PDB ID : 6CMO
EMDB ID: EMD-7517
Title : Rhodopsin-Gi complex
Deposited on : 2018-03-05
Resolution : 4.50 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
with specific help available everywhere you see the symbol.

MolProbity : 4.02b-467
Mogul : 1.7.3 (157068), CSD as539be (2018)
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-20031633
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.

### Metric Percentile Ranks Value

<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>
</tbody>
</table>

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>R</td>
<td>463</td>
<td>61% 8% 30%</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>354</td>
<td>86% 14%</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>345</td>
<td>86% 12%</td>
</tr>
<tr>
<td>4</td>
<td>G</td>
<td>68</td>
<td>75% 10% 15%</td>
</tr>
<tr>
<td>5</td>
<td>L</td>
<td>215</td>
<td>85% 13%</td>
</tr>
<tr>
<td>6</td>
<td>H</td>
<td>239</td>
<td>91% 5%</td>
</tr>
</tbody>
</table>
2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 11834 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 protein called chimera protein of Soluble cytochrome b562 and Rhodopsin.

<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>R</td>
<td>323</td>
<td>Total C N O S</td>
<td>2567 1714 393 434 26</td>
<td>0</td>
</tr>
</tbody>
</table>

There are 42 discrepancies between the modelled and reference sequences:

<table>
<thead>
<tr>
<th>Chain</th>
<th>Residue</th>
<th>Modelled</th>
<th>Actual</th>
<th>Comment</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>-139</td>
<td>PHE</td>
<td>-</td>
<td>expression tag</td>
<td>UNP P0ABE7</td>
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<tr>
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<td>ALA</td>
<td>-</td>
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<td>R</td>
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<tr>
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<td>-136</td>
<td>TYR</td>
<td>-</td>
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<td>UNP P0ABE7</td>
</tr>
<tr>
<td>R</td>
<td>-135</td>
<td>LYS</td>
<td>-</td>
<td>expression tag</td>
<td>UNP P0ABE7</td>
</tr>
<tr>
<td>R</td>
<td>-134</td>
<td>ASP</td>
<td>-</td>
<td>expression tag</td>
<td>UNP P0ABE7</td>
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<tr>
<td>R</td>
<td>-133</td>
<td>ASP</td>
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<tr>
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<tr>
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<tr>
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<tr>
<td>R</td>
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<tr>
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<tr>
<td>R</td>
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<tr>
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<td>-</td>
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<td>R</td>
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<tr>
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<td>ASN</td>
<td>-</td>
<td>expression tag</td>
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<tr>
<td>R</td>
<td>-112</td>
<td>LEU</td>
<td>-</td>
<td>expression tag</td>
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</tbody>
</table>
Continued from previous page...

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<thead>
<tr>
<th>Chain</th>
<th>Residue</th>
<th>Modelled</th>
<th>Actual</th>
<th>Comment</th>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>R</td>
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<tr>
<td>R</td>
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<td>PHE</td>
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<tr>
<td>R</td>
<td>-109</td>
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<td>-</td>
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<tr>
<td>R</td>
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<tr>
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<tr>
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<td>MET</td>
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</tr>
<tr>
<td>R</td>
<td>-4</td>
<td>ILE</td>
<td>HIS</td>
<td>conflict</td>
<td>UNP P0ABE7</td>
</tr>
<tr>
<td>R</td>
<td>0</td>
<td>LEU</td>
<td>-</td>
<td>linker</td>
<td>UNP P0ABE7</td>
</tr>
<tr>
<td>R</td>
<td>1</td>
<td>MET</td>
<td>-</td>
<td>linker</td>
<td>UNP P0ABE7</td>
</tr>
<tr>
<td>R</td>
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<td>CYS</td>
<td>-</td>
<td>linker</td>
<td>UNP P0ABE7</td>
</tr>
<tr>
<td>R</td>
<td>113</td>
<td>GLN</td>
<td>GLU</td>
<td>conflict</td>
<td>UNP P08100</td>
</tr>
<tr>
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<td>257</td>
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<td>MET</td>
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</tr>
<tr>
<td>R</td>
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<td>CYS</td>
<td>ASN</td>
<td>conflict</td>
<td>UNP P08100</td>
</tr>
</tbody>
</table>

- Molecule 2 is a protein called Guanine nucleotide-binding protein G(i) subunit alpha-1.

