

Energy

Role of energy

- light energy for photosynthesis
- ATP used for conversion of GP to TP
- ATP used to regenerate RuBP
- Energy needed for anabolic reactions: protein synthesis
- Activation energy to activate glucose in glycolysis
- Active transport: sodium potassium pump
- Movement: muscle contraction
- Endocytosis / exocytosis / pinocytosis / bulk transport
- Temperature regulation

ATP structure

- Nucleotide
- Three phosphate groups
- Nitrogenous base / adenine
- Pentose sugar / ribose
- Ester linkages / covalent bonds

ATP as universal energy currency

- Small
- Water soluble so can move around cell
- Immediate source of energy
- Intermediate between energy yielding and energy requiring reactions
- When hydrolysed, phosphate removed, releases energy
- 30.5 kJ mol^{-1}
- ATP splits to ADP and P_i
- Reversible
- High turnover

ATP synthesis

- Substrate-linked reactions in
 - Glycolysis
 - Krebs cycle

Roles of

- **NAD**
 - Acts as a coenzyme for dehydrogenase