

Pleated sheets in parallel planes produced by S-shaped peptide chains

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

References

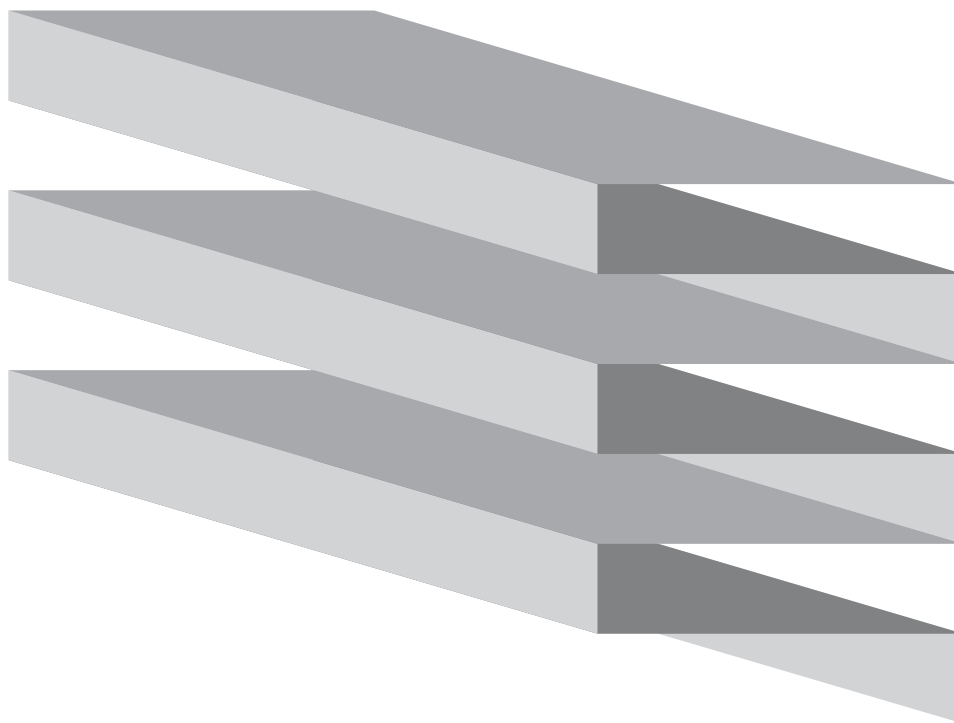
AlphaJoinedSheets.pdf—Sheets of connected parallel strands in parallel planes

