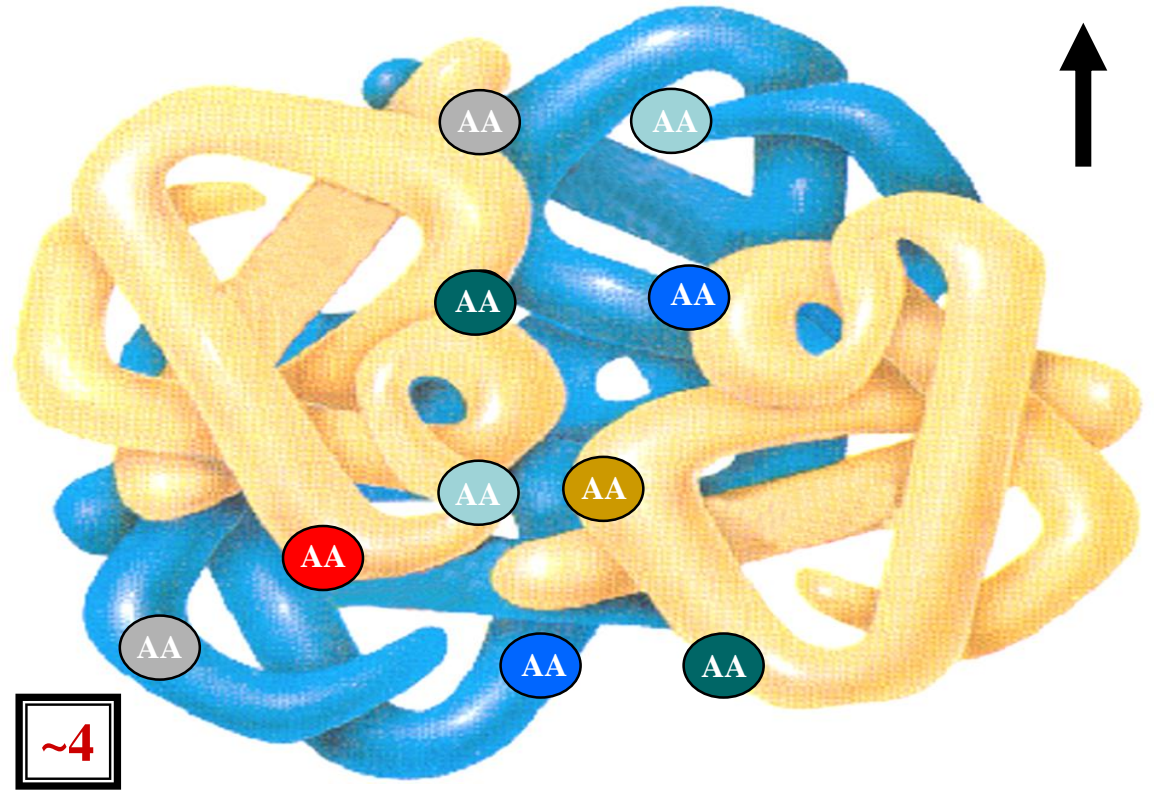
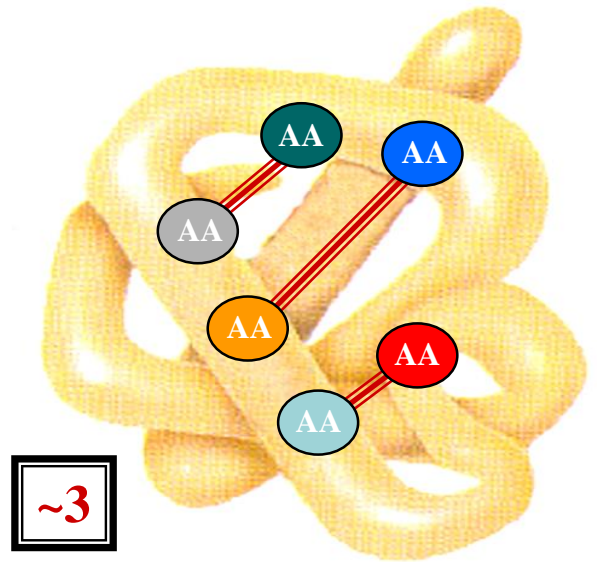


BD

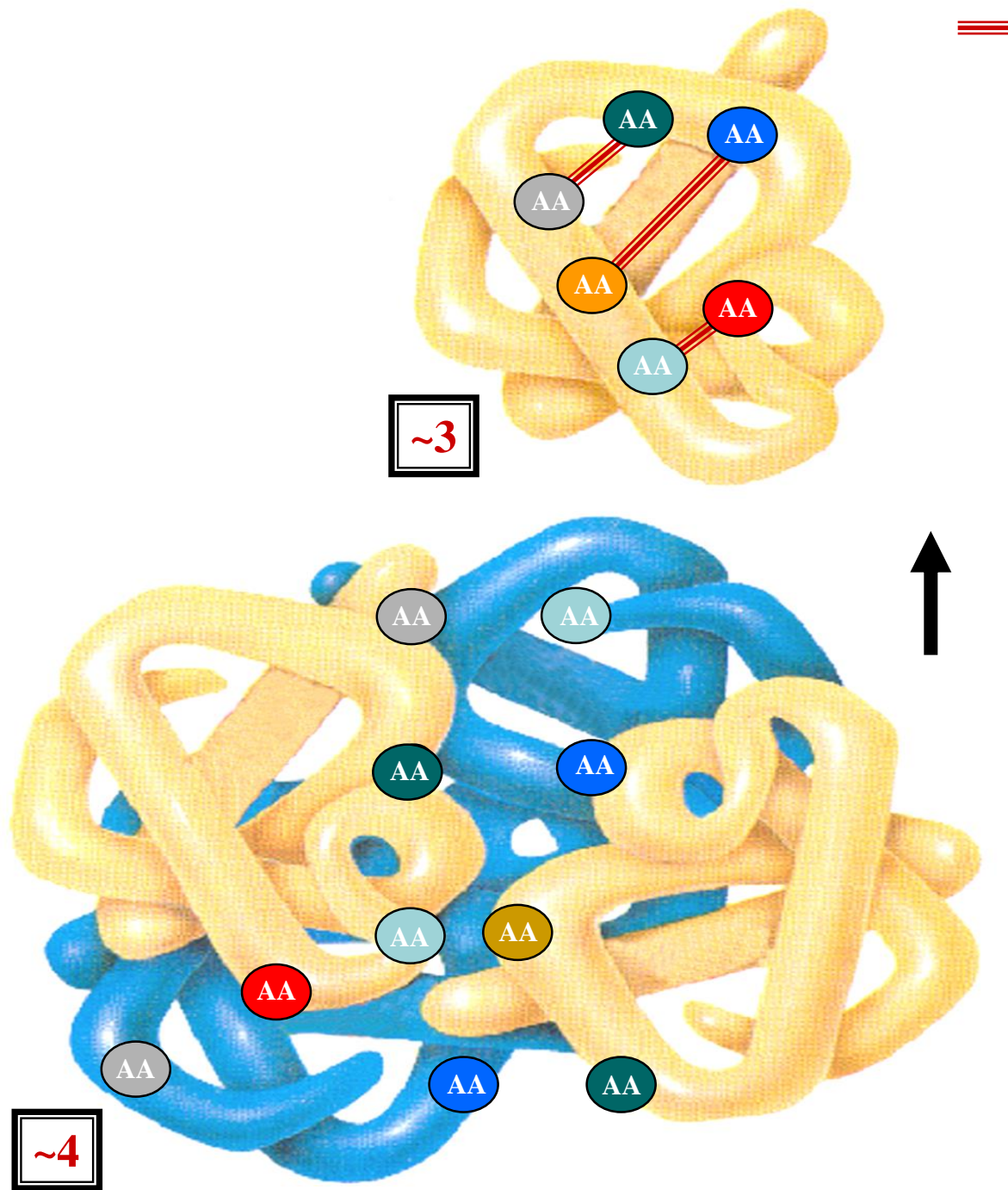


H-BONDS
WEAK BONDS
ENZYME

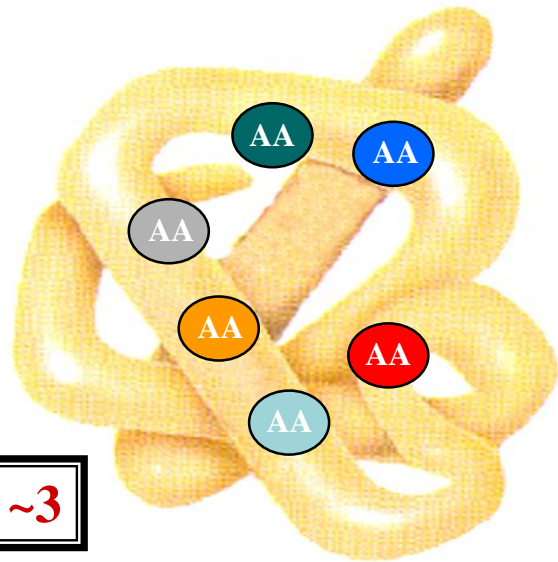
==== = H-BOND

H-BONDS BREAK-DOWN ENZYME

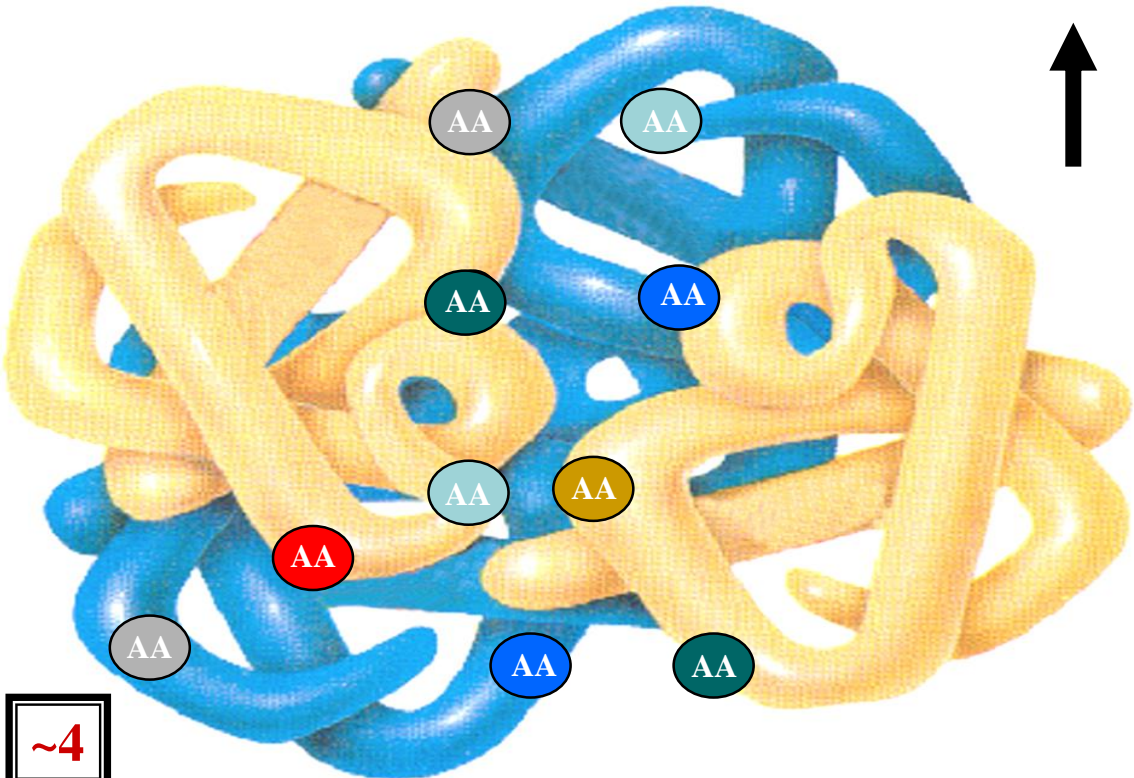
==== = H-BOND



~2



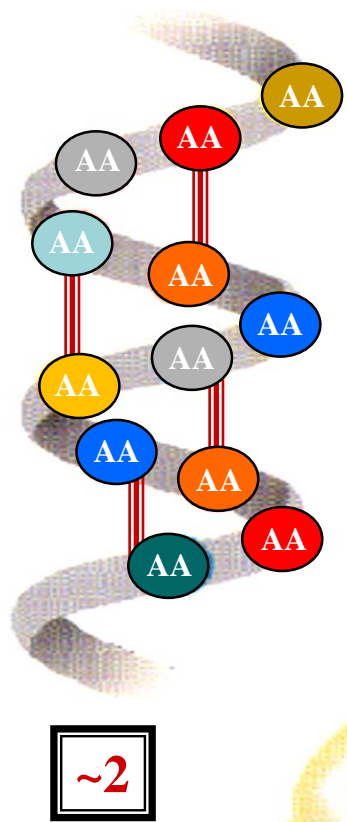
~3



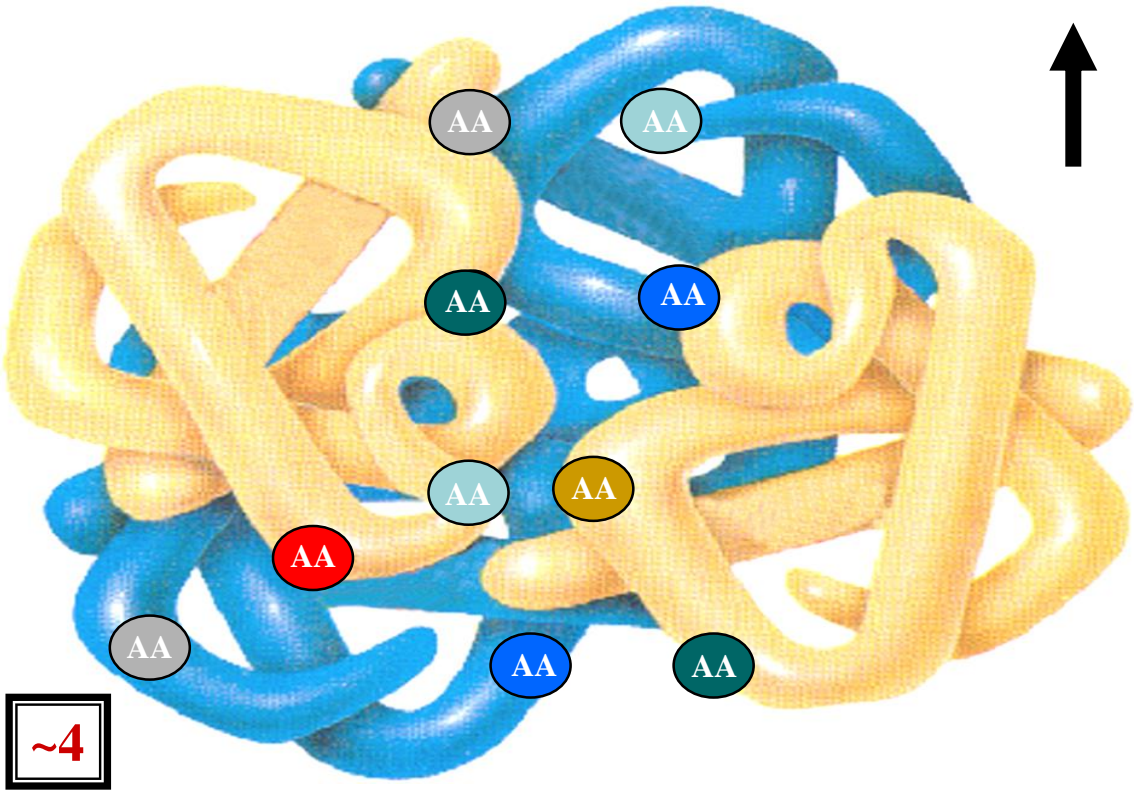
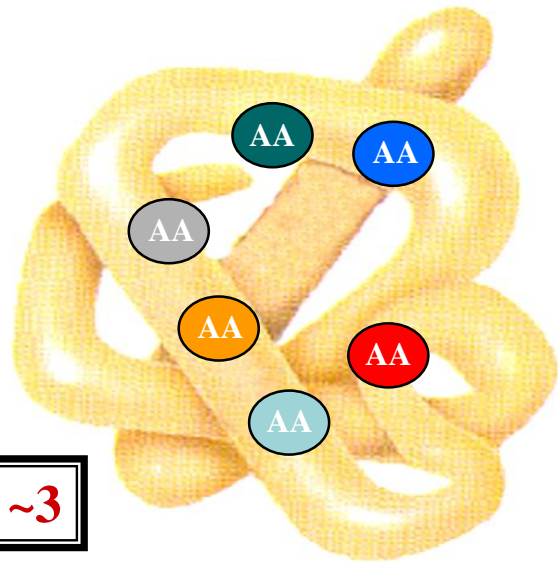
~4

H-BONDS
BREAK-DOWN
ENZYME

==== = H-BOND



~3

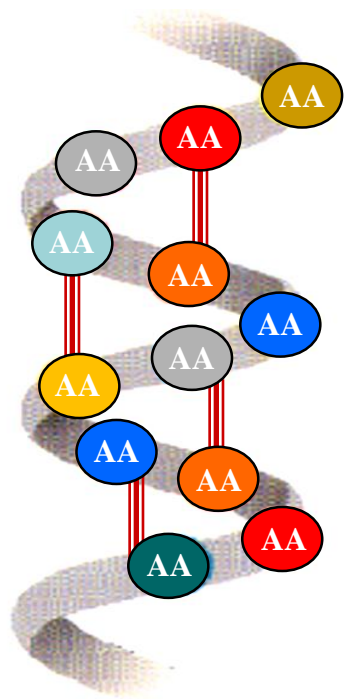


H-BONDS

ENZYME

==== = H-BOND

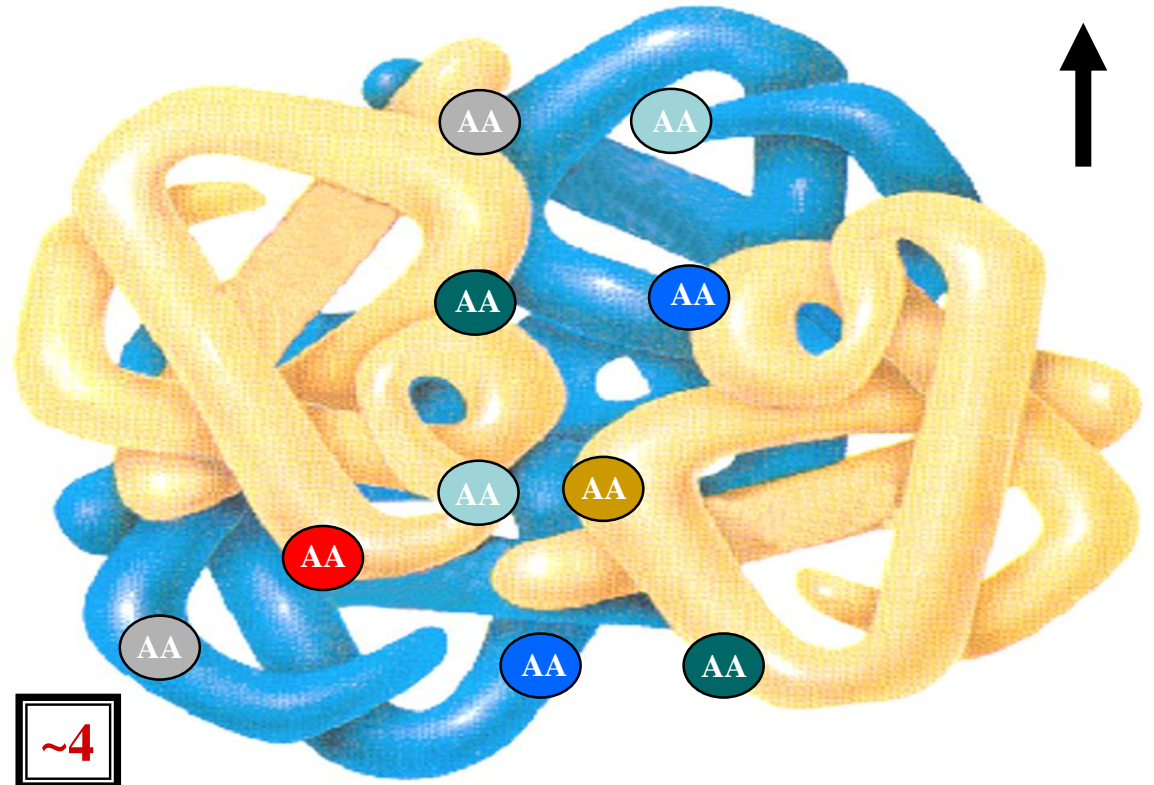
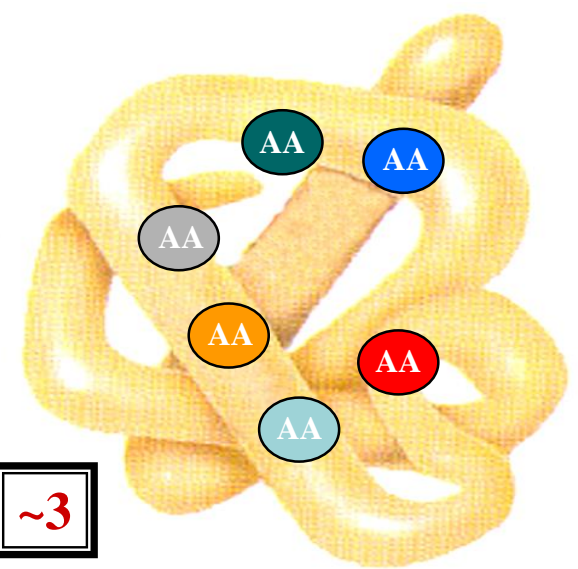
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~2



