

# Learning and Memory

*Learning – the acquisition of new information or knowledge.*

*Memory – the retention of learned information.*

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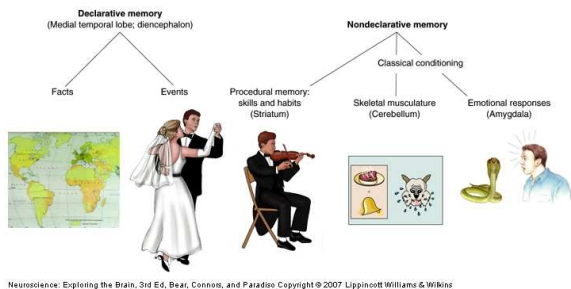
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**Declarative Memory:** memory for facts and events (*explicit memory – requires conscious effort*). These memories tend to be easy to form and easy to forget.

**Non-declarative Memory:** the memory for skills, habits and behaviors other than facts and events. (*implicit memory – is formed by experience*). Learning these memories tends to require repetition and practice over a longer period of time, but these memories are less likely to be forgotten.



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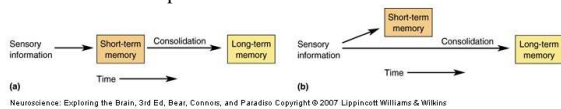
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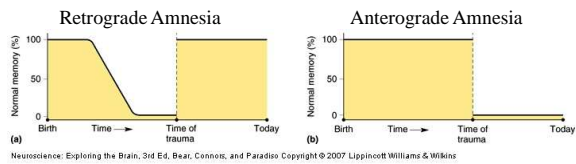
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Long-term memory – are thoughts that can be recalled days, months, and years after they were originally stored. Very difficult to disrupt.

Short-term memory – last on the order of seconds to hours and are vulnerable to disruption.



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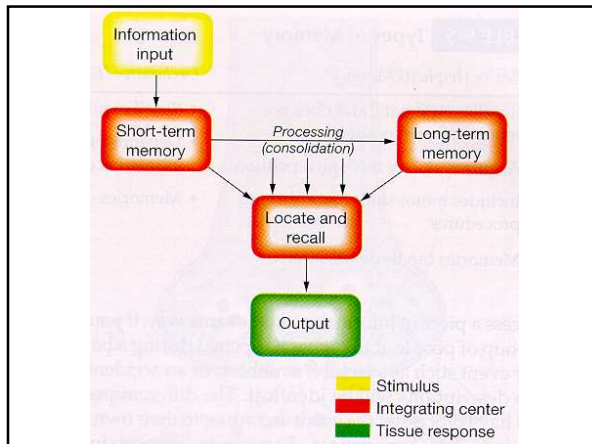
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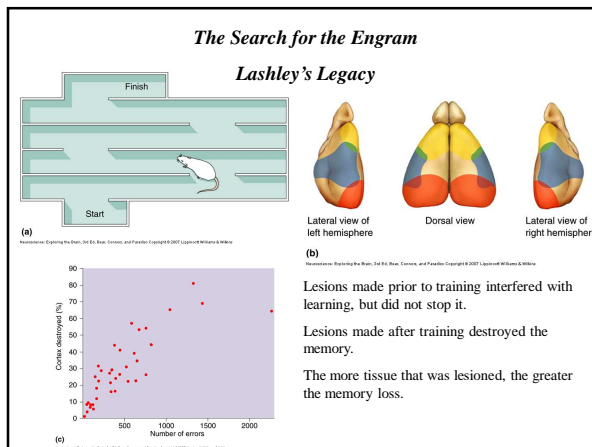
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*Lashley* deduced from his findings that memory for running the maze did not reside in one spot in the cortex, but was distributed equally to all parts of the cortex.

**“The Distributed Memory Model”**

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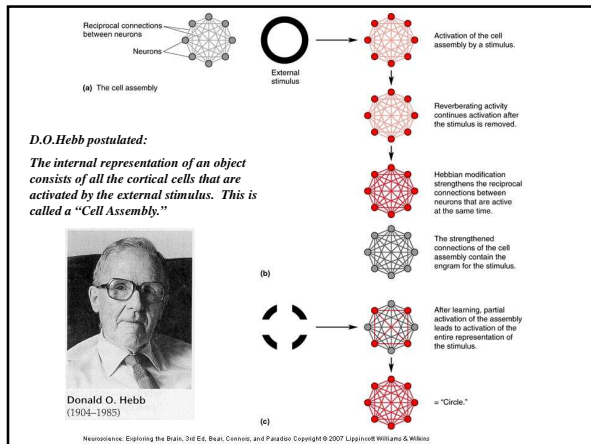
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**Synaptic Plasticity and Learning**

**Is anything happening at the cell?**

**What is happening at the cellular level?**

**Should anything be happening at the cell?**

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**When an axon of cell A is near enough to excite a cell B and repeatedly or persistently takes part in firing it, some growth process or metabolic change takes place in one or both cells such that A's efficacy, as one of the cells firing B, is increased.**

*D.O. Hebb, 1949*

**Description of Cellular Learning ?**

Donald O. Hebb (1904–1985)

