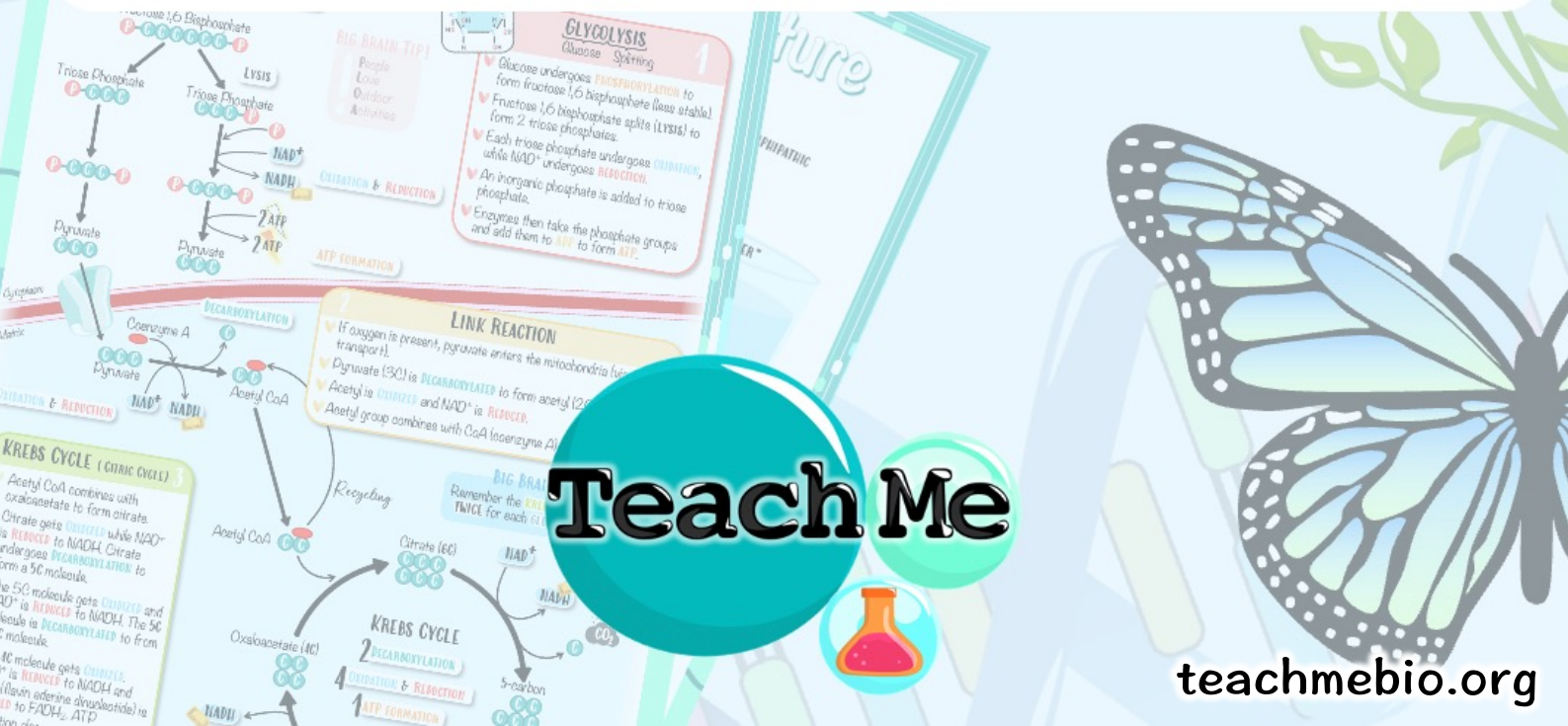


TeachMe

STUDY

NOTES

C1.1 ENZYMES

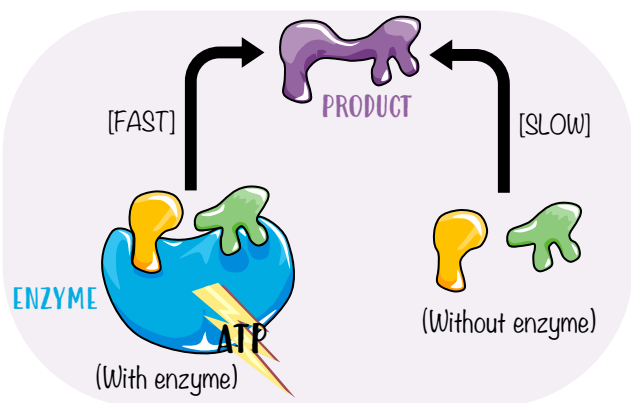


Enzymes

An enzyme is a biological **CATALYST**

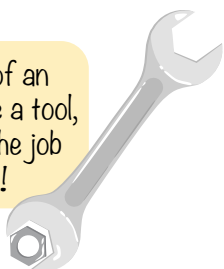
A substance that speeds up a reaction by **LOWERING THE ACTIVATION ENERGY*** (occurring in living things) that may otherwise take forever to happen.

*see page 2

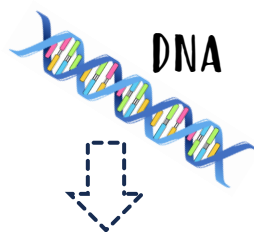


NOTE!

You can think of an enzyme acting like a tool, helping you get the job done faster!

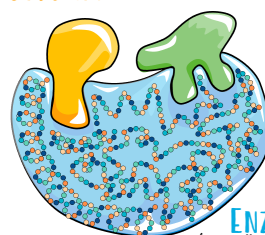


How do **ENZYMES** work?
(overview)



DNA codes for enzymes (even their very specific 3D structure)

