

DISULFIDE BRIDGE

**TERTIARY
STRUCTURE**

**HYDROPHOBIC
INTERACTIONS**

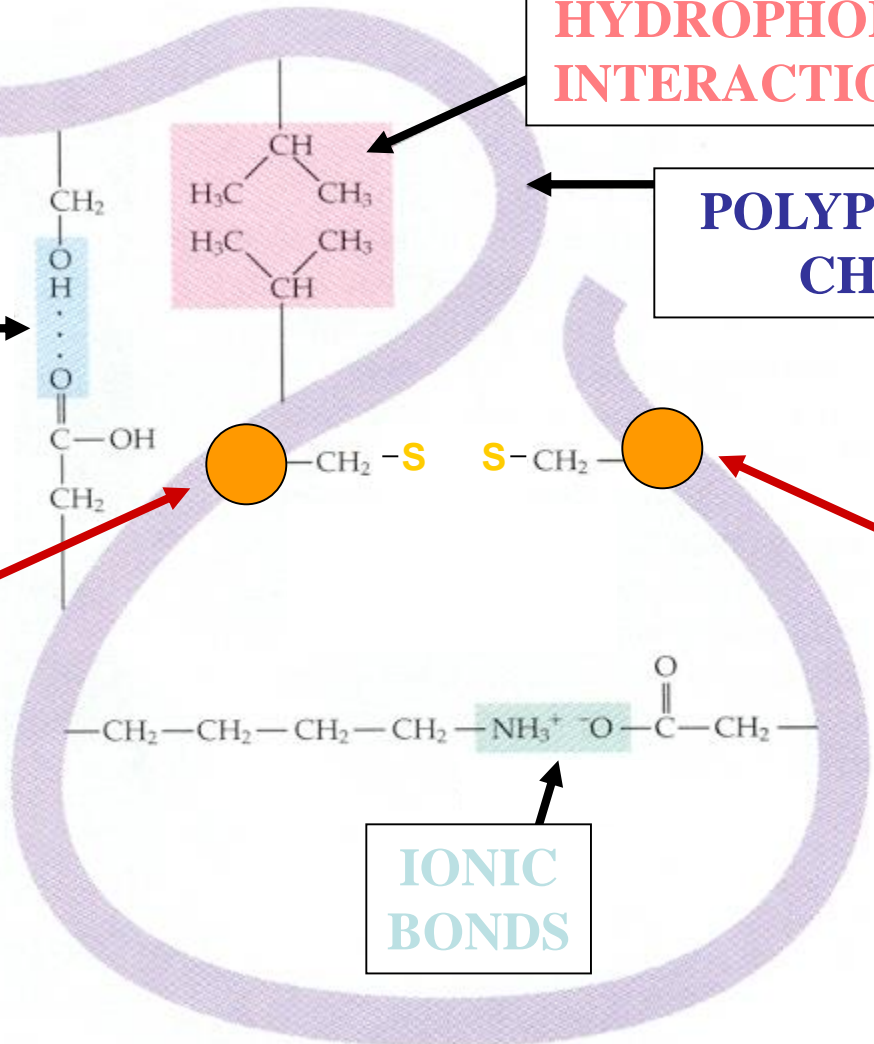
**POLYPEPTIDE
CHAIN**

**HYDROGEN
BONDS**

**CYSTEINE
AMINO ACID**

**CYSTEINE
AMINO ACID**

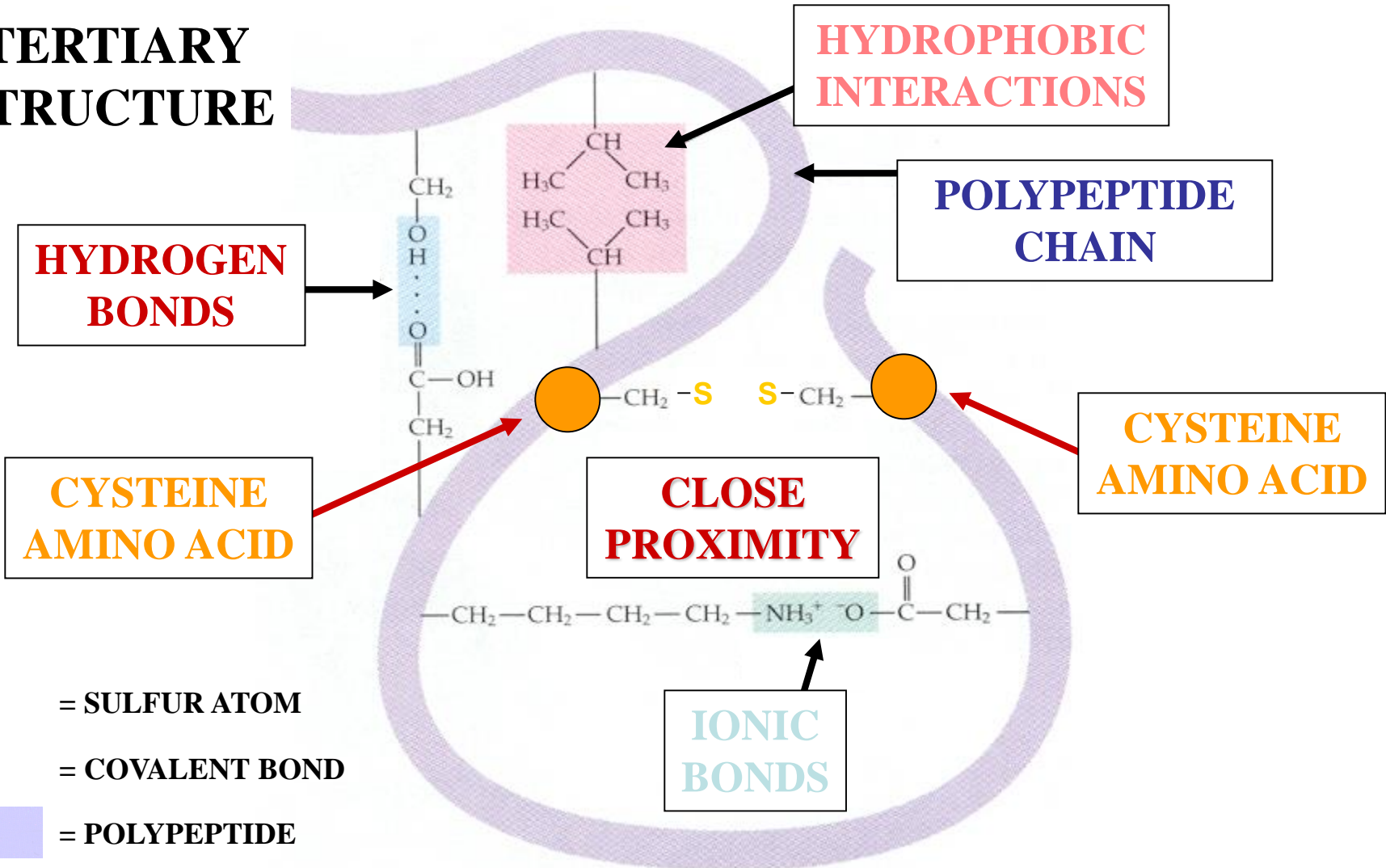
**IONIC
BONDS**



- S** = SULFUR ATOM
- *** = COVALENT BOND
- [Purple Box]** = POLYPEPTIDE

DISULFIDE BRIDGE

**TERTIARY
STRUCTURE**



DISULFIDE BRIDGE

**TERTIARY
STRUCTURE**

**HYDROPHOBIC
INTERACTIONS**

**POLYPEPTIDE
CHAIN**

**HYDROGEN
BONDS**

**CYSTEINE
AMINO ACID**

**CYSTEINE
AMINO ACID**

**SULFUR
ATOMS**

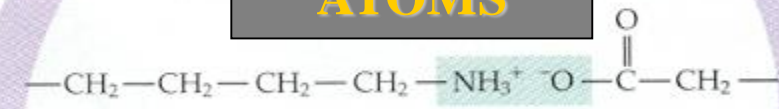
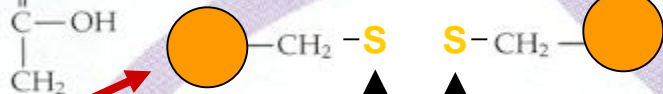
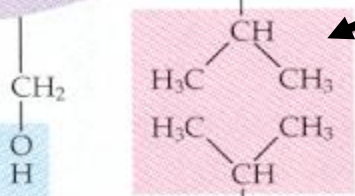
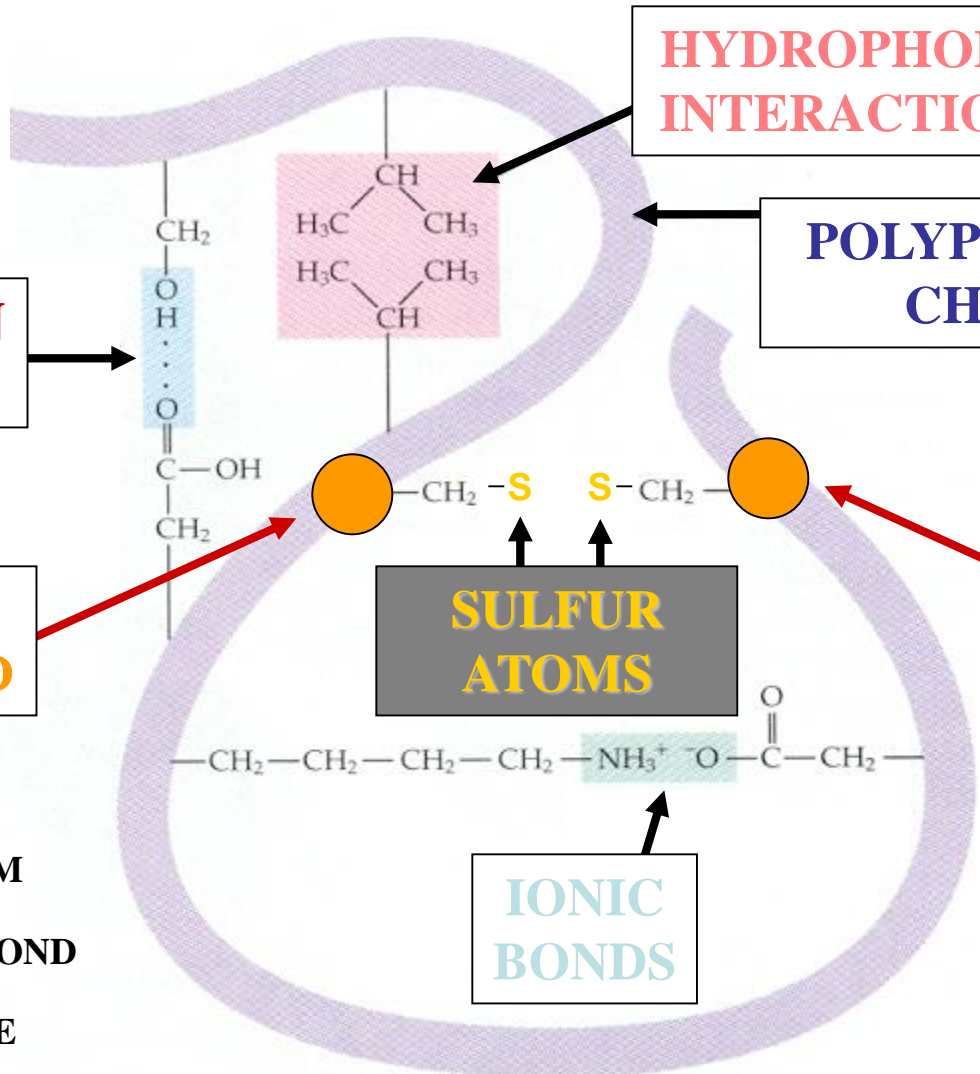
**IONIC
BONDS**



