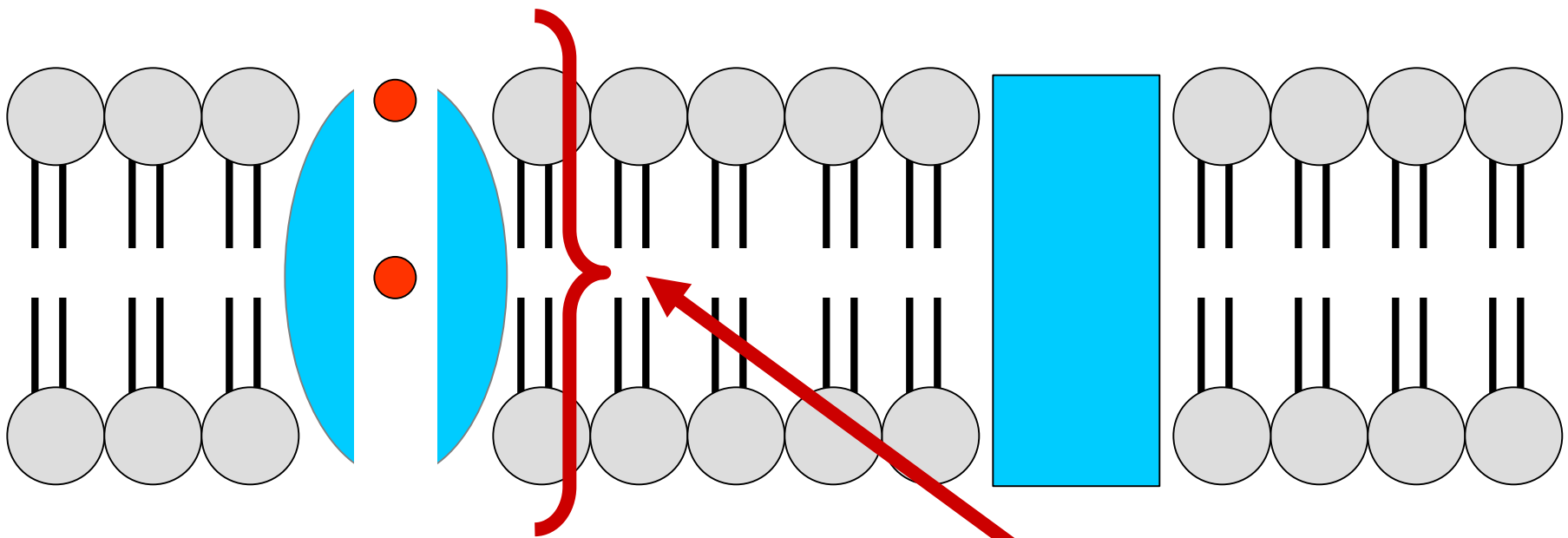


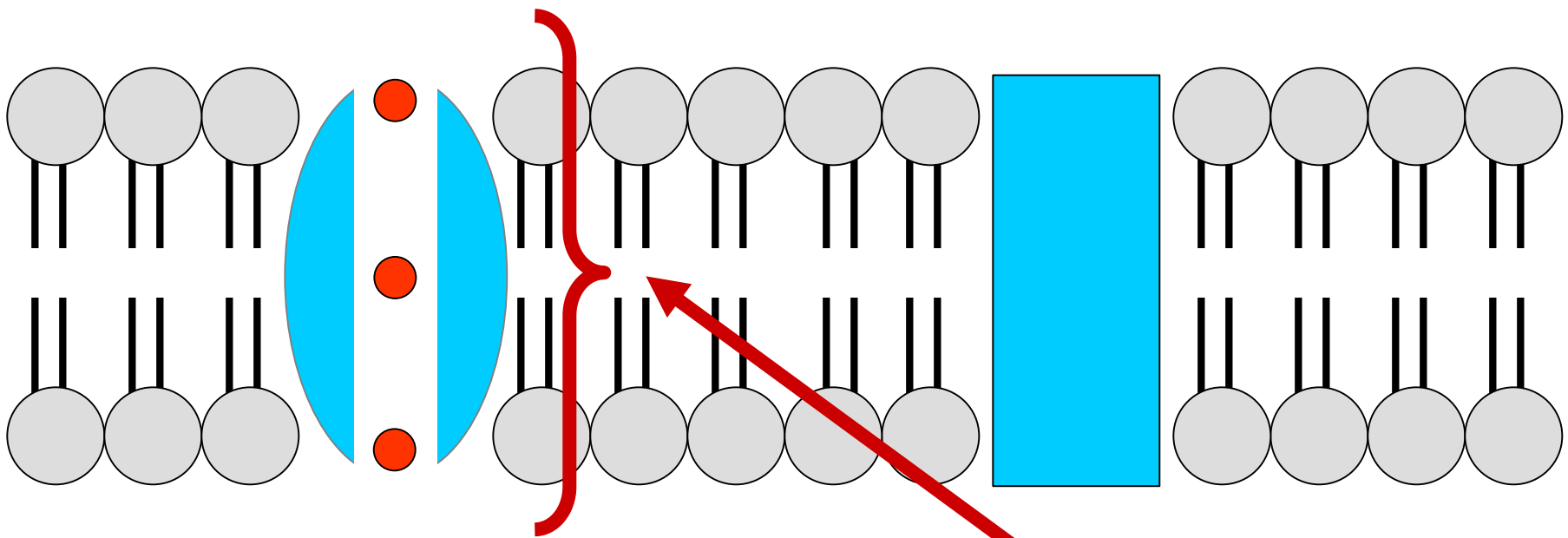
TRANSPORT PROTEINS



**CHANNEL
TRANSPORT
PROTEIN**

 = POLAR SOLUTE +/-

TRANSPORT PROTEINS

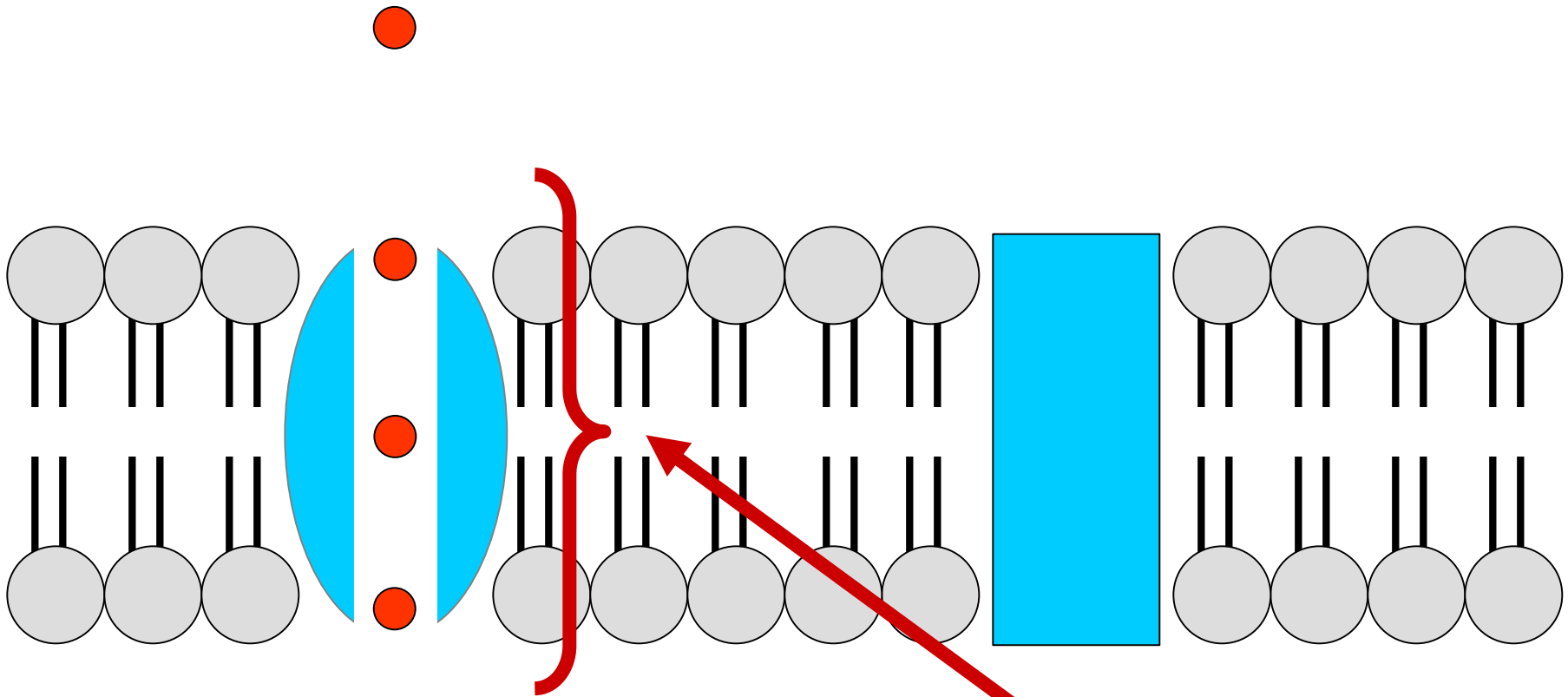


**CHANNEL
TRANSPORT
PROTEIN**

● = POLAR SOLUTE +/-

TRANSPORT PROTEINS

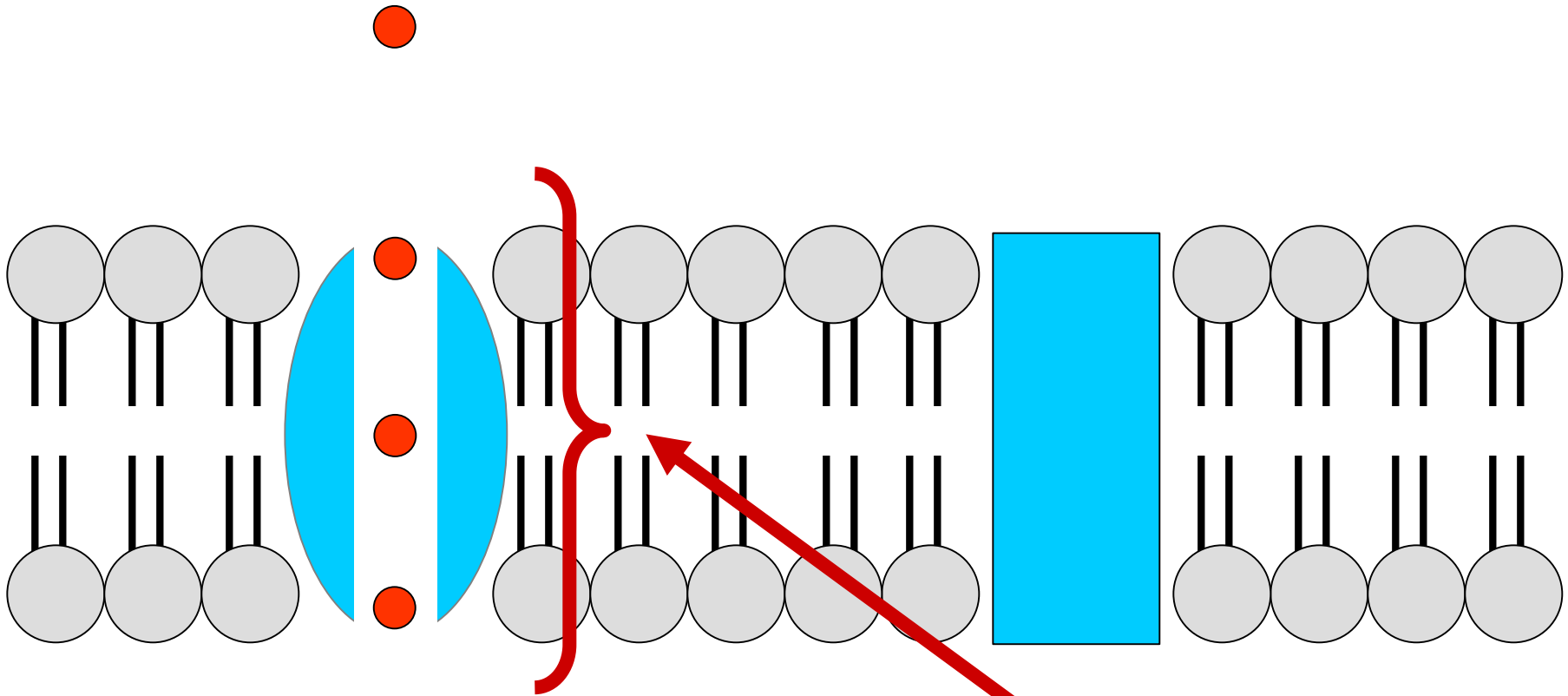
C
AB



**CHANNEL
TRANSPORT
PROTEIN**

● = POLAR SOLUTE +/-

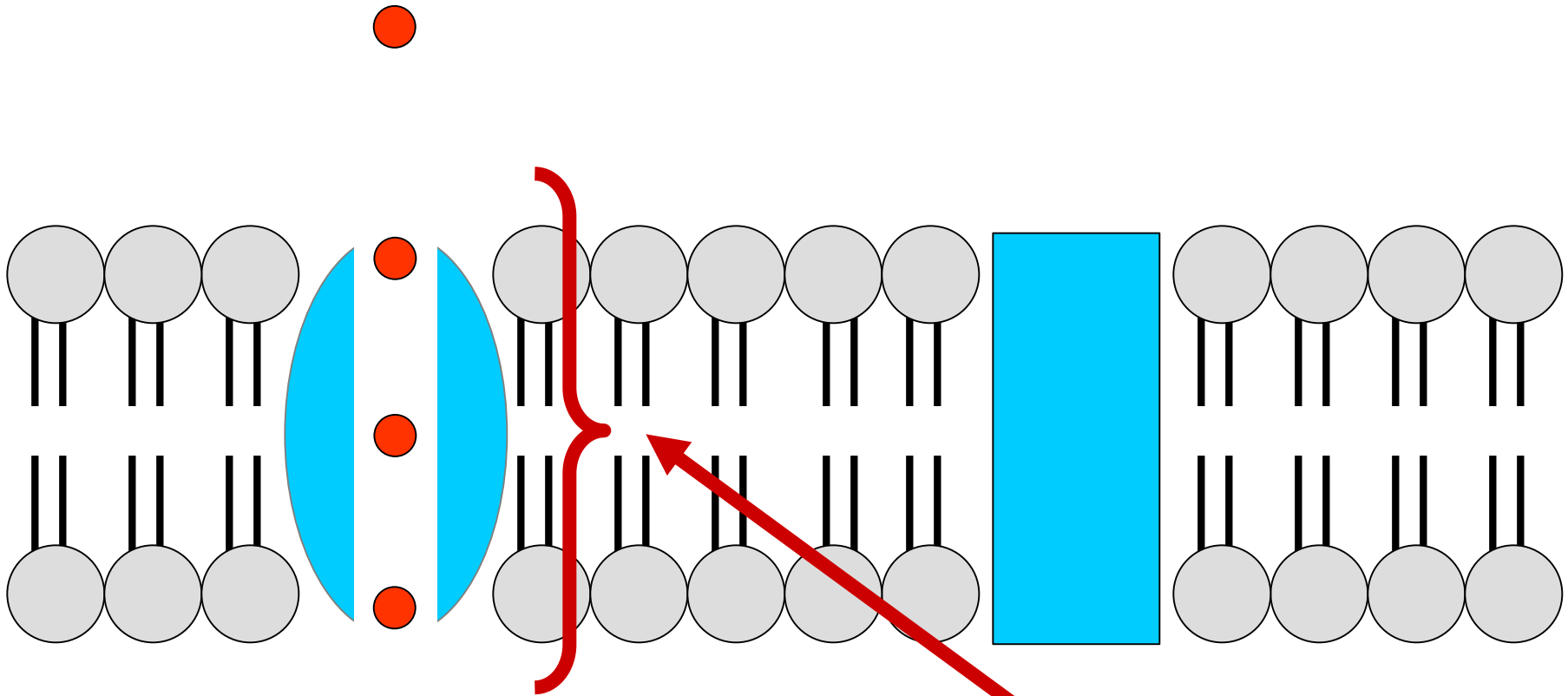
TRANSPORT PROTEINS



**CONFORMATION
CHANGE
ABSENT**

● = POLAR SOLUTE +/-

TRANSPORT PROTEINS



ATP
EXPENSE
ABSENT

● = POLAR SOLUTE +/-

**CARRIER
TRANSPORT
PROTEIN**



CARRIER TRANSPORT PROTEIN

SHUNTS

POLAR SOLUTES

ACROSS MEMBRANE

CARRIER TRANSPORT PROTEIN



CARRIER TRANSPORT PROTEIN

**CONFORMATION
CHANGE: REQUIRED**

CARRIER TRANSPORT PROTEIN



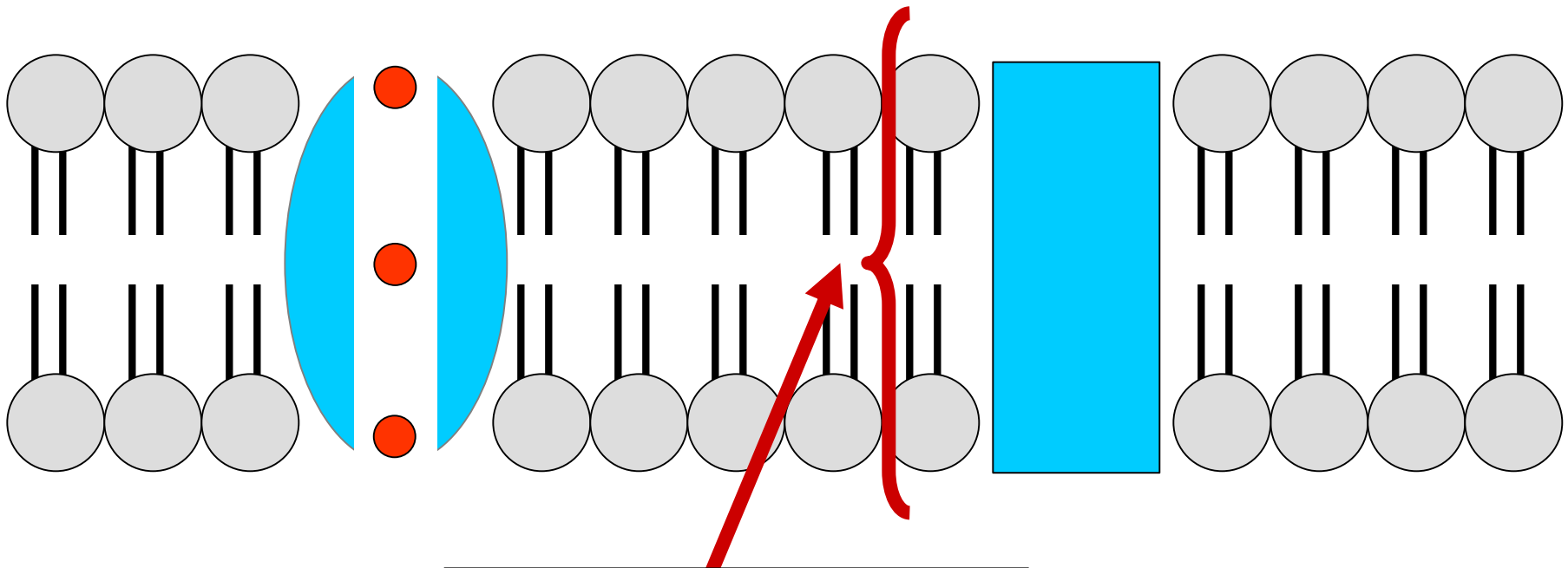
CARRIER TRANSPORT PROTEIN

**CONFORMATION
CHANGE: REQUIRED**

ATP EXPENSE: REQUIRED

CARRIER TRANSPORT PROTEIN

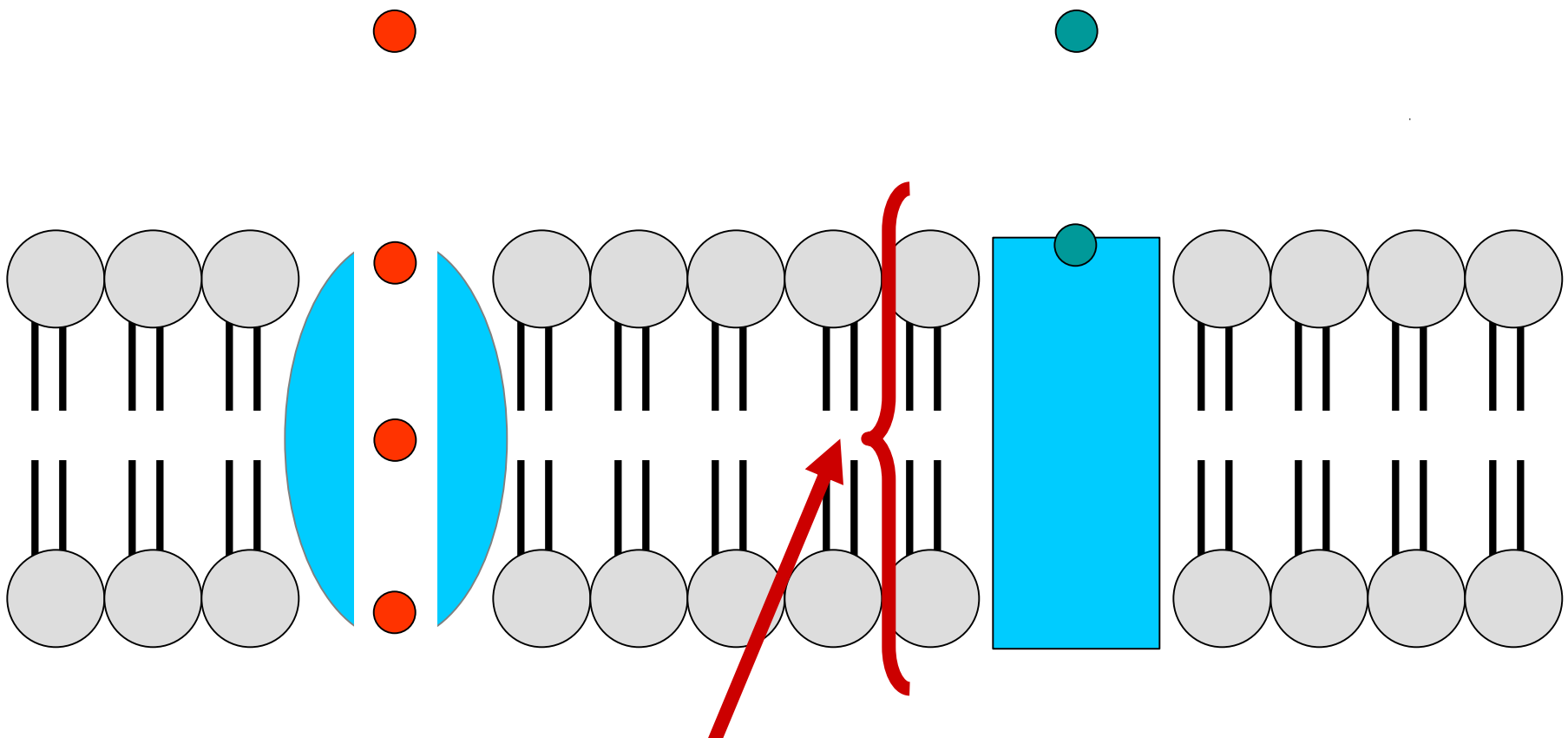
TRANSPORT PROTEINS