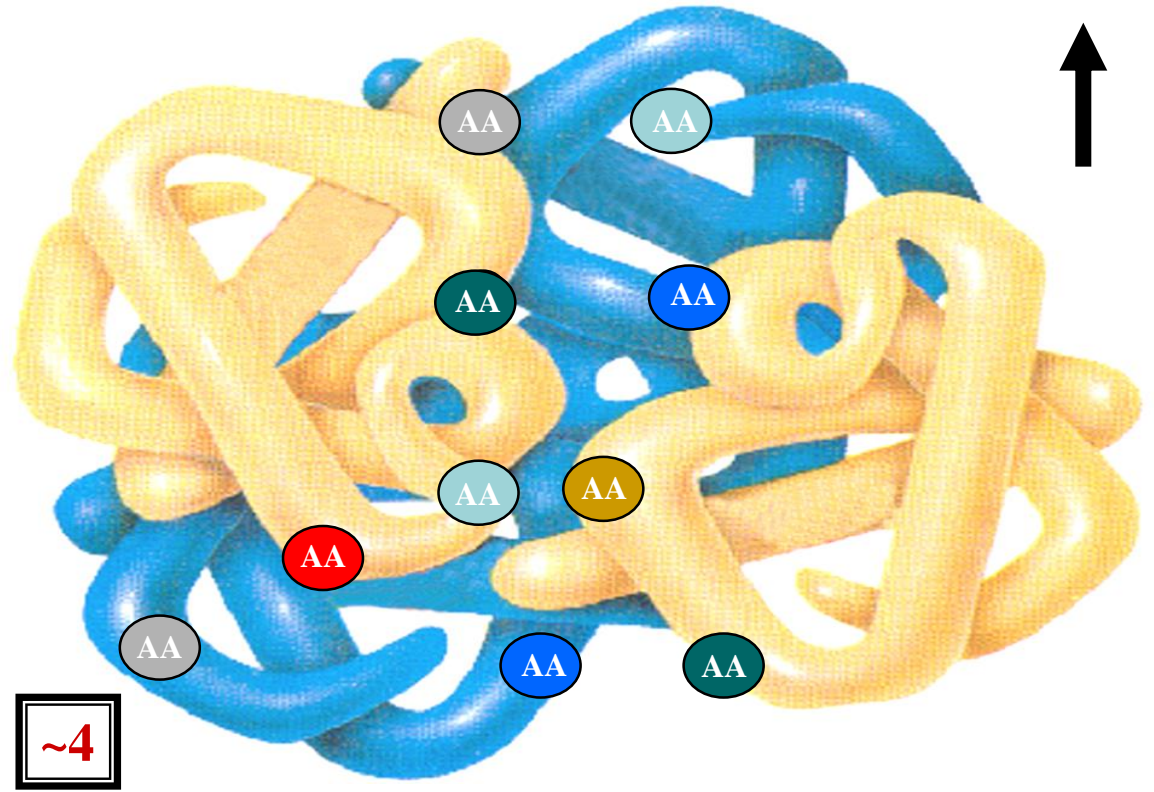
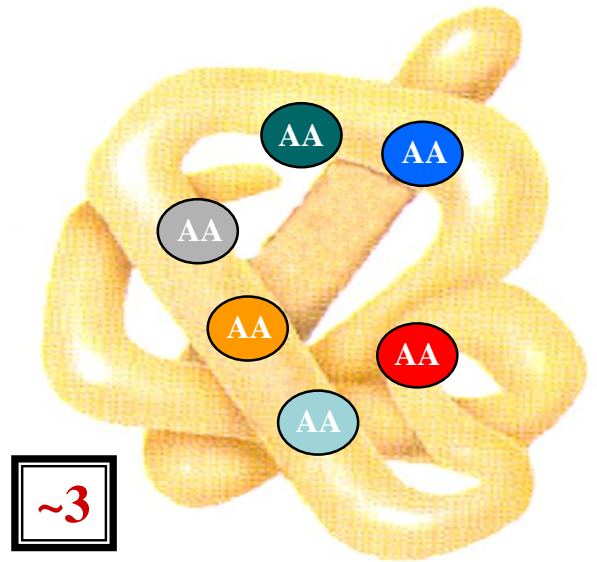
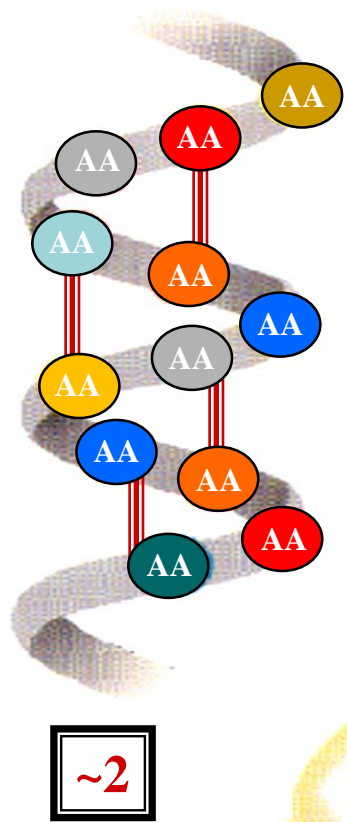
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~4

