

## HIV capsid–octahedral structure

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<http://homepage.mac.com/whitby/>

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<http://web.me.com/whitby/Octahedron/Welcome.html>

### Reference

#### 1. **Octahedron, the Universe defined** by Robert William Whitby

A description of the atomic shapes and how they join which follows from the discovery that the periodicity of the atomic elements matches the periodicity of recurring form in which identical regular octahedra combine to form ever larger regular octahedra. Octahedron1stEd.pdf shows that the atomic elements are crystalline assemblies of identical regular octahedra and explores the implications of this discovery. 500 pages. See **Octahedron1stEd.pdf**.

<http://homepage.mac.com/whitby/FileSharing103.html>

#### 2. **VirusBook.pdf** by Robert William Whitby

A chapter excerpted from Reference 1 that describes the octahedral structure of viruses having icosahedral capsids.

<http://homepage.mac.com/whitby/BiologicalViruses/FileSharing88.html>

#### 3. **VIRUS PICTURES: image of HIV virion (virus structure)**, Russell Kightley Media

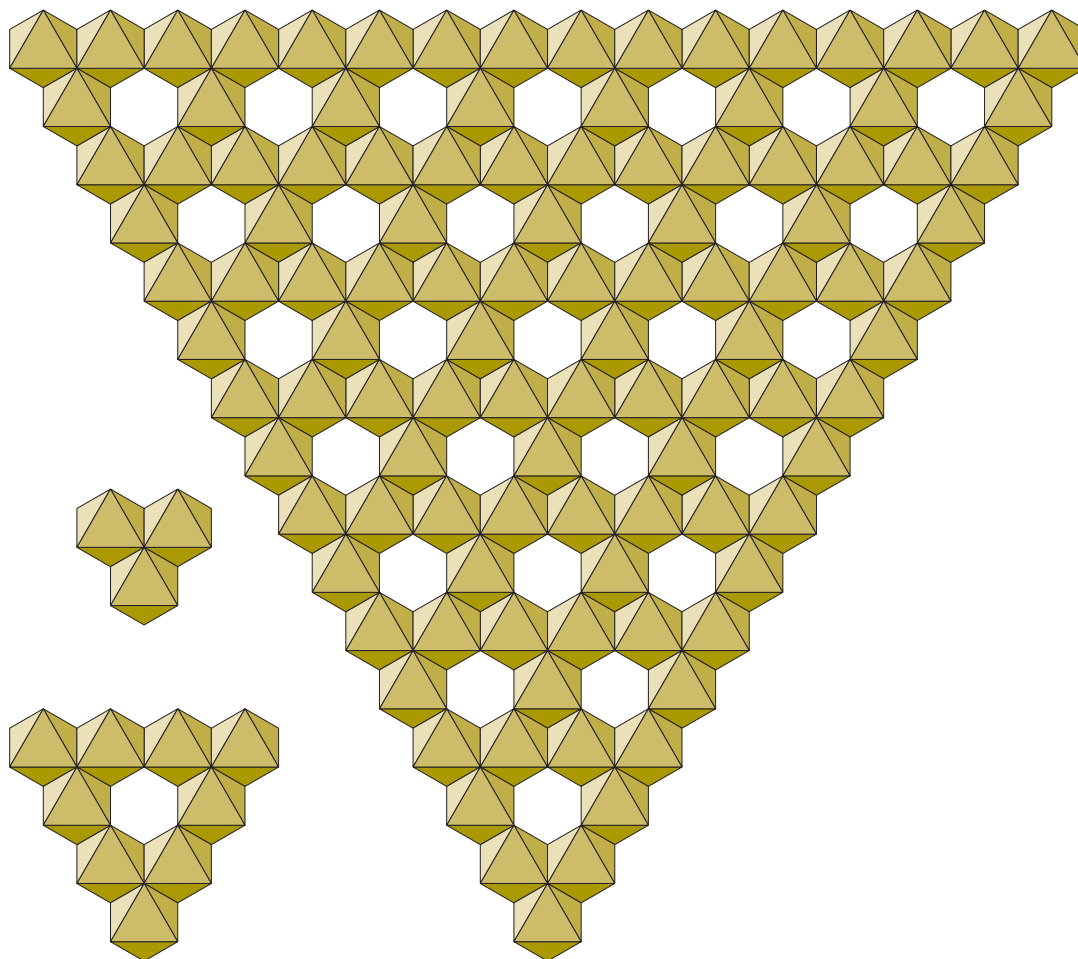
<The underlying matrix protein arrangement is based on the model for the MA shell published in: Journal of Molecular Biology (2000) 298, 841-857, Molecular Modelling Study of HIV p17gag (MA) Protein Shell Utilising Data from Electron Microscopy and X-ray Crystallography. M. J. Forster, B. Mulloy and M. V. Nermut.>

