Interactions between molecules affect their structure and function.

**ENZYME STRUCTURE AND FUNCTION**
Structure and Function

Structure always determines function.

Molecular interactions lead to organism phenotypes.
Metabolism is Controlled by Enzymes
More Steps = More Control = More Complexity
Enzymes are (mostly) Proteins

**Enzymes** are molecules that serve as biological **catalysts**.

Some RNA molecules also have catalytic properties.
**Catalysis**

**Catalysts:** Substances that increase the rate of a chemical reaction by lowering the activation energy of the reaction, without participating in the reaction.
Enzymes work by physically positioning reactants ("substrate") in ways that increase the likelihood of chemical bonds being broken or formed.

Enzymes are highly specific for the substrates that they interact with. The name of an enzyme tells you about its substrate in the first part of its name, and ends in –ase. (Ex. lipase)
Induced Fit Model:
Substrate molecules physically bind to an area of the enzyme called the “active site”. The binding causes the conformation of the enzyme to change slightly, catalyzing the reaction.
Co-factors/Co-enzymes

many enzymes require organic (co-enzymes: “vitamins”) or inorganic (co-factors: “minerals”) groups of atoms to be complexed with the enzyme.

Ex. Many enzymes involved in interacting with DNA require zinc$^{2+}$ ions as co-factors (green spheres).
Ex. Vitamin C

Diagram showing the conversion of ascorbate to ascorbate radical with the help of cytochrome b₃ reductase.