Receptive Fields

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U2IS - ENSTA - IPParis

ecampus moodle: MI210 - Modèles neuro-computationnels de la vision (P4 - 2020-21)

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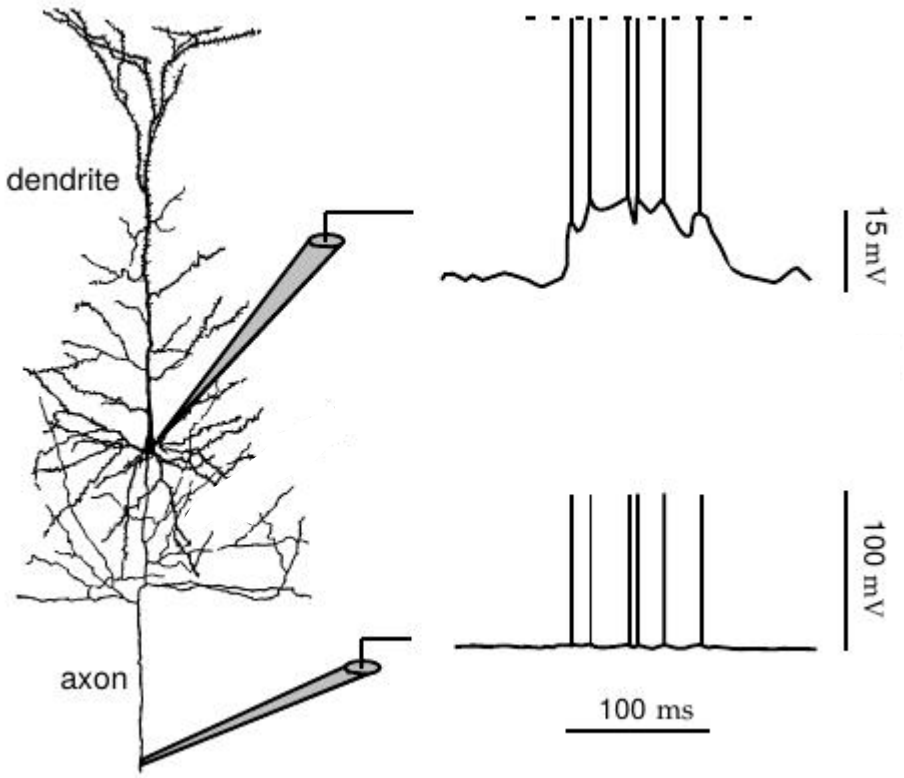
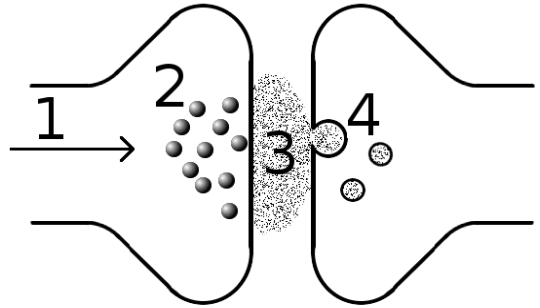
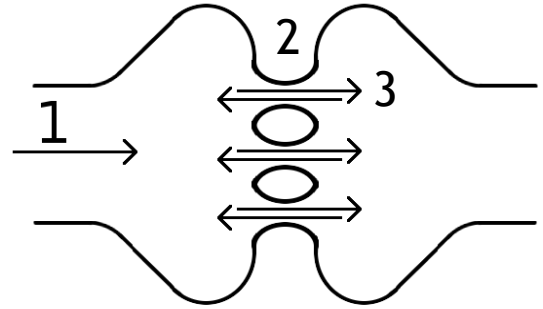
How are spikes generated?