= POLYPEPTIDE

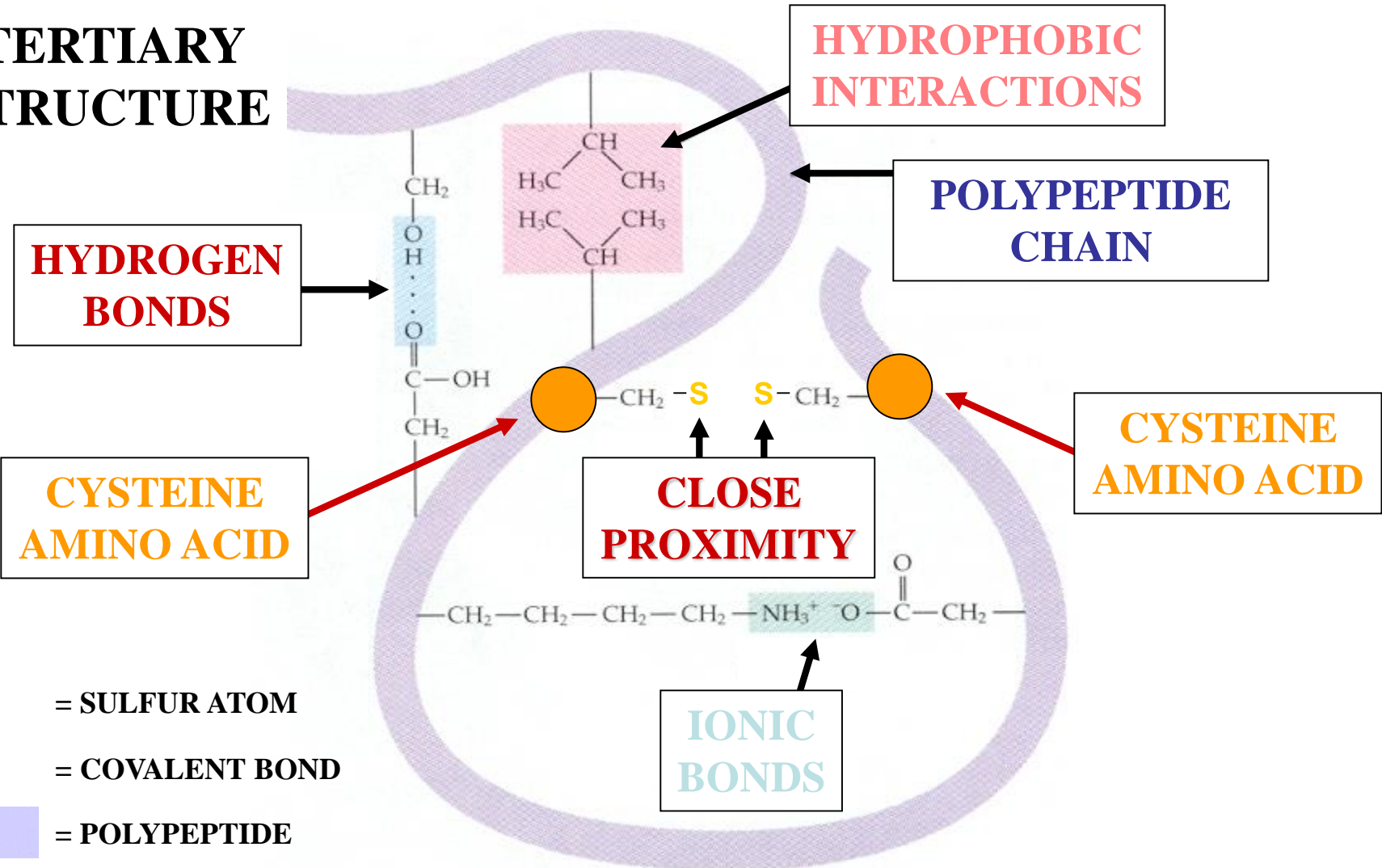
S = SULFUR ATOM

***** = COVALENT BOND



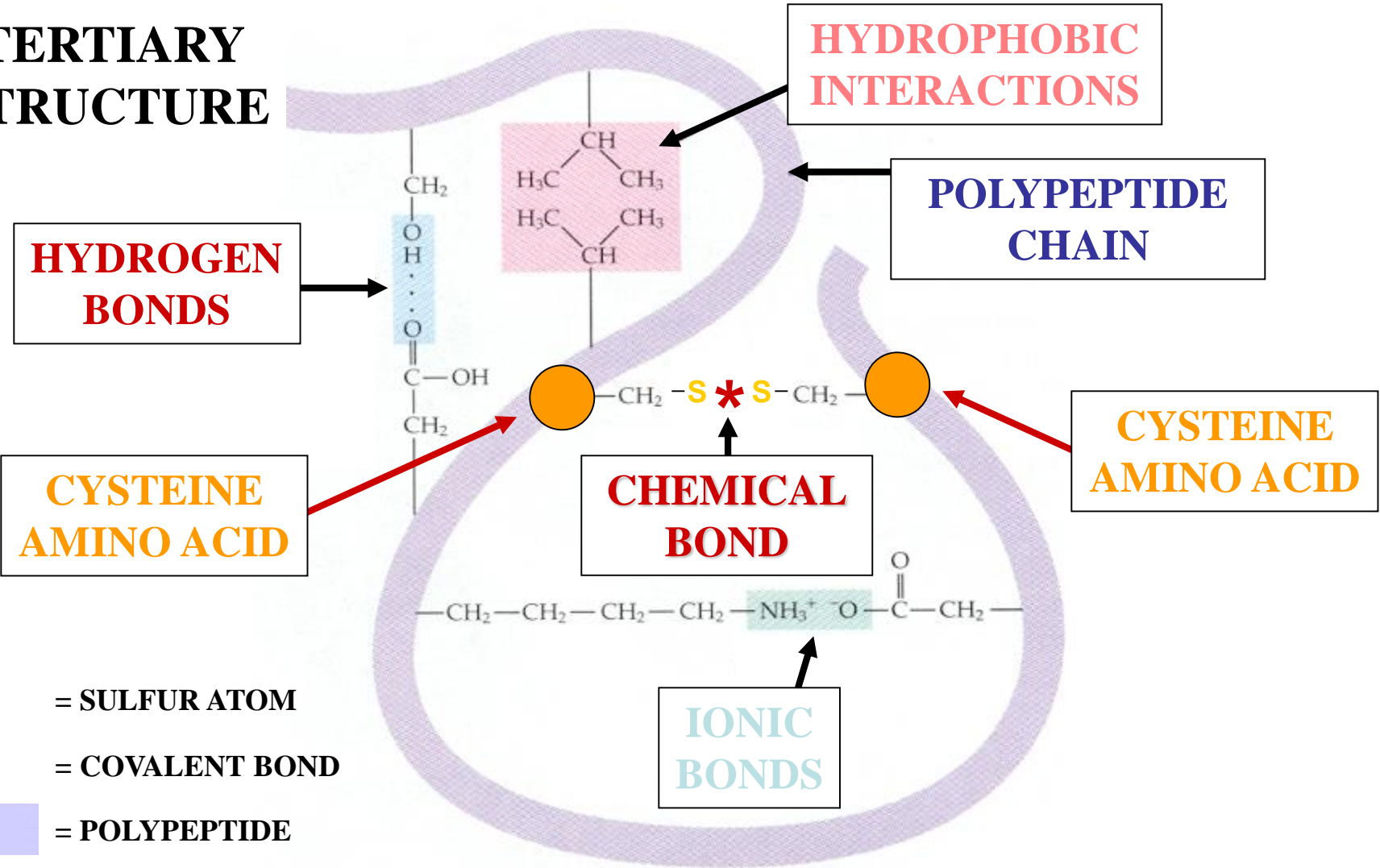
DISULFIDE BRIDGE

**TERTIARY
STRUCTURE**



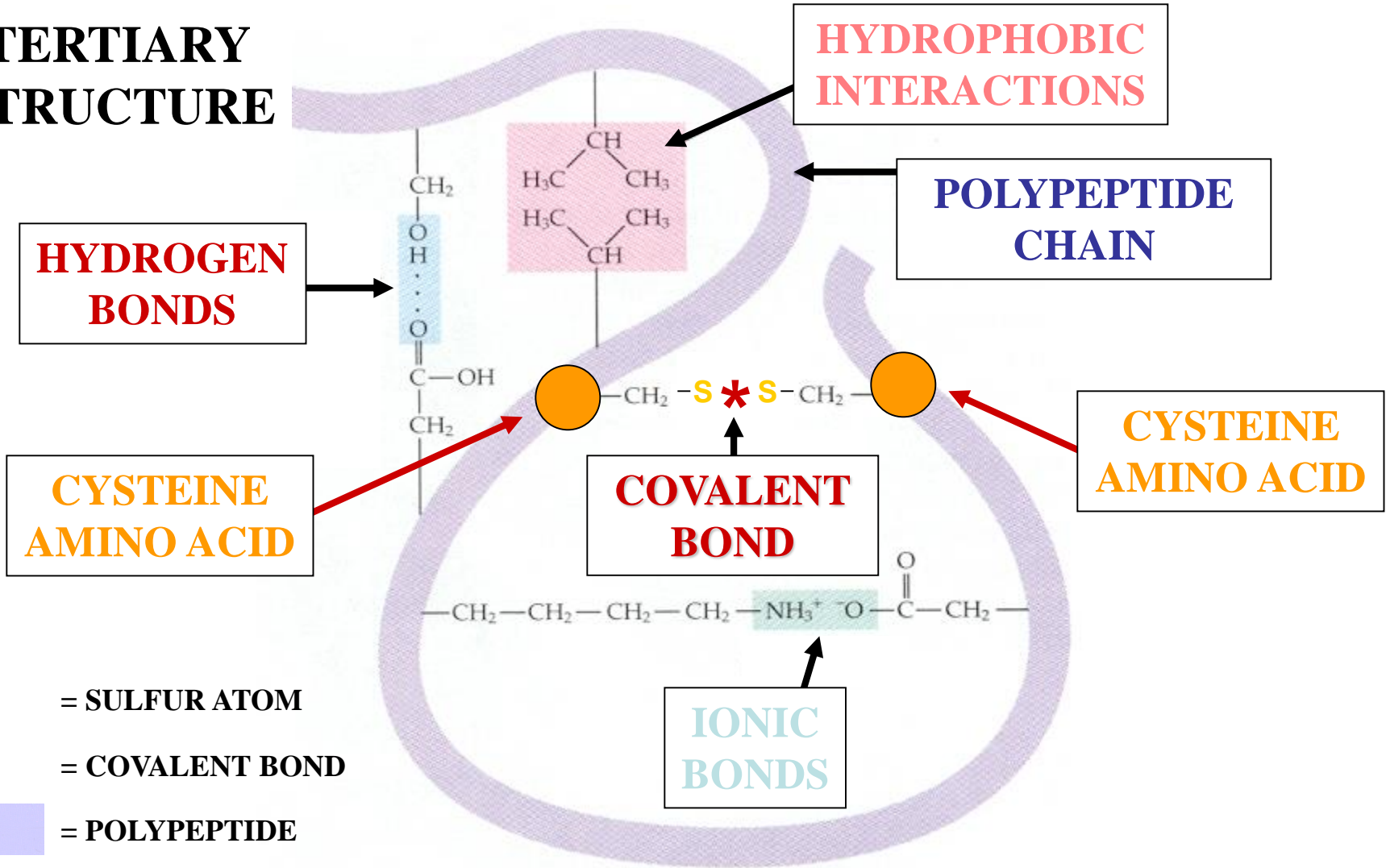
DISULFIDE BRIDGE

TERTIARY STRUCTURE



DISULFIDE BRIDGE

**TERTIARY
STRUCTURE**



DISULFIDE BRIDGE

**TERTIARY
STRUCTURE**

**HYDROPHOBIC
INTERACTIONS**

**POLYPEPTIDE
CHAIN**

**HYDROGEN
BONDS**

**CYSTEINE
AMINO ACID**

**CYSTEINE
AMINO ACID**

**STRONG
BOND**

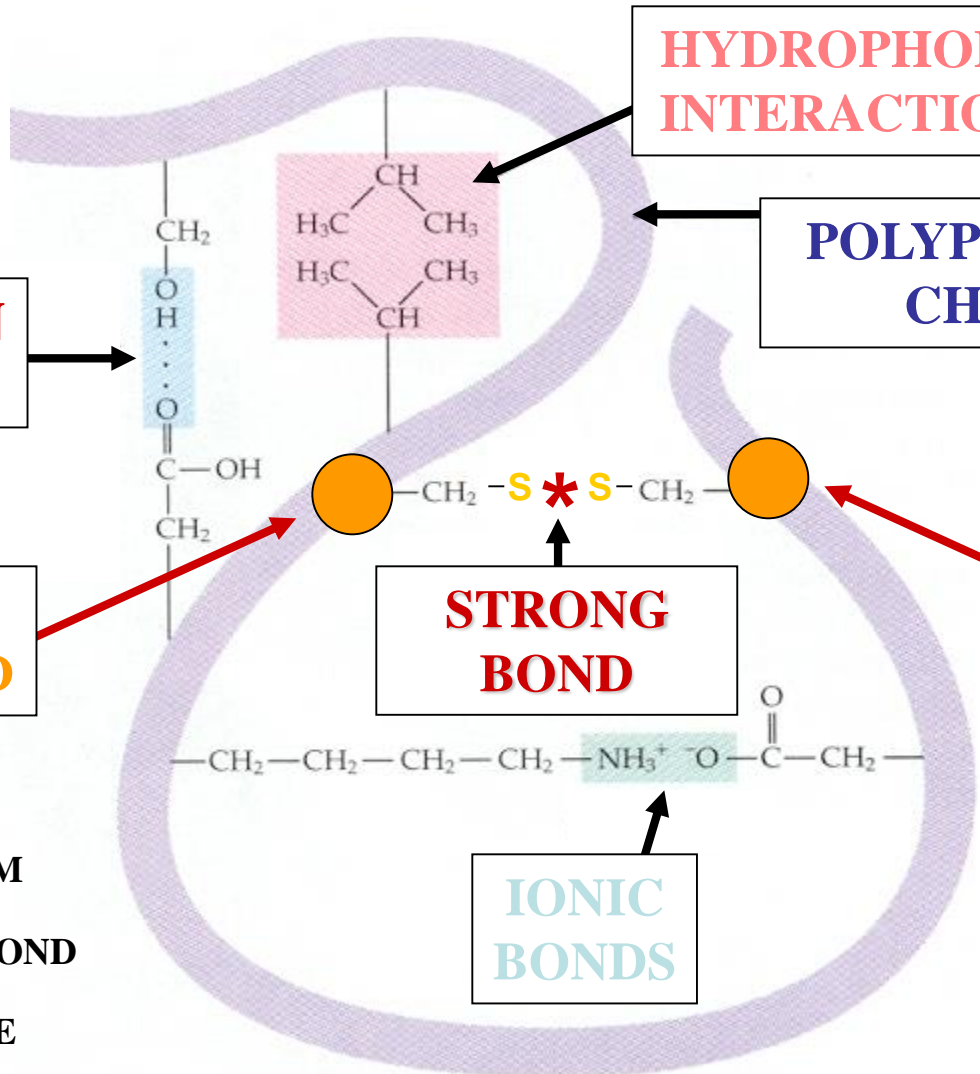
**IONIC
BONDS**



= POLYPEPTIDE

S = SULFUR ATOM

***** = COVALENT BOND



DISULFIDE BRIDGE



**TERTIARY
STRUCTURE**

**HYDROPHOBIC
INTERACTIONS**

**POLYPEPTIDE
CHAIN**

**HYDROGEN
BONDS**

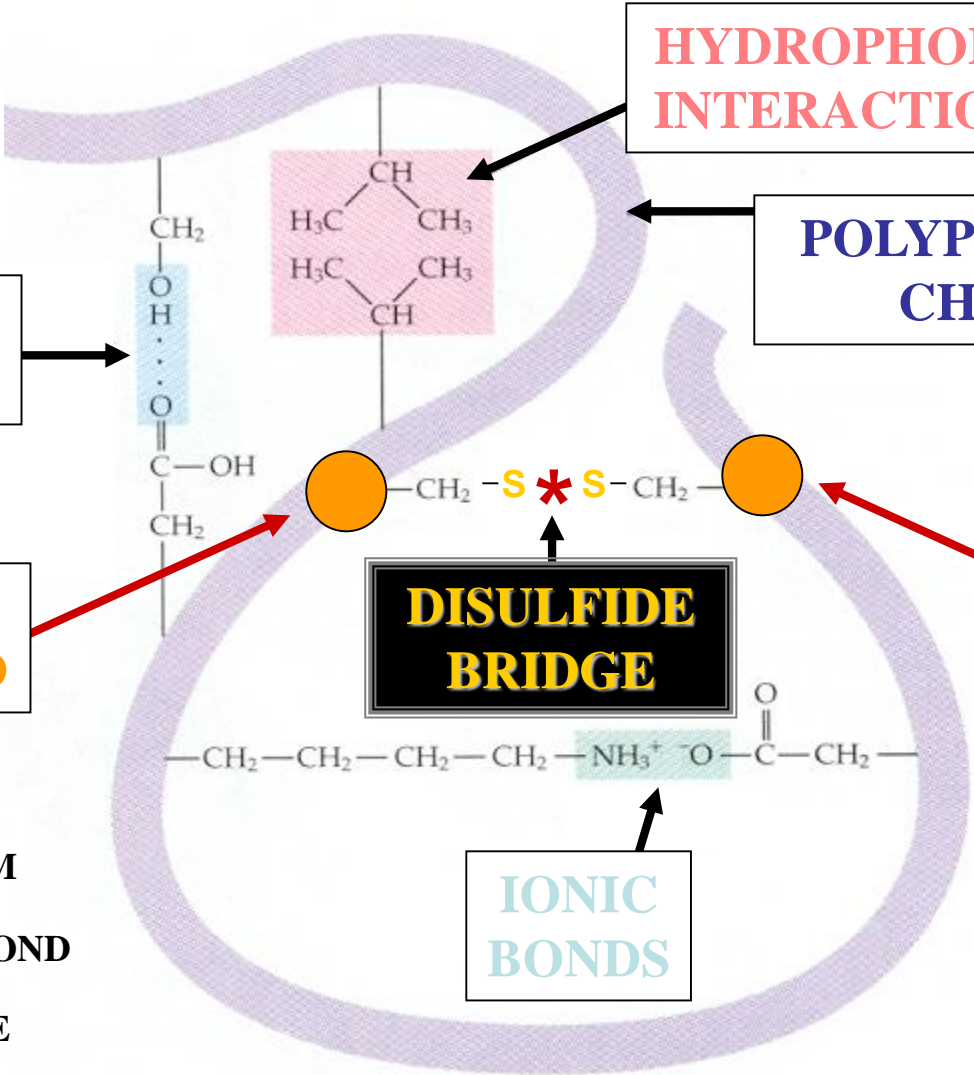
**CYSTEINE
AMINO ACID**

**CYSTEINE
AMINO ACID**

**DISULFIDE
BRIDGE**

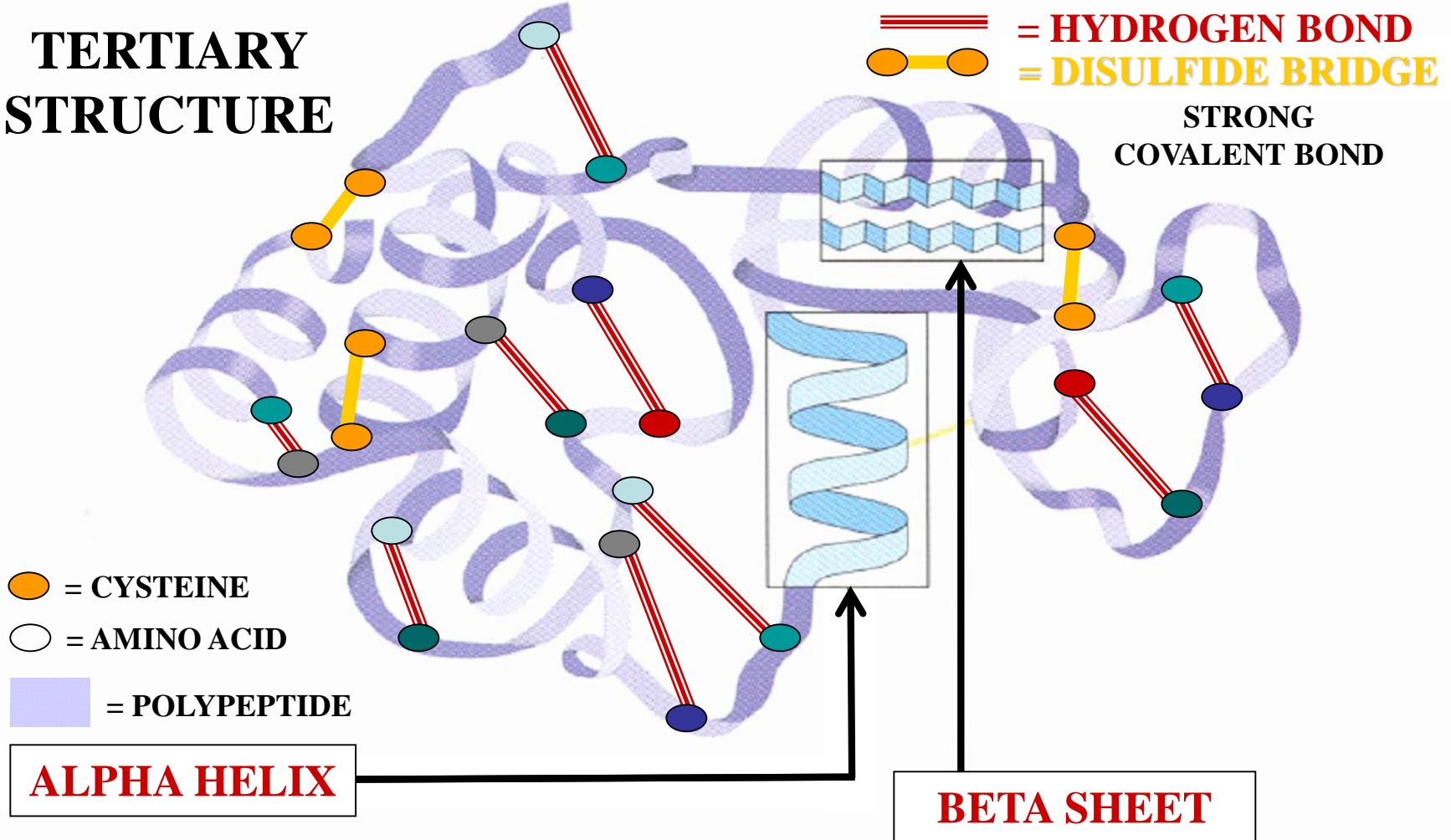
**IONIC
BONDS**

- S** = SULFUR ATOM
- *** = COVALENT BOND
- [Purple Box]** = POLYPEPTIDE



PROTEIN STRUCTURE

TERTIARY STRUCTURE

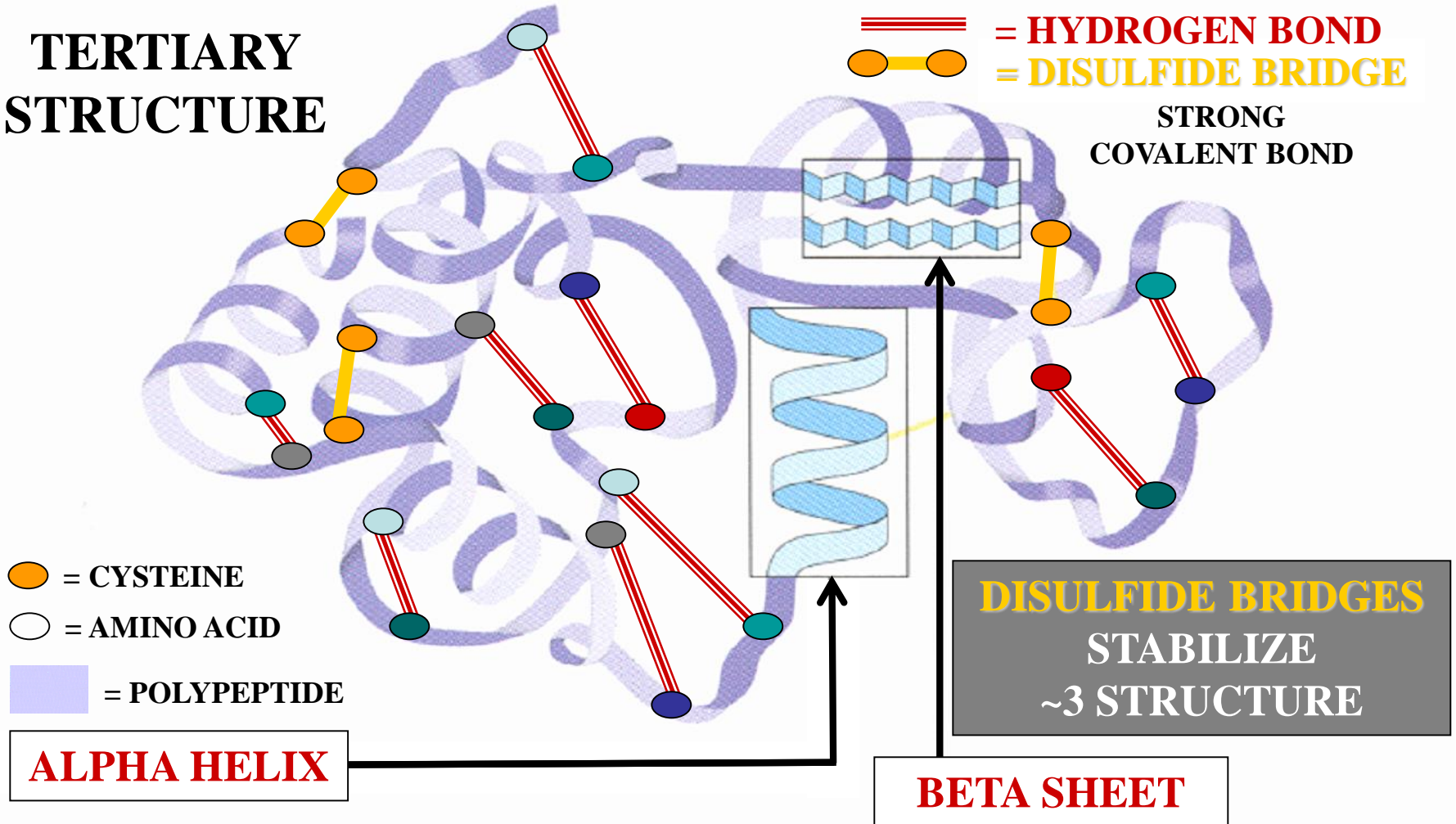


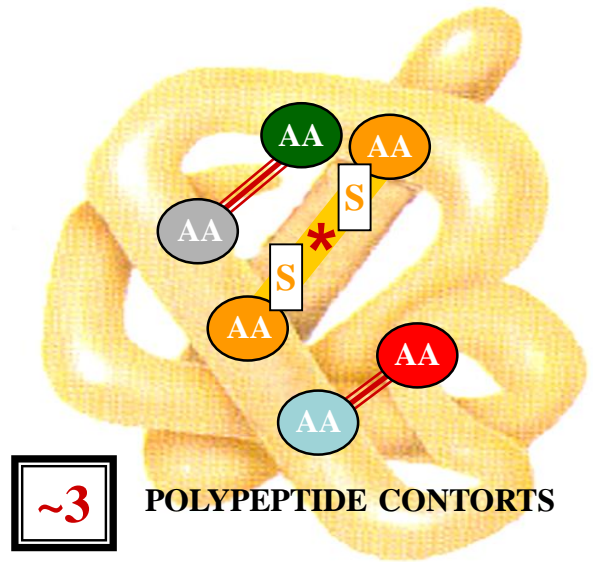
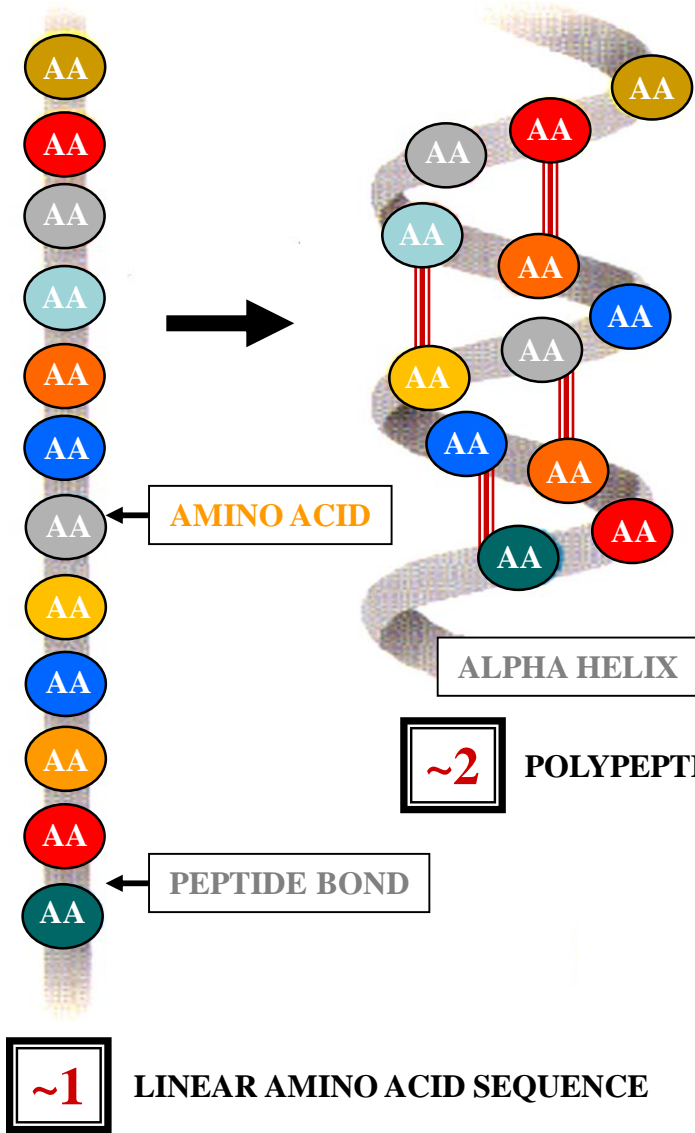
PROTEIN STRUCTURE



~3

TERTIARY STRUCTURE





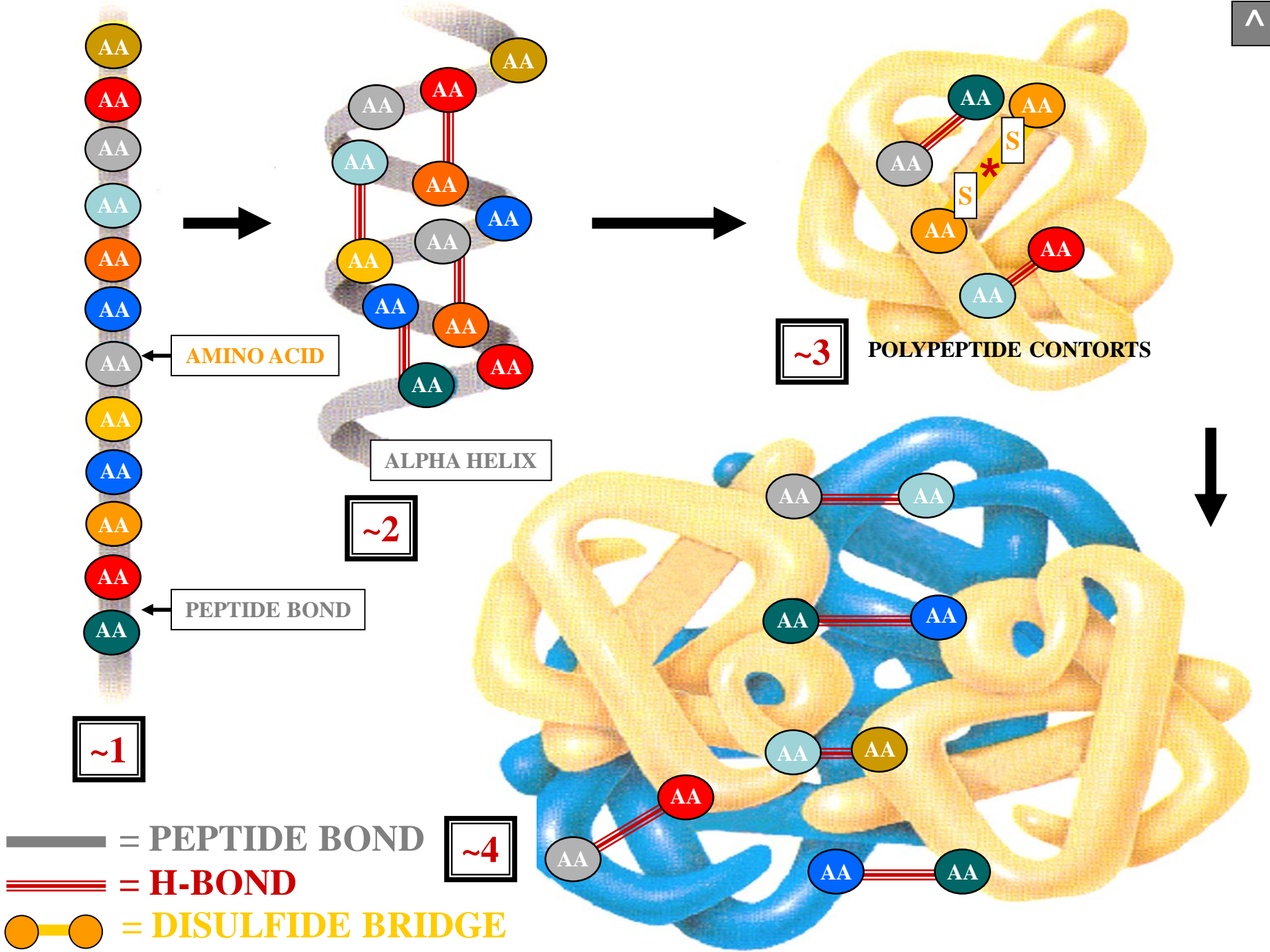
— = PEPTIDE BOND

== = H-BOND

—●—● = DISULFIDE BRIDGE

[S] = SULFUR ATOM

* = COVALENT BOND



PROTEIN QUATERNARY STRUCTURE

**PROTEIN
QUATERNARY
STRUCTURE**



PROTEIN ~4 STRUCTURE

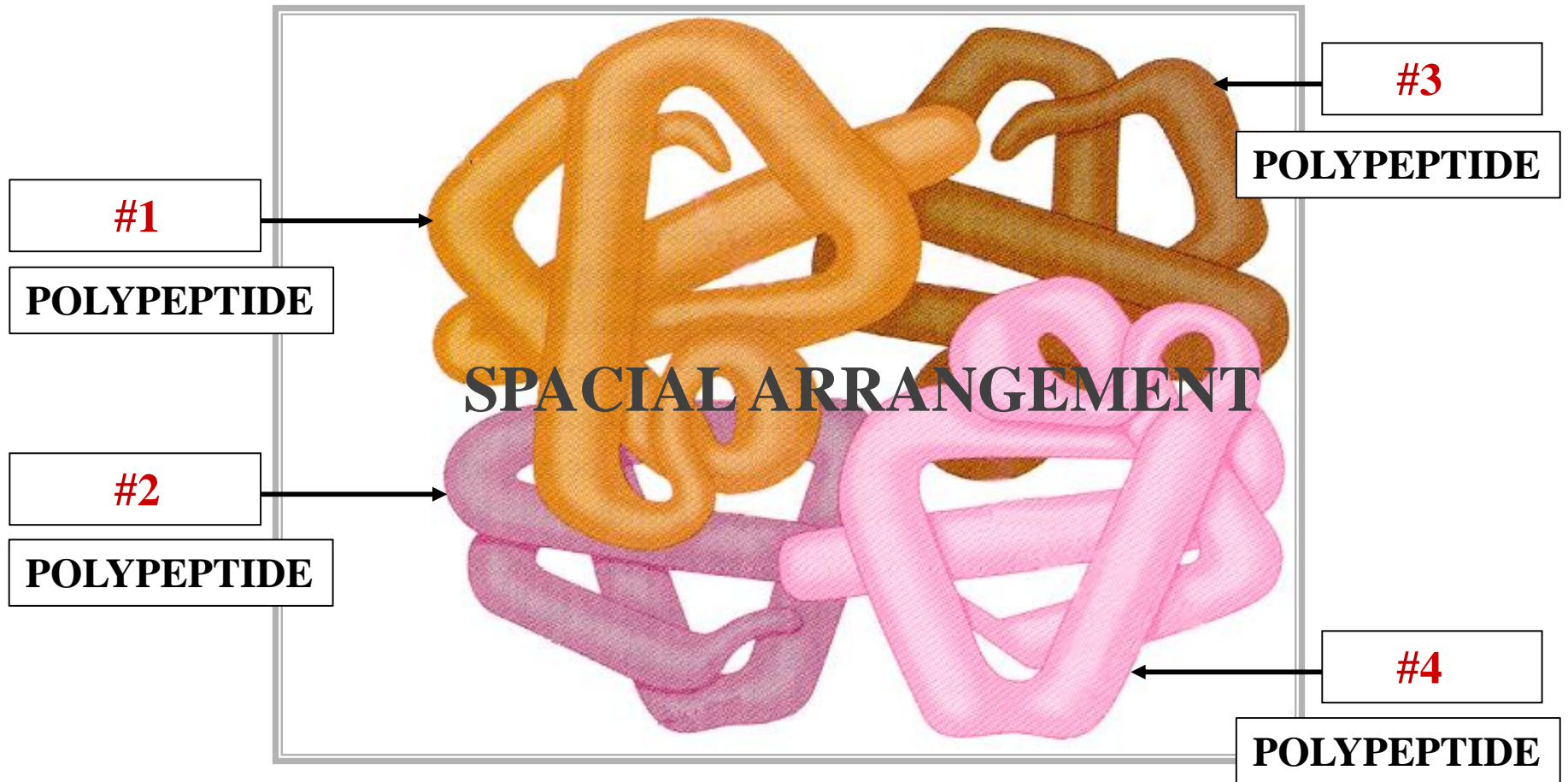
**SPACIAL
ARRANGEMENT
2 OR MORE
~3 POLYPEPTIDES**

