td>SINGLE PARTICLE</td>
<td>Depositor</td>
</tr>
<tr>
<td>Imposed symmetry</td>
<td>POINT, Not provided</td>
<td>Depositor</td>
</tr>
<tr>
<td>Number of particles used</td>
<td>391837</td>
<td>Depositor</td>
</tr>
<tr>
<td>Resolution determination method</td>
<td>FSC 0.143 CUT-OFF</td>
<td>Depositor</td>
</tr>
<tr>
<td>CTF correction method</td>
<td>PHASE FLIPPING ONLY</td>
<td>Depositor</td>
</tr>
<tr>
<td>Microscope</td>
<td>FEI TITAN KRIOS</td>
<td>Depositor</td>
</tr>
<tr>
<td>Voltage (kV)</td>
<td>300</td>
<td>Depositor</td>
</tr>
<tr>
<td>Electron dose (e⁻/Å²)</td>
<td>1.5</td>
<td>Depositor</td>
</tr>
<tr>
<td>Minimum defocus (nm)</td>
<td>Not provided</td>
<td>Depositor</td>
</tr>
<tr>
<td>Maximum defocus (nm)</td>
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<td>Depositor</td>
</tr>
<tr>
<td>Magnification</td>
<td>Not provided</td>
<td>Depositor</td>
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<tr>
<td>Image detector</td>
<td>FEI FALCON II (4k x 4k)</td>
<td>Depositor</td>
</tr>
</tbody>
</table>
5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Bond lengths</th>
<th>Bond angles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RMSZ</td>
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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.

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Continued from previous page...

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There are no chirality outliers.

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</table>

5.2 Too-close contacts

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

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<th>H(added)</th>
<th>Clashes</th>
<th>Symm-Clashes</th>
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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 17.
There are no clashes within the asymmetric unit.
There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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.

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<td>144 (94%)</td>
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<td>124/150 (83%)</td>
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<td>13 (10%)</td>
<td>1 (1%)</td>
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All (26) Ramachandran outliers are listed below:

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5.3.2 Protein sidechains

In the following table, the Percentiles column shows the percent sidechain 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.

<table>
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<tr>
<th>Mol</th>
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<th>Outliers</th>
<th>Percentiles</th>
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<tr>
<td>2</td>
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<td>171/212 (81%)</td>
<td>164 (96%)</td>
<td>7 (4%)</td>
<td>33 68</td>
</tr>
<tr>
<td>3</td>
<td>e</td>
<td>139/147 (95%)</td>
<td>135 (97%)</td>
<td>4 (3%)</td>
<td>45 75</td>
</tr>
<tr>
<td>4</td>
<td>g</td>
<td>132/132 (100%)</td>
<td>128 (97%)</td>
<td>4 (3%)</td>
<td>44 75</td>
</tr>
</tbody>
</table>

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Continued from previous page...

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<th>Rotameric</th>
<th>Outliers</th>
<th>Percentiles</th>
</tr>
</thead>
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<td>106/108 (98%)</td>
<td>103 (97%)</td>
<td>3 (3%)</td>
<td>47 76</td>
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<tr>
<td>6</td>
<td>i</td>
<td>102/125 (82%)</td>
<td>98 (96%)</td>
<td>4 (4%)</td>
<td>35 69</td>
</tr>
<tr>
<td>7</td>
<td>j</td>
<td>88/90 (98%)</td>
<td>85 (97%)</td>
<td>3 (3%)</td>
<td>40 72</td>
</tr>
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<td>8</td>
<td>k</td>
<td>91/105 (87%)</td>
<td>85 (93%)</td>
<td>6 (7%)</td>
<td>18 55</td>
</tr>
<tr>
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<td>l</td>
<td>103/105 (98%)</td>
<td>98 (95%)</td>
<td>5 (5%)</td>
<td>27 63</td>
</tr>
<tr>
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<td>o</td>
<td>75/77 (97%)</td>
<td>74 (99%)</td>
<td>1 (1%)</td>
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<td>11</td>
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<td>r</td>
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<td>55 (100%)</td>
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<td>100 100</td>
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<td>s</td>
<td>69/84 (82%)</td>
<td>67 (97%)</td>
<td>2 (3%)</td>
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</tr>
<tr>
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<td>69/70 (99%)</td>
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</tr>
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<td>174 (99%)</td>
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<td>84 (99%)</td>
<td>1 (1%)</td>
<td>74 89</td>
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<tr>
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<td>m</td>
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<td>100 100</td>
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<td>u</td>
<td>30/31 (97%)</td>
<td>23 (77%)</td>
<td>7 (23%)</td>
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<td>All</td>
<td>All</td>
<td>1999/2192 (91%)</td>
<td>1942 (97%)</td>
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All (57) residues with a non-rotameric sidechain are listed below:

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Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

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<td>k</td>
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</tr>
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<td>d</td>
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</tr>
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5.3.3 RNA

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<th>Pucker Outliers</th>
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<td>1504/1528 (98%)</td>
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Continued on next page...
Continued from previous page...

<table>
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<tr>
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<th>Backbone Outliers</th>
<th>Pucker Outliers</th>
</tr>
</thead>
<tbody>
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All (409) RNA backbone outliers are listed below:

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There are no RNA pucker outliers to report.
5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.