-  = POLAR SOLUTE
-  = POLAR SOLUTE

**CARRIER
TRANSPORT
PROTEIN**

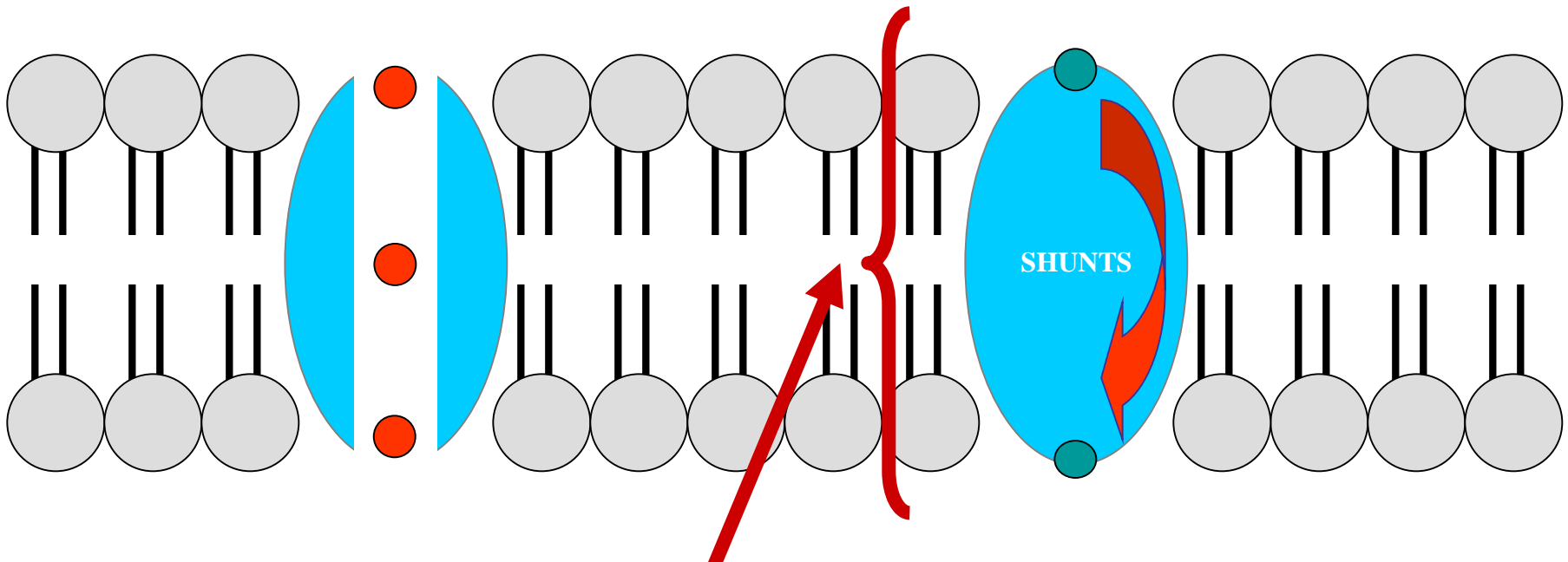
TRANSPORT PROTEINS



**CARRIER
TRANSPORT
PROTEIN**

-  = POLAR SOLUTE
-  = POLAR SOLUTE

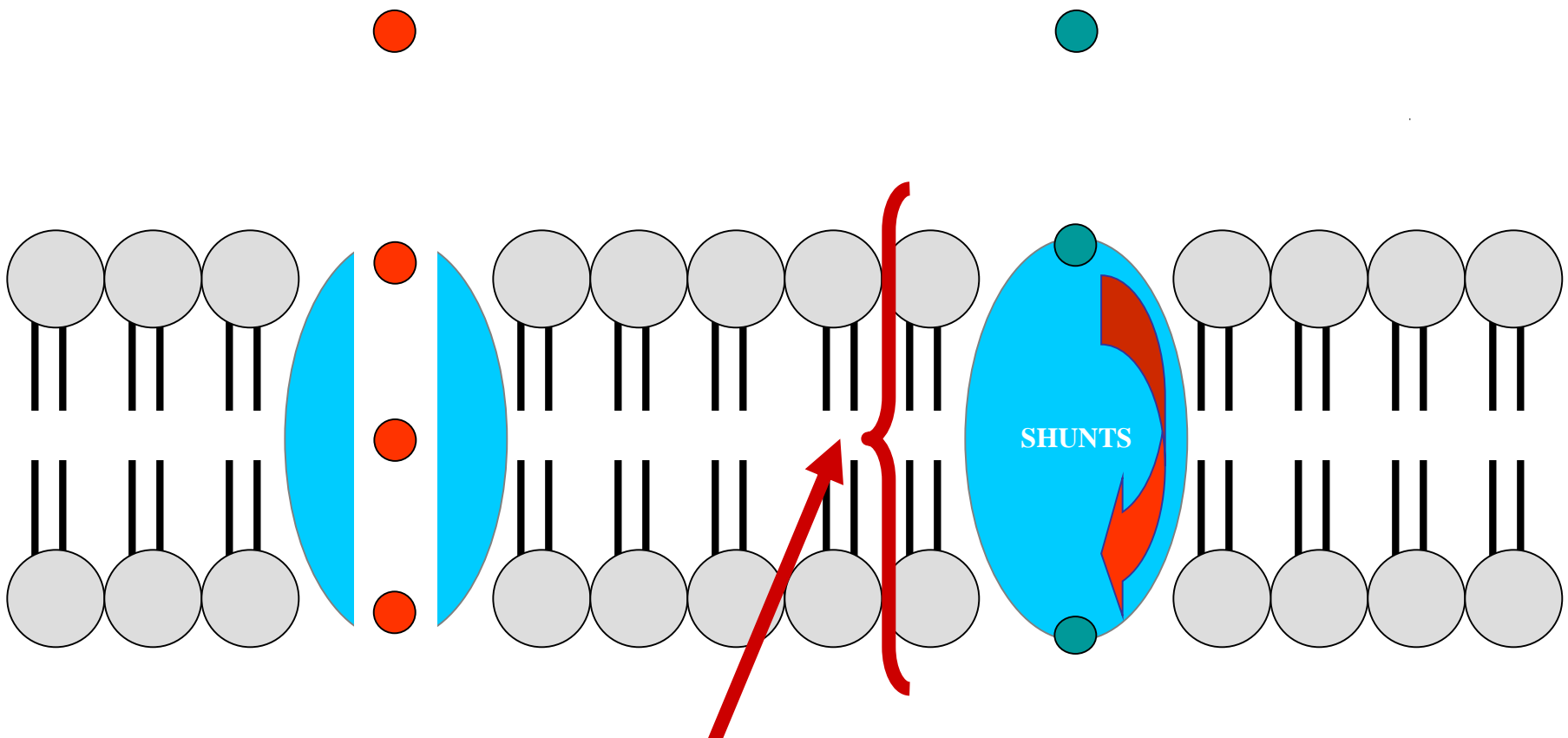
TRANSPORT PROTEINS



 = POLAR SOLUTE
 = POLAR SOLUTE

**CARRIER
TRANSPORT
PROTEIN**

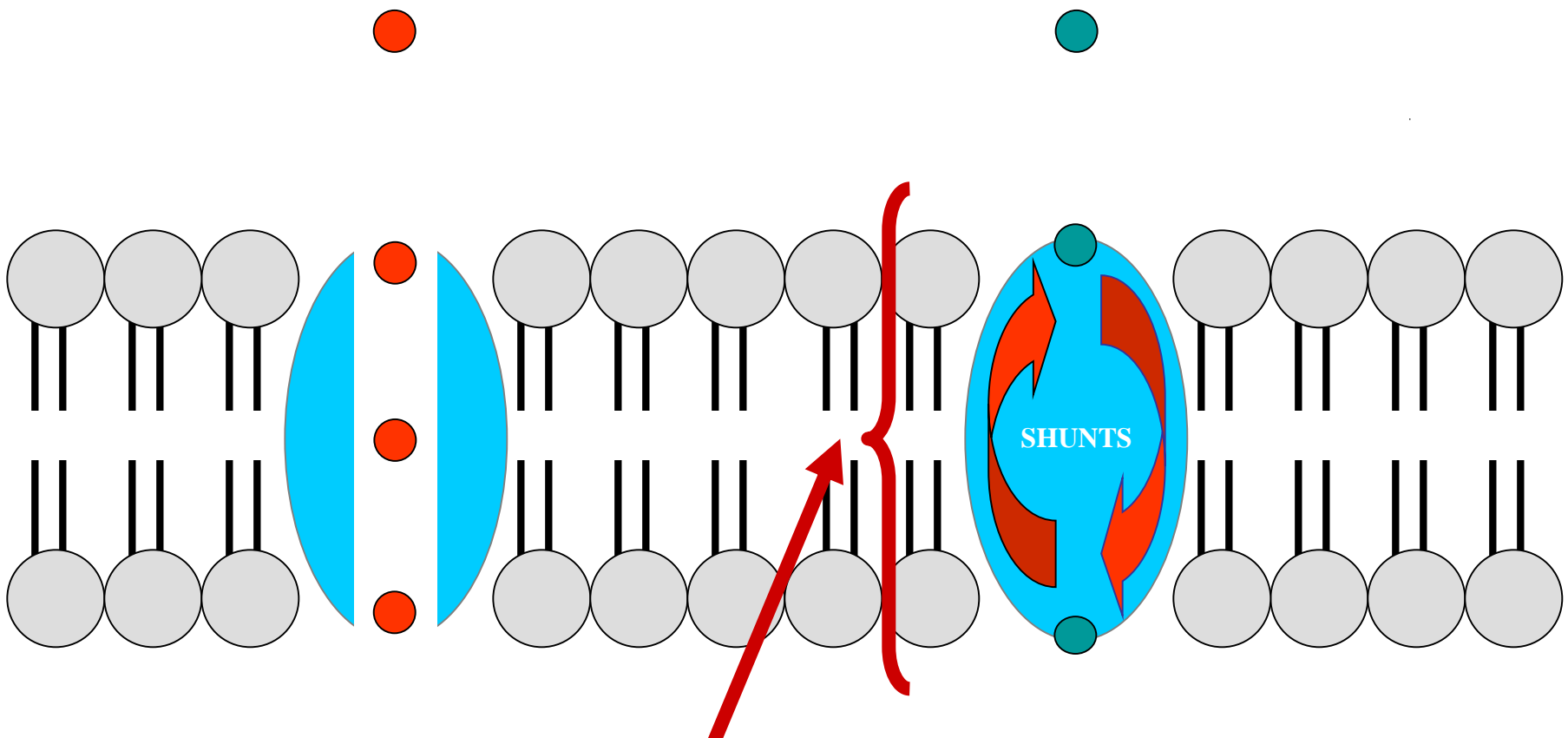
TRANSPORT PROTEINS



-  = POLAR SOLUTE
-  = POLAR SOLUTE

**CARRIER
TRANSPORT
PROTEIN**

TRANSPORT PROTEINS

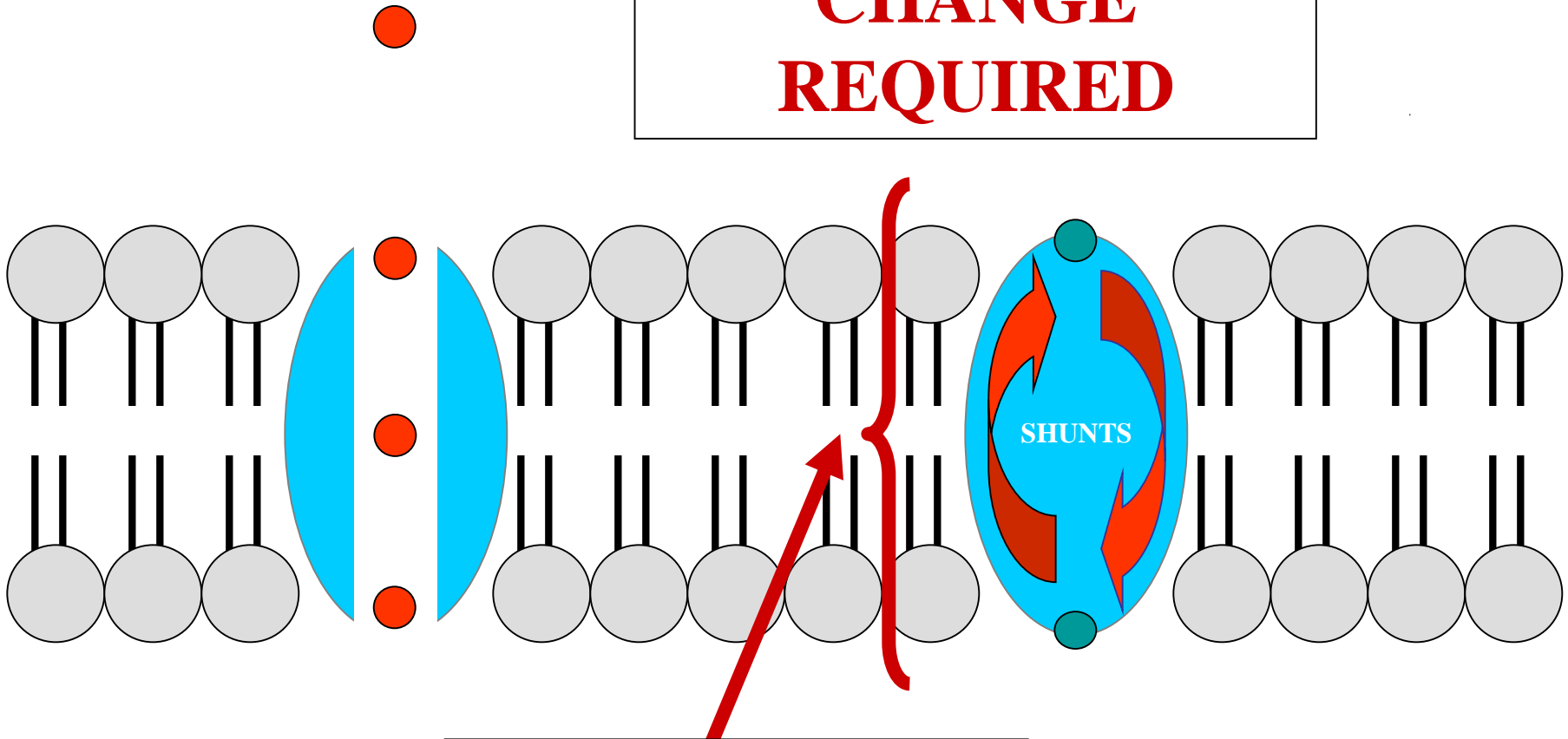


● = POLAR SOLUTE
● = POLAR SOLUTE

**CARRIER
TRANSPORT
PROTEIN**

TRANSPORT PROTEINS

CONFORMATION CHANGE REQUIRED

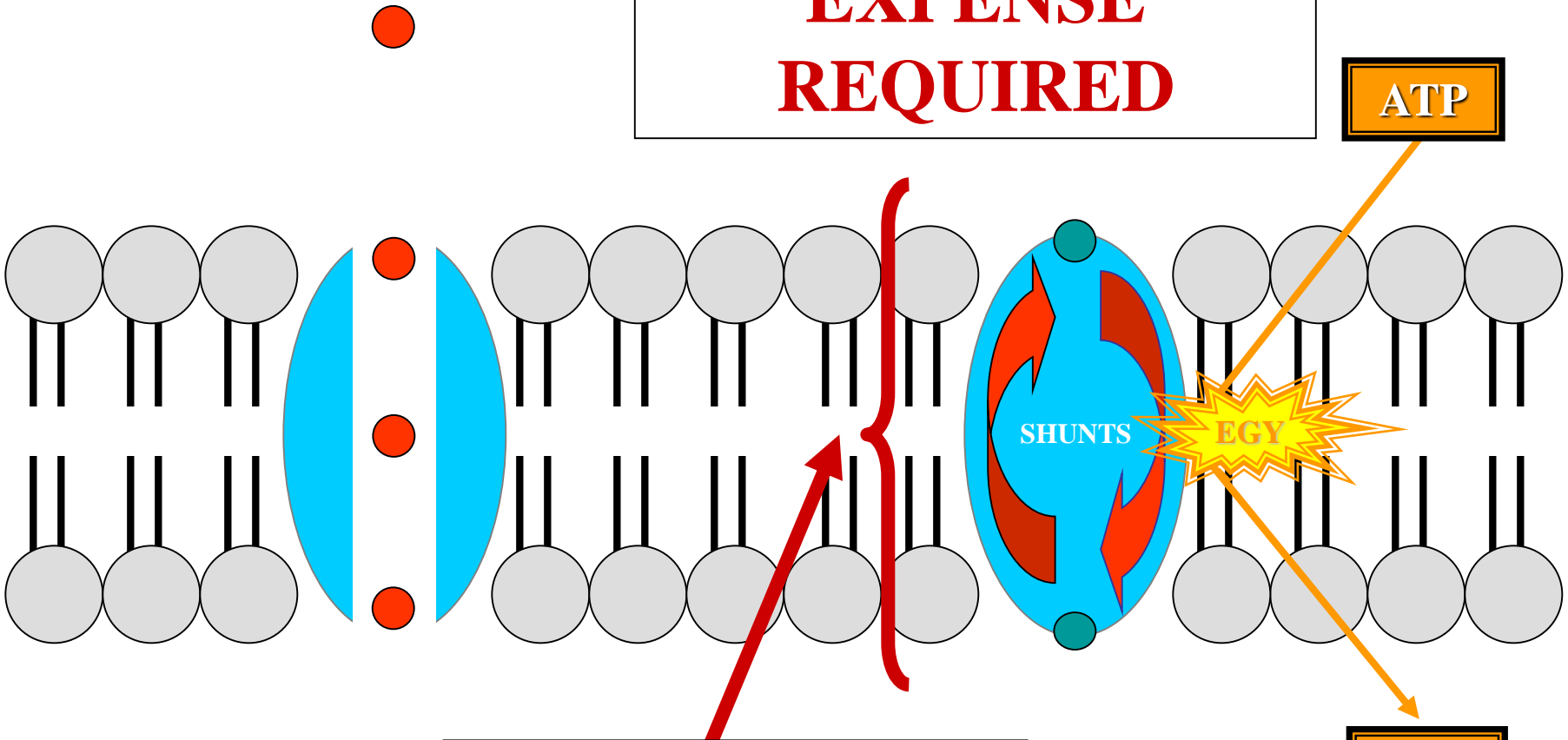


CARRIER TRANSPORT PROTEIN

- = POLAR SOLUTE
- = POLAR SOLUTE

TRANSPORT PROTEINS

**ATP
EXPENSE
REQUIRED**



ATP

ADP

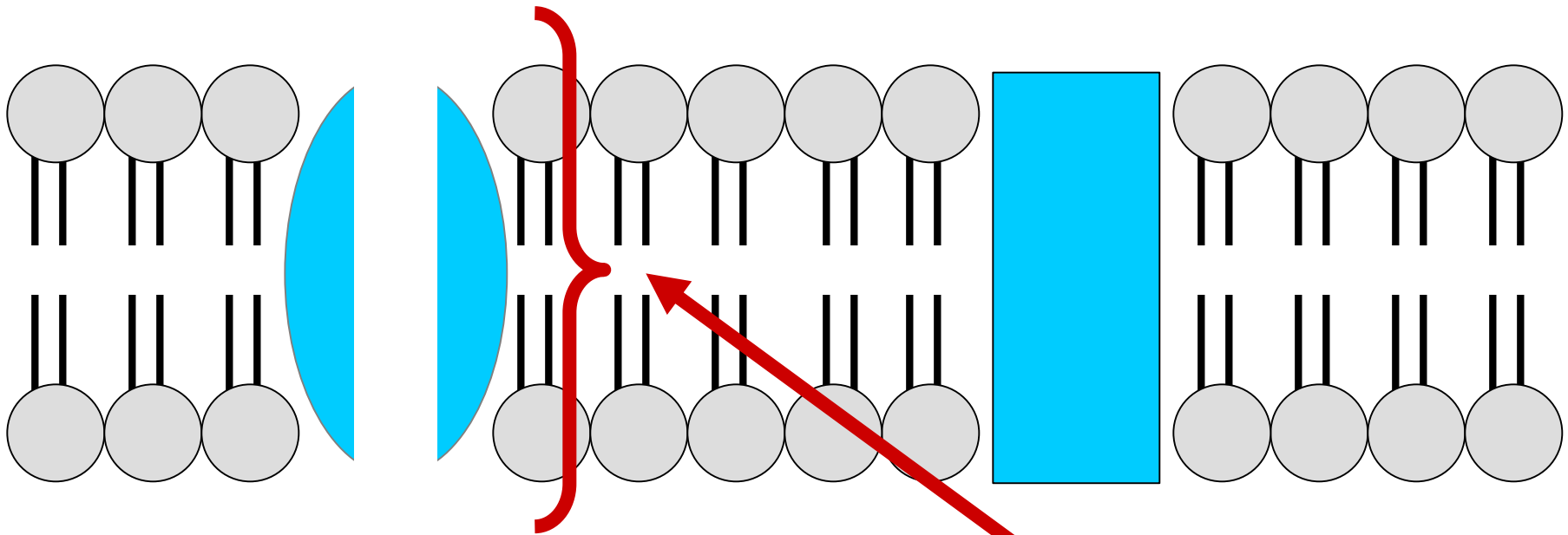
**CARRIER
TRANSPORT
PROTEIN**

-  = POLAR SOLUTE
-  = POLAR SOLUTE



TRANSPORT PROTEINS SUMMARY

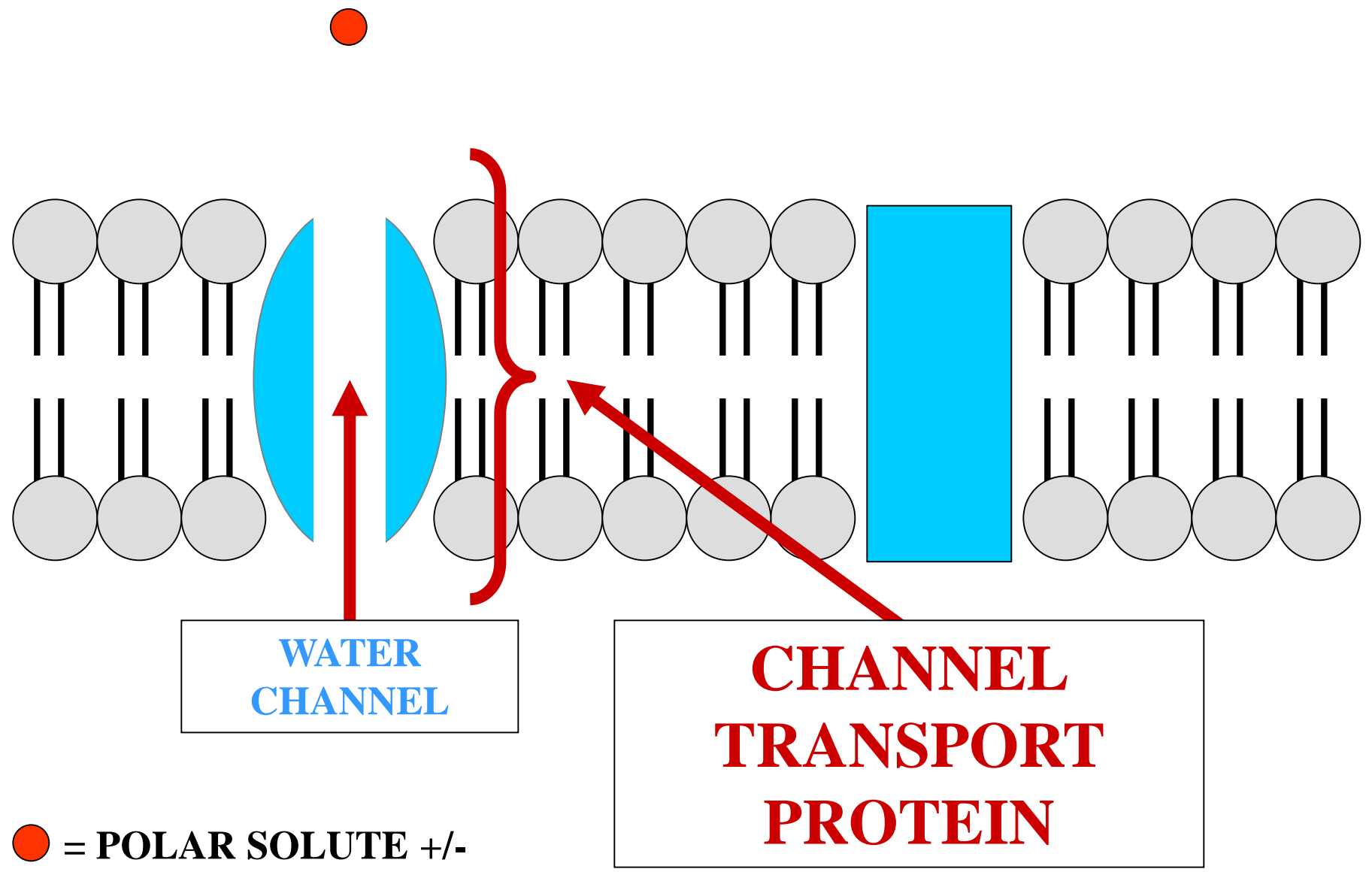
TRANSPORT PROTEINS



?

