CONCEPT: ALPHA HELIX PITCH AND RISE

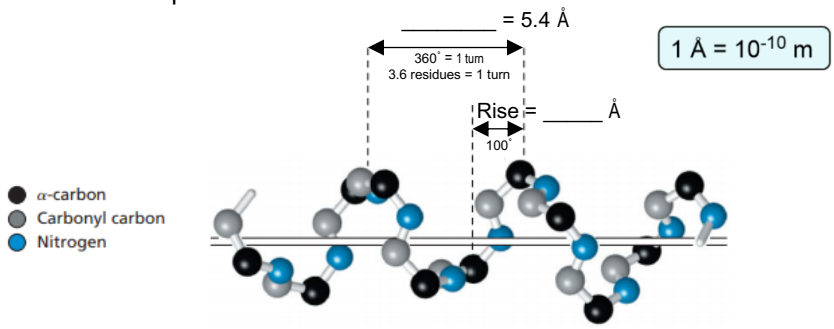
●α-Helix _____: the *length/distance per turn* along α-helix axis between adjacent, corresponding points (Pitch =____ Å).

□ *Pitch* indicates one single _____ of the α-helix backbone which has about _____ amino acid residues.

●_____: the length/distance covered *per amino acid residue* along the helix axis (Rise =____ Å).

□ α-helix backbone turns _____° per residue.

EXAMPLE: Fill-in the blanks with the α-helix pitch & rise.



PRACTICE: How many amino acid residues are needed for the α-helix backbone to obtain exactly one full periodic repeat?

a) 1.5 b) 3.6 c) 5.4 d) 18

Calculating Length of an α-Helix

●_____ of an α-Helix can be calculated with the total number of amino acid residues & α-Helix rise (1.5 Å).

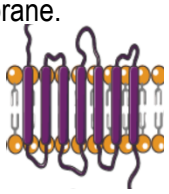
Length of α-Helix = (Total # of Amino Acid _____) x (α-Helix ____)

EXAMPLE: What is the length of an α-helix containing 52 amino acids?

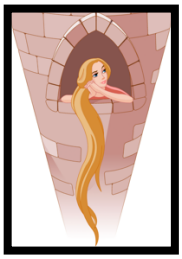
a) 33 Å b) 47 Å c) 69 Å d) 78 Å

PRACTICE: Suppose a cell membrane is 45 Å thick & an embedded protein has 7 parallel transmembrane α-helical segments. Calculate the minimum # of aa-residues required for all 7 α-helical segments to traverse the membrane.

a) 125 residues. b) 39 residues. c) 71 residues. d) 210 residues.



PRACTICE: Hair is predominantly made of α-helix structures. Suppose hair grows at a rate of 20 cm/year. What is the rate at which amino acid residues are synthesized to account for the indicated growth of hair?



a) 42 residues/sec b) 21 residues/sec c) 57 residues/sec d) 34 residues/sec