PROTEIN ~4 STRUCTURE

PROTEIN STRUCTURE

QUATERNARY
STRUCTURE

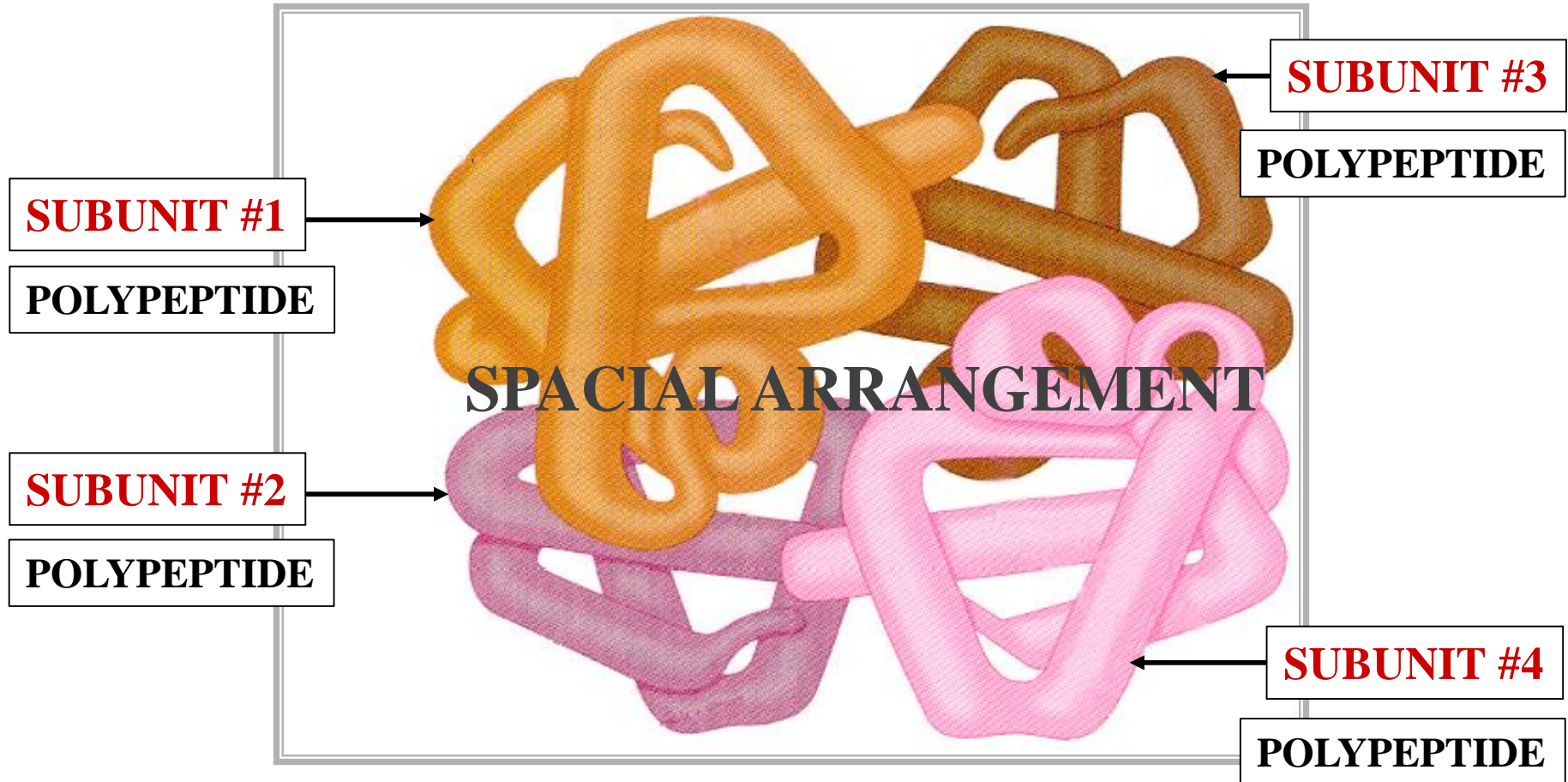
1-2-3-4 = POLYPEPTIDE
IN ~3 STRUCTURE



PROTEIN STRUCTURE

QUATERNARY
STRUCTURE

**SUBUNIT = POLYPEPTIDE
IN ~3 STRUCTURE**



SUBUNIT



~4 STRUCTURE SUBUNIT

**DIFFERENT
POLYPEPTIDE**

ASSOCIATED WITH

~4 STRUCTURE

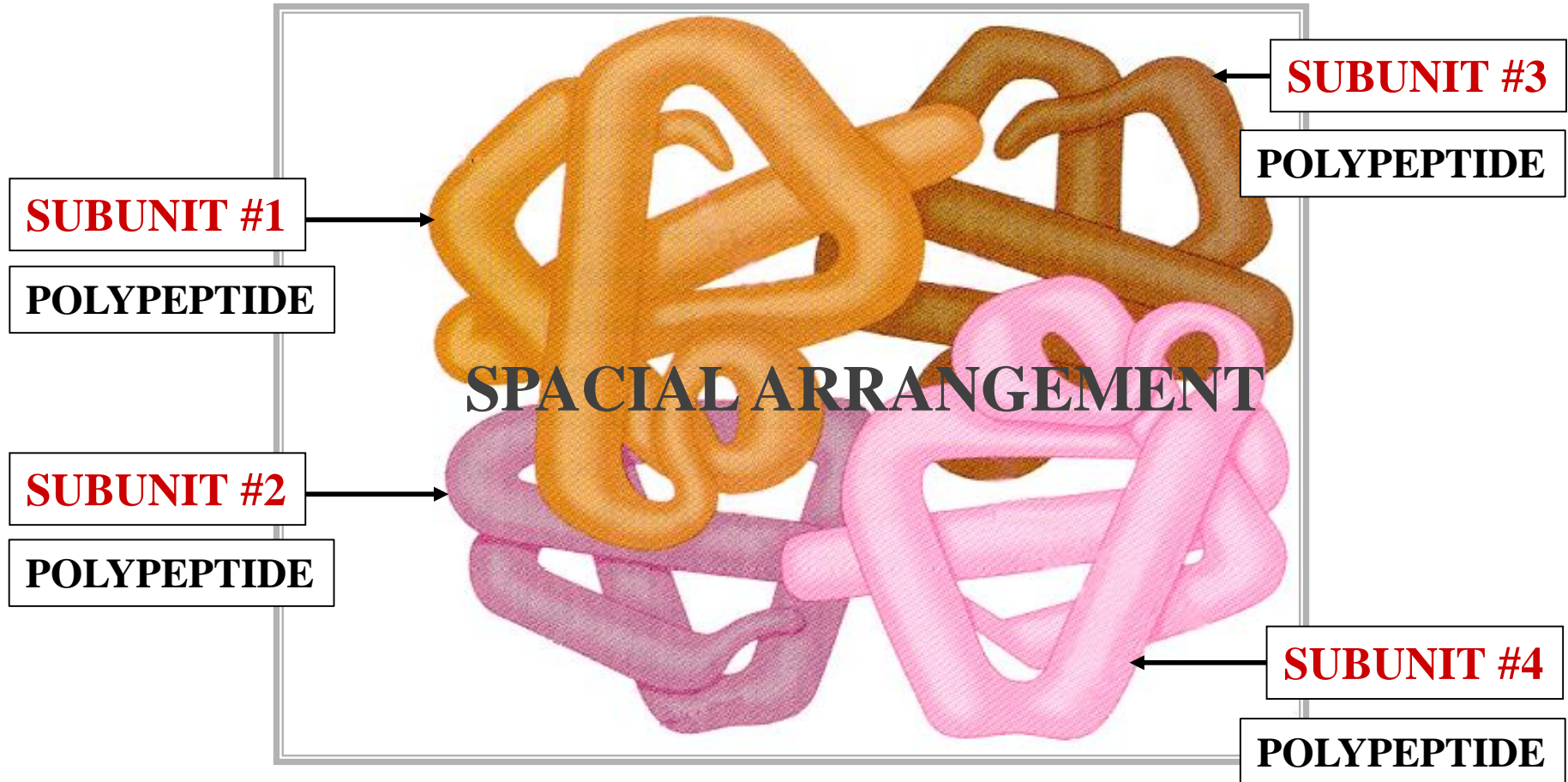
~4 STRUCTURE SUBUNIT

PROTEIN STRUCTURE



**QUATERNARY
STRUCTURE**

**SUBUNIT = POLYPEPTIDE
IN ~3 STRUCTURE**



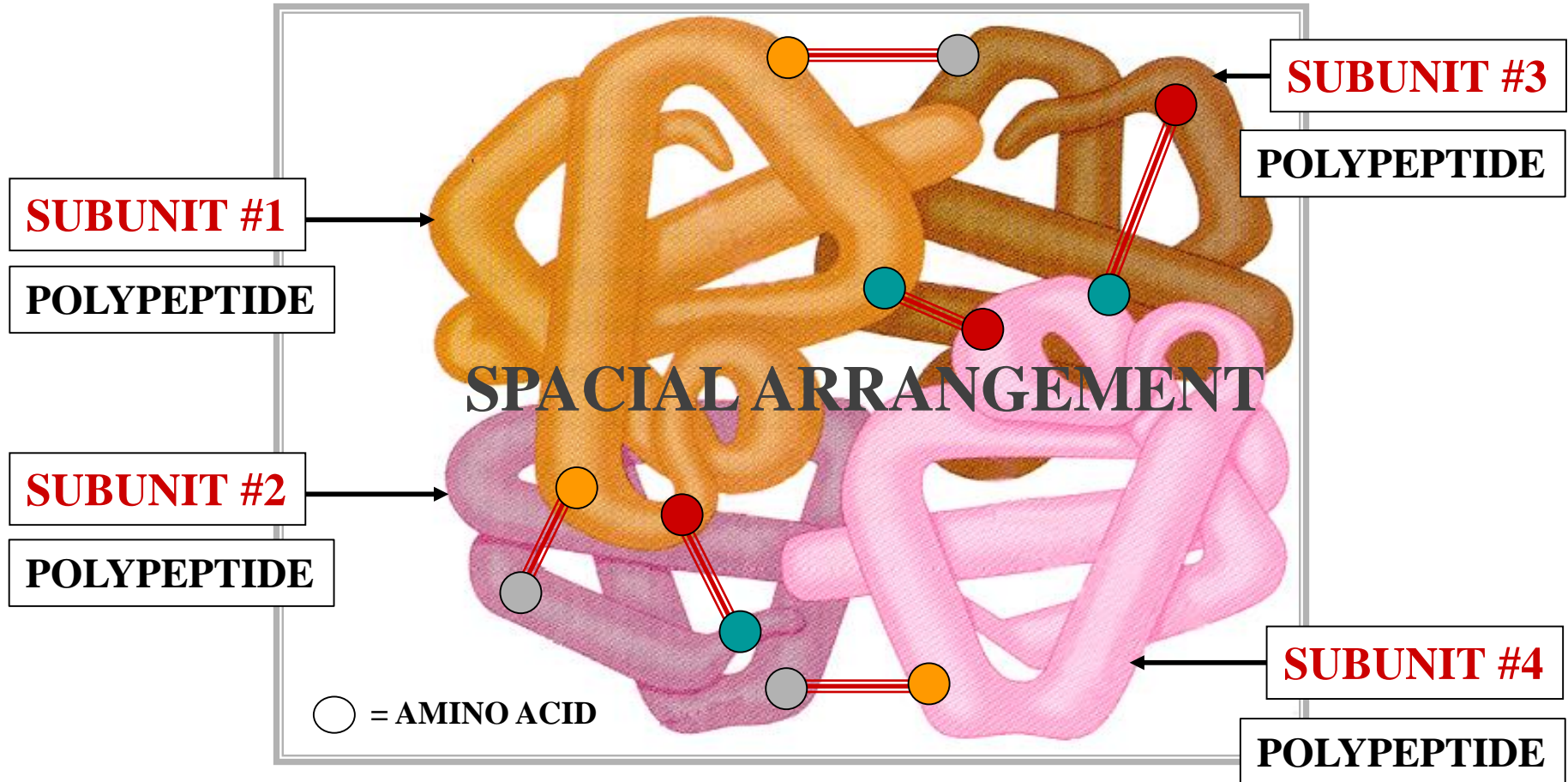
PROTEIN STRUCTURE

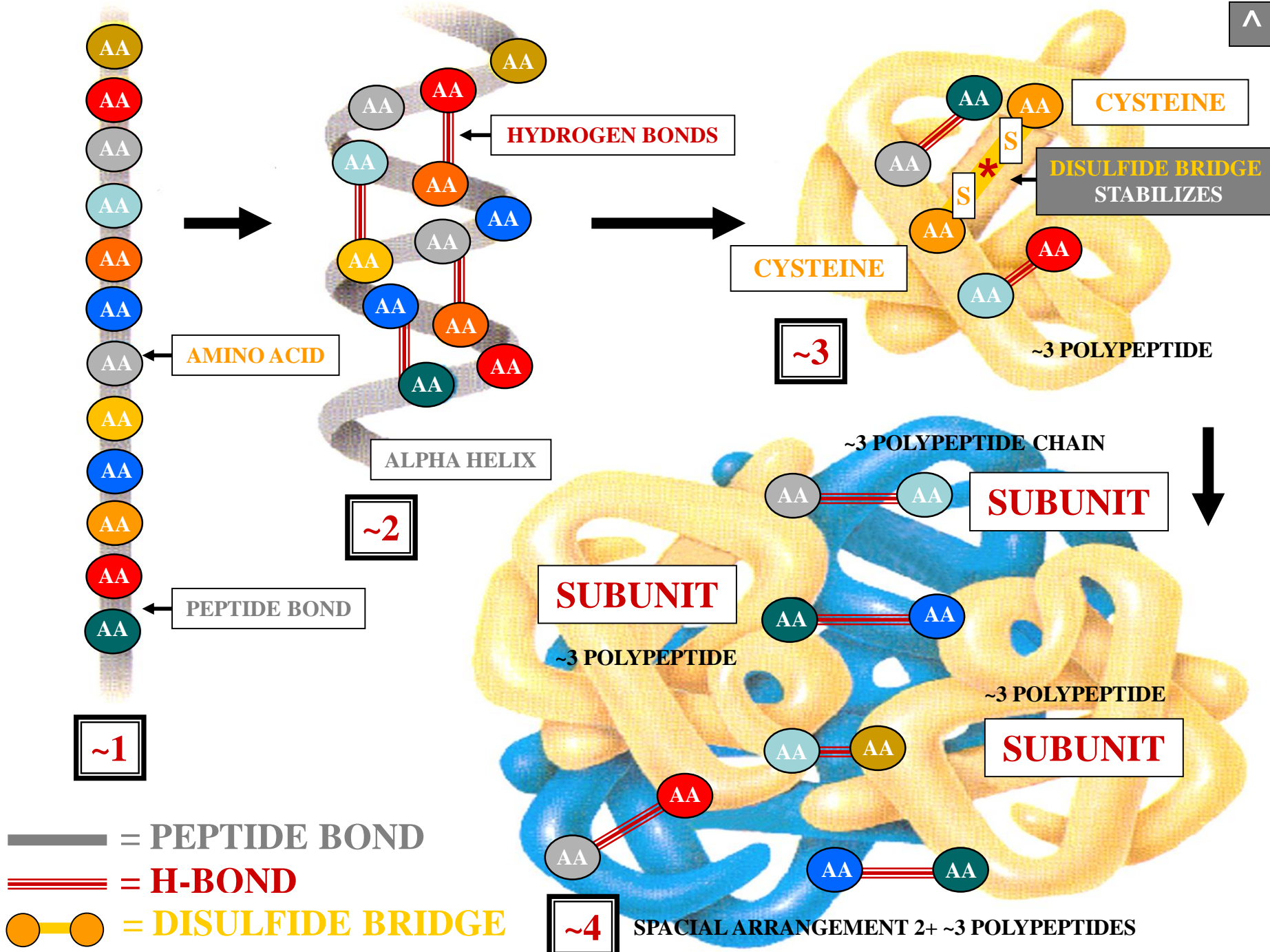


**QUATERNARY
STRUCTURE**

SUBUNIT = POLYPEPTIDE

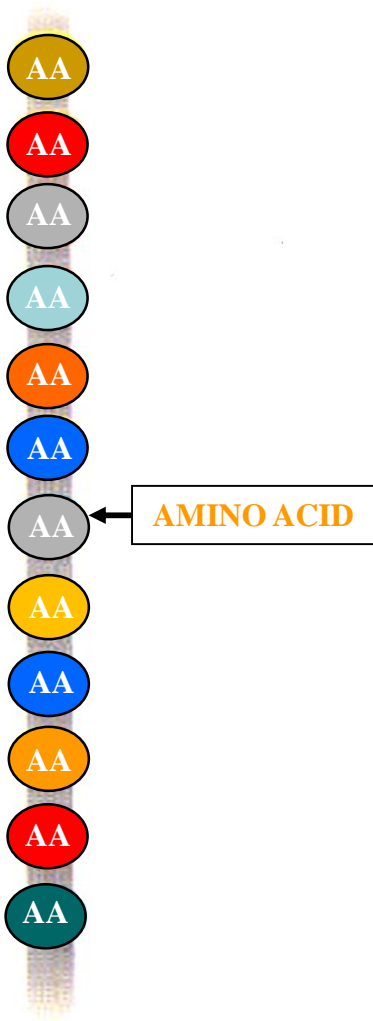
== = HYDROGEN BOND



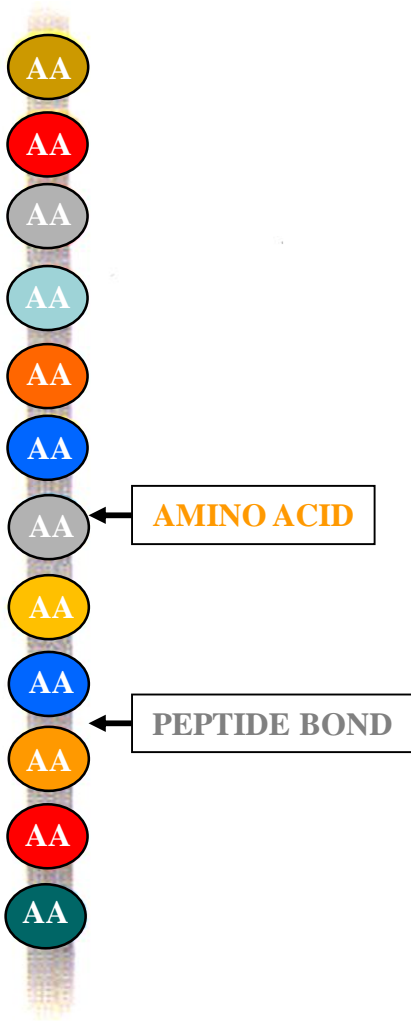




PROTEIN STRUCTURE SUMMARY

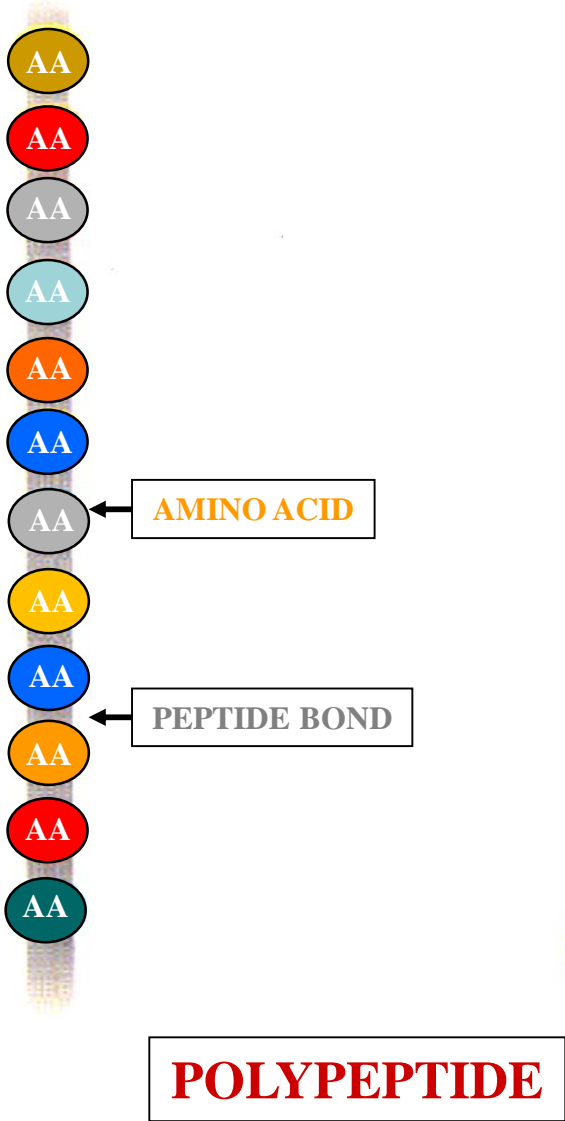


LINEAR AMINO ACID SEQUENCE

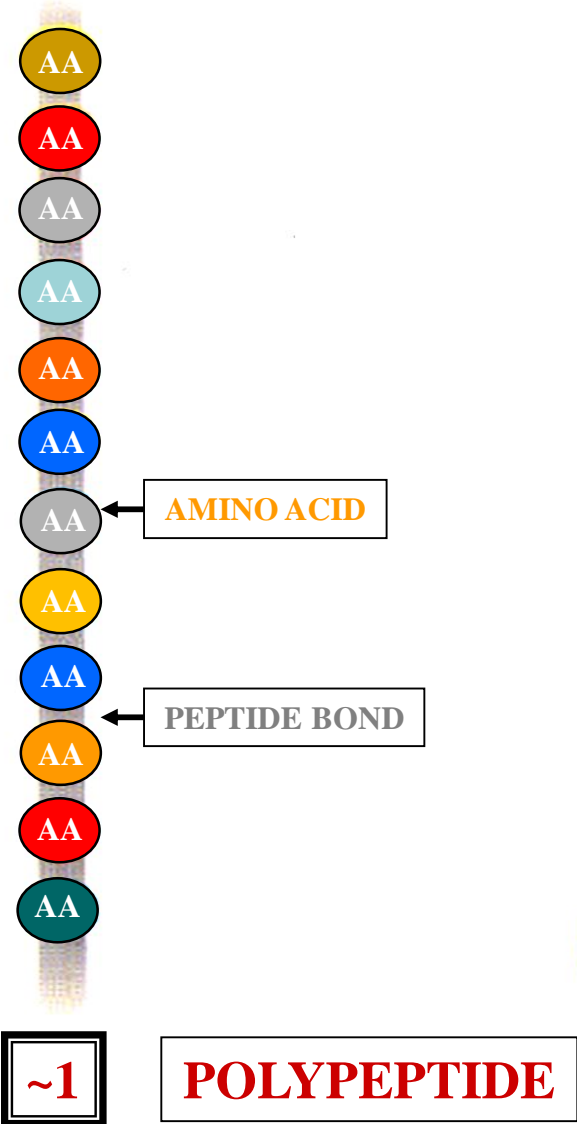


LINEAR AMINO ACID SEQUENCE

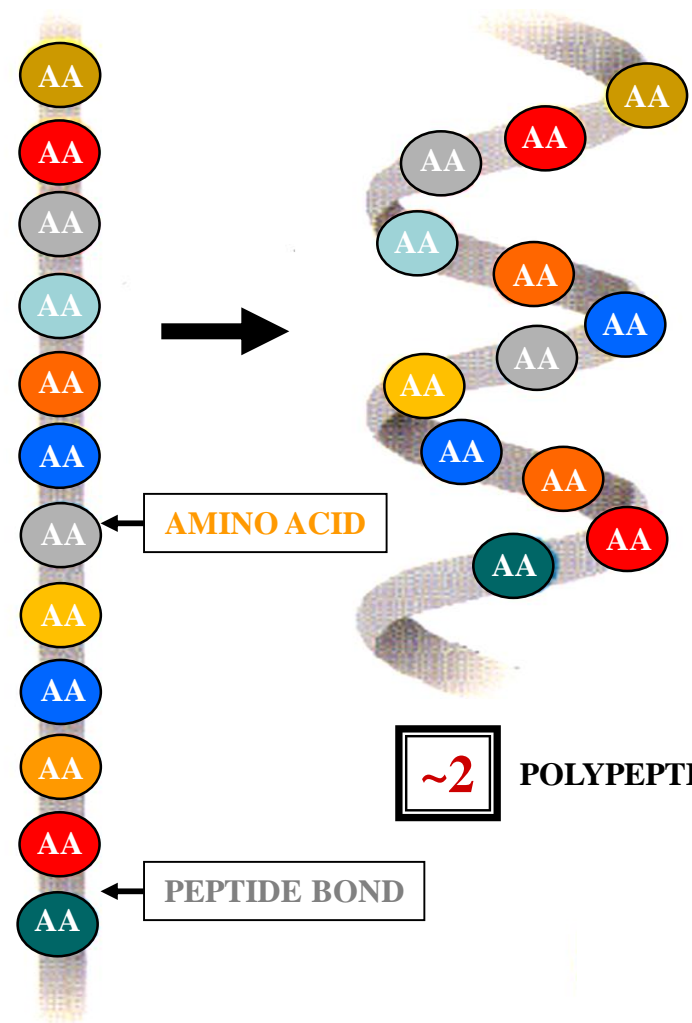
— = PEPTIDE BOND



— = PEPTIDE BOND



— = PEPTIDE BOND



AMINO ACID

PEPTIDE BOND