H-BONDS
WEAK BONDS
ENZYME

==== = H-BOND

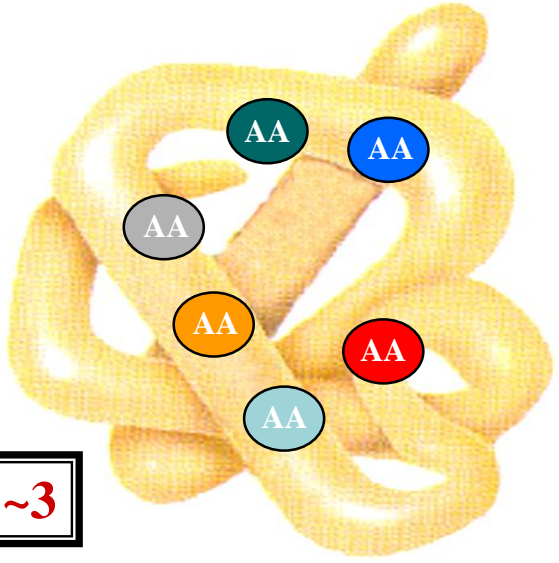


**H-BONDS
BREAK-DOWN
ENZYME**

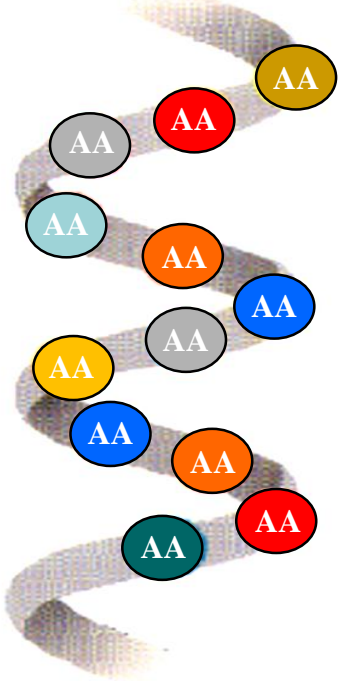
==== = H-BOND

~4

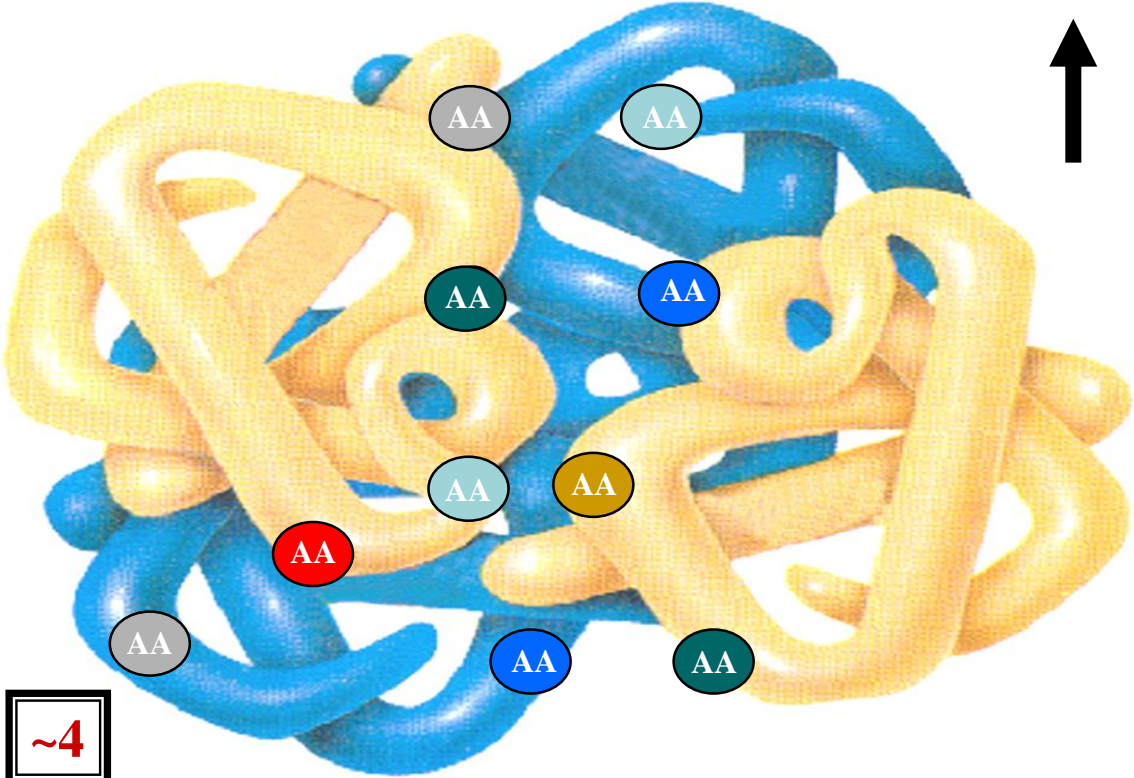
~1



~3



~2

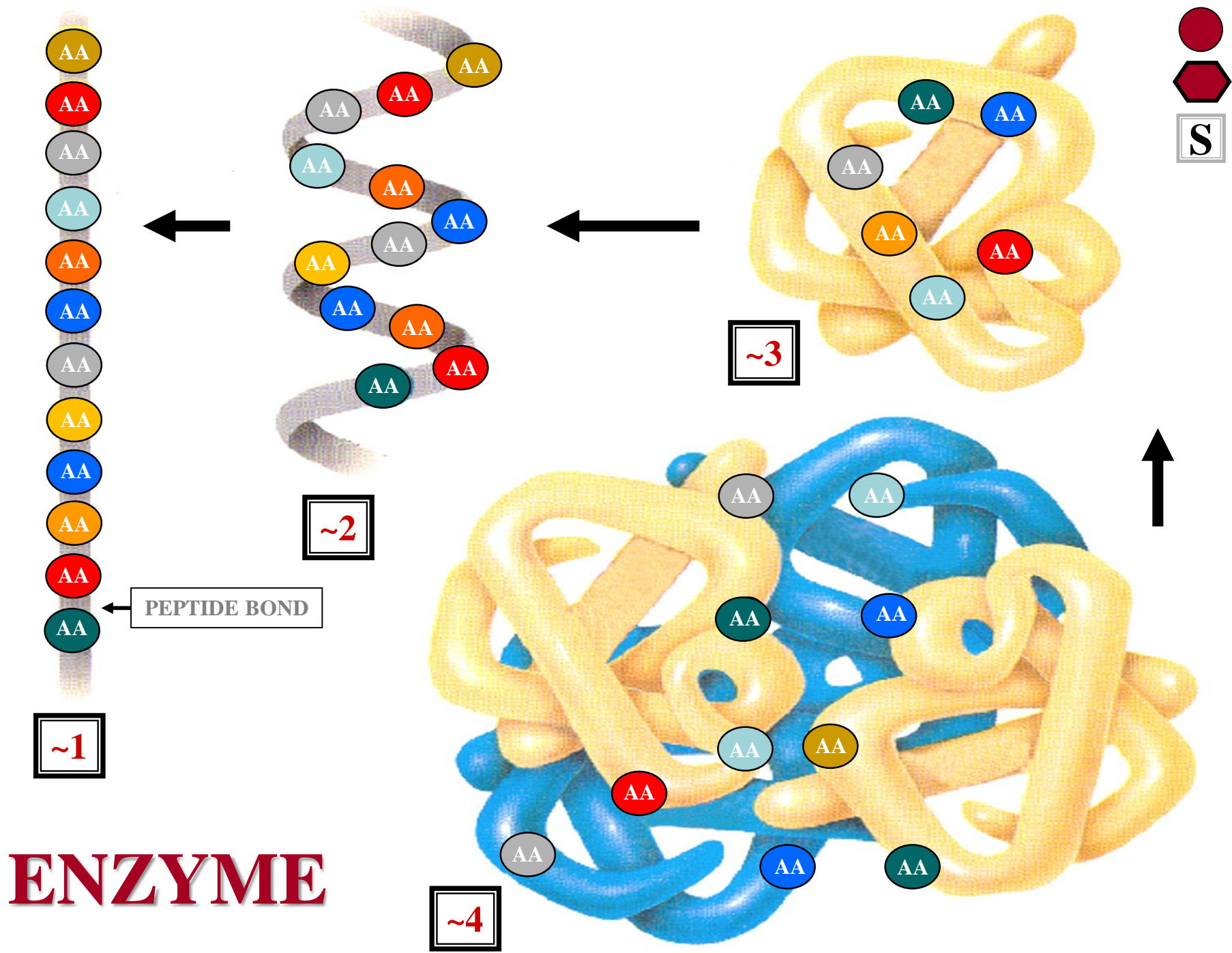


~4

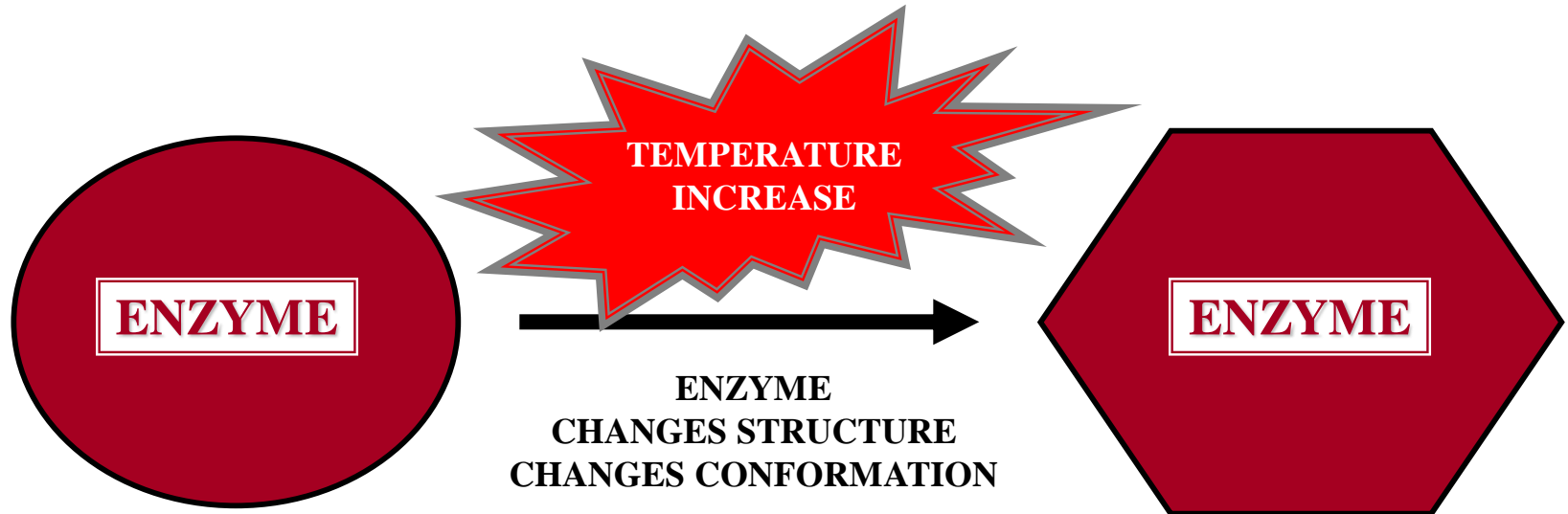
H-BONDS
BREAK-DOWN
ENZYME

==== = H-BOND





ENZYME DENATURES

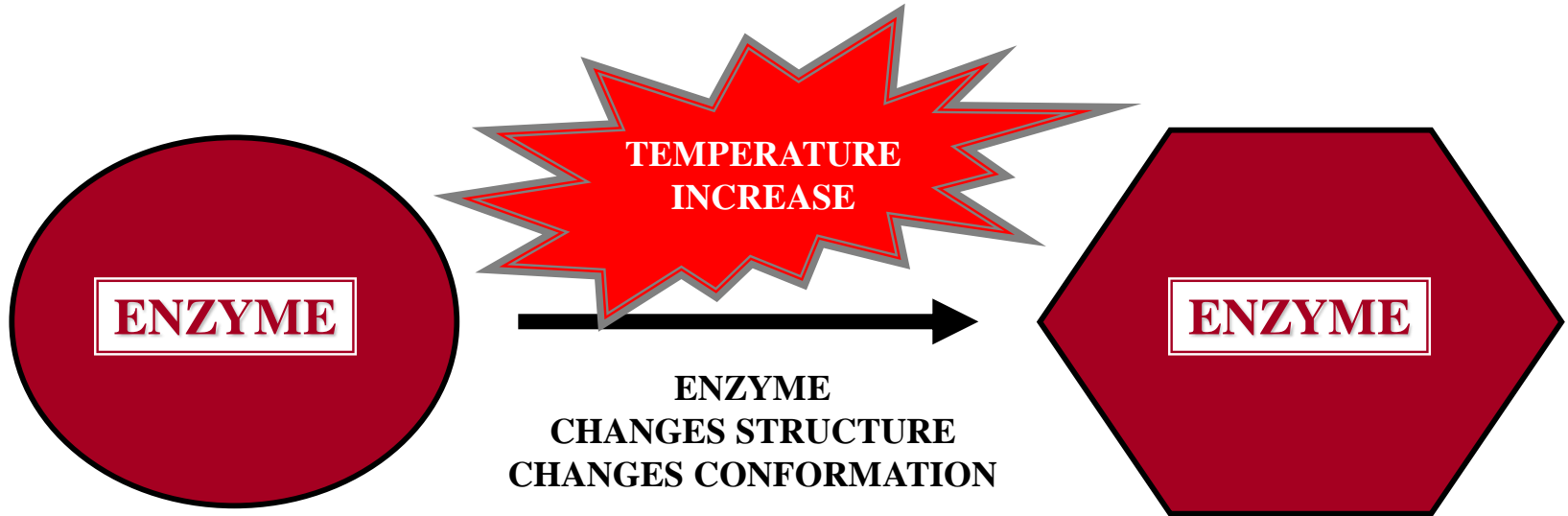


STRUCTURAL CHANGE

ENZYME DENATURES

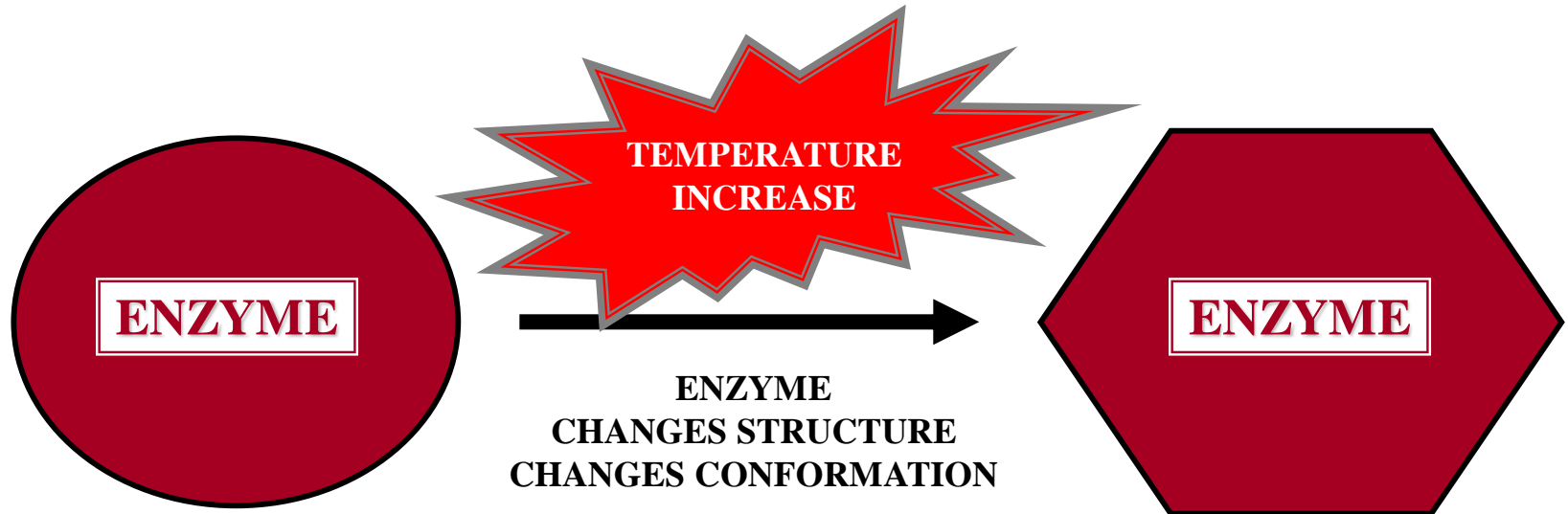


DN



CONFORMATION CHANGE

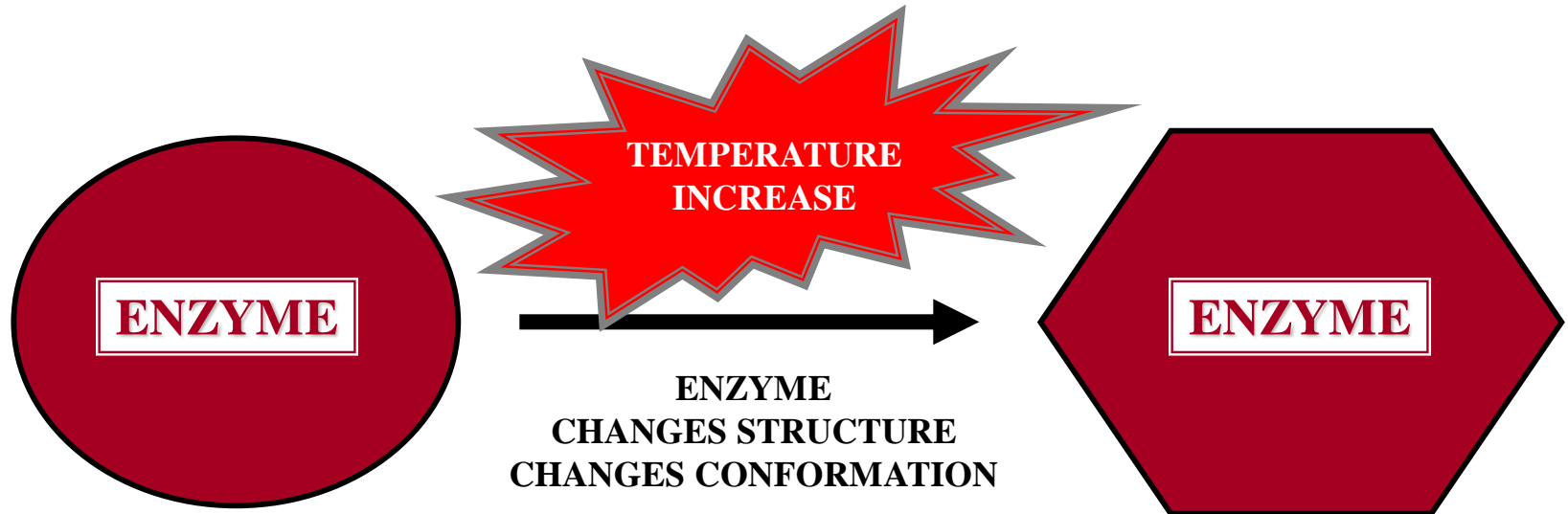
ENZYME DENATURES



**CONFORMATION CHANGE
ENZYME DENATURES**



ENZYME DENATURES

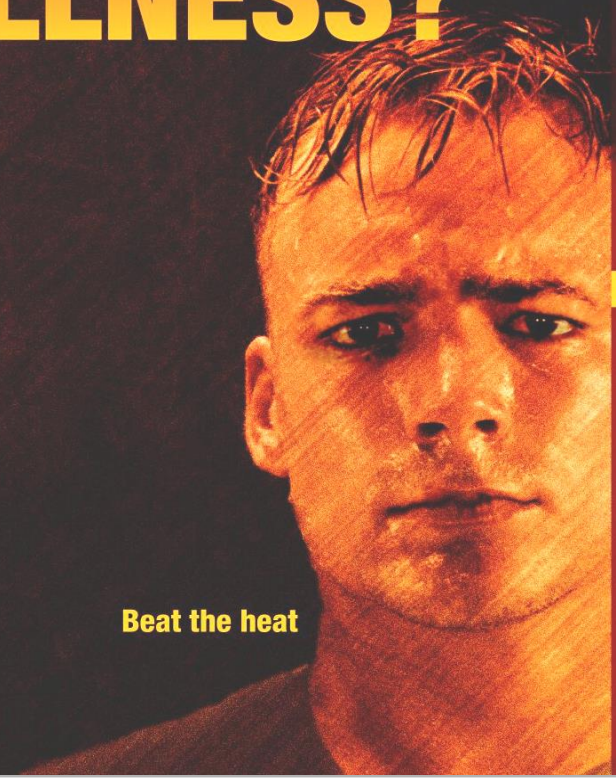


**ENZYME DENATURES
LOST ENZYME FUNCTION**

**H
Y
P
E
R
T
H
E
R
M
I
A**

**It's hot.
It's humid.
You're working hard.
Do you know the
signs of
heat
ILLNESS?**

Beat the heat



HEAT EXHAUSTION

Symptoms

- Headaches
- Dizziness or lightheadedness
- Weakness
- Mood changes, irritability, confusion or the inability to think clearly
- Nausea and vomiting
- Decreased or dark-colored urine
- Fainting
- Pale, clammy skin

▶ ACT IMMEDIATELY. If not treated, heat exhaustion can advance to heat stroke or death.

Take action!

- Move victim to cool, shaded area. Don't leave the person alone. If symptoms include dizziness or lightheadedness, lay the victim on his or her back and raise legs 6 to 8 inches. If symptoms include nausea or vomiting, lay the victim on his or her side.
- Loosen and remove any heavy clothing.
- Give the person cool water to drink – about a cup every 15 minutes – unless he or she is nauseous or vomiting.
- Fan the victim and spray with a cool mist of water or apply a wet cloth to skin.
- Call 911 for emergency help if the person does not feel better in a few minutes.

HEAT STROKE — A MEDICAL EMERGENCY

Symptoms

- Dry, pale skin with no sweating
- Hot, red skin that looks sunburned
- Mood changes, irritability, confusion or the inability to think clearly
- Seizures
- Inability to revive from an unconscious state

▶ CALL 911 for emergency help IMMEDIATELY.

Take action!

- Move the victim to a cool, shaded area. Don't leave the person alone. Lay the victim on his or her back. Move any nearby objects away if the victim is having seizures. If symptoms include nausea or vomiting, lay the victim on his or her side.
- Loosen and remove any heavy clothing.
- Give the person cool water to drink – about a cup every 15 minutes – unless the victim is nauseous or vomiting.
- Fan the victim and spray with a cool mist of water or wipe the victim with a wet cloth, or cover with a wet sheet.
- Place ice packs under the armpits and groin area.

Prevent heat illness



DRINK PLENTY OF FLUIDS



**H
Y
P
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H
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R
M
I
A**