<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>A</td>
<td>354</td>
<td>Total C N O S</td>
<td>2834 1790 481 544 19</td>
<td>0</td>
</tr>
</tbody>
</table>

There are 2 discrepancies between the modelled and reference sequences:

<table>
<thead>
<tr>
<th>Chain</th>
<th>Residue</th>
<th>Modelled</th>
<th>Actual</th>
<th>Comment</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>203</td>
<td>ALA</td>
<td>GLY</td>
<td>conflict</td>
<td>UNP P63096</td>
</tr>
<tr>
<td>A</td>
<td>326</td>
<td>SER</td>
<td>ALA</td>
<td>conflict</td>
<td>UNP P63096</td>
</tr>
</tbody>
</table>

- Molecule 3 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

<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>B</td>
<td>340</td>
<td>Total C N O S</td>
<td>2616 1612 470 513 21</td>
<td>0</td>
</tr>
</tbody>
</table>

There are 6 discrepancies between the modelled and reference sequences:

<table>
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<th>Residue</th>
<th>Modelled</th>
<th>Actual</th>
<th>Comment</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>-4</td>
<td>MET</td>
<td>-</td>
<td>initiating methionine</td>
<td>UNP P54311</td>
</tr>
<tr>
<td>B</td>
<td>-3</td>
<td>GLY</td>
<td>-</td>
<td>expression tag</td>
<td>UNP P54311</td>
</tr>
<tr>
<td>B</td>
<td>-2</td>
<td>SER</td>
<td>-</td>
<td>expression tag</td>
<td>UNP P54311</td>
</tr>
<tr>
<td>B</td>
<td>-1</td>
<td>LEU</td>
<td>-</td>
<td>expression tag</td>
<td>UNP P54311</td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>LEU</td>
<td>-</td>
<td>expression tag</td>
<td>UNP P54311</td>
</tr>
</tbody>
</table>

Continued on next page...
• Molecule 4 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-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>4</td>
<td>G</td>
<td>58</td>
<td>Total C 173 N 65 O 18 S 8</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

• Molecule 5 is a protein called Fab light chain.

<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>L</td>
<td>211</td>
<td>Total C 173 N 65 O 18 S 8</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

• Molecule 6 is a protein called Fab Heavy chain.

<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>H</td>
<td>230</td>
<td>Total C 173 N 65 O 18 S 8</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

• Molecule 7 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C₈H₁₅NO₆).

![NAG](image)
Continued from previous page...

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Residues</th>
<th>Atoms</th>
<th>AltConf</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>R</td>
<td>1</td>
<td>Total C N O</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>28 16 2 10</td>
<td></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**: chimera protein of Soluble cytochrome b562 and Rhodopsin

  Chain R:

- **Molecule 2**: Guanine nucleotide-binding protein G(i) subunit alpha-1

  Chain A:

- **Molecule 3**: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1

  Chain B:

- **Molecule 4**: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2

  Chain G:
• Molecule 5: Fab light chain

Chain L:

• Molecule 6: Fab Heavy chain

Chain H:
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>227386</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>NONE</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 ($e^-/\AA^2$)</td>
<td>1.92</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>
<td>Not provided</td>
<td>Depositor</td>
</tr>
<tr>
<td>Magnification</td>
<td>Not provided</td>
<td>Depositor</td>
</tr>
<tr>
<td>Image detector</td>
<td>GATAN K2 SUMMIT (4k x 4k)</td>
<td>Depositor</td>
</tr>
</tbody>
</table>
5 Model quality

