

Fibroin-like structures

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24 December 2003

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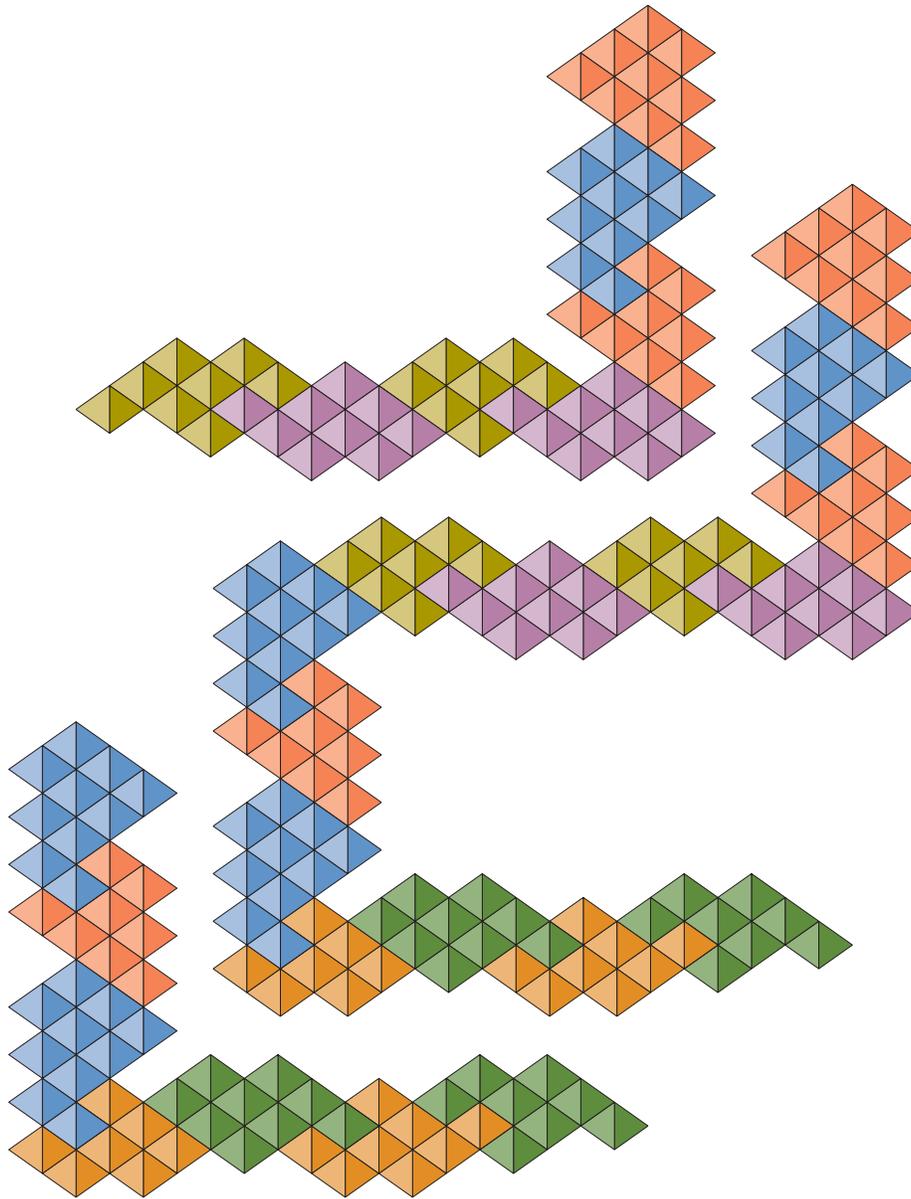
<http://web.me.com/whitby/Octahedron/Welcome.html>

References

1. AlphaJoinedSheets.pdf—Sheets of connected parallel strands in parallel planes
2. PleatedSheets.pdf
3. Octahedron1stEd.pdf
4. ProteinFold.pdf—Plausible peptides, page 10
5. SheetFormingSChains.pdf

Introduction

Fibroin has a structure in which pleated sheets define parallel planes in both close and near proximity. The basic sheet arrangement has been shown in references 1 and 5. This document looks first at extending the links between the beta180-strands. A chain which can form parallel sheets with different intersheet spacings is shown next. This chain is modified by extending its beta180-strands and adding side chains to the main chain units which compose it.