METABOLISM

GLUCOSE

METABOLISM

HEXOKINASE

ATP

EGY

ADP

DN

GLUCOSE-6-PHOSPHATE

ENZYMES
VITAL TO METABOLISM

PHOSPHOGLUCOISOMERASE

ENZYMES
VITAL TO METABOLISM

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

ATP

EGY

ADP

RED = ENZYME

FRUCTOSE-1-6-PHOSPHATE

METABOLISM

METABOLISM

GLUCOSE

~~HEXOKINASE~~

ATP

EGY

ADP



+

D

**ENZYMES
DENATURE**

GLUCOSE-6-PHOSPHATE

~~PHOSPHOGISOMERASE~~

**ENZYMES
DENATURE**

FRUCTOSE-6-PHOSPHATE

~~PHOSPHOKINASE~~

ATP

EGY

ADP

RED = ENZYME

FRUCTOSE-1-6-PHOSPHATE

***METABOLISM
DISRUPTED***



***HOMEOSTASIS
DISRUPTED***

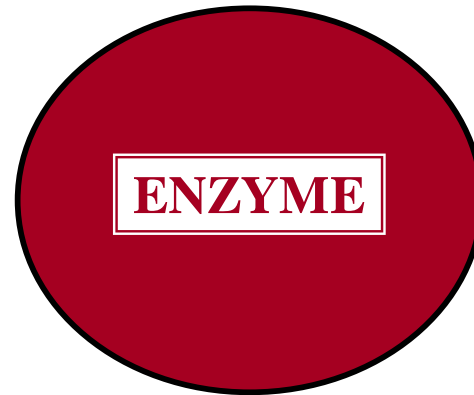




**ENZYME
DENATURES
pH CHANGE**



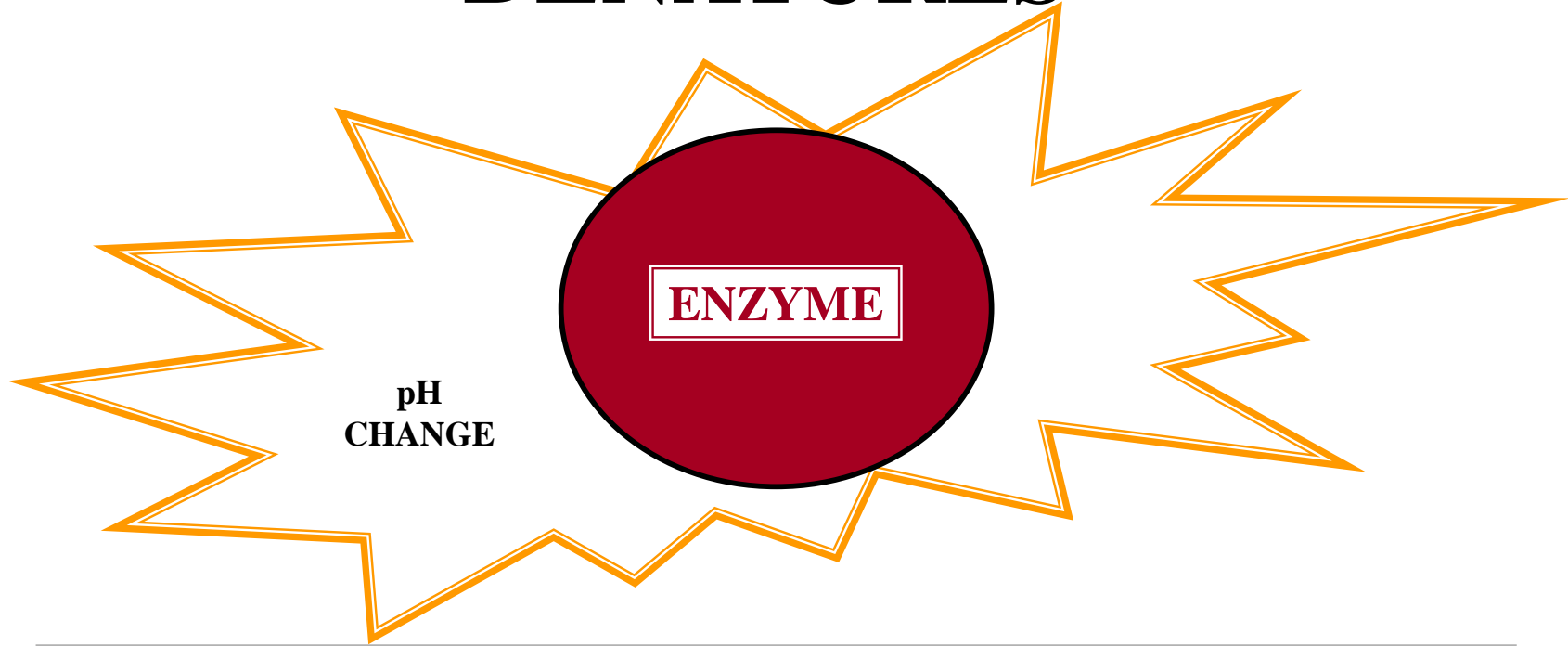
ENZYME DENATURES



**ENZYMES
NARROW pH
TOLERANCE**

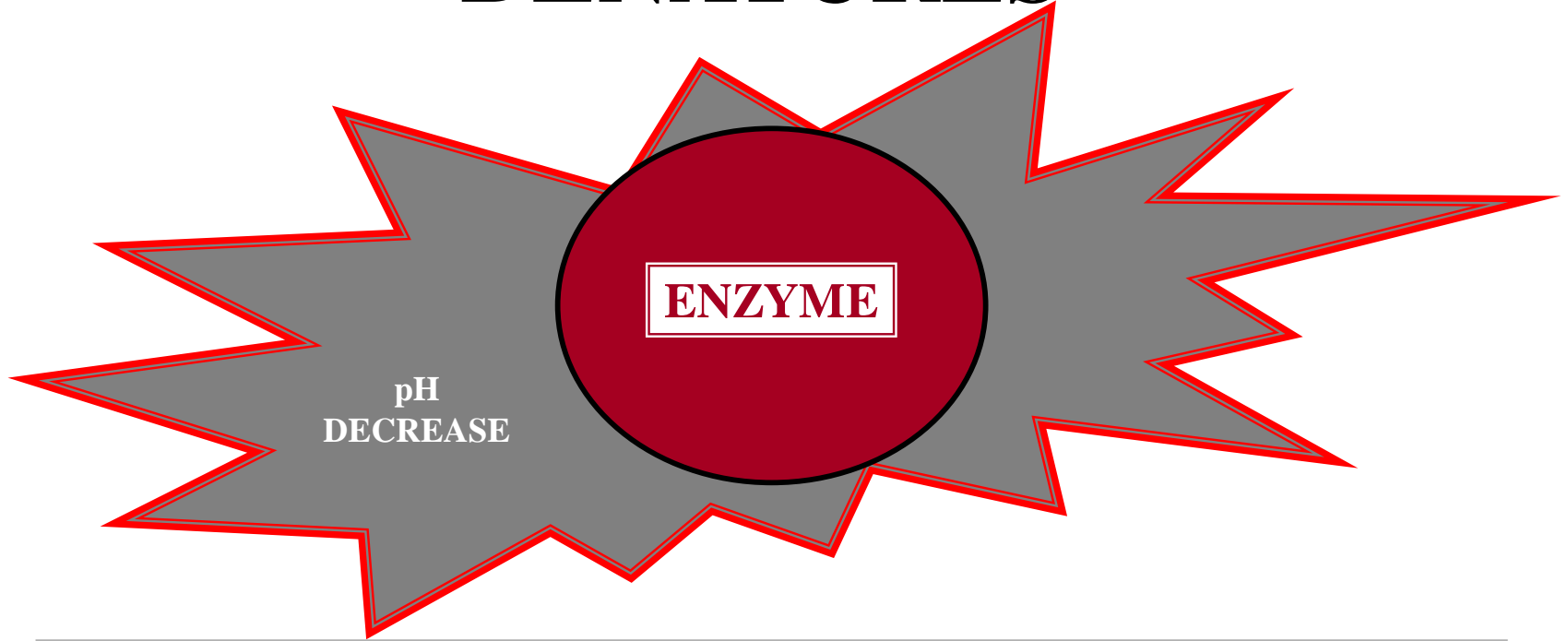


ENZYME DENATURES



**ENZYMES
NARROW pH
TOLERANCE**

ENZYME DENATURES

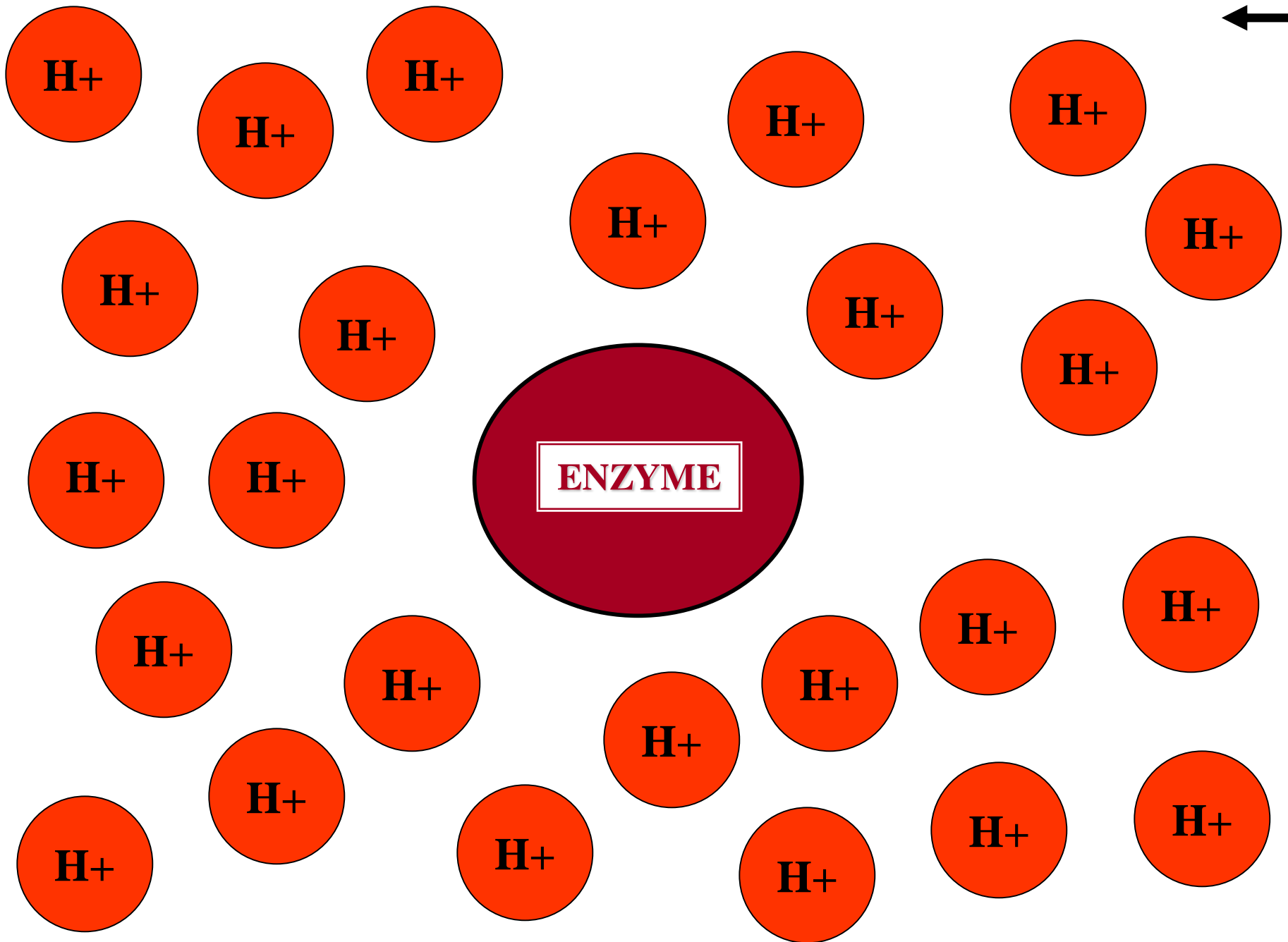


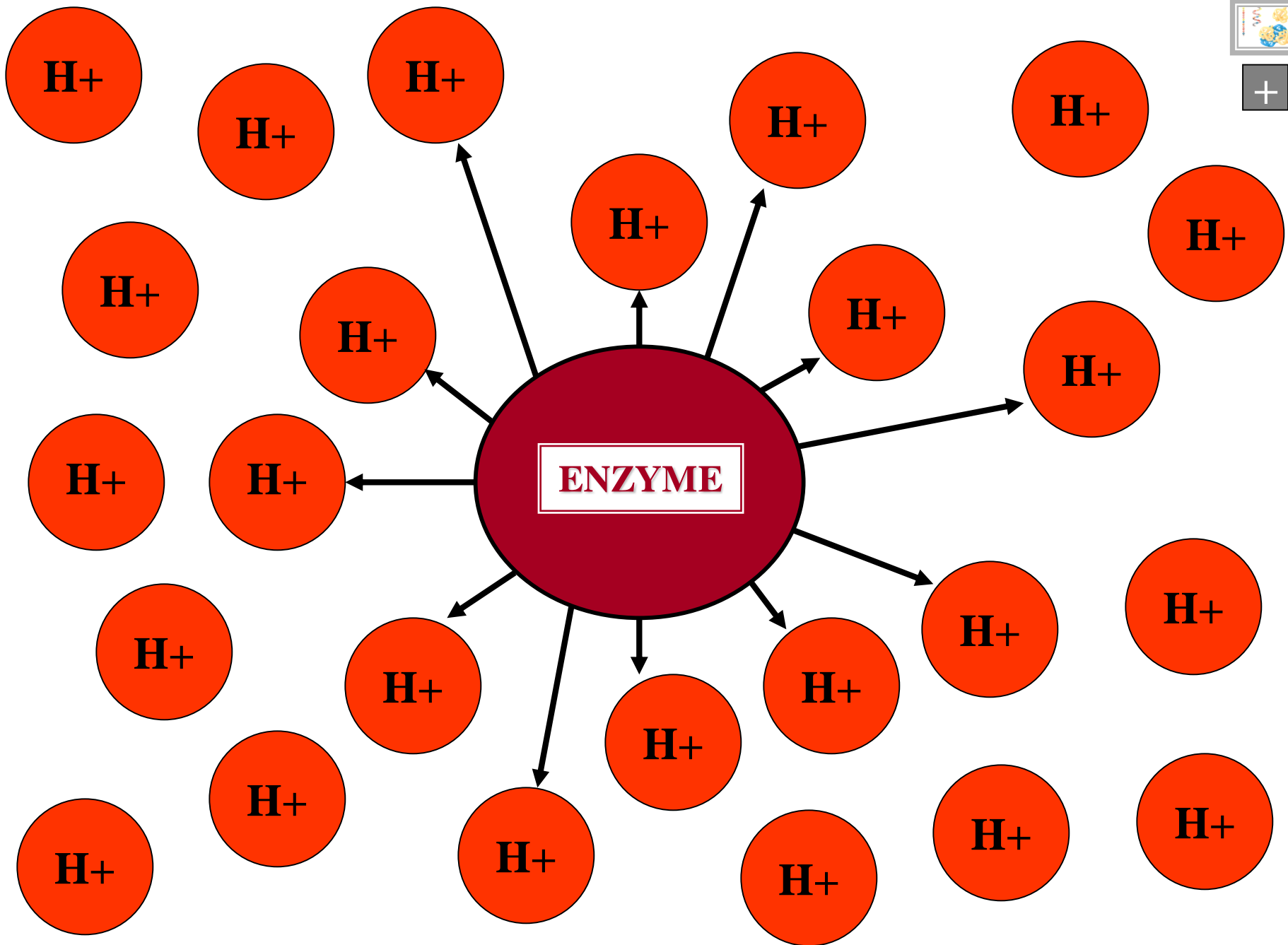
**ENZYMES
NARROW pH
TOLERANCE**





AQUEOUS SOLUTION

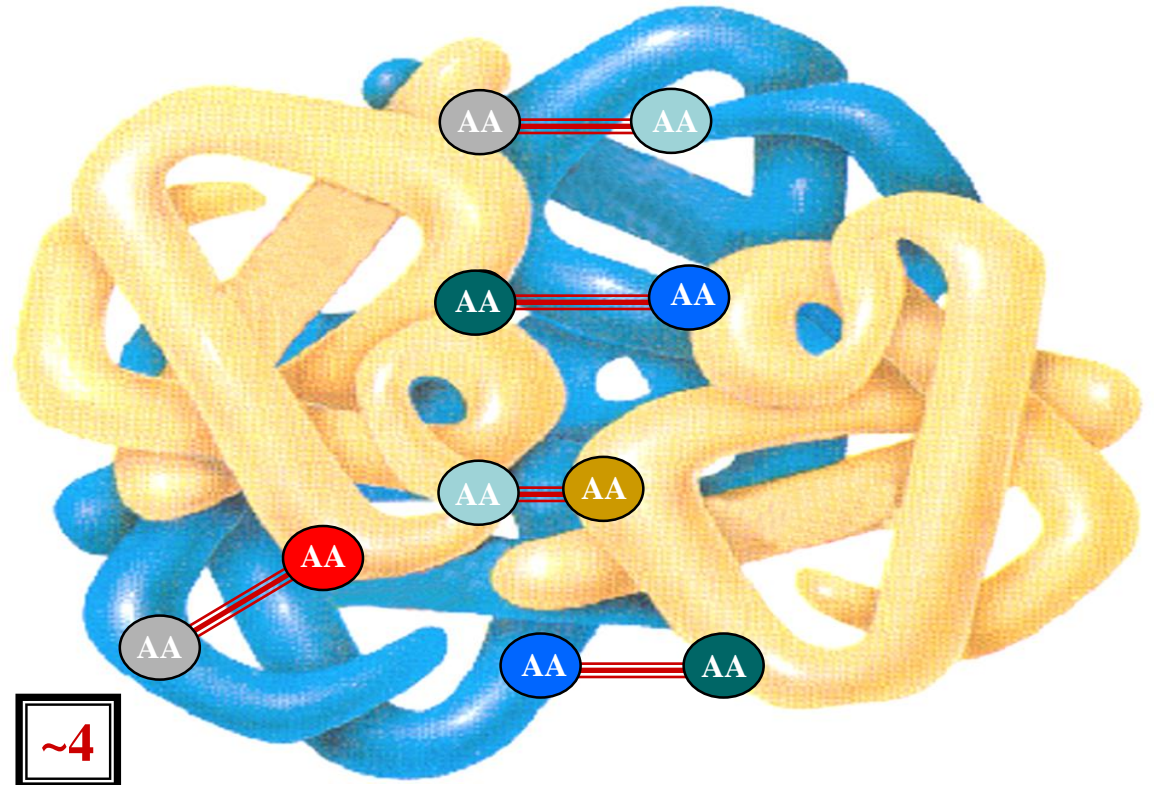




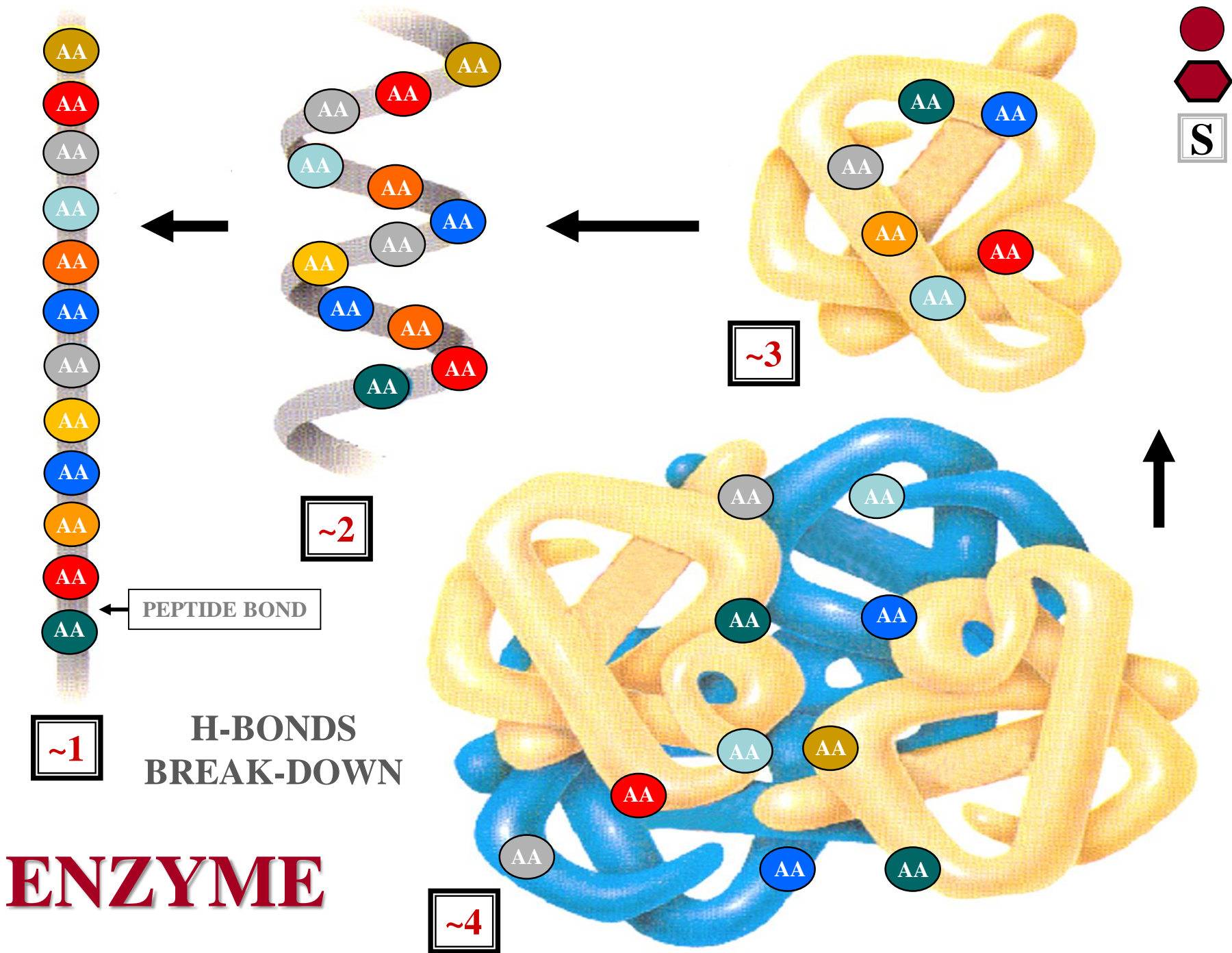


ph DECREASE INCREASES ENZYME **H+ ATTRACTION**

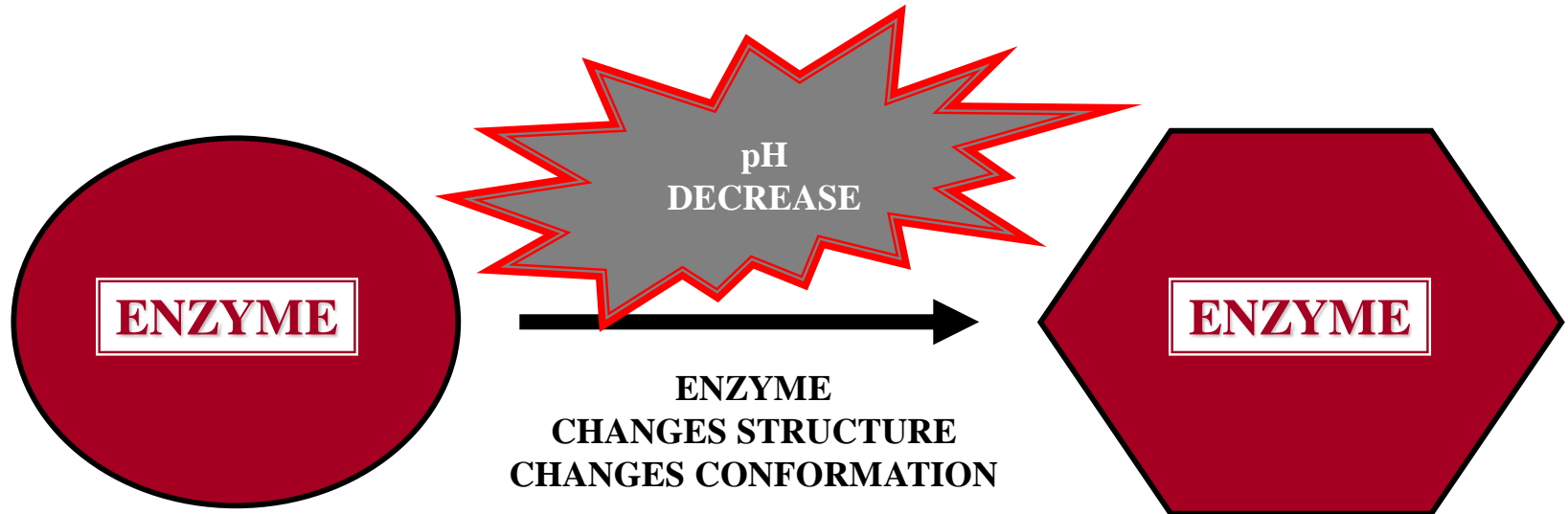
H-BONDS
WEAK BONDS
ENZYME



==== = H-BOND



ENZYME DENATURES

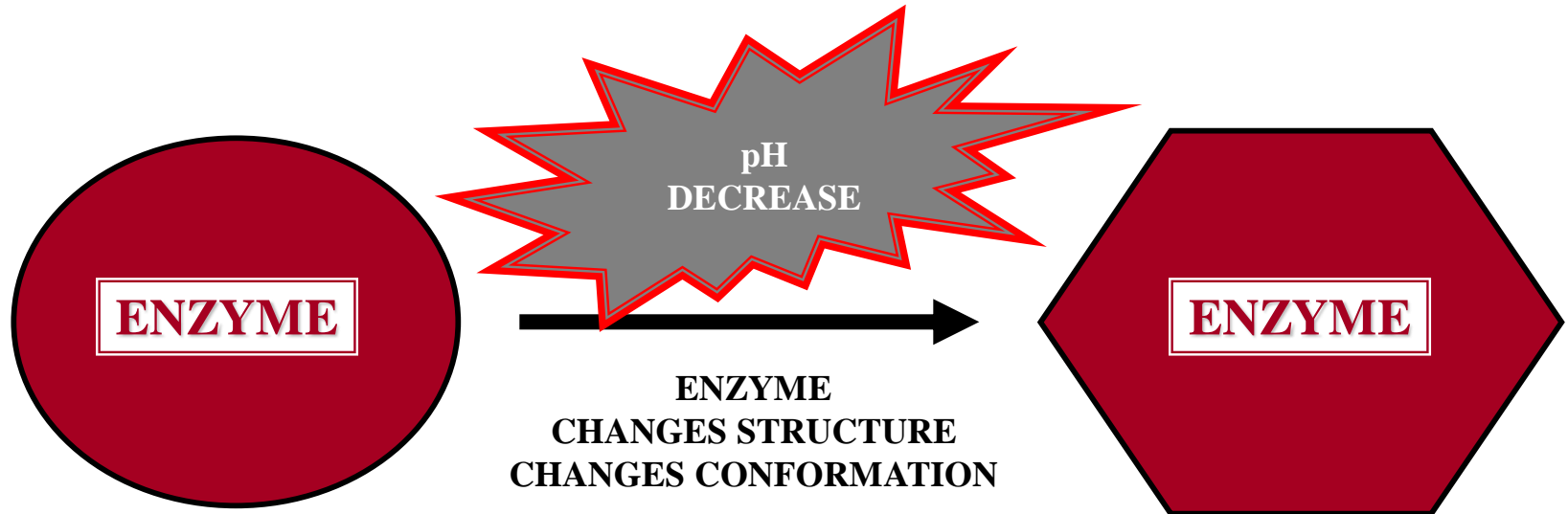


STRUCTURAL CHANGE

ENZYME DENATURES

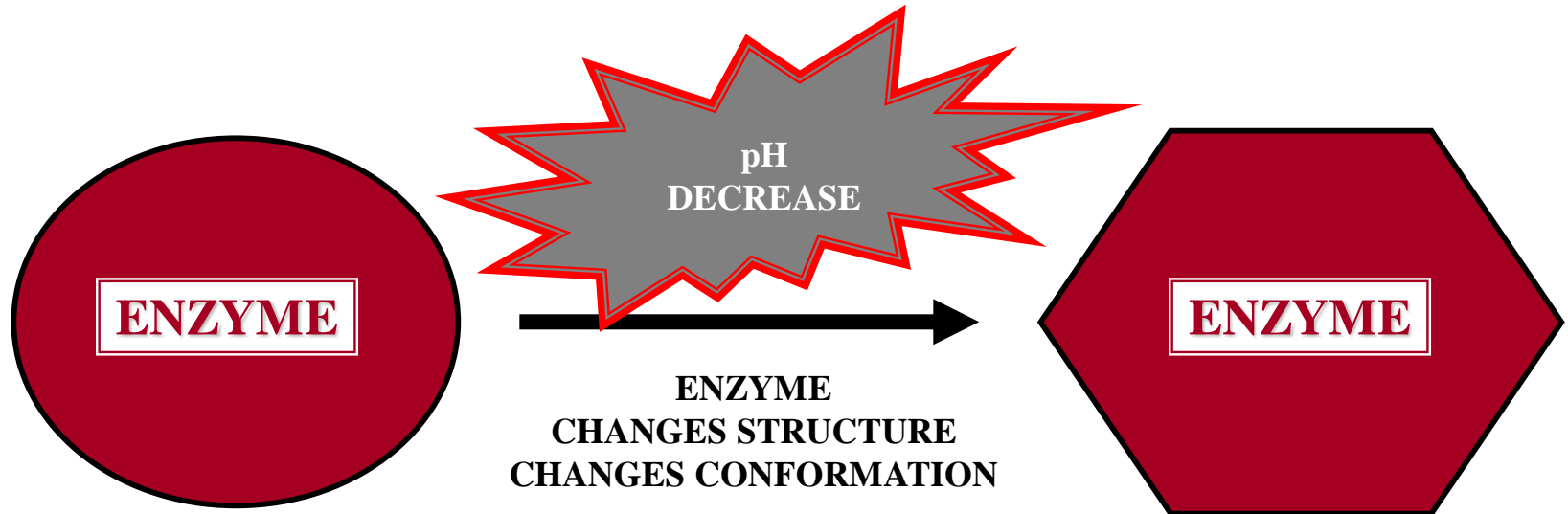


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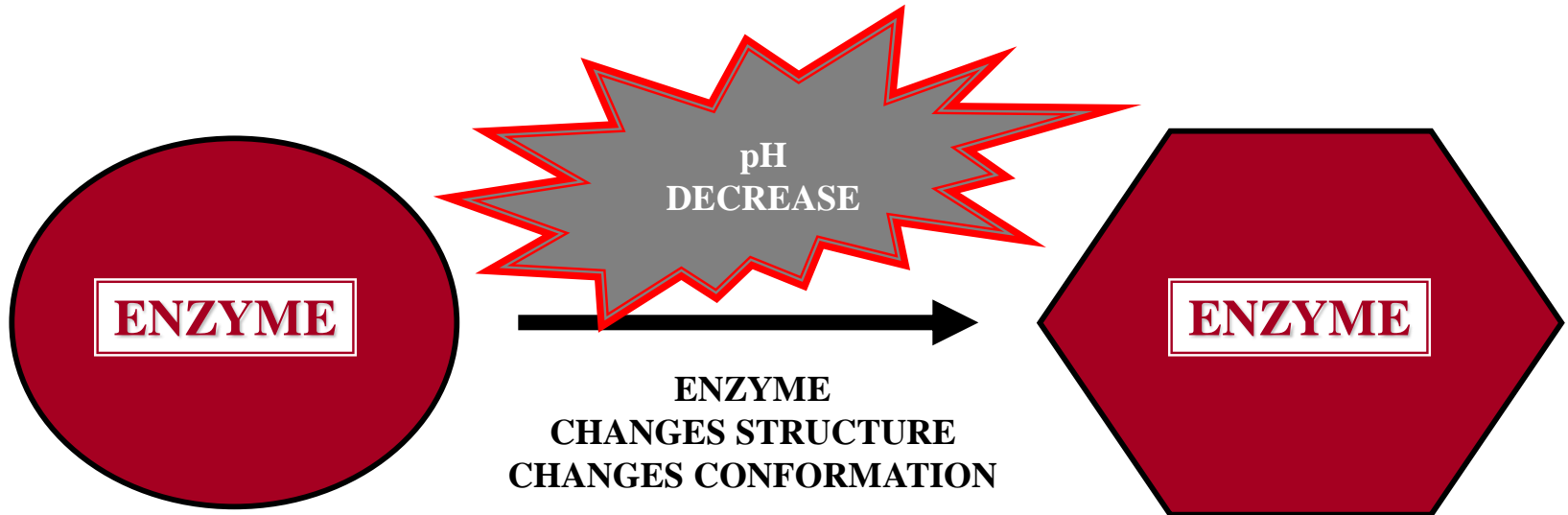
CONFORMATION CHANGE

