

FOLDING OF PROTEIN DOMAINS

ABA SANDWICH/ROSSMAN FOLD

RCSB PDB-101

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The Rossman fold is a type of alpha-beta-alpha (ABA) sandwich.

In this fold, 6 parallel beta strands form an extended beta sheet. Two of the alpha helices are under, and two are over the beta sheet.

The fold is common and found in many enzymes that bind to nucleotide cofactors.

Explore the Rossman fold domain in the PDB structure **1LDM**.



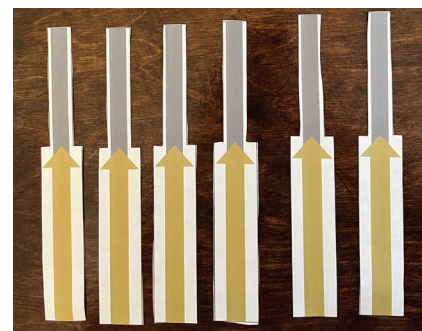
DOMAIN FOLDING INSTRUCTIONS

STEP 1

Preparing the components

To construct this fold, you will need

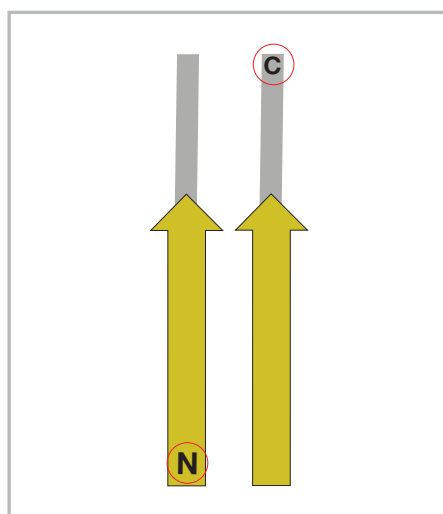
- 4 alpha helices (print one sheet, construct all)
- 6 beta strands (print 1 sheet; 3 strands will be left over). Cut out on the solid black lines.



STEP 2

Marking the N- and C-termini

Take two beta strands, orient them arrow-up. Write N on the bottom of one arrow, write C on the top of the extending loop on another.



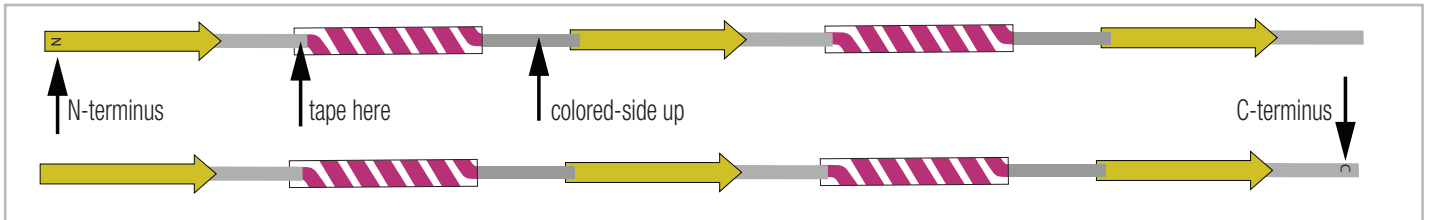
STEP 3

Connecting the helices and sheets

Starting with the N-terminus strand, tape a helix to the top of the extending loop aligning the line representations of the primary chain.

Keep repeating until you have a **strand-helix-strand-helix-strand** sequence.

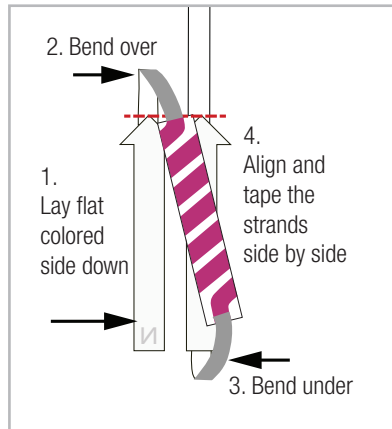
Create another chain like the first one, this time finishing it with the strand marked C.



