(a) Fed state: insulin dominates

Glucagon

↑ Glucose oxidation
↑ Glycogen synthesis
↑ Fat synthesis
↑ Protein synthesis

(b) Fasted state: glucagon dominates

Glucagon

↑ Glycogenolysis
↑ Gluconeogenesis
↑ Ketogenesis
(a) In the absence of insulin, glucose cannot enter the cell.

(b) Insulin signals the cell to insert GLUT-4 transporters into the membrane, allowing glucose to enter cell.
Stan Andrisse and Prof Fisher
Stan had been my grad TA for this course
Brain needs glucose
The large bottle (pile of cubes) per day
<table>
<thead>
<tr>
<th>Tissue location</th>
<th>$K_m$</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 All mammalian tissues</td>
<td>1 mM</td>
<td>Basal glucose uptake</td>
</tr>
<tr>
<td>2 Liver and pancreatic $\beta$ cells</td>
<td>15–20 mM</td>
<td>In the pancreas, plays a role in regulating insulin. In the liver, removes excess glucose from blood</td>
</tr>
<tr>
<td>3 All mammalian tissues</td>
<td>1 mM</td>
<td>Basal glucose uptake</td>
</tr>
<tr>
<td>4 Muscle and fat cells</td>
<td>5 mM</td>
<td>Amount in muscle plasma membrane increases with endurance training</td>
</tr>
<tr>
<td>5 Small intestine</td>
<td>—</td>
<td>Primarily a fructose transporter</td>
</tr>
</tbody>
</table>

Different glucose transporters