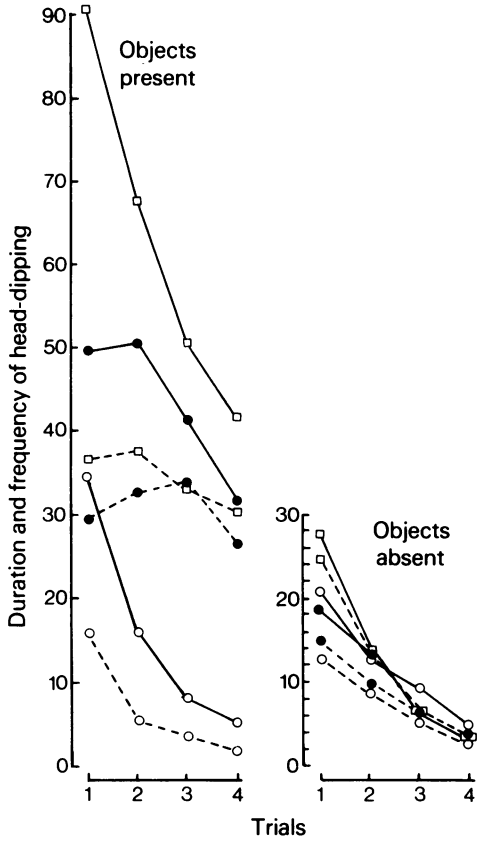

Figure 1. The frequency (- - - -) and duration (——) of head-dipping, in the presence and in the absence of objects, for rats injected with saline (○) or scopolamine, 1 mg/kg (●) or 2mg/kg (□). Each point is the mean from 10 animals. Four 10 min trials were given at intervals of 24 hours.

($P < 0.001$). The frequency of head-dipping did not habituate in the scopolamine groups. No drug effects were found when rats were tested in the absence of objects, i.e. in a simpler task. A similar pattern of results was shown by mice. Neither atropine sulphate (10 and 20 mg/kg i.p.) nor benzhexol hydrochloride (40 mg/kg i.p.) affected habituation of exploration in rats, whether this was measured by the frequency or the duration of head-dipping, and regardless of whether objects were present or absent.

The effects of muscarinic antagonists on habituation of distraction were also studied. Tones were presented to rats and their distraction and subsequent habituation to these measured by the interruption in their base-line licking. Scopolamine, methylscopolamine, atropine, methylatropine and benzhexol all failed to impair habituation.

These experiments provide no support for the suggestion that central muscarinic systems are essential for habituation of exploration or distraction.

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Effect of some phospholipids on acetylcholine output from the cerebral cortex in the rat

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The effect of phosphatidylserine (PS), phosphatidylethanolamine (PE) and phosphatidylcholine (PC) on acetylcholine (ACh) output from the cerebral cortex was investigated in adult Wistar rats under urethane anaesthesia according to the procedure described by Hemsworth & Neal (1968). ACh output was determined by placing a collecting cylinder filled with eserinized Ringer solution on the exposed frontoparietal cortex. Every 10 min the solution was changed and bioassayed on the dorsal muscle of the leech. The phospholipids were prepared from bovine brain and we checked their purity by thin layer chromatography. They were injected intravenously as a sonicated suspension in Tris buffer in a volume not exceeding 0.3 ml.

The spontaneous ACh output from the cerebral cortex prior to the phospholipid administration

was 1.63 ± 0.18 ng.cm^{-2} min^{-1} ($n = 36$). PS injected at the doses of 50, 75, and 150 mg/kg caused increases in ACh output of 57%, 83% and 313% respectively. PE, 150 mg/kg, only caused a 50% increase and PC had no effect. The increase only occurred in the two samples collected following the phospholipid administration. When calcium was removed from the Ringer solution and substituted with magnesium the spontaneous ACh output was decreased and the increase induced by PS was either prevented or strongly reduced.

It has been shown by Mongar & Svec (1972) that PS potentiates the histamine release by antigen from three sensitized rat tissues. This effect is calcium dependent. It therefore seems possible that a number of secretory processes at peripheral and central levels might be affected by PS through a mechanism in which calcium plays an important role.

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Developmental changes in the sensitivity of neurohormone-stimulated cyclic AMP formation in chick cerebral hemispheres

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In a previous study from this laboratory we reported that in the *in vivo* 3′-5′-adenosine cyclic monophosphate (cyclic AMP) content of chick cerebral hemispheres decreased with increasing age (Nahorski, Rees & Rogers, 1975). Moreover, whereas the responsiveness of the cerebral cyclic AMP system to isoprenaline and histamine *in vivo* fell throughout the post-natal period, the post mortem ischaemic increase in the cyclic nucleotide became progressively larger with age. In the present experiments we have used *in vitro* techniques in an attempt to elucidate possible mechanisms for these developmental changes in sensitivity.

Experiments were performed on Rhode Island Red X Sussex Brown chicks and embryos at various stages during their perinatal development. Cerebral hemisphere slices (0.37 mm thick) were preincubated for 60 min in a Krebs-bicarbonate buffer containing 10 mM glucose and following exposure of the slices to various agonists, the cyclic AMP content of the tissue was determined by a protein-binding assay. Responsiveness to isoprenaline and histamine in the slices became evident at 17 days embryonic age whereas a response to adenosine was observed at 15 days embryonic age. By means of dose-response curves it was found that the maximal cyclic AMP response to isoprenaline (493 p moles/mg protein) and histamine (524 p moles/mg protein) occurred at 3 days postnatal age and then declined during the first postnatal month. The largest increase in the nucleotide concentration following exposure to adenosine was observed at 19 days embryonic age (211 p moles/mg protein) and this response was maintained throughout the period studied. Despite the apparent developmental alterations in the maximum response to different agonists, the ED_{50} for each of the agonists was similar at all ages studied.

The activity of adenylate cyclase in cerebral homogenates of chicks of various ages was assayed in the presence and absence of 10 mM NaF. Significant basal activity was observed in 15 day old embryos and this increased at least 4 fold by 21 days postnatal age. NaF only significantly stimulated enzyme activity in tissue from the oldest birds. Ethyleneglycolbis (β-aminoethyl)-*N*, *N*′-tetracetic acid (EGTA) markedly suppressed enzyme activity and in the presence of this Ca^{++} chelator no developmental changes in adenylate cyclase activity were observed. Phosphodiesterase activity was determined using low (1 μM cyclic AMP) substrate concentrations. Enzyme activity increased from 949 ± 82 p moles cyclic AMP hydrolysed min^{-1} mg^{-1} protein at 15 days embryonic age to 4529 ± 153 p moles cyclic AMP hydrolysed min^{-1} mg^{-1} protein at 4 weeks post hatch.

The results suggest that in the embryonic and neonatal periods the development of cerebral neurohormone receptors coupled to adenylate cyclase may precede the development of