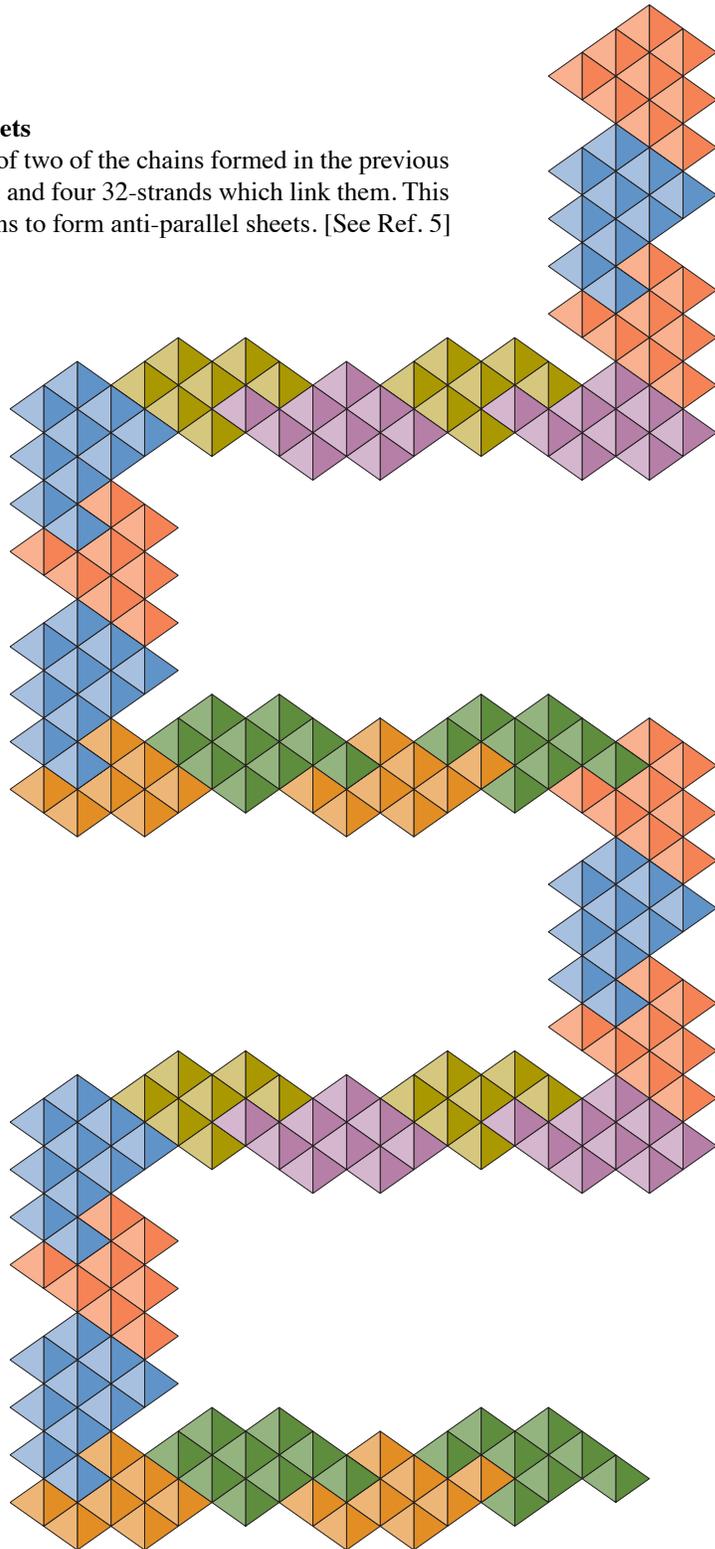


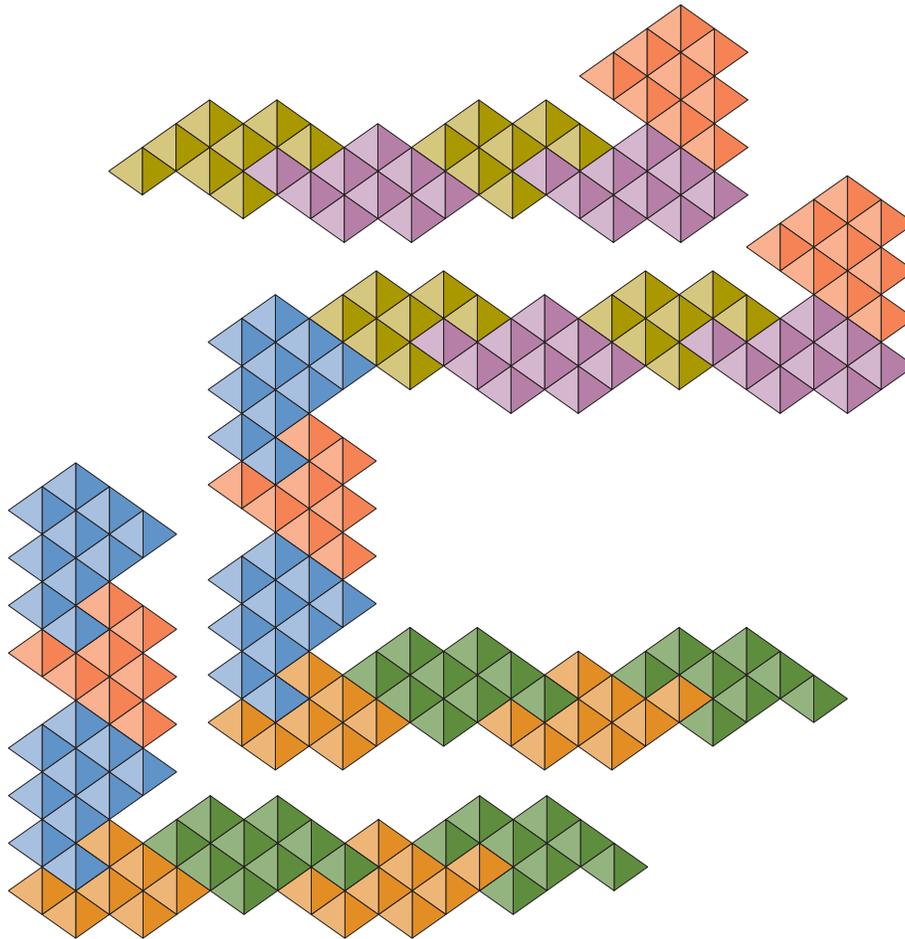
Parallel plane sheet forming chain with extended links between sheet strands.

The L-shaped chains at the top and the bottom of the figure combine to form the chain at the middle of the figure. The horizontal portions of the chains are beta180 -strands; the vertical portions of the chains are 32-strands. Either strand can be extended by the addition of pairs of main chain units. The middle chain can join with identical chains to form a larger chain.