5.1 Standard geometry

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

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>
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<th>Bond lengths</th>
<th>Bond angles</th>
</tr>
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<td></td>
<td>RMSZ</td>
<td>#</td>
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<td>0/2649</td>
</tr>
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<td>2</td>
<td>A</td>
<td>0.29</td>
<td>0/2881</td>
</tr>
<tr>
<td>3</td>
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</tr>
<tr>
<td>4</td>
<td>G</td>
<td>0.25</td>
<td>0/450</td>
</tr>
<tr>
<td>5</td>
<td>L</td>
<td>0.26</td>
<td>0/1634</td>
</tr>
<tr>
<td>6</td>
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</tr>
<tr>
<td>All</td>
<td>All</td>
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<td>0/12071</td>
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</table>

There are no bond length outliers.

All (7) bond angle outliers are listed below:

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<th>Chain</th>
<th>Res</th>
<th>Type</th>
<th>Atoms</th>
<th>Z</th>
<th>Observed(°)</th>
<th>Ideal(°)</th>
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</thead>
<tbody>
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<td>6.81</td>
<td>130.96</td>
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</tr>
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<td>R</td>
<td>40</td>
<td>LEU</td>
<td>CA-CB-CG</td>
<td>6.07</td>
<td>129.27</td>
<td>115.30</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>309</td>
<td>ASP</td>
<td>CB-CG-OD1</td>
<td>5.67</td>
<td>123.41</td>
<td>118.30</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>152</td>
<td>ASP</td>
<td>CB-CG-OD1</td>
<td>5.46</td>
<td>127.85</td>
<td>115.30</td>
</tr>
<tr>
<td>1</td>
<td>R</td>
<td>43</td>
<td>TYR</td>
<td>CA-CB-CG</td>
<td>5.44</td>
<td>123.74</td>
<td>113.40</td>
</tr>
<tr>
<td>1</td>
<td>R</td>
<td>226</td>
<td>LEU</td>
<td>CA-CB-CG</td>
<td>5.29</td>
<td>127.47</td>
<td>115.30</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>146</td>
<td>LEU</td>
<td>CA-CB-CG</td>
<td>5.01</td>
<td>126.82</td>
<td>115.30</td>
</tr>
</tbody>
</table>

There are no chirality outliers.

There are no planarity outliers.

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.
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 4.

