Week 7 – Chapter 4
Principles of sensory processing in any modality

_________ - collects, filters, and amplifies relevant information

<table>
<thead>
<tr>
<th>Modality</th>
<th>Receptor Class</th>
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<tbody>
<tr>
<td>Sound (A1)</td>
<td>__________</td>
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<tr>
<td>Touch (S1)</td>
<td>__________</td>
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<td>__________</td>
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<td>__________ (Gustatory cortex)</td>
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<td>Smell (OC)</td>
<td>__________ (Olfactory cortex)</td>
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</tbody>
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_________ - receptor cells convert environmental stimulus into an electrical signal

Receptor Class

Sound (A1) - __________
Touch (S1) - __________
Sight (V1) - __________
Taste (GC) - __________ (Gustatory cortex)
Smell (OC) - __________ (Olfactory cortex)

_________ - sensory processing changes to be most sensitive to relevant stimulus levels. This maximizes the amount of sensory information that can be processed.

light adaptation: photopic v. scotopic vision
range of light processing: more than ___ orders of magnitude

_________ - Rods are active, no color vision, poor acuity
_________ - Cones are active, color vision, high acuity

_____ - measure of discrimination; accuracy of sensory system determined largely by density of receptors

Stimulus duration and adaptation

___________ (phasic) receptors – convey changes, stimulus onset and offset
___________ (tonic) receptors – reports that the stimulus is ongoing

Organization of Sensory Cortices

Topographic organization

_________ – more cortical area is devoted to tasks that require more processing
_________ – Neurons with similar functional properties are grouped together
**Multisensory integration**

**Vision**
- **Fovea** – most dense region of photoreceptors
- **Blind spot** – a region where no photoreceptors exist
- **Saccades** – fast eye movements cover blind spots and areas of low acuity. 3-4 times per seconds

- **Rods** (black/white)
- **Cones** (RGB)

**Bipolar cells**
- **Horizontal cells** – ________ information processing
- **Amacrine cells** – ________ information processing

**Ganglion**
- Feedforward and feedback information

Information flows to the Lateral Geniculate Nucleus (LGN) of the Thalamus and reaches the primary visual cortex (V1) in a _________ (topographic) manner.

Two visual information streams
- **‘Where’ pathway** – ______ stream: Parietal cortex, spatial relations
- **‘What’ pathway** – ______ stream: Temporal cortex, form and color

**Organization:**
Is sensory processing hierarchical or distributed?
- ________ – the region that when stimulated, elicits a sensory response
- 2-point discrimination test

A ________ defines the stimulus to which the cell is maximally responsive
- e.g. Stimulus orientation in visual cortex

**Sensory Coding**
- ________ – the pattern of activity of an array of neurons, each with a different tuning curve, represents sensory information  *(fyi: not to be confused with place cells!)*

- ________ – Information about the stimulus (intensity…) is encoded in the firing rates of a neuron or population of neurons

- ________ – temporal information (onset, offset, persistence…) is encoded by the precise timing of action potentials

- ________ – The “real-world” stimulus must be inferred from the neural representation formed by our sensory systems *(Empirical coding)*

**Topographic representations** – Identify the primary cortex for each:
- **Retinotopic**
- **Tonotopic**
Somatotopic