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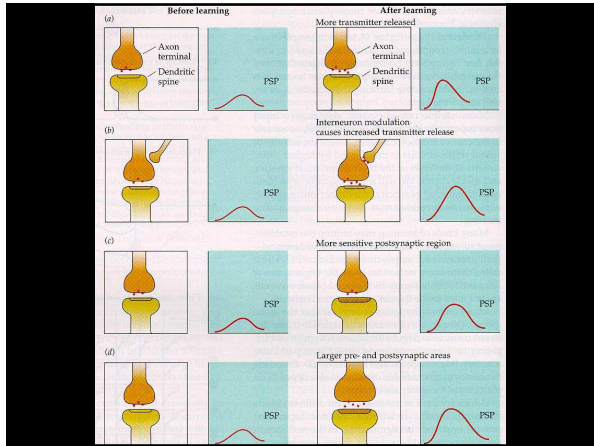
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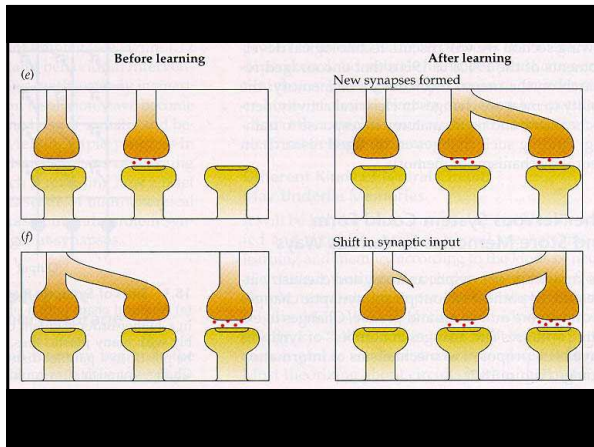
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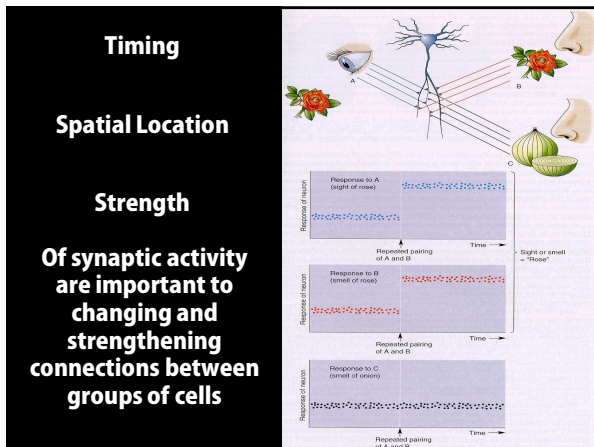
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## Classical Conditioning

**Stimulus      Response**

Before conditioning

CS

US

(a)

Stimulus      Response

Conditioning

After conditioning CR

(b)

Ivan Petrovich Pavlov	
Born	September 14, 1849 Ryazan, Russia
Died	February 27, 1936 (aged 86) Leningrad, Soviet Union
Nationality	Russian, Soviet
Fields	Physiologist, psychologist, physician
Institutions	Military Medical Academy
Alma mater	Saint Petersburg University
Known for	Classical conditioning Transsynaptic inhibition Behaviour modification
Notable awards	Nobel Prize in Physiology or Medicine (1904)

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**Eric R. Kandel**

## Behavioral/Physiological experiments illustrating concept of Long-Term Potentiation

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(a)

(b)

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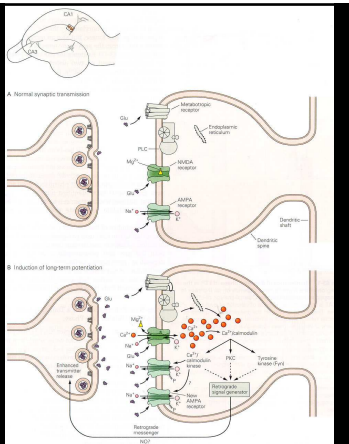




# The Story of Long-Term Potentiation

Modified or Type of Sensitization ?

Learning at the Cellular level




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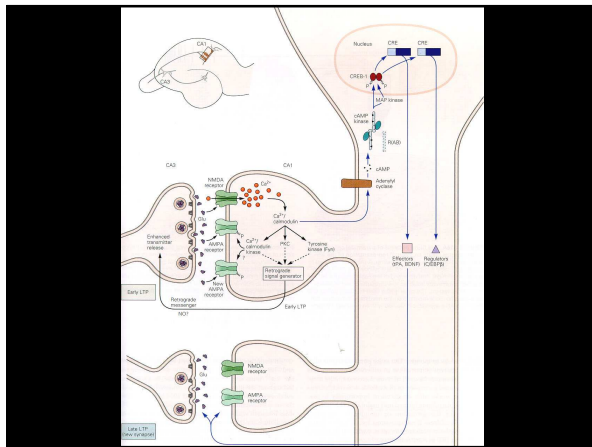
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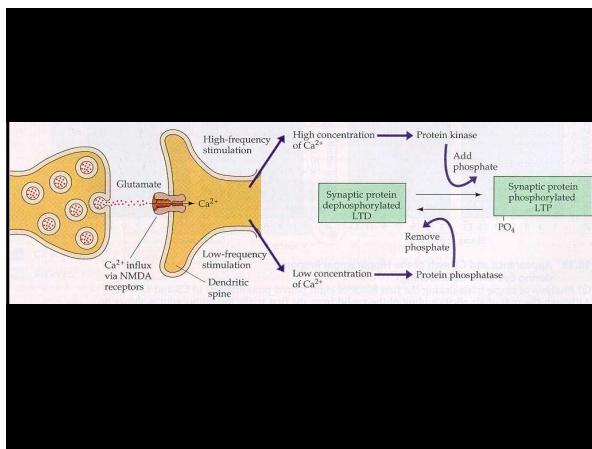
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