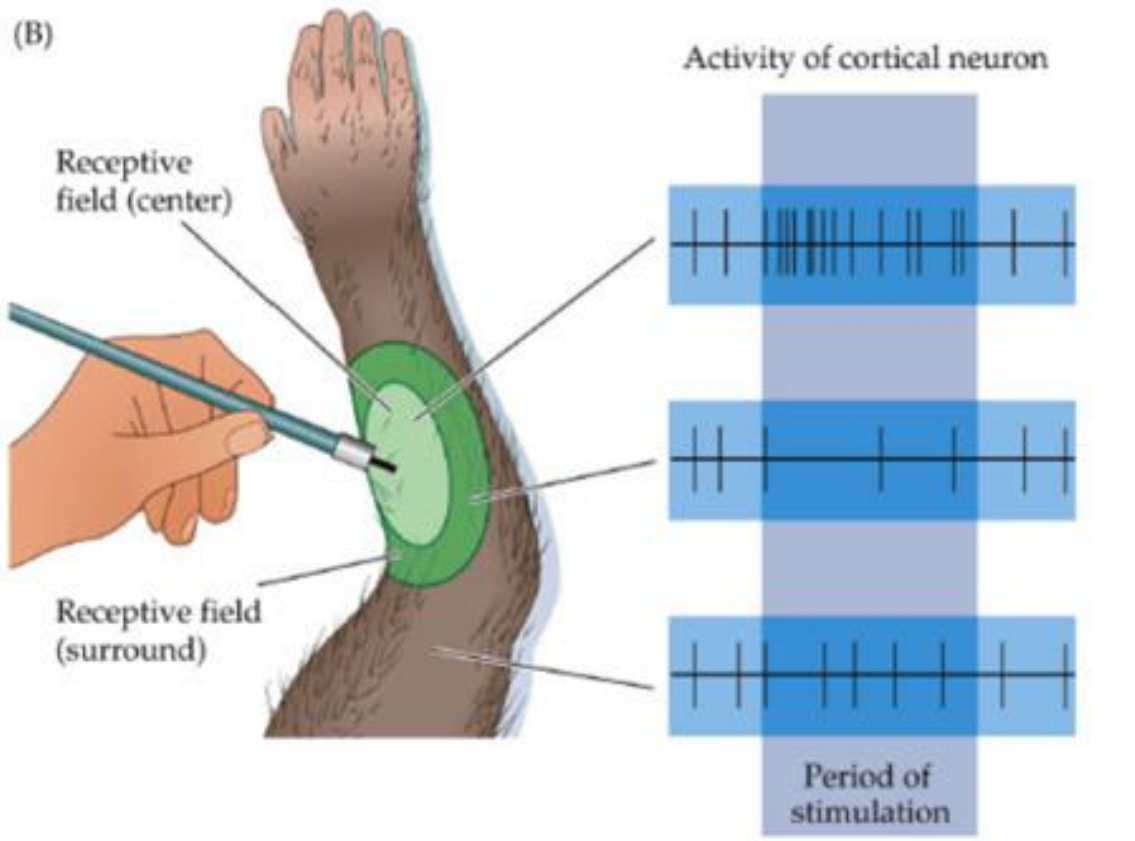
Two simulated recordings from a neuron.





