

**Thème 3 – Corps humain et santé**  
**3-B – Neurone et fibre musculaire : la communication  
nerveuse, motricité et plasticité cérébrale**

**Brain Plasticity: How learning changes your brain**

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**Question: Using Documents 1 and 2, explain how and in what case the brain reorganizes and forms new connections between neurons.**

**Document 1 : Brain Plasticity**

5 In addition to genetic factors, the environment in which a person lives, as well as the actions of each person, play a significant role in plasticity.

Neuroplasticity occurs in the brain...

1- At the beginning of life: when the immature brain organizes itself.

2- In case of brain injury: to compensate for lost functions or maximize remaining functions.

3- Through adulthood: whenever something new is learned and memorized

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**Plasticity, learning and memory**

For a long time, it was believed that as we aged, the connections in the brain became fixed, and then simply faded. Research has shown that in fact the brain never stops changing through learning. Plasticity is the capacity of the brain to change with learning.

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Changes associated with learning occur mostly at the level of connections between neurons: New connections form and the internal structure of the existing synapses change. Did you know that when you become an expert in a specific domain, the areas in your brain that deal with this type of skill will grow?

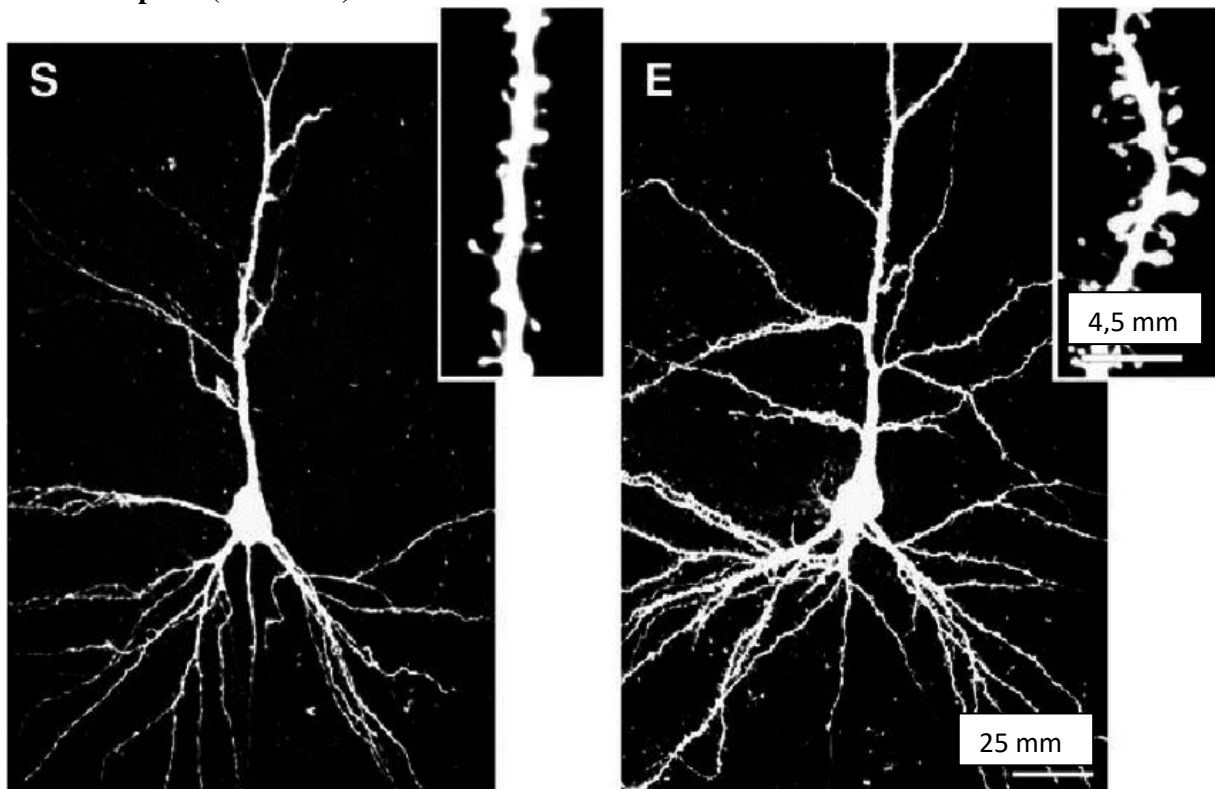
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For instance, London taxi drivers have a larger hippocampus (in the posterior region) than London bus drivers. Why is that? It is because this region of the hippocampus is specialized in acquiring and using complex spatial information in order to navigate efficiently. Taxi drivers have to navigate around London whereas bus drivers follow a limited set of routes.

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Plasticity can also be observed in the brains of bilinguals. It looks like learning a second language is possible through functional changes in the brain: the left inferior parietal cortex is larger in bilingual brains than in monolingual brains.

**Document 2:** Pyramidal neurons in cortical layer III in male 4 months' old spontaneously hypertensive rats housed in standard environment (S) or housed in an enriched environment (E). The environmental enrichment significantly increases dendritic branching and number of dendritic spines (insertions).



© 2019 SharpBrains.researchgate.net: Pyramidal-neurons-in-cortical-layer-III-in-male-4-months-old-spontaneously-hypertensive\_fig1\_8083028