PDB ID : 5WYK
EMDB ID: EMD-6696
Title : Cryo-EM structure of the 90S small subunit pre-ribosome (Mtr4-depleted, Enp1-TAP)
Authors : Ye, K.; Zhu, X.; Sun, Q.
Deposited on : 2017-01-13
Resolution : 4.50 Å (reported)

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) : trunk30686
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 4.50 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%.

<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>3A</td>
<td>333</td>
<td>23% 19% 53%</td>
</tr>
<tr>
<td>2</td>
<td>3B</td>
<td>327</td>
<td>59% 14% 27%</td>
</tr>
<tr>
<td>2</td>
<td>3C</td>
<td>327</td>
<td>61% 12% 27%</td>
</tr>
<tr>
<td>3</td>
<td>3D</td>
<td>504</td>
<td>62% 12% 27%</td>
</tr>
<tr>
<td>4</td>
<td>3E</td>
<td>511</td>
<td>62% 12% 25%</td>
</tr>
<tr>
<td>5</td>
<td>3F</td>
<td>573</td>
<td>48% 16% 36%</td>
</tr>
<tr>
<td>6</td>
<td>3G</td>
<td>126</td>
<td>80% 17%</td>
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<tr>
<td>6</td>
<td>3H</td>
<td>126</td>
<td>88% 9%</td>
</tr>
</tbody>
</table>

Continued on next page...
### Mol | Chain | Length | Quality of chain
--- | --- | --- | ---
7 | 5A | 700 | ![Green](34%) ![Yellow](26%) ![Red](5%) ![Gray](34%)  
8 | AA | 776 | ![Green](70%) ![Yellow](30%)  
9 | AB | 643 | ![Green](54%) ![Yellow](9%) ![Gray](37%)  
10 | AC | 713 | ![Green](56%) ![Yellow](10%) ![Gray](34%)  
11 | AD | 575 | ![Green](16%) ![Gray](82%)  
12 | AE | 1769 | ![Green](19%) ![Yellow](77%)  
13 | AF | 513 | ![Green](66%) ![Yellow](7%) ![Gray](27%)  
14 | AG | 896 | ![Green](58%) ![Gray](32%)  
15 | B1 | 1183 | ![Green](36%) ![Yellow](9%) ![Gray](55%)  
16 | BA | 923 | ![Green](61%) ![Red](20%) ![Gray](18%)  
17 | BB | 943 | ![Green](58%) ![Yellow](24%) ![Gray](17%)  
18 | BC | 817 | ![Green](74%) ![Gray](22%)  
19 | BD | 594 | ![Green](33%) ![Red](21%) ![Gray](45%)  
20 | BE | 939 | ![Green](60%) ![Red](19%) ![Gray](20%)  
21 | CA | 297 | ![Green](49%) ![Red](16%) ![Gray](34%)  
22 | CB | 1237 | ![Green](67%) ![Red](21%) ![Gray](11%)  
23 | E1 | 252 | ![Green](72%) ![Red](14%) ![Gray](14%)  
24 | E2 | 252 | ![Green](66%) ![Red](19%) ![Gray](14%)  
25 | E4 | 707 | ![Green](38%) ![Gray](60%)  
26 | K1 | 316 | ![Green](46%) ![Red](9%) ![Gray](45%)  
27 | MA | 183 | ![Green](63%) ![Gray](27%)  
28 | MB | 290 | ![Green](47%) ![Gray](37%)  
29 | MC | 593 | ![Green](7%) ![Gray](92%)  
30 | P1 | 274 | ![Green](53%) ![Gray](37%)  
31 | R1 | 367 | ![Green](72%) ![Gray](25%)  

*Continued on next page...*
### Continued from previous page...