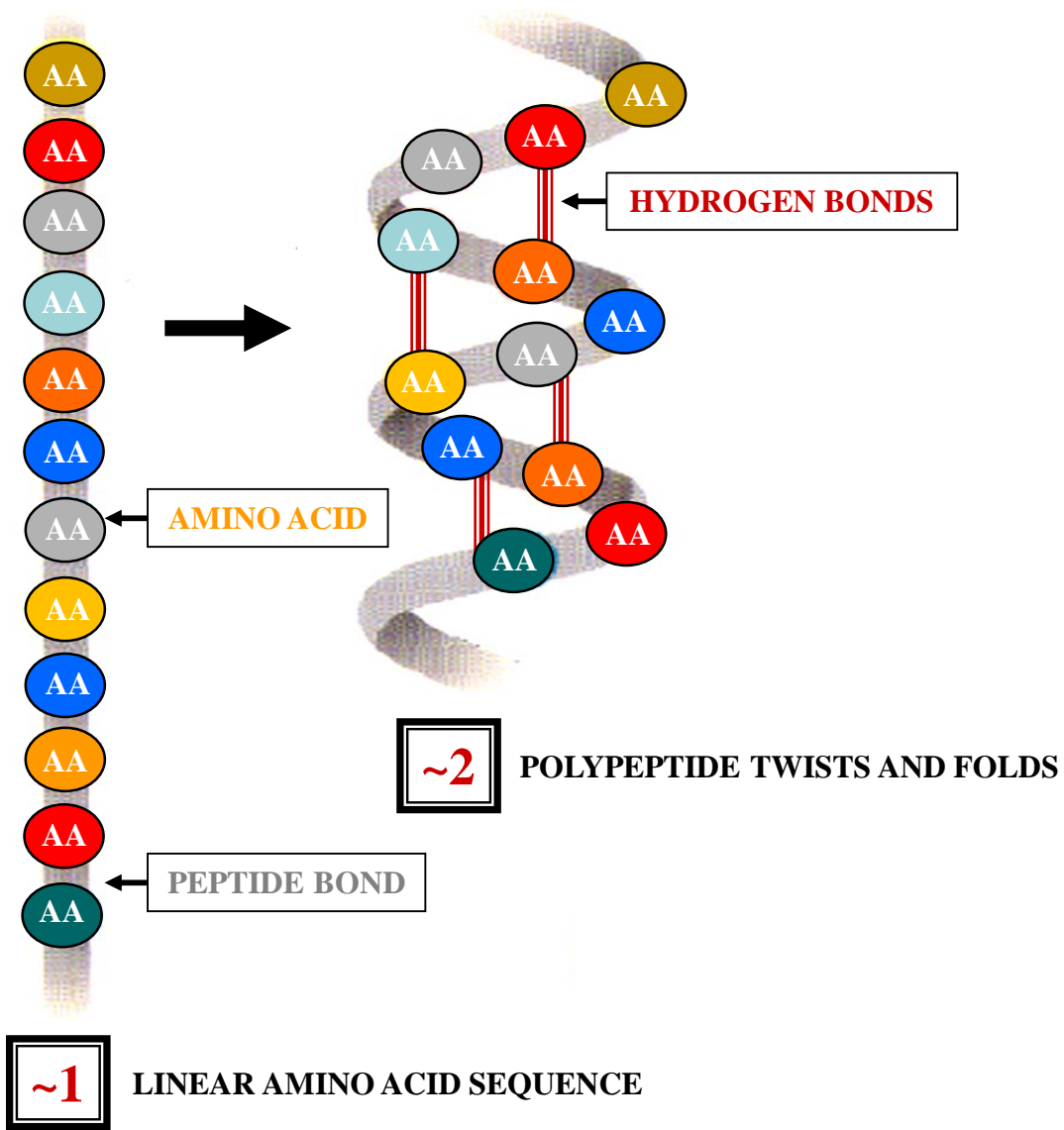
~2

POLYPEPTIDE TWISTS AND FOLDS

~1

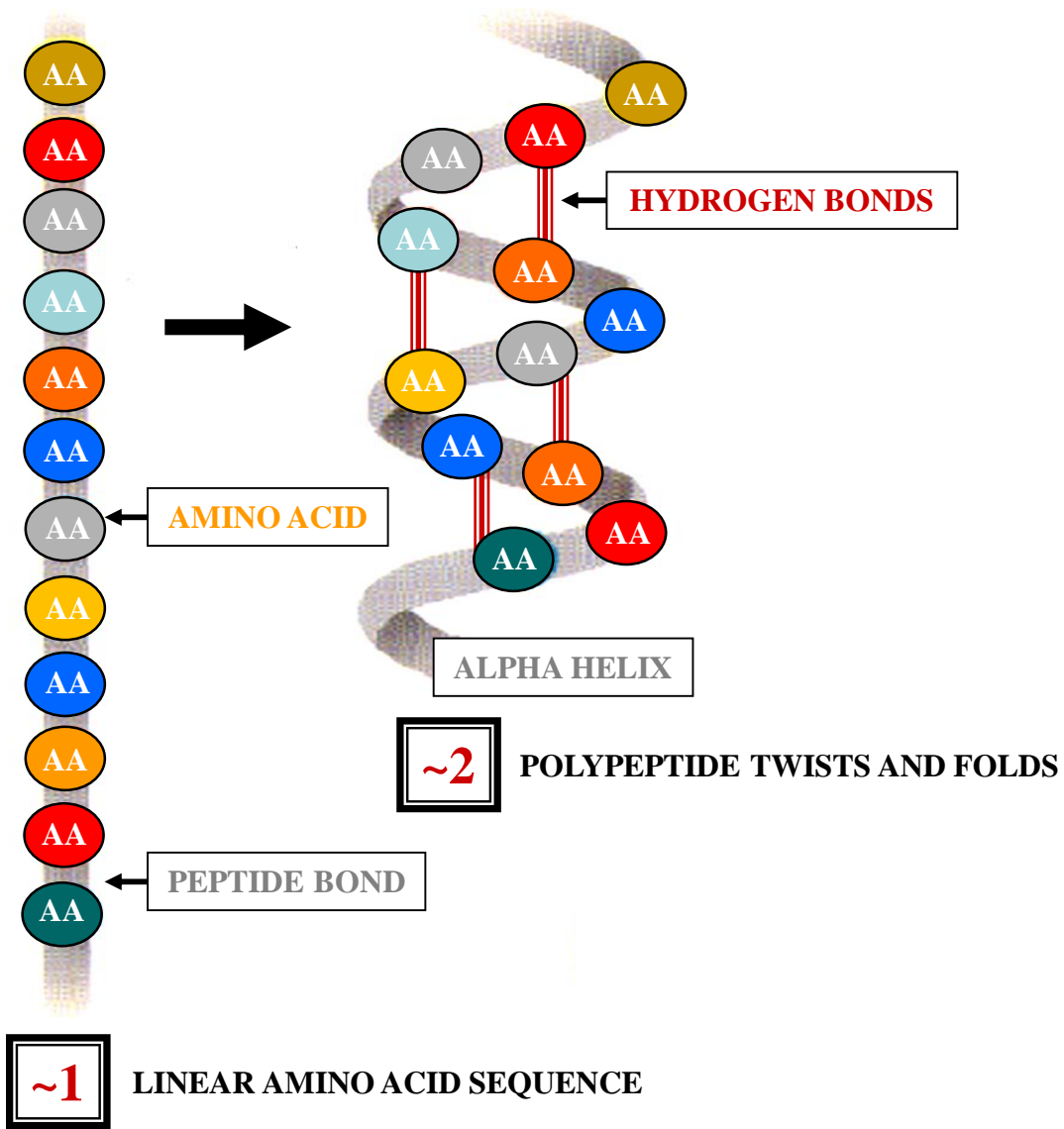
LINEAR AMINO ACID SEQUENCE

— = PEPTIDE BOND



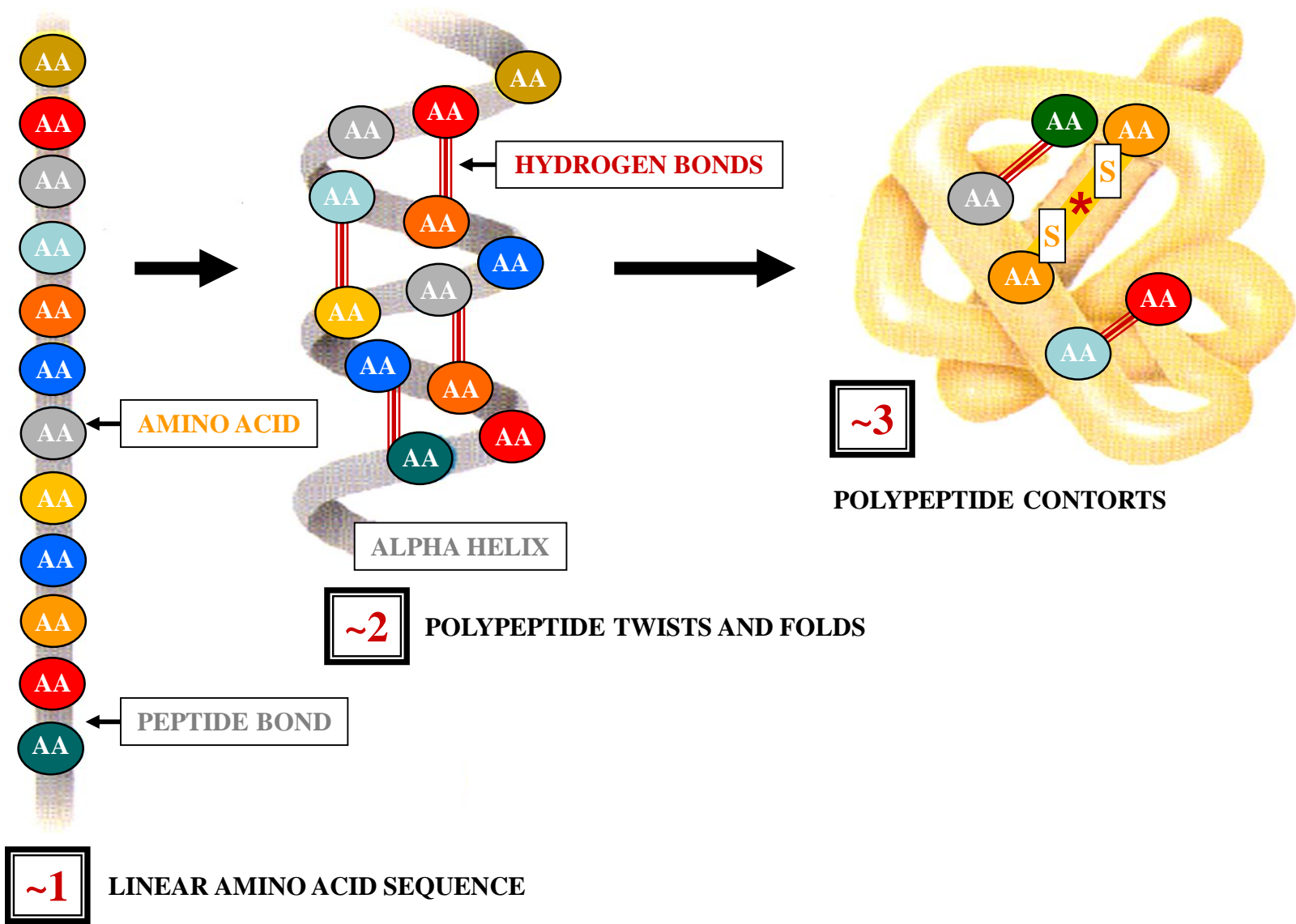
— = PEPTIDE BOND

== = H-BOND



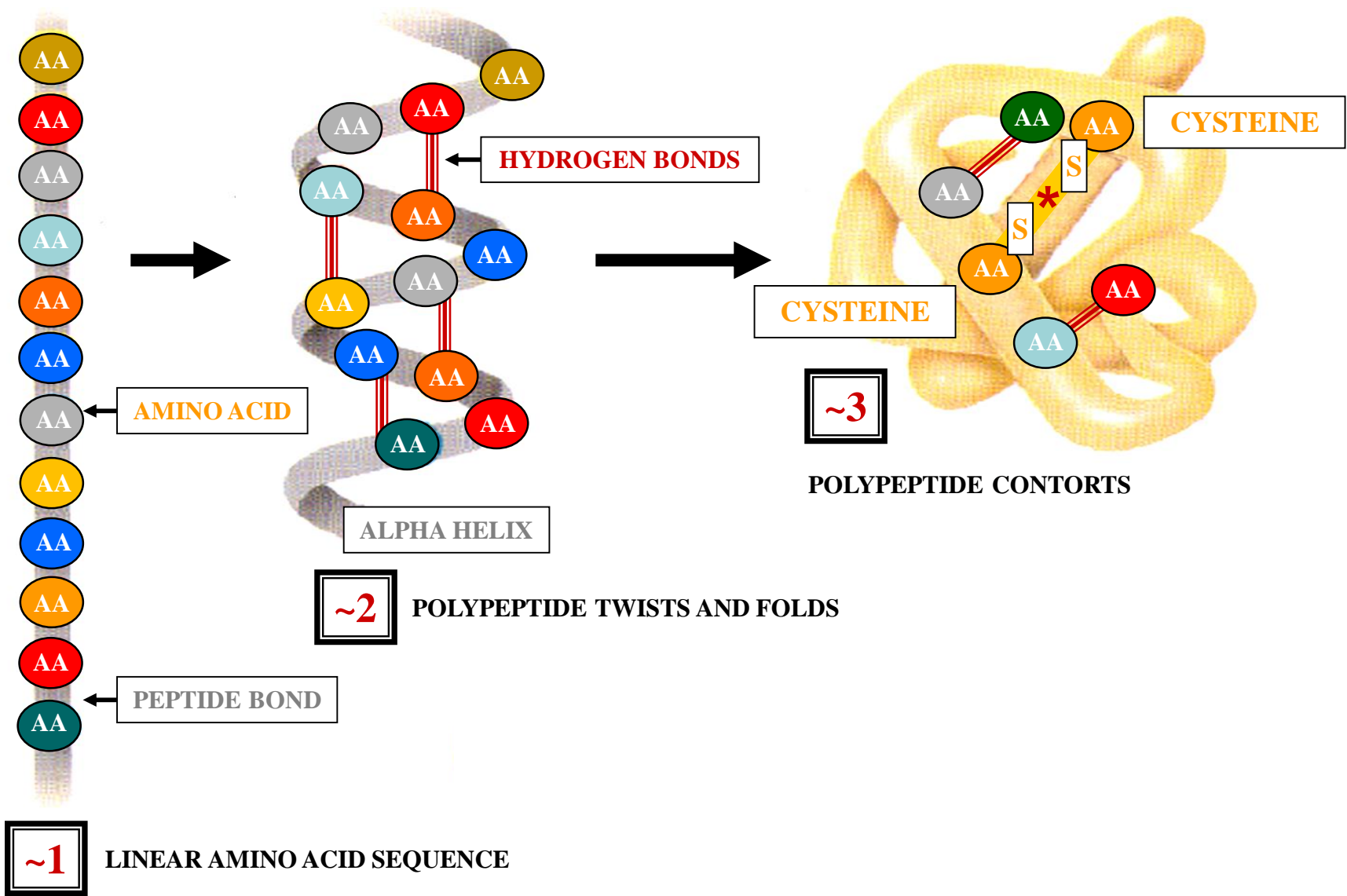
— = PEPTIDE BOND

== = H-BOND



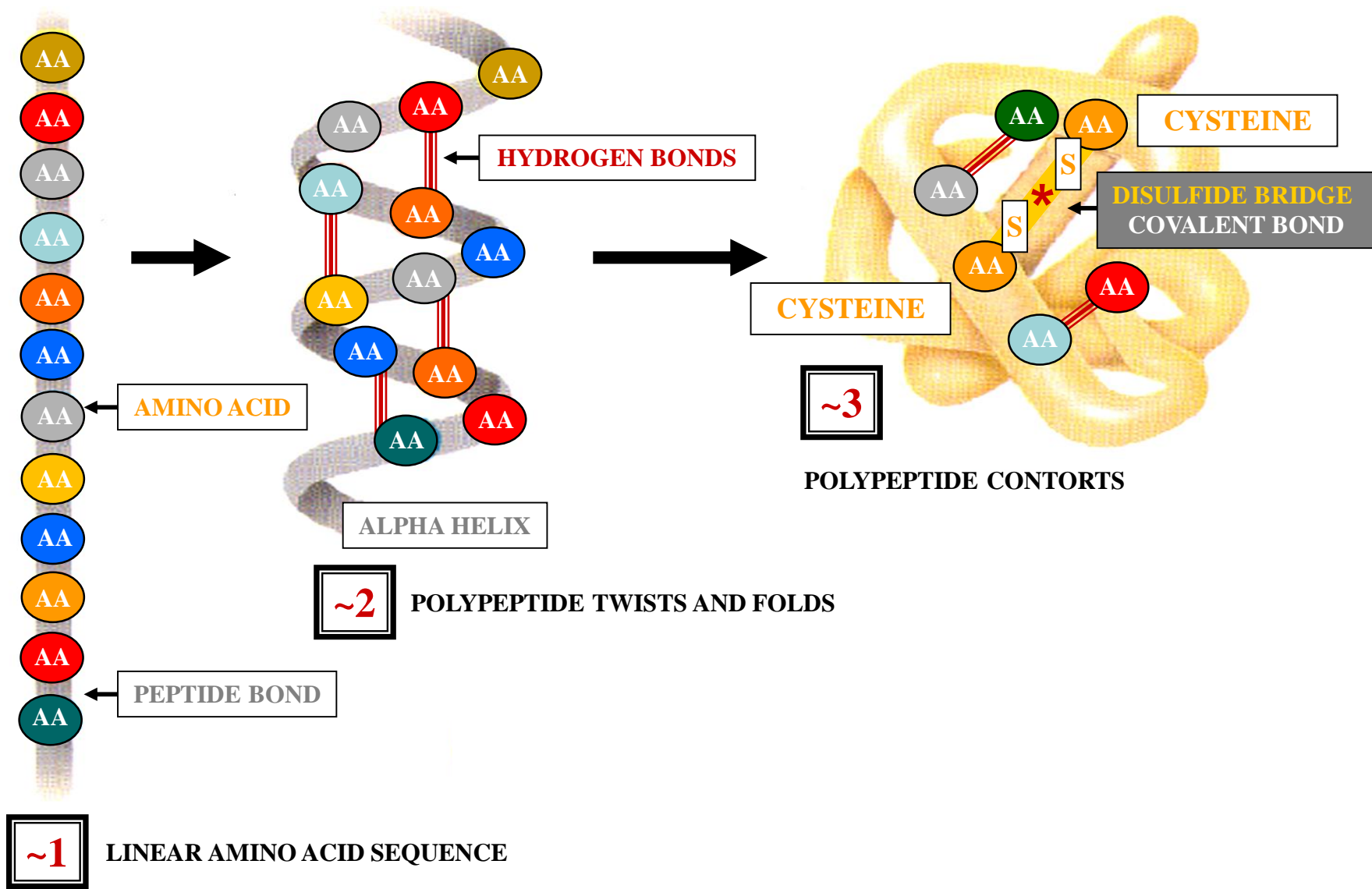
— = PEPTIDE BOND

== = H-BOND



— = PEPTIDE BOND

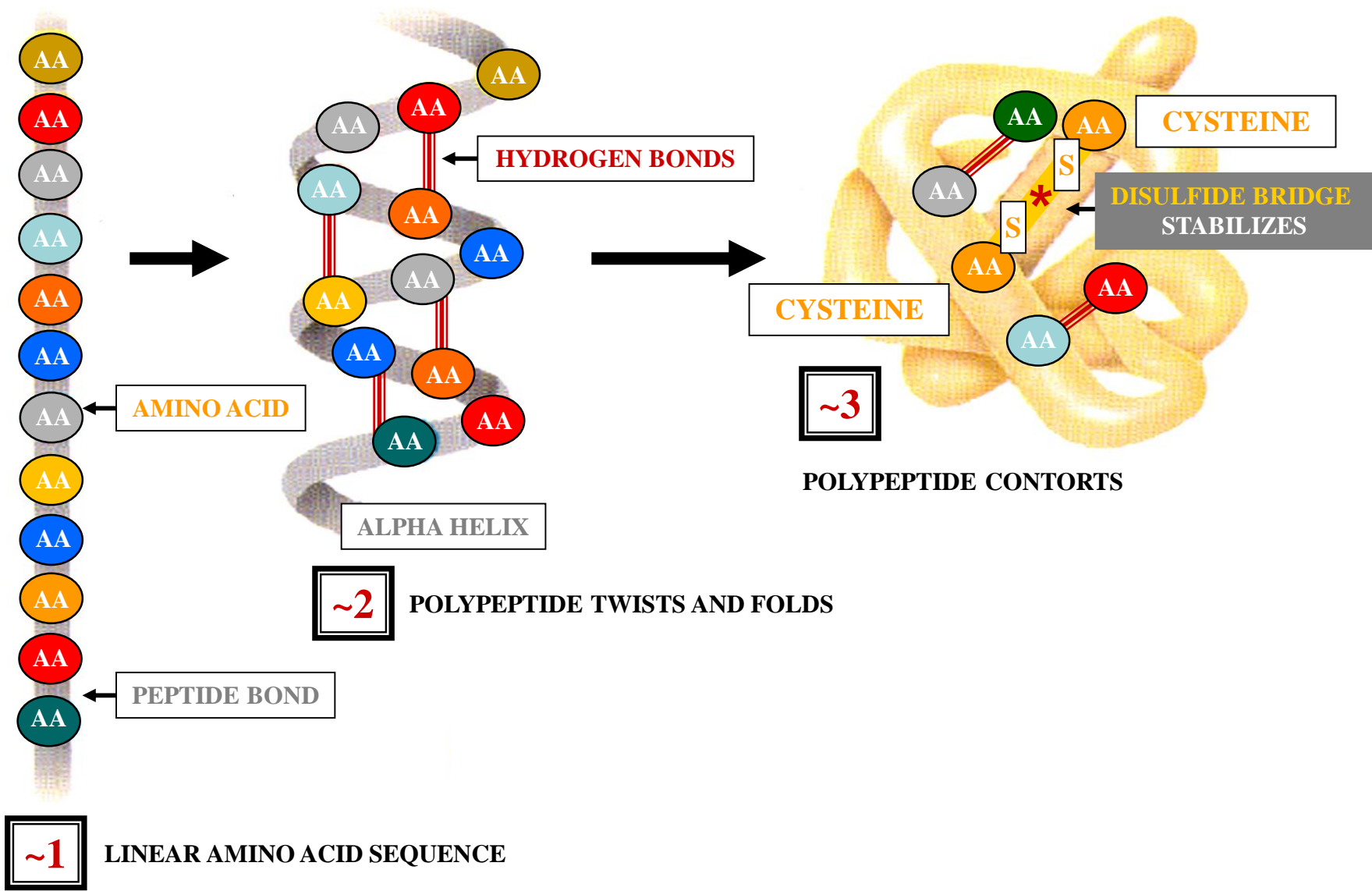
== = H-BOND



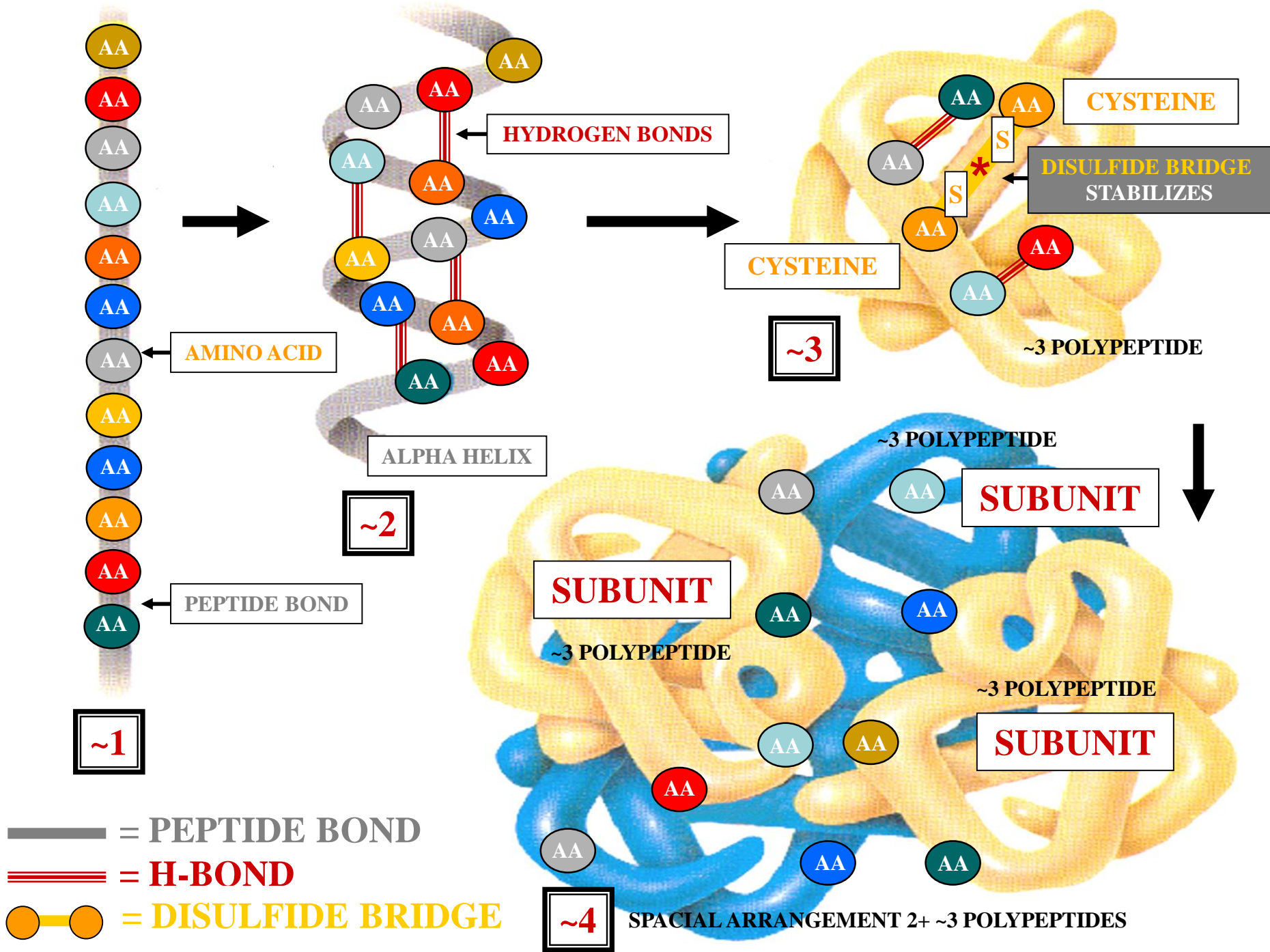
— = PEPTIDE BOND

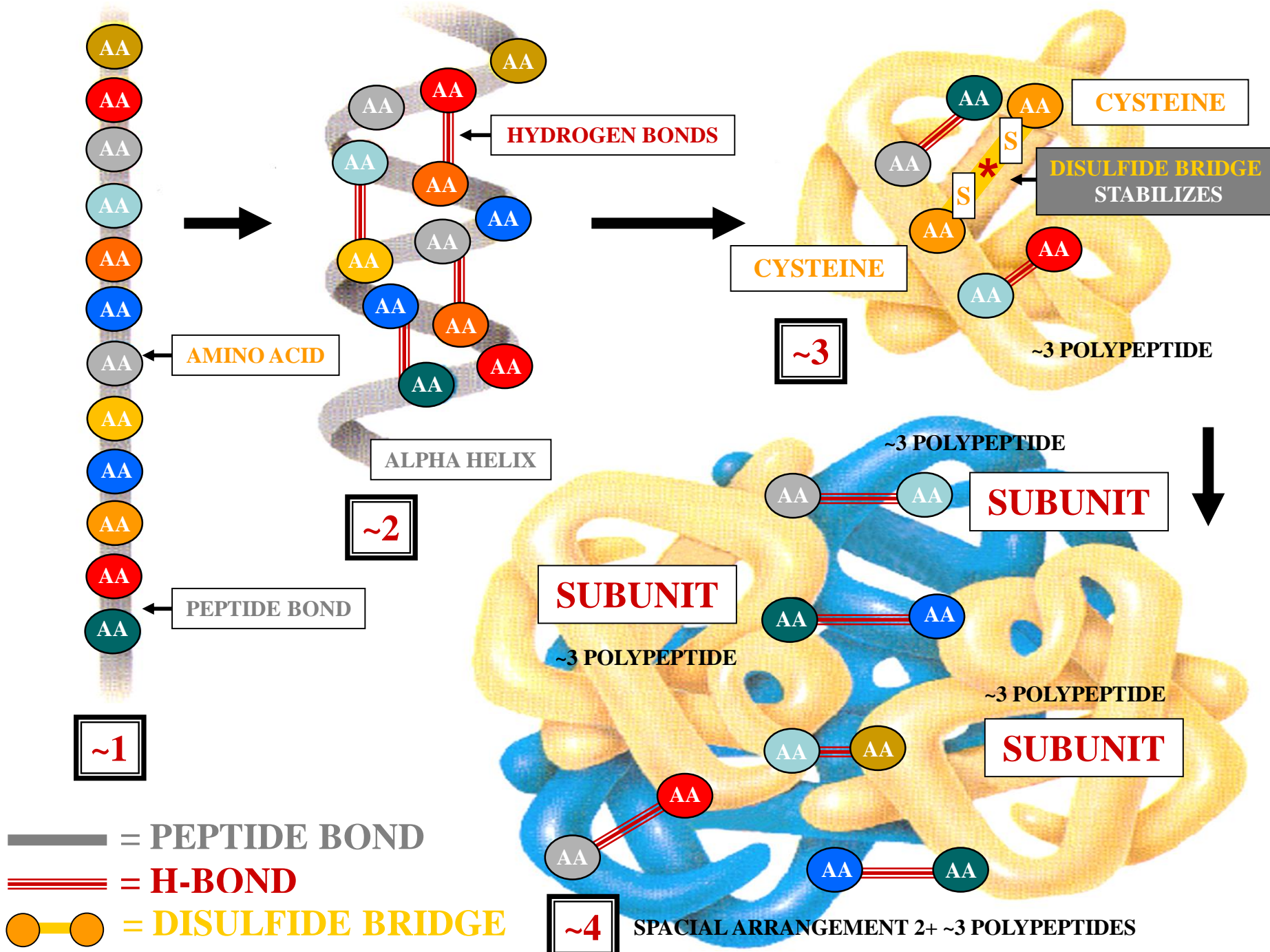
== = H-BOND

●—● = DISULFIDE BRIDGE [S] = SULFUR ATOM * = COVALENT BOND



- = PEPTIDE BOND
- ==** = **H-BOND**
- = **DISULFIDE BRIDGE**





PROTEIN CONFORMATION

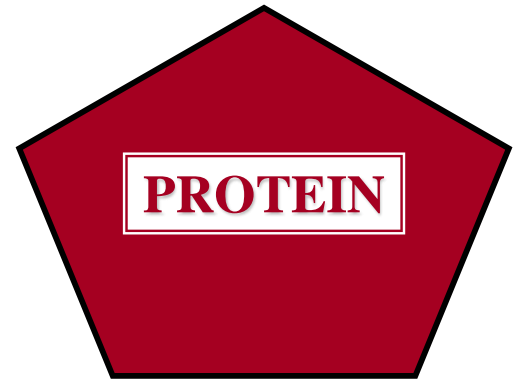
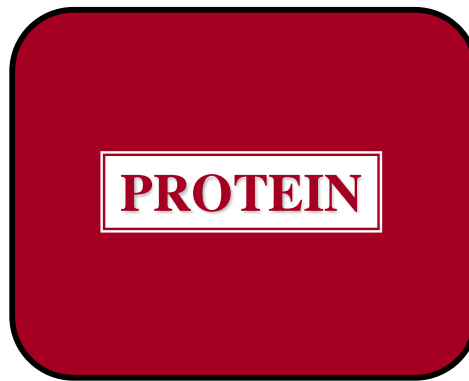
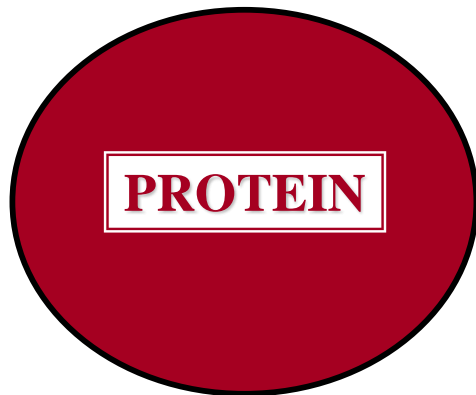
PROTEIN CONFORMATION

PROTEIN CONFORMATION

OVERALL PROTEIN STRUCTURE

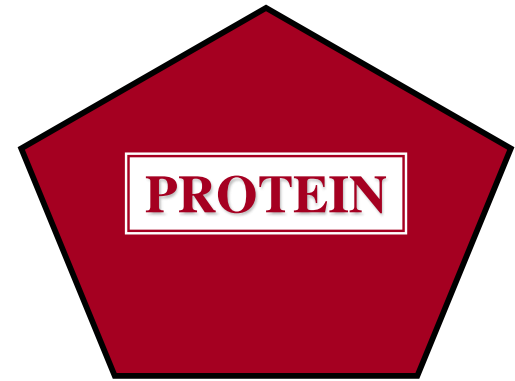
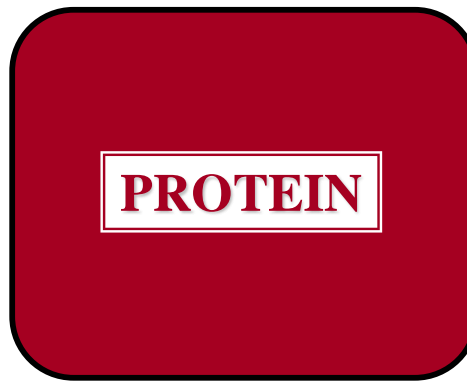
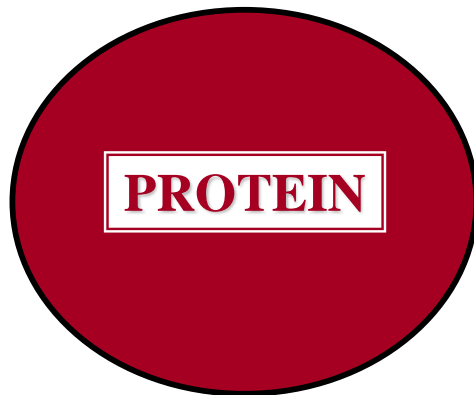
PROTEIN CONFORMATION