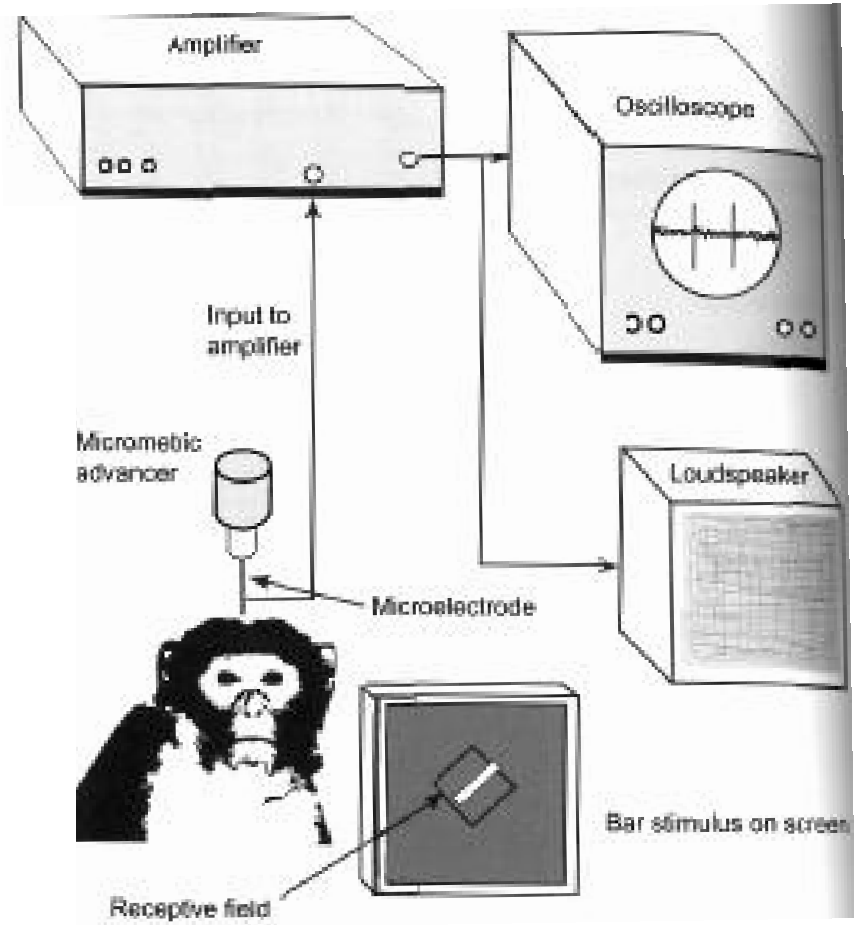
What makes a sensory neuron fire?

Receptive field: particular region of the sensory space (e.g., the body surface, or the visual field) in which a stimulus will modify the firing of a sensory neuron



NEUROSCIENCE, Fourth Edition, Figure 1.13 (Part 2)

Neural Recordings



3.5 Single cell recording
The primate looks alert in the picture, and indeed fully conscious animals are sometimes used (the brain has no pain receptors). However, the animal is usually anaesthetized to achieve complete immobilization. This helps control accurately where the eyes are looking

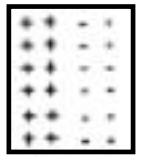
Seeing: The compuational Approach to Biological Vision

What is a receptive field?

- https://www.youtube.com/watch?v=jIevCFZixIg
- https://www.youtube.com/watch?v=8VdFf3egwfg

Receptive Fields as Templates

Receptive Field



Stimulus white is + black is -

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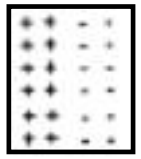

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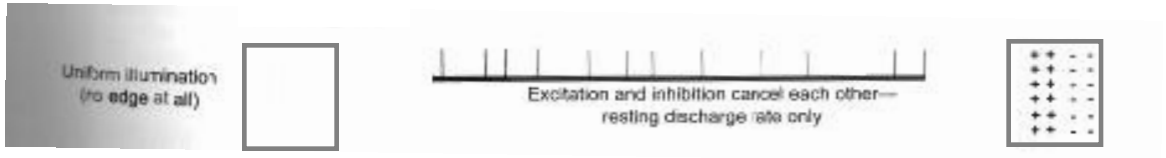

