

## Regulation of Metabolism

Physiology 2015

Here is a brief problem related to lecture in a recent class:

Imagine a metabolic pathway that proceeds in the body from A to Z and where "E" refers to an enzyme:  $A \xrightleftharpoons{E1} B \xrightleftharpoons{E2} C \xrightleftharpoons{E3} D \xrightleftharpoons{E4} Z$

Biochemical analyses finds for two different levels of demand for Z:

Reaction	Substrate Concentrations, Situation #1	Substrate Concentrations, Situation #2	Equilibrium Constant
A $\rightleftharpoons$ B	[A] = 0.4 [B] = 0.09	[A] = 0.82 [B] = 0.01	$K_{eq} = 0.2$
B $\rightleftharpoons$ C	[B] = 0.09 [C] = 0.28	[B] = 0.01 [C] = 0.03	$K_{eq} = 3.0$
C $\rightleftharpoons$ D	[C] = 0.28 [D] = 0.26	[C] = 0.03 [D] = 0.031	$K_{eq} = 1.0$
D $\rightleftharpoons$ Z	[D] = 0.26 [Z] = 0.20	[D] = 0.031 [Z] = 0.025	$K_{eq} = 0.8$

1. Which enzymes would be said to catalyze "equilibril" reactions and which catalyze "non-equilibril" reactions?

2. Which step is used to regulate the overall rate of the pathway?