PROTEIN CONFORMATION



DIFFERENT PROTEINS

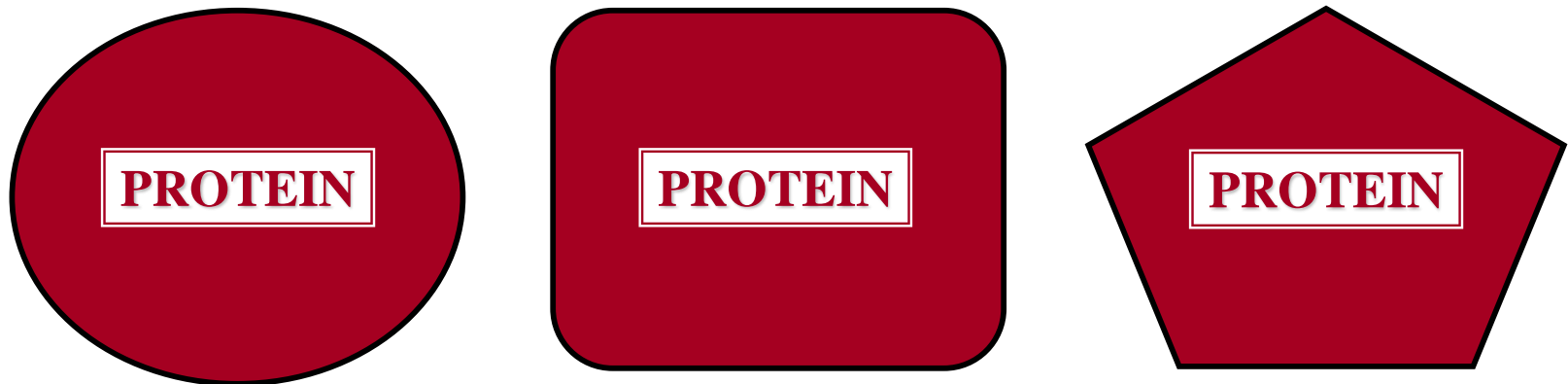
PROTEIN CONFORMATION



DIFFERENT PROTEINS

DIFFERENT STRUCTURE

PROTEIN CONFORMATION



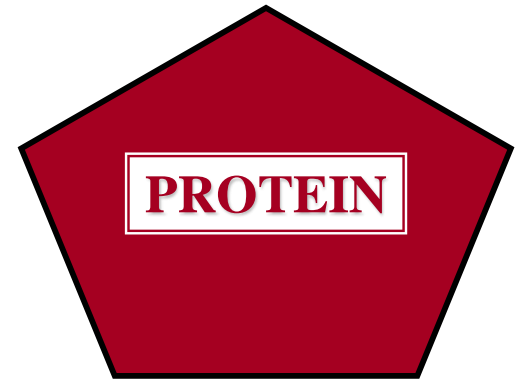
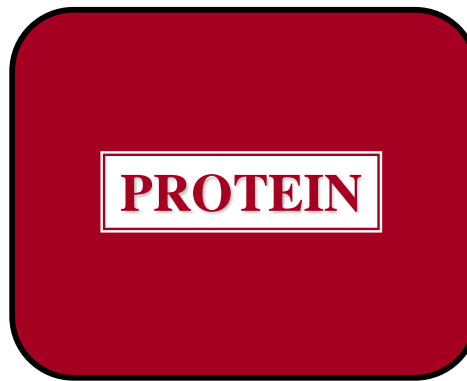
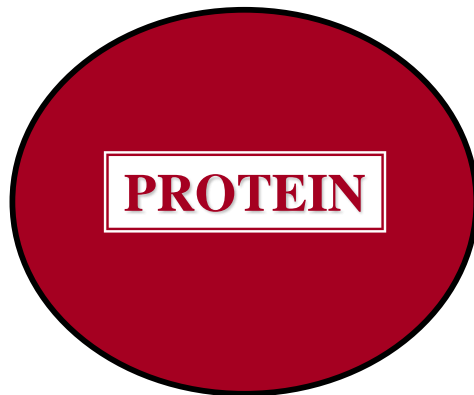
DIFFERENT PROTEINS

DIFFERENT STRUCTURE

DIFFERENT CONFORMATION



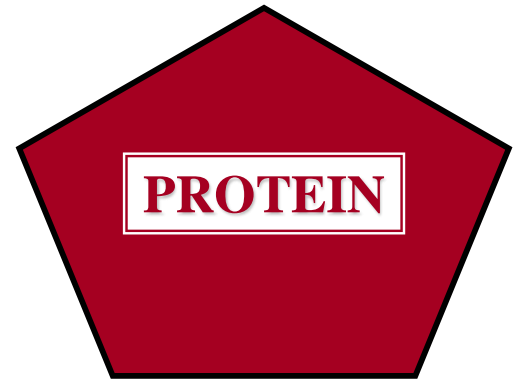
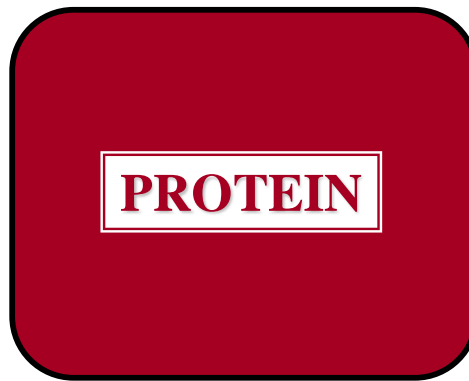
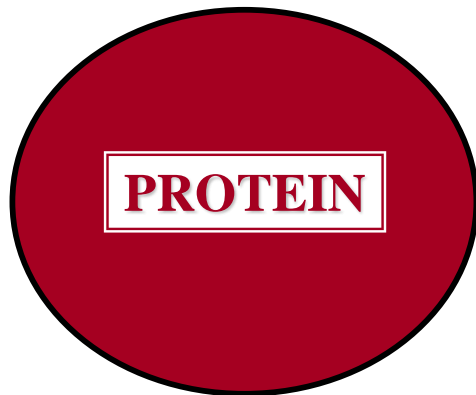
PROTEIN CONFORMATION



DIFFERENT FUNCTION



PROTEIN CONFORMATION



**PROTEIN CONFORMATION
DICTATES
PROTEIN FUNCTION**

PROTEIN CONFORMATION



**PROTEIN
CONFORMATION
DICTATES
PROTEIN
FUNCTION**

PROTEIN CONFORMATION



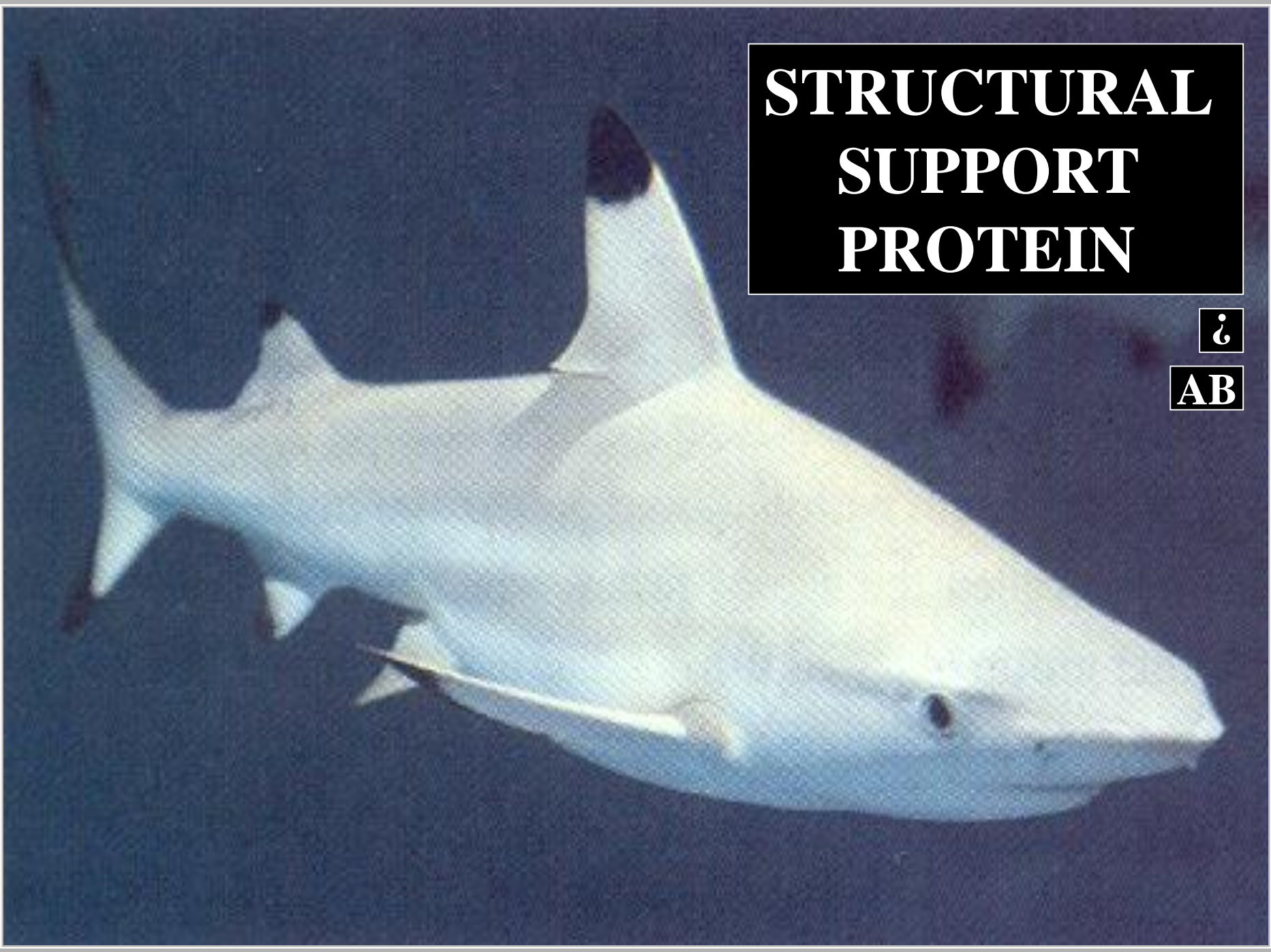
PROTEIN FUNCTION



PROTEIN

STRUCTURAL

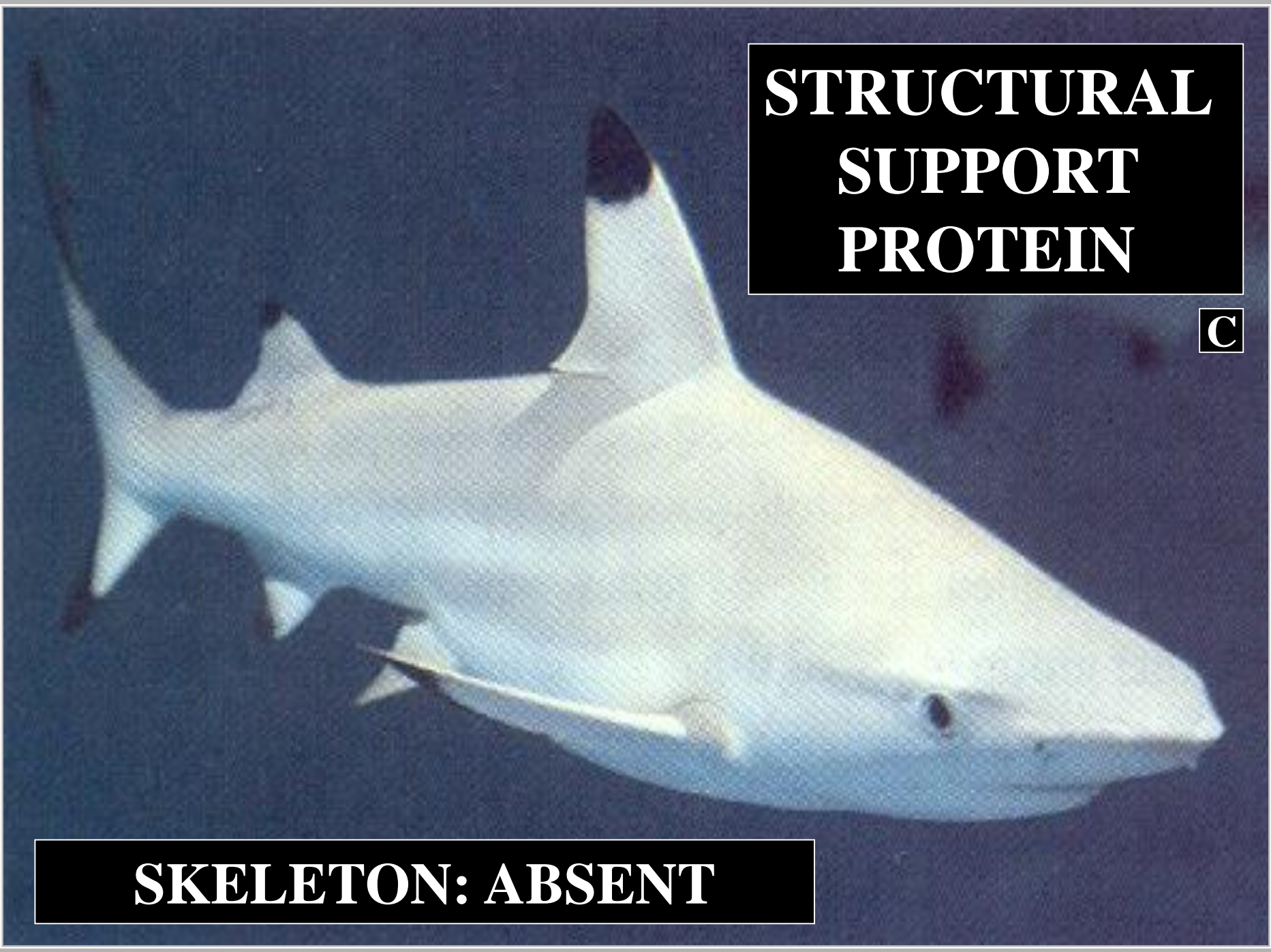
FUNCTION



STRUCTURAL SUPPORT PROTEIN

?

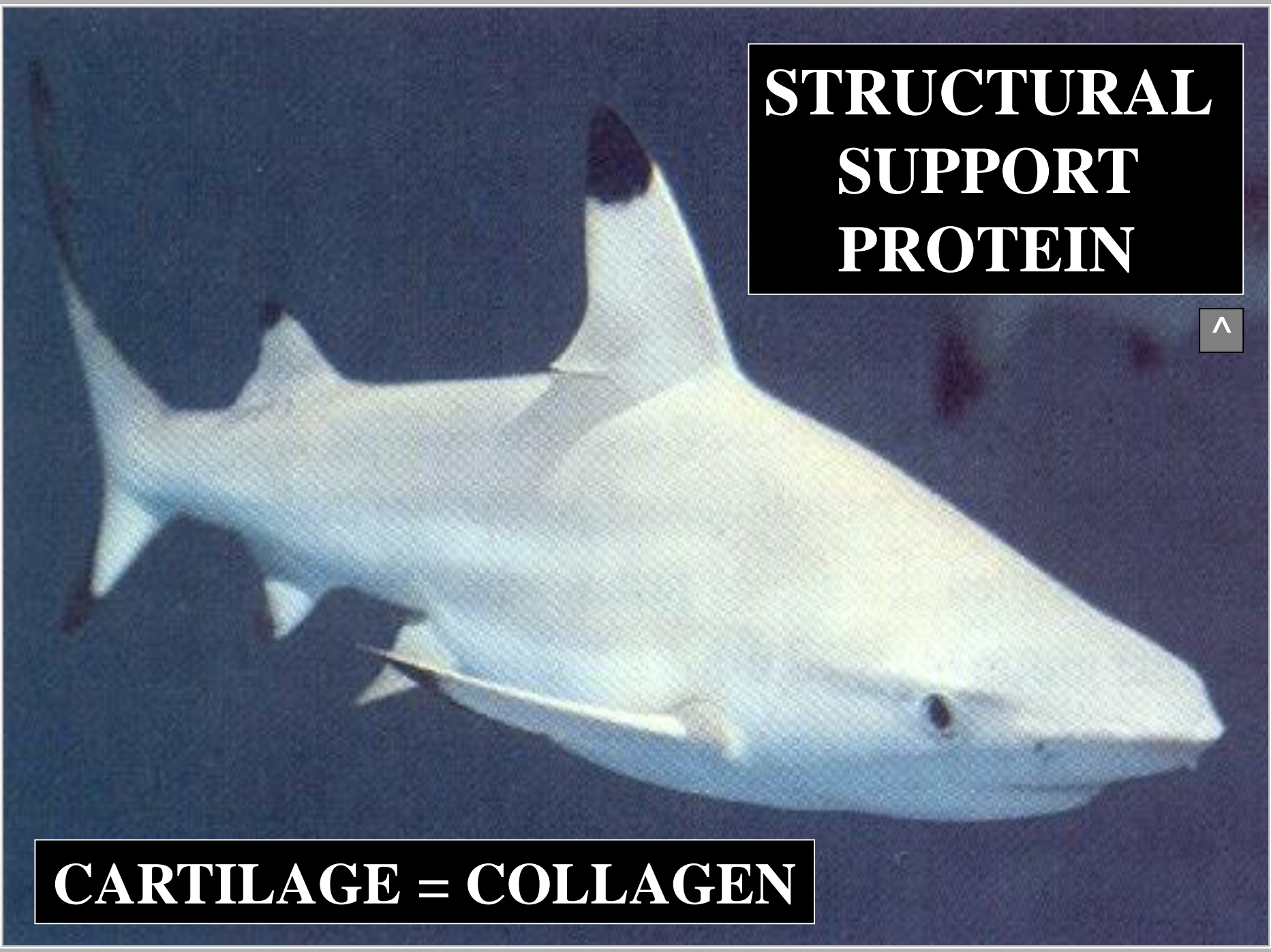
AB



**STRUCTURAL
SUPPORT
PROTEIN**

C

SKELETON: ABSENT



**STRUCTURAL
SUPPORT
PROTEIN**



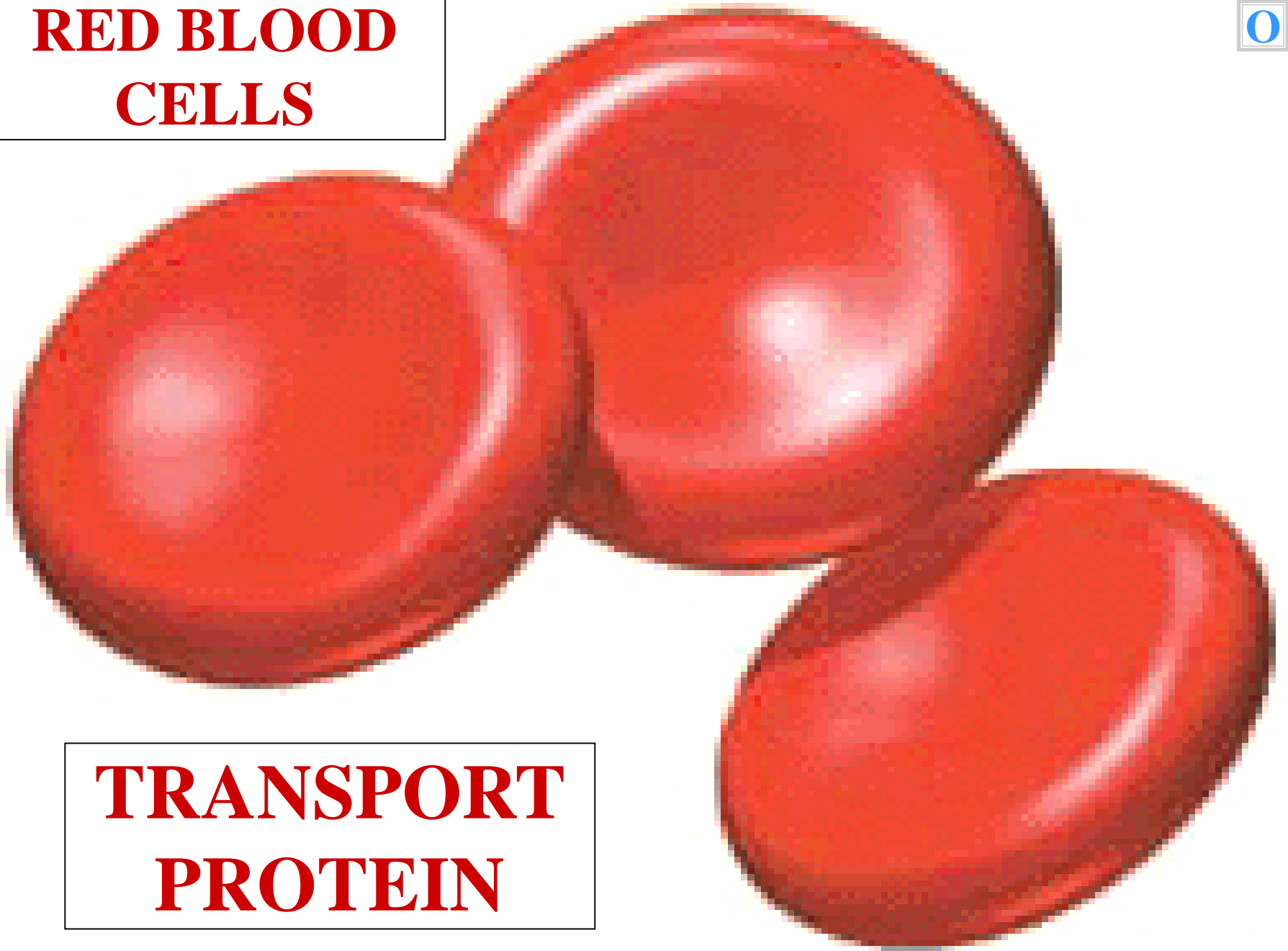
CARTILAGE = COLLAGEN



PROTEIN TRANSPORT FUNCTION

RED BLOOD CELLS

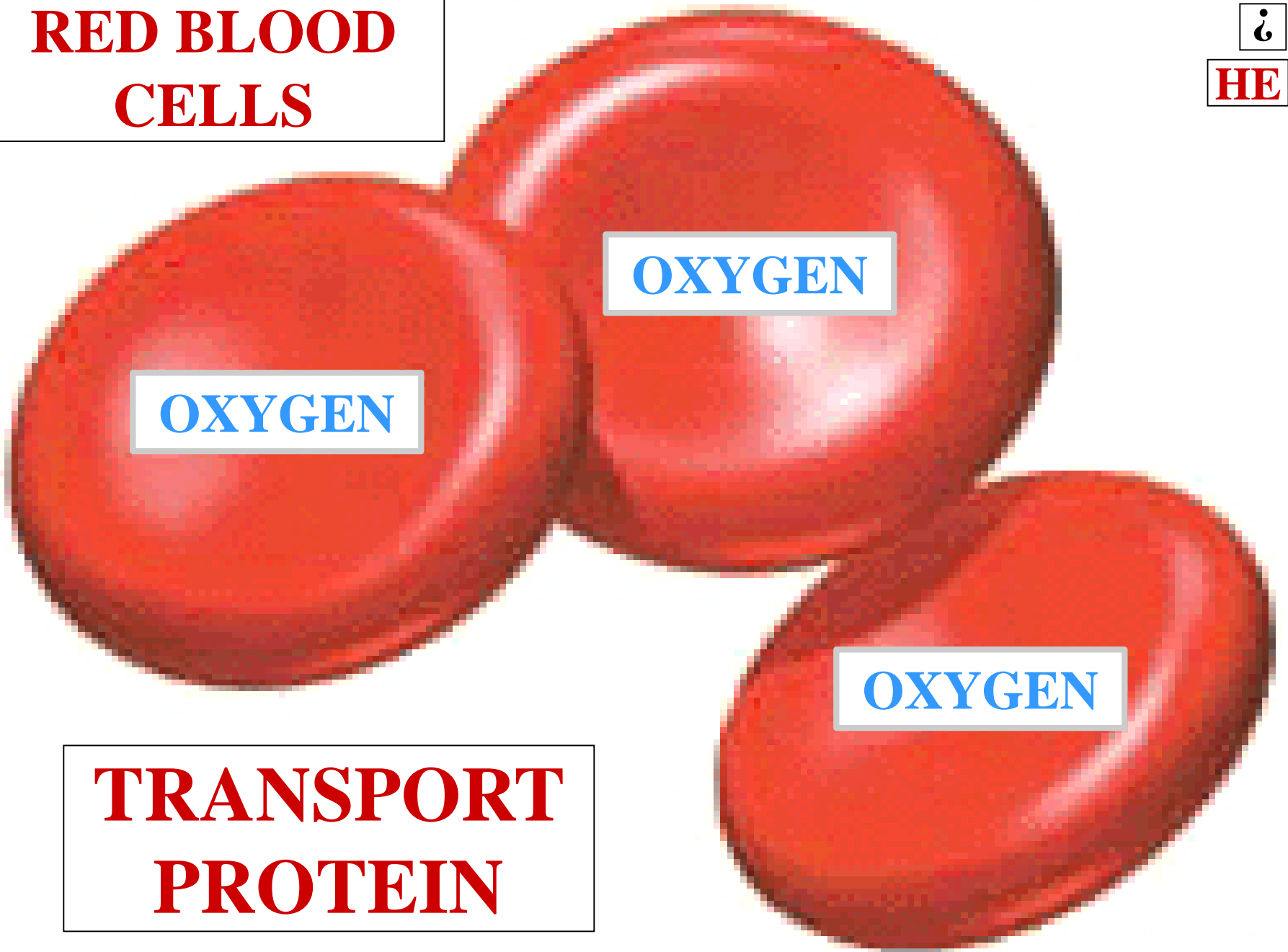
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TRANSPORT
PROTEIN