All (91) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

<table>
<thead>
<tr>
<th>Atom-1</th>
<th>Atom-2</th>
<th>Interatomic distance (Å)</th>
<th>Clash overlap (Å)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:R:115:PHE:O</td>
<td>1:R:119:LEU:HB2</td>
<td>1.91</td>
<td>0.70</td>
</tr>
<tr>
<td>1:R:87:VAL:O</td>
<td>1:R:91:PHE:HB2</td>
<td>1.93</td>
<td>0.68</td>
</tr>
<tr>
<td>5:L:90:GLN:HE22</td>
<td>5:L:92:SER:HB2</td>
<td>1.60</td>
<td>0.66</td>
</tr>
<tr>
<td>2:A:209:LYS:HG2</td>
<td>2:A:210:LYS:HG3</td>
<td>1.79</td>
<td>0.64</td>
</tr>
<tr>
<td>1:R:125:LEU:HD11</td>
<td>1:R:215:PRO:HG3</td>
<td>1.80</td>
<td>0.63</td>
</tr>
<tr>
<td>3:B:286:LEU:HB3</td>
<td>3:B:318:LEU:HD21</td>
<td>1.81</td>
<td>0.63</td>
</tr>
<tr>
<td>6:H:23:LEU:HD12</td>
<td>6:H:84:LEU:HD22</td>
<td>1.84</td>
<td>0.60</td>
</tr>
<tr>
<td>4:G:41:CYS:O</td>
<td>4:G:45:ALA:HB2</td>
<td>2.01</td>
<td>0.60</td>
</tr>
<tr>
<td>4:G:41:CYS:O</td>
<td>4:G:45:ALA:CB</td>
<td>2.51</td>
<td>0.59</td>
</tr>
<tr>
<td>3:B:26:ALA:HB2</td>
<td>3:B:259:GLN:HE22</td>
<td>1.66</td>
<td>0.59</td>
</tr>
<tr>
<td>1:R:135:ARG:NH2</td>
<td>1:R:309:MET:SD</td>
<td>2.69</td>
<td>0.59</td>
</tr>
<tr>
<td>3:B:271:CYS:HB3</td>
<td>3:B:290:ASP:HB2</td>
<td>1.86</td>
<td>0.58</td>
</tr>
<tr>
<td>3:B:119:ASN:ND2</td>
<td>3:B:144:GLY:O</td>
<td>2.37</td>
<td>0.57</td>
</tr>
<tr>
<td>3:B:256:ARG:HH11</td>
<td>4:G:28:ILE:HG13</td>
<td>1.69</td>
<td>0.57</td>
</tr>
<tr>
<td>2:A:159:LEU:HA</td>
<td>2:A:162:ILE:HB</td>
<td>1.87</td>
<td>0.56</td>
</tr>
<tr>
<td>3:B:224:GLY:O</td>
<td>3:B:251:ARG:NH1</td>
<td>2.40</td>
<td>0.55</td>
</tr>
<tr>
<td>3:B:7:LEU:HD12</td>
<td>4:G:16:VAL:HG21</td>
<td>1.88</td>
<td>0.55</td>
</tr>
<tr>
<td>2:A:304:GLN:O</td>
<td>2:A:308:GLU:HB2</td>
<td>2.07</td>
<td>0.54</td>
</tr>
<tr>
<td>5:L:131:ALA:HB3</td>
<td>5:L:187:TYR:HE2</td>
<td>1.72</td>
<td>0.54</td>
</tr>
<tr>
<td>5:L:116:VAL:HB</td>
<td>5:L:137:LEU:HD23</td>
<td>1.90</td>
<td>0.54</td>
</tr>
<tr>
<td>5:L:91:GLN:NE2</td>
<td>5:L:93:SER:OG</td>
<td>2.38</td>
<td>0.53</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Atom-1</th>
<th>Atom-2</th>
<th>Interatomic distance (Å)</th>
<th>Clash overlap (Å)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:B:50:THR:HG22</td>
<td>3:B:337:LYS:HG2</td>
<td>1.91</td>
<td>0.52</td>
</tr>
<tr>
<td>1:R:110:CYS:HA</td>
<td>1:R:113:GLN:HB3</td>
<td>1.91</td>
<td>0.52</td>
</tr>
<tr>
<td>1:R:119:LEU:HD21</td>
<td>1:R:168:ALA:HB2</td>
<td>1.91</td>
<td>0.52</td>
</tr>
<tr>
<td>3:B:60:ALA:HB3</td>
<td>3:B:73:ALA:HB3</td>
<td>1.92</td>
<td>0.51</td>
</tr>
<tr>
<td>5:L:149:TRP:NE1</td>
<td>5:L:195:CYS:SG</td>
<td>2.83</td>
<td>0.51</td>
</tr>
<tr>
<td>3:B:16:ASN:HA</td>
<td>3:B:19:ARG:HG2</td>
<td>1.91</td>
<td>0.51</td>
</tr>
<tr>
<td>3:B:31:SER:O</td>
<td>3:B:35:ASN:HB2</td>
<td>2.12</td>
<td>0.50</td>
</tr>
<tr>
<td>3:B:248:ALA:HB1</td>
<td>3:B:269:ILE:HG22</td>
<td>1.92</td>
<td>0.49</td>
</tr>
<tr>
<td>2:A:76:ASN:O</td>
<td>2:A:80:SER:HB3</td>
<td>2.12</td>
<td>0.49</td>
</tr>
<tr>
<td>3:B:285:LEU:HD23</td>
<td>3:B:299:ALA:HB2</td>
<td>1.95</td>
<td>0.49</td>
</tr>
<tr>
<td>1:R:262:LEU:HD12</td>
<td>1:R:266:VAL:HG21</td>
<td>1.95</td>
<td>0.49</td>
</tr>
<tr>
<td>3:B:180:PHEN:HE1</td>
