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Michaelis–Menten mechanism

The Michaelis–Menten mechanism is the simplest mechanism that will explain Michaelis–Menten kinetics According to the mechanism, a substrate A first combines with a molecule of enzyme E, and this process is followed by a step in which the enzyme-substrate complex EA breaks down (sometimes with the participation of the solvent) into enzyme and reaction products:

$$\mathrm{E} + \mathrm{A} \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} \mathrm{EA} \xrightarrow{k_2} \mathrm{E} + \mathrm{Products}$$

If, as is usual, the substrate A is present in great excess of the enzyme it can be shown that steady-state conditions apply, and that the rate equation is:

$$v = \frac{k_2 [\mathrm{E}]_0 [\mathrm{A}]}{\frac{k_{-1} + k_2}{k_1} + [\mathrm{A}]}$$

where $[\mathrm{E}]_0$ is the total concentration of enzyme. This equation is of the form of the Michaelis–Menten equation. Other, more complicated, mechanisms lead to the Michaelis–Menten equation, adherence to which therefore does not require that the Michaelis– Menten mechanism applies.

Source:
PAC, 1996, *68*, 149 *(A glossary of terms used in chemical kinetics, including reaction dynamics (IUPAC Recommendations 1996))* on page 172