RED BLOOD CELLS

HE



OXYGEN

OXYGEN

OXYGEN

TRANSPORT PROTEIN

HEMOGLOBIN

^

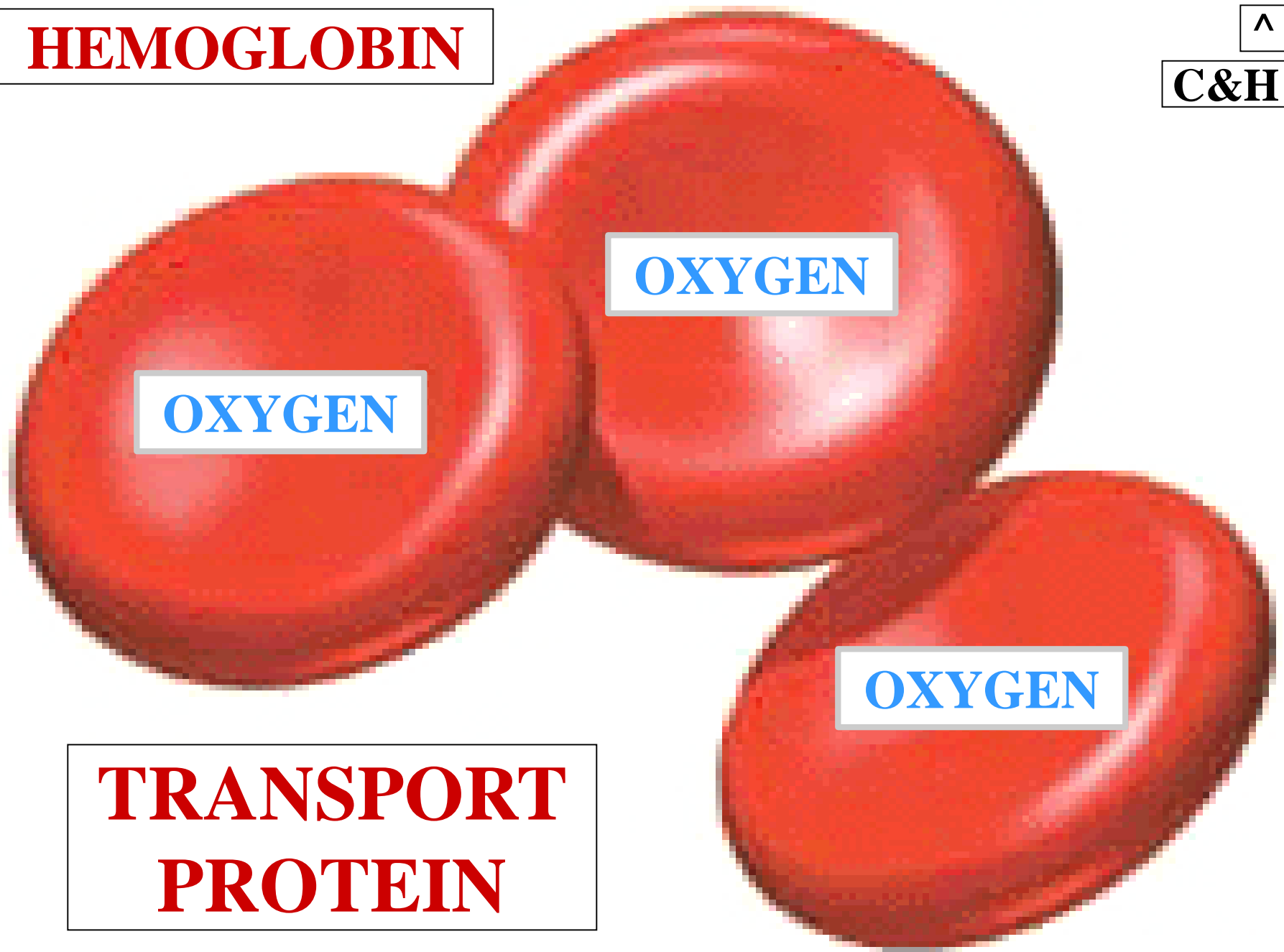
C&H

OXYGEN

OXYGEN

OXYGEN

**TRANSPORT
PROTEIN**



COLLAGEN
VS
HEMOGLOBIN
CONTRAST

COLLAGEN VS HEMOGLOBIN



COLLAGEN

COLLAGEN VS HEMOGLOBIN

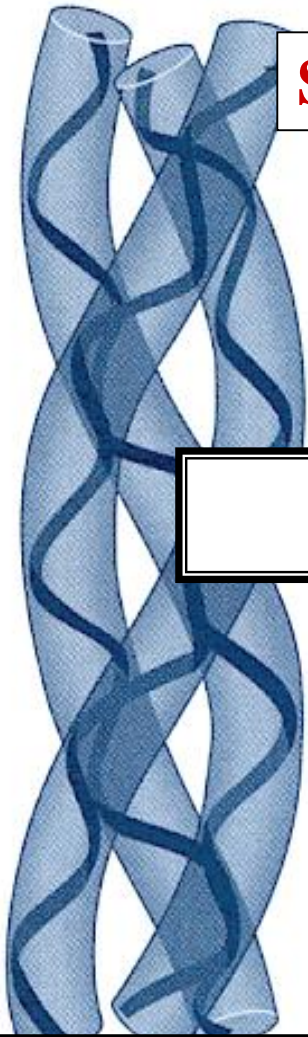


COLLAGEN



HEMOGLOBIN

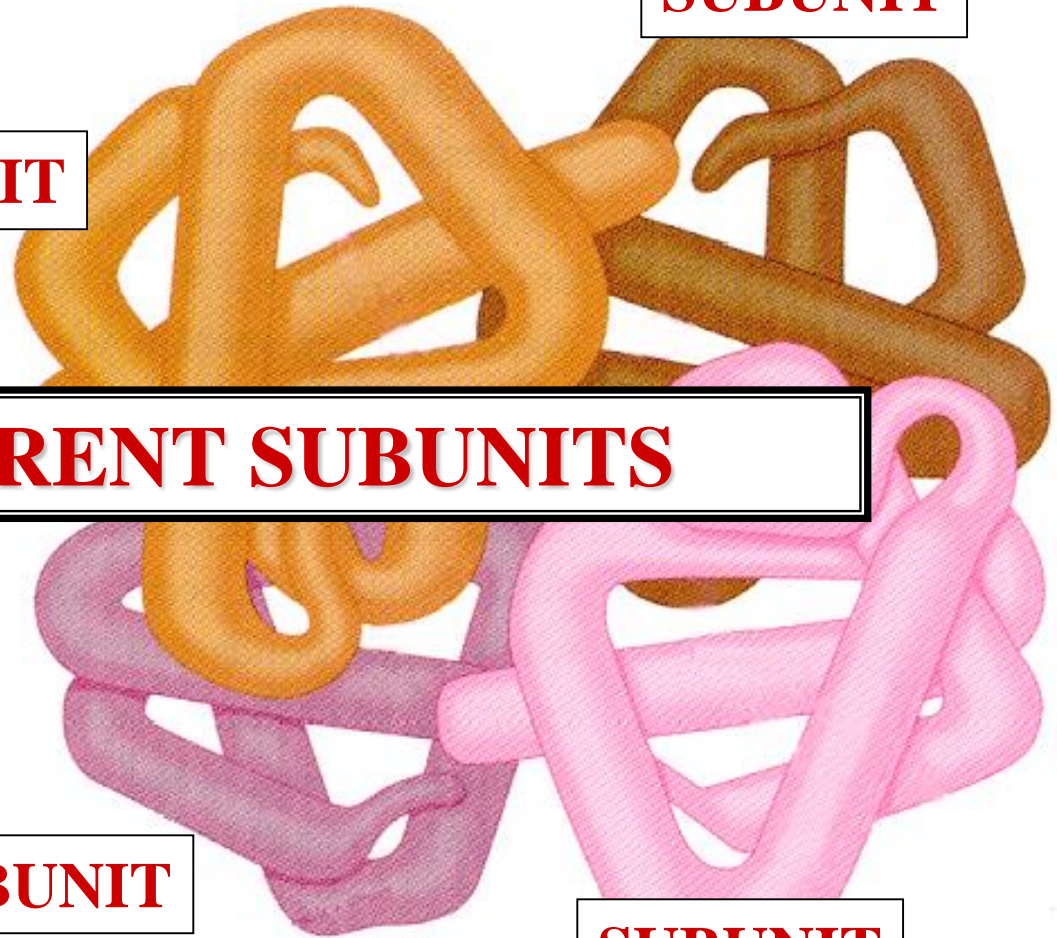
COLLAGEN VS HEMOGLOBIN



SUBUNIT

SUBUNIT

COLLAGEN



SUBUNIT

SUBUNIT

SUBUNIT

HEMOGLOBIN

DIFFERENT SUBUNITS

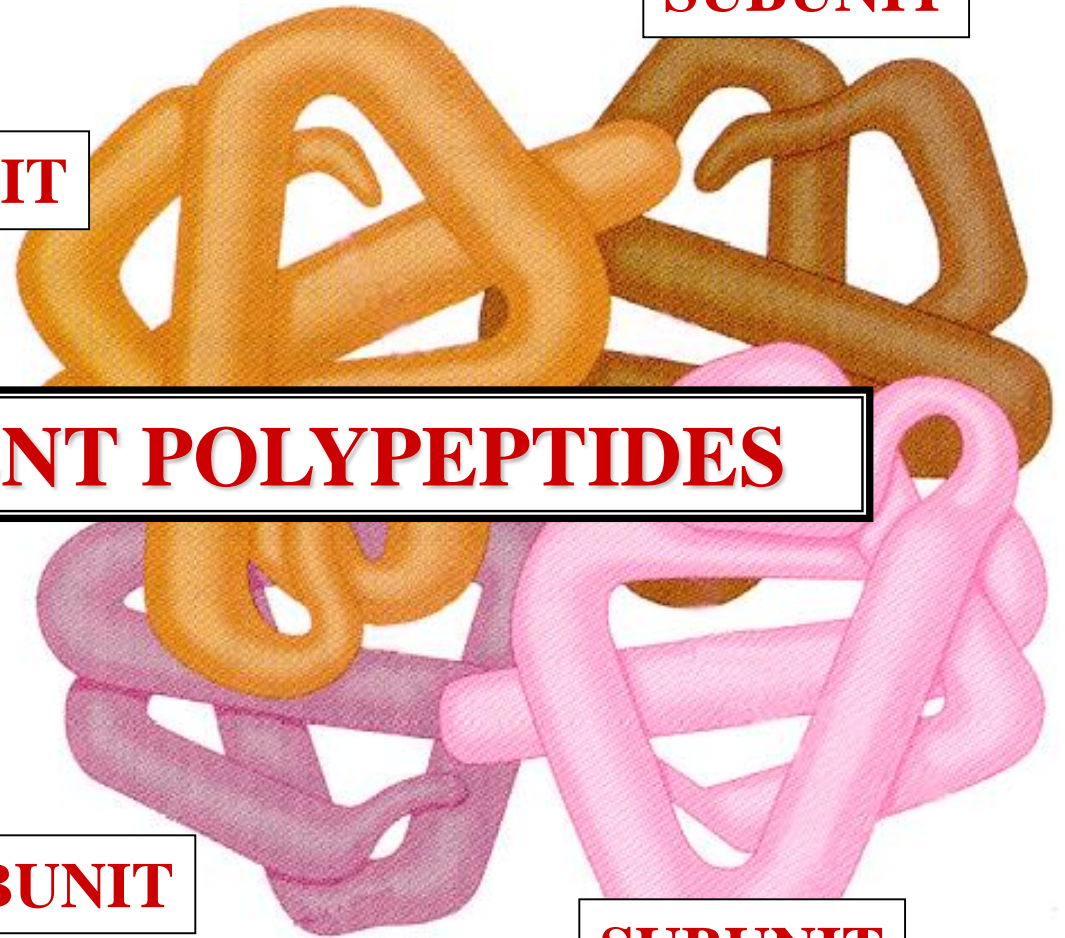
COLLAGEN VS HEMOGLOBIN



SUBUNIT

SUBUNIT

COLLAGEN



SUBUNIT

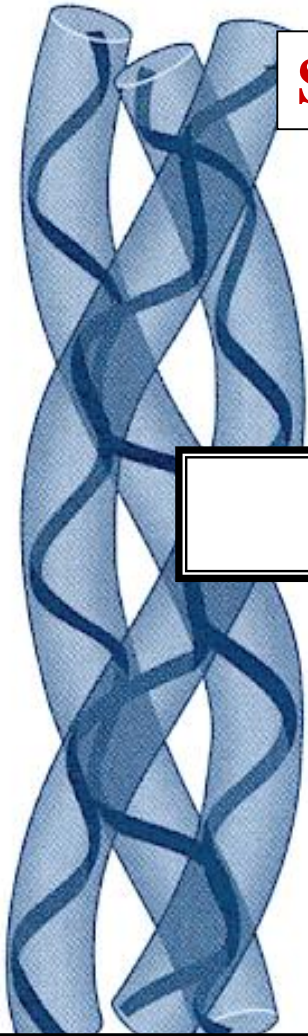
SUBUNIT

SUBUNIT

HEMOGLOBIN

DIFFERENT POLYPEPTIDES

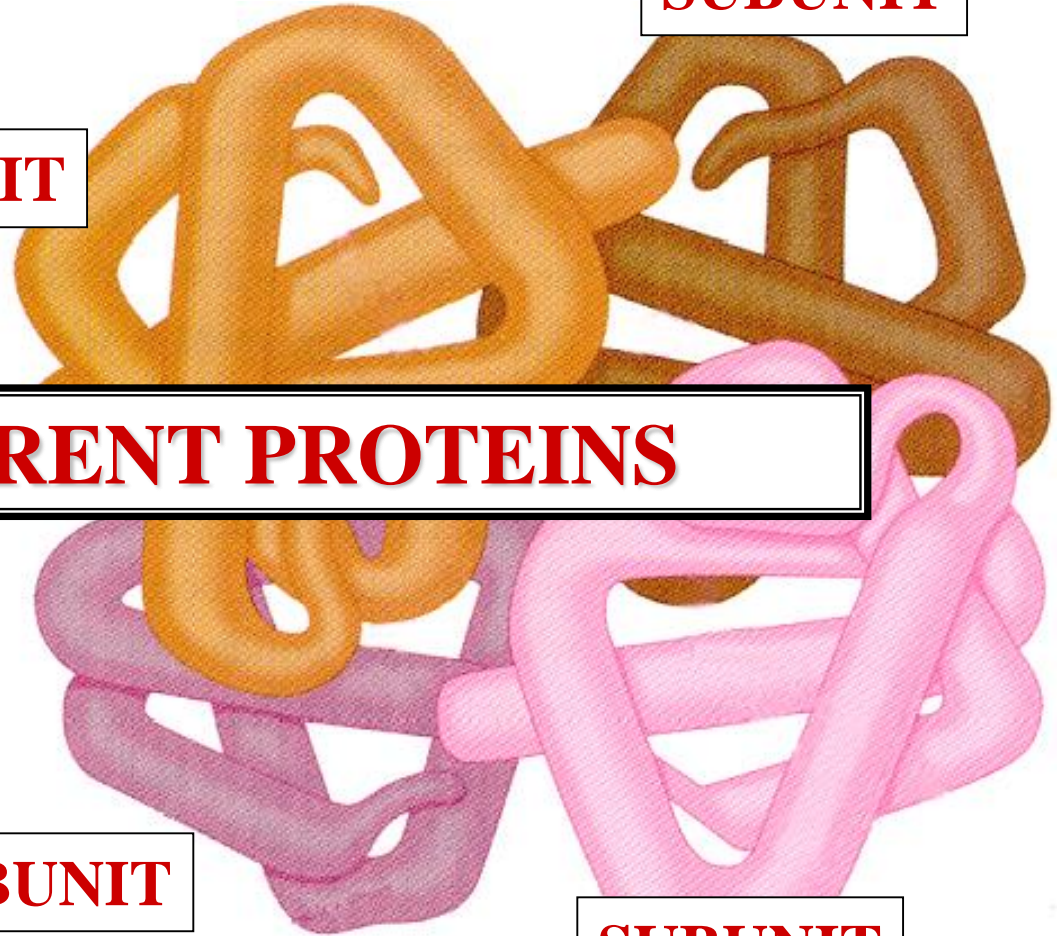
COLLAGEN VS HEMOGLOBIN



SUBUNIT

SUBUNIT

COLLAGEN



SUBUNIT

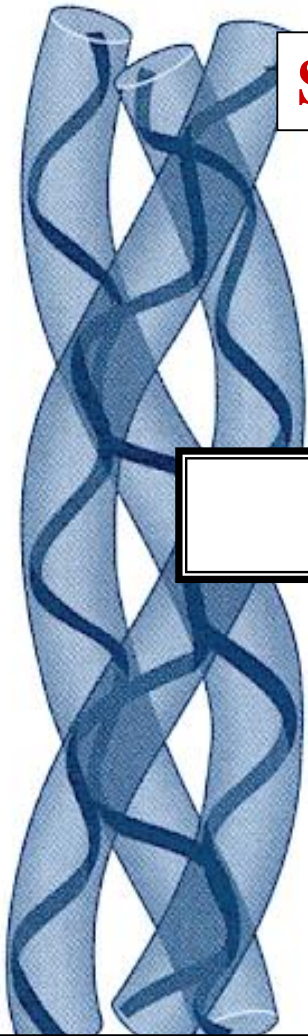
SUBUNIT

SUBUNIT

HEMOGLOBIN

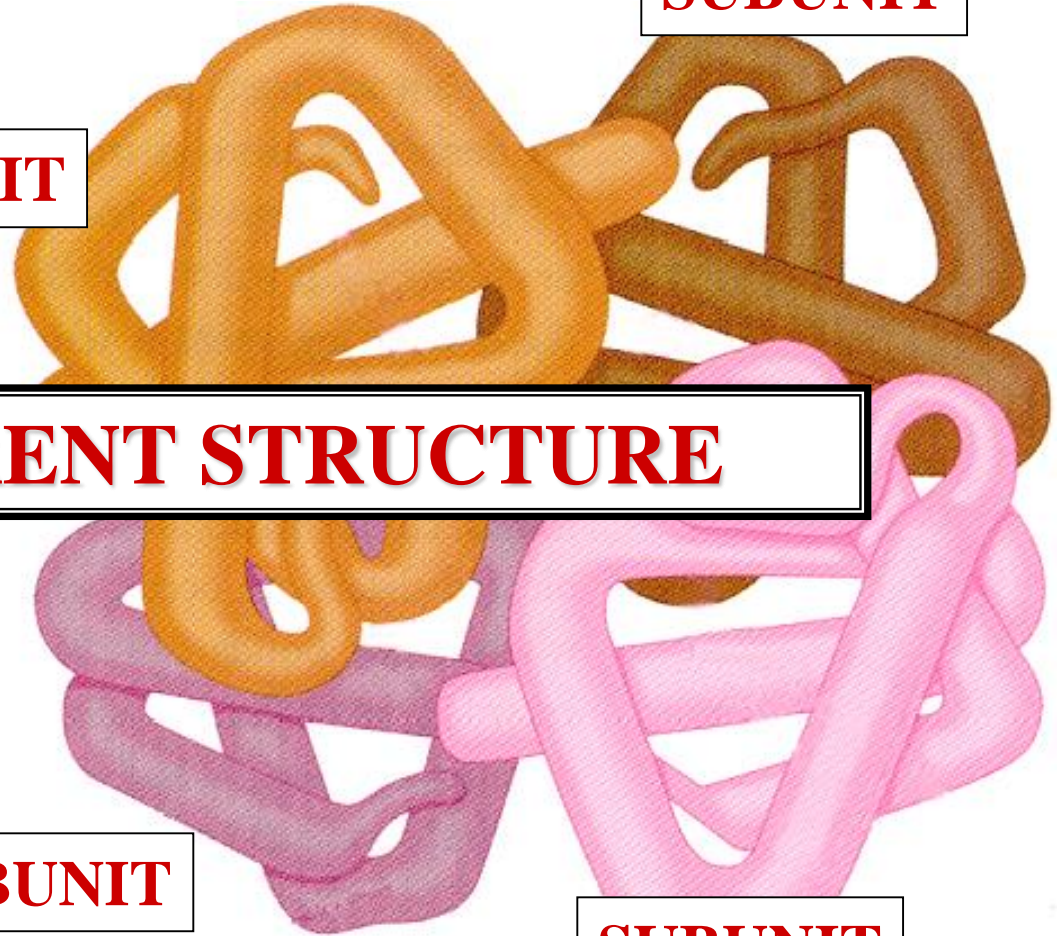
DIFFERENT PROTEINS

COLLAGEN VS HEMOGLOBIN



SUBUNIT

SUBUNIT



SUBUNIT

SUBUNIT

SUBUNIT

DIFFERENT STRUCTURE

COLLAGEN

HEMOGLOBIN

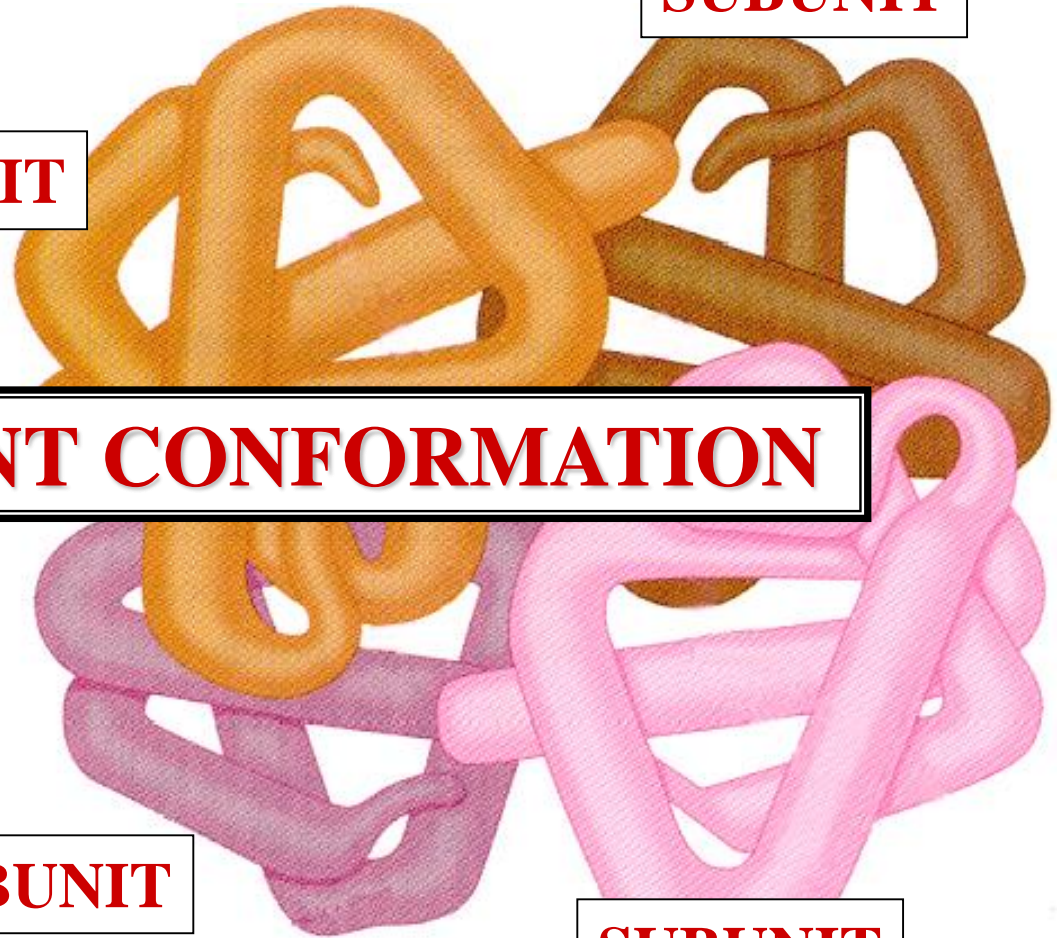
COLLAGEN VS HEMOGLOBIN



SUBUNIT

SUBUNIT

COLLAGEN



SUBUNIT

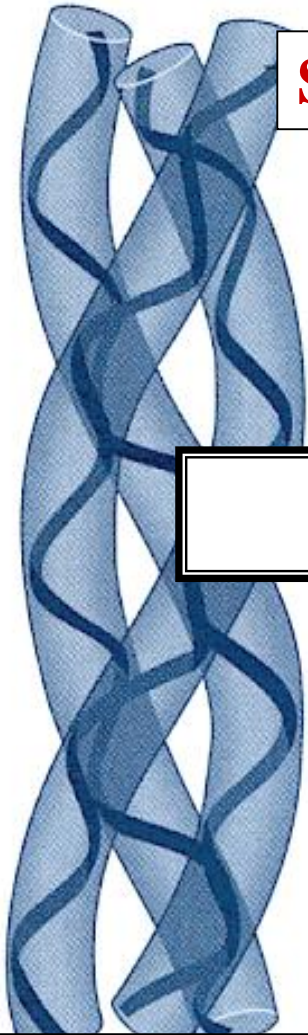
SUBUNIT

SUBUNIT

HEMOGLOBIN

DIFFERENT CONFORMATION

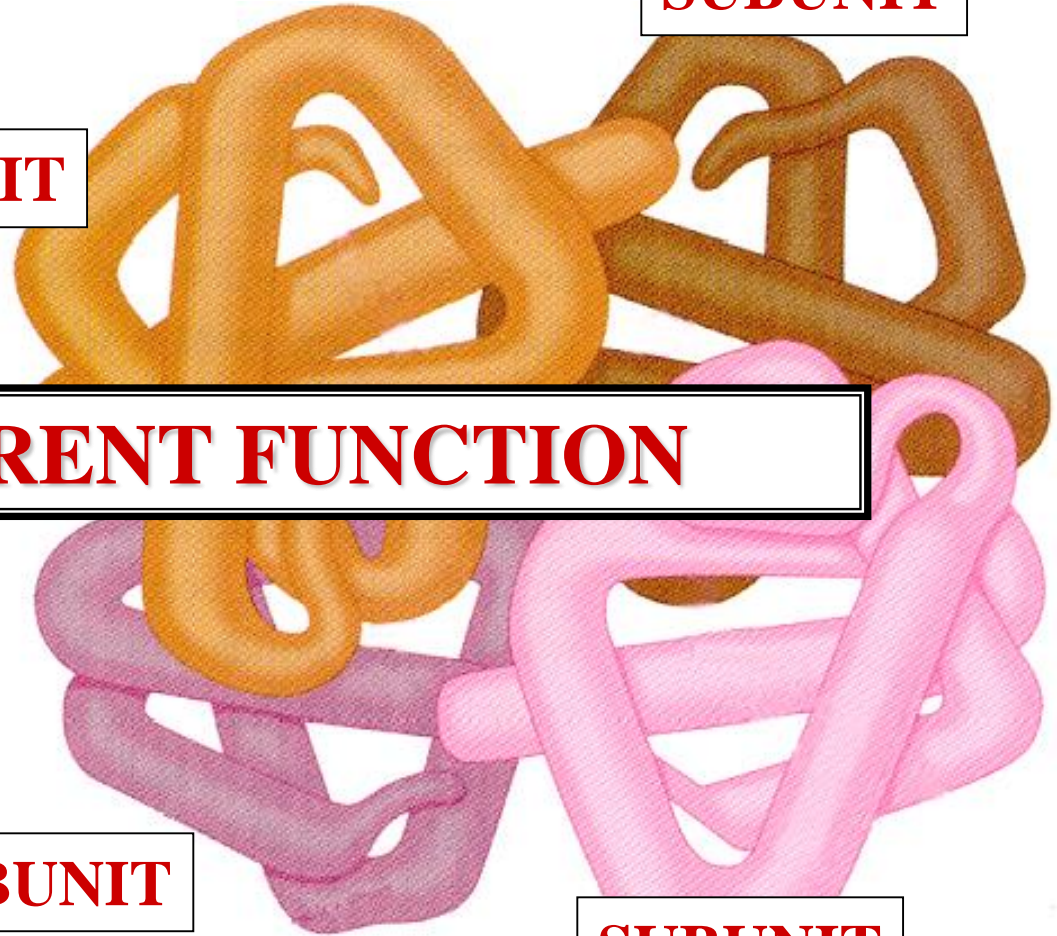
COLLAGEN VS HEMOGLOBIN



SUBUNIT

SUBUNIT

COLLAGEN



SUBUNIT

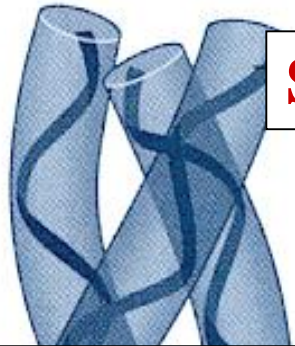
SUBUNIT

SUBUNIT

HEMOGLOBIN

DIFFERENT FUNCTION

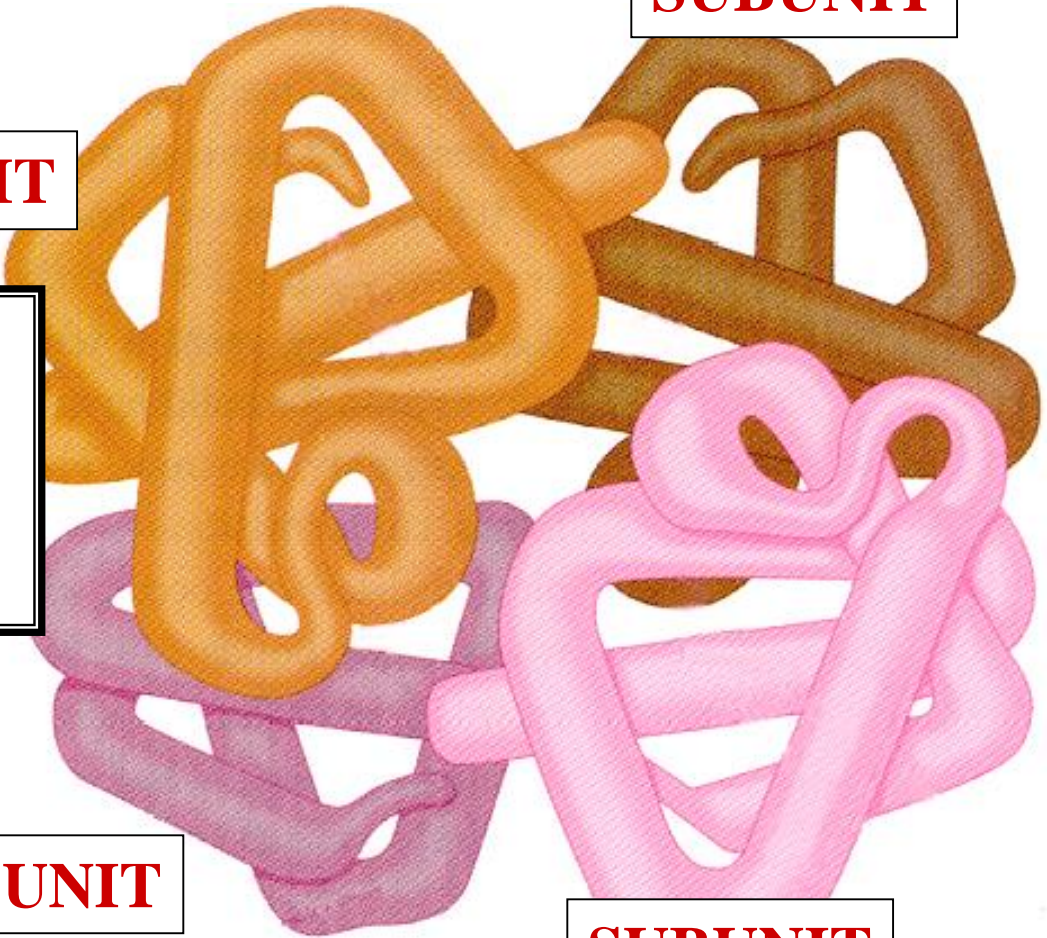
COLLAGEN VS HEMOGLOBIN



SUBUNIT

SUBUNIT

COLLAGEN
STRUCTURAL
FUNCTION



SUBUNIT

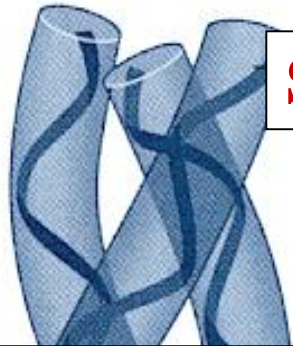
SUBUNIT

SUBUNIT

COLLAGEN

HEMOGLOBIN

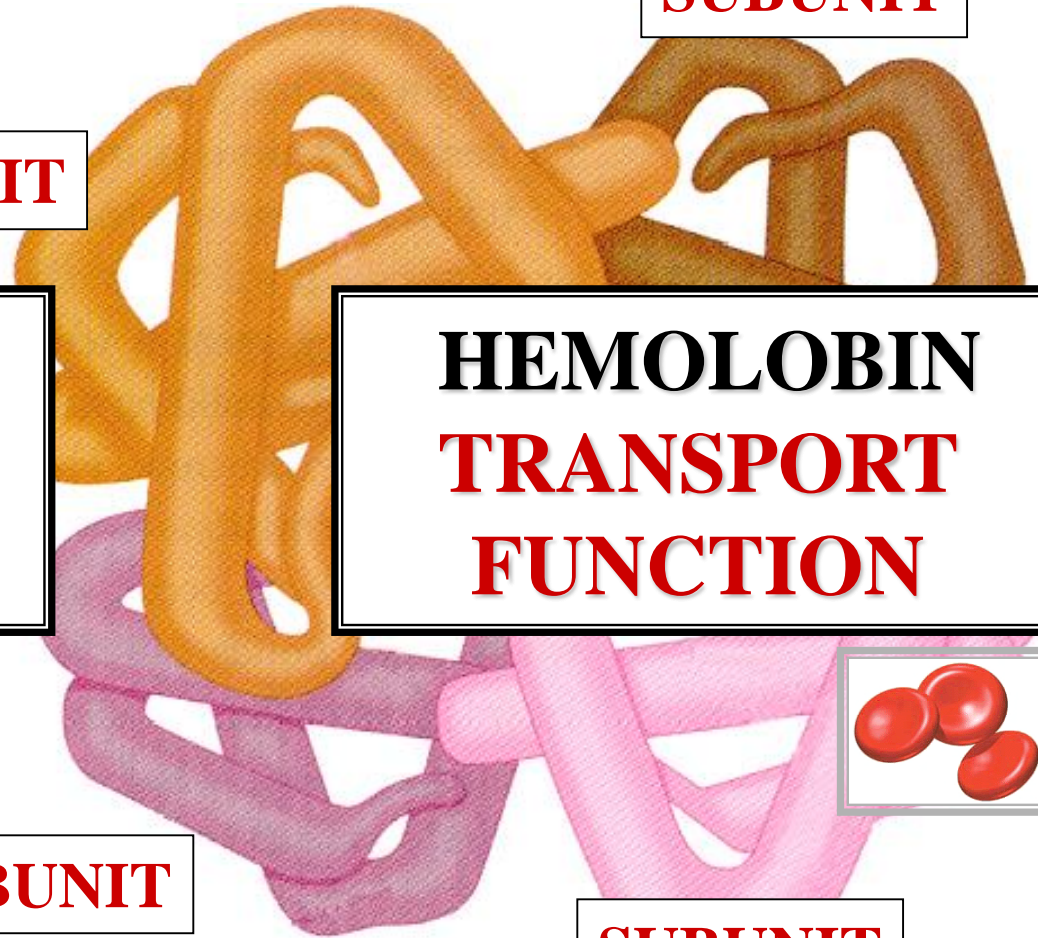
COLLAGEN VS HEMOGLOBIN



SUBUNIT

SUBUNIT

COLLAGEN
STRUCTURAL
FUNCTION



SUBUNIT

HEMOLOBIN
TRANSPORT
FUNCTION



SUBUNIT

SUBUNIT

COLLAGEN

HEMOGLOBIN

PROTEIN
ENZYMATIC