<td>3:B:216:GLY:HA2</td>
<td>1.78</td>
<td>0.48</td>
</tr>
<tr>
<td>1:R:303:PRO:O</td>
<td>1:R:307:ILE:HB</td>
<td>2.13</td>
<td>0.48</td>
</tr>
<tr>
<td>5:L:17:GLY:H</td>
<td>5:L:79:LEU:HB3</td>
<td>1.79</td>
<td>0.48</td>
</tr>
<tr>
<td>3:B:103:CYS:SG</td>
<td>3:B:104:ALA:N</td>
<td>2.87</td>
<td>0.48</td>
</tr>
<tr>
<td>3:B:264:TYR:OH</td>
<td>3:B:299:ALA:O</td>
<td>2.28</td>
<td>0.47</td>
</tr>
<tr>
<td>5:L:34:VAL:HB</td>
<td>5:L:52:ALA:HB2</td>
<td>1.97</td>
<td>0.47</td>
</tr>
<tr>
<td>5:L:190:HIS:HE2</td>
<td>5:L:193:TYR:HB3</td>
<td>1.81</td>
<td>0.46</td>
</tr>
<tr>
<td>5:L:163:SER:HB3</td>
<td>5:L:177:SER:HB3</td>
<td>1.96</td>
<td>0.46</td>
</tr>
<tr>
<td>1:R:87:VAL:HG23</td>
<td>1:R:91:PHE:CD2</td>
<td>2.51</td>
<td>0.46</td>
</tr>
<tr>
<td>3:B:321:THR:HG23</td>
<td>3:B:324:GLY:H</td>
<td>1.79</td>
<td>0.45</td>
</tr>
<tr>
<td>5:L:118:ILE:HD11</td>
<td>5:L:208:LYS:HB3</td>
<td>1.98</td>
<td>0.45</td>
</tr>
<tr>
<td>1:R:195:LYS:HE2</td>
<td>1:R:198:VAL:HB</td>
<td>1.99</td>
<td>0.45</td>
</tr>
<tr>
<td>1:R:222:CYS:SG</td>
<td>1:R:223:TYR:N</td>
<td>2.89</td>
<td>0.45</td>
</tr>
<tr>
<td>1:R:81:VAL:HA</td>
<td>1:R:84:LEU:HD23</td>
<td>1.98</td>
<td>0.45</td>
</tr>
<tr>
<td>2:A:97:ASP:O</td>
<td>2:A:100:ARG:NH1</td>
<td>2.51</td>
<td>0.44</td>
</tr>
<tr>
<td>1:R:68:LEU:O</td>
<td>1:R:73:ASN:ND2</td>
<td>2.48</td>
<td>0.43</td>
</tr>
<tr>
<td>5:L:150:LYS:HD3</td>
<td>5:L:194:ALA:HB3</td>
<td>2.00</td>
<td>0.43</td>
</tr>
<tr>
<td>3:B:254:ASP:HB2</td>
<td>3:B:261:LEU:HD21</td>
<td>2.01</td>
<td>0.43</td>
</tr>
<tr>
<td>2:A:172:GLN:O</td>
<td>2:A:176:ARG:HB2</td>
<td>2.19</td>
<td>0.43</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Atom-1</th>
<th>Atom-2</th>
<th>Interatomic distance (Å)</th>
<th>Clash overlap (Å)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:A:274:PHE:O</td>
<td>2:A:278:ILE:HG12</td>
<td>2.18</td>
<td>0.42</td>
</tr>
<tr>
<td>6:H:186:ALA:HB1</td>
<td>6:H:194:TYR:HB3</td>
<td>2.01</td>
<td>0.42</td>
</tr>
<tr>
<td>5:L:163:SER:N</td>
<td>5:L:177:SER:O</td>
<td>2.51</td>
<td>0.42</td>
</tr>
<tr>
<td>3:B:30:LEU:HD21</td>
<td>3:B:261:LEU:HD12</td>
<td>2.01</td>
<td>0.42</td>
</tr>
<tr>
<td>1:R:170:PRO:HA</td>
<td>1:R:175:TRP:HB3</td>
<td>2.01</td>
<td>0.42</td>
</tr>
<tr>
<td>1:R:71:PRO:HA</td>
<td>1:R:74:TYR:HD2</td>
<td>1.83</td>
<td>0.42</td>
</tr>
<tr>
<td>5:L:26:ALA:HB3</td>
<td>5:L:70:THR:HB</td>
<td>2.00</td>
<td>0.42</td>
</tr>
<tr>
<td>3:B:241:PHE:HD2</td>
<td>3:B:253:PHE:HB2</td>
<td>1.84</td>
<td>0.42</td>
</tr>
<tr>
<td>2:A:235:ALA:HB2</td>
<td>2:A:240:MET:HA</td>
<td>2.01</td>
<td>0.42</td>
</tr>
<tr>
<td>3:B:51:LEU:HB2</td>
<td>3:B:336:LEU:HB2</td>
<td>2.01</td>
<td>0.42</td>
</tr>
<tr>
<td>5:L:144:GLU:O</td>
<td>5:L:199:HIS:NE2</td>
<td>2.53</td>
<td>0.41</td>
</tr>
<tr>
<td>1:R:247:GLU:HA</td>
<td>1:R:250:VAL:HG12</td>
<td>2.02</td>
<td>0.41</td>
</tr>
<tr>
<td>4:G:18:GLN:O</td>
<td>4:G:22:GLU:HB2</td>
<td>2.21</td>
<td>0.41</td>
</tr>
<tr>
<td>1:R:256:ILE:HA</td>
<td>1:R:259:ILE:HG12</td>
<td>2.02</td>
<td>0.41</td>
</tr>
<tr>
<td>1:R:126:TRP:HA</td>
<td>1:R:129:VAL:HG12</td>
<td>2.03</td>
<td>0.40</td>
</tr>
<tr>
<td>1:R:82:ALA:O</td>
<td>1:R:86:MET:HG2</td>
<td>2.22</td>
<td>0.40</td>
</tr>
</tbody>
</table>

