

1. a. What groundbreaking research helped neuroscientists to discover that autobiographical (or explicit / declarative) memories were initially formed in the hippocampus, but were stored independently in the cortex? [2]

b. What physiological state might promote transfer of memories from one site in the brain to another? [1]
2. What is the general term for the ability of a synapse to change (ie. either an increase or decrease in synaptic strength) during learning and memory? [1]
3. What is the term for the physical representation of a memory in the brain? Briefly describe where and how this may be represented? [2]
4. What are mushroom bodies and where are they found? Do we have mushroom bodies? [2]
5. What sense uses olfactory neurons? [1]
6. a. Which neurotransmitter did Ron Davis find was important for forgetting in the *Drosophila* olfactory memory system? [1]

b. What two primary roles does this same neurotransmitter play in human brains? [2]
7. If dopaminergic neurons were activated, did they promote or inhibit forgetting? How was this determined? [2]
8. What is the term for long-term enhancement of synaptic strength? [1]
9. The article states that “connection strength is determined by the amount of...AMPA receptors”.
a. What is an AMPA receptor and on which side of the synapse is it generally found? [1]

b. What kind of synaptic response does the AMPA receptor generally produce and why? [1]

c. What role does the NMDA receptor play in changing synaptic strength? [1]
10. What is the proposed cellular (synaptic) mechanism for forgetting? [1]
11. A paper by Paul Frankland in 2014 found that increasing neurogenesis in the adult rat brain actually caused mice to forget more. Does this mean that neurogenesis is detrimental to hippocampal function and memory formation? Look at the literature on this topic (and cite at least one other article) in your discussion of this answer. [4]
12. What is the term “overfit” described as, in the field of Artificial Intelligence? [1]

13. Why would a similar process (or “overfit”) in the human brain not necessarily be a good thing? [2]

14. What is HSAM and SDAM? [2]

15. People with which condition generally show the best abstract thinking and why? [2]

16. Explain the link between GABA, inputs from the cortex and forgetting. [2]

17. Explain how diazepam functions as an anti-anxiety drug. [2]

18. Name two conditions that an overactive hippocampus is linked to. [2]

19. What regions of the hippocampus are generally associated with:

a. memory formation [1]

b. emotional regulation? [1]

20. Provide your OWN thoughts on the purpose of forgetting in humans. Do you generally perceive it as beneficial, detrimental or both? Explain or justify your answer [2].