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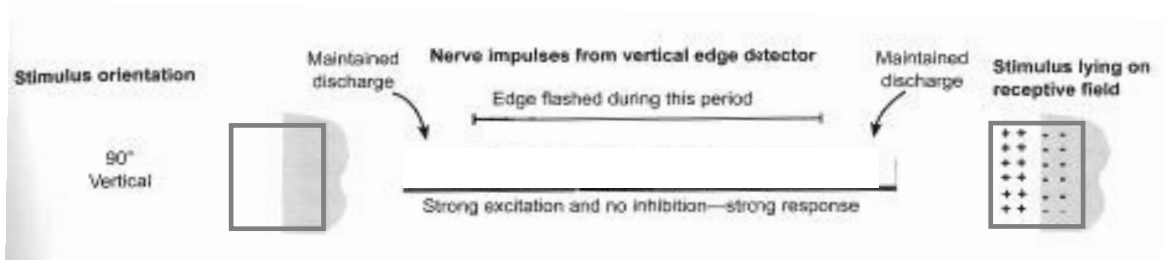

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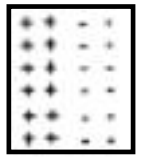

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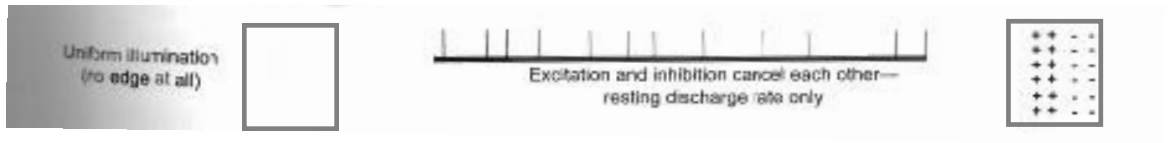

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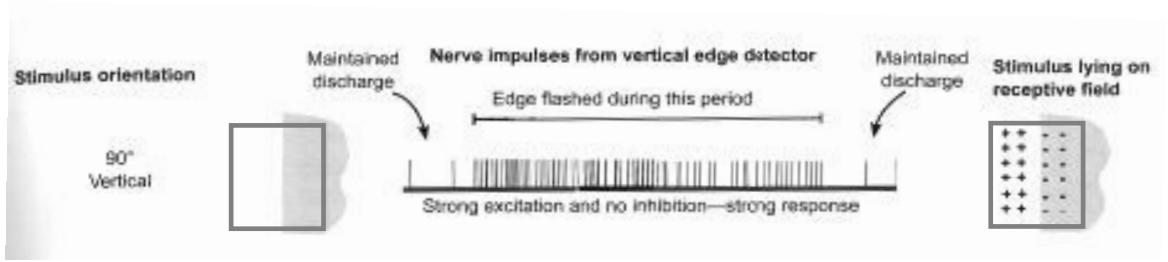

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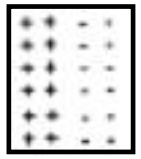

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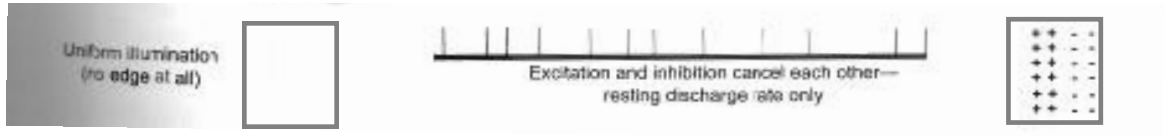

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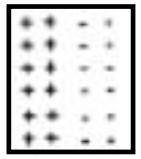