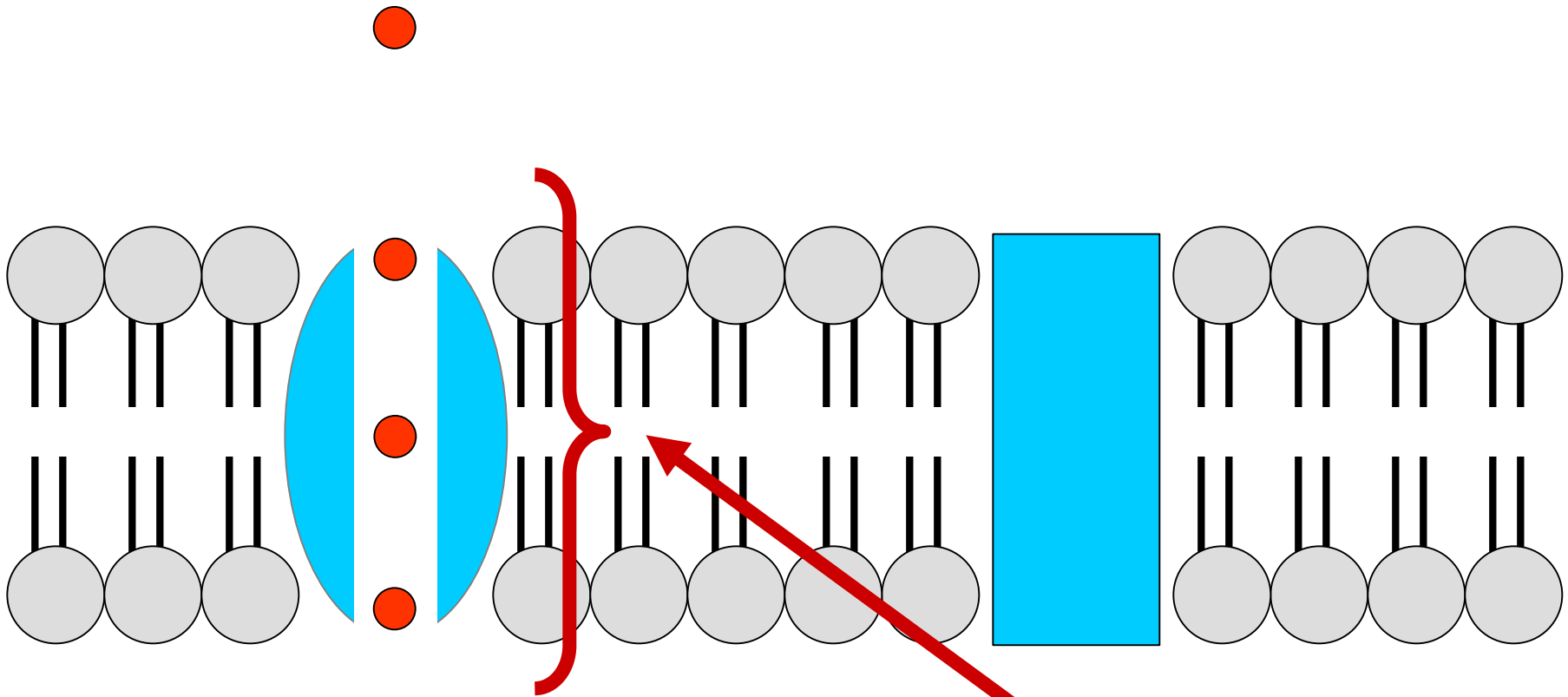
● = POLAR SOLUTE +/-

TRANSPORT PROTEINS



TRANSPORT PROTEINS

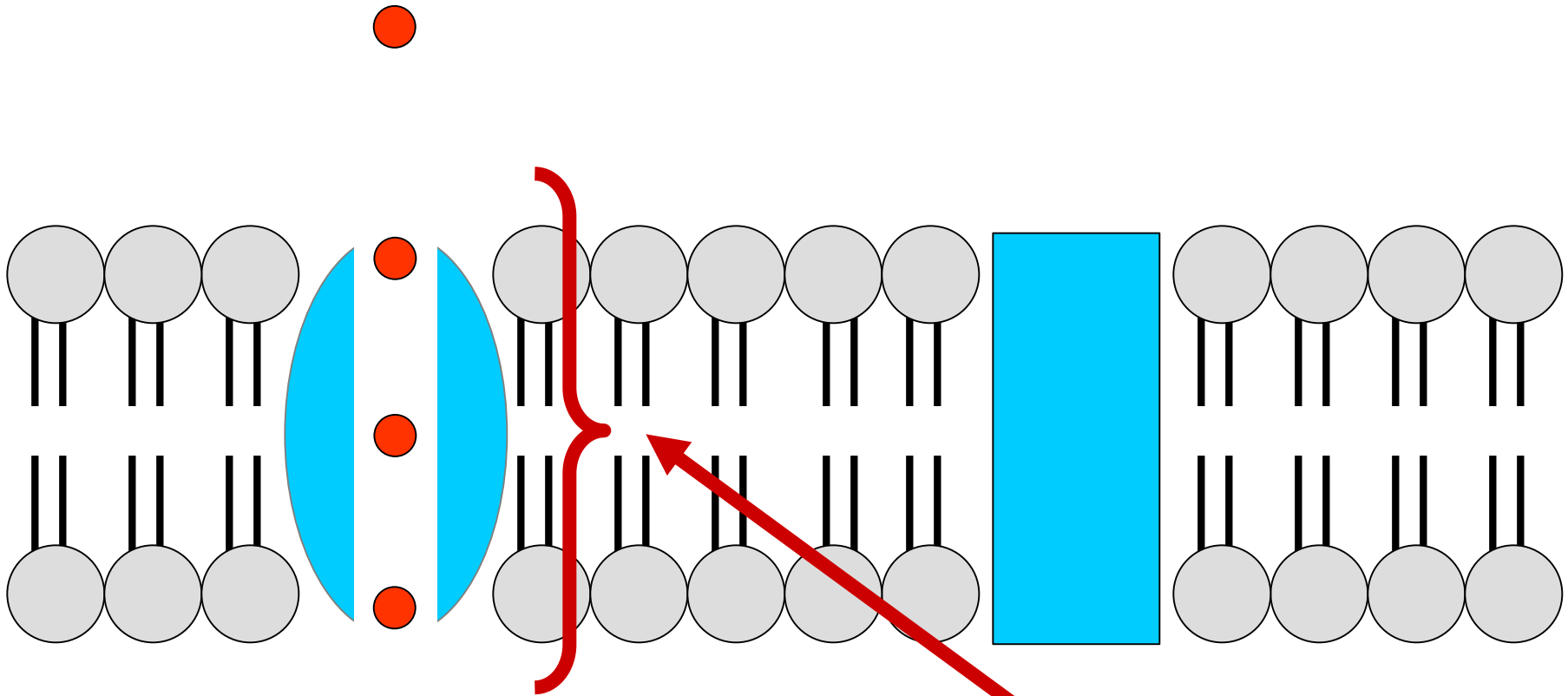
C
AB



**CHANNEL
TRANSPORT
PROTEIN**

● = POLAR SOLUTE +/-

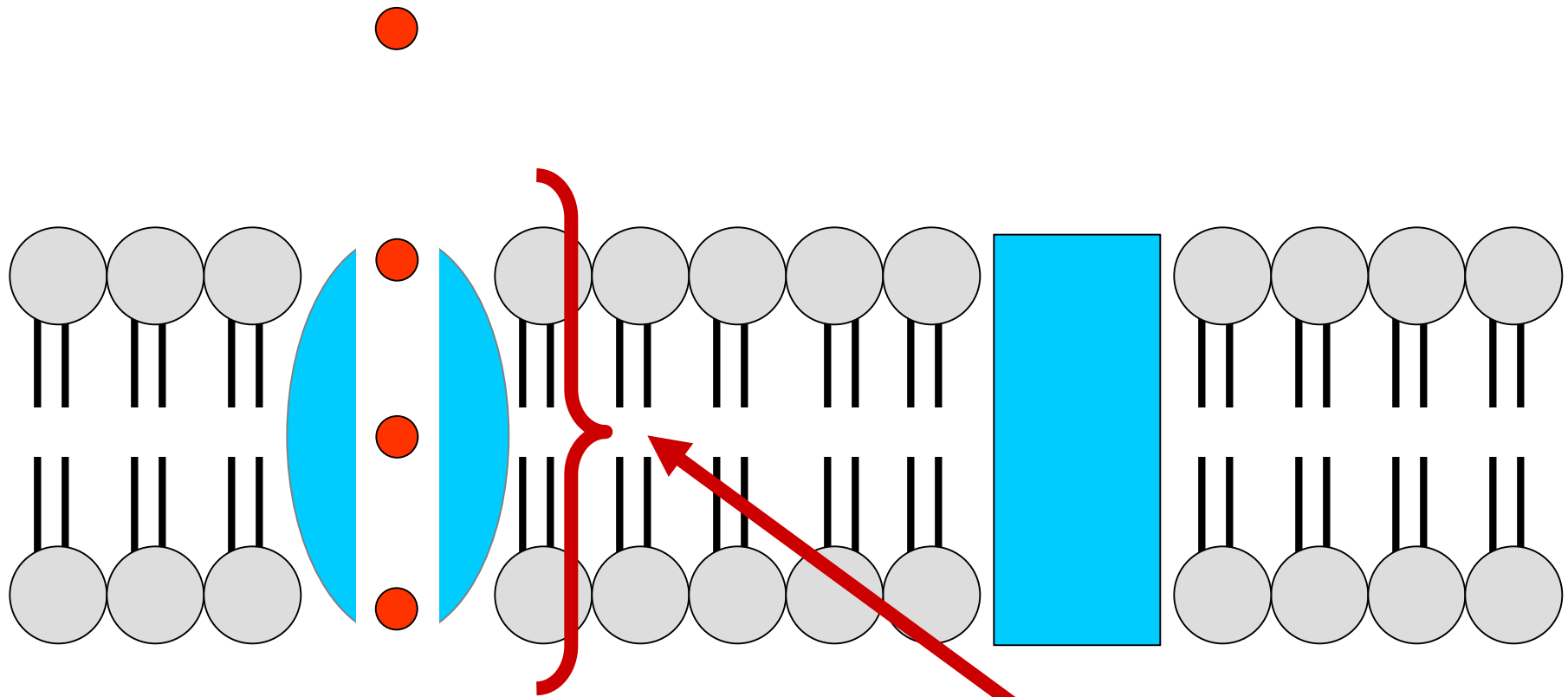
TRANSPORT PROTEINS



**CONFORMATION
CHANGE
ABSENT**

● = POLAR SOLUTE +/-

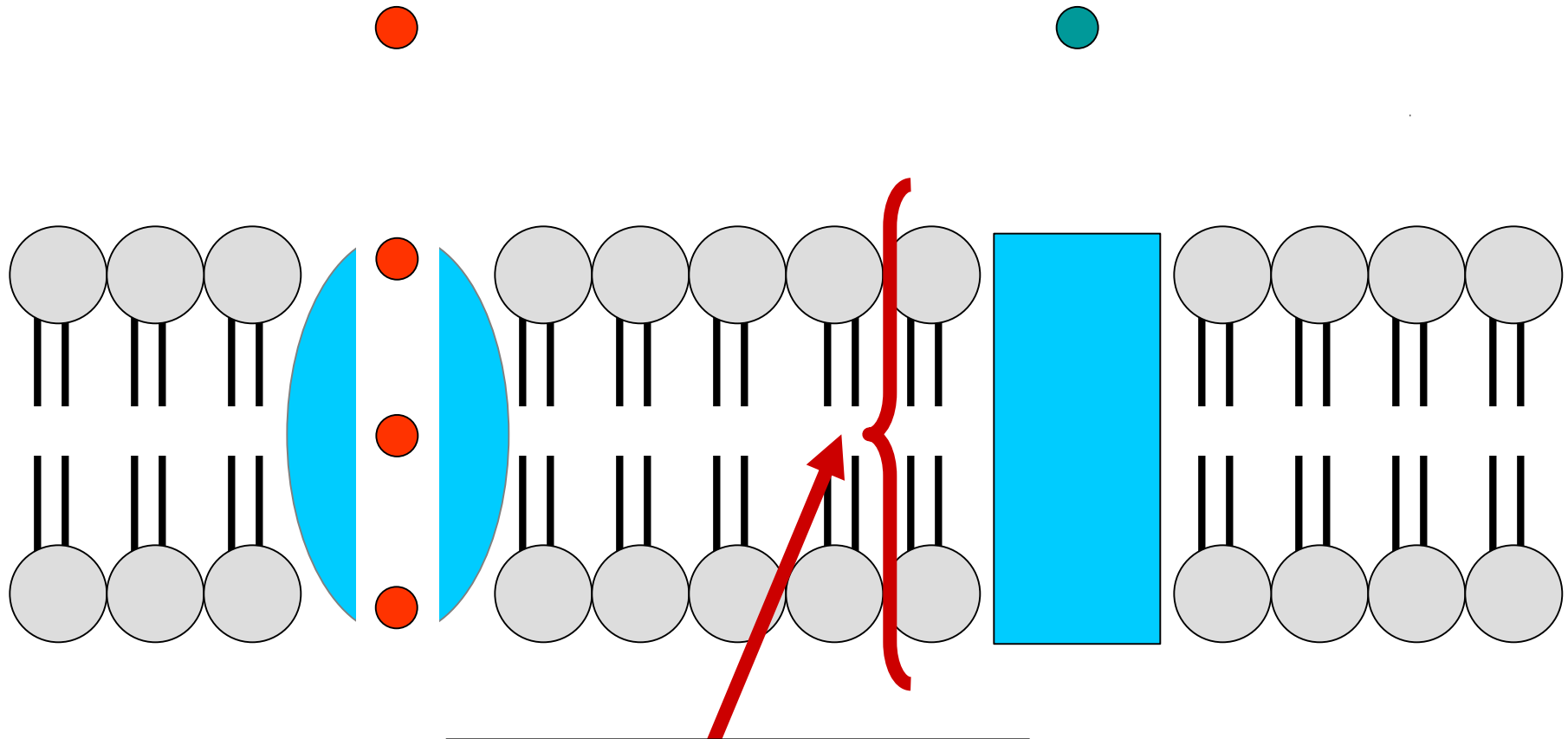
TRANSPORT PROTEINS





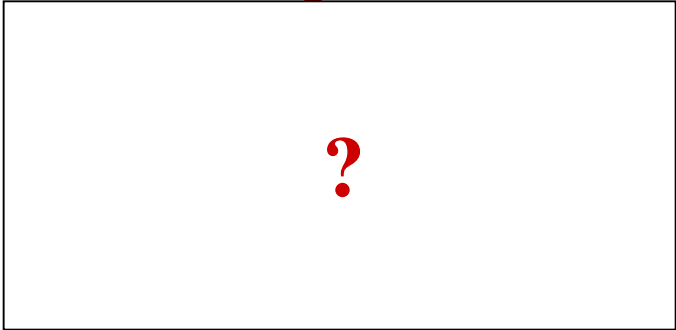
ATP
EXPENSE
ABSENT

● = POLAR SOLUTE +/-

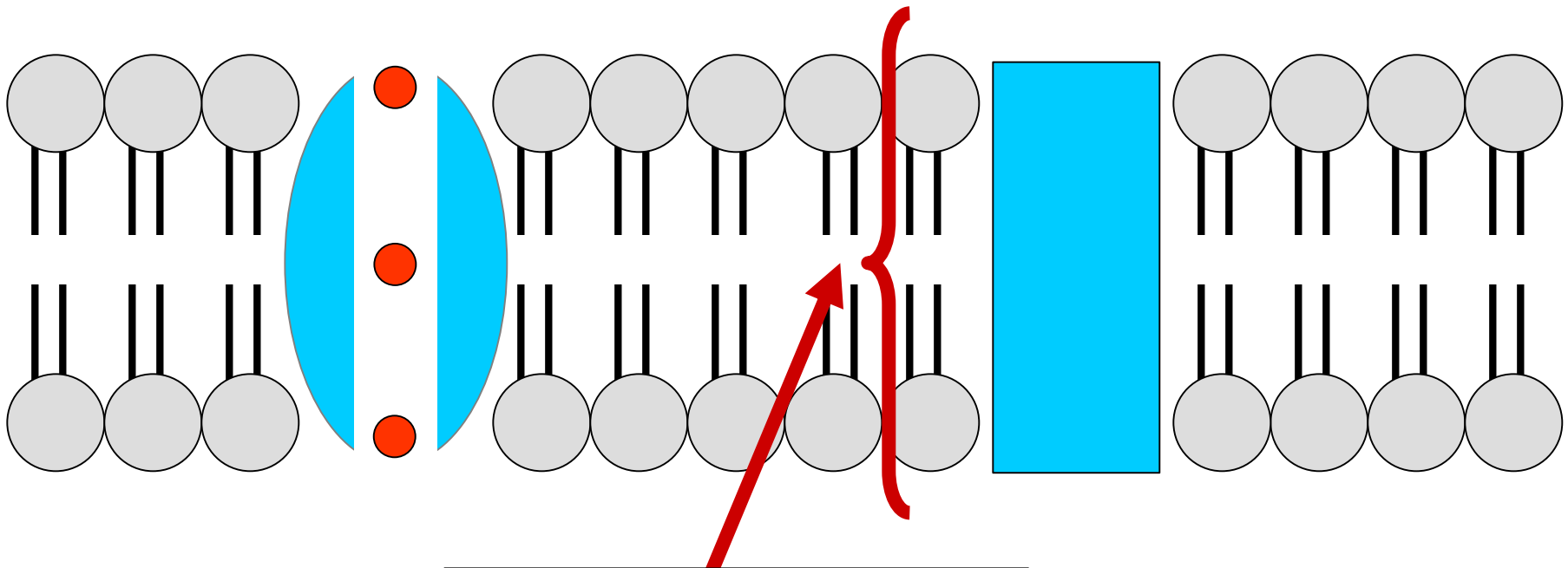
TRANSPORT PROTEINS



 = POLAR SOLUTE
 = POLAR SOLUTE



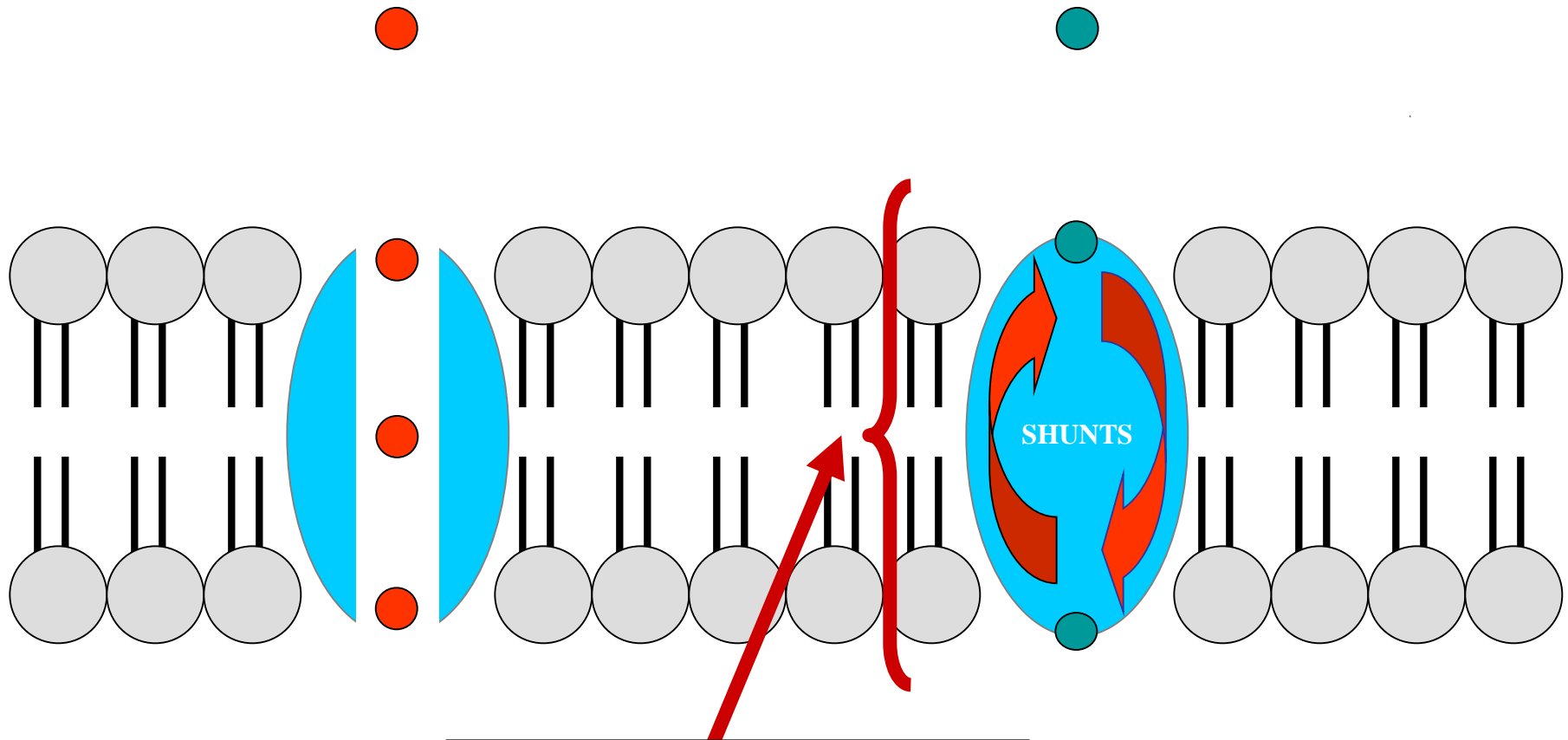
TRANSPORT PROTEINS



-  = POLAR SOLUTE
-  = POLAR SOLUTE

**CARRIER
TRANSPORT
PROTEIN**

TRANSPORT PROTEINS

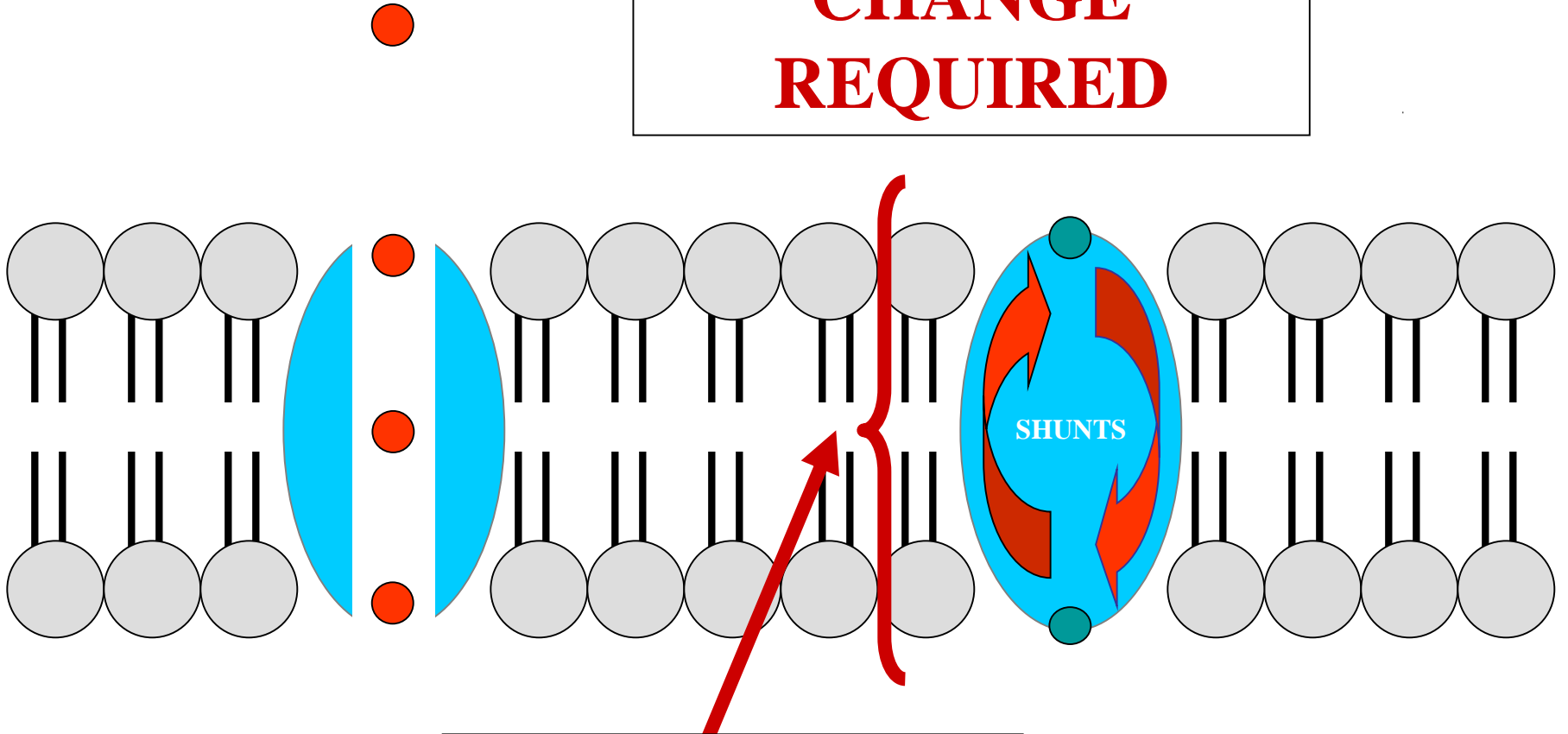


**CARRIER
TRANSPORT
PROTEIN**

● = POLAR SOLUTE
● = POLAR SOLUTE

TRANSPORT PROTEINS

CONFORMATION CHANGE REQUIRED REQUIRED

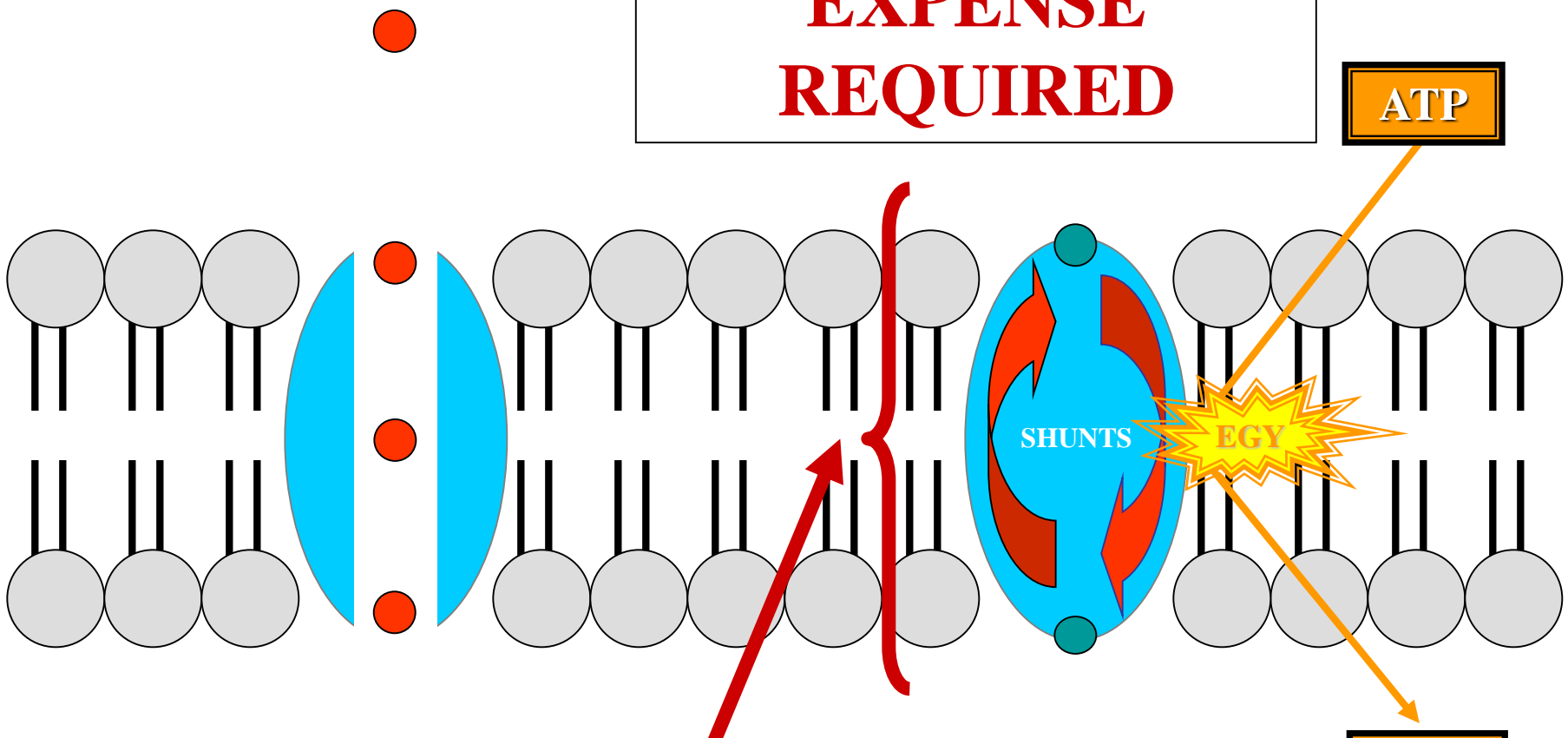


 = POLAR SOLUTE
 = POLAR SOLUTE

CARRIER TRANSPORT PROTEIN

TRANSPORT PROTEINS

ATP EXPENSE REQUIRED



ATP

ENERGY

SHUNTS

ADP

CARRIER TRANSPORT PROTEIN

- = POLAR SOLUTE
- = POLAR SOLUTE



SOLUTE MEMBRANE TRANSPORT

**SOLUTE
MEMBRANE
TRANSPORT
TYPES**

SOLUTE MEMBRANE TRANSPORT TYPES

PASSIVE TRANSPORT

SOLUTE MEMBRANE TRANSPORT TYPES

SOLUTE MEMBRANE TRANSPORT TYPES

PASSIVE TRANSPORT

PASSIVE FACILITATED TRANSPORT

SOLUTE MEMBRANE TRANSPORT TYPES

SOLUTE MEMBRANE TRANSPORT TYPES



PASSIVE TRANSPORT
PASSIVE FACILITATED TRANSPORT
ACTIVE TRANSPORT

SOLUTE MEMBRANE TRANSPORT TYPES

