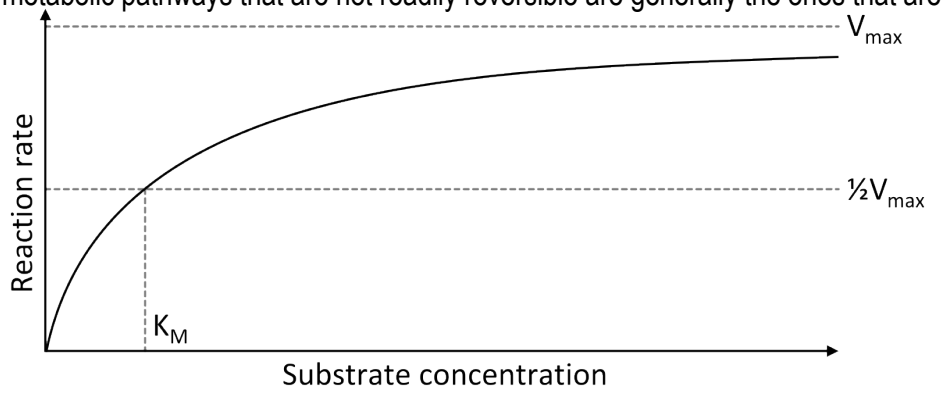
**CONCEPT:** METABOLIC REGULATION

- Substrate concentration in cells is close to $K_m$ of their respective enzymes; ensures enzyme activity fluctuates with $\Delta$[S]
    - □ Elasticity coefficient – slope of line on Michaelis-Menten, most elastic in 0-$K_m$ range
    - □ ADP and ATP concentration don't fluctuate too much in a cell, AMP concentration can fluctuate drastically
        - AMP-activated protein kinase has a wide range of effects on metabolism (fatty acid oxidation in the heart)
    - □ Enzymes of metabolic pathways that are not readily reversible are generally the ones that are regulated




- Glycolysis and gluconeogenesis must be tightly controlled, and regulated in conjunction, to prevent futile cycles
- Hexokinase I is the most influential enzyme on the rate of glycolysis, followed by phosphofructokinase-1
    - □ Glucose 6-phosphate (the product of hexokinase's reaction with glucose) inhibits hexokinase
- Glucokinase (hexokinase IV) – present in liver cells, stored in the nucleus, and has a much higher $K_m$ than hexokinase I
    - □ Glucose causes glucokinase to move from the nucleus to cytoplasm
    - □ Fructose 6-phosphate causes glucokinase to move back into nucleus
    - □ It is NOT inhibited by glucose 6-phosphate, allowing for the supply, not demand, of glucose to gauge rxn rate