IB Psychology Paper 1 BioAPP - Essay Plan

Localization

Key Terms:

- Localization of a function: The idea that different areas of the brain are responsible for different behaviours, processes and activities.
- Acetylcholine (ACh) is a neurotransmitter and can have both excitatory effects and inhibitory ones.
- physostigmine: is an ACh agonist;
- scopolamine: is an ACh antagonist;
- The hippocampus: is a structure in the brain responsible for, among other things, processing memories

Rogers and Kneser - The Hippocampus and spatial memory

<u>Central Argument</u>: This study demonstrates that memory is more complicated than the multi-store model proposed. We need two separate processes to secure our learning: encoding and consolidation. ACh has a role to play in determining which of these processes takes place, and when.

<u>Aim:</u> To investigate the role of acetylcholine (ACh) during the encoding and retrieval of spatial information.

<u>Procedure:</u> Rogers & Kesner used a number of rats that had been bred to be essentially the same surgically injected either scopolamine, physostigmine or saline into the hippocampi, and then put them into a maze. The rats were observed as they made their way from their starting box to their goal, which had a food reward in it. Every time a rat made a mistake e.g. going the wrong way or venturing too far into a conner, that mistake was counted. The total number of errors was recorded for each rat every time it went through the maze. If a rat learns its way through the maze, then we should expect to find that it takes less time, and fewer mistakes are made, each time it is put back into the enclosure.

Results: Rogers and Kesner found that rats with higher ACh levels (physostigmine) made fewer mistakes in a maze-learning task than those with lower levels, but overnight they didn't retain the routes they had learned (encoding enhanced, consolidation impaired). However, rats with lowered levels of ACh (scopolamine) remembered the routes much better overnight, but had made more mistakes during the initial learning phase. (ACh levels naturally fall at night when there is no need to encode new information. It is at this point that consolidation occurs more efficiently.)

Conclusion: ACh has two clear effects on memory processes: it facilitates the encoding of new information and inhibits the consolidation (long-term storage) of information. The reason for this two-fold function is to enable the efficient processing of information. One particular region of the hippocampus is involved in both the encoding and consolidation processes.

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