<http://www.rkm.com.au/VIRUS/HIV/HIV-virus-structure.html>

### Introduction

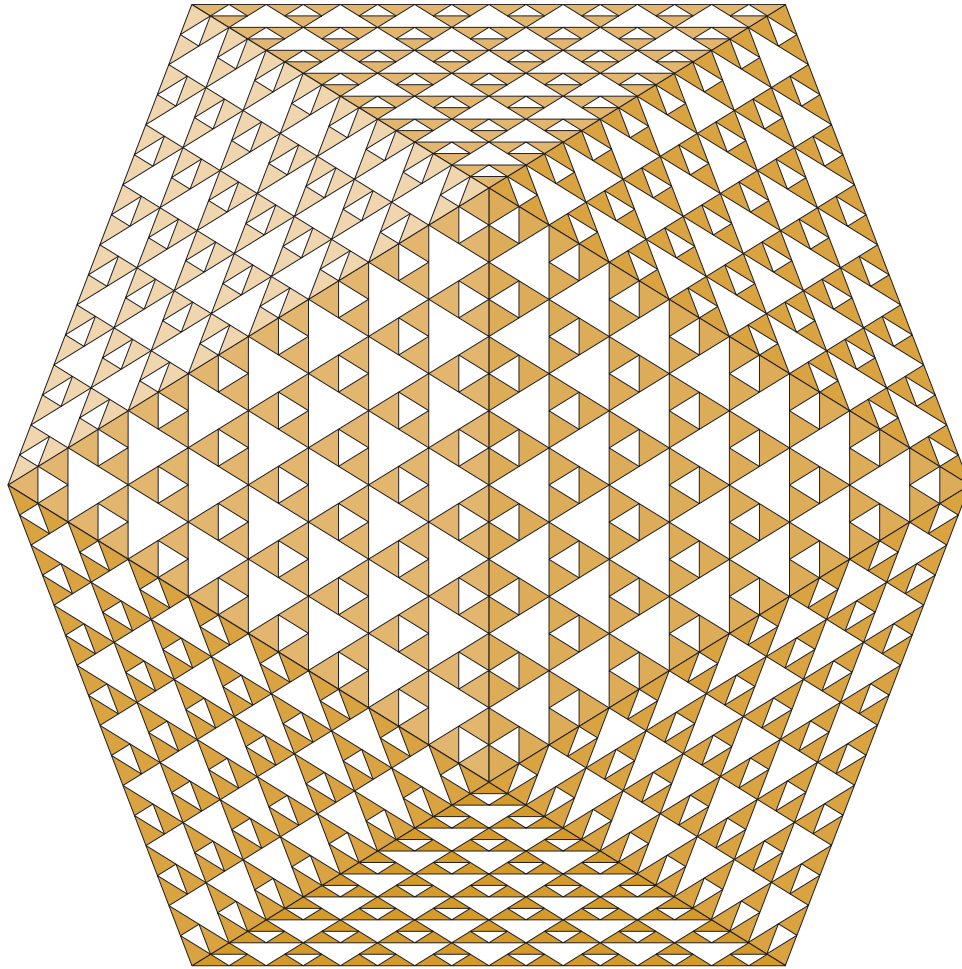
Images of the HIV capsid found online at Reference 3 suggest the octahedral assembly presented here. Twenty identical triangular panels of thirty-six octahedral triplets each (See Figure 1.) form the regular icosahedron shown in Figure 2. Each panel has three knobs as shown in Figure 4. Figure 3 shows another view of the knob assembly.

