CONCEPT: DEGREE OF INHIBITION

●*Question*: How can we measure inhibitor effects on the initial rate/velocity (V_0) of an enzyme-catalyzed-reaction?

●_____ *of inhibition*: a factor that measures/quantifies how much an enzyme is actually being *inhibited* by the inhibitor.

●Recall: inhibitors can *either* bind to the _____ enzyme to form EI-complex or to the ____-complex to form ESI-complex.

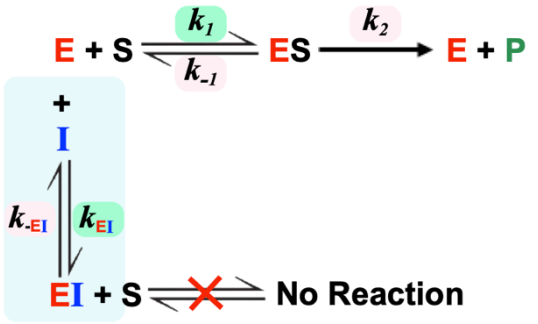
□ Biochemists can *separately* measure the *degree of inhibition* on the _____ enzyme & the _____-complex.

α Measures Effects of Inhibition on Free Enzyme (E)

●*Degree of Inhibition on _____ enzyme* (___) = $1 + \frac{[I]}{K_I}$

□ α is a *unitless* factor that is _____ greater than or equal to 1 ($\alpha \geq 1$).

□ No inhibitor is present when α = ____, AND as α _____, [inhibitor] *increases*.



Degree of Inhibition on _____ Enzyme = $\alpha = \left(1 + \frac{[I]}{K_I}\right)$

α < 1	
α __ 1	Inhibitor is _____ (___ inhibitor)
α > 1	Inhibitor is _____.

EXAMPLE: According to the data in the table below, which enzyme is affected most by the inhibitor?

a) Enzyme A. b) Enzyme B. c) Enzyme C.

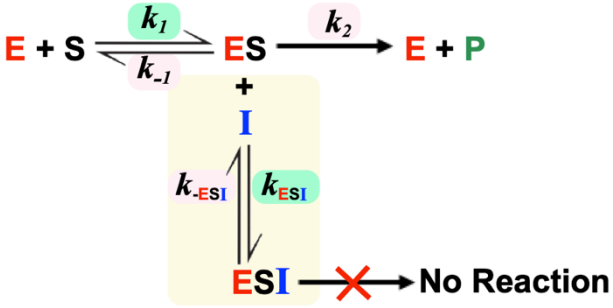
Enzyme A	α = **1.37**
Enzyme B	α = **1.98**
Enzyme C	α = **1.02**

PRACTICE: Calculate the degree of inhibition of an inhibitor on the free enzyme if the [I] = 3 μM and the K_I = 6 μM.

a) α = 1.5 b) α = 2 c) α = 4 d) α = 3.5 e) α = 0.5

α' Measures Effects of Inhibition on ES-Complex

●*Degree of Inhibition on* _____-Complex (___) quantifies effect of an inhibitor on the ES-complex (α').



Degree of Inhibition on ____-complex = ___ = $\left(1 + \frac{[I]}{K'_I}\right)$

●α and α' are used as *factors* to modify the *Michaelis-Menten* & *Lineweaver-Burk* equations in the presence of inhibitors.

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PRACTICE: Calculate the degree of inhibition of an inhibitor on the ES-complex if the [I] = 8 μM and the K'_I = 0.03 mM.

a) α = 0.87
b) α = 1.08
c) α = 1.27
d) α = 2.39
e) α = 0.27