<table>
<thead>
<tr>
<th>Mol</th>
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<td>33</td>
<td>SC</td>
<td>255</td>
<td>59%</td>
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<tr>
<td>34</td>
<td>SF</td>
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<td>65%</td>
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<tr>
<td>35</td>
<td>SG</td>
<td>225</td>
<td>70%</td>
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<tr>
<td>36</td>
<td>SI</td>
<td>190</td>
<td>61%</td>
</tr>
<tr>
<td>37</td>
<td>SJ</td>
<td>200</td>
<td>62%</td>
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<tr>
<td>38</td>
<td>SK</td>
<td>197</td>
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<td>SM</td>
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<td>40</td>
<td>SO</td>
<td>151</td>
<td>77%</td>
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<tr>
<td>41</td>
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<td>42</td>
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<td>43</td>
<td>SX</td>
<td>130</td>
<td>79%</td>
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<tr>
<td>44</td>
<td>SY</td>
<td>145</td>
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</tr>
<tr>
<td>45</td>
<td>SZ</td>
<td>135</td>
<td>56%</td>
</tr>
<tr>
<td>46</td>
<td>Sc</td>
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<td>94%</td>
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<tr>
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<td>Sd</td>
<td>67</td>
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<tr>
<td>48</td>
<td>Sf</td>
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<td>46%</td>
</tr>
<tr>
<td>49</td>
<td>U1</td>
<td>554</td>
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<tr>
<td>50</td>
<td>U2</td>
<td>250</td>
<td>27%</td>
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<tr>
<td>51</td>
<td>U4</td>
<td>189</td>
<td>59%</td>
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<td>52</td>
<td>U5</td>
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<td>20%</td>
</tr>
<tr>
<td>54</td>
<td>UB</td>
<td>987</td>
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</tr>
<tr>
<td>55</td>
<td>UC</td>
<td>1033</td>
<td>60%</td>
</tr>
</tbody>
</table>
2 Entry composition

There are 55 unique types of molecules in this entry. The entry contains 150760 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 U3 RNA.

<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>3A</td>
<td>157</td>
<td>Total C N O P</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3327 1488 575 1107 157</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 2 is a protein called rRNA 2′-O-methyltransferase fibrillarin.

<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>3B</td>
<td>239</td>
<td>Total C N O S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1866 1183 332 341 10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>3C</td>
<td>239</td>
<td>Total C N O S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1866 1183 332 341 10</td>
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<td>0</td>
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</tbody>
</table>

- Molecule 3 is a protein called Nucleolar protein 56.

<table>
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<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>3D</td>
<td>370</td>
<td>Total C N O S</td>
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<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>2915 1843 503 560 9</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 4 is a protein called Nucleolar protein 58.

<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>3E</td>
<td>382</td>
<td>Total C N O S</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2935 1859 498 570 8</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 5 is a protein called Ribosomal RNA-processing protein 9.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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<tr>
<td>5</td>
<td>3F</td>
<td>365</td>
<td>Total C N O S</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2916 1871 506 529 10</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 6 is a protein called 13 kDa ribonucleoprotein-associated 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>6</td>
<td>3G</td>
<td>122</td>
<td>Total C N O S</td>
<td>924 589 159 172 4</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>3H</td>
<td>122</td>
<td>Total C N O S</td>
<td>924 589 159 172 4</td>
<td>0</td>
</tr>
</tbody>
</table>
- Molecule 14 is a protein called Utp17.

<table>
<thead>
<tr>
<th>Mol</th>
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<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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</thead>
<tbody>
<tr>
<td>14</td>
<td>AG</td>
<td>612</td>
<td>Total C N O</td>
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<td>0</td>
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- Molecule 15 is a protein called Ribosome biogenesis protein BMS1.

<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>15</td>
<td>B1</td>
<td>536</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

- Molecule 16 is a protein called Periodic tryptophan protein 2.

<table>
<thead>
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<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>BA</td>
<td>755</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
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</table>

- Molecule 17 is a protein called U3 small nucleolar RNA-associated protein 12.

<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>17</td>
<td>BB</td>
<td>778</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
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- Molecule 18 is a protein called U3 small nucleolar RNA-associated protein 13.

<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>18</td>
<td>BC</td>
<td>783</td>
<td>Total C N O S</td>
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<td>0</td>
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- Molecule 19 is a protein called U3 small nucleolar RNA-associated protein 18.

<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>19</td>
<td>BD</td>
<td>325</td>
<td>Total C N O S</td>
<td>0</td>
<td>0</td>
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- Molecule 20 is a protein called U3 small nucleolar RNA-associated protein 21.
- Molecule 21 is a protein called Ribosomal RNA-processing protein 7.

- Molecule 22 is a protein called U3 small nucleolar RNA-associated protein 22.

- Molecule 23 is a protein called Ribosomal RNA small subunit methyltransferase NEP1.

- Molecule 24 is a protein called Enp2.