ENZYME DENATURES



**CONFORMATION CHANGE
ENZYME DENATURES**

ENZYME DENATURES



**ENZYME DENATURES
LOST ENZYME FUNCTION**



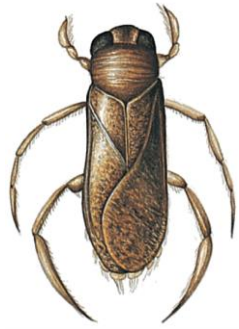
*ACIDS
PRECIPITATE*

ACID RAIN

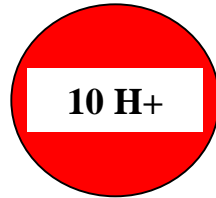
ACID RAIN AQUATIC HABITAT pH BALANCE DISRUPTED



AQUATIC ORGANISMS NARROW pH TOLERANCE

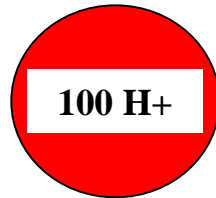


pH = 7

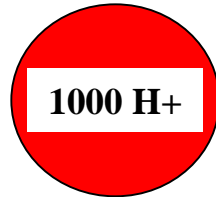


pH = 6

**ORGANISMS
THRIVE**



pH = 5

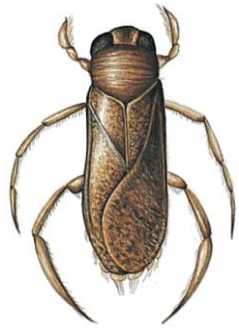


pH = 4

**ORGANISMS
PERISH**

TOLERANCE

THRESH-HOLD



METABOLISM

GLUCOSE

METABOLISM

HEXOKINASE

ATP

EGY

ADP



DN

GLUCOSE-6-PHOSPHATE

PHOSPHOGLUCOISOMERASE

ENZYMES
VITAL TO METABOLISM

ENZYMES
VITAL TO METABOLISM

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

ATP

EGY

ADP

RED = ENZYME

FRUCTOSE-1-6-PHOSPHATE

METABOLISM

METABOLISM

GLUCOSE

~~HEXOKINASE~~

ATP

EGY

ADP



+

D

**ENZYMES
DENATURE**

GLUCOSE-6-PHOSPHATE

~~PHOSPHOGISOMERASE~~

**ENZYMES
DENATURE**

FRUCTOSE-6-PHOSPHATE

~~PHOSPHOKINASE~~

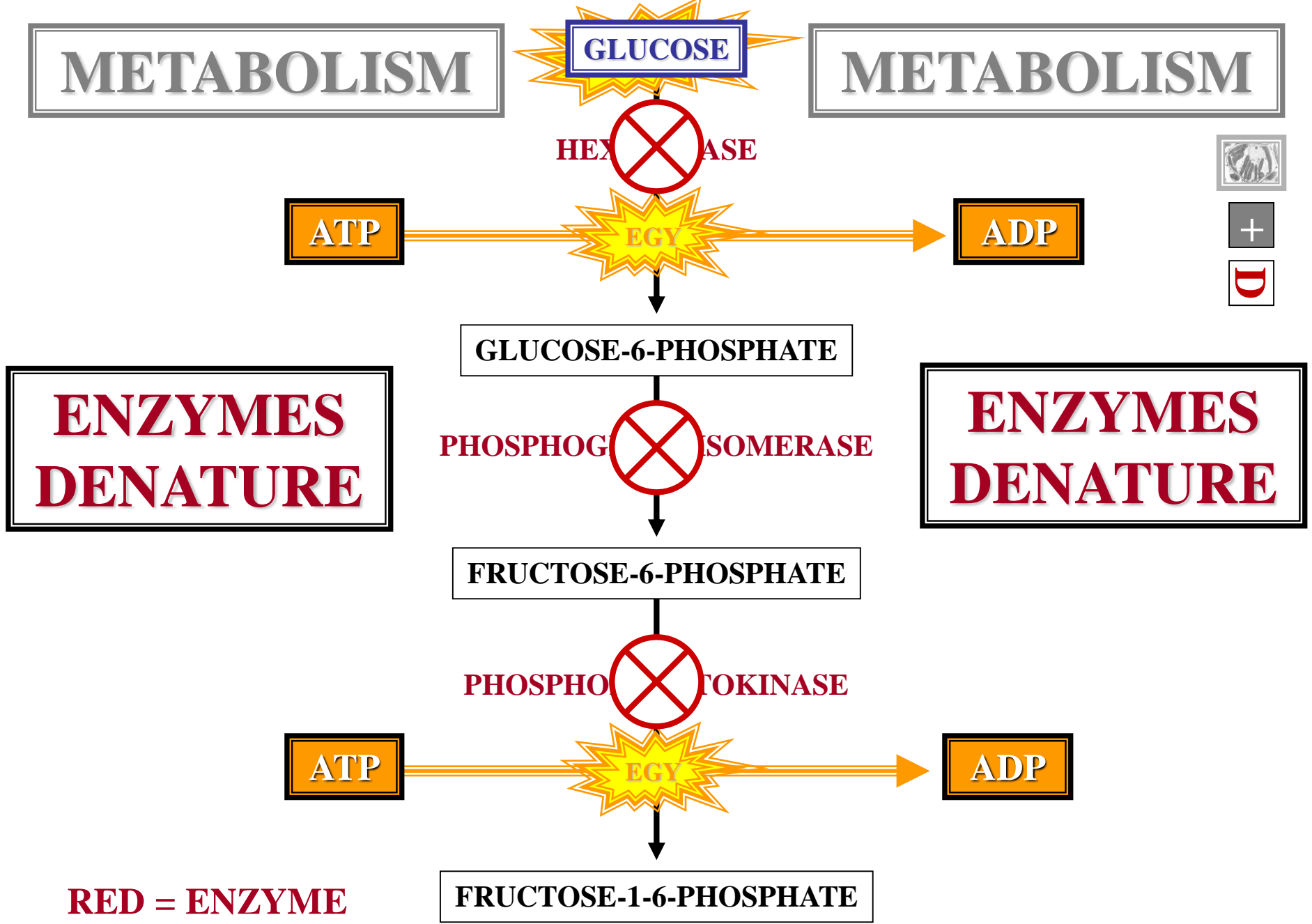
ATP

EGY

ADP

RED = ENZYME

FRUCTOSE-1-6-PHOSPHATE



***METABOLISM
DISRUPTED***

?

***HOMEOSTASIS
DISRUPTED***



QUESTION

WHEN ENZYMES DENATURE
WHAT BONDS BREAK-DOWN
HYDROGEN BONDS
OR
PEPTIDE BONDS?

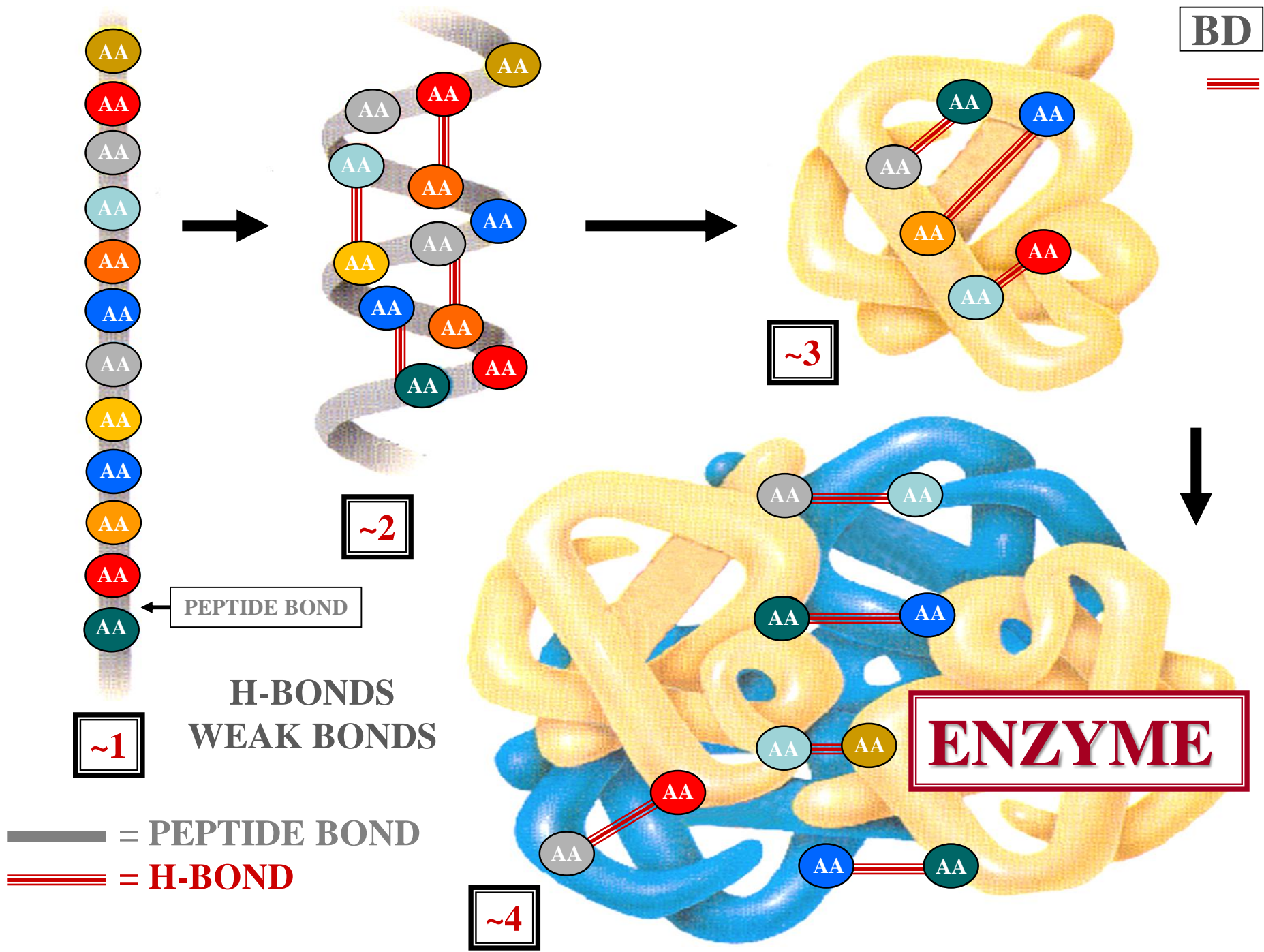
QUESTION

ANSWER



H-BONDS

ANSWER

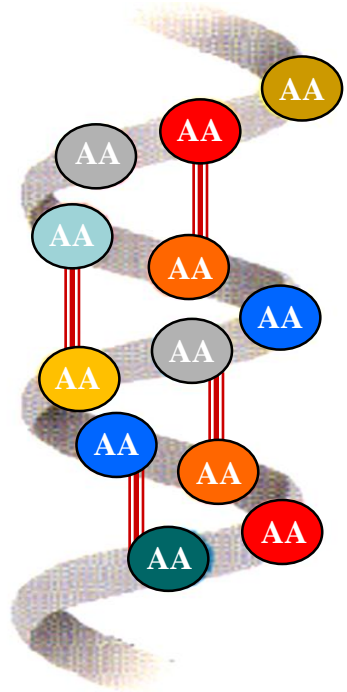


BD

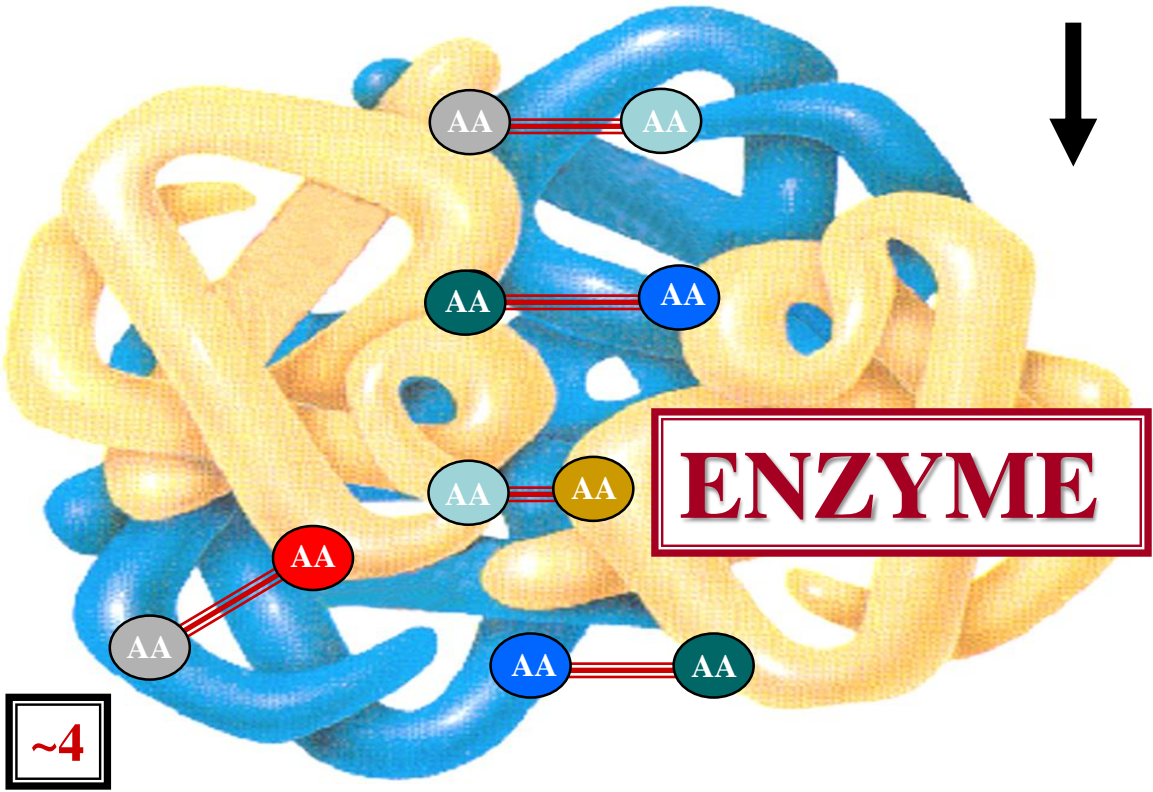
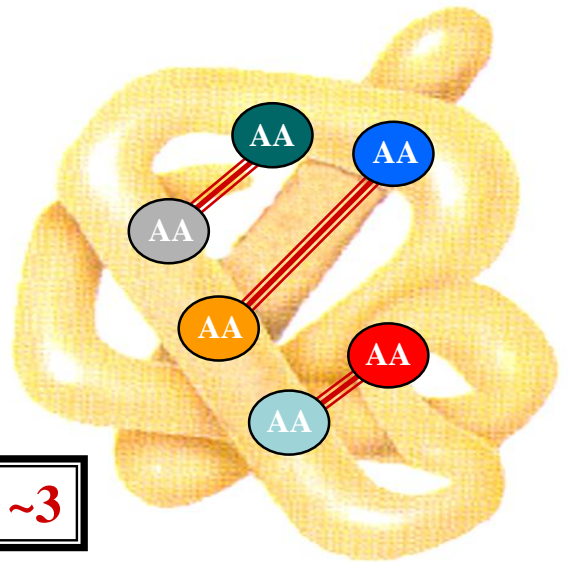
==