SOLUTION TERMS

SOLUTION

SOLUTION TERMS

**SOLUTION
SOLVENT-SOLUTE
MIXTURE**

SOLUTION TERMS

SOLVENT

SOLUTION TERMS

SOLVENT

LIQUID

SOLUTION

COMPONENT

SOLUTION TERMS

SOLUTE

SOLUTION TERMS



SOLUTE

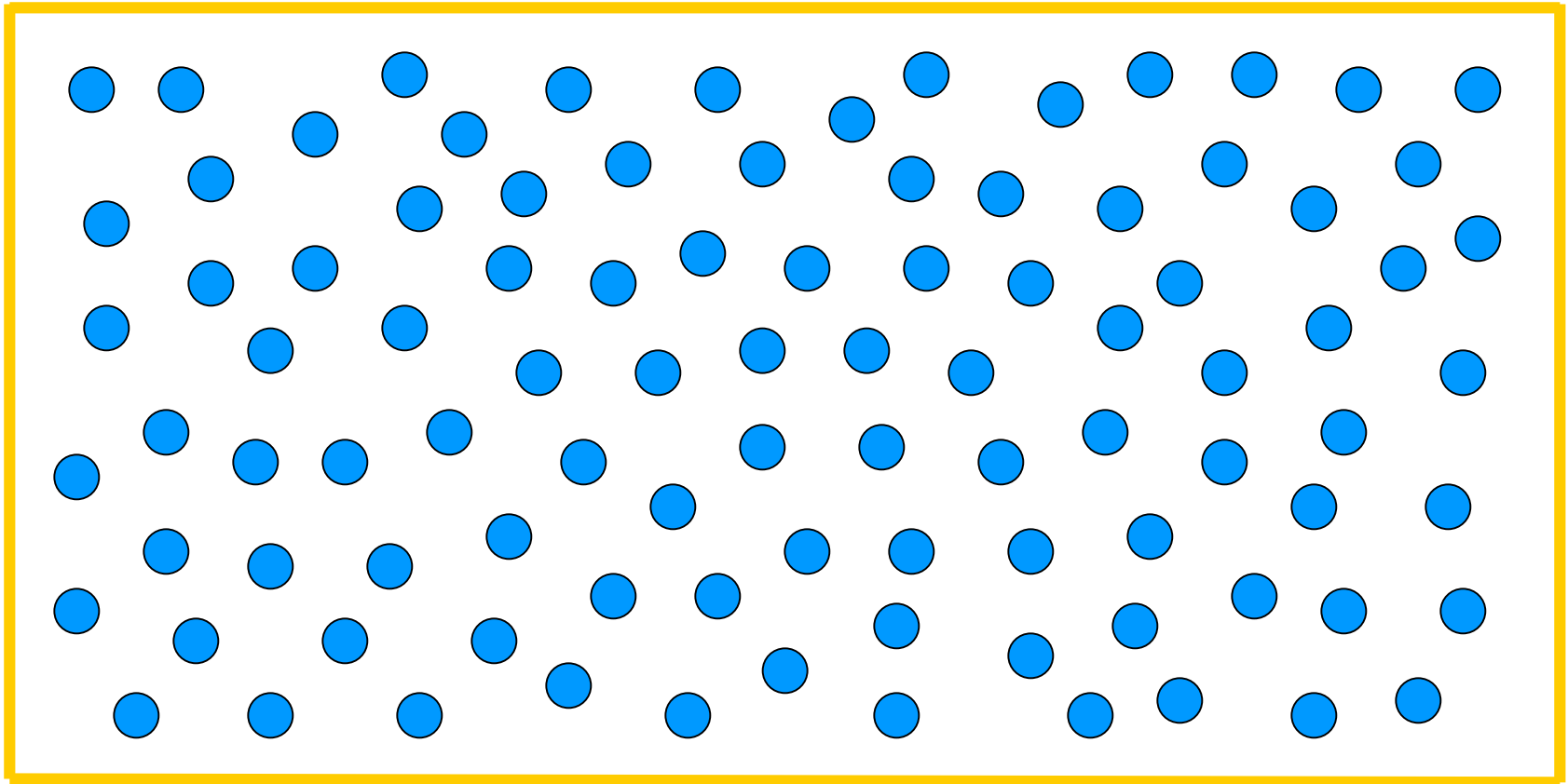
DISSOLVED

SOLUTION

COMPONENT

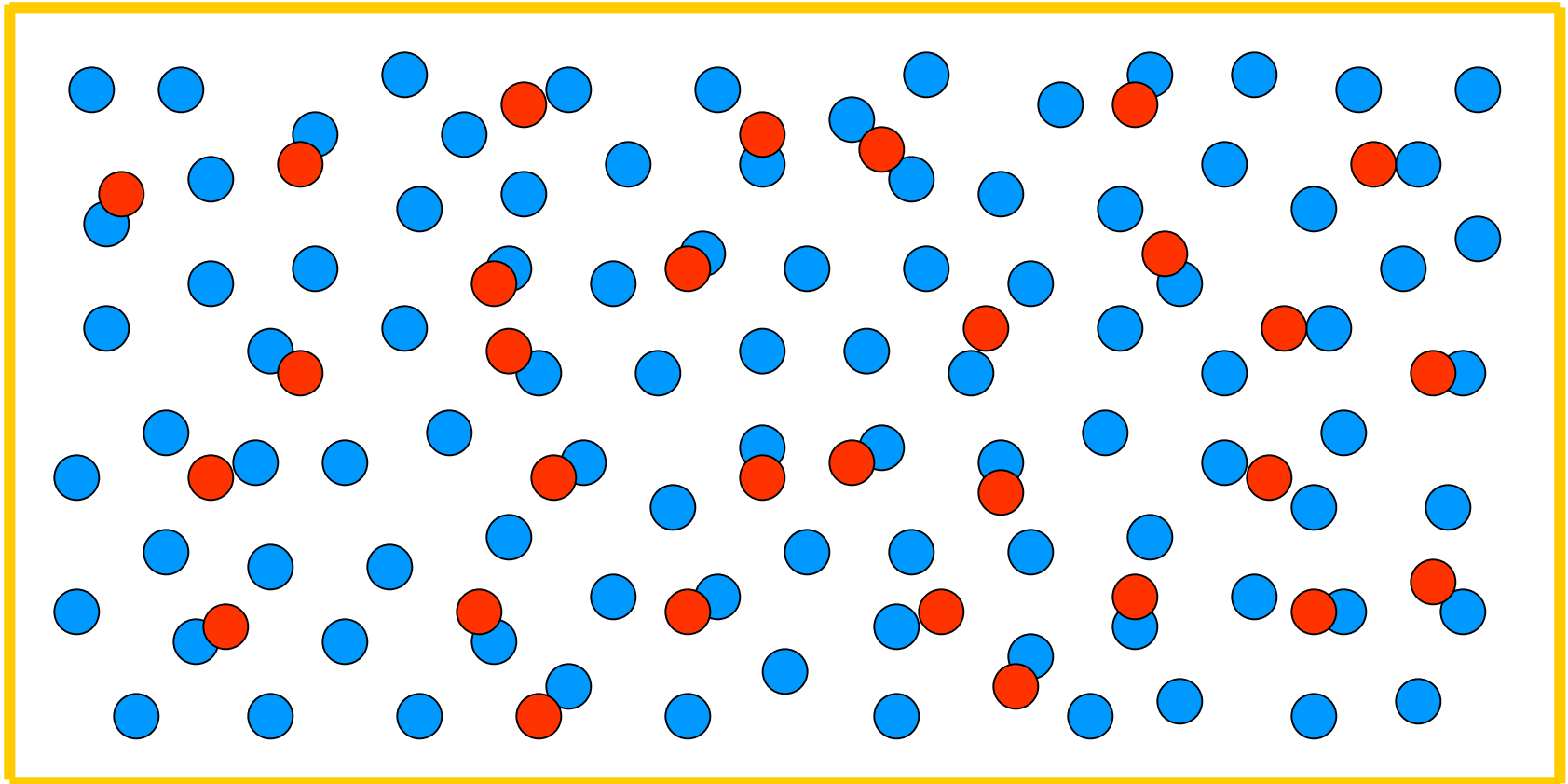
SOLUTION TERMS

SOLUTION TERMS



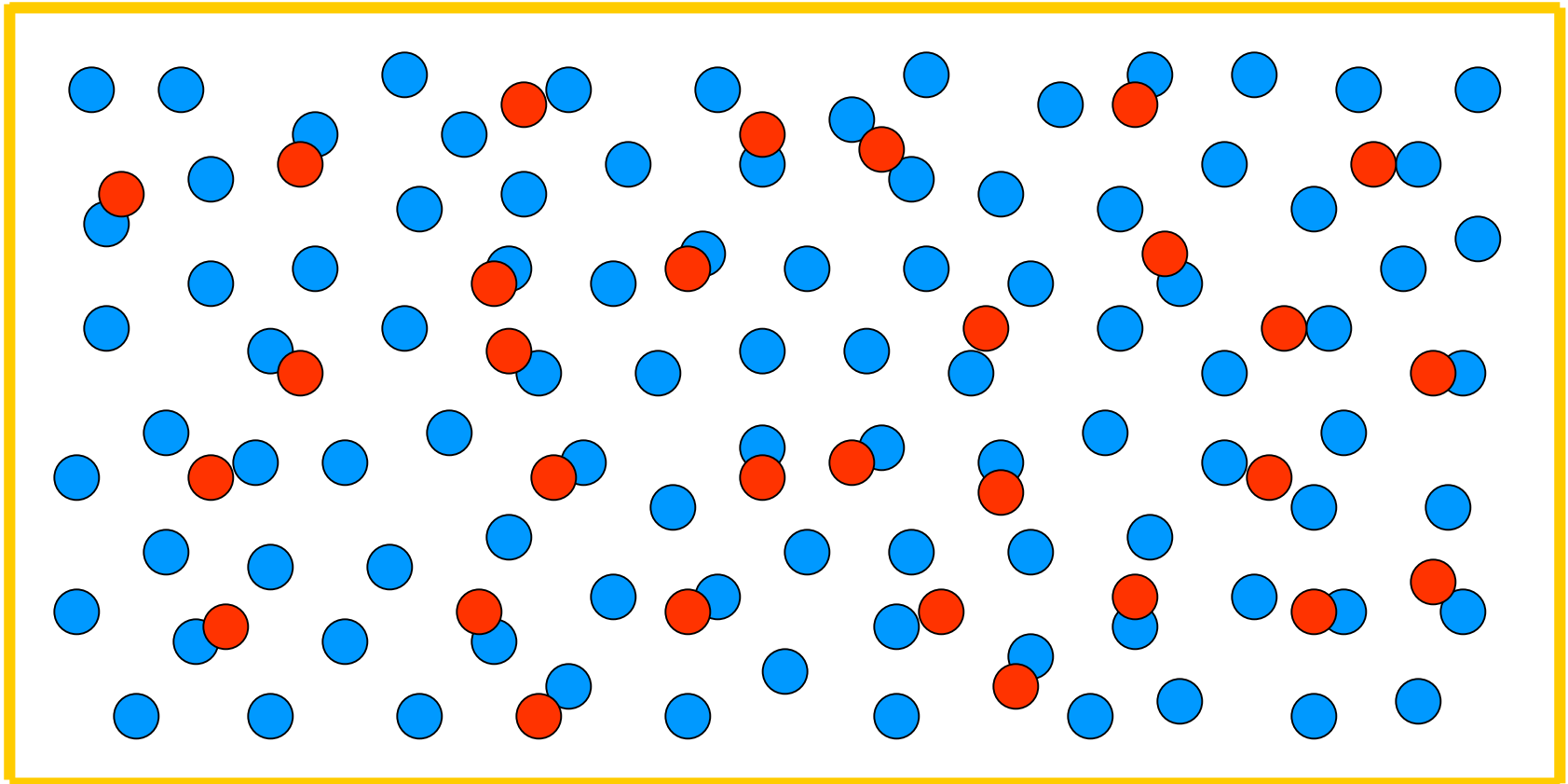
● = SOLVENT MOLECULE

SOLUTION TERMS



● = SOLVENT MOLECULE
● = SOLUTE MOLECULE } = MIXTURE

SOLUTION TERMS



● = SOLVENT MOLECULE
● = SOLUTE MOLECULE } = SOLUTION

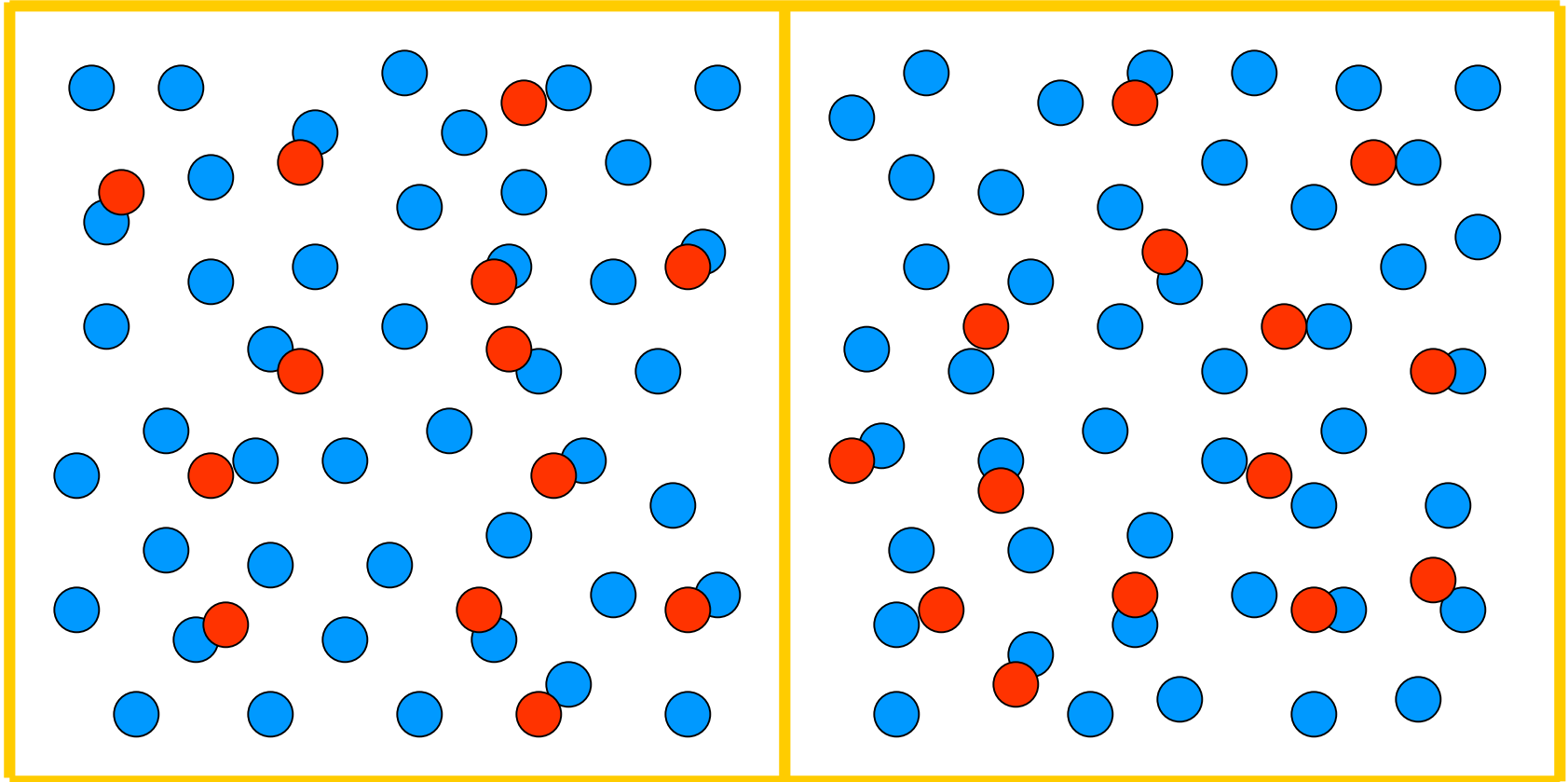


SOLUTION

SOLUTION A

TERMS

SOLUTION B



● = SOLVENT MOLECULE

● = SOLUTE MOLECULE

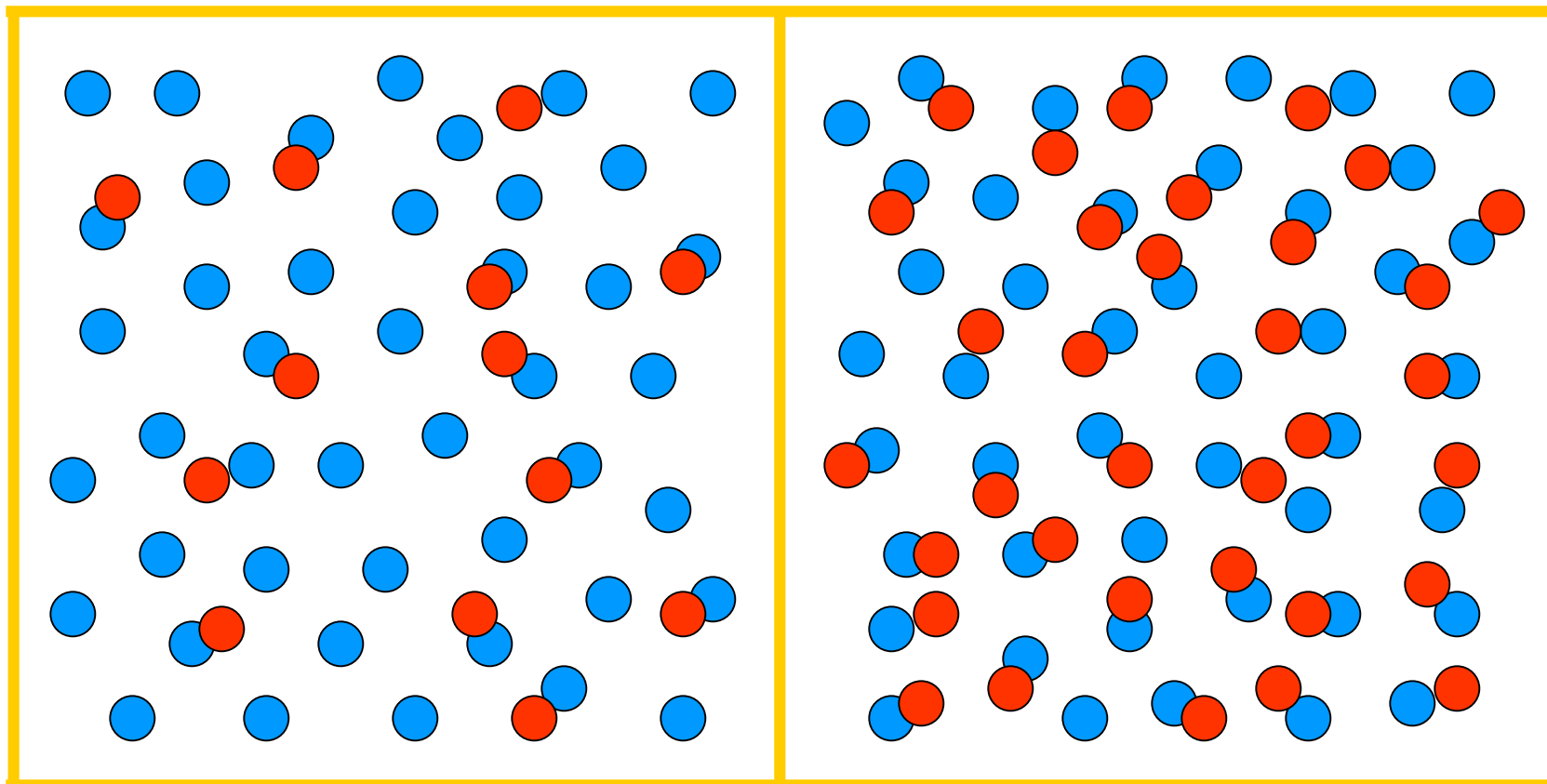
} = SOLUTION

SOLUTION

SOLUTION A

TERMS

SOLUTION B



● = SOLVENT MOLECULE

● = SOLUTE MOLECULE

} = SOLUTION

GRADIENT



SOLUTION TERMS

**2 SOLUTIONS
WITH DIFFERENT
SOLUTE
CONCENTRATION**

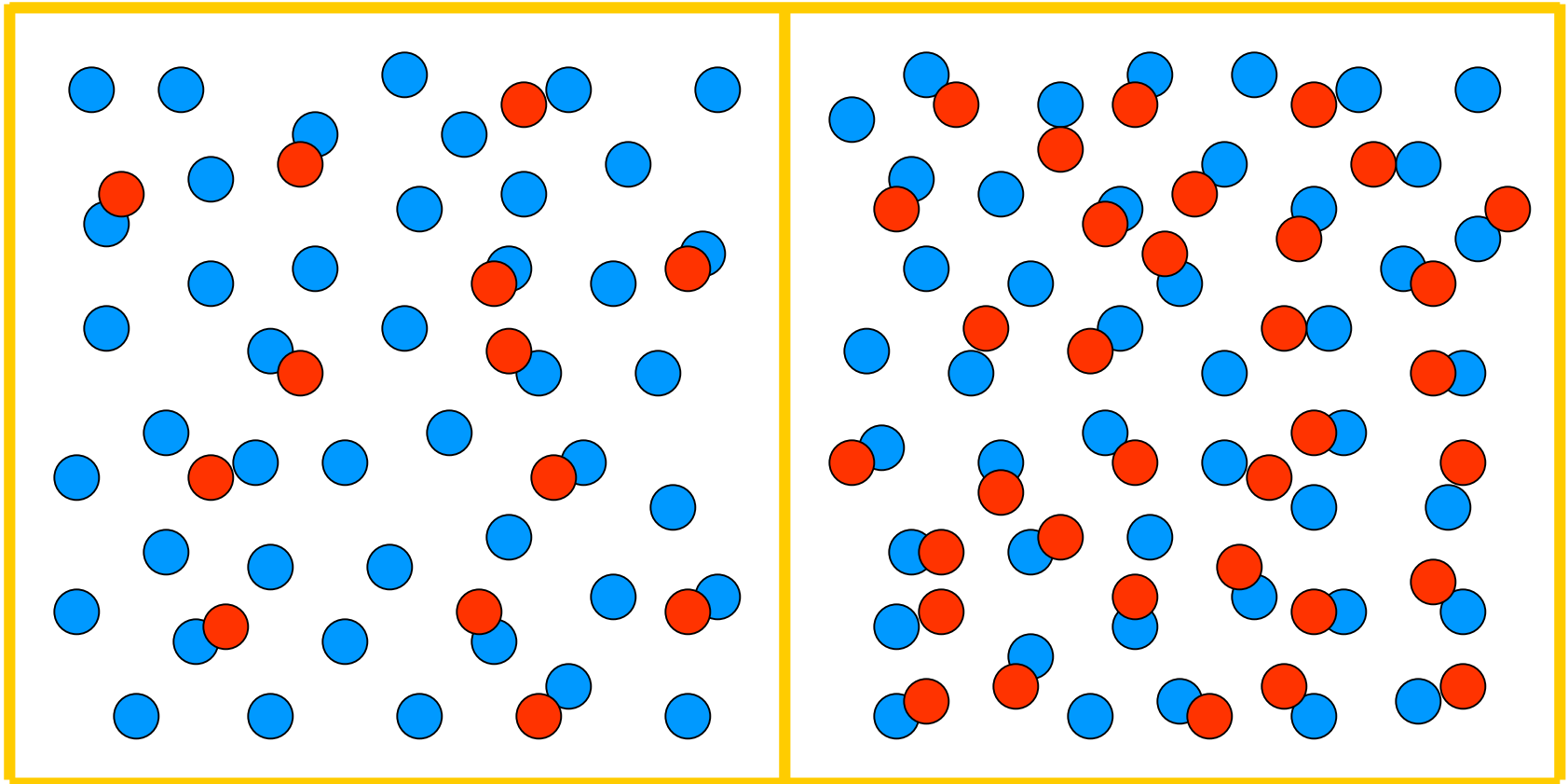
SOLUTION TERMS

SOLUTION

SOLUTION A

TERMS

SOLUTION B



25% SOLUTE

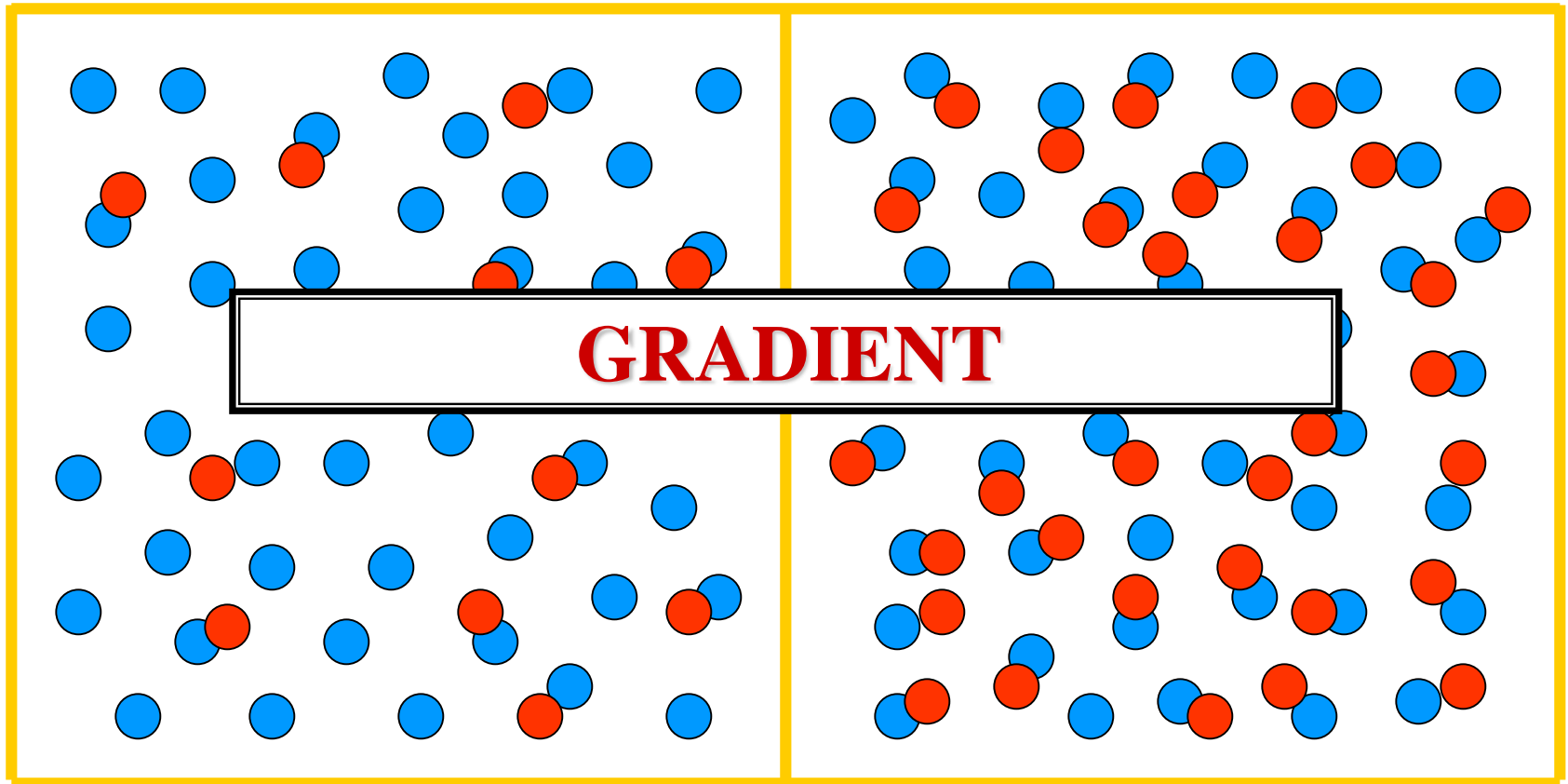
75% SOLUTE

SOLUTION

SOLUTION A

TERMS

SOLUTION B



25% SOLUTE

75% SOLUTE

CONCENTRATION



SOLUTION TERMS

**AMOUNT DISSOLVED
SOLUTE**

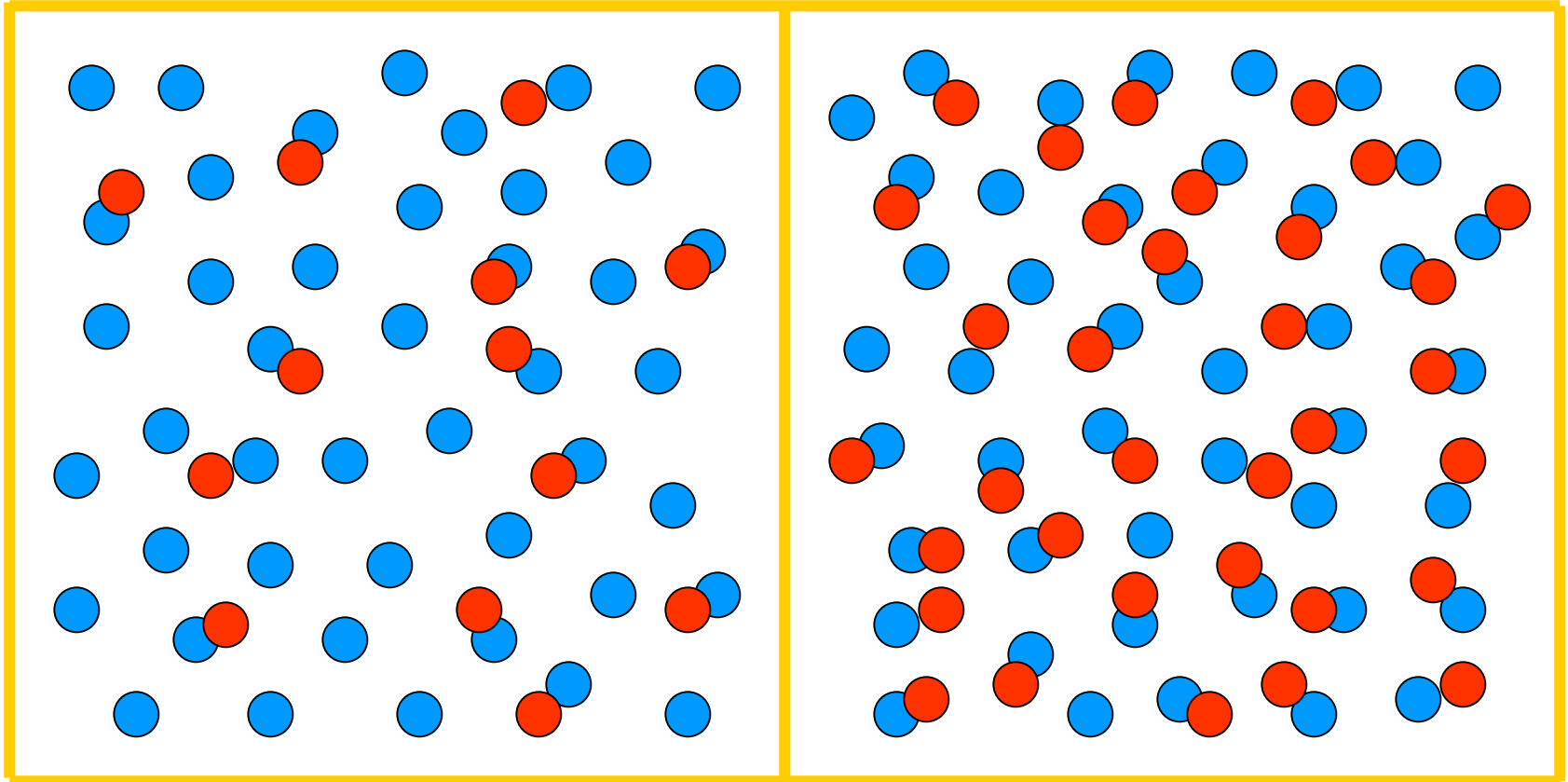
SOLUTION TERMS

SOLUTION

SOLUTION A

TERMS

SOLUTION B



**25% SOLUTE
CONCENTRATION**

**75% SOLUTE
CONCENTRATION**

PASSIVE TRANSPORT

P

PASSIVE

TRANSPORT

SYNONYMOUS

DIFFUSION

PASSIVE TRANSPORT



PASSIVE TRANSPORT

NET SOLUTE MOVEMENT:

PASSIVE TRANSPORT



PASSIVE TRANSPORT

NET SOLUTE MOVEMENT:
DOWN CON GRADIENT

PASSIVE TRANSPORT



PASSIVE TRANSPORT

NET SOLUTE MOVEMENT
DOWN CON GRADIENT
HIGH CON →

PASSIVE TRANSPORT



PASSIVE TRANSPORT

NET SOLUTE MOVEMENT
DOWN CON GRADIENT
HIGH CON → LOW CON

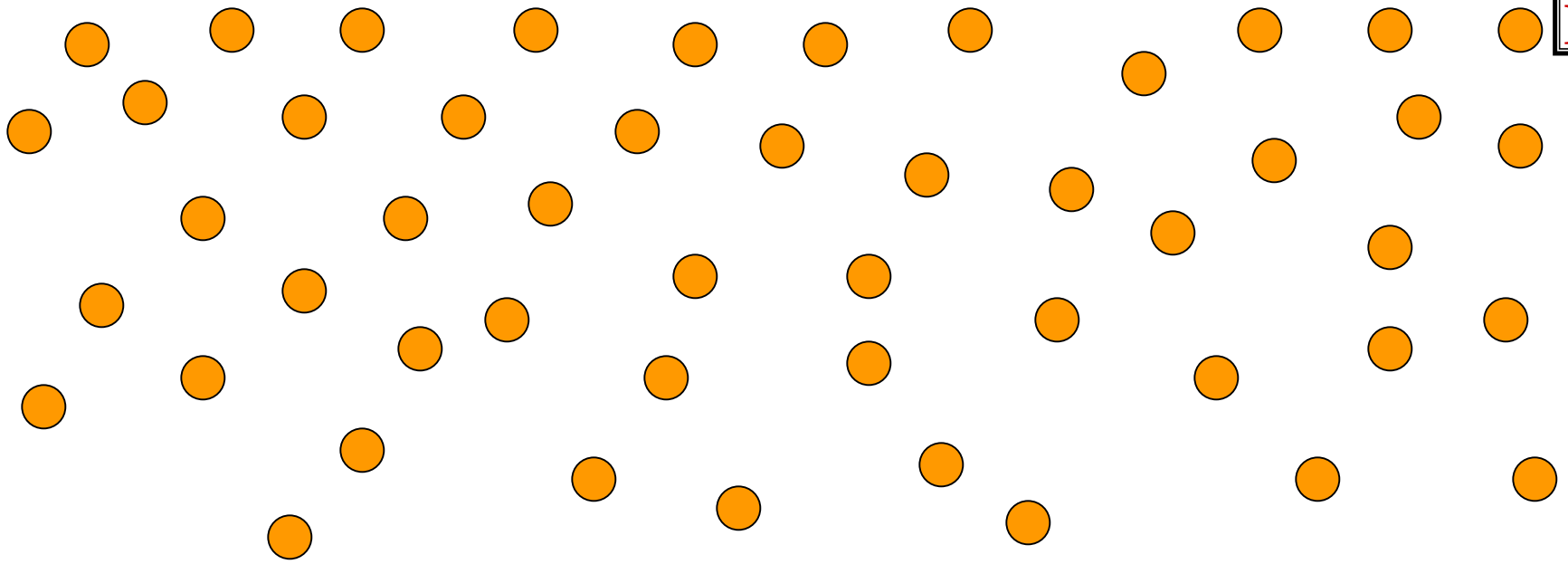
PASSIVE TRANSPORT



PASSIVE TRANSPORT

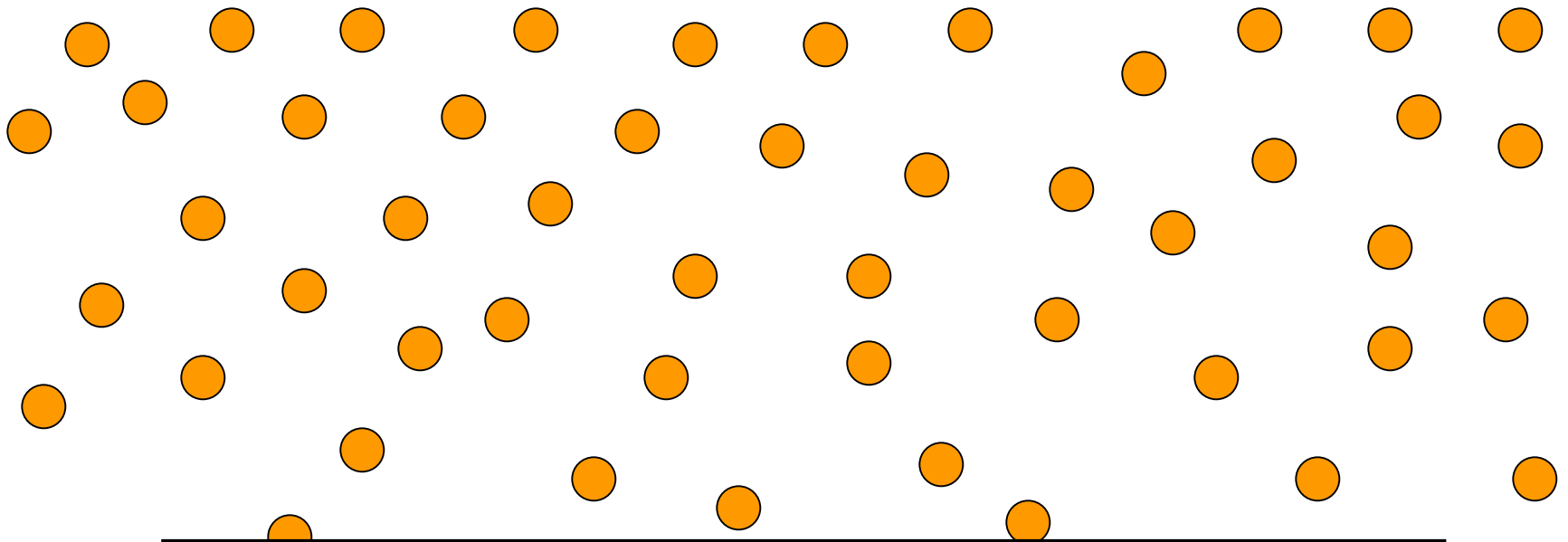
NET SOLUTE MOVEMENT
DOWN CON GRADIENT
HIGH CON → LOW CON
EQUILIBRIUM

PASSIVE TRANSPORT



MEMBRANE

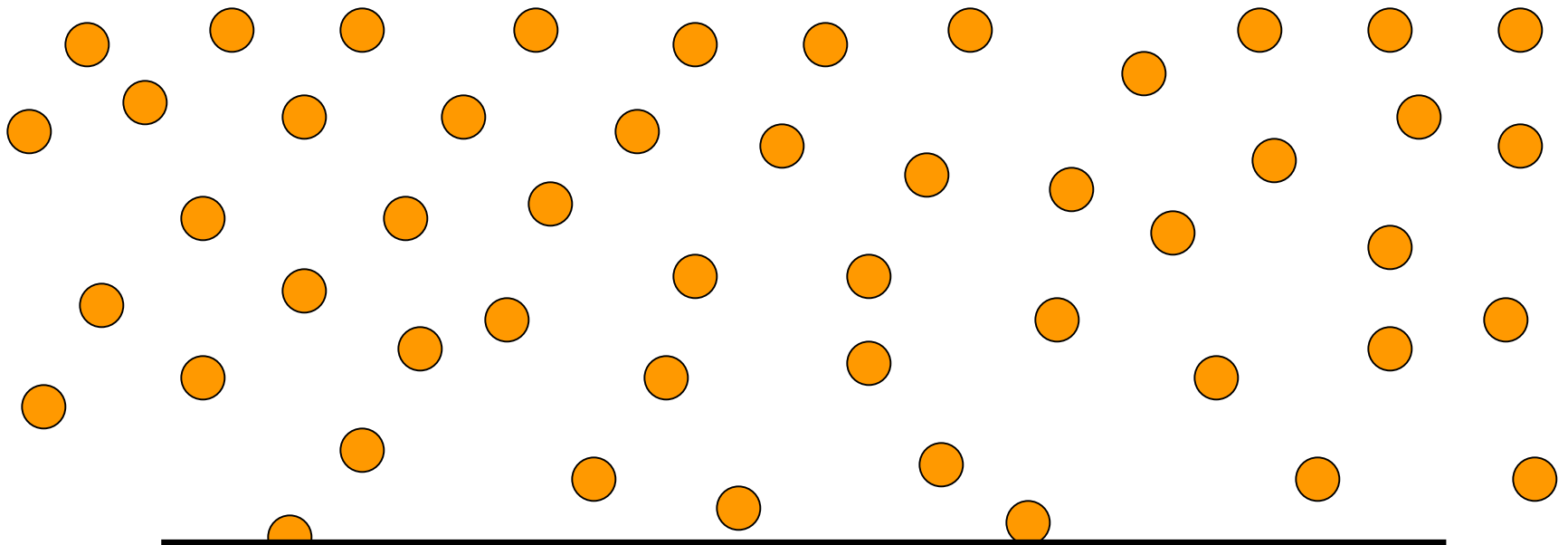
 = **SOLUTE**
 = **MEMBRANE**



PASSIVE TRANSPORT

● = SOLUTE

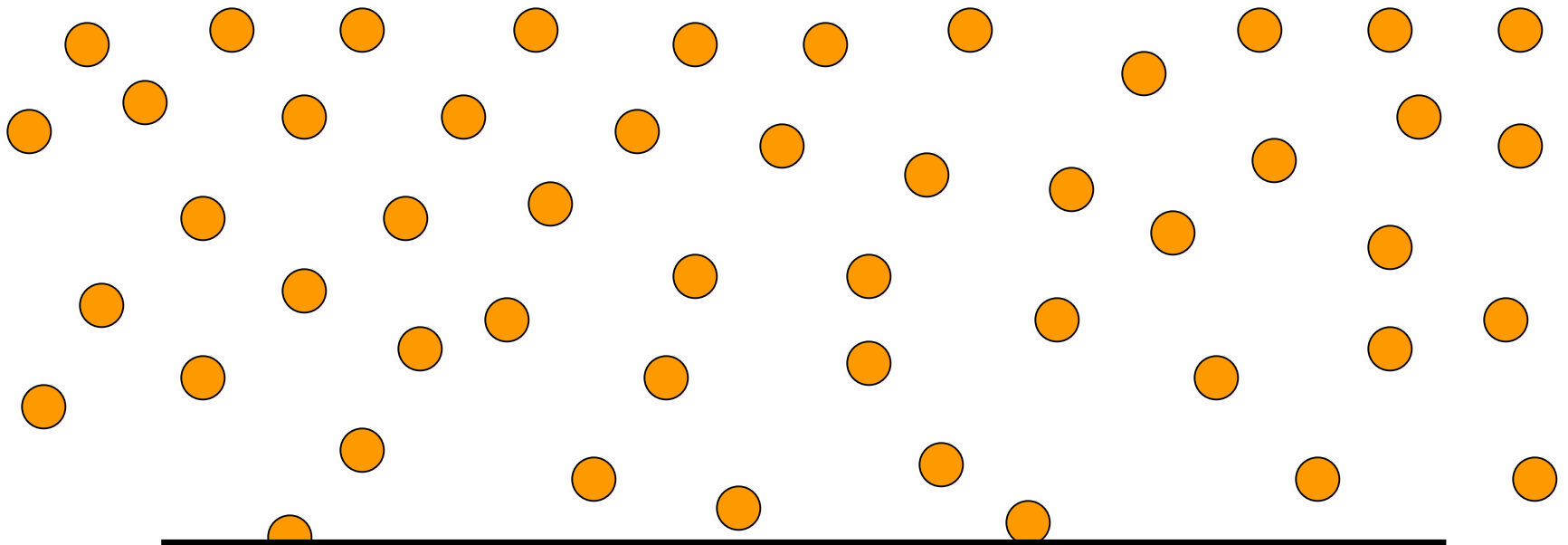
— = MEMBRANE



NET SOLUTE MOVEMENT

● = SOLUTE

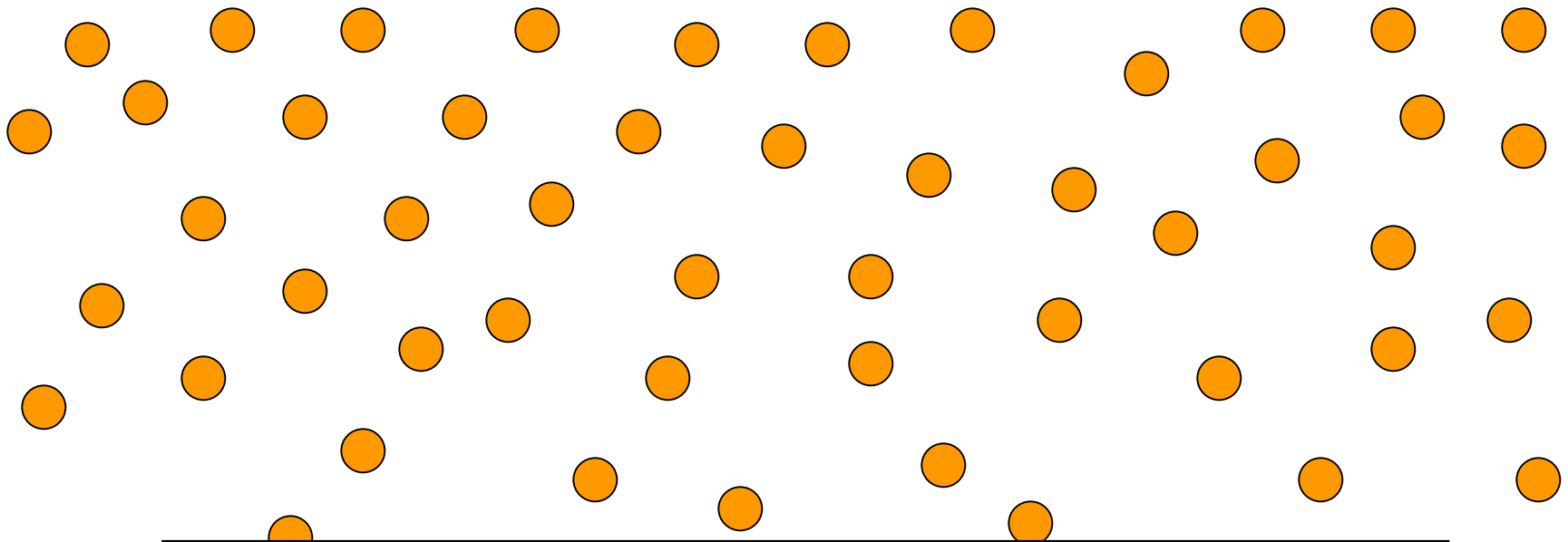
— = MEMBRANE



DOWN CON GRADIENT

 = SOLUTE

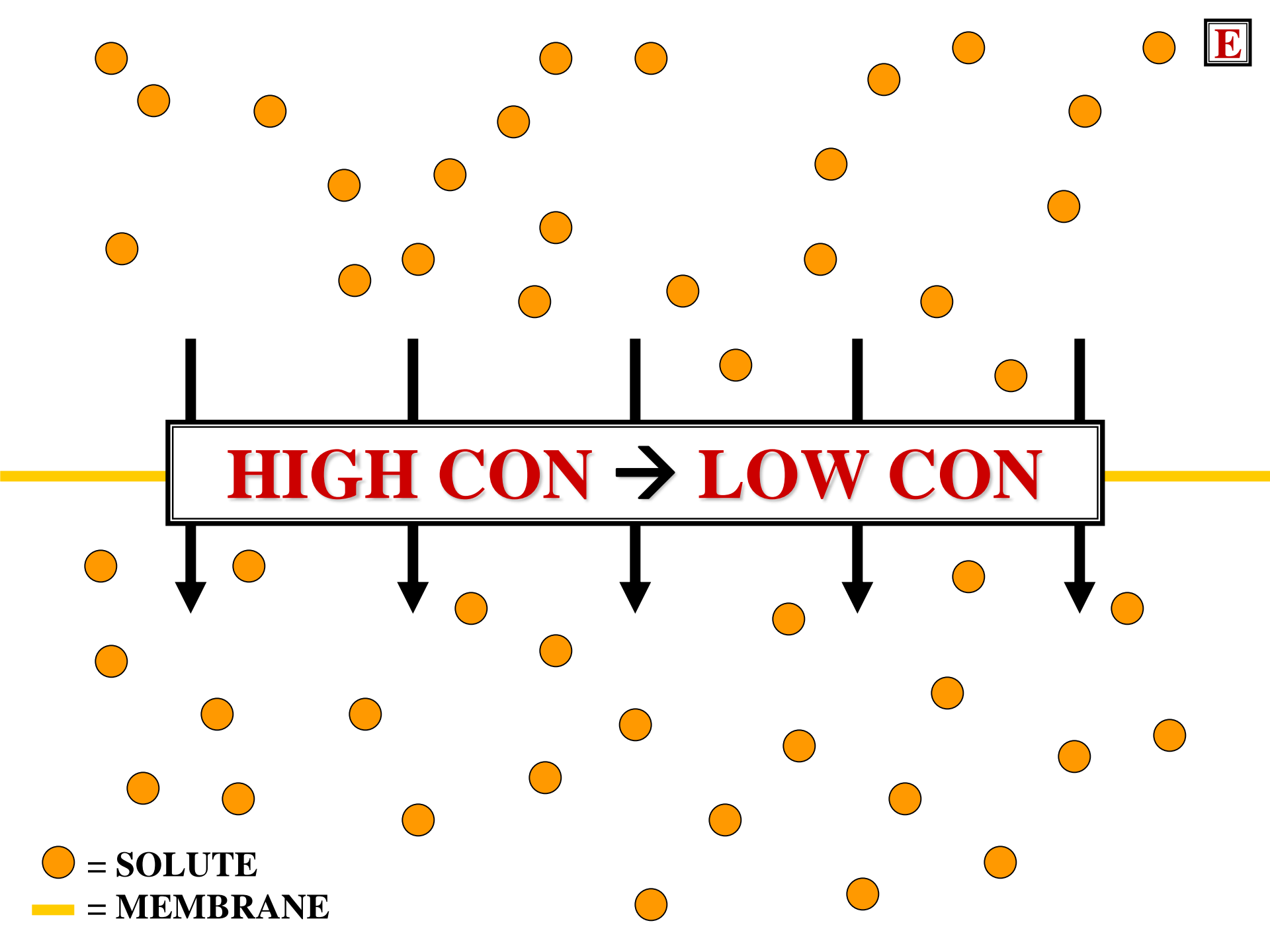
 = MEMBRANE



HIGH CON →

 = **SOLUTE**

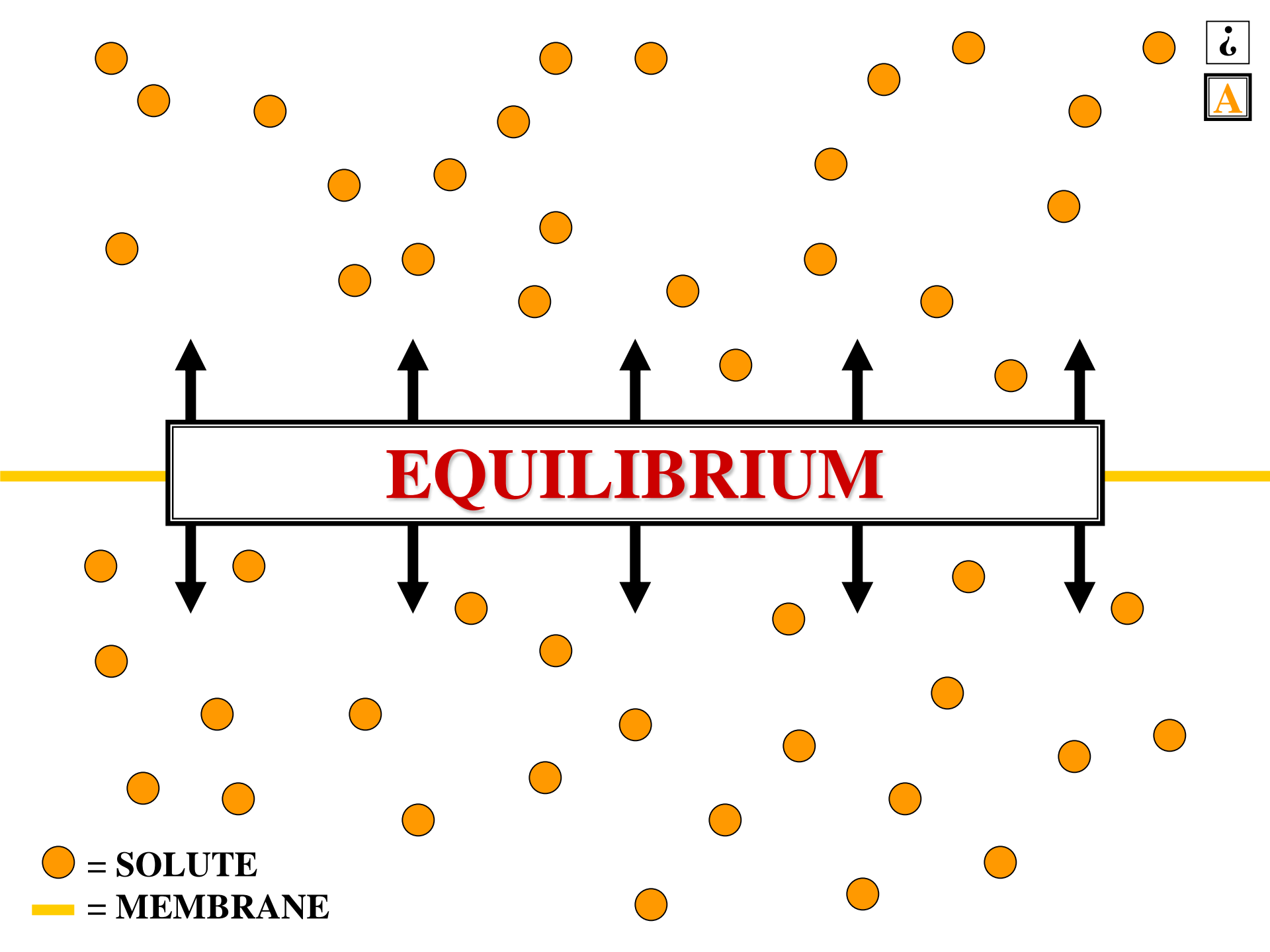
 = **MEMBRANE**



HIGH CON → LOW CON

 = **SOLUTE**

 = **MEMBRANE**