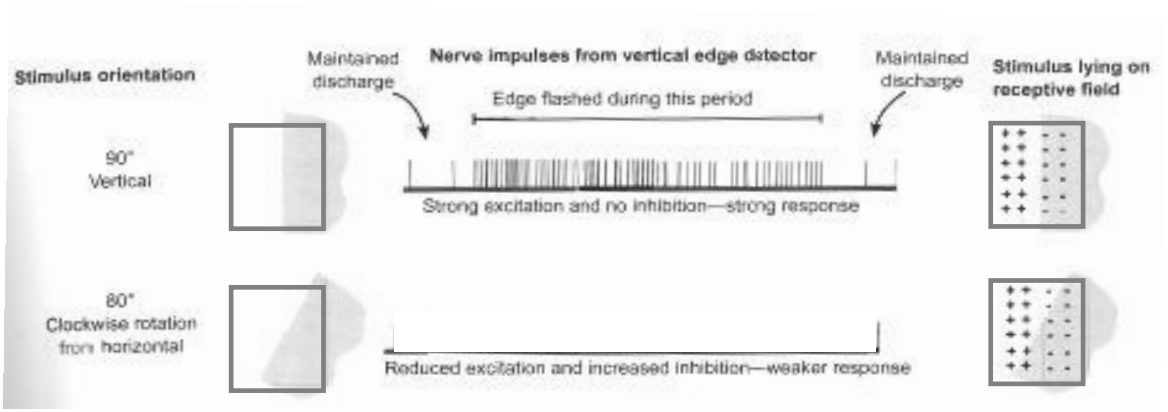

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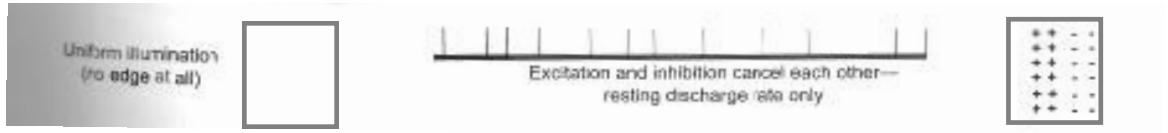

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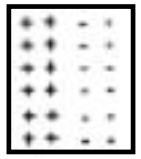

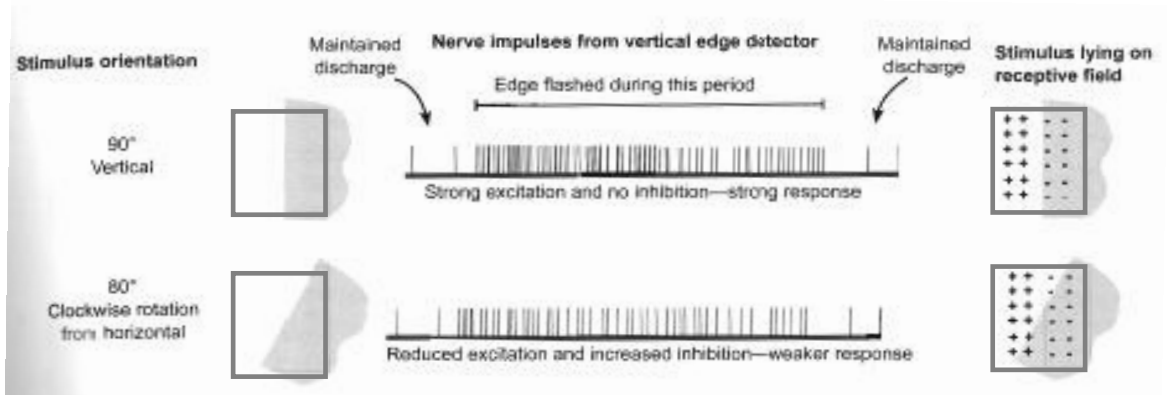

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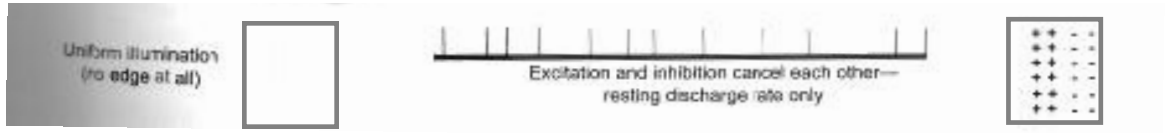

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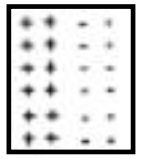