This capsid is a larger version of the three triplet per panel capsid shown on pages 14 and 15 of Reference 2.



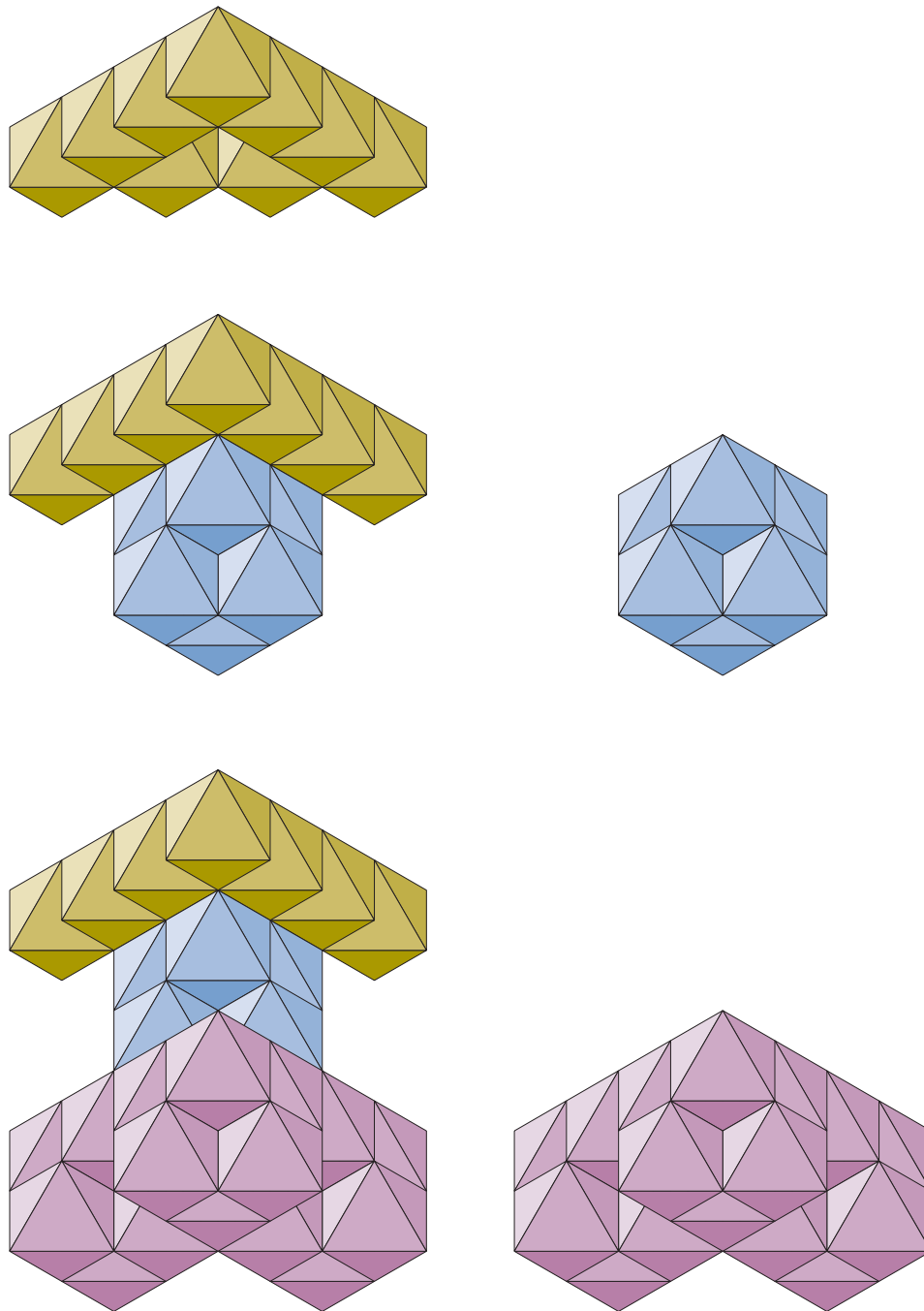
**Fig. 1 HIV capsid–icosahedral facial panel**

The figure shows a triangular panel of thirty-six octahedral triplets. It is accompanied by a lone triplet and a triangular assembly of three triplets. The capsid of HIV consists of twenty identical panels, each acting as the face of a regular icosahedron.