- AA
- AA
- AA
- AA
- AA
- AA
- AA
- AA
- AA
- AA
- AA
- AA
- AA
- AA
- AA

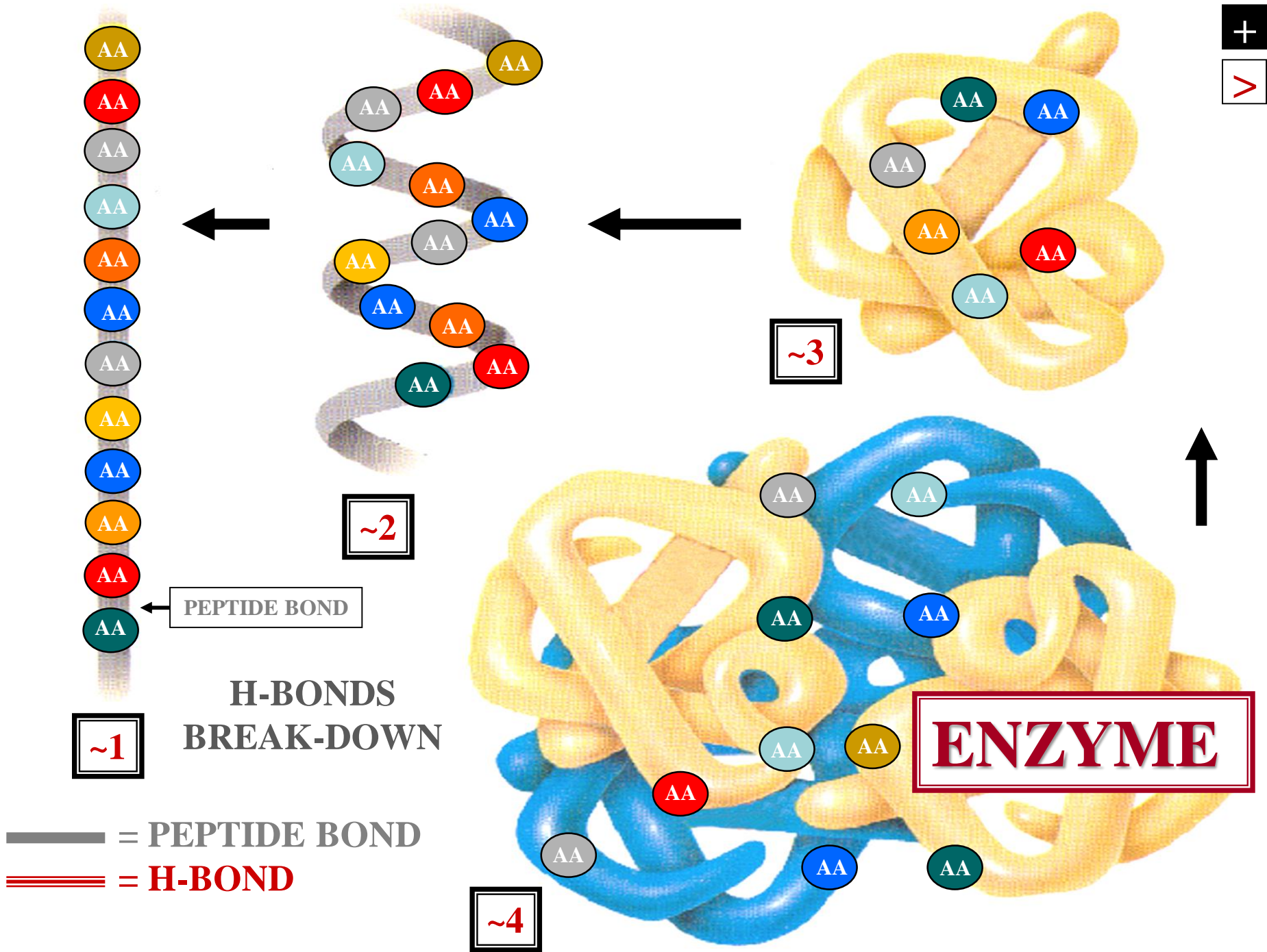


~3



ENZYME

— = PEPTIDE BOND
== = **H-BOND**



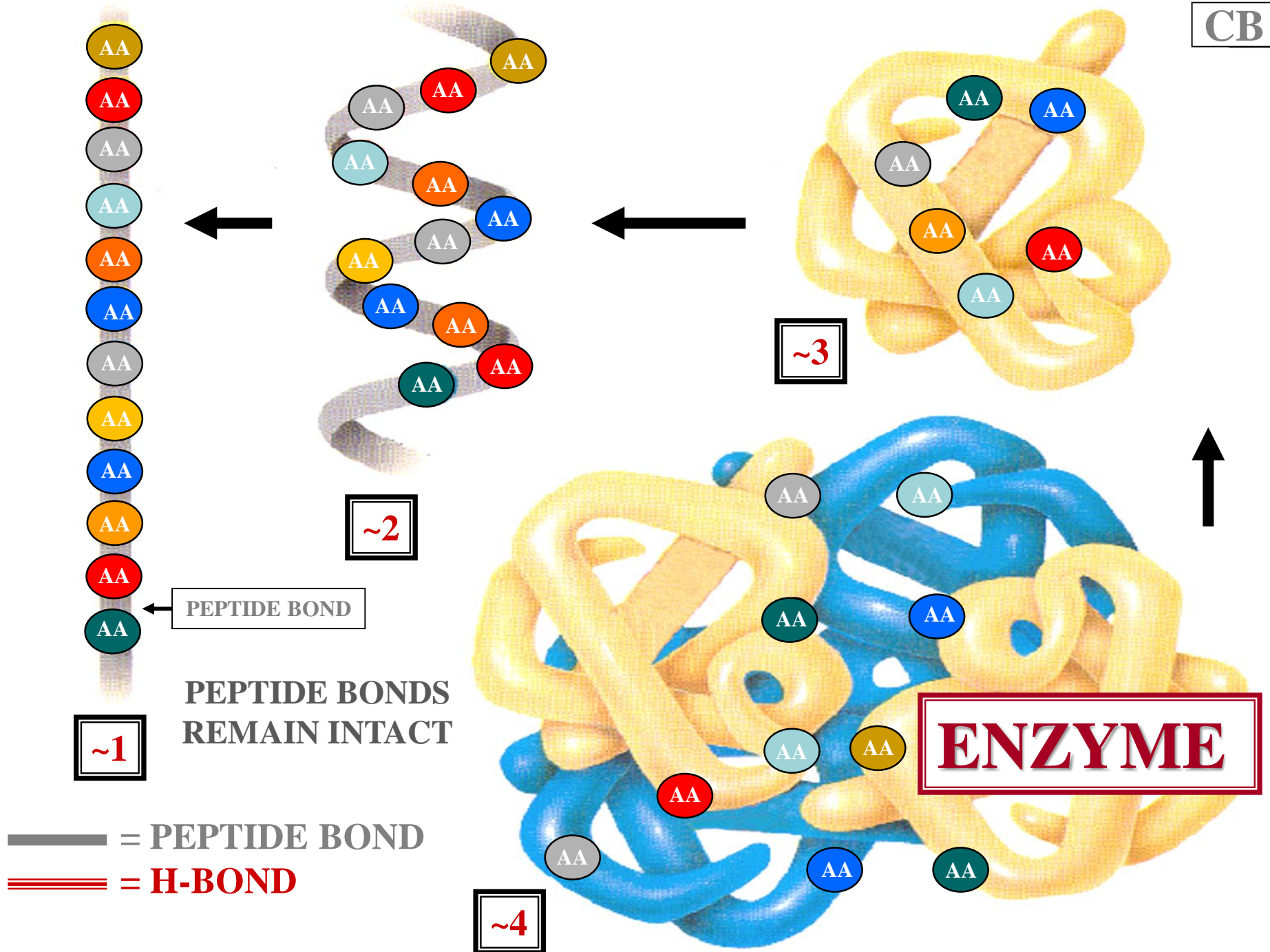


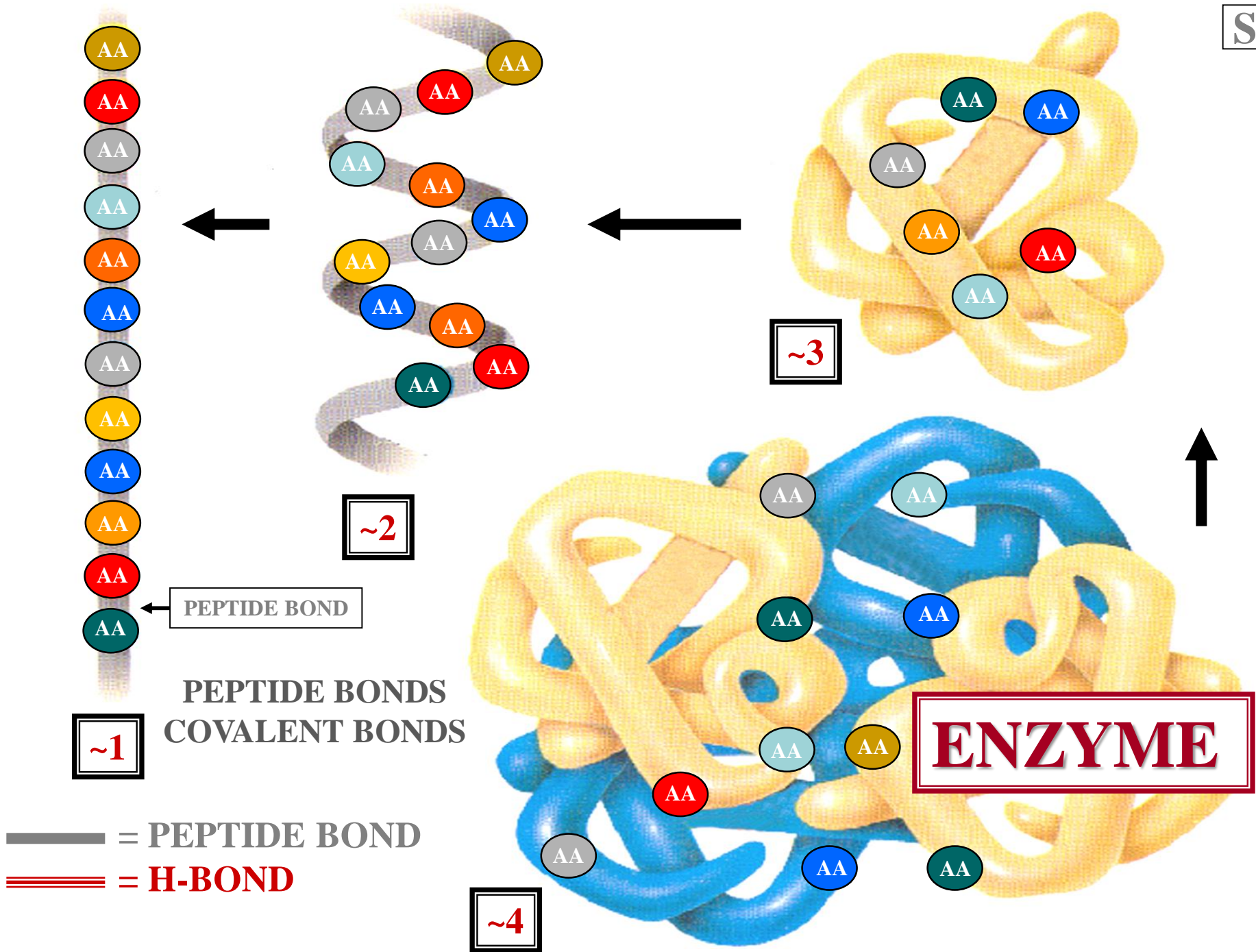
ENZYME DENATURES

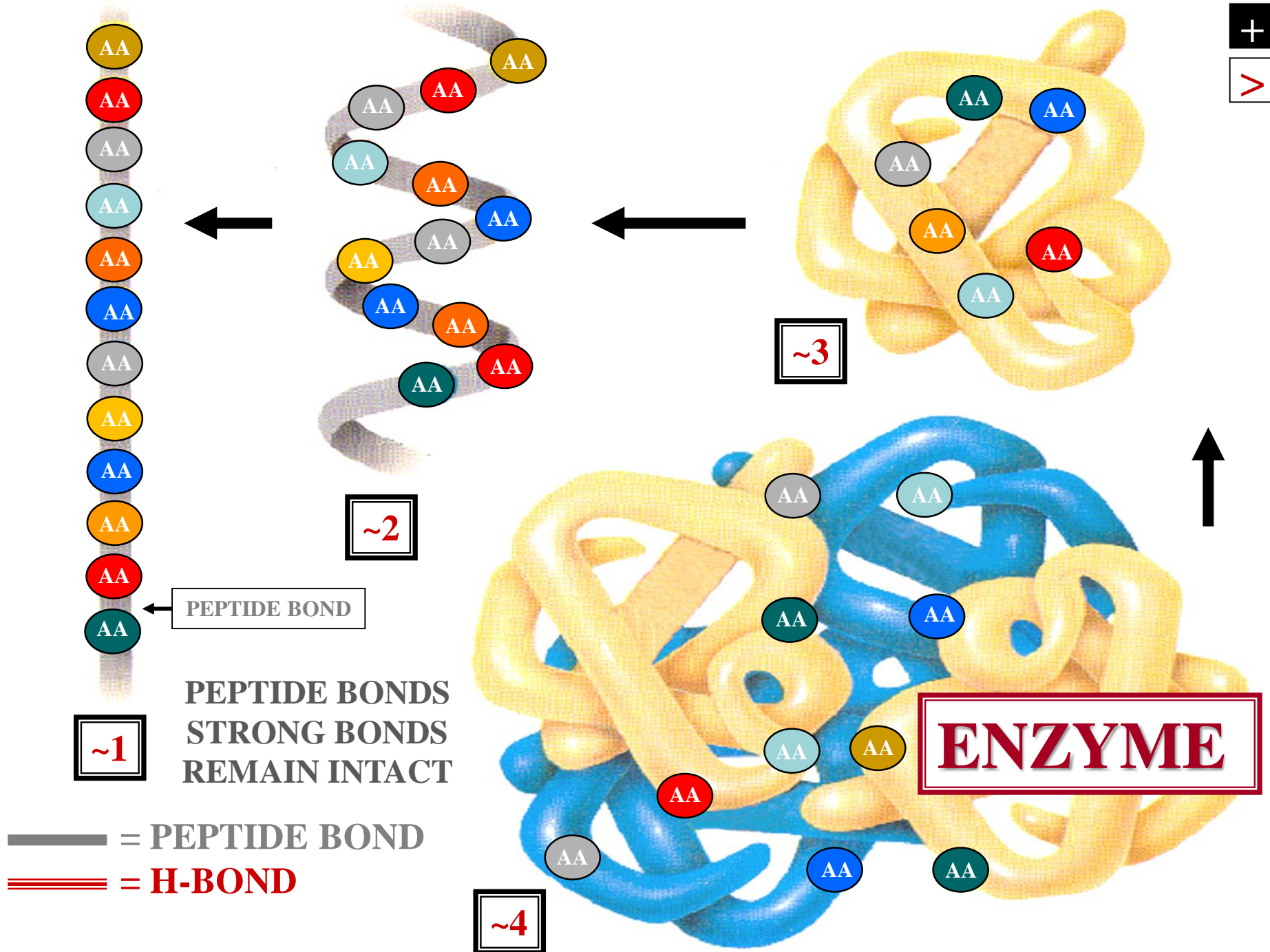
**H-BONDS
BREAK-DOWN**

ENZYME DENATURES

CB









ENZYME DENATURATION

COVALENT

PEPTIDE BONDS

REMAIN INTACT

ENZYME DENATURATION

MACROMOLECULE CLASSES



CARBOHYDRATES

LIPIDS

PROTEINS

NUCLEIC ACIDS

MACROMOLECULE CLASSES

NUCLEIC ACIDS

NUCLEIC ACID

NUCLEIC ACID

**NUCLEOTIDE
POLYMER**

NUCLEIC ACID

NUCLEOTIDE



NUCLEOTIDE

**NUCLEIC ACID
MONOMER**

NUCLEOTIDE

NUCLEOTIDE

NUCLEIC ACID

MONOMER

NUCLEIC ACID

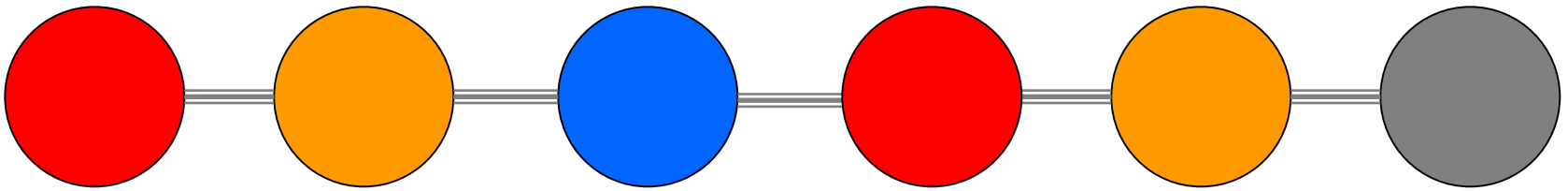
BUILDING BLOCK

NUCLEOTIDE



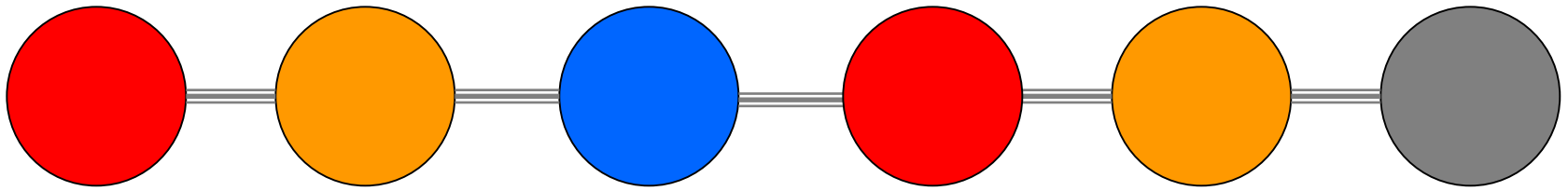
NUCLEIC ACIDS
NUCLEOTIDES
APPLIED

NUCLEIC ACID STRUCTURE



NUCLEIC ACID

NUCLEIC ACID STRUCTURE

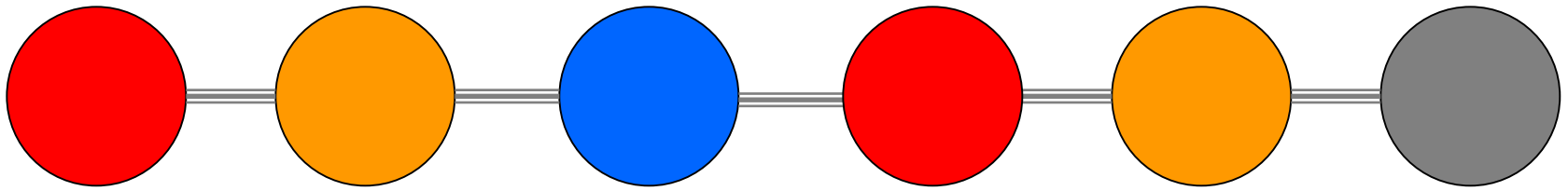


**BUILDING
BLOCKS**



NUCLEIC ACID / POLYMER

NUCLEIC ACID STRUCTURE



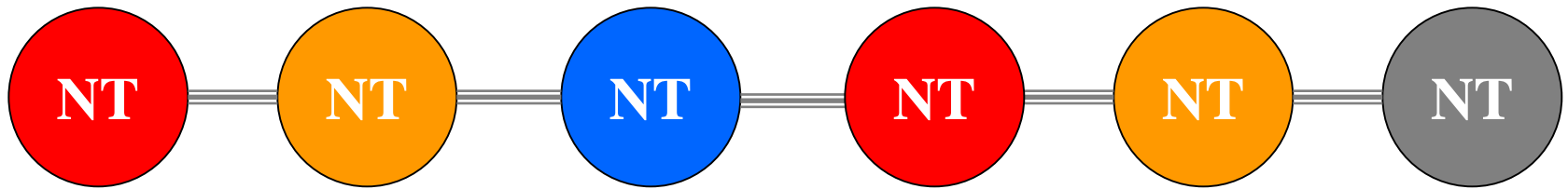
MONOMER



NUCLEIC ACID / POLYMER



NUCLEIC ACID STRUCTURE



NUCLEOTIDE



NUCLEIC ACID



NUCLEOTIDE STRUCTURE

NUCLEOTIDE STRUCTURAL COMPONENTS

**NUCLEOTIDE
STRUCTURAL COMPONENTS**

SUGAR

**NUCLEOTIDE
STRUCTURE COMPONENTS**

**NUCLEOTIDE
STRUCTURAL COMPONENTS**

SUGAR

PHOSPHATE

**NUCLEOTIDE
STRUCTURE COMPONENTS**

NUCLEOTIDE



STRUCTURAL COMPONENTS

SUGAR

PHOSPHATE

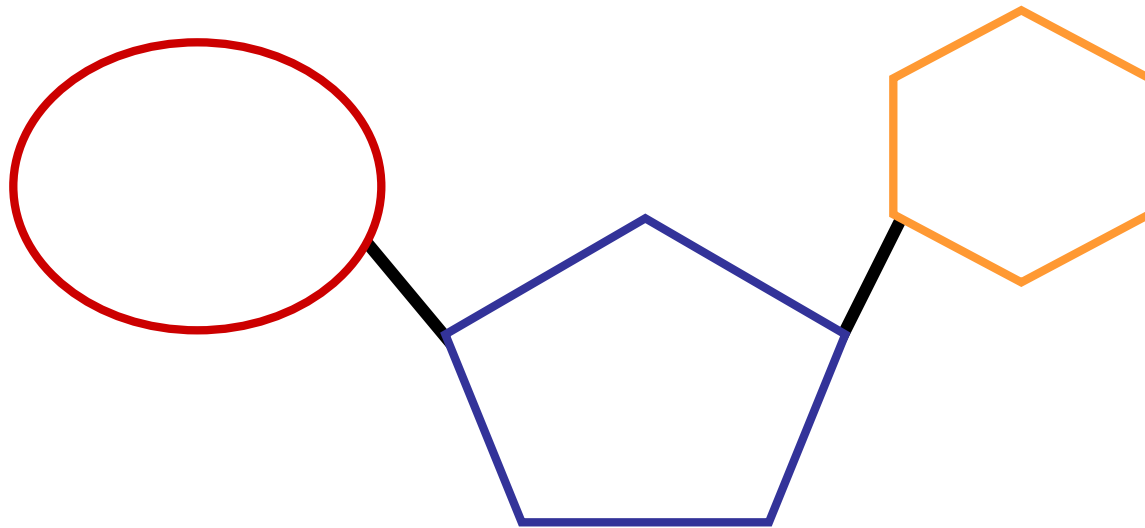
