Glucagon and insulin: prime regulators of glucose homeostasis:
- Increased plasma [glucose] \(\rightarrow\) increased [insulin] \(\rightarrow\) reduced plasma [glucose]
  \(\rightarrow\) increased [glucagon] \(\rightarrow\) increased [glucose]
- Increased plasma glucose levels signals insulin secretion and suppression of
  glucagon secretion

Glucagon and insulin: counter-regulatory function
- Insulin: reduces blood glucose
- Glucagon: increases blood glucose

**Glucose**

Glucose: located in the liver, skeletal muscle, adipose tissue, pancreas, in circulation

Hypoglycemia: drowsy, aggression, irritability, loss of consciousness

Glucose sources for glycogen synthesis:
- 10-15\% glucose absorbed and converted to pyruvate
- 40-60\% glucose converted to G6P to be stored as glycogene
- 30-40\% used peripherally

**Insulin**

Properties:
- Water soluble
- Synthesized as very long pre-pro-insulin and then spliced into pro-insulin; C-
  peptide holds two parts of molecule together via S=S bridges; these are cleaved
to give C-peptide and insulin molecule
- MW: 5808Da
- Insulin gene located on Chromosome 11
- Half life = 5mins
- 80\% degraded in the liver and kidneys (If problem with these tissues then get an
  accumulation of insulin)

Rapid action of insulin (seconds)
- Increased glucose, AA and K+ uptake into insulin-sensitive cells (adipose tissue
  and muscle cells)

Intermediate action of insulin (minutes)
- Stimulate protein synthesis
- Inhibit protein degradation (muscle and liver)
- Activate glycogen synthase and glycolytic enzymes (liver)
- Inhibit phosphorylase and gluconeogenic enzymes (liver)

Delayed action of insulin (hours)
- Increased mRNA for lipogenic and other enzymes

**Regulation of Insulin Release**

<table>
<thead>
<tr>
<th>Stimulators</th>
<th>Inhibitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>somatostatin</td>
</tr>
<tr>
<td>Amino acids</td>
<td>insulin</td>
</tr>
<tr>
<td>Glucagon</td>
<td>2-deoxyglucose</td>
</tr>
<tr>
<td>GIP</td>
<td>alpha adrenergics</td>
</tr>
<tr>
<td>cAMP</td>
<td>potassium depletion</td>
</tr>
<tr>
<td>beta adrenergics</td>
<td>beta blockers</td>
</tr>
<tr>
<td>sulphonylureas</td>
<td>thiazide diuretics</td>
</tr>
</tbody>
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