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.

<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>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R</td>
<td>321/463 (69%)</td>
<td>319 (99%)</td>
<td>2 (1%)</td>
<td>0</td>
<td>100/100</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>352/354 (99%)</td>
<td>344 (98%)</td>
<td>8 (2%)</td>
<td>0</td>
<td>100/100</td>
</tr>
</tbody>
</table>

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

<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>
</thead>
<tbody>
<tr>
<td>3</td>
<td>B</td>
<td>338/345 (98%)</td>
<td>335 (99%)</td>
<td>3 (1%)</td>
<td>0</td>
<td>100  100</td>
</tr>
<tr>
<td>4</td>
<td>G</td>
<td>56/68 (82%)</td>
<td>56 (100%)</td>
<td>0</td>
<td>0</td>
<td>100  100</td>
</tr>
<tr>
<td>5</td>
<td>L</td>
<td>209/215 (97%)</td>
<td>205 (98%)</td>
<td>4 (2%)</td>
<td>0</td>
<td>100  100</td>
</tr>
<tr>
<td>6</td>
<td>H</td>
<td>228/239 (95%)</td>
<td>226 (99%)</td>
<td>2 (1%)</td>
<td>0</td>
<td>100  100</td>
</tr>
<tr>
<td>All</td>
<td>All</td>
<td>1504/1684 (89%)</td>
<td>1485 (99%)</td>
<td>19 (1%)</td>
<td>0</td>
<td>100  100</td>
</tr>
</tbody>
</table>

There are no Ramachandran outliers to report.