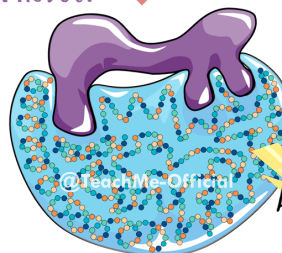
SUBSTRATE **SUBSTRATE**



The substrates (reactants) bind to the **ACTIVE SITES** (very specific shape) as they are complementary to each other, to form an **ENZYME-SUBSTRATE COMPLEX**

FAST

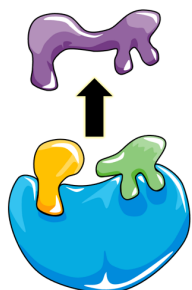
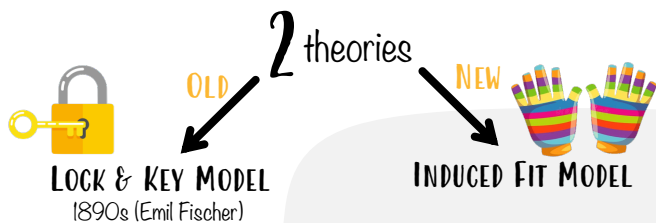
PRODUCT



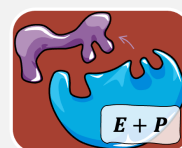
The product quickly gets formed – sometimes by the use of **ENERGY** (ATP)



MODELS OF ENZYME ACTION



OLD theory – enzymes (the lock) and substrates (the key) fit together specifically due to their complementary shapes.