PleatedSheets.pdf

Octahedron1stEd.pdf

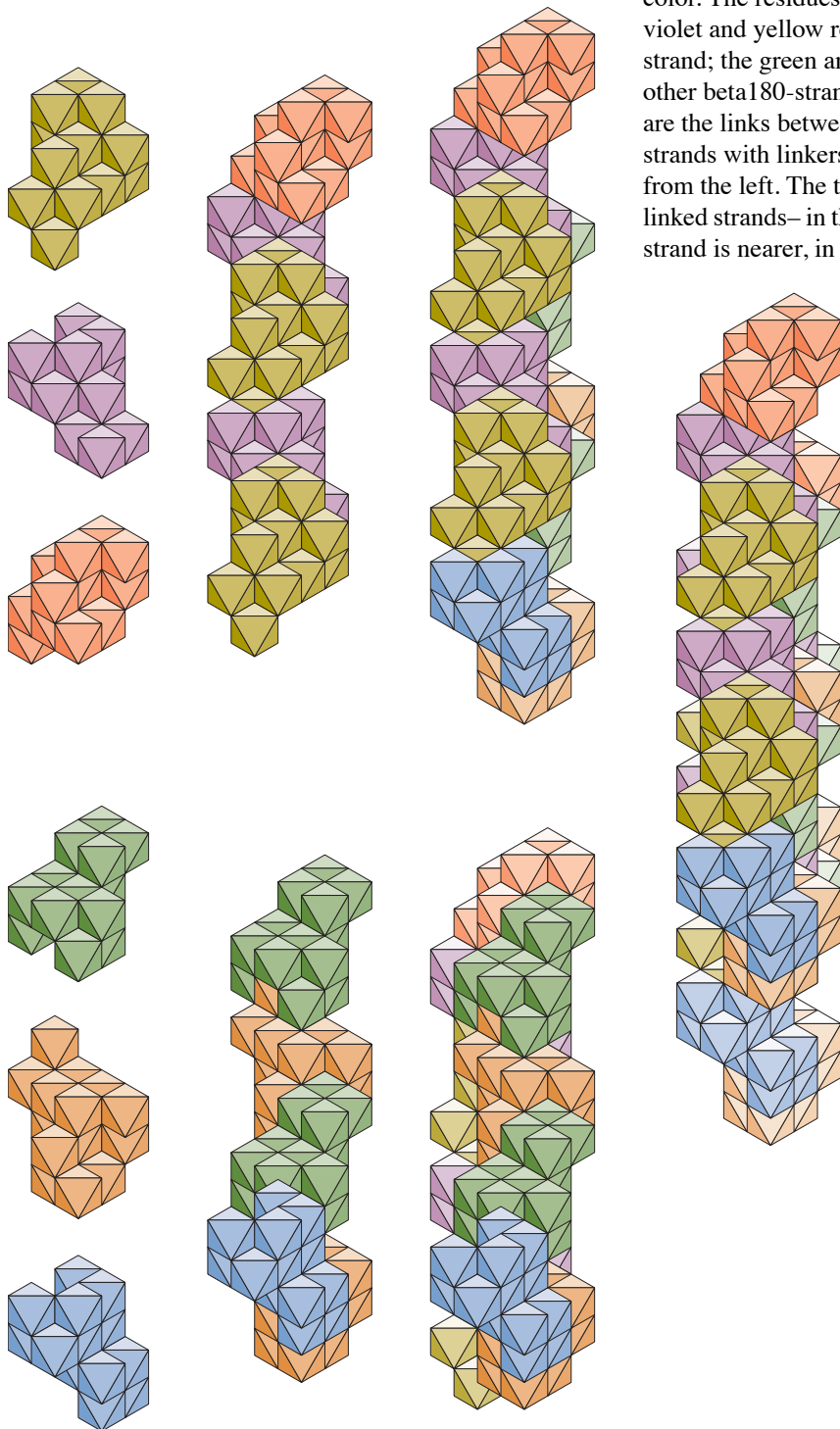
Introduction

The structural motif found in fibroin is described herein. Pairs of main chain units are joined in a beta180-strand. Another main chain unit is alpha helically joined at the female terminus of the strand. The process is followed for a second strand. An S-shaped chain is formed from the linked strands. Identical chains join so that their strands form either parallel or anti-parallel pleated sheets.



Sheets produced by the parallel strands of S-shaped chains

The figure shows the arrangement of pleated sheets which result from the sheet joining of parallel beta180-strands of S-shaped chains. The chains are parallel to the edge of the S-shaped planar assembly.

