

## ATP and Energy Transfer

### ATP Structure

- Adenosine + 3 phosphates
- High-energy phosphate bonds
- Hydrolysis:  $\text{ATP} \rightarrow \text{ADP} + \text{P}_i$
- $\Delta G^\circ = -7.3 \text{ kcal/mol}$

### Energy Coupling

- Links exergonic to endergonic
- Common intermediate strategy
- Enzyme catalyzed
- Metabolic efficiency

### Other Energy Carriers

- GTP: protein synthesis
- NADH: reduction reactions
- $\text{FADH}_2$ : electron transport
- Creatine phosphate: muscle

### Cellular Energy Budget

- Daily ATP turnover: ~body weight
- Majority for biosynthesis
- Transport and signaling
- Mechanical work