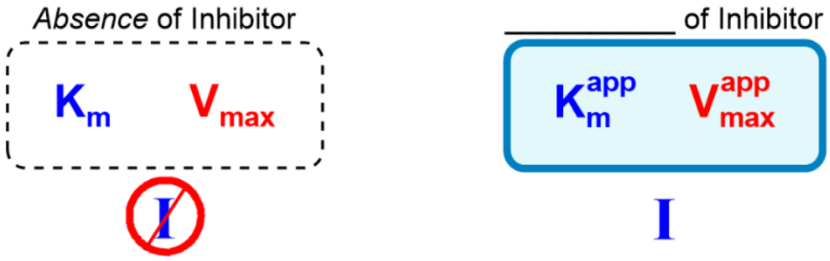
**CONCEPT:** APPARENT $K_M$ AND $V_{MAX}$

- Presence of inhibitors can result in an *apparent* change to either the _____ and/or _____ of an enzyme.
- _____ $K_m$ & $V_{max}$ ($K_m^{app}$ and $V_{max}^{app}$): the resulting $K_m$ & $V_{max}$ that an enzyme has in the *presence* of an inhibitor.




**$K_m^{app}$ & $V_{max}^{app}$ Are Affected by $\alpha$ And/Or $\alpha$'**

- $\alpha$ and/or $\alpha$' indicate the degree at which the $K_m^{app}$ and $V_{max}^{app}$ are altered by the inhibitor.
  - □ Depending on the _____ of inhibitor, $\alpha$ or $\alpha$' may affect the $K_m^{app}$ and/or $V_{max}^{app}$ in _____ ways.

| Depending on the _____ of inhibitor: | | Effect on $K_m$ | Effect on $V_{max}$ |
|---|---|---|---|
| _____ Inhibitor | $K_m^{app} = \alpha K_m$ | _____ | _____ |
| _____ Inhibitor | $K_m^{app} = \frac{K_m}{\alpha'}$ & $V_{max}^{app} = \frac{V_{max}}{\alpha'}$ | _____ | _____ |
| _____ & _____ Inhibitors | $K_m^{app} = \frac{\alpha K_m}{\alpha'}$ & $V_{max}^{app} = \frac{V_{max}}{\alpha'}$ | _____ | _____ |

**EXAMPLE:** The $K_I$ value for a certain competitive inhibitor is 2 µM. When no inhibitor is present, the $K_m$ value is 10 µM. Calculate the apparent $K_m$ when 4 µM inhibitor is present.

**PRACTICE:** Competitive inhibitor A at a concentration of 2 µM doubles the apparent $K_m$ for an enzymatic reaction, whereas competitive inhibitor B at a concentration of 9 µM quadruples the apparent $K_m$. What is the ratio of the $K_I$ for inhibitor B to the $K_I$ for inhibitor A? (Hint: use the table above).

a) 1.5 b) 3 c) 4 d) 2/3 e) 1/4

**CONCEPT:** APPARENT $K_M$ AND $V_{MAX}$

**PRACTICE:** The $K_I$ value for a certain competitive inhibitor is 10 mM. When no inhibitor is present, the $K_m$ value is 50 mM. Calculate the apparent $K_m$ when 40 mM inhibitor is present. (Hint: use the table on the previous page).

a) 20 mM.
b) 10 mM.
c) 100 mM.
d) 150 mM.
e) 250 mM.

**PRACTICE:** Uncompetitive inhibitor A at a concentration of 4 mM cuts the $K_m^{app}$ in half for an enzymatic reaction, whereas the $K_m^{app}$ is one-fourth the $K_m$ in the presence of 18 mM uncompetitive inhibitor B. What is the ratio of the $K'_I$ for inhibitor A to the $K'_I$ for inhibitor B? (Hint: use the table on the previous page).

a) 3/2
b) 2/3
c) 1/3
d) 3
e) 1