NITROGENOUS BASE

NUCLEOTIDE

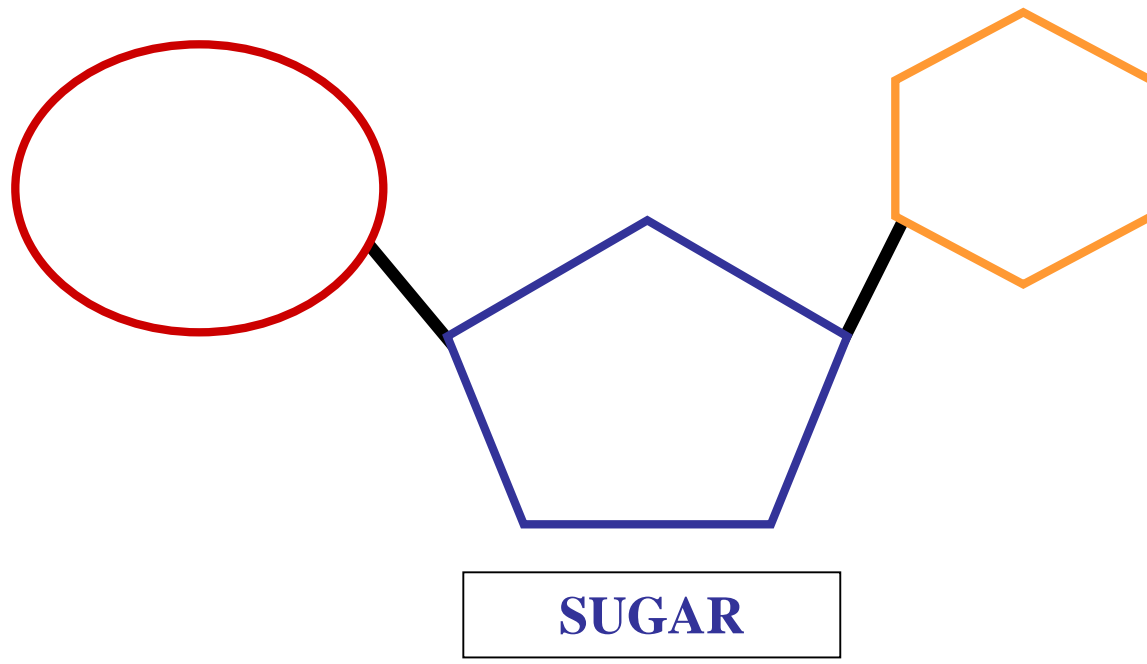
STRUCTURE COMPONENTS

NUCLEOTIDE

STRUCTURAL COMPONENTS

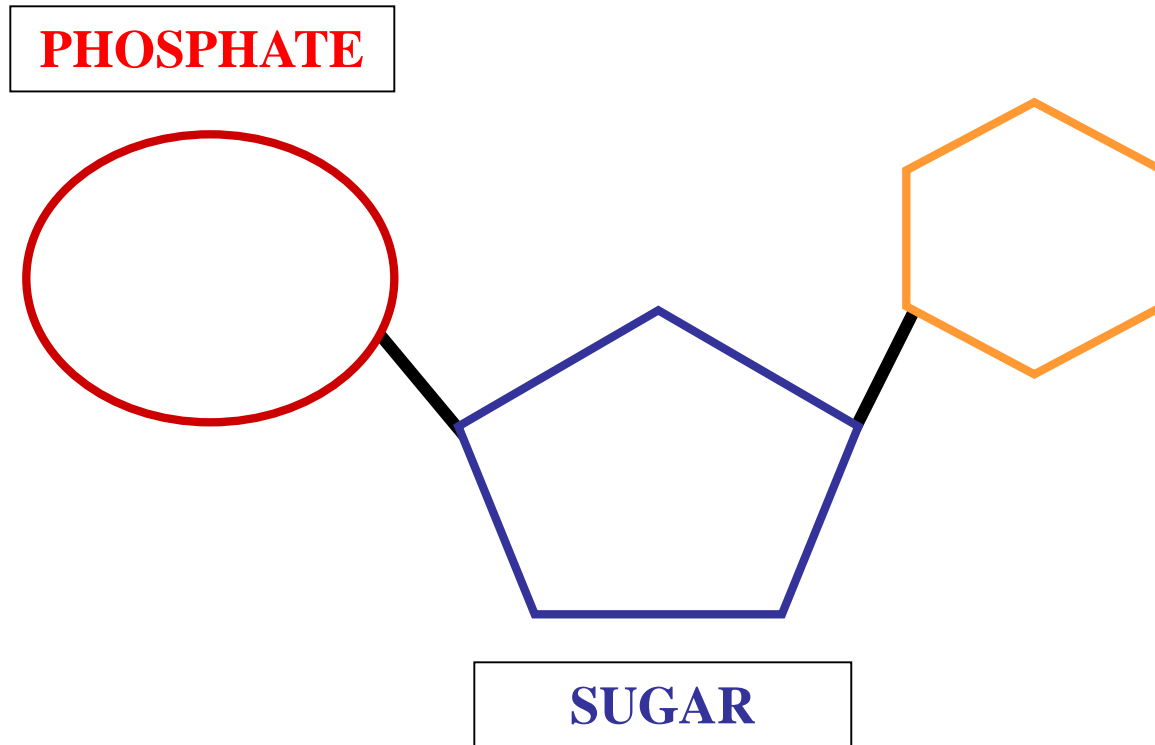


NUCLEOTIDE STRUCTURAL COMPONENTS

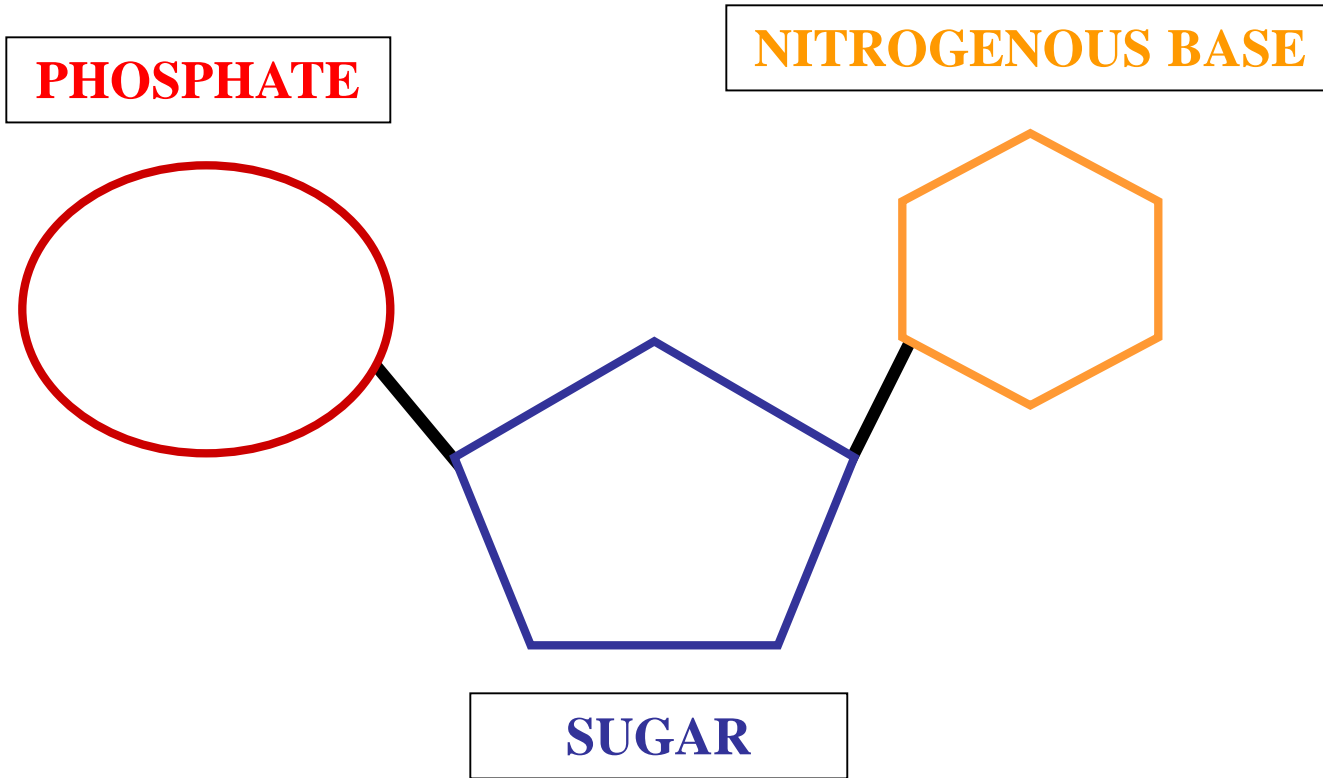


NUCLEOTIDE

STRUCTURAL COMPONENTS



NUCLEOTIDE STRUCTURAL COMPONENTS

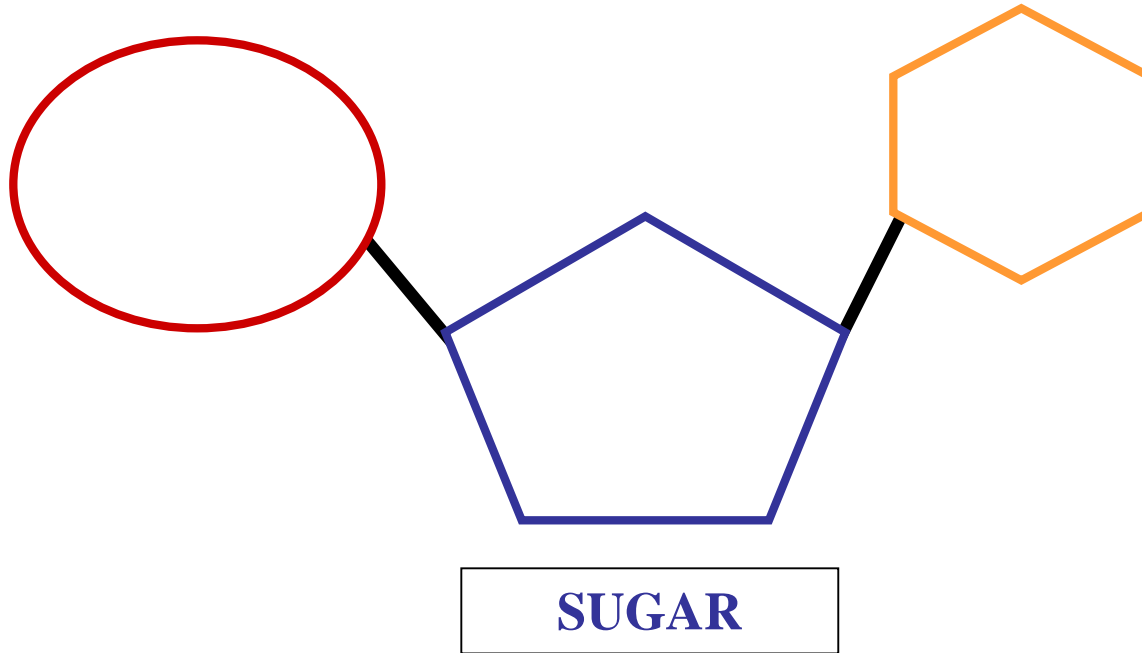


NUCLEOTIDE STRUCTURAL COMPONENTS

STANDARD

PHOSPHATE

NITROGENOUS BASE



NUCLEOTIDE



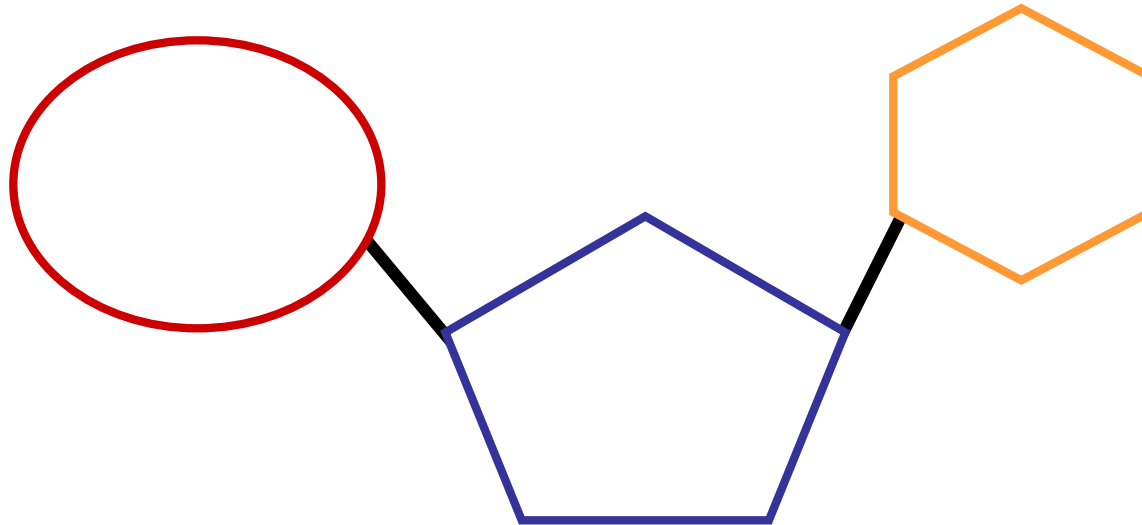
STRUCTURAL COMPONENTS

STANDARD

PHOSPHATE

VARIABLES

NITROGENOUS BASE



SUGAR

VARIABLES

NUCLEOTIDE SUGARS

NUCLEOTIDE SUGARS

DEOXYRIBOSE

NUCLEOTIDE SUGARS

NUCLEOTIDE SUGARS

DEOXYRIBOSE

RIBOSE

NUCLEOTIDE SUGARS

NUCLEOTIDE SUGARS

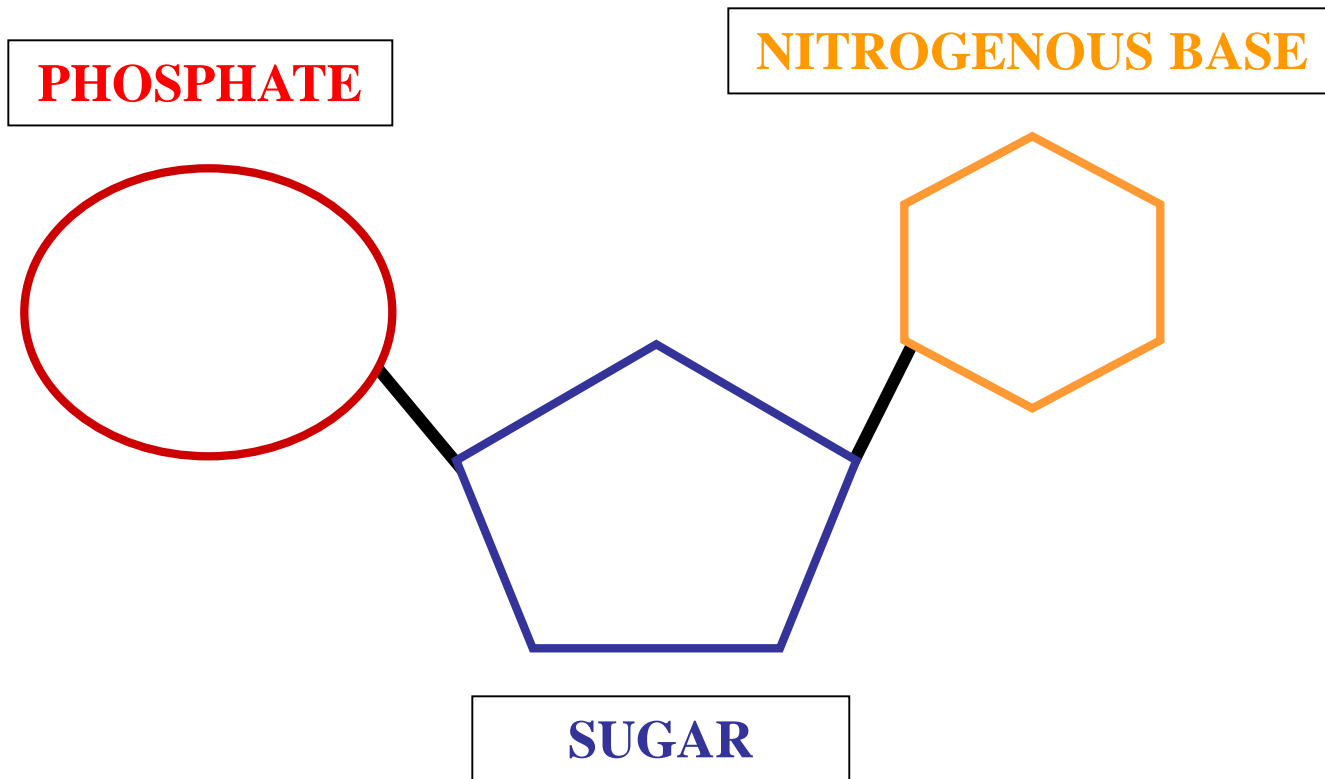


DEOXYRIBOSE

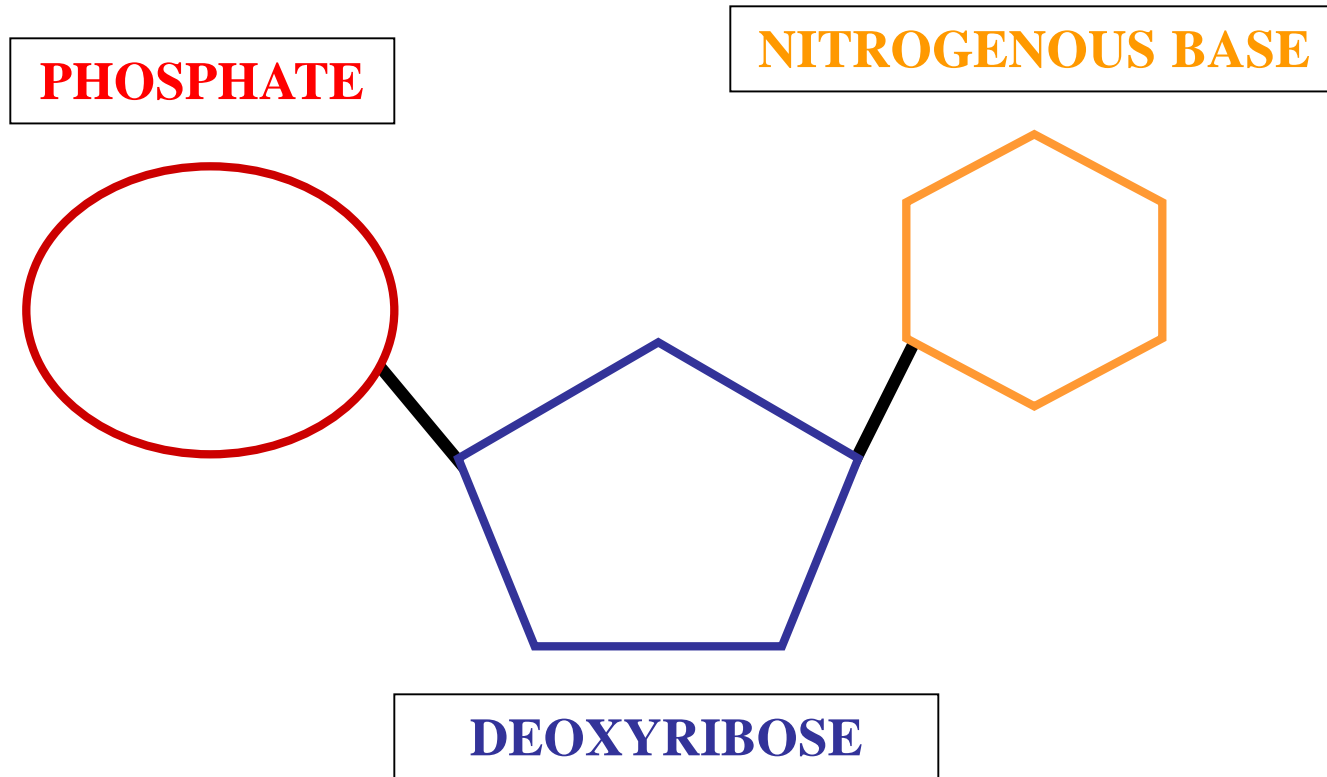
RIBOSE

NUCLEOTIDE SUGARS

NUCLEOTIDE STRUCTURAL COMPONENTS



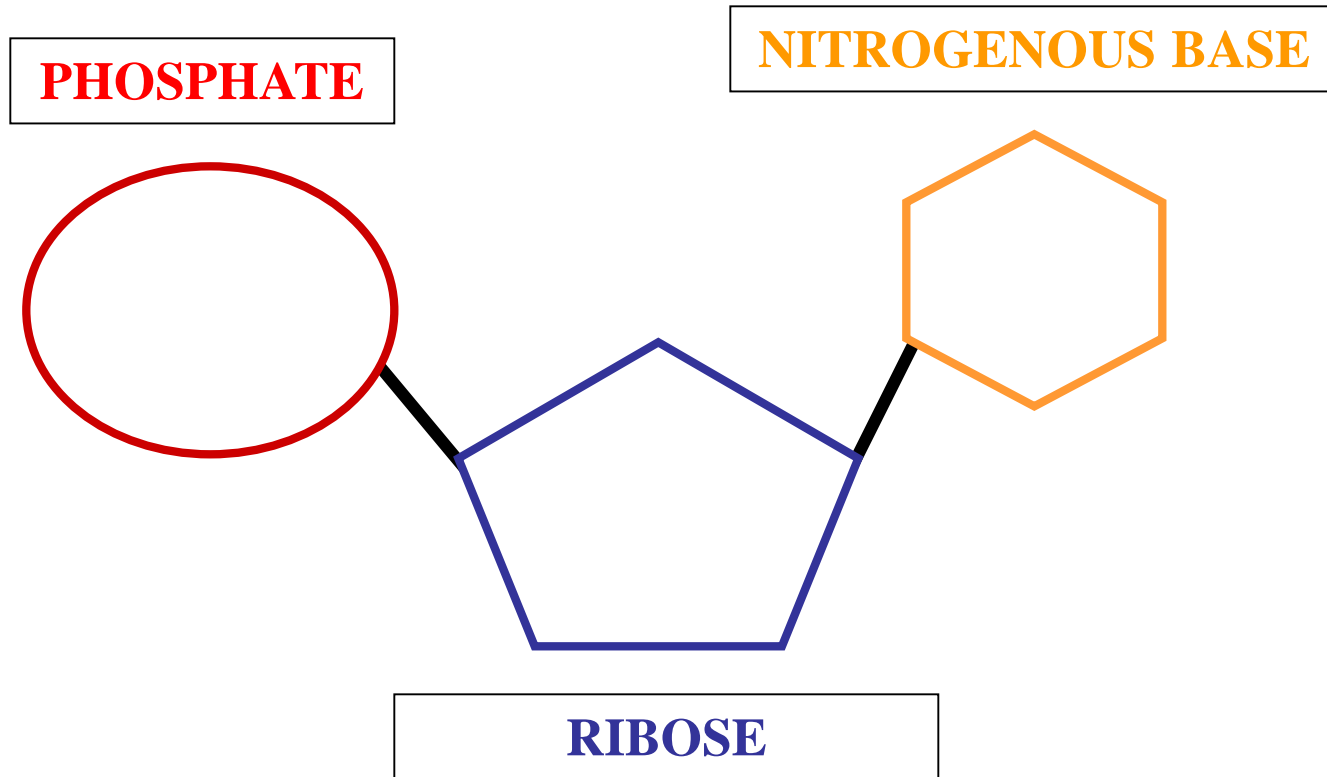
NUCLEOTIDE STRUCTURAL COMPONENTS



NUCLEOTIDE



STRUCTURAL COMPONENTS



NUCLEOTIDE BASES

NUCLEOTIDE BASES

ADENINE

NUCLEOTIDE BASES

NUCLEOTIDE BASES

ADENINE

GUANINE

NUCLEOTIDE BASES

NUCLEOTIDE BASES

ADENINE

GUANINE

THYMINE

NUCLEOTIDE BASES

NUCLEOTIDE BASES

ADENINE

GUANINE

THYMINE

CYTOSINE

NUCLEOTIDE BASES

NUCLEOTIDE BASES

ADENINE

GUANINE

THYMINE

CYTOSINE

URACIL

NUCLEOTIDE BASES

NUCLEOTIDE BASES

ADENINE

GUANINE

THYMINE

CYTOSINE

URACIL

2 CLASSES

NUCLEOTIDE BASES

NUCLEOTIDE BASES

ADENINE

GUANINE

THYMINE

CYTOSINE

URACIL

2 CLASSES
PURINES

NUCLEOTIDE BASES