- Molecule 25 is a protein called KRR1 small subunit processome component.

- Molecule 26 is a protein called U3 small nucleolar ribonucleoprotein protein IMP3.

- Molecule 27 is a protein called U3 small nucleolar ribonucleoprotein protein IMP4.
- Molecule 28 is a protein called Mpp10, U3 small nucleolar RNA-associated protein MPP10.

<table>
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<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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<tr>
<td>28</td>
<td>MC</td>
<td>46</td>
<td>Total C N O</td>
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- Molecule 29 is a protein called Pre-rRNA-processing protein PNO1.

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<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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</thead>
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<tr>
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<td>P1</td>
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- Molecule 30 is a protein called RNA 3’-terminal phosphate cyclase-like protein.

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<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>R1</td>
<td>355</td>
<td>Total C N O S</td>
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<td>0</td>
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- Molecule 31 is a protein called Sof1.

<table>
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<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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<tbody>
<tr>
<td>31</td>
<td>S1</td>
<td>285</td>
<td>Total C N O</td>
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<td>0</td>
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- Molecule 32 is a RNA chain called 18S ribosomal RNA.

<table>
<thead>
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<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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</thead>
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<td>32</td>
<td>SA</td>
<td>1000</td>
<td>Total C N O P</td>
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- Molecule 33 is a protein called 40S ribosomal protein S1-A.

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<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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</thead>
<tbody>
<tr>
<td>33</td>
<td>SC</td>
<td>214</td>
<td>Total C N O S</td>
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<td>0</td>
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- Molecule 34 is a protein called 40S ribosomal protein S4-A.
• Molecule 35 is a protein called 40S ribosomal protein S5.

<table>
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<th>Chain</th>
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<th>Trace</th>
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<tr>
<td>34</td>
<td>SF</td>
<td>237</td>
<td>Total C 1881, N 1205, O 345, S 328</td>
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• Molecule 36 is a protein called 40S ribosomal protein S7-A.

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<th>Trace</th>
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<tbody>
<tr>
<td>36</td>
<td>SI</td>
<td>165</td>
<td>Total C 1322, N 856, O 227</td>
<td>0</td>
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</table>

• Molecule 37 is a protein called 40S ribosomal protein S8-A.

<table>
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<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>SJ</td>
<td>170</td>
<td>Total C 1412, N 892, O 272</td>
<td>0</td>
<td>0</td>
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</table>

• Molecule 38 is a protein called 40S ribosomal protein S11-A.

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<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>SM</td>
<td>141</td>
<td>Total C 1143, N 733, O 216</td>
<td>0</td>
<td>0</td>
</tr>
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• Molecule 40 is a protein called 40S ribosomal protein S13.

<table>
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<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>SO</td>
<td>134</td>
<td>Total C 1087, N 698, O 202</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

• Molecule 41 is a protein called 40S ribosomal protein S14-A.
<table>
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<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>SP</td>
<td>112</td>
<td>Total C  N  O  S</td>
<td>771  477  150  143  1</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 42 is a protein called 40S ribosomal protein S16-A.

<table>
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<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>SR</td>
<td>125</td>
<td>Total C  N  O  S</td>
<td>973  625  174  174</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 43 is a protein called 40S ribosomal protein S22-A.

<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>43</td>
<td>SX</td>
<td>129</td>
<td>Total C  N  O  S</td>
<td>1021  650  188  180  3</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 44 is a protein called 40S ribosomal protein S23-A.

<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>44</td>
<td>SY</td>
<td>103</td>
<td>Total C  N  O  S</td>
<td>785  501  144  138  2</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 45 is a protein called 40S ribosomal protein S24-A.

<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>45</td>
<td>SZ</td>
<td>101</td>
<td>Total C  N  O  S</td>
<td>801  512  144  145</td>
<td>0</td>
</tr>
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- Molecule 46 is a protein called 40S ribosomal protein S27-A.

<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>46</td>
<td>Sc</td>
<td>79</td>
<td>Total C  N  O  S</td>
<td>595  371  108  111  5</td>
<td>0</td>
</tr>
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</table>

- Molecule 47 is a protein called 40S ribosomal protein S28-A.

<table>
<thead>
<tr>
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<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>Sd</td>
<td>63</td>
<td>Total C  N  O  S</td>
<td>497  306  99  91  1</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 48 is a protein called 40S ribosomal protein S30-A.
- Molecule 49 is a protein called Utp7.