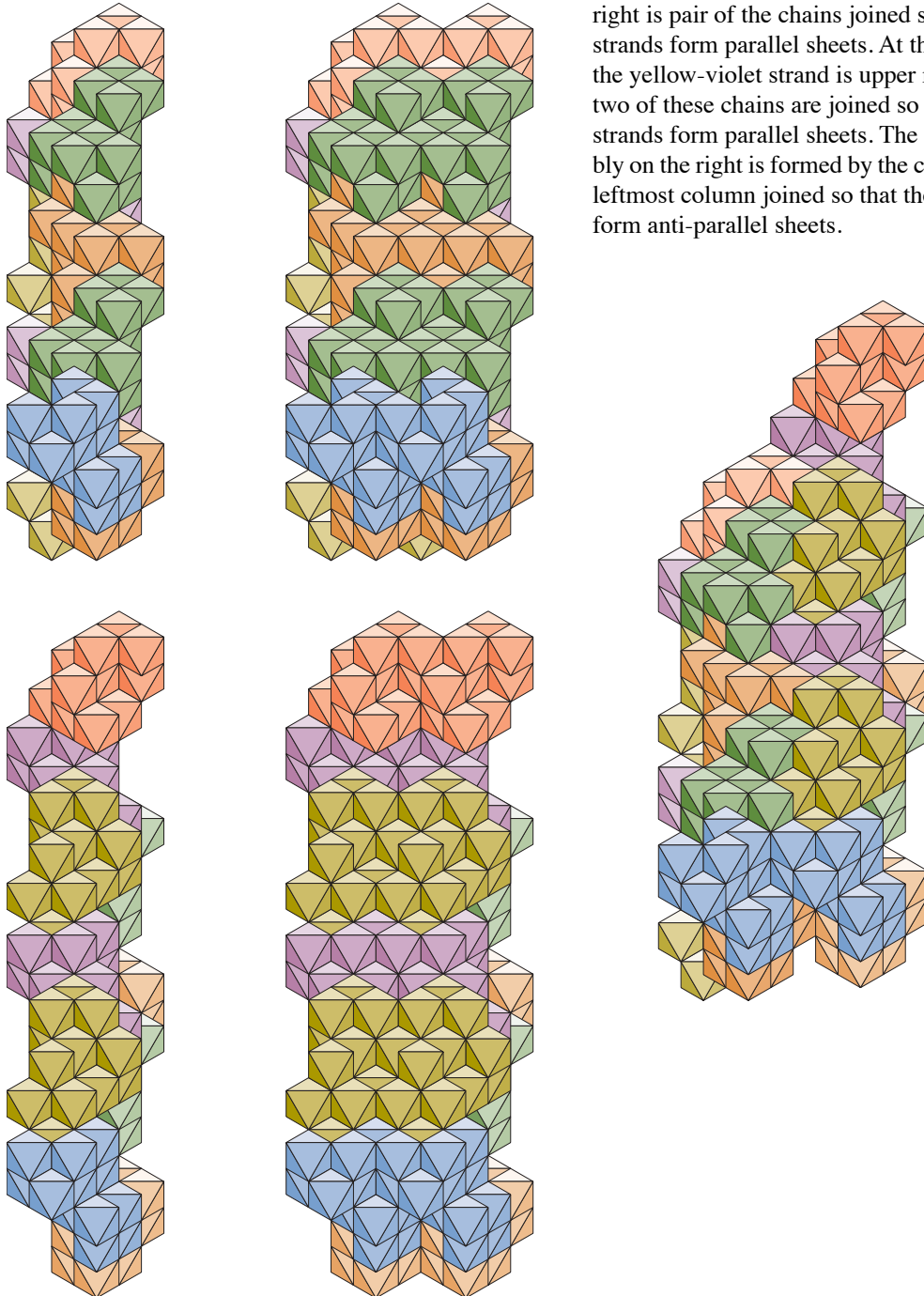


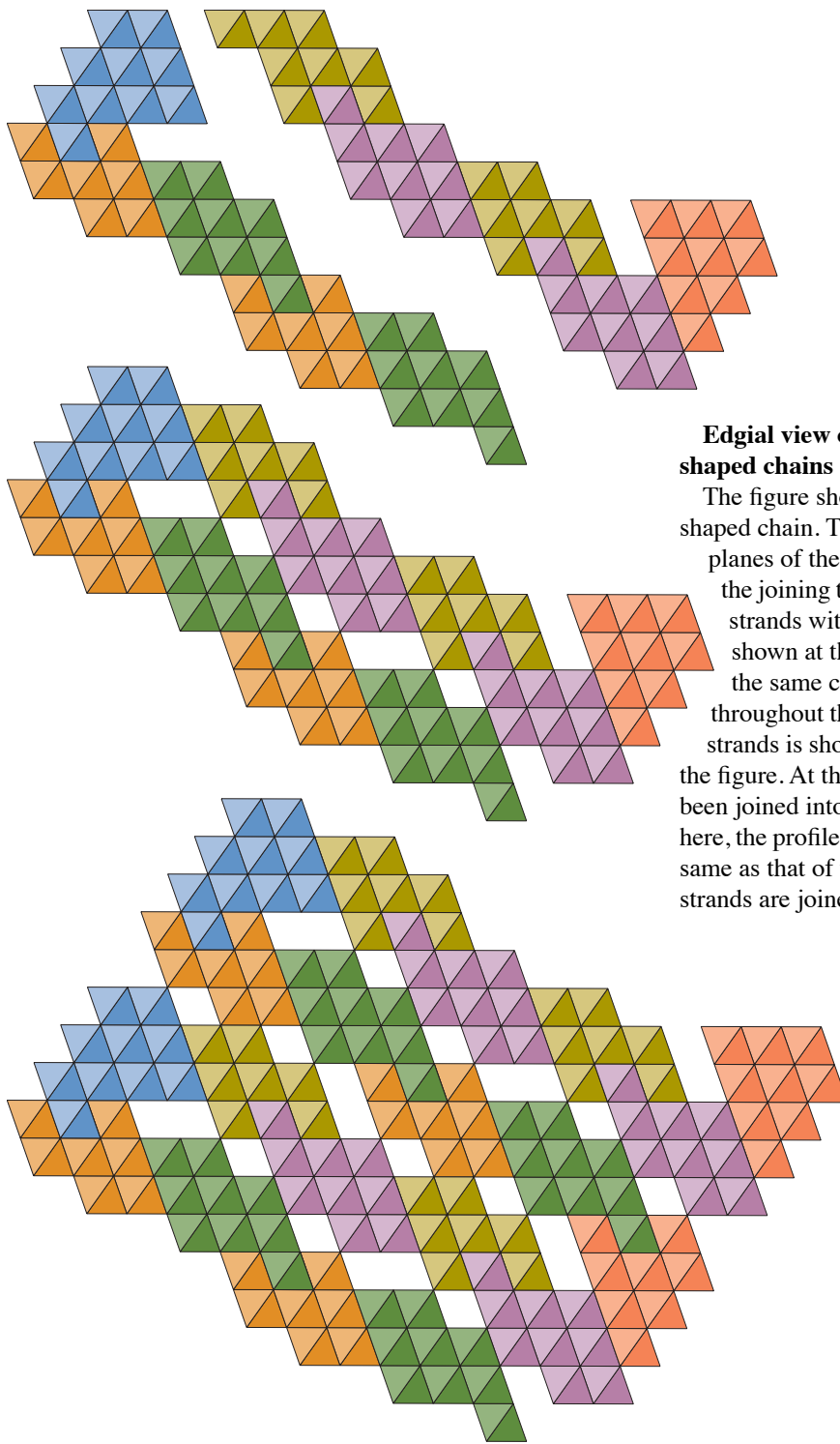
S-shaped chain-assembly

Residues of the same orientation have the same color. The residues are shown on the left. The violet and yellow residues form one beta180-strand; the green and orange residues form the other beta180-strand. The red and blue residues are the links between the beta180-strands. The strands with linkers are in the second column from the left. The third column shows pairs of linked strands- in the upper pair the violet-yellow strand is nearer, in the lower pair the green-orange strand is nearer. The assembly on the right has two of the upper pairs joined into a single chain.

Sheets made of S-shaped chains

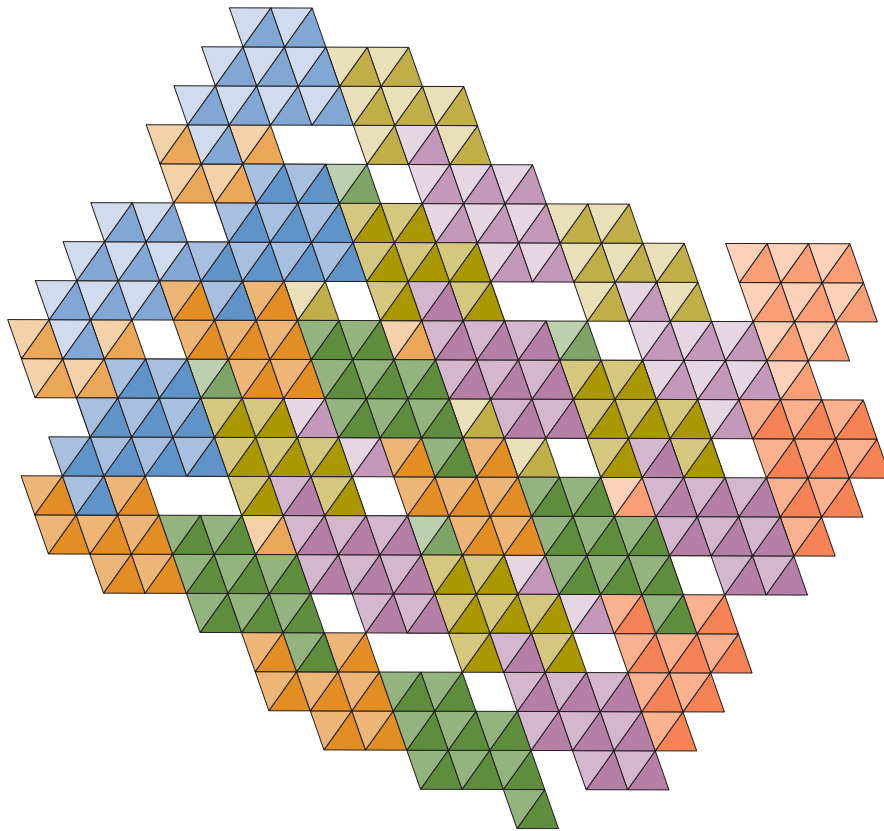
The figure shows the formation of sheets from two-stranded S-shaped chains. The green-orange strand is atop the yellow violet strand at the top of the left column. To its right is pair of the chains joined so that their strands form parallel sheets. At the bottom, the yellow-violet strand is upper most and two of these chains are joined so that their strands form parallel sheets. The lone assembly on the right is formed by the chains in the leftmost column joined so that their strands form anti-parallel sheets.





Edgial view of sheets formed by S-shaped chains

The figure shows the formation of an S-shaped chain. The view is parallel to the planes of the sheets that are formed by the joining to identical chains. The two strands with their linking residues are shown at the top. The residues have the same colors here that they have throughout this document. A pair of the strands is shown joined in the middle of the figure. At the bottom, two pairs have been joined into a single chain. As seen here, the profile of the parallel sheets is the same as that of the chain itself when the strands are joined in parallel sheets.



S-chains with strands joined to form anti-parallel sheets

The viewing direction here is parallel to the planes of the sheets. The profile of the chain is the same as shown in the previous figure. The anti-parallel joining of the strands requires offsetting one chain relative to those adjoining it. The profiles of alternate chains are congruent. The near chain is fully colored. The colors of the chain behind it have been lightened.

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