NUCLEOTIDE BASES

ADENINE
GUANINE
THYMINE
CYTOSINE
URACIL



2 CLASSES
PURINES
PYRIMIDINES

NUCLEOTIDE BASES

**NUCLEOTIDE
BASE CLASS
PURINES**

NUCLEOTIDE BASES
PURINES

ADENINE

NUCLEOTIDE BASES
PURINES

NUCLEOTIDE BASES

PURINES

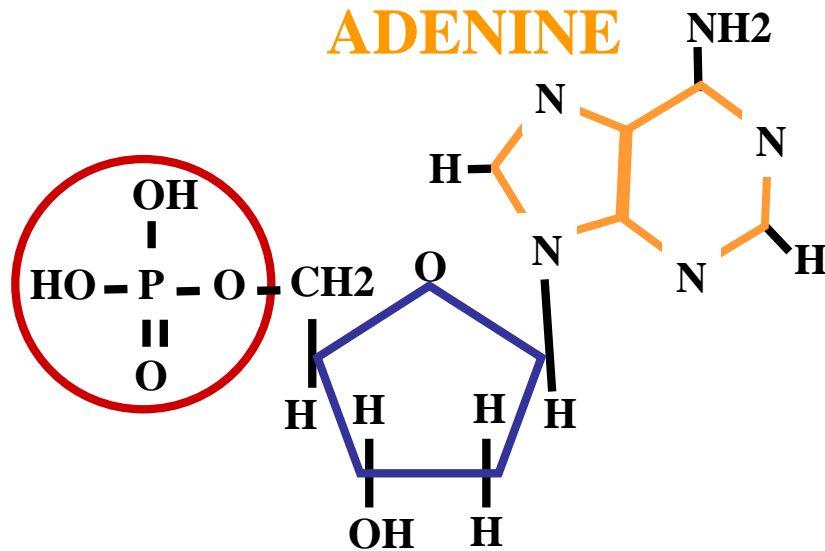


ADENINE
GUANINE

NUCLEOTIDE BASES
PURINES

NUCLEOTIDE BASES

PURINES



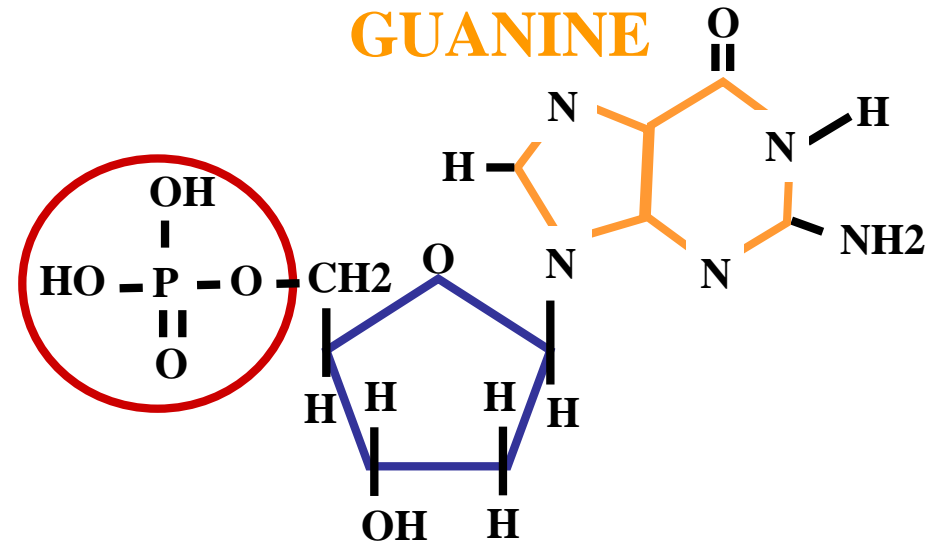
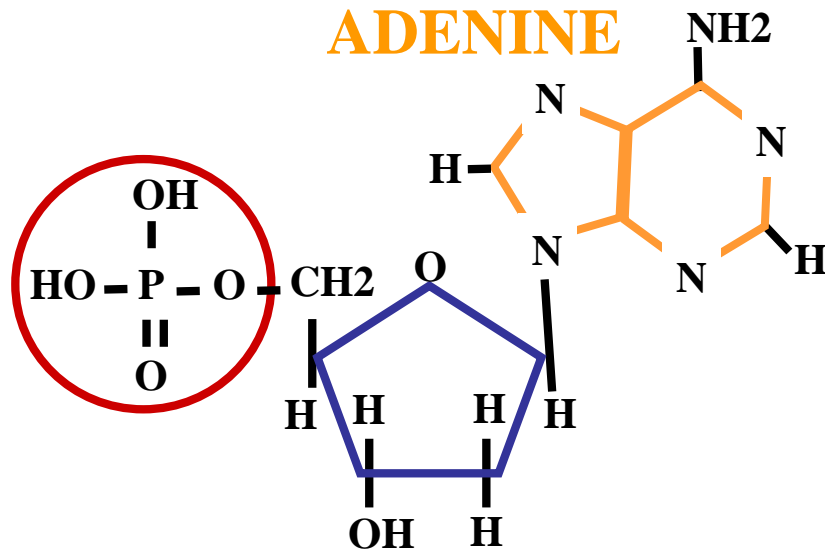
ADENINE

PURINES



NUCLEOTIDE BASES

PURINES



ADENINE

GUANINE

PURINES

NUCLEOTIDE
BASE CLASS
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NUCLEOTIDE BASES
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NUCLEOTIDE BASES
PURIMIDINES

NUCLEOTIDE BASES

PYRIMIDINES



THYMINE

CYTOSINE

URACIL

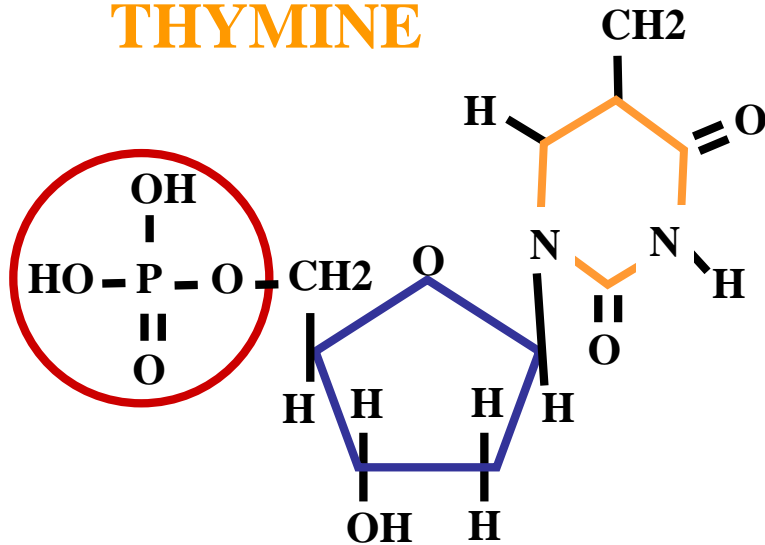
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PURIMIDINES

NUCLEOTIDE BASES

PYRIMIDINES

THYMINE



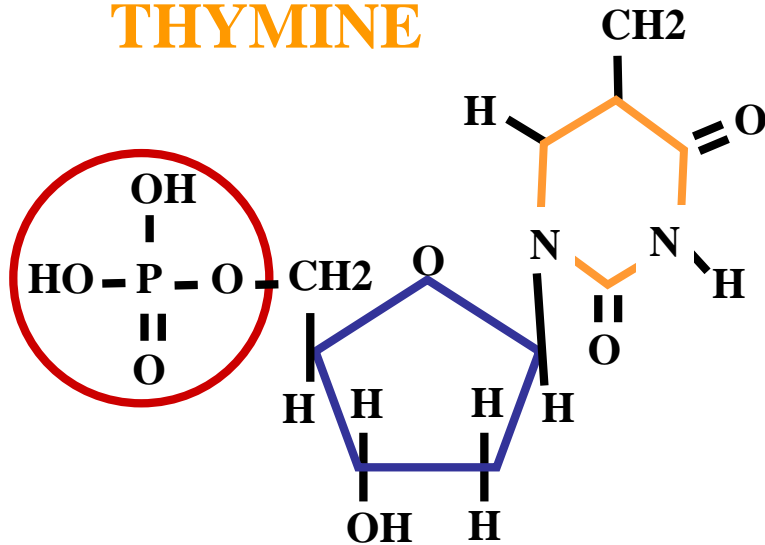
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PYRIMIDINES

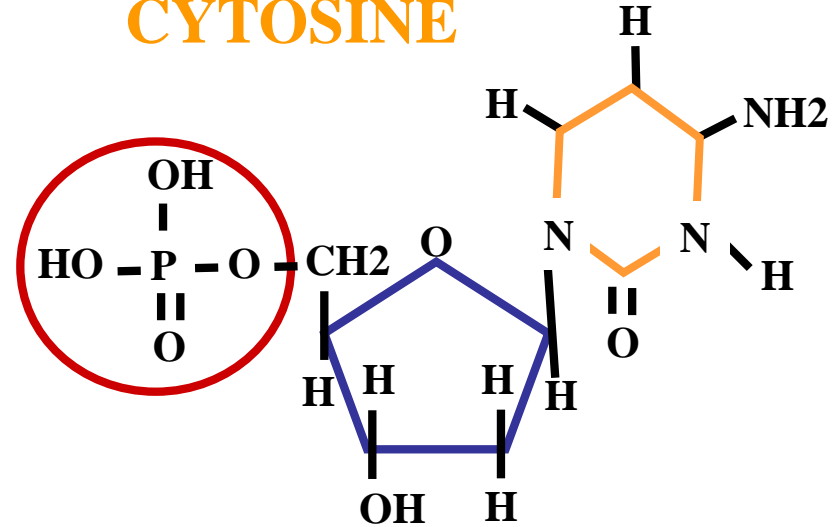
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PYRIMIDINES

THYMINE



CYTOSINE

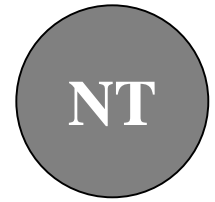
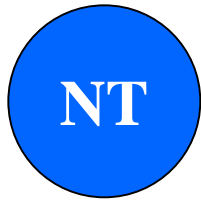


THYMINE

CYTOSINE

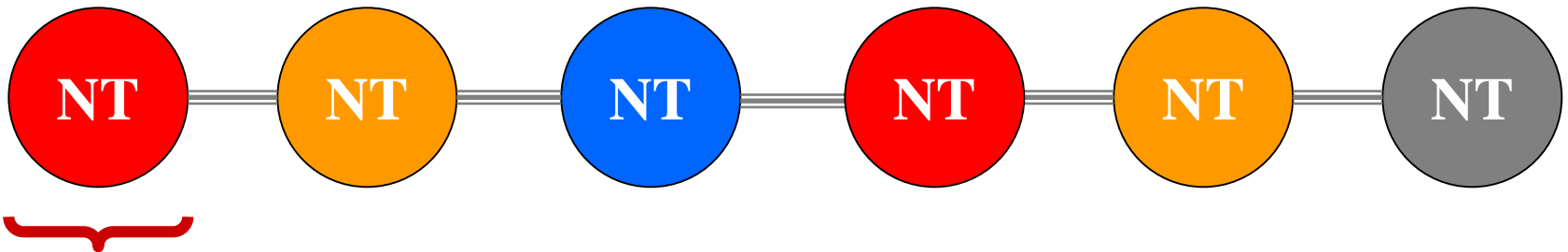
PYRIMIDINES

NUCLEIC ACID STRUCTURE



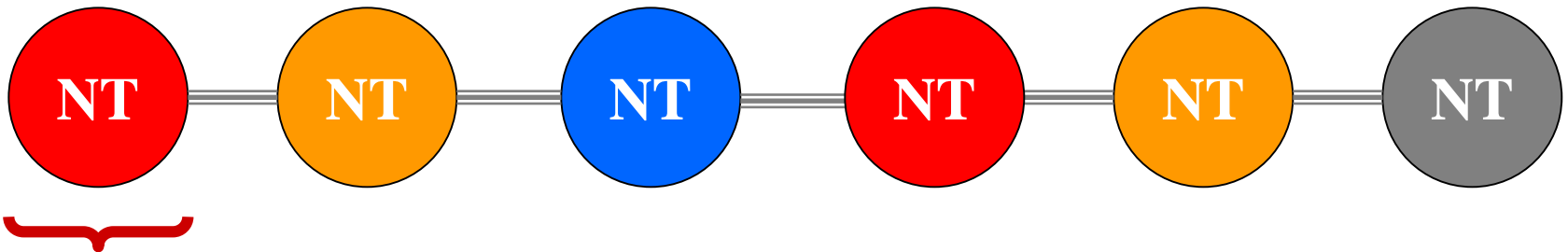
NUCLEOTIDE

NUCLEIC ACID STRUCTURE



NUCLEOTIDE == = **BOND**

NUCLEIC ACID STRUCTURE



NUCLEOTIDE == = **PHOSPHODIESTER BOND**

**PHOSPHODIESTER BOND
LINKS
NUCLEOTIDES**

PHOSPHODIESTER BOND