<table>
<thead>
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<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>Sf</td>
<td>30</td>
<td>Total C N O 251 162 50 39</td>
<td>0</td>
<td>0</td>
</tr>
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</table>

- Molecule 50 is a protein called Utp11.

<table>
<thead>
<tr>
<th>Mol</th>
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<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
<th>Trace</th>
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</thead>
<tbody>
<tr>
<td>50</td>
<td>U2</td>
<td>73</td>
<td>Total C N O 365 219 73 73</td>
<td>0</td>
<td>0</td>
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</table>

- Molecule 51 is a protein called rRNA-processing protein FCF1.

<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>51</td>
<td>U4</td>
<td>126</td>
<td>Total C N O S 990 633 179 168 10</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

- Molecule 52 is a protein called Ribosome biogenesis protein UTP30.

<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>52</td>
<td>U5</td>
<td>248</td>
<td>Total C N O S 2009 1285 357 359 8</td>
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<td>0</td>
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</table>

- Molecule 53 is a protein called Helical 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>53</td>
<td>UA</td>
<td>338</td>
<td>Total C N O 1690 1014 338 338</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Molecule 54 is a protein called Helical 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>54</td>
<td>UB</td>
<td>555</td>
<td>Total C N O 2775 1665 555 555</td>
<td>0</td>
<td>0</td>
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</table>

- Molecule 55 is a protein called Unassigned helices.
<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>55</td>
<td>UC</td>
<td>660</td>
<td>Total C N O</td>
<td>3300</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1980 660 660</td>
<td></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: U3 RNA

Chain 3A:

• Molecule 2: rRNA 2'-O-methyltransferase fibrillarin

Chain 3B:

• Molecule 2: rRNA 2'-O-methyltransferase fibrillarin

Chain 3C:
• Molecule 3: Nucleolar protein 56

Chain 3D:

• Molecule 4: Nucleolar protein 58

Chain 3E:

• Molecule 5: Ribosomal RNA-processing protein 9

Chain 3F:
• Molecule 6: 13 kDa ribonucleoprotein-associated protein

Chain 3G:

• Molecule 6: 13 kDa ribonucleoprotein-associated protein

Chain 3H:

• Molecule 7: 5ETS RNA

Chain 5A:
• Molecule 8: Utp4

Chain AA:

• Molecule 9: Utp5

Chain AB:

• Molecule 10: Utp8

Chain AC:
• Molecule 11: Utp9

Chain AD:

• Molecule 12: U3 small nucleolar RNA-associated protein 10
- Molecule 13: Utp15

Chain A:

- Molecule 14: Utp17

Chain A:
• Molecule 15: Ribosome biogenesis protein BMS1

Chain B1:
• Molecule 16: Periodic tryptophan protein 2

Chain BA:

• Molecule 17: U3 small nucleolar RNA-associated protein 12

Chain BB:
• Molecule 18: U3 small nucleolar RNA-associated protein 13

Chain BC:

• Molecule 19: U3 small nucleolar RNA-associated protein 18

Chain BD:
• Molecule 20: U3 small nucleolar RNA-associated protein 21

Chain BE:

• Molecule 21: Ribosomal RNA-processing protein 7

Chain CA:
- Molecule 22: U3 small nucleolar RNA-associated protein 22

Chain CB:

- Molecule 23: Ribosomal RNA small subunit methyltransferase NEP1
Chain E1:

- Molecule 23: Ribosomal RNA small subunit methyltransferase NEP1

Chain E2:

- Molecule 24: Enp2

Chain E4:

- Molecule 25: KRR1 small subunit processome component

Chain K1:
• Molecule 26: U3 small nucleolar ribonucleoprotein protein IMP3

Chain MA:  63%  9%  27%

• Molecule 27: U3 small nucleolar ribonucleoprotein protein IMP4

Chain MB:  47%  16%  37%

• Molecule 28: Mpp10, U3 small nucleolar RNA-associated protein MPP10

Chain MC:  7%  92%
- **Molecule 29: Pre-rRNA-processing protein PNO1**

| Chain | P1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

- **Molecule 30: RNA 3’-terminal phosphate cyclase-like protein**

<table>
<thead>
<tr>
<th>Chain</th>
<th>R1</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

