Not much data so a step back to basics

- Cells and organelles
- Central dogma
- Structure/function
- Cell signaling
- Developmental cellular processes
- The landscape of the developing Hypothalamus
Standard mammalian cell - Who can tell us what each of these does?
Central Dogma of Molecular Biology

www.youtube.com/watch?v=983lhh20rGY
Amino acid sequence dictates structure and function of protein

- Pleated sheet
- Alpha helix
- Secondary structure
- Tertiary structure
- Quaternary structure

**Group**

<table>
<thead>
<tr>
<th>Group</th>
<th>Acid</th>
<th>Base + H⁺</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspartic/glutamic acid</td>
<td>COOH → COO⁻ + H⁺</td>
<td></td>
</tr>
<tr>
<td>Histidine</td>
<td>CH₂⁺NH⁺ → CH₂⁺NH⁻</td>
<td>+ H⁺</td>
</tr>
<tr>
<td>Cysteine</td>
<td>- SH → S⁻ + H⁺</td>
<td></td>
</tr>
<tr>
<td>Tyrosine</td>
<td>- OH → O⁻ + H⁺</td>
<td></td>
</tr>
<tr>
<td>Lysine</td>
<td>- NH₃⁺ → NH₂⁻ + H⁺</td>
<td></td>
</tr>
<tr>
<td>Arginine</td>
<td>- NH₂⁻ → NH₂⁻ + H⁺</td>
<td></td>
</tr>
</tbody>
</table>
Regulation of transcription and translation
Things cells do in development

- Born - mitosis or proliferation
  - cell cycle checkpoints / protein expression
- Get named - differentiation and specification
  - cellular cues (from inside and outside) and protein expression
- Learn to crawl - migration
  - Cellular cues and protein expression
- Build relationships - synapse formation
- Experience survival of the fittest - synapse elimination and apoptosis
Hypothalamic developmental landscape

• Heterogeneous population of cells
  – Cell cycle stage, size, protein expression, some migrating some already sending out axons
The embryonic PVN
• Questions
• http://multimedia.mcb.harvard.edu