

**Regulation of Metabolic Control:
Preventing “Chemical Chaos”**

- In many cases, the molecules that naturally regulate enzyme activity behave like reversible noncompetitive inhibitors.
- These molecules often bind weakly to an **allosteric site**, a specific receptor on the enzyme that is not the active site.
- Binding by these molecules can either inhibit or stimulate enzyme activity.
- One of the common methods of metabolic control is **feedback inhibition** in which a metabolic pathway is turned off by its end product.
- The end product acts as an allosteric inhibitor of an enzyme in the pathway.
- When the product is abundant the pathway is turned off, when rare the pathway is active.
- Some enzymes have multiple catalytic subunits
- Substrate binding to the active site of one subunit causes favorable conformational changes to occur in all other subunits
- This process is called **cooperativity**
- Cooperativity amplifies the response of enzymes to substrates, priming the enzyme to accept additional substrates

**The localization of enzymes
within a cell helps order metabolism**

- Structures within the cell bring order to metabolic pathways.
- A **team of enzymes** may be assembled together to perform several steps of a metabolic pathway
- The product from the first can then pass quickly to the next enzyme until the final product is released.
- Some enzymes and enzyme complexes have fixed locations within the cells as structural components of particular membranes.
- Others are confined within membrane-enclosed eukaryotic organelles.
- Both methods concentrate enzymes for efficiency