FUNCTION

ENZYMIE



ENZYME

**PROTEIN
BIOCHEMICAL
CATALYST**

ENZYME

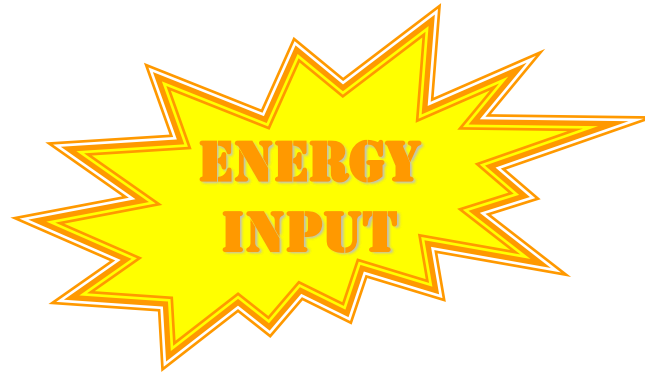
BIOCHEMICAL REACTION



REACTANT(S)

PRODUCT(S)

BIOCHEMICAL REACTION

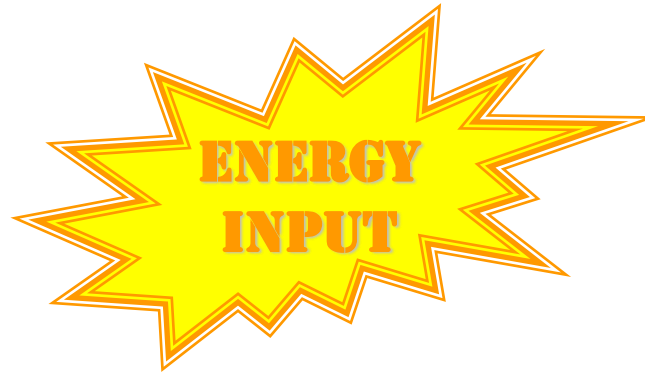


REACTANT(S)

PRODUCT(S)

?

BIOCHEMICAL REACTION

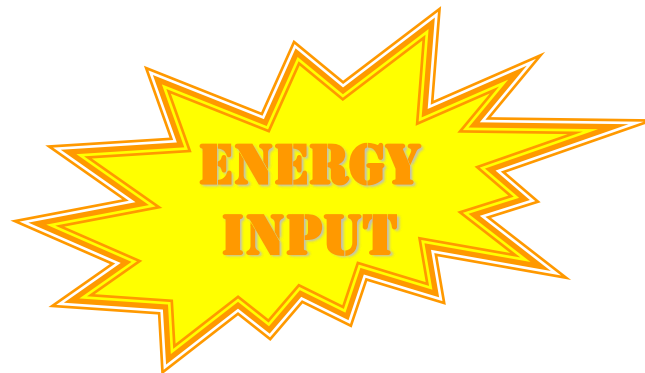


REACTANT(S)

PRODUCT(S)

ACTIVATION ENERGY

BIOCHEMICAL REACTION

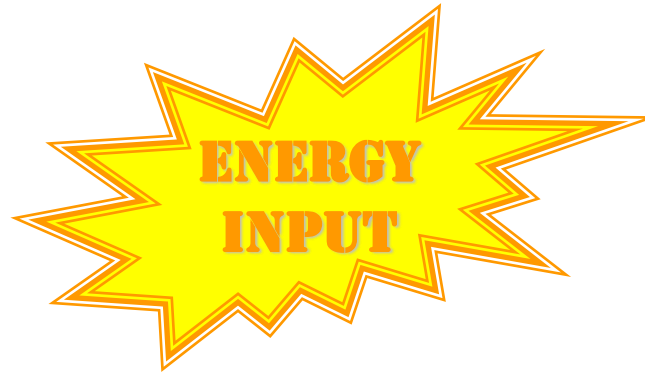


REACTANT(S)

PRODUCT(S)

ACTIVATION ENERGY

BIOCHEMICAL REACTION

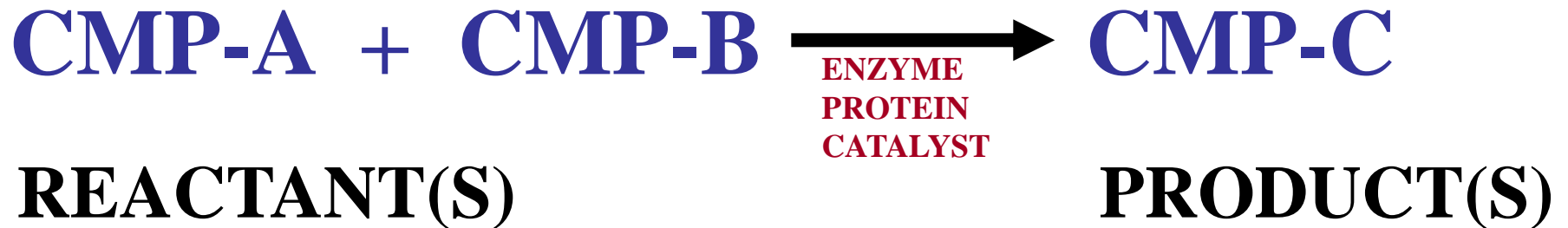
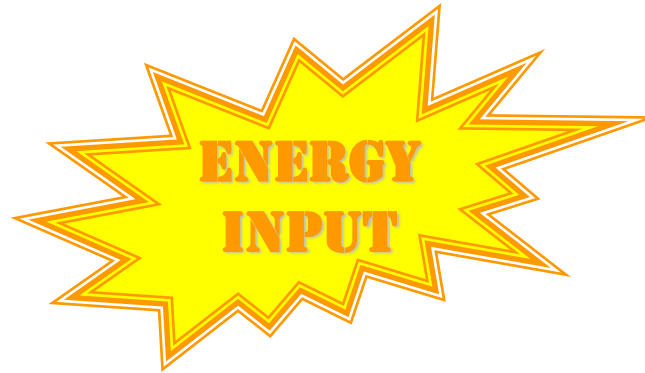


REACTANT(S)

PRODUCT(S)

ACTIVATION ENERGY

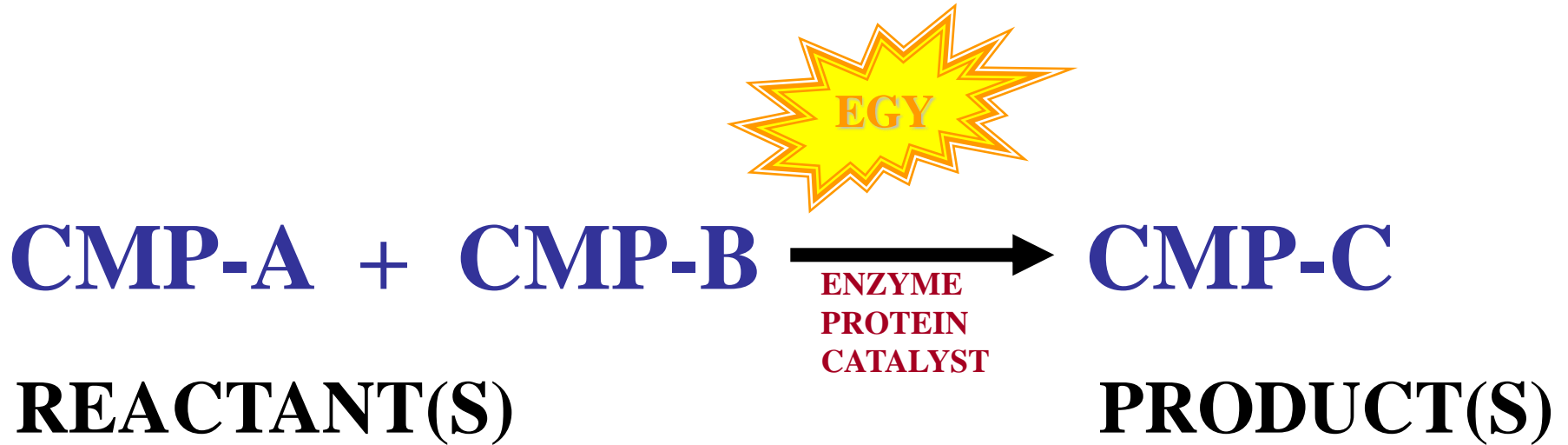
BIOCHEMICAL REACTION



ACTIVATION ENERGY



BIOCHEMICAL REACTION



**ACTIVATION ENERGY
DECREASES**

***ENZYMES
ENSURE
EFFICIENT
METABOLISM***



HOMEOSTASIS



An electron micrograph showing a cross-section of a cell. The image displays various organelles, including a large nucleus with a prominent nucleolus, rough endoplasmic reticulum with ribosomes, and several mitochondria with visible internal folds (cristae). The text is overlaid in a large, bold, red, italicized font. In the top right corner, there is a small thumbnail image and a navigation arrow.

ENZYMES

VITAL

CELL

METABOLISM



ENZYMES



VITAL



TO

LIFE

EARTH

ENZYME DENATURES

ENZYME DENATURES

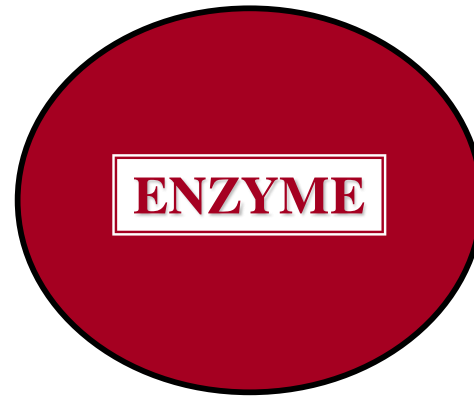


ENZYME DENATURES

**CONFORMATION
CHANGE**

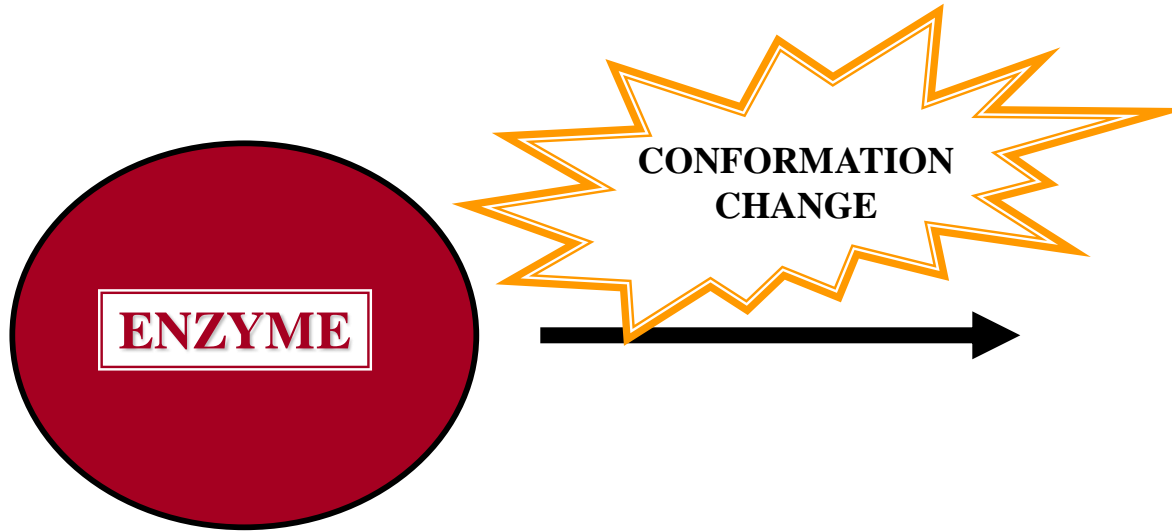
ENZYME DENATURES

ENZYME DENATURES



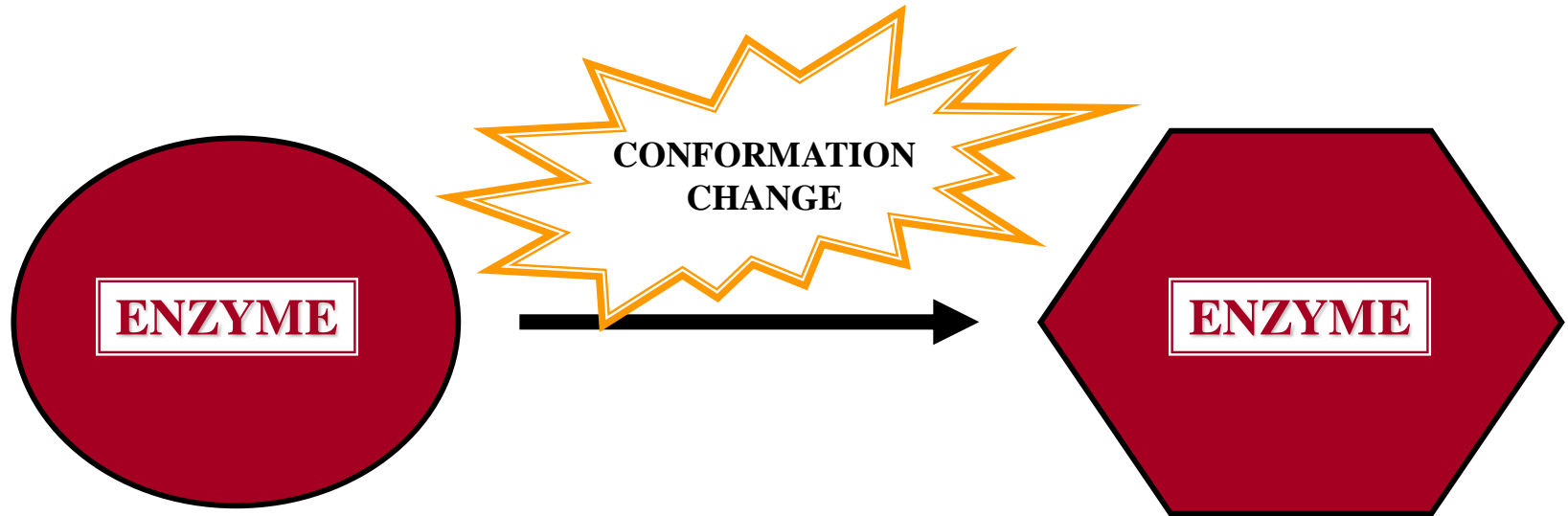


ENZYME DENATURES



**ENZYME
CONFORMATION CHANGE**

ENZYME DENATURES



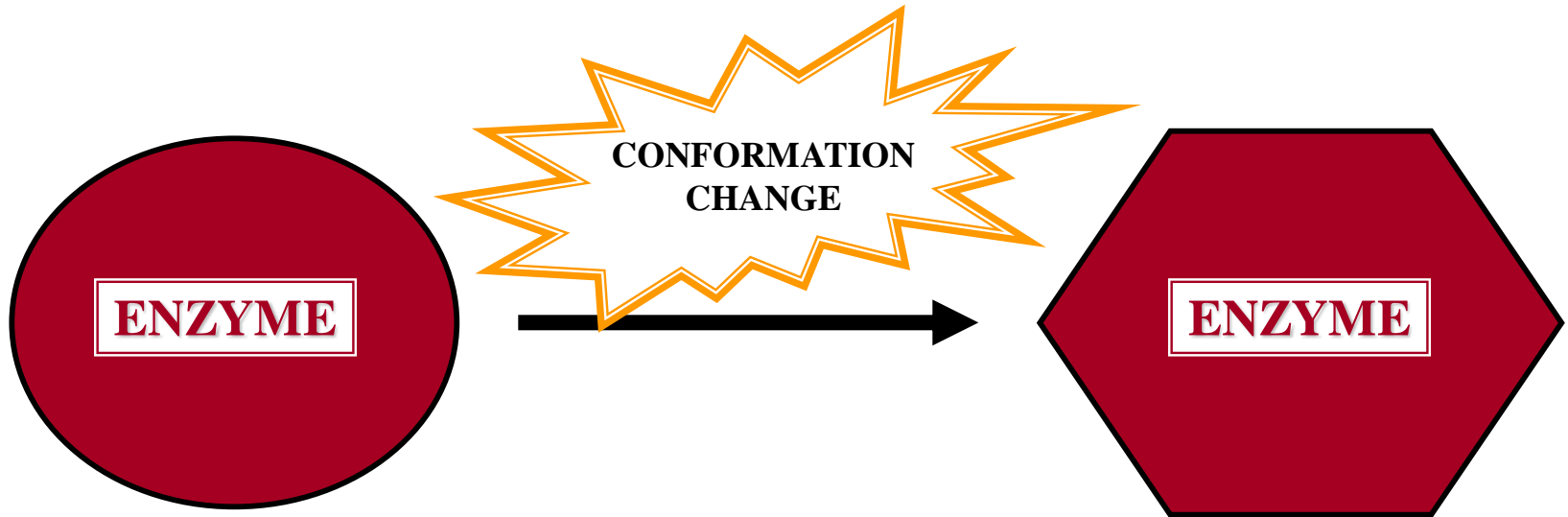
**ENZYME
STRUCTURE CHANGE**

ENZYME DENATURES

ES

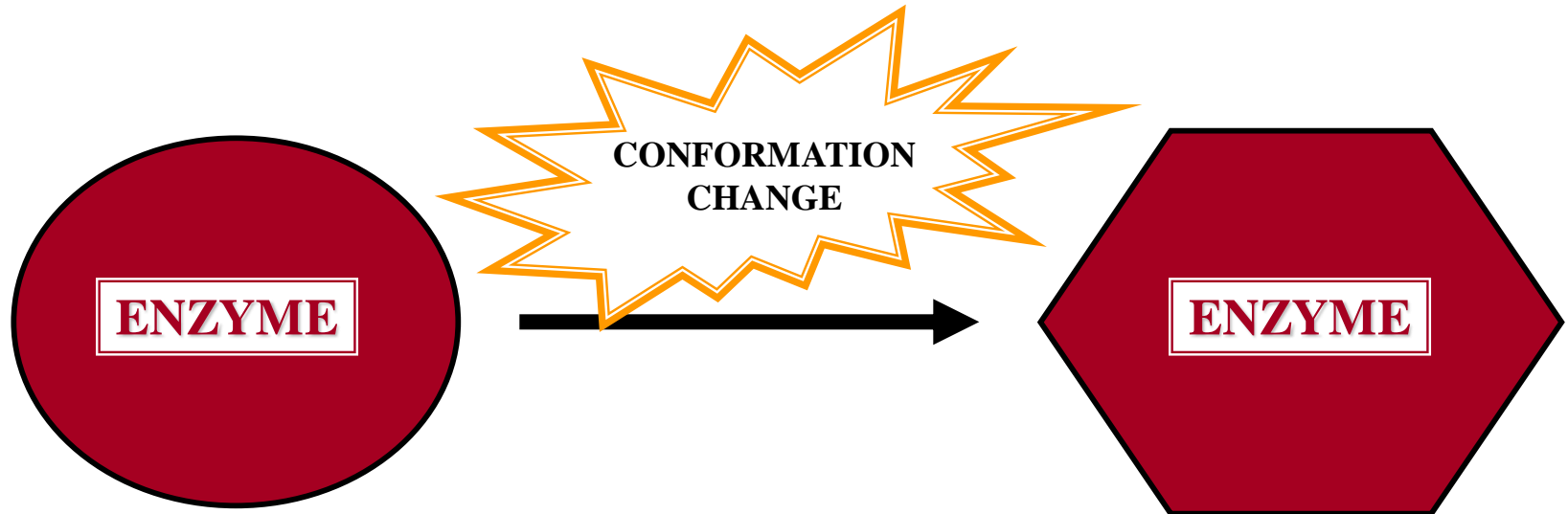
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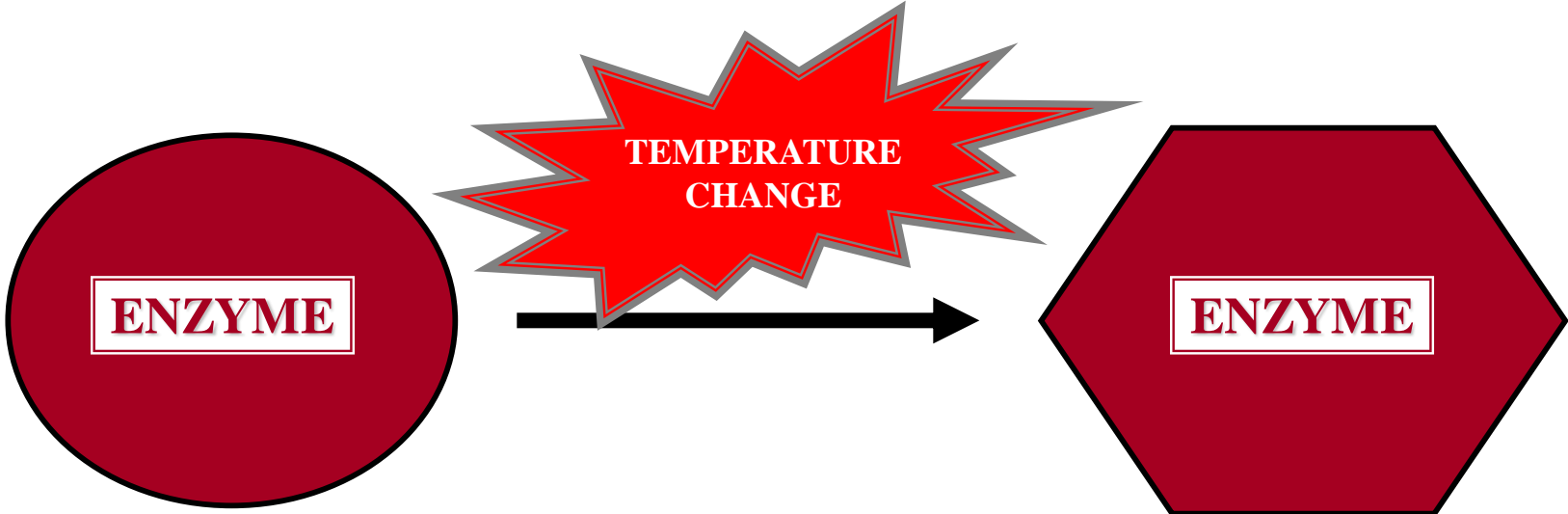
**ENZYME
LOST FUNCTION**