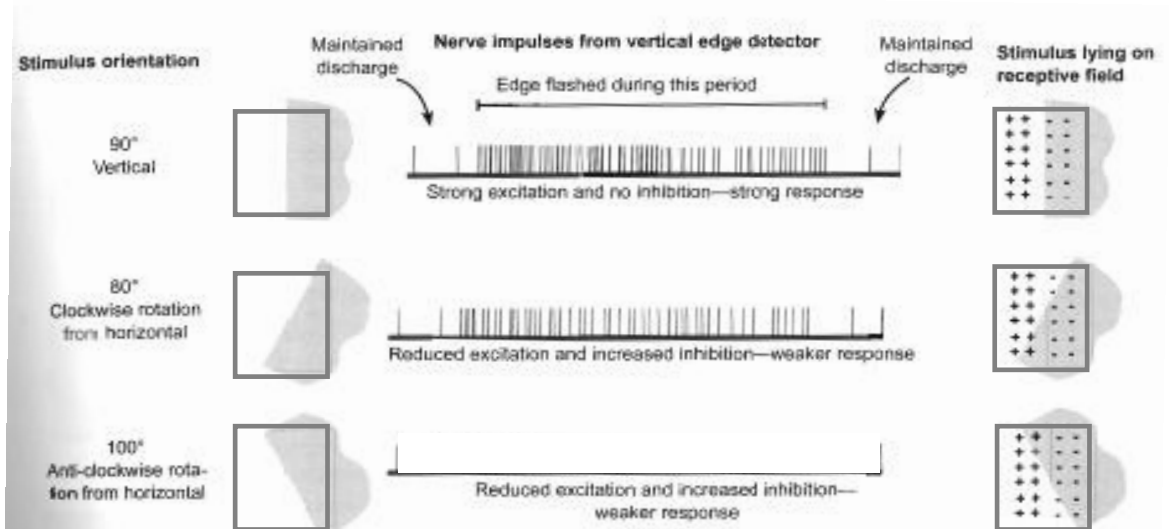

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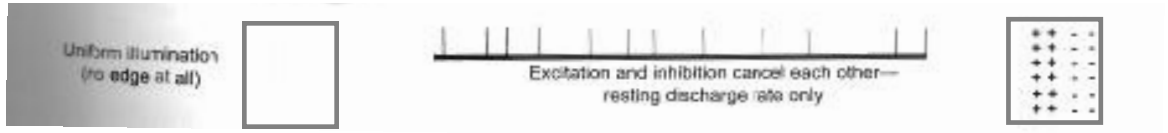

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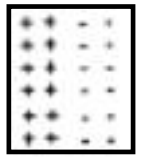