**Fig. 2 HIV capsid–icosahedral edgial view**

The figure shows an edgial view of an icosahedron. Each of the eight visible faces represents an octahedral panel consisting of thirty-six regular octahedral triplets. Each octahedron of each triplet is represented as an orange triangle which is the innermost face of that octahedron.



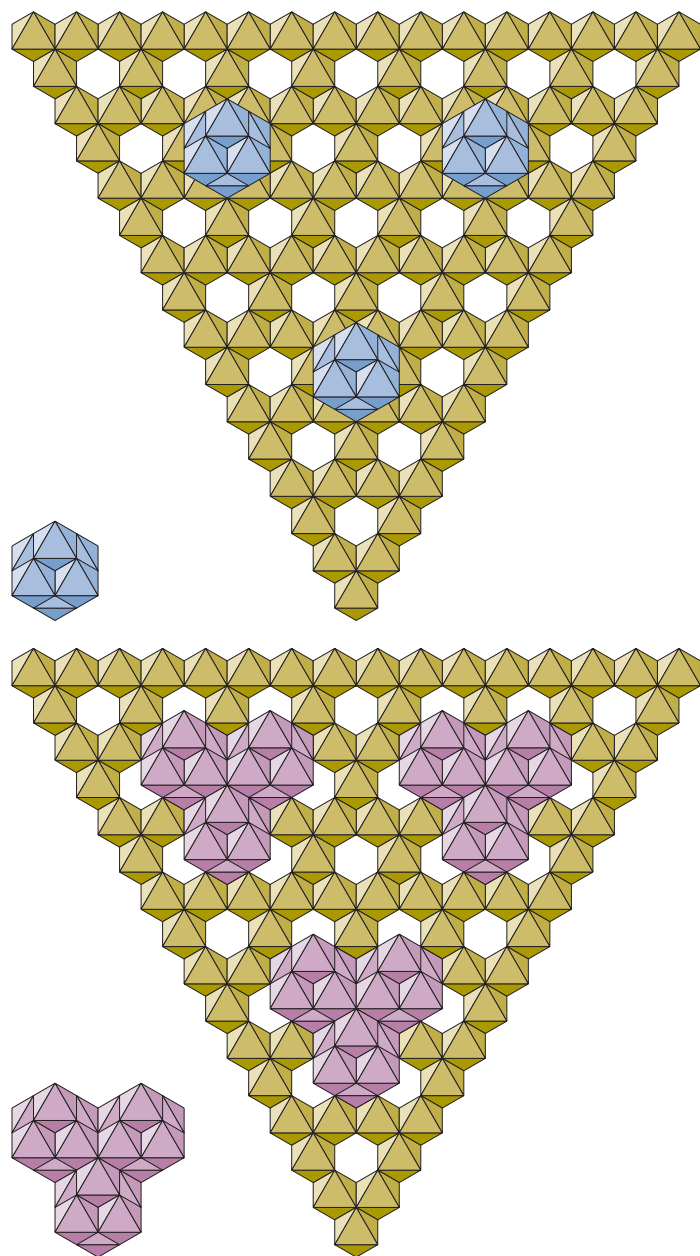
**Fig. 3 HIV capsid–knob**

Each panel of the HIV capsid has protuberances which are called knobs. The figure shows the octahedral structure of the knob and how it joins with the panel.

At top, a triangular assembly of three triplets provides a location for joining a 2-octa.

At middle, a blue 2-octa shown separately has been joined to the triangular assembly.

At bottom, a triplet of violet 2-octas shown separately has been joined to the blue 2-octa to complete the knob.



**Fig. 4 HIV capsid–icosahedral panel with knobs**

The figure shows an icosahedral panel of an HIV capsid with knobs.

At top, the panel is depicted with a blue 2-octa shown separately attached at each of the three knob sites.

At bottom, a violet triplet shown separately has been joined to each of the blue 2-octas completing the knobs.

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