ENZYME DENATURES



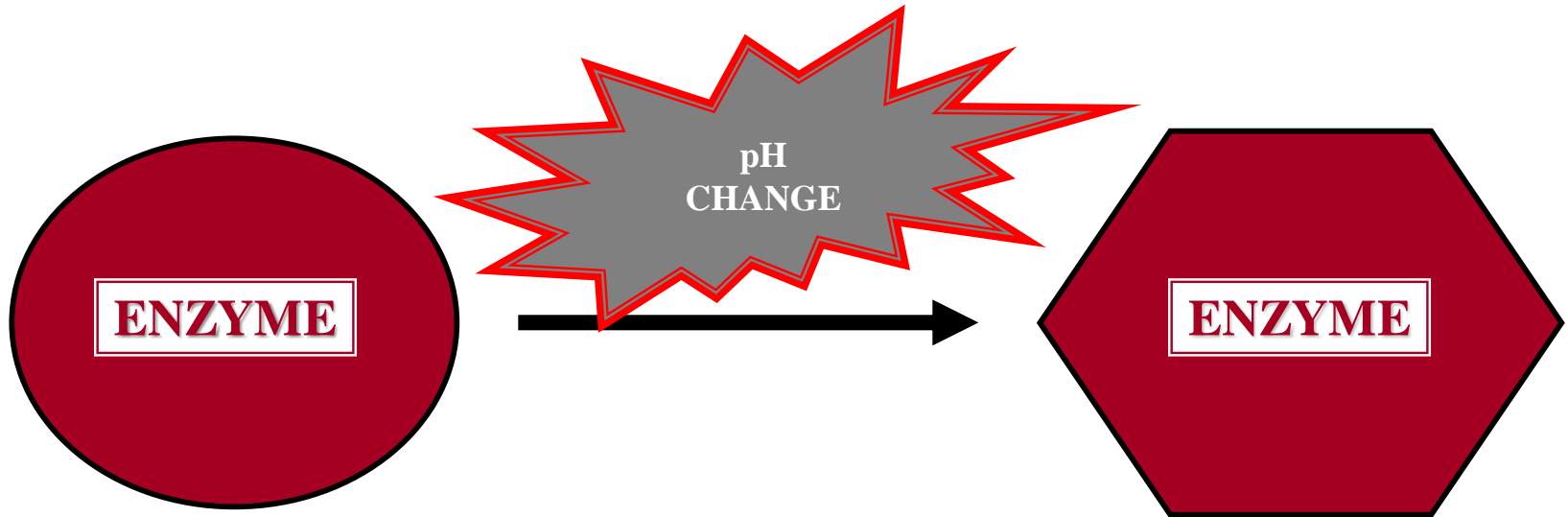
ENZYMES SENSITIVE:

ENZYME DENATURES




**ENZYMES SENSITIVE:
TEMPERATURE CHANGE**

ENZYME DENATURES



ENZYMES SENSITIVE:
pH CHANGE



**ENZYMES
DENATURE
TEMPERATURE
CHANGE**



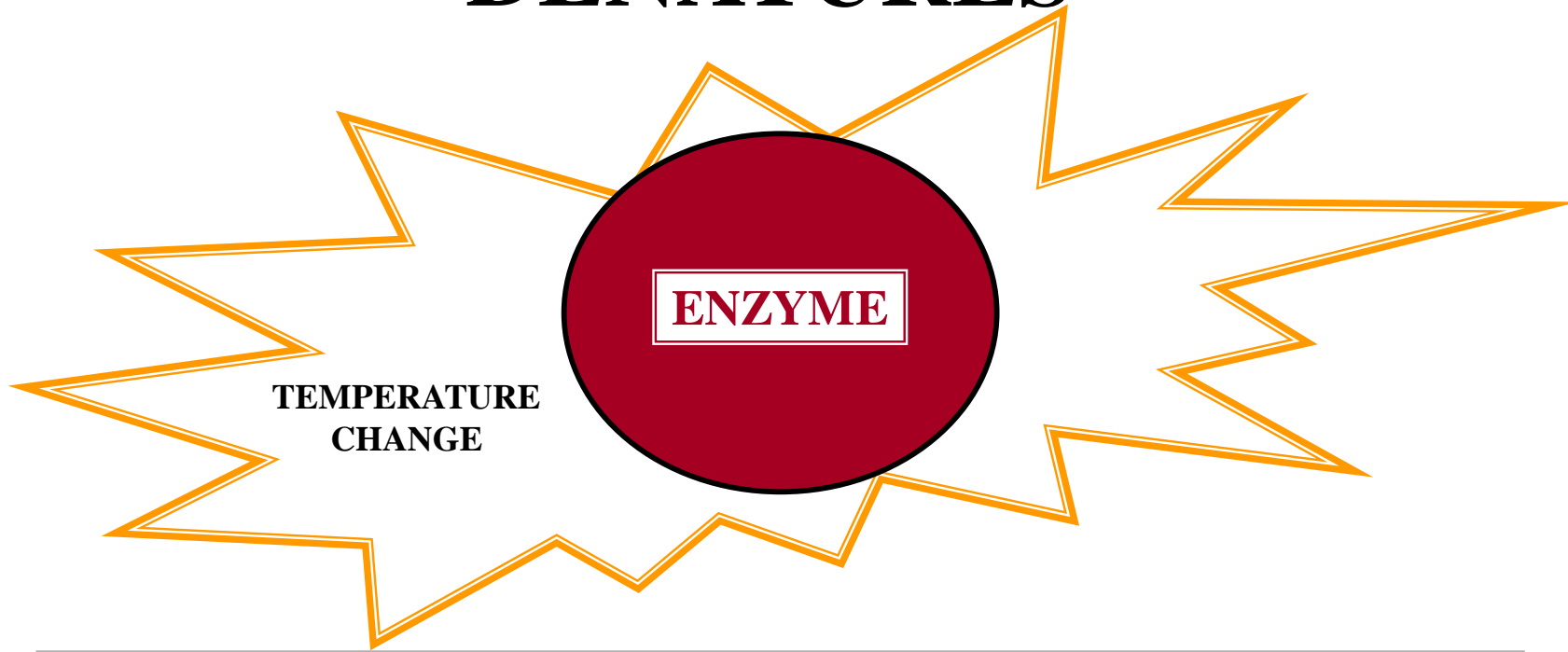
ENZYME DENATURES



ENZYMES
NARROW **TEMPERATURE**
TOLERANCE

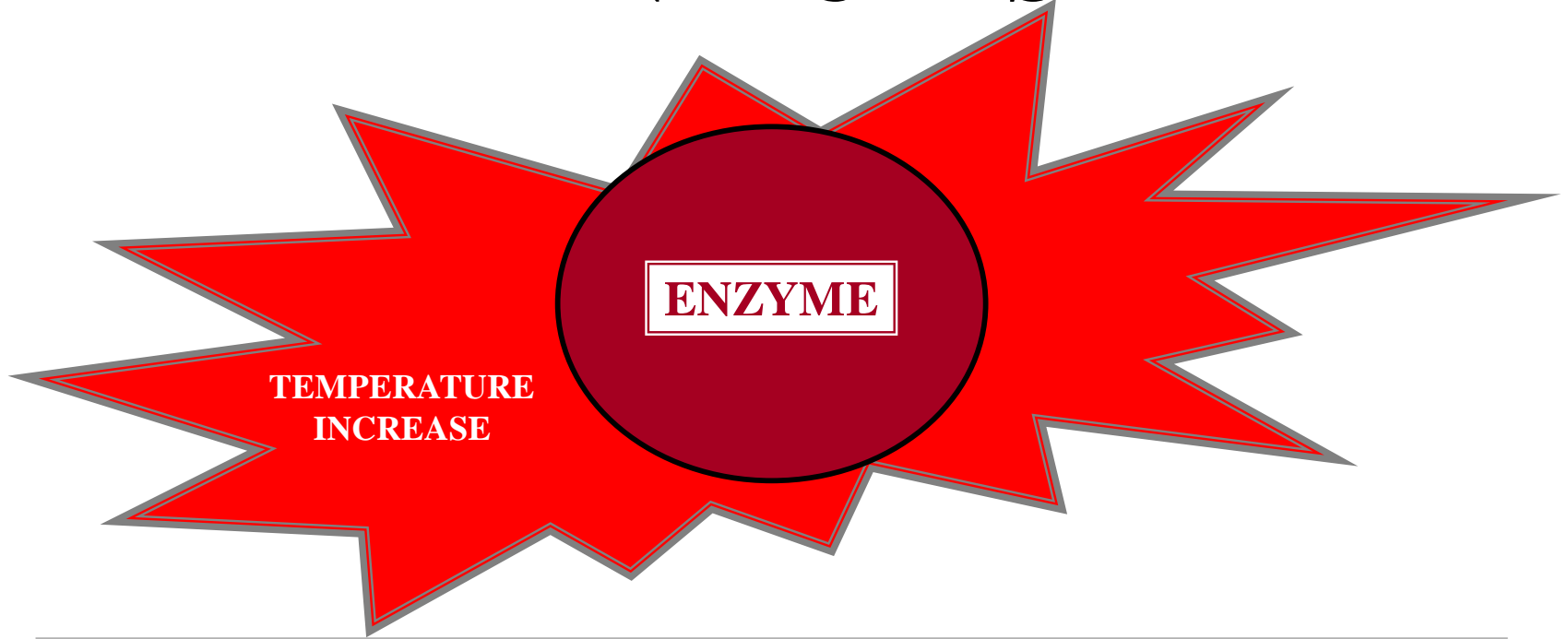


ENZYME DENATURES



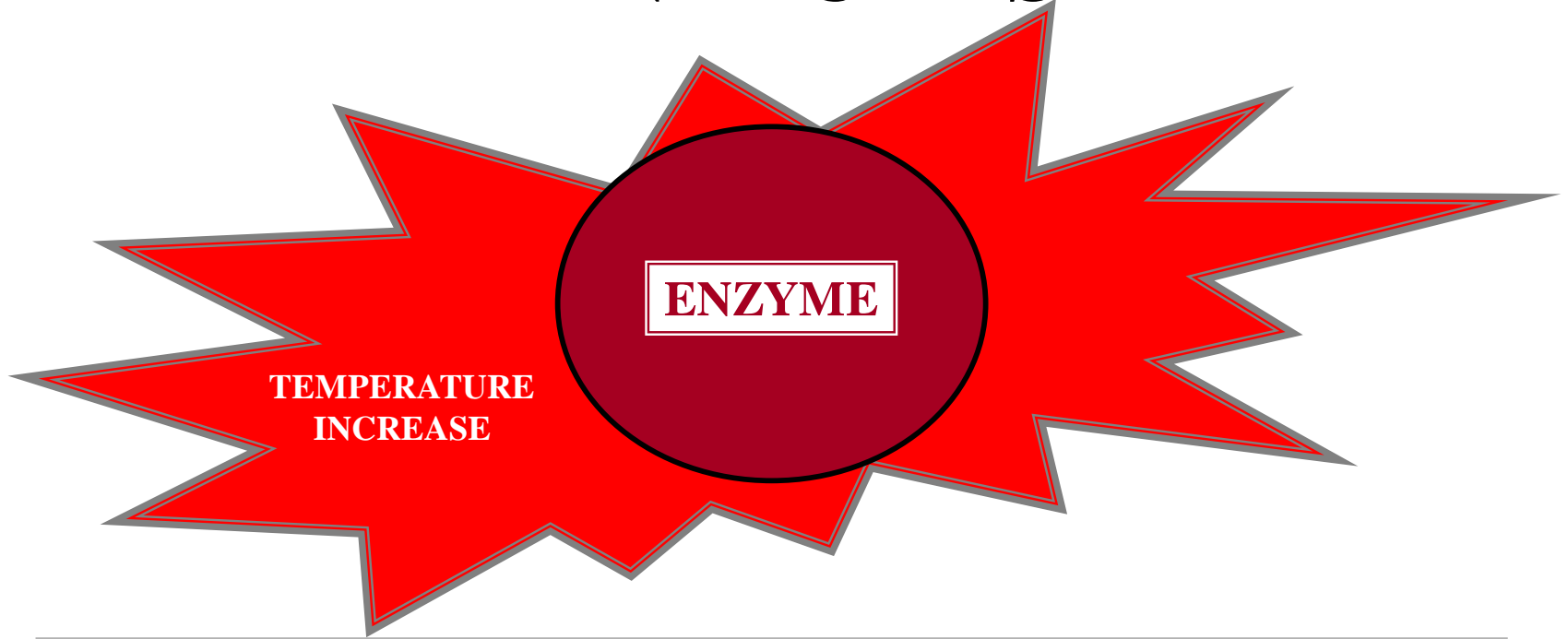
ENZYMES
NARROW TEMPERATURE
TOLERANCE

ENZYME DENATURES



ENZYMES
NARROW TEMPERATURE
TOLERANCE

ENZYME DENATURES



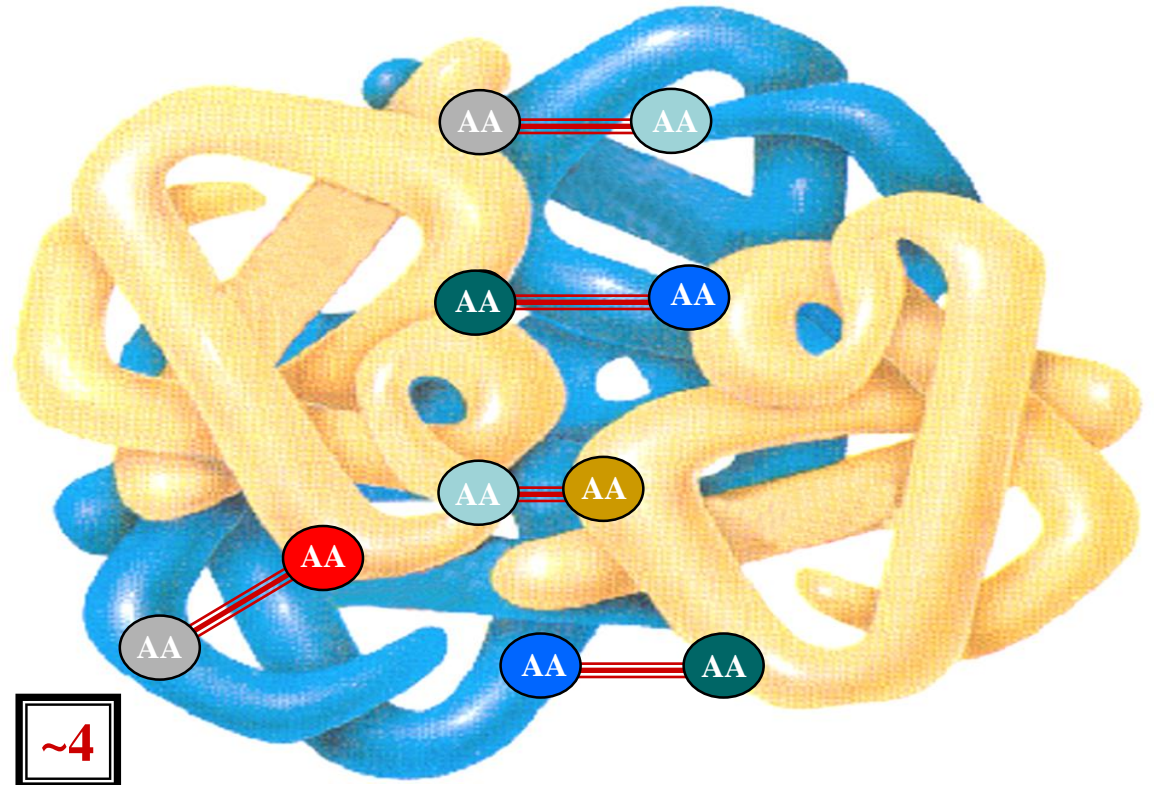
ENZYME
INCREASES
MOLECULAR MOVEMENT



TEMPERATURE INCREASE INCREASES ENZYME MOLECULAR MOVEMENT

H-BONDS

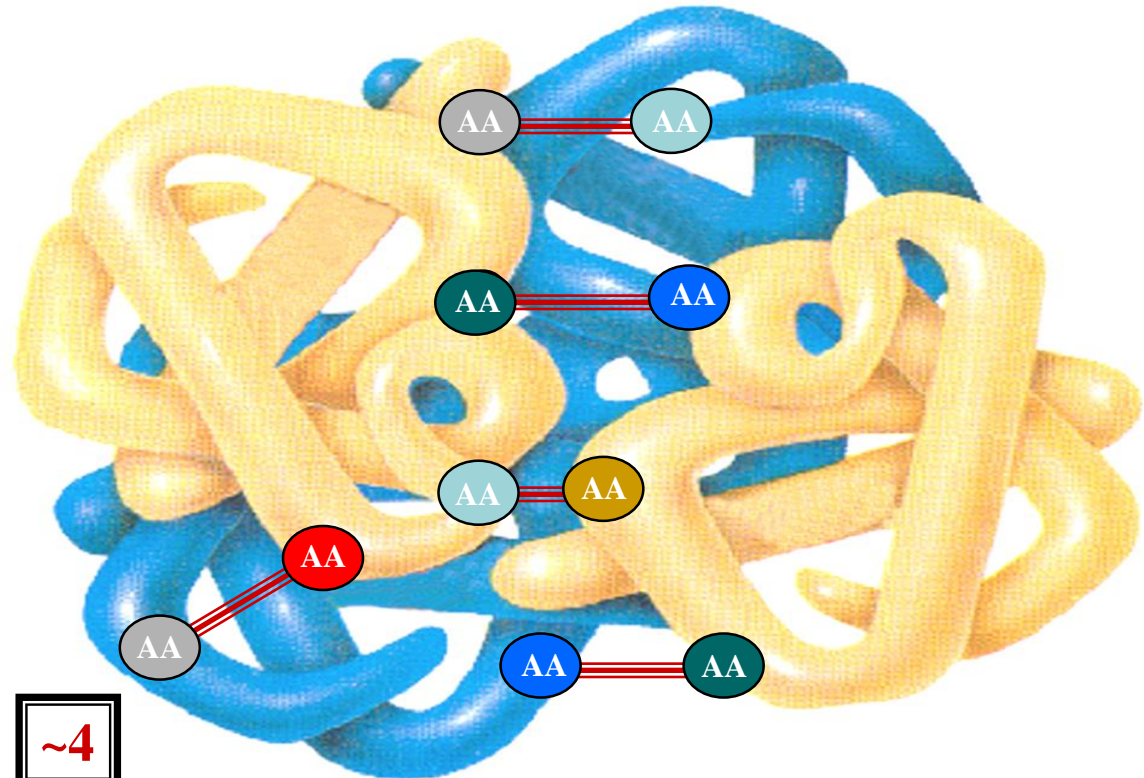
ENZYME



==== = H-BOND

TEMPERATURE INCREASE INCREASES ENZYME MOLECULAR MOVEMENT

H-BONDS
WEAK BONDS
ENZYME

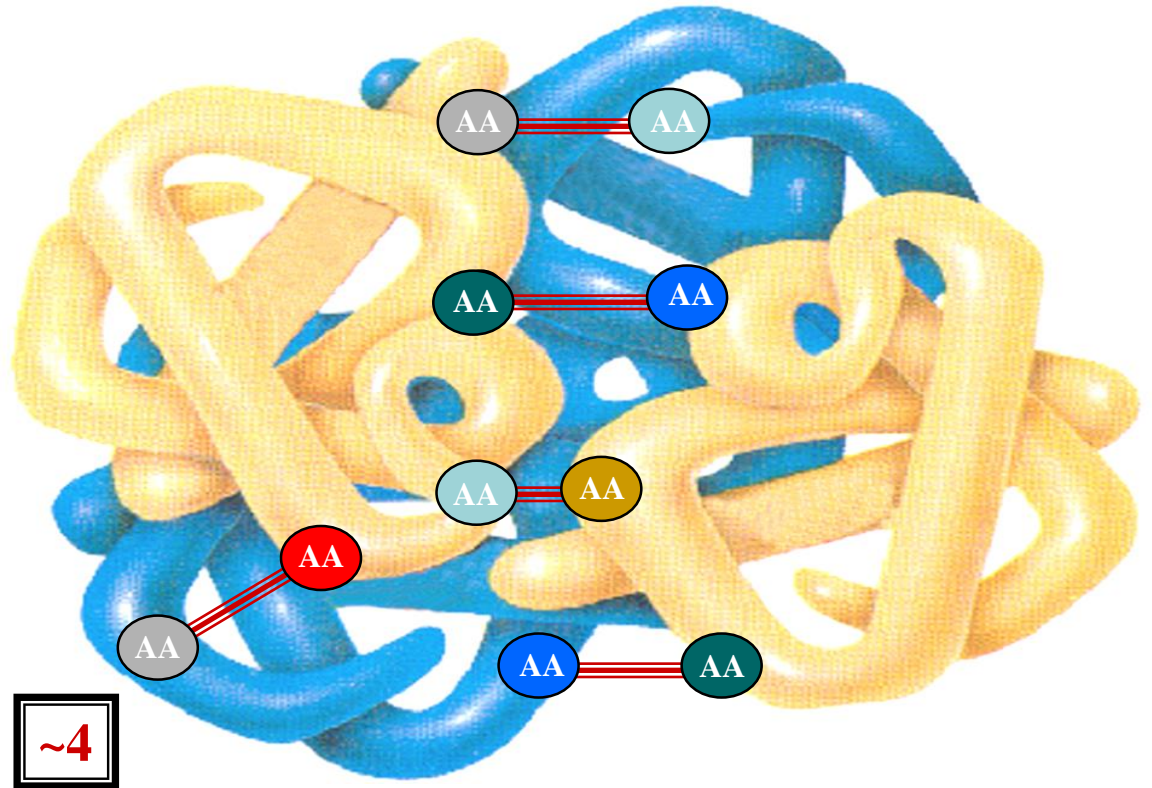


==== = H-BOND

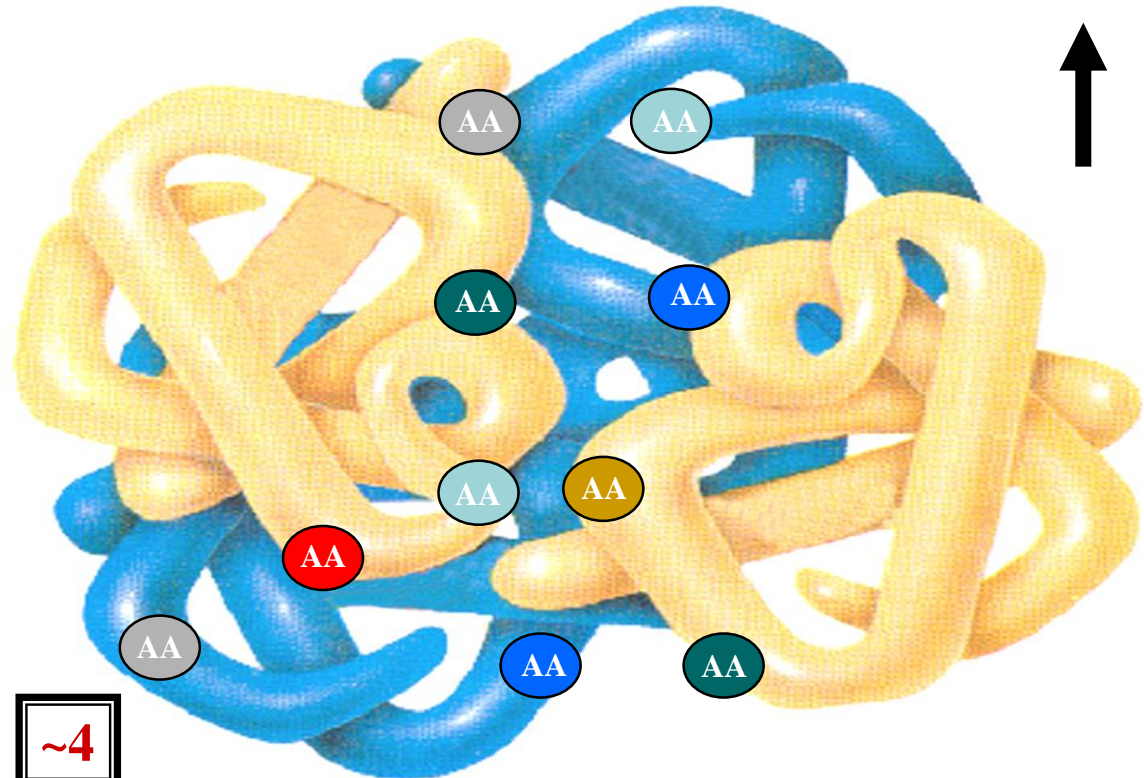
TEMPERATURE INCREASE INCREASES ENZYME MOLECULAR MOVEMENT

H-BONDS
BREAK-DOWN
ENZYME

==== = H-BOND

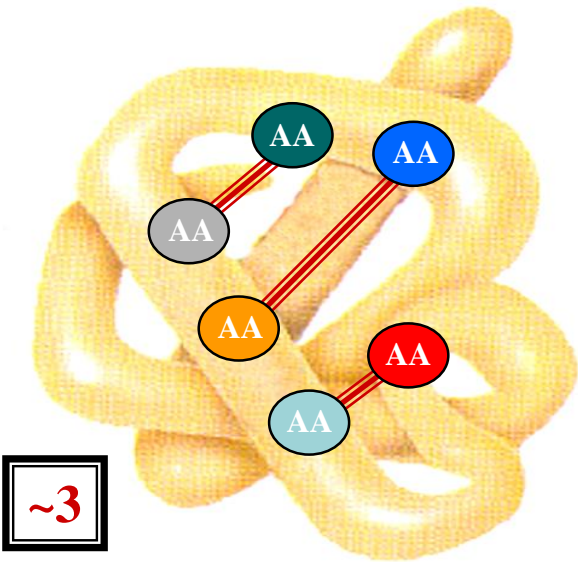


TEMPERATURE INCREASE INCREASES ENZYME MOLECULAR MOVEMENT

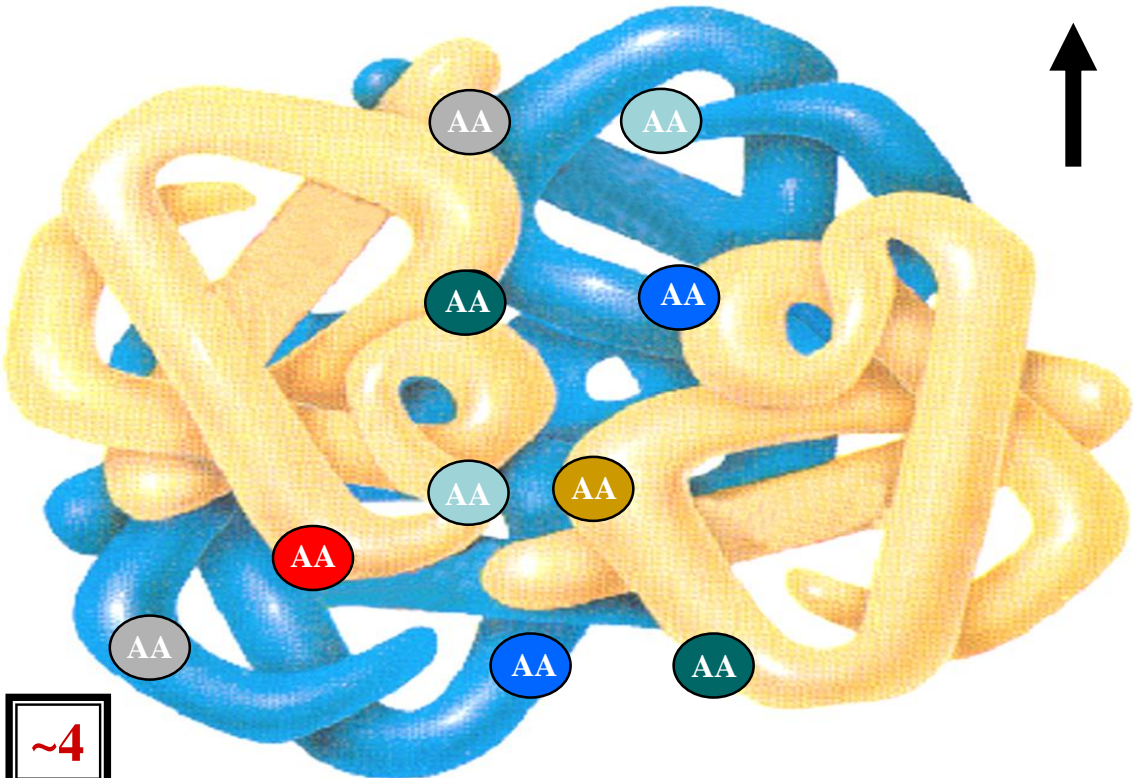


H-BONDS
BREAK-DOWN
ENZYME

==== = H-BOND



~3



H-BONDS

ENZYME

==== = H-BOND

~4