Effect of Turmeric on Memory Curves of Planarians: An Investigation into Chemical Memory

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The concept of chemical memory is supported by research showing memories passing between Dugesia dorotocephala (planarian) specimens. My previous year's research demonstrated C. longa could quicken learning in D. dorotocephala through classic conditioning. Therefore, this investigation combines these two concepts and explores chemical memory of D. dorotocephala and its interactions with antioxidants in Curcuma longa (turmeric). D. dorotocephala specimens were divided into two groups. Only one group was exposed to a maze. All specimens were decapitated and each regenerated either a head or a tail in the presence of C. longa or negative control (Capsicum annuum, red chili). A specimen from each group (n=10) was placed in the maze under light stress and the time taken to exit the maze was recorded in a blinded manner. T-Test determined statistical significance. Previously exposed specimens performed significantly more quickly than unexposed specimens, suggesting the presence of chemical memory. Regenerating or retaining a head did not significantly impact time spent in maze. Neither C. longa nor negative control, C. annuum, showed any significant effect in most cases. C. longa showed a significant difference in specimens exposed to the maze that retained the head, suggesting that memory pathways of the brain wherein C. longa interacts differ fundamentally from those of chemical memories. Bioinformatics analysis revealed largely un-annotated motifs in planarian genes and significant homology with human genes involved in the brain and its disorders. These results provide a glimpse into chemical memory, and these concepts can be extrapolated in neurobiological research and medical treatment.