Sheet forming chain—four sheets

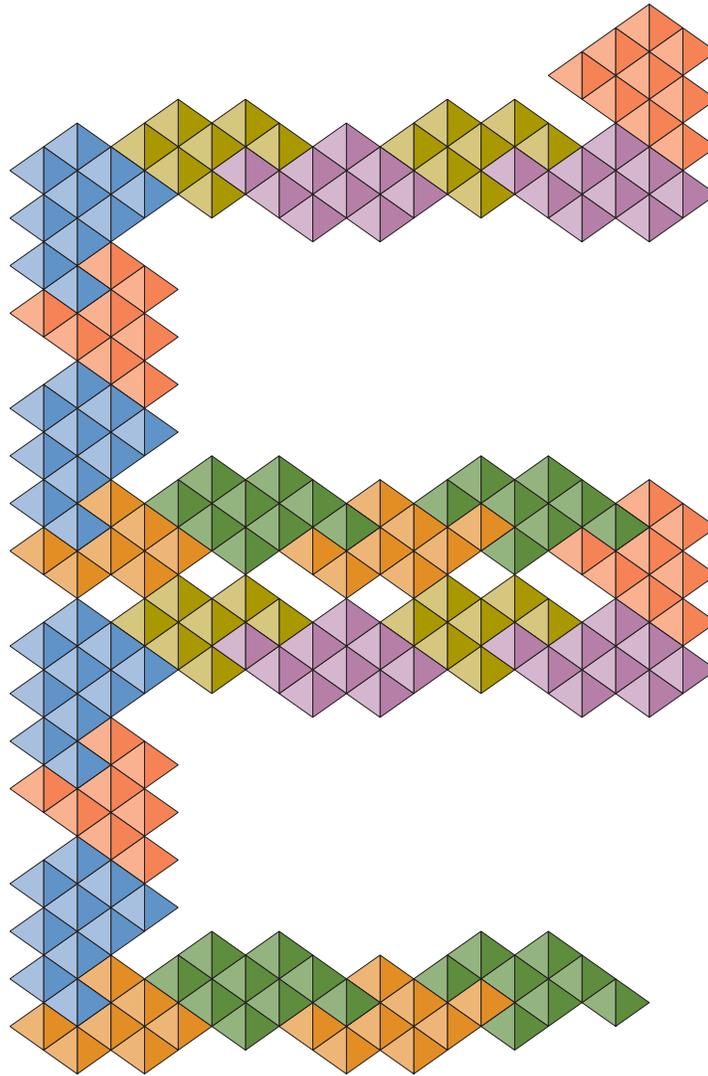
The chain shown here consists of two of the chains formed in the previous figure. It has four beta180-strands and four 32-strands which link them. This chain can join with identical chains to form anti-parallel sheets. [See Ref. 5]





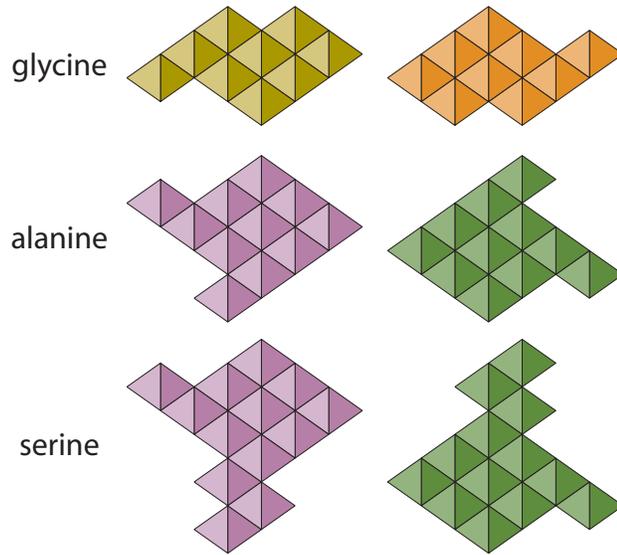
Sheet forming chain–mixed spacing between sheet planes

The chain in the middle is composed of the two L-shaped chains shown at the top and bottom of the figure. The top chain has a link which consists of just one main chain unit; the link of the bottom chain consists of three main chain units joined as a 32-strand.



Sheet forming chain –four sheet strands, two spacings

Two chains from the previous figure have been joined into a single chain. This alternate spacing accommodates the side chains of silk fibroin.



Silk fibroin-like chain

The beta180-strands have been extended and side chains have been added to the main chain units of the mixed spacing chain of the previous figure. The sequence of residues for the beta180-strands is gly-ala-gly-ala-gly-ser beginning at the male end of the strand and proceeding to the female end of the strand.