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>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Analysed</th>
<th>Rotameric</th>
<th>Outliers</th>
<th>Percentiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R</td>
<td>275/391 (70%)</td>
<td>273 (99%)</td>
<td>2 (1%)</td>
<td>85  92</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>306/306 (100%)</td>
<td>302 (99%)</td>
<td>4 (1%)</td>
<td>71  85</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>283/287 (99%)</td>
<td>282 (100%)</td>
<td>1 (0%)</td>
<td>92  95</td>
</tr>
<tr>
<td>4</td>
<td>G</td>
<td>47/56 (84%)</td>
<td>47 (100%)</td>
<td>0</td>
<td>100 100</td>
</tr>
<tr>
<td>5</td>
<td>L</td>
<td>186/190 (98%)</td>
<td>186 (100%)</td>
<td>0</td>
<td>100 100</td>
</tr>
<tr>
<td>6</td>
<td>H</td>
<td>193/202 (96%)</td>
<td>192 (100%)</td>
<td>1 (0%)</td>
<td>90  94</td>
</tr>
<tr>
<td>All</td>
<td>All</td>
<td>1290/1432 (90%)</td>
<td>1282 (99%)</td>
<td>8 (1%)</td>
<td>88  93</td>
</tr>
</tbody>
</table>

All (8) residues with a non-rotameric sidechain are listed below:

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Res</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R</td>
<td>288</td>
<td>MET</td>
</tr>
<tr>
<td>1</td>
<td>R</td>
<td>311</td>
<td>LYS</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>209</td>
<td>LYS</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>243</td>
<td>MET</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>283</td>
<td>LEU</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>346</td>
<td>ASN</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>340</td>
<td>ASN</td>
</tr>
<tr>
<td>6</td>
<td>H</td>
<td>31</td>
<td>ASN</td>
</tr>
</tbody>
</table>
Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

<table>
<thead>
<tr>
<th>Mol</th>
<th>Chain</th>
<th>Res</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R</td>
<td>111</td>
<td>ASN</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>164</td>
<td>GLN</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>346</td>
<td>ASN</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>119</td>
<td>ASN</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>220</td>
<td>GLN</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>259</td>
<td>GLN</td>
</tr>
<tr>
<td>5</td>
<td>L</td>
<td>90</td>
<td>GLN</td>
</tr>
<tr>
<td>5</td>
<td>L</td>
<td>91</td>
<td>GLN</td>
</tr>
<tr>
<td>5</td>
<td>L</td>
<td>211</td>
<td>ASN</td>
</tr>
<tr>
<td>6</td>
<td>H</td>
<td>31</td>
<td>ASN</td>
</tr>
</tbody>
</table>

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 \(|Z| > 2\) 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>Type</th>
<th>Chain</th>
<th>Res</th>
<th>Link</th>
<th>Bond lengths</th>
<th>Bond angles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Counts</td>
<td>RMSZ</td>
</tr>
<tr>
<td>7</td>
<td>NAG</td>
<td>R</td>
<td>501</td>
<td>1,7</td>
<td>14,14,15</td>
<td>0.30</td>
</tr>
<tr>
<td>7</td>
<td>NAG</td>
<td>R</td>
<td>502</td>
<td>7</td>
<td>14,14,15</td>
<td>0.28</td>
</tr>
</tbody>
</table>
In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. ‘-’ means no outliers of that kind were identified.

<table>
<thead>
<tr>
<th>Mol</th>
<th>Type</th>
<th>Chain</th>
<th>Res</th>
<th>Link</th>
<th>Chirals</th>
<th>Torsions</th>
<th>Rings</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>NAG</td>
<td>R</td>
<td>501</td>
<td>1,7</td>
<td>-</td>
<td>0/6/23/26</td>
<td>0/1/1/1</td>
</tr>
<tr>
<td>7</td>
<td>NAG</td>
<td>R</td>
<td>502</td>
<td>7</td>
<td>-</td>
<td>0/6/23/26</td>
<td>0/1/1/1</td>
</tr>
</tbody>
</table>

There are no bond length outliers.
There are no bond angle outliers.
There are no chirality outliers.
There are no torsion outliers.
There are no ring outliers.
No monomer is involved in short contacts.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.