STEP 4

Connecting the first beta strand cluster

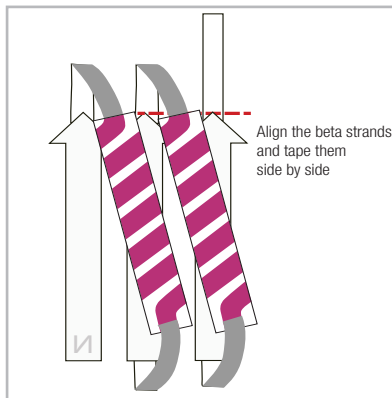
Take the strand marked N and flip it over to the uncolored side and lay flat. Take the helix that follows and first bend the loop over the strand and bend under. Now align and tape the next strand in the sequence to the right of the N-terminal strand.



STEP 5

Finishing the first beta strand cluster

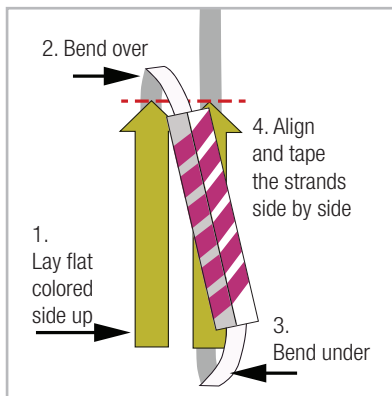
Repeat the last step with the second helix and last beta strand.



STEP 6

Connecting the second cluster

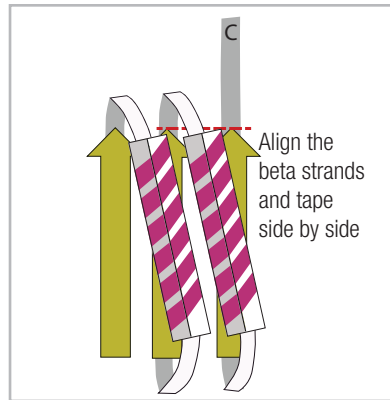
Take the second long chain and orient the strand arrows up, so that the strand marked C is at the end of the chain. Take the first beta strand and lay it flat colored side up. Bend over the loop extending from the beta strand and then bend under the loop extending from the helix to align the next beta strand in the chain to the right of the first one and tape them side by side.



STEP 7

Finishing the second cluster

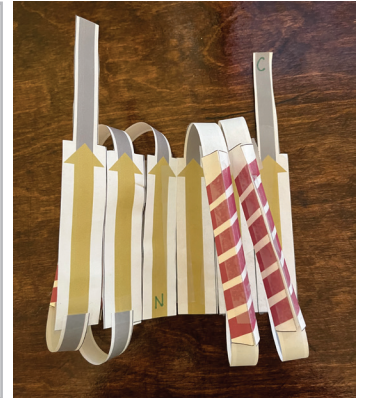
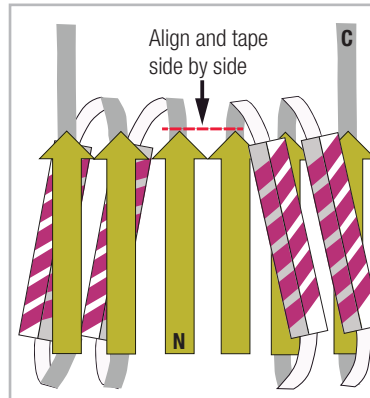
Repeat the last step with the second helix and last beta strand.



STEP 8

Connecting the beta sheet

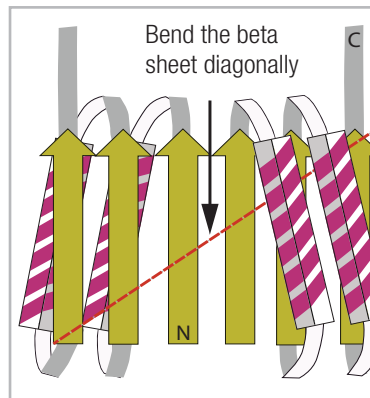
Align and tape the beta sheets you created: the cluster with the N-terminus on the left, the cluster with the C-terminus on the right, both colored side up. Now you can see the three layers of the alpha-beta-alpha sandwich.



STEP 9

Creating the twist in the beta sheet

Orient the beta sheet arrows side up. Fold over the sheet diagonally starting from the bottom left to bottom right.



STEP 10

Connecting the last loop

Orient the beta sheet arrows up. Take the extending loop from the most left beta strand and tape it to the fourth helix from the right. Now you can follow the polymer.