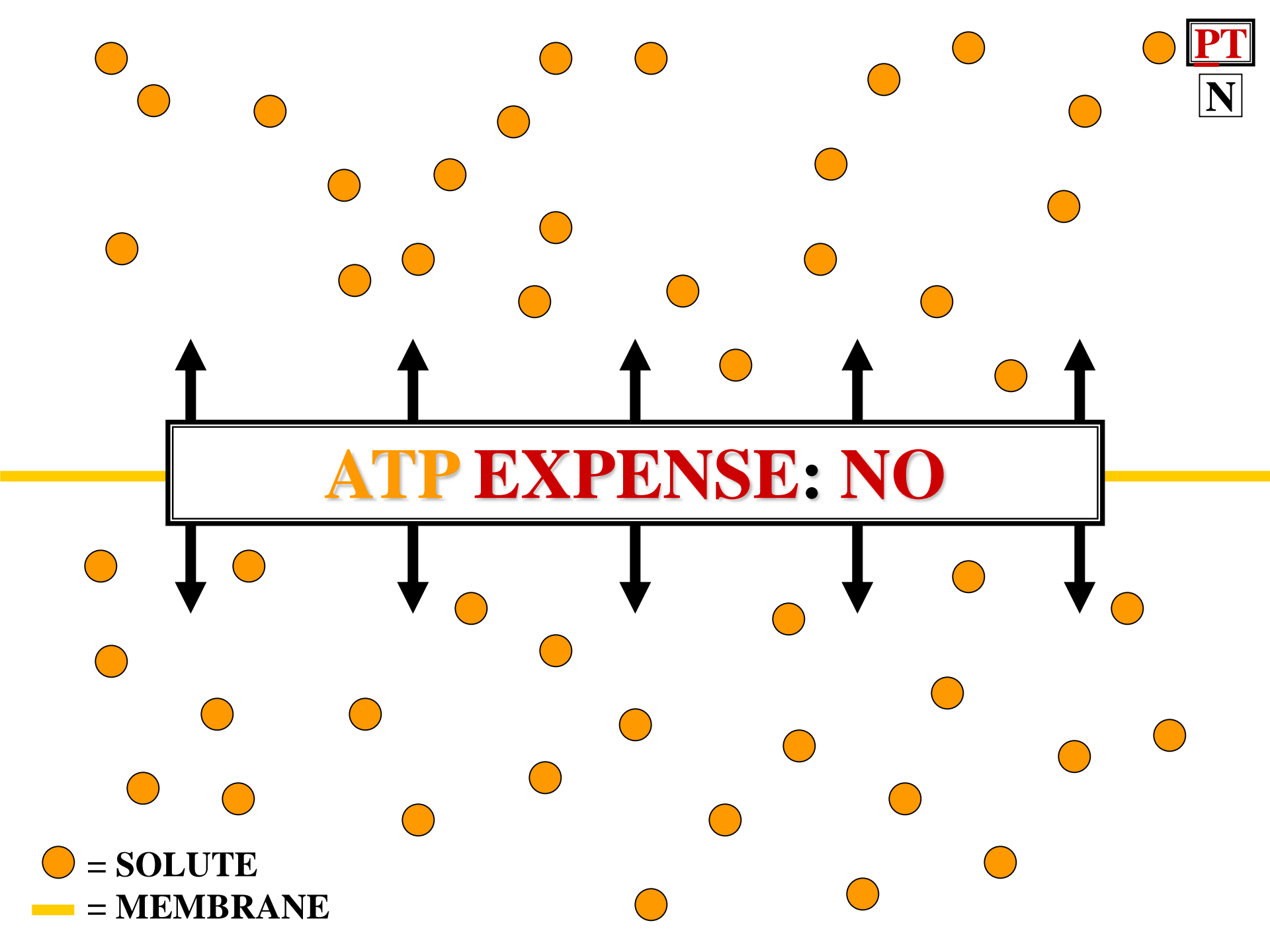


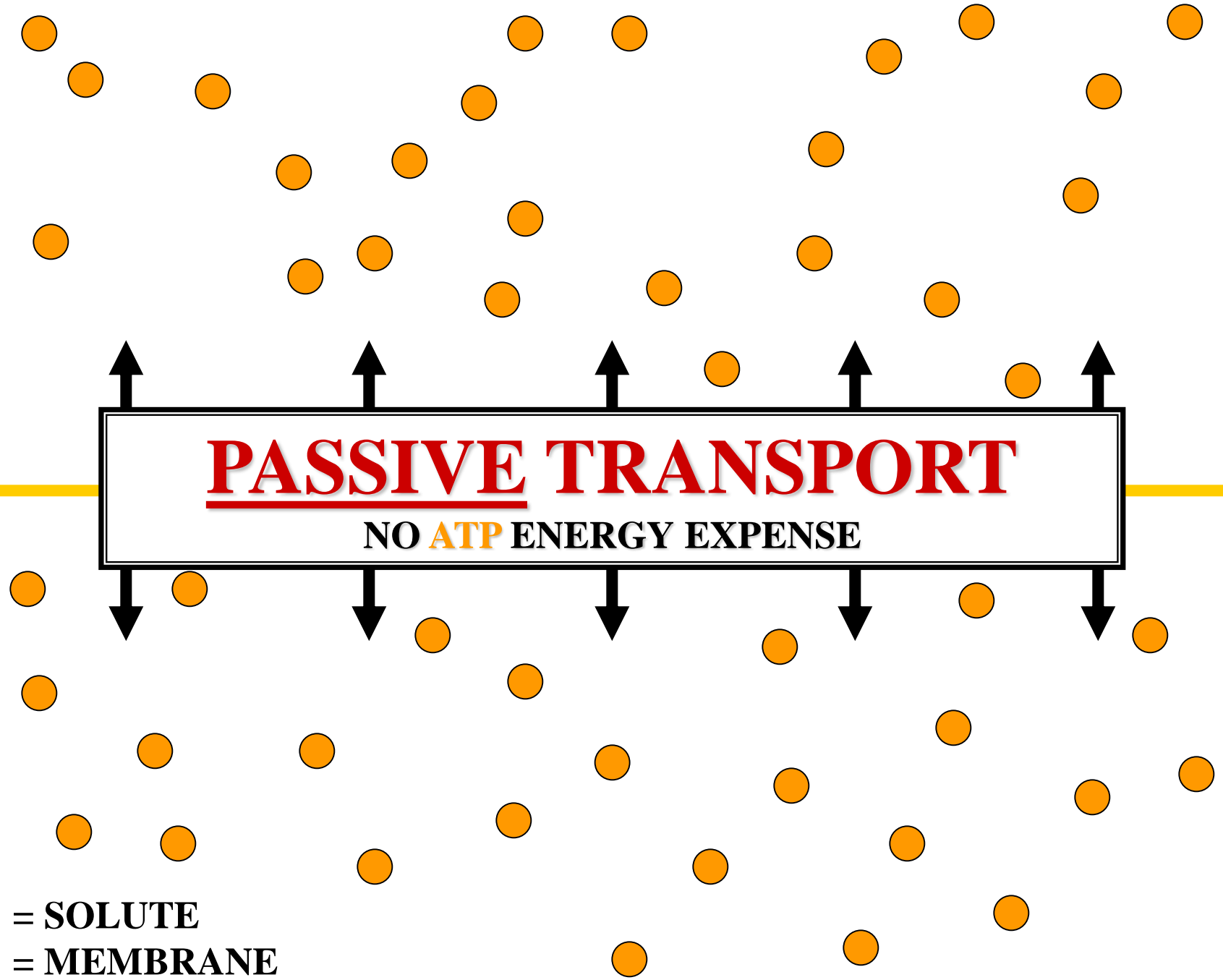
 = SOLUTE

 = MEMBRANE

ATP EXPENSE: NO

● = SOLUTE
— = MEMBRANE





 = SOLUTE
 = MEMBRANE

**FACTORS
AFFECTING
PASSIVE
TRANSPORT**

FACTORS AFFECTING PASSIVE TRANSPORT

TEMPERATURE

FACTORS AFFECTING PASSIVE TRANSPORT

FACTORS AFFECTING PASSIVE TRANSPORT

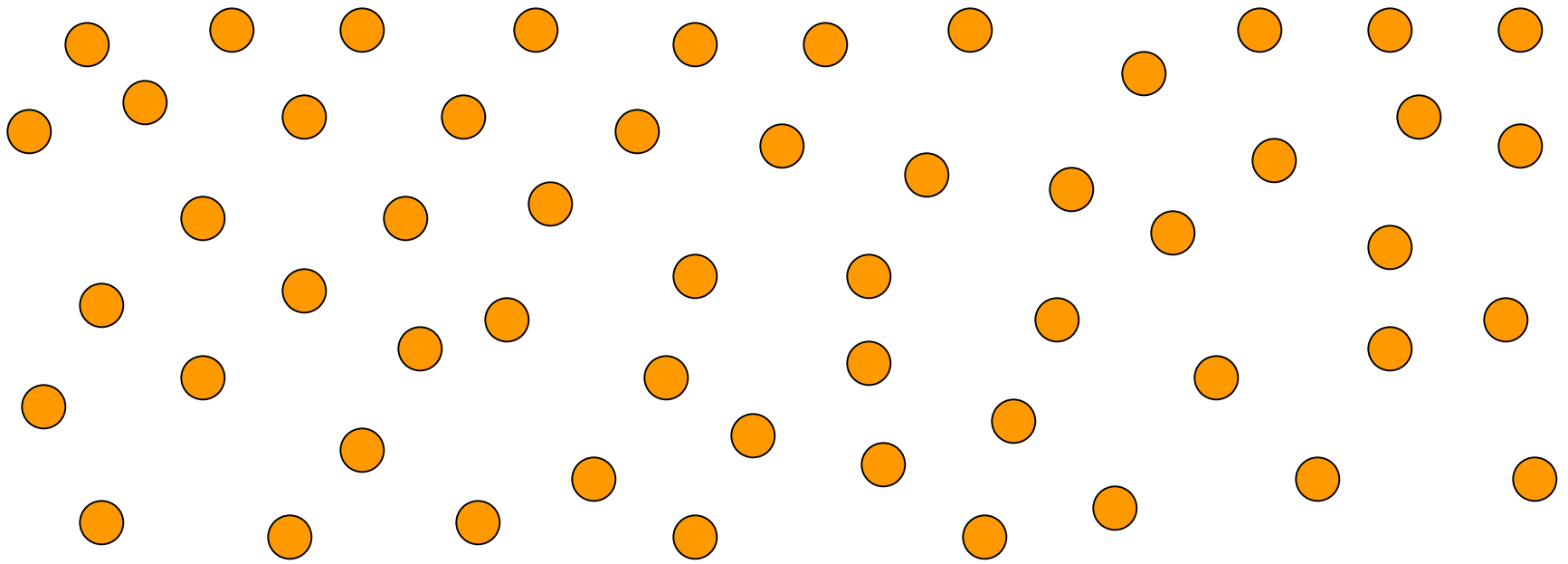


TEMPERATURE
MOLECULAR SIZE

**FACTORS AFFECTING
PASSIVE TRANSPORT**



PASSIVE TRANSPORT TEMPERATURE

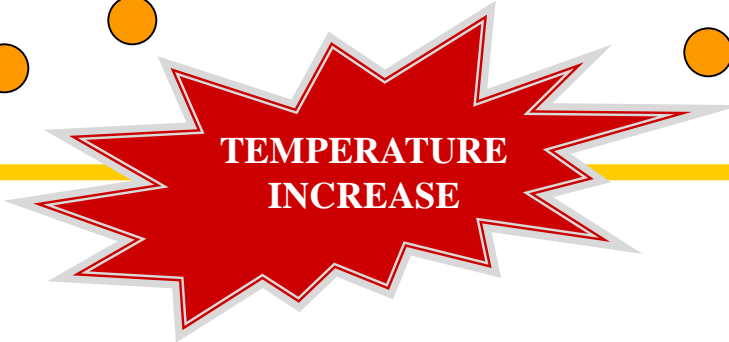


MEMBRANE

TEMPERATURE

● = SOLUTE

— = MEMBRANE

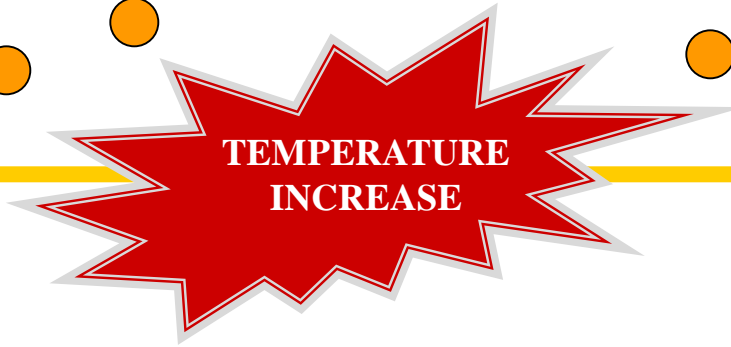


TEMPERATURE
INCREASE

**INCREASE
TEMPERATURE**

● = SOLUTE

— = MEMBRANE



TEMPERATURE
INCREASE

**RAPID
SOLUTE MOVEMENT**

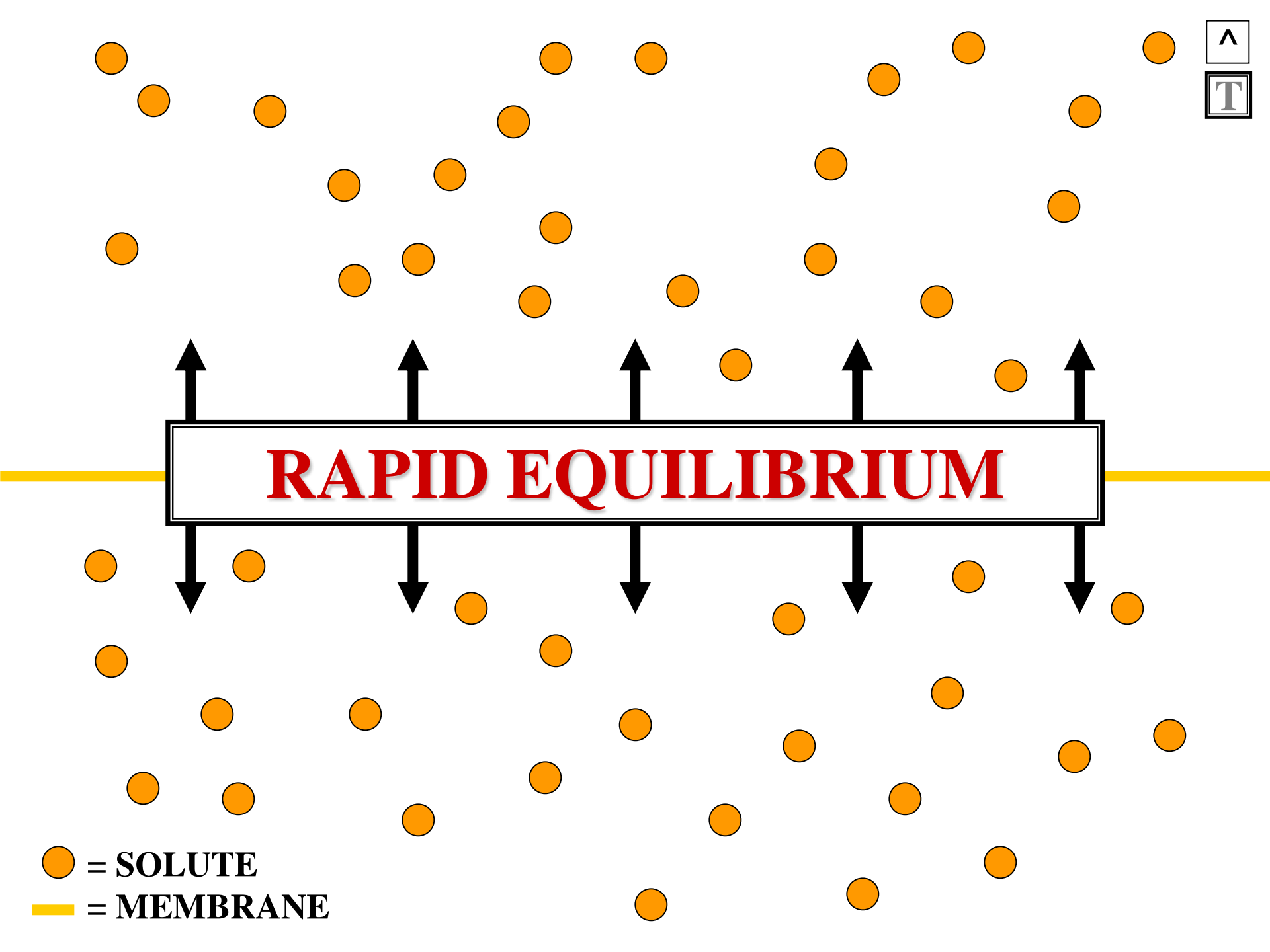
 = SOLUTE

 = MEMBRANE

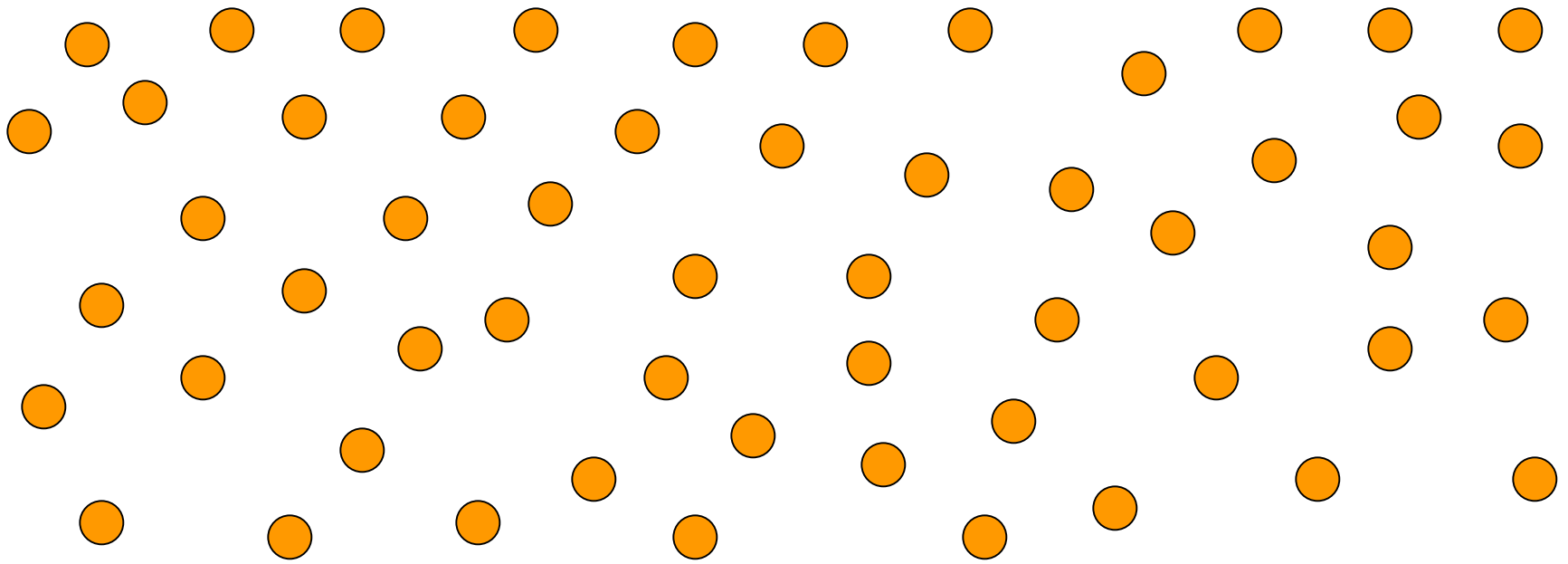
TEMPERATURE
INCREASE

**RAPID
PASSIVE TRANSPORT**

- = SOLUTE
- = MEMBRANE



● = SOLUTE
— = MEMBRANE



MEMBRANE

TEMPERATURE

 = **SOLUTE**

