Chemical Signalling
- hormones and growth factors

Produced for the CRC for Premium Quality Wool undergraduate program by;
Dr. Janelle Hocking Edwards, The University of Western Australia.
Chemical Signals

- Hormones, growth factors, neurotransmitters
  - Steroids / hydrophobic - testosterone
  - Proteins (peptides) / hydrophilic - GH, IGF
  - Combination /partly hydrophilic/phobic - Thyroxine

- Produced by a number of cell types

- How do they convey specific signals?
  - through their unique structure
  - through receptors in target cells
    - these can affect gene expression or cell cycle
General properties of growth factors

- small proteins (5 - 30kDa)
- found in various animal tissues
- accelerate the transport of ions and nutrients
- stimulate growth and development
  - increase DNA, RNA, protein synthesis and lipogenesis
  - decrease protein breakdown and lipolysis
Similarities of growth factors and hormones

- structural
- specific receptors
- use secondary messengers
- some functions
### Differences between growth factors and hormone properties

<table>
<thead>
<tr>
<th></th>
<th>Hormones</th>
<th>Growth factors</th>
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</thead>
<tbody>
<tr>
<td><strong>Response</strong></td>
<td>Rapid/Acute</td>
<td>Slower</td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td>Endocrine</td>
<td>Auto/para/endo.</td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td>Secretory cell</td>
<td>All cells</td>
</tr>
<tr>
<td><strong>Release</strong></td>
<td>Bolus</td>
<td>Diffusion</td>
</tr>
<tr>
<td><strong>Receptors</strong></td>
<td>Inter &amp; extracellular</td>
<td>Cell membrane</td>
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</tbody>
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Janelle Hocking Edwards