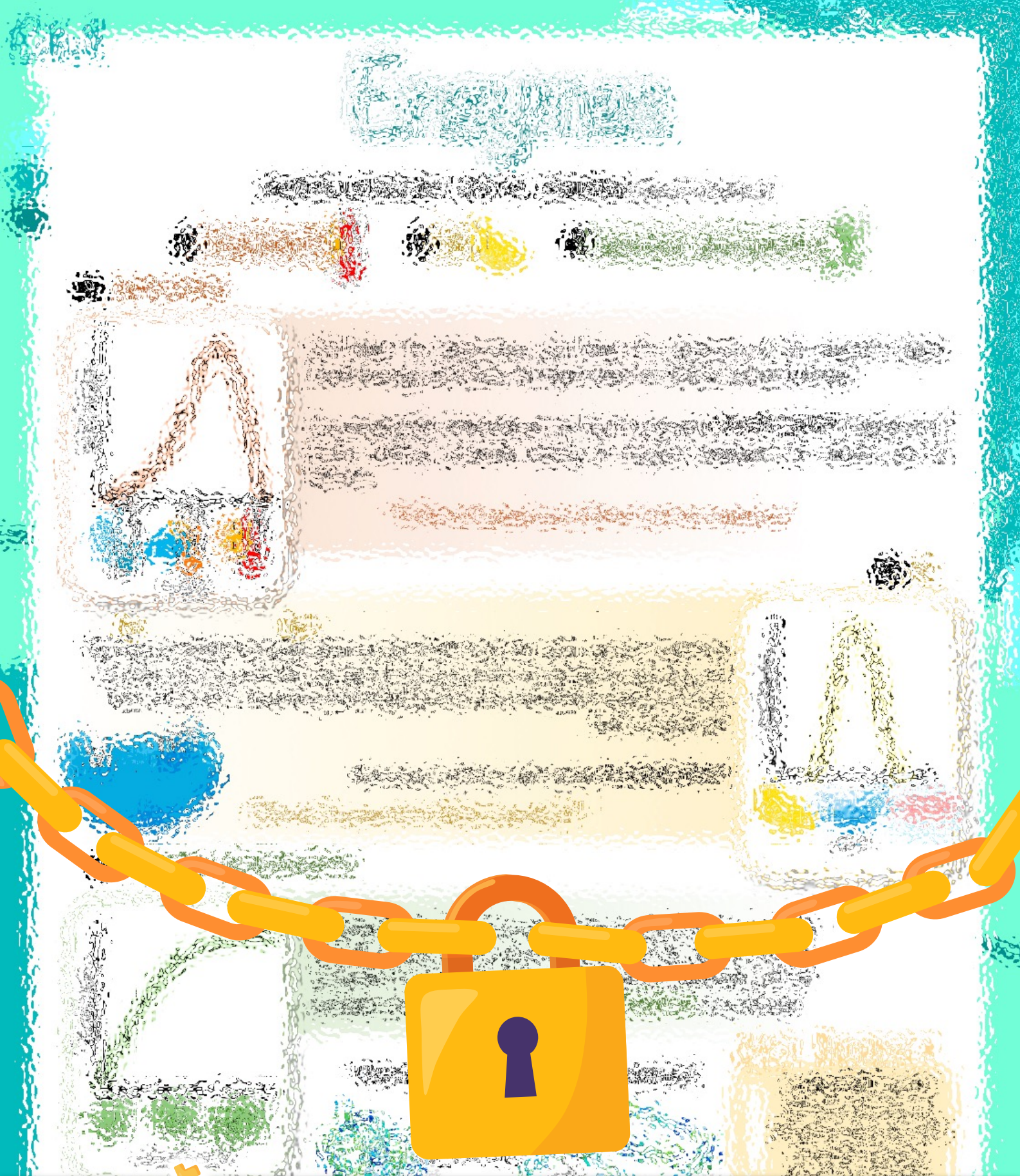
MECHANISM OF ENZYME ACTION (INDUCED FIT)

1. The surface of the substrate contacts the active sites of the enzyme
2. Interaction between enzyme and the substrate requires a slight conformational change.
3. A temporary complex (enzyme-substrate complex) forms. The conformational change causes stress on the bonds in the substrate (destabilized) favoring a reaction.
4. Activation energy is lowered, and the substrate is altered by the rearrangement of the existing atoms
5. The transformed substrate (the product), is released from the active site.
6. The unchanged enzyme is then free to combine with other substrate molecules

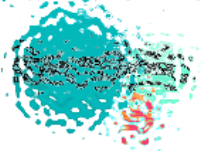
NEW & ACCEPTED theory – enzymes and substrates undergo conformational changes upon binding, leading to a more complementary fit: like a glove on your hand.



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