- **Molecule 31: Sofl**

<table>
<thead>
<tr>
<th>Chain</th>
<th>S1</th>
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<th></th>
<th></th>
<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
• Molecule 32: 18S ribosomal RNA

Chain SA:
• Molecule 33: 40S ribosomal protein S1-A

Chain SC:

• Molecule 34: 40S ribosomal protein S4-A
Chain SF:

- Molecule 35: 40S ribosomal protein S5

Chain SG:

- Molecule 36: 40S ribosomal protein S7-A

Chain SI:

- Molecule 37: 40S ribosomal protein S8-A

Chain SJ:

- Molecule 38: 40S ribosomal protein S9-A

Chain SK:
• Molecule 39: 40S ribosomal protein S11-A

Chain SM:

• Molecule 40: 40S ribosomal protein S13

Chain SO:

• Molecule 41: 40S ribosomal protein S14-A

Chain SP:

• Molecule 42: 40S ribosomal protein S16-A

Chain SR:

• Molecule 43: 40S ribosomal protein S22-A

Chain SX:

• Molecule 44: 40S ribosomal protein S23-A

Chain SY:
• Molecule 45: 40S ribosomal protein S24-A

Chain SZ:

• Molecule 46: 40S ribosomal protein S27-A

Chain Sc:

• Molecule 47: 40S ribosomal protein S28-A

Chain Sd:

• Molecule 48: 40S ribosomal protein S30-A

Chain Sf:

• Molecule 49: Utp7

Chain U1:
• Molecule 50: Utp11

Chain U2:

• Molecule 51: rRNA-processing protein FCF1

Chain U4:

• Molecule 52: Ribosome biogenesis protein UTP30

Chain U5:

• Molecule 53: Helical domain protein

Chain UA:
• Molecule 54: Helical domain protein

Chain UB:

• Molecule 55: Unassigned helices

Chain UC:
## 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, C1</td>
<td>Depositor</td>
</tr>
<tr>
<td>Number of particles used</td>
<td>73543</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 ($e^-/Å^2$)</td>
<td>40</td>
<td>Depositor</td>
</tr>
<tr>
<td>Minimum defocus (nm)</td>
<td>1500</td>
<td>Depositor</td>
</tr>
<tr>
<td>Maximum defocus (nm)</td>
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<td>Depositor</td>
</tr>
<tr>
<td>Magnification</td>
<td>79545</td>
<td>Depositor</td>
</tr>
<tr>
<td>Image detector</td>
<td>OTHER</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>
<td>#</td>
</tr>
<tr>
<td>1</td>
<td>3A</td>
<td>0.53</td>
<td>0/3710</td>
</tr>
<tr>
<td>12</td>
<td>AE</td>
<td>0.35</td>
<td>0/3386</td>
</tr>
<tr>
<td>15</td>
<td>B1</td>
<td>0.36</td>
<td>0/4431</td>
</tr>
<tr>
<td>16</td>
<td>BA</td>
<td>0.42</td>
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</tr>
<tr>
<td>17</td>
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</tr>
<tr>
<td>18</td>
<td>BC</td>
<td>0.31</td>
<td>0/6226</td>
</tr>
<tr>
<td>19</td>
<td>BD</td>
<td>0.37</td>
<td>0/2597</td>
</tr>
<tr>
<td>2</td>
<td>3B</td>
<td>0.41</td>
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</tr>
<tr>
<td>2</td>
<td>3C</td>
<td>0.30</td>
<td>0/1903</td>
</tr>
<tr>
<td>20</td>
<td>BE</td>
<td>0.39</td>
<td>0/6056</td>
</tr>
<tr>
<td>21</td>
<td>CA</td>
<td>0.34</td>
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<tr>
<td>22</td>
<td>CB</td>
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<td>0/9081</td>
</tr>
<tr>
<td>23</td>
<td>E1</td>
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<td>23</td>
<td>E2</td>
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</tr>
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<td>K1</td>
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<td>26</td>
<td>MA</td>
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<td>0/1496</td>
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<td>MC</td>
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<td>3</td>
<td>3D</td>
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<tr>
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<td>R1</td>
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</tr>
<tr>
<td>32</td>
<td>SA</td>
<td>0.47</td>
<td>5/23814 (0.0%)</td>
</tr>
<tr>
<td>33</td>
<td>SC</td>
<td>0.34</td>
<td>0/1735</td>
</tr>
<tr>
<td>34</td>
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<td>0/1920</td>
</tr>
<tr>
<td>35</td>
<td>SG</td>
<td>0.44</td>
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<td>0.32</td>
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<td>SJ</td>
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<td>40</td>
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</tr>
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</tr>
<tr>
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<td>0/499</td>
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<tr>
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<td>Sf</td>
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<td>0/255</td>
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<td>52</td>
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<tr>
<td>6</td>
<td>3G</td>
<td>0.32</td>
<td>0/936</td>
</tr>
<tr>
<td>6</td>
<td>3H</td>
<td>0.34</td>
<td>0/936</td>
</tr>
<tr>
<td>7</td>
<td>5A</td>
<td>0.51</td>
<td>0/11029</td>
</tr>
<tr>
<td>All</td>
<td>All</td>
<td>0.39</td>
<td>5/131380 (0.0%)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>#Chirality outliers</th>
<th>#Planarity outliers</th>
</tr>
</thead>
<tbody>
<tr>
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<td>AE</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>BI</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>BA</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>BB</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>18</td>
<td>BC</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>19</td>
<td>BD</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3B</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>BE</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
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<td>CA</td>
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<td>1</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
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<td>3D</td>
<td>0</td>
<td>2</td>
</tr>
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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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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 8.
All (2077) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

