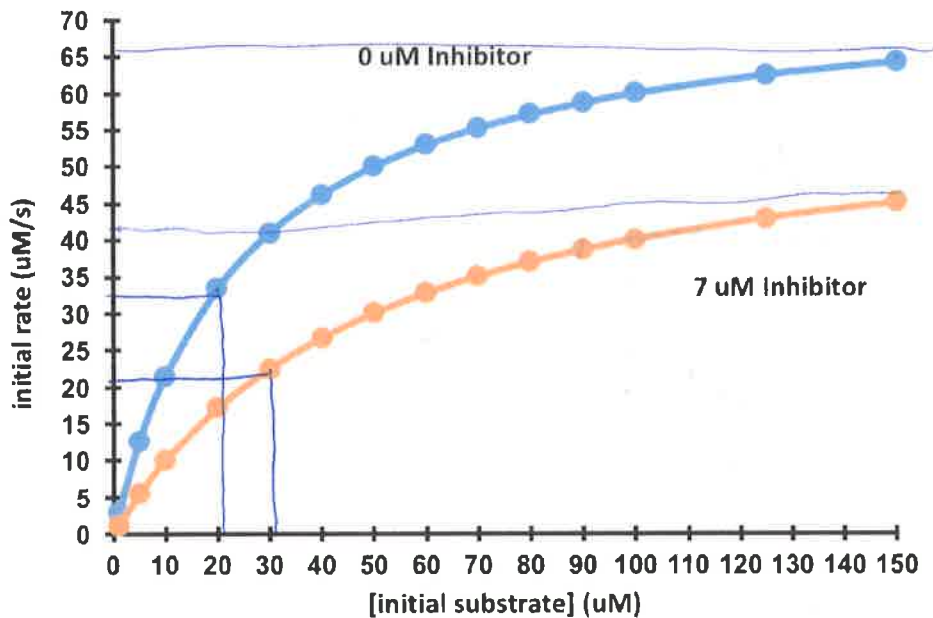
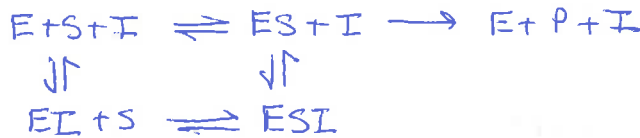


Name: Key

Imagine that you collect the following kinetic data with 5 nM of enzyme present in each assay.



1. Write out the mechanism supported by the presented data. There is no need to include the mathematical expression. *Mixed Inhibition*



2. Determine the numerical value of V_{Max} . Include units.

$$V_{max} \approx 66 \mu M/s$$

3. Determine the numerical value of K_M . Include units.

$$K_m \approx 21 \mu M$$

4. Determine the numerical value of k_{cat} . Include units.

$$k_{cat} = \frac{V_{max}}{[E]_{total}} = \frac{66 \mu M/s}{0.005 \mu M} = 13,200 \frac{1}{s}$$

5. [On the back] Determine the numerical value of any K_i parameters. Include units.

$$0 \mu\text{M I}$$

$$V_{\text{max}} = 66 \frac{\mu\text{M}}{\text{s}}$$

$$K_m = 21 \mu\text{M}$$

$$7 \mu\text{M I}$$

$$V_{\text{max}}^{\text{app}} = 41 \mu\text{M/s}$$

$$K_m^{\text{app}} = 31 \mu\text{M}$$

$K_{I,ES}$

$$V_{\text{max}}^{\text{app}} = \frac{V_{\text{max}}}{\left(1 + \frac{[I]}{K_{I,ES}}\right)}$$

$$41 \frac{\mu\text{M}}{\text{s}} = \frac{66 \frac{\mu\text{M}}{\text{s}}}{\left(1 + \frac{7 \mu\text{M}}{K_{I,ES}}\right)}$$

$$1 + \frac{7 \mu\text{M}}{K_{I,ES}} = \frac{66 \frac{\mu\text{M}}{\text{s}}}{41 \frac{\mu\text{M}}{\text{s}}} = 1.6098$$

$$\frac{7 \mu\text{M}}{K_{I,ES}} = 0.6098$$

$$K_{I,ES} = 11.48 \mu\text{M}$$

$$K_{I,E} \quad K_m^{\text{app}} = K_m \left(\frac{1 + \frac{[E]}{K_{I,E}}}{1 + \frac{[I]}{K_{I,ES}}} \right)$$

$$31 \mu\text{M} = 21 \mu\text{M} \left(\frac{1 + \frac{7 \mu\text{M}}{K_{I,E}}}{1 + \frac{7 \mu\text{M}}{11.48 \mu\text{M}}} \right)$$

$$1.4762 = \frac{1 + \frac{7 \mu\text{M}}{K_{I,E}}}{1.6098}$$

$$2.3764 = 1 + \frac{7 \mu\text{M}}{K_{I,E}}$$

$$K_{I,E} = 5.086 \mu\text{M}$$