 = **MEMBRANE**

TEMPERATURE
DECREASE

**DECREASE
TEMPERATURE**

 = SOLUTE

 = MEMBRANE

TEMPERATURE
DECREASE

**SLOW
SOLUTE MOVEMENT**

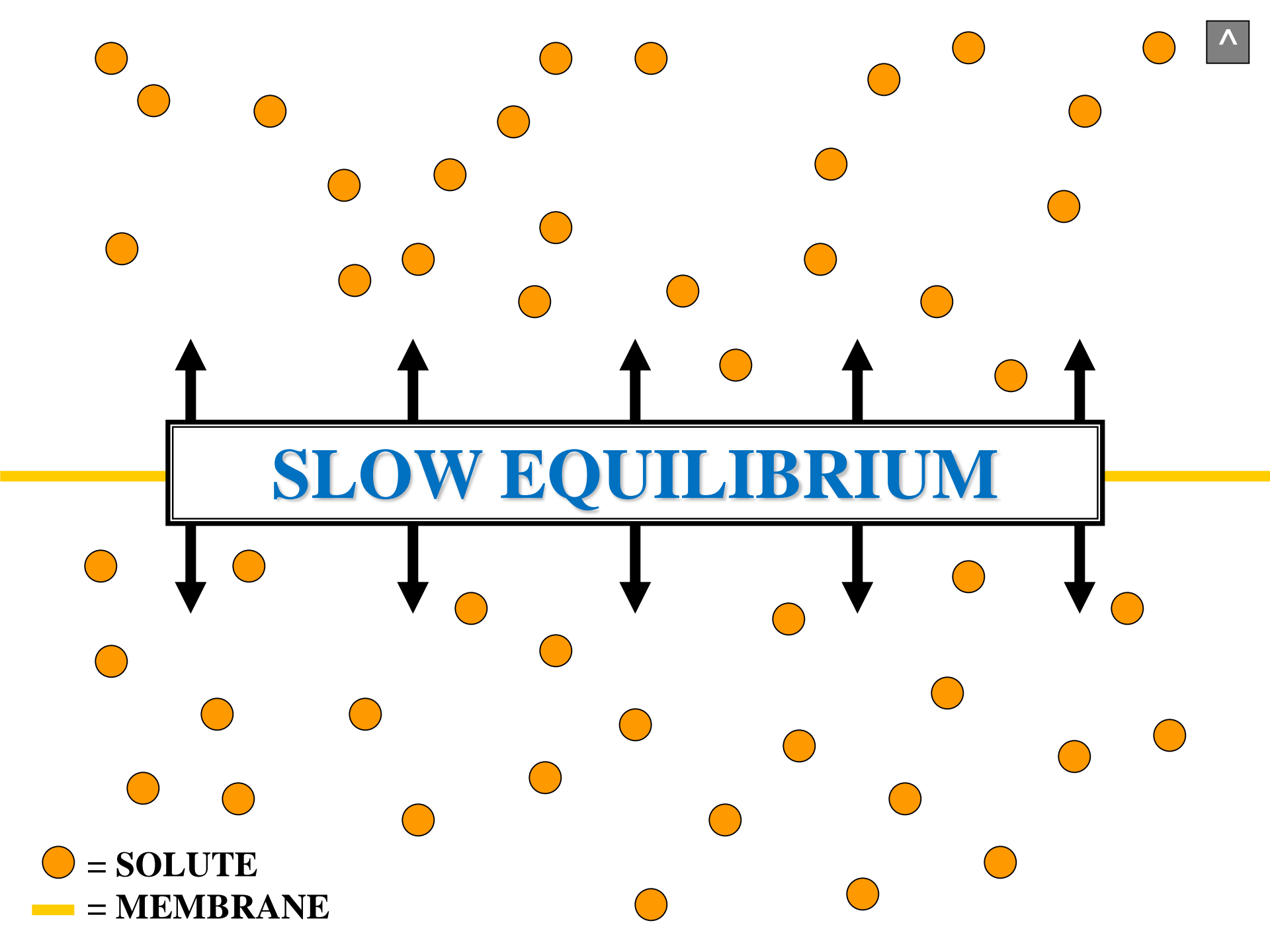
 = SOLUTE

 = MEMBRANE

TEMPERATURE
DECREASE

**SLOW
PASSIVE TRANSPORT**

-  = SOLUTE
-  = MEMBRANE



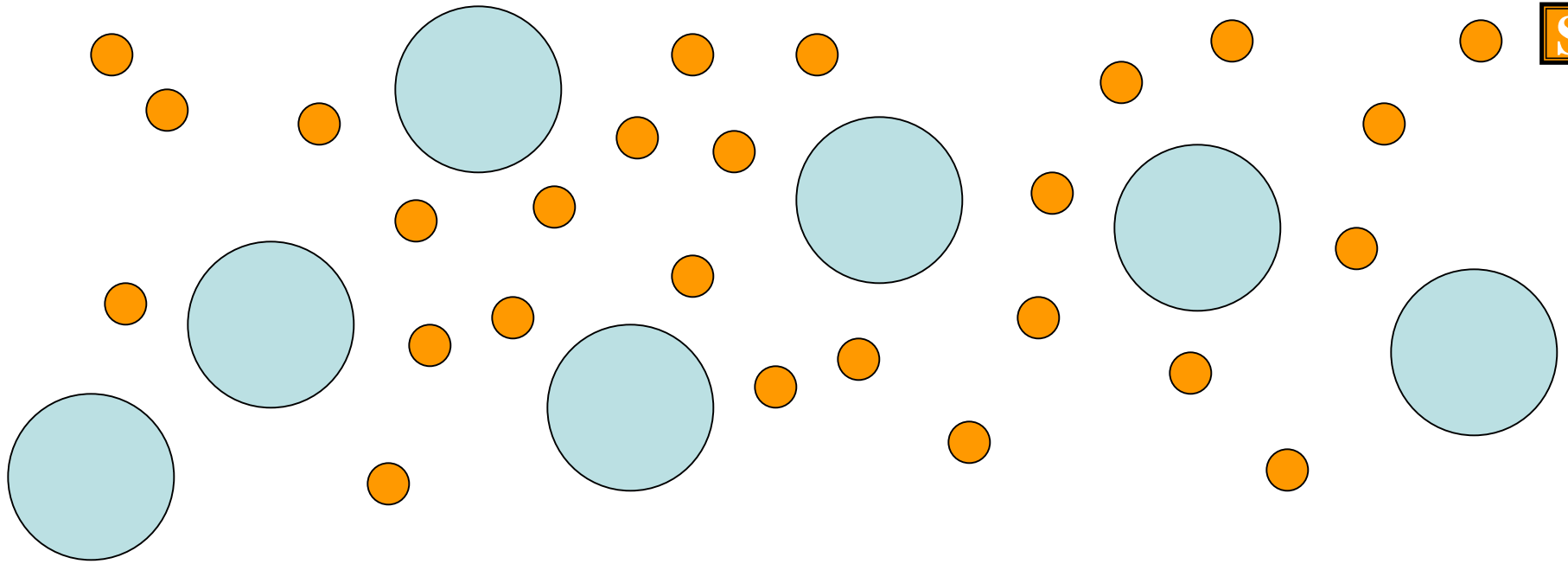
SLOW EQUILIBRIUM

● = SOLUTE

— = MEMBRANE



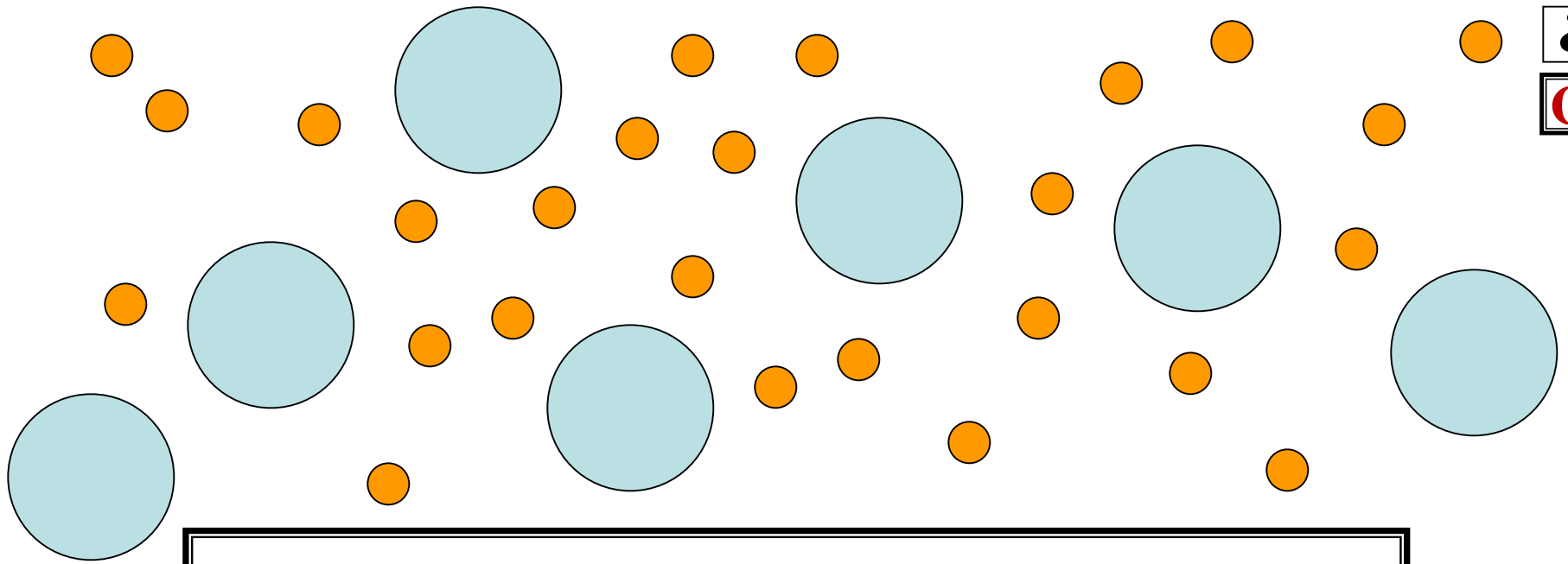
PASSIVE TRANSPORT MOLECULAR SIZE



MEMBRANE

MOLECULAR SIZE

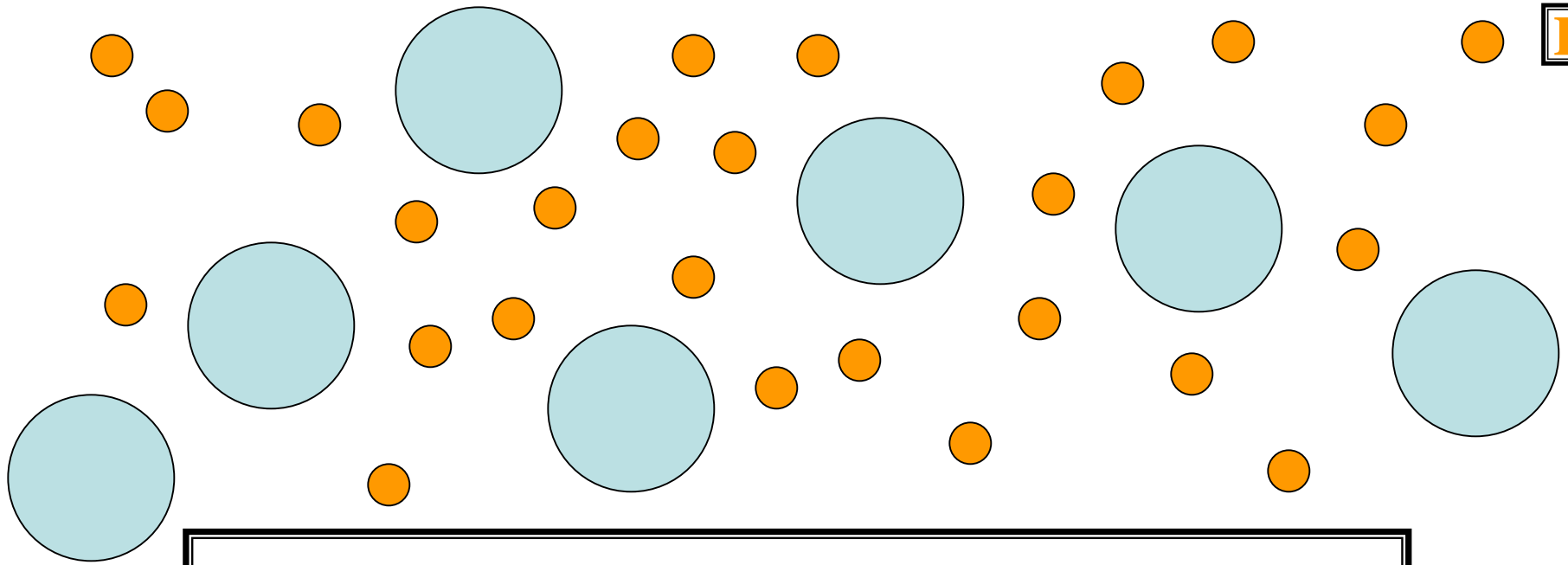
● ● = **SOLUTE**
— = **MEMBRANE**



SMALL SOLUTE

MOLECULAR SIZE

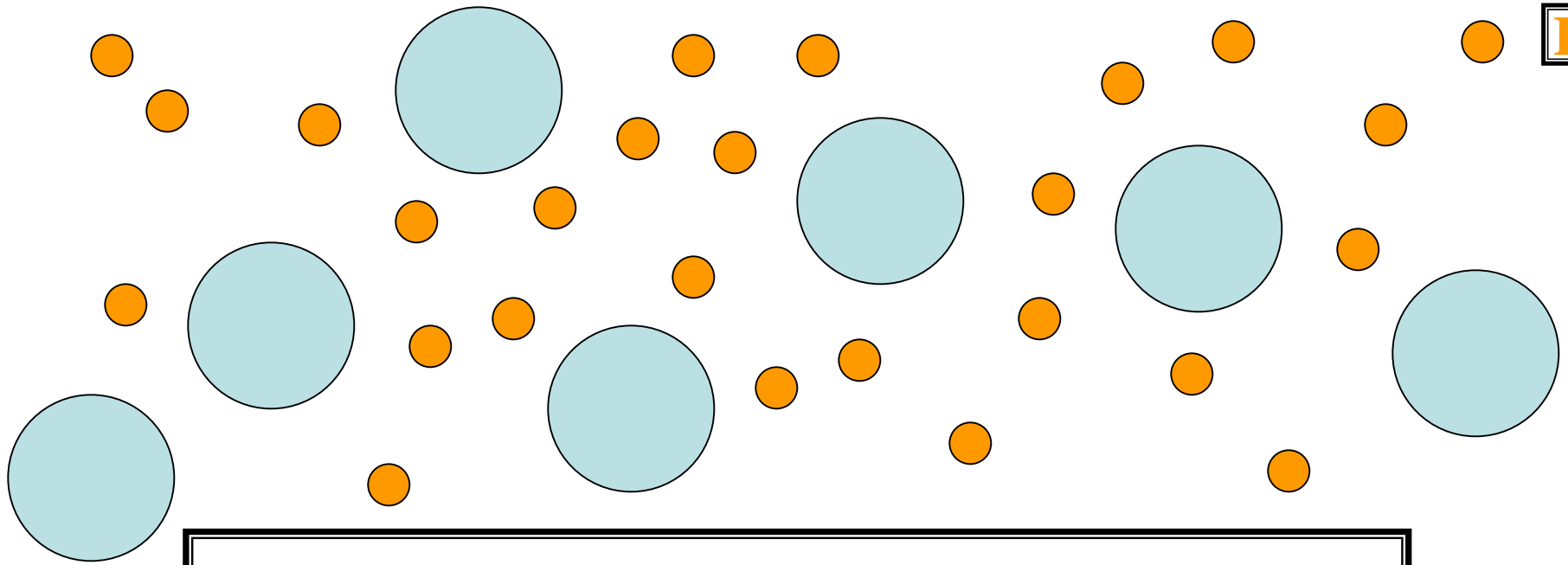
  = **SOLUTE**
 = **MEMBRANE**



**GIVEN AMOUNT
ENERGY EXPENDED**

● ● = SOLUTE

— = MEMBRANE

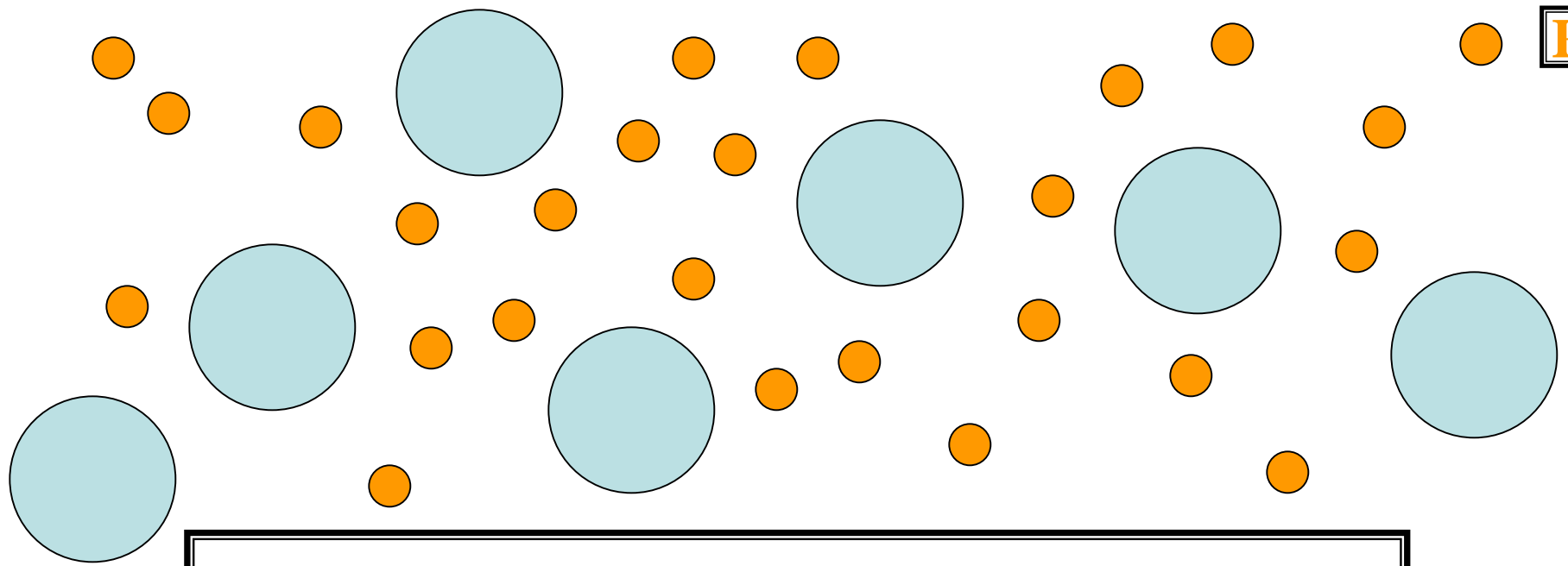


SMALL SOLUTE

**RAPID
SOLUTE MOVEMENT**

● ● = **SOLUTE**

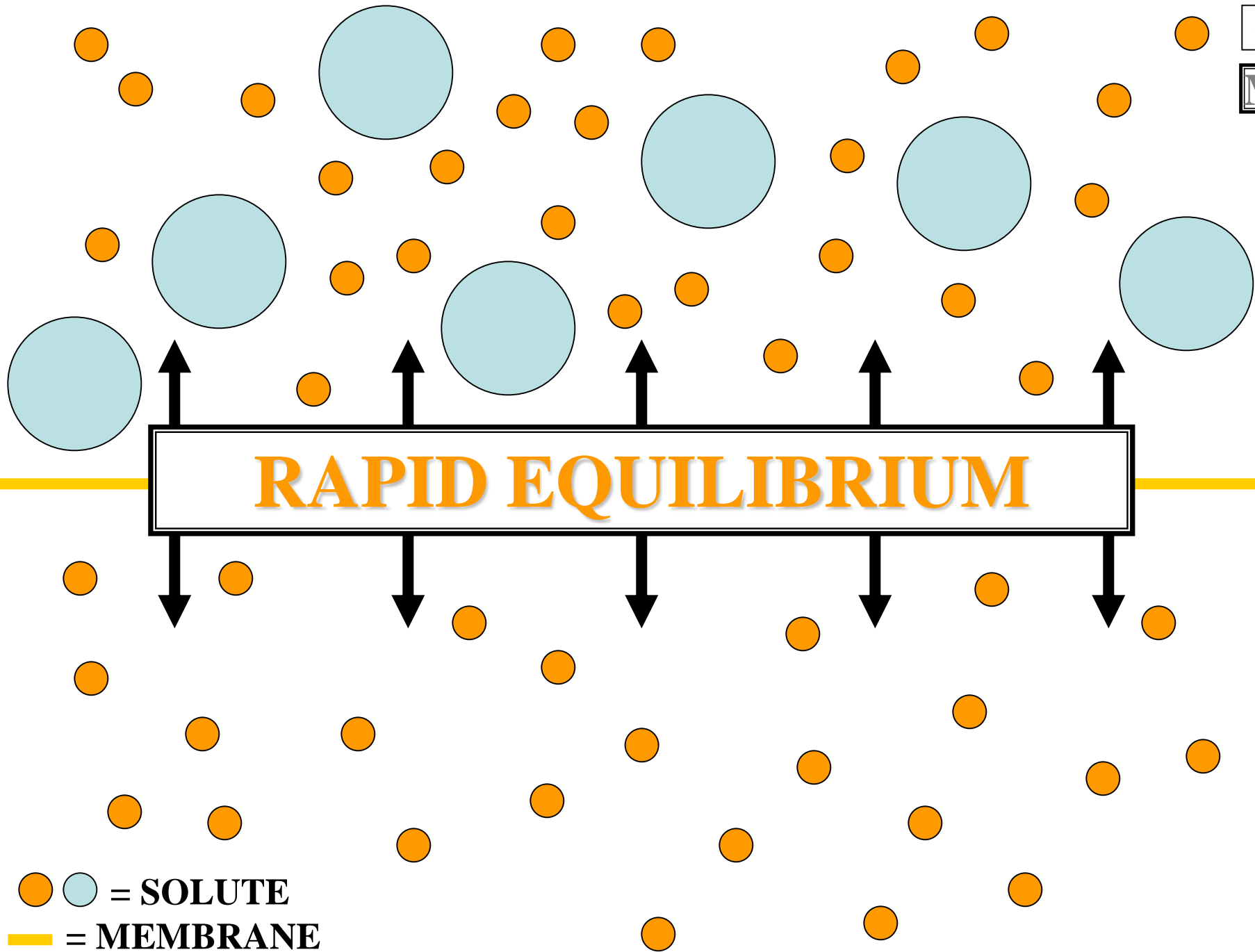
— = **MEMBRANE**



SMALL SOLUTE

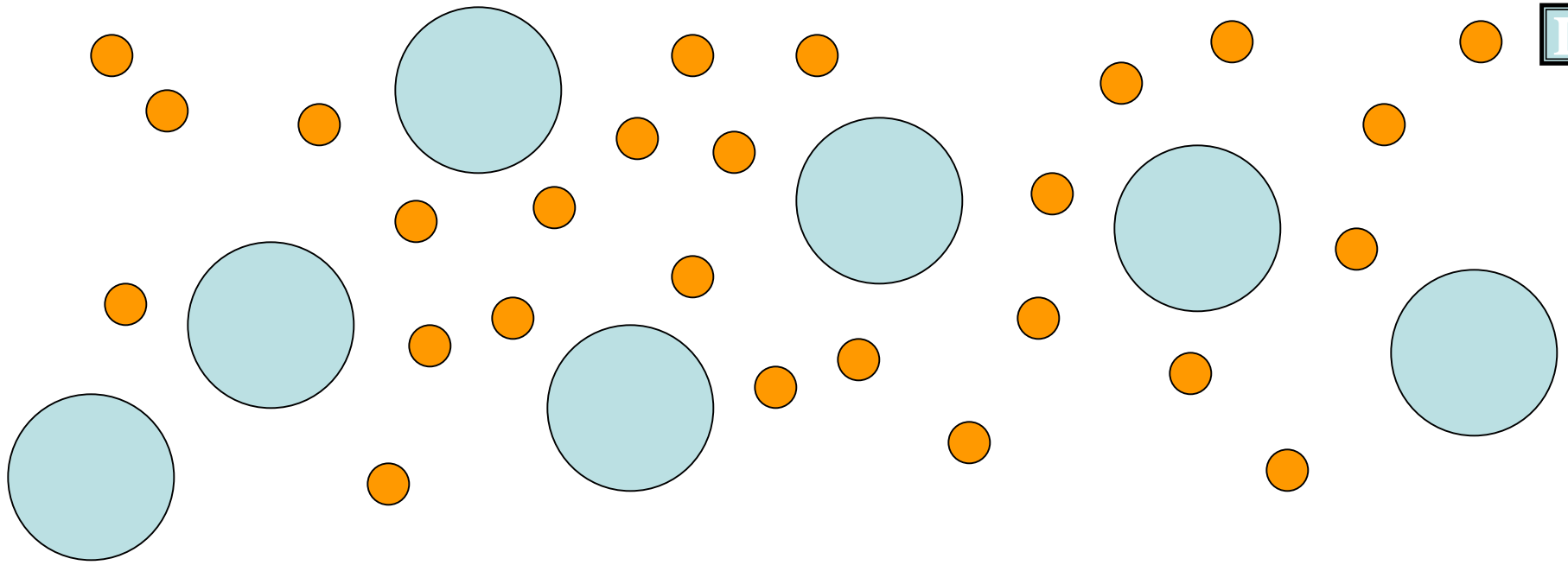
**RAPID
PASSIVE TRANSPORT**

● ● = SOLUTE