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Continued on next page...
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.
<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Analysed</th>
<th>Favoured</th>
<th>Allowed</th>
<th>Outliers</th>
<th>Percentiles</th>
</tr>
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<tr>
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<td>3B</td>
<td>237/327 (72%)</td>
<td>222 (94%)</td>
<td>15 (6%)</td>
<td>0</td>
<td>100 100</td>
</tr>
<tr>
<td>2</td>
<td>3C</td>
<td>237/327 (72%)</td>
<td>218 (92%)</td>
<td>19 (8%)</td>
<td>0</td>
<td>100 100</td>
</tr>
<tr>
<td>3</td>
<td>3D</td>
<td>366/504 (73%)</td>
<td>339 (93%)</td>
<td>27 (7%)</td>
<td>0</td>
<td>100 100</td>
</tr>
<tr>
<td>4</td>
<td>3E</td>
<td>378/511 (74%)</td>
<td>352 (93%)</td>
<td>26 (7%)</td>
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<td>100 100</td>
</tr>
<tr>
<td>5</td>
<td>3F</td>
<td>353/573 (62%)</td>
<td>332 (94%)</td>
<td>21 (6%)</td>
<td>0</td>
<td>100 100</td>
</tr>
<tr>
<td>6</td>
<td>3G</td>
<td>120/126 (95%)</td>
<td>114 (95%)</td>
<td>6 (5%)</td>
<td>0</td>
<td>100 100</td>
</tr>
<tr>
<td>6</td>
<td>3H</td>
<td>120/126 (95%)</td>
<td>115 (96%)</td>
<td>5 (4%)</td>
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<tr>
<td>12</td>
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<td>380 (93%)</td>
<td>27 (7%)</td>
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<td>657 (88%)</td>
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<td>53  88</td>
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<tr>
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<td>681 (88%)</td>
<td>86 (11%)</td>
<td>3 (0%)</td>
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<tr>
<td>18</td>
<td>BC</td>
<td>779/817 (95%)</td>
<td>682 (88%)</td>
<td>93 (12%)</td>
<td>4 (0%)</td>
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<td>19</td>
<td>BD</td>
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<td>265 (84%)</td>
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<td>741/939 (79%)</td>
<td>683 (92%)</td>
<td>57 (8%)</td>
<td>1 (0%)</td>
<td>53  88</td>
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<tr>
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<td>CA</td>
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<td>182 (96%)</td>
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<td>100 100</td>
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<td>1050 (97%)</td>
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<td>E1</td>
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<td>209 (98%)</td>
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<td>K1</td>
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<td>150 (87%)</td>
<td>22 (13%)</td>
<td>1 (1%)</td>
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<td>39</td>
<td>SM</td>
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<td>128 (97%)</td>
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<td>U4</td>
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<td>52</td>
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<td>All</td>
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<td>966 (8%)</td>
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All (31) 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.

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All (87) residues with a non-rotameric sidechain are listed below:

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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.