

of either saline or a 2% lidocaine solution (in order to produce neural inactivation) into either the dorsal hippocampus or dorsolateral caudate nucleus.

On the probe trials, rats which entered the baited maze arm (i.e., approached the *place* where food was located during training) were designated place learners, and rats which entered the unbaited maze arm (i.e., made the same turning *response* as during training) were designated response learners.

Saline-treated rats displayed place learning on the Day 8 probe trial and response learning on the Day 16 probe trial, indicating that with extended training there is a shift in learning mechanisms controlling behaviour.

Rats given lidocaine injections into the hippocampus showed no preference for place or response learning on the Day 8 probe trial, but displayed response learning on the Day 16 probe trial, indicating blockade of place learning following inactivation of the hippocampus.

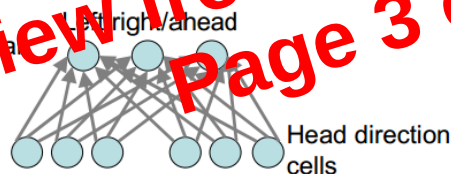
Rats given lidocaine injections into the caudate nucleus displayed place learning on both the Day 8 and the Day 16 probe trials, indicating a blockade of response learning following inactivation of the caudate nucleus.

The findings indicate: (1) the hippocampus and caudate nucleus selectively mediate expression of place and response learning, respectively (2), in a visually cued extramaze environment, hippocampal-dependent place learning is acquired faster than caudate-dependent response learning, and (3) when animals shift to caudate dependent response learning with extended training, the hippocampal-based place representation remains intact.

Brown & Sharp (1995) model: learning to make correct moves from place and direction information

Nucleus accumbens (basal ganglia/ motor output)

Hippocampus



Inputs were place cells in the hippocampus and head direction cells

Output cells were nucleus accumbens (basal ganglia/motor output); these output cells should say left/right/ahead.

They wondered naively whether they could just get a model, a neural network with modifiable connection weights to learn the correct associations between being in different places (represented by place cells firing) facing different directions (represented by head direction cells firing). Then the connection weights will learn to generate outputs of left, right or ahead.

This model was insufficiently powerful for the same reason the perceptron can't do the exclusive/or (XOR) problem. Navigation is non-linearly separable.