— = MEMBRANE



● ○ = SOLUTE

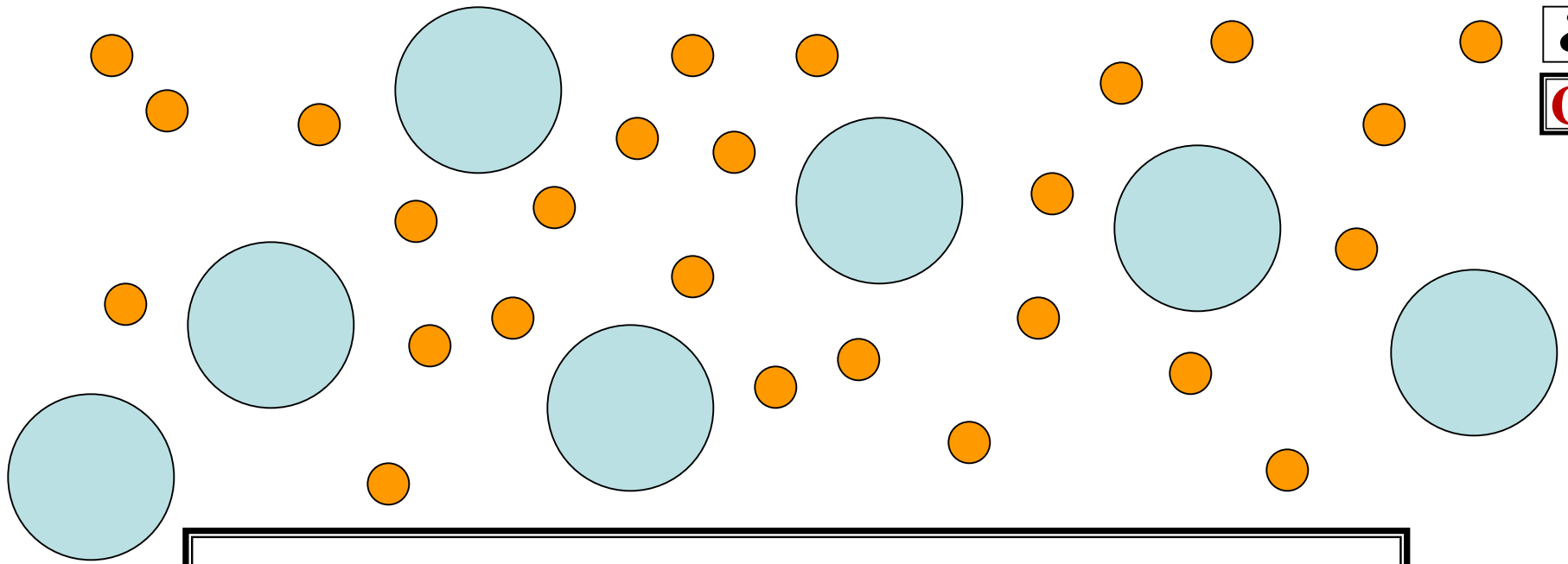
— = MEMBRANE



MEMBRANE

MOLECULAR SIZE

● ● = **SOLUTE**
— = **MEMBRANE**

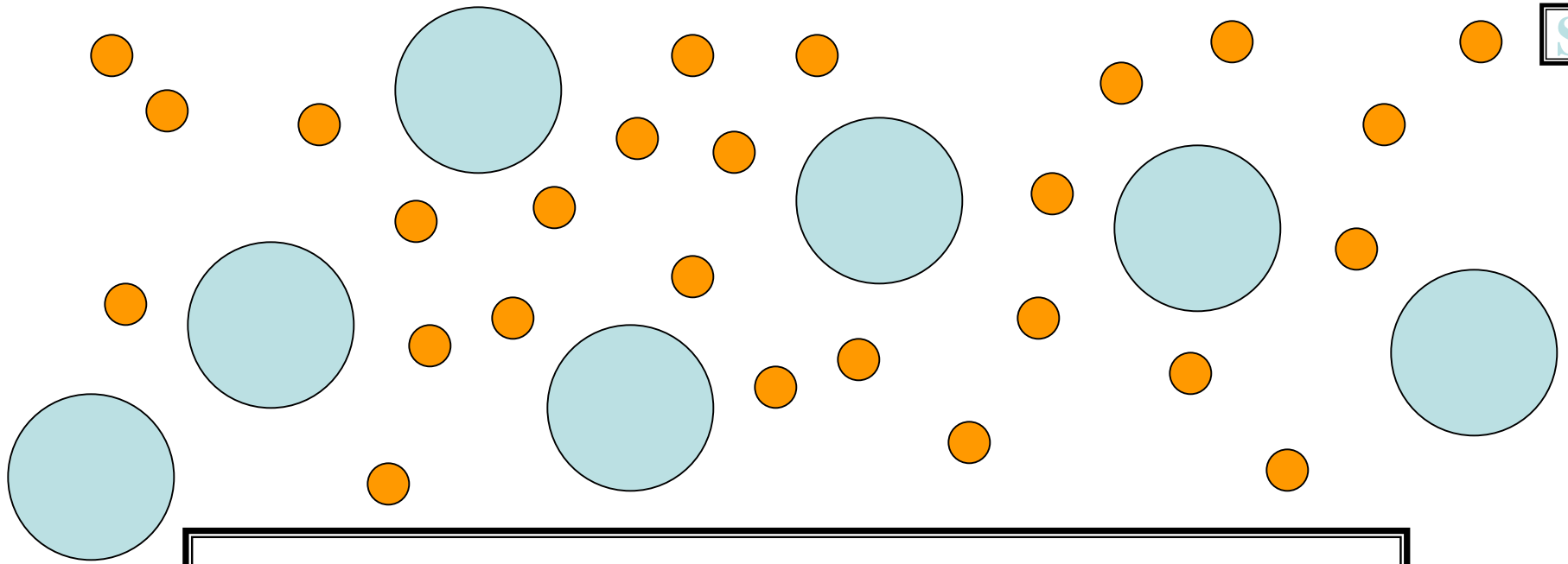


LARGE SOLUTE

MOLECULAR SIZE

  = SOLUTE

 = MEMBRANE

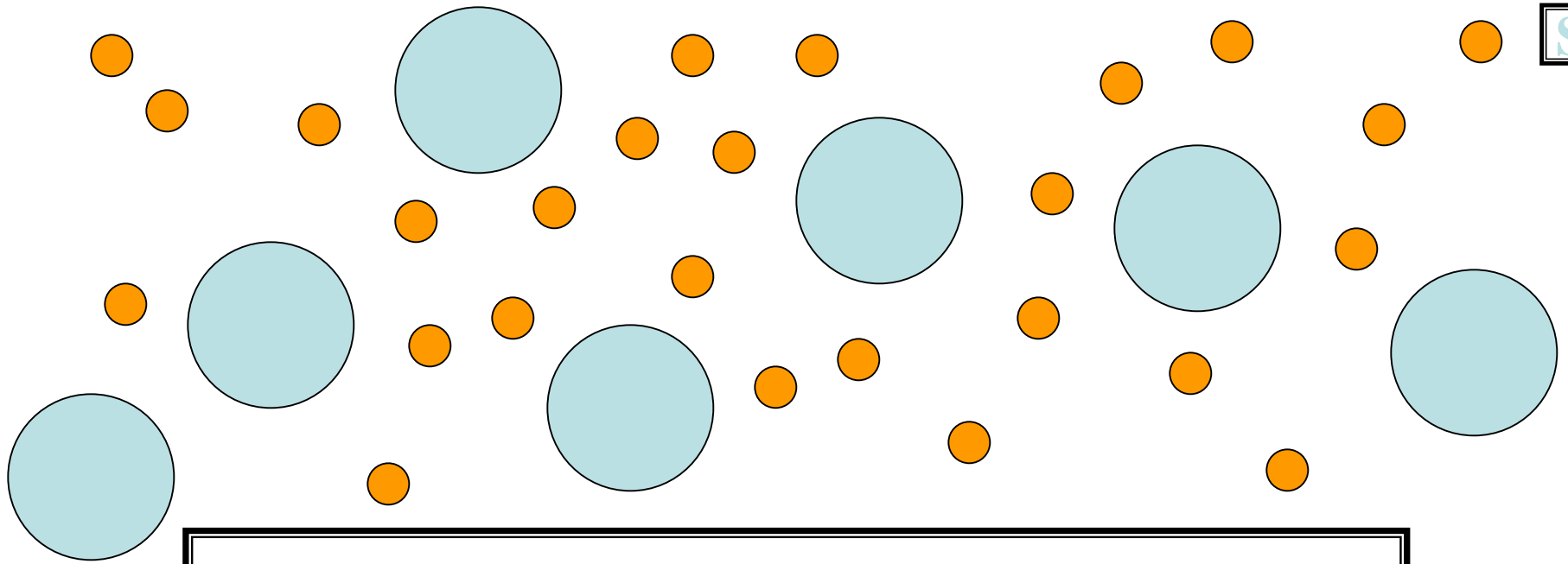


LARGE SOLUTE

**GIVEN AMOUNT
ENERGY EXPENDED**

  = **SOLUTE**

 = **MEMBRANE**

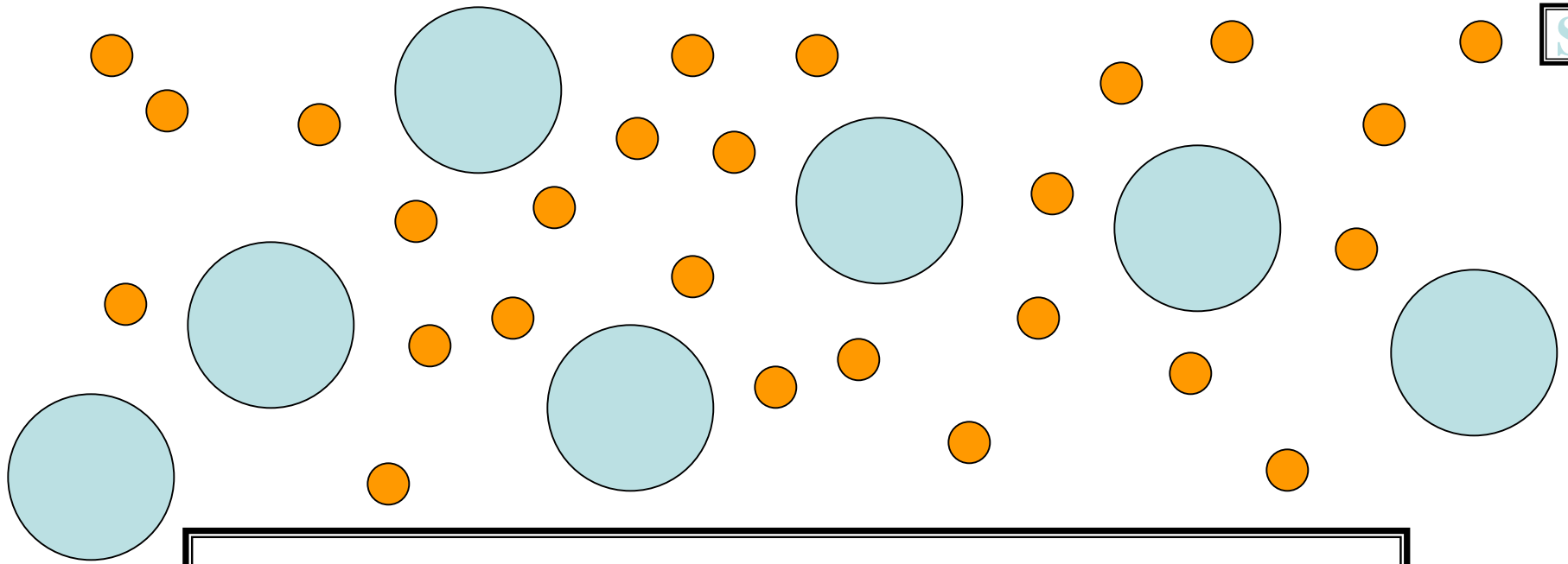


LARGE SOLUTE

SLOW
SOLUTE MOVEMENT

● ● = SOLUTE

— = MEMBRANE

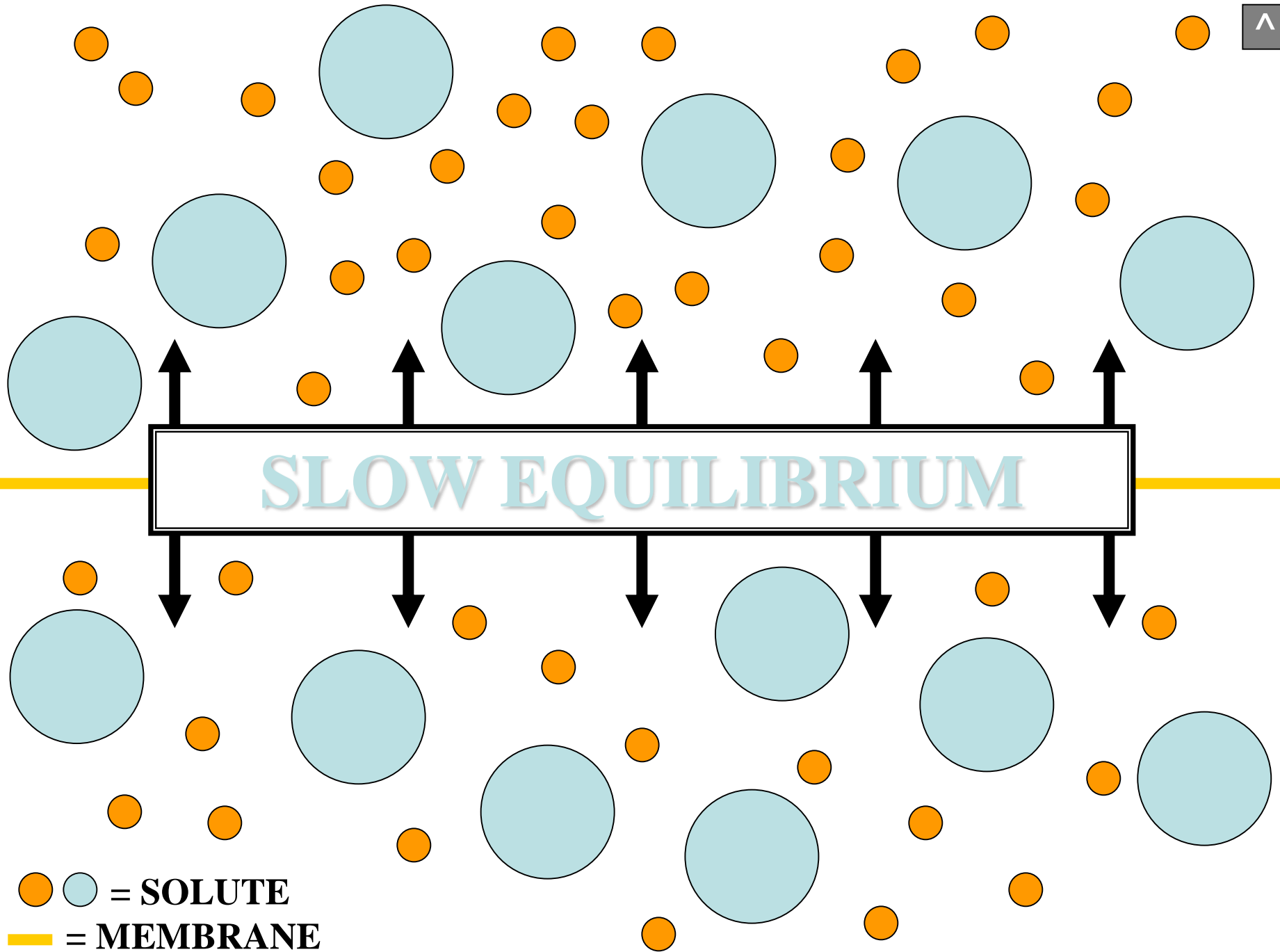


LARGE SOLUTE

SLOW
PASSIVE TRANSPORT

  = SOLUTE

 = MEMBRANE



● ○ = SOLUTE

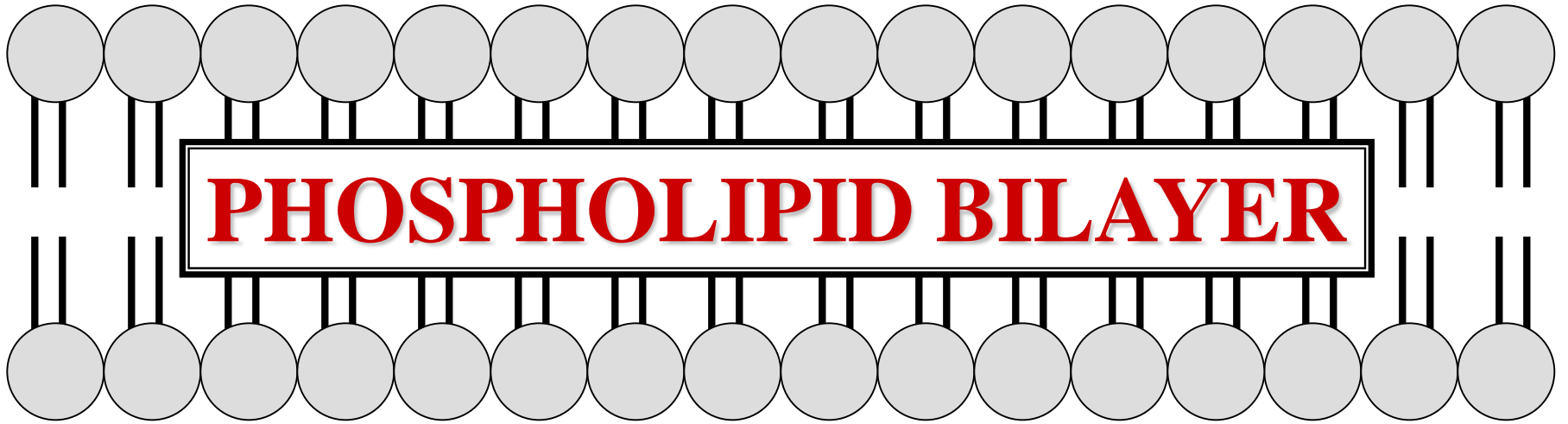
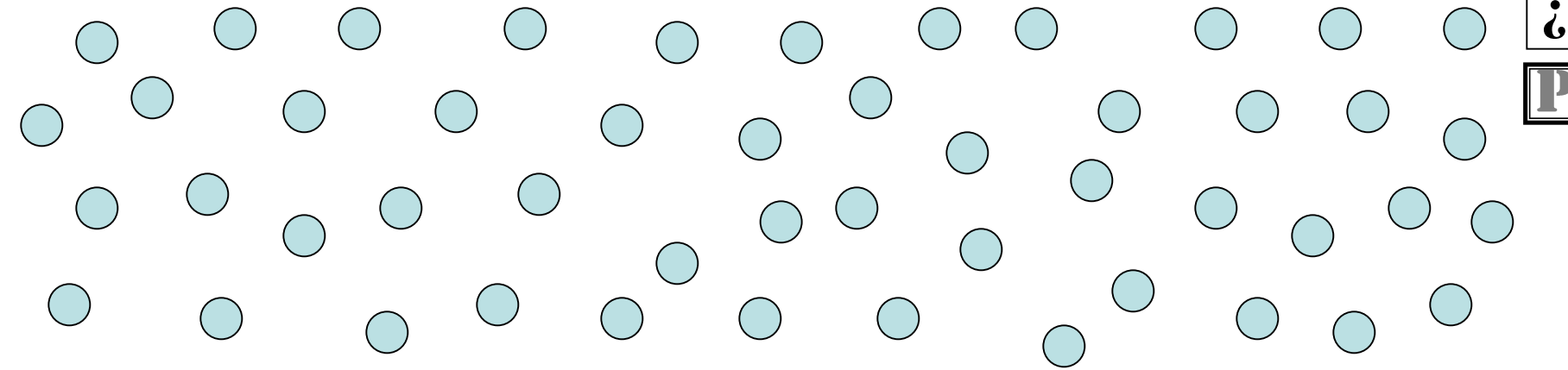
— = MEMBRANE



PASSIVE
TRANSPORT
MEMBRANE
APPLIED

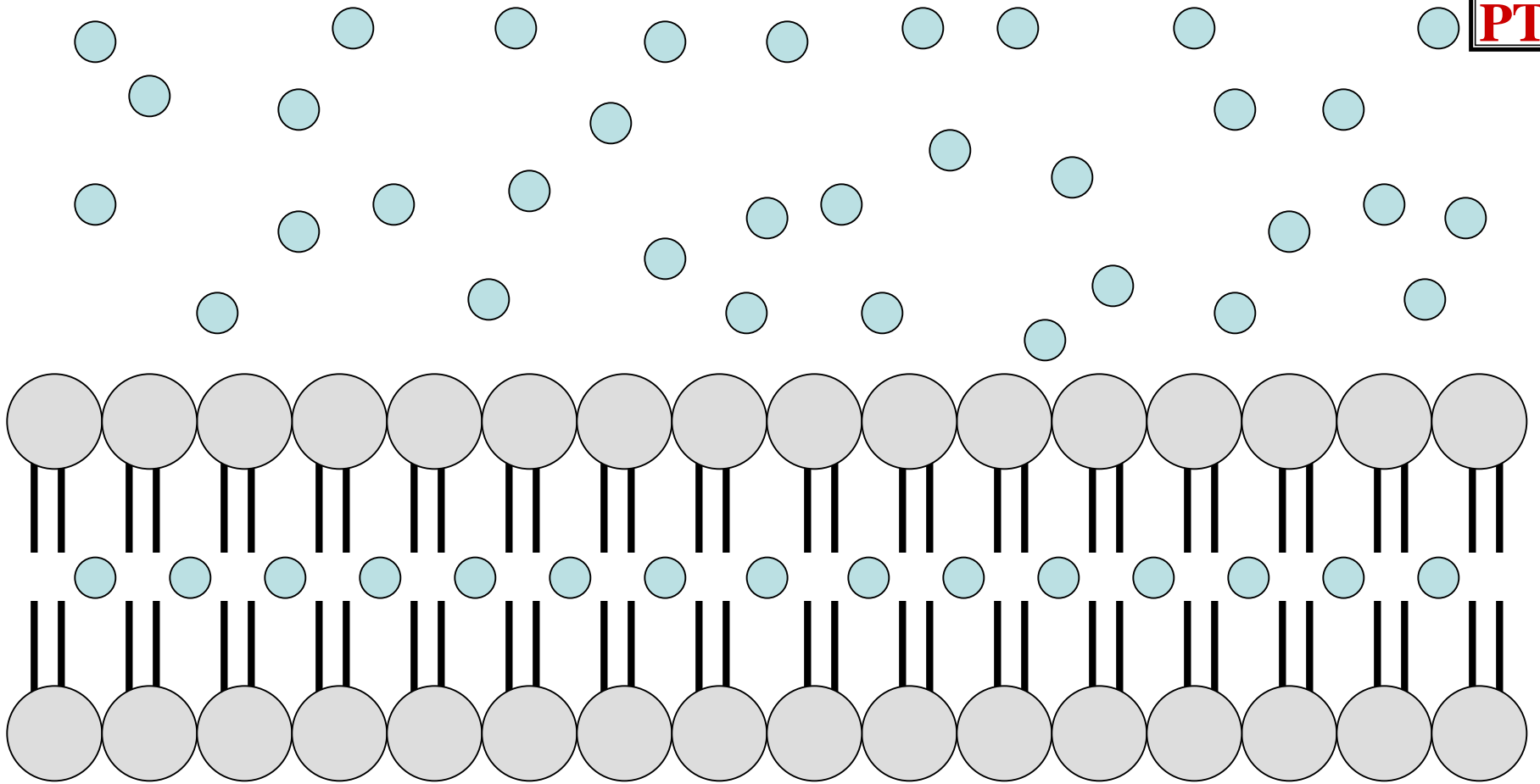


NON-POLAR SOLUTES



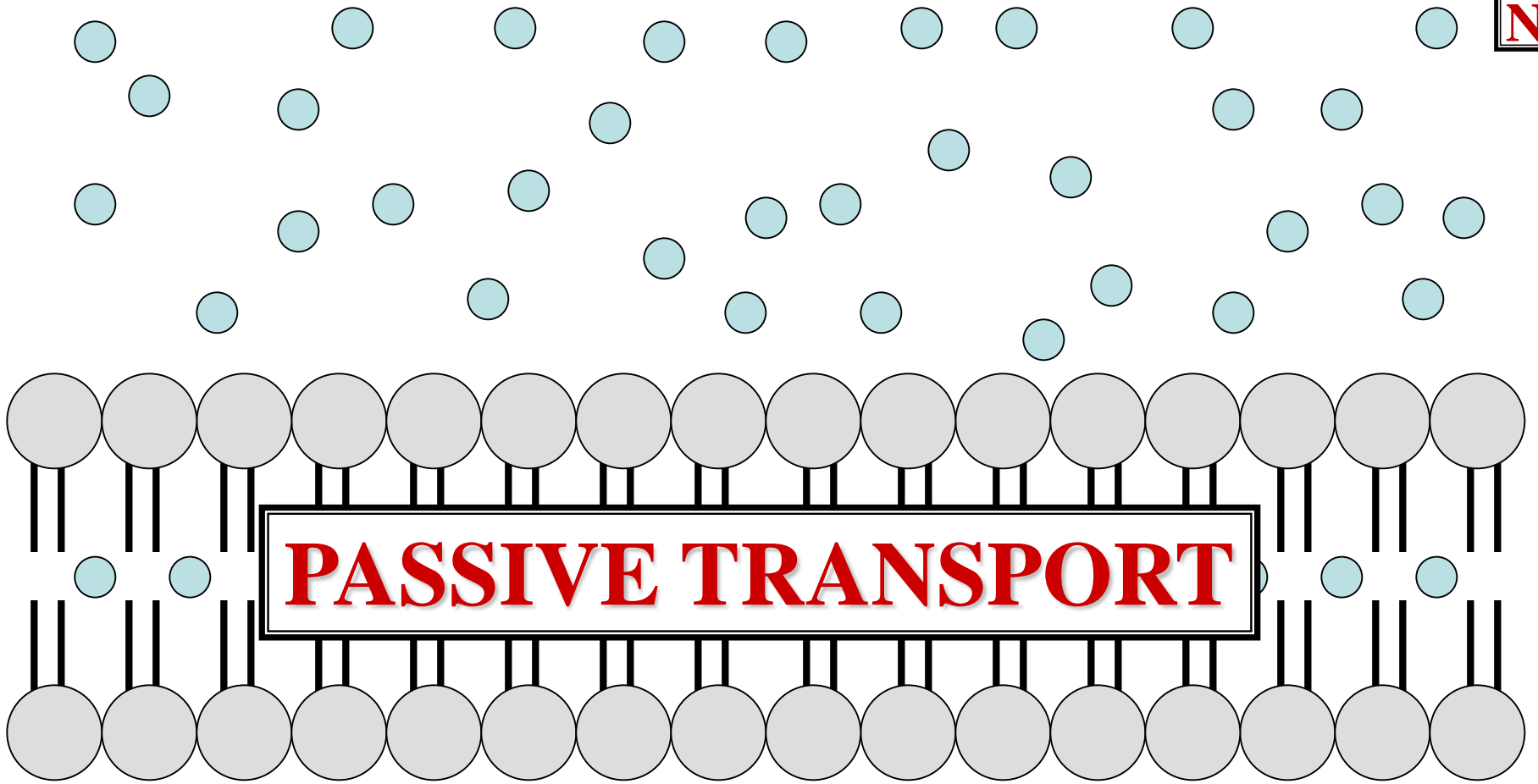
NON-POLAR SOLUTE

● = NON-POLAR SOLUTE ~



**BILAYER PERMITS PASSAGE
NON-POLAR SOLUTES**

● = NON-POLAR SOLUTE ~



● = NON-POLAR SOLUTE ~