

**p-chlorophenylalanine-induced serotonin depletion prevents aversive learning and long-term sensitization in terrestrial snails.**

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Among the brain's neuromodulators, serotonin (5-hydroxytryptamine, 5-HT) is likely the most ambivalent one with regard to its supposed importance for behavior and memory [4]. 5-HT is commonly described as “mysterious” in scientific contexts [3], reflecting the fact that a unifying function of its physiological role has not been established and data are often inconclusive. Since Molluscs have been proven to be ideal animal models to study learning and memory [2], two series of experiments were performed on the terrestrial snail *Helix lucorum* to study the influence of 5-HT on 2 forms of behavioral plasticity: the conditioned defensive reflex of food aversion and long-term sensitization. After the animals were injected with para-chlorophenylalanine (p-CPA), a serotonin synthesis inhibitor [7], they were divided into 2 groups and introduced into two training schemes. The first was designed to form an associative habit consisting of refusing a particular type of food (cucumber) and involved coupling an unconditional stimulus US (electric shock) with conditional stimulus CS (presenting the food) [6]. The second scheme involved presenting multiple electric stimuli to form a non-associative amplified response to a tactile stimulus [5]. We found that the injection of p-CPA prior to the training hindered the two types of learning. Furthermore, in order to investigate the underlying electrophysiological changes in the circuit involved in aversive learning, we measured the electrophysiological properties of the giant premotor interneuron in that circuit [1,2]. The intracellular recording was conducting using sharp glass microelectrodes on preparations of the extracted nerve rings of the snails after training. In p-CPA snails, a significant hyperpolarization shift in the membrane potential and an increase in the action potential generation threshold were observed in comparison to the control. The results obtained demonstrate the necessity of 5-HT for conditioned and non-conditioned learning in terrestrial snail.

### References

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