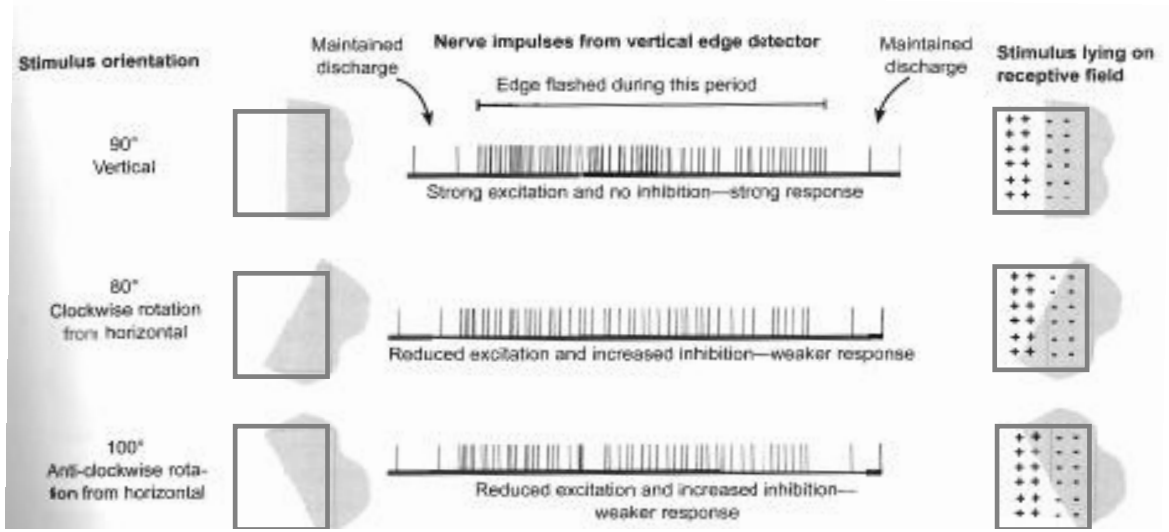

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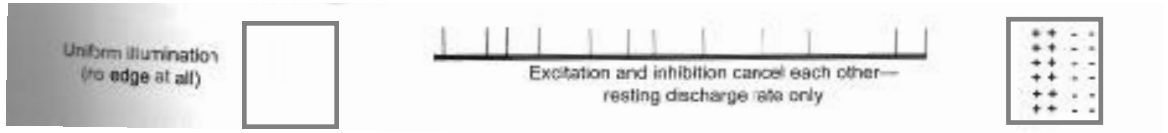

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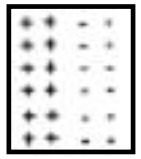

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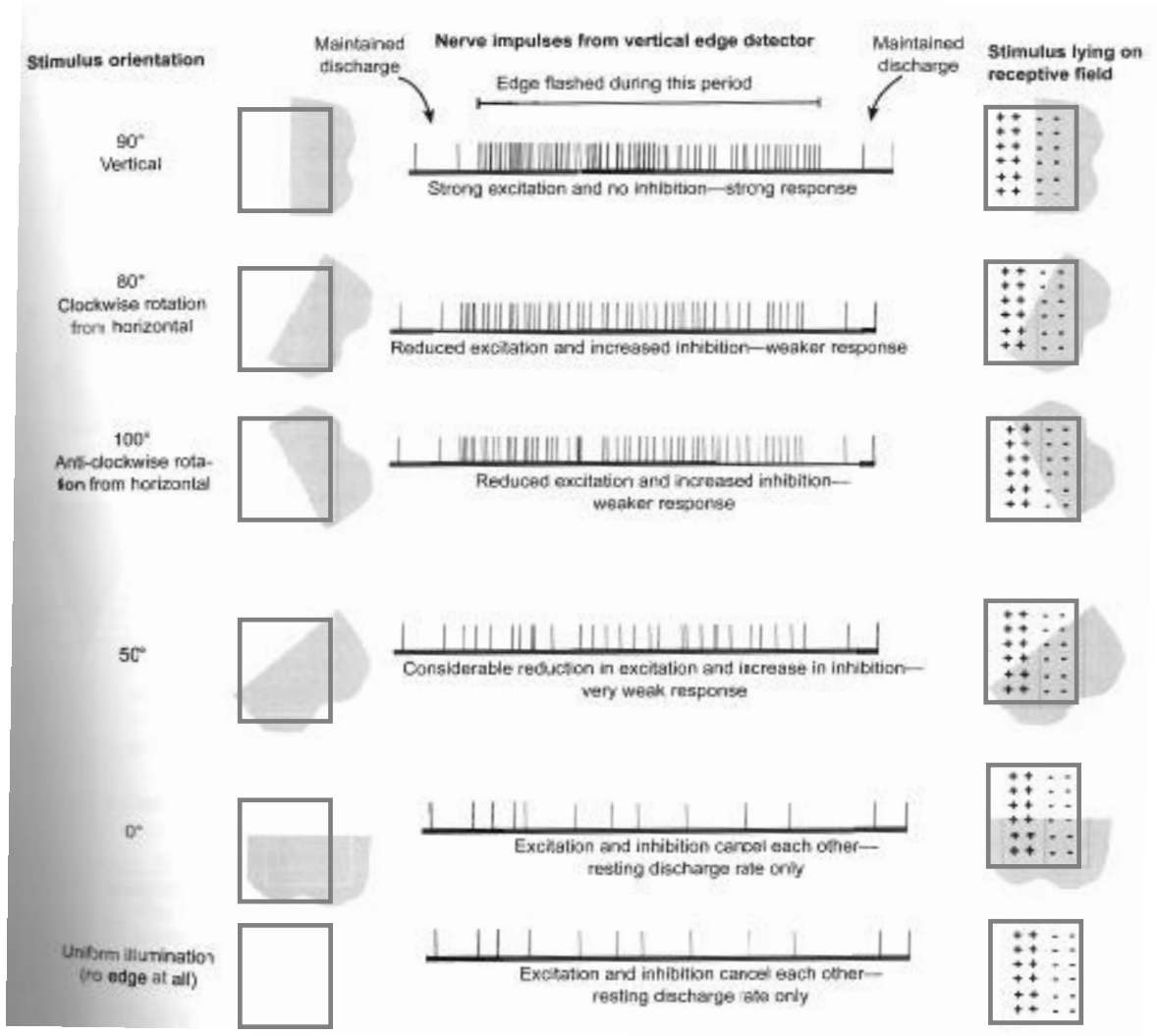
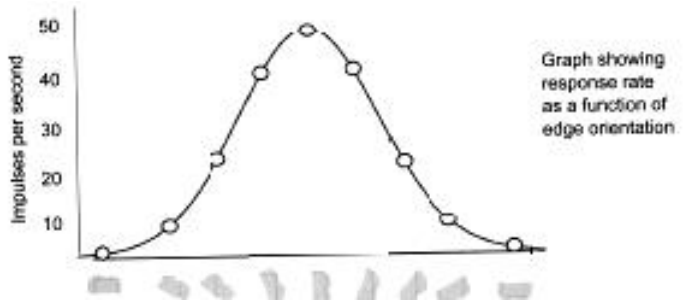


