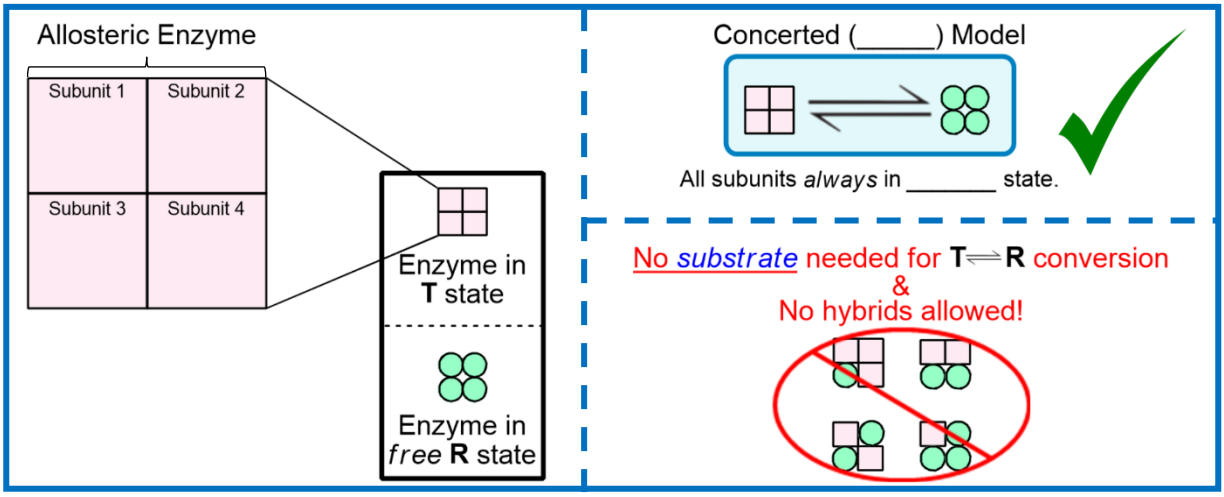
CONCEPT: CONCERTED (MWC) MODEL

●*Concerted (MWC) Model*: _____ T State & R State conversions in ALL *subunits* of an allosteric enzyme.

□ _____ Rule: All allosteric-enzyme-*subunits* must be in the _____ conformation/state (no hybrids allowed).

□ A natural _____ converts enzyme from T state to R state (no *substrate* needed via induced-fit).

□ Though **S** is not required to induce T-R conversion, the T⇌R equilibrium is _____ by *increasing* [**S**].



Positive Cooperativity of Concerted Model

●_____ *Cooperativity*: binding of **S** disrupts the T-R equilibrium *in favor of the R State* to _____ V_0.

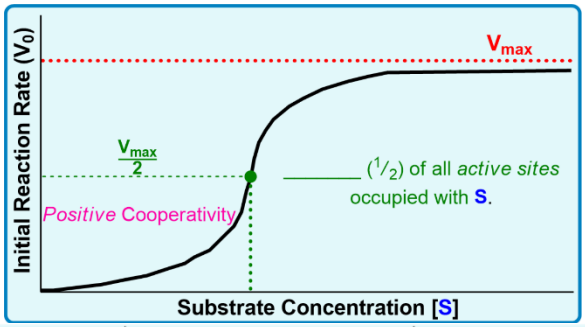
□ Accounts for the _____ increase in V_0 in the sigmoidal kinetics curve.

●Recall: at *low* [**S**], equilibrium favors the *inactive* ____ State (_____ L_0 = T/R).

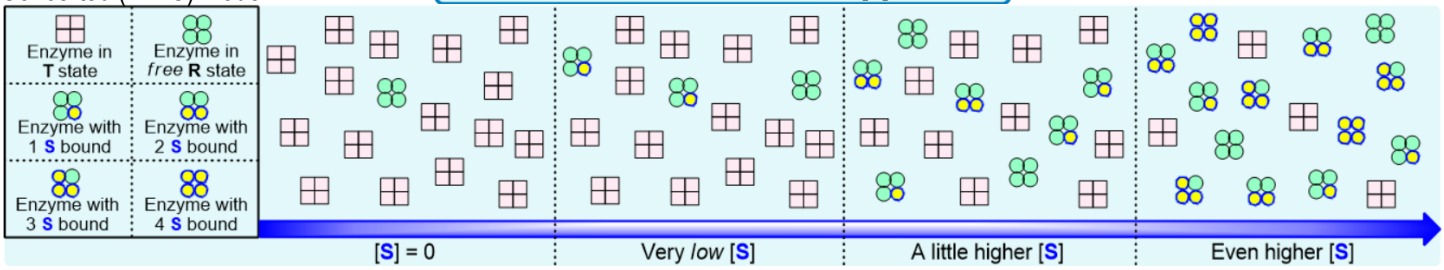
□ Under cell conditions, the enzyme will sometimes spontaneously _____ from T State to the R State.

●At high [**S**], it is _____ likely that **S** will bind to a R State subunit, *trapping* other subunits in the ___ State too.

□ High [**S**] leads to *more* **S** binding & the _____ of subunits in the R State (lower L_0 & _____ V_0).



Concerted (MWC) Model



CONCEPT: CONCERTED (MWC) MODEL

PRACTICE: In the Concerted model for allosteric enzymes:

a) Relative affinities of substrate for the T & R states play a crucial role in reaction cooperativity.
b) Equilibrium between T and R states plays a minor role.
c) Enzymatic activity of the T state is considerably higher than that of the R state.
d) It is possible to describe the reactions of all allosteric enzymes accurately.

PRACTICE: Which of the following is true concerning the symmetry rule & the Concerted model of allosterism?

a) The protein is an oligomer of symmetrically related proteins.
b) Though not with the same affinity, the ligand can bind to a subunit in either conformation.
c) The oligomer can only exist in one of two conformational states (T & R), which are in equilibrium.
d) All the above are true.

PRACTICE: According to the Concerted model & symmetry rule for allosteric proteins, which of the following statements is true for hemoglobin?

a) Each of the 4 subunits in hemoglobin changes one at a time from the low affinity to high affinity state.
b) First hemoglobin's α-subunits, then β subunits change from the low to the high affinity state.
c) Each of the four subunits in the hemoglobin tetramer is either in the low affinity or the high affinity state.
d) Hemoglobin's α-subunits have a low affinity state while the β subunits have high affinity for oxygen.