Tunning Curve



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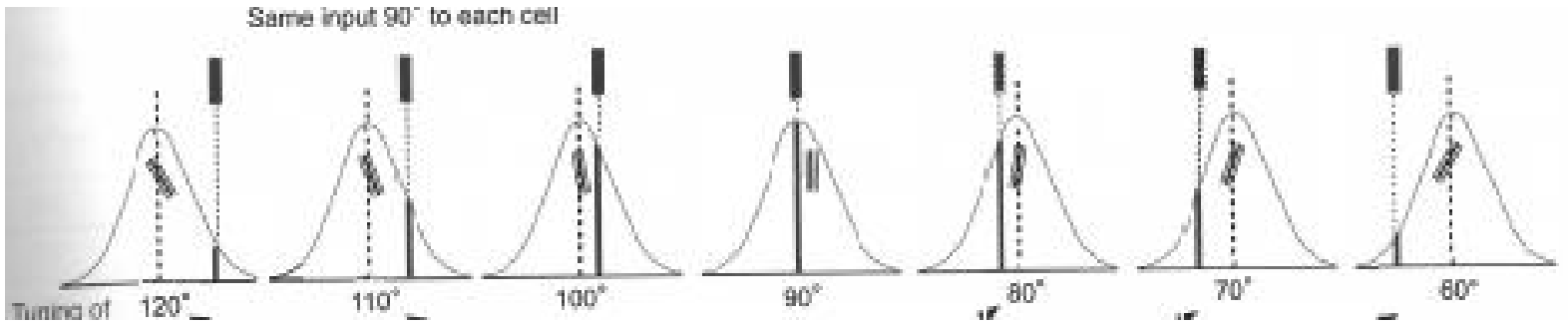
Each RF has its own tunning curve

Set up:

- 7 neurons recorded at the same time each with a different orientation preference
- 1 stimulus oriented vertically



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