

local infiltration of procaine in the area of the incision. The head and neck of the foetus were located and an interrupted circle suture about 1.5 in. across was made in the uterus over the head of the foetus. The head and long neck of the foetus were delivered through a small uterine incision in the centre of the circle, the purse string of uterine tissue drawn firmly around the neck of the foetus and a rubber bag tied over the head of the foetus. The trachea was exposed and cannulated without loss of fluid. A soft rubber tube connected the cannula to a glass tube having an internal bore of about $\frac{1}{8}$ in. The tube was about half filled with saline.

The meniscus in the tube was fixed level with the tracheal cannula, which was some, but an unmeasured number of, cm above the mean level of the foetal lung. There was no appreciable filling of the tube in 15–20 min or sometimes a lowering of the level occurred. The level of the meniscus was then lowered 5–6 cm below the level of the cannula in the trachea. A slow but steady flow of fluid from the foetal lung through the trachea then occurred. Finally, the meniscus was held above the level of the cannula, at variable heights and for varying lengths of time. There was always a movement of fluid into the foetal lung. In order to keep the meniscus in view, it was necessary to add saline to the tube. The rate was not measured, but it was fairly fast. Sometimes as much as 5–10 c.c. of saline had to be added within about 15 min in order to keep the meniscus in sight.

It is clear that, although additional quantitative data are needed, the foetal lung is a two-way diffusing system. There are vast capillary surfaces available for this⁶. Since intra-uterine pressure is usually very low (2–5 mm mercury in sheep before labour⁷; 2–5 mm mercury in the human before term, and 10 mm at term⁸; 2 mm mercury in the monkey⁹), one may imagine that fluid from the foetal lung may move from there into the amniotic cavity when the uterine pressure is low, but that when uterine contractions develop pressures of 20–60 mm mercury, there can be a movement of fluid in the reverse direction, into the foetus. One is still free to guess if the foetus is forced to swallow amniotic fluid when the uterus contracts.

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PHARMACOLOGY

Correlation between Brain Catecholamine and Sedative Action of Reserpine

It is now well established that the sedative action of reserpine is closely associated with loss of noradrenaline and disappearance of 5-hydroxytryptamine (5HT) in the brain^{1–3}. However, those amines the lack of which is responsible for the sedative action of reserpine are as yet unknown. If lack of amines were responsible for the tranquillizing effects of reserpine, then the administration of amines should counteract these effects. However, there is the blood-brain barrier to amines. There are two ways of bringing about an increase in amine content of the brain: one is the administration of the precursors of the amines, the other is the central administration of them. Intra-

peritoneal injection of 3,4-dihydroxyphenylalanine, a precursor of catecholamine, produced complete counteraction of the reserpine action; on the other hand, the injection of 5-hydroxytryptophan, a precursor of 5HT, did not⁴. This supports the assumption that lack of catecholamine in the brain is responsible for the sedative action of reserpine.

Our experiments were performed on rabbits in order to achieve a better understanding of the central action of reserpine. Noradrenaline (0.05–10 mg per kg) was injected into the cisterna of the tranquillized rabbit (male, weighing about 2 kg), which had received an intraperitoneal injection of reserpine (5 mg per kg) 4 h earlier. Forty minutes after the administration of noradrenaline, the content in the brain of noradrenaline and its metabolites, 3,4-dihydroxymandelic acid and normetanephrine, was markedly increased over control values. However, the animal did not resume normal behaviour, and tranquillization and ptosis persisted in spite of high concentration of noradrenaline in the brain. Intracisternal injections of 5HT, dopamine, or mixtures of both amines with noradrenaline did not antagonize the tranquillizing action of reserpine. A dramatic response occurred on simultaneous administration of noradrenaline (0.75 mg per kg) and pheniprazine ('Catron') (1.5 mg per kg) to the cisterna of a reserpinized rabbit, which showed complete tranquillization. Within about 10 min ptosis disappeared and the animal resumed normal behaviour showing signs of central excitation. This effect lasted about 6–8 h, after which the animal gradually returned to the tranquillizing condition. The intracisternal injections of pheniprazine alone, dopamine or 5HT with it did not produce a complete counteraction of the reserpine effects. The same results were also obtained in experiments using another monoamine oxidase inhibitor, iproniazid.

Three assumptions can be made from these results. First, the sedative effect of reserpine seems to be related to the change in brain noradrenaline rather than 5HT. Secondly, in addition to the inhibiting effect on monoamine oxidase, pheniprazine and iproniazid seem to produce a strong binding of noradrenaline with active sites or receptor in the brain, which may cause central excitation. Thirdly, the sedative effect of reserpine can be related to an increase of 3,4-dihydroxymandelic aldehyde (an intermediate metabolite of noradrenaline) rather than a decrease of noradrenaline in the brain.

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HEMATOLOGY

A Carbonic Anhydrase Variant in the Baboon

WHILE examining red-cell haemolysates from baboons by starch-gel electrophoresis, using the discontinuous tris-borate system of Poulik¹, individual variations were noticed in the main non-haemoglobin protein (NHP) band after staining the starch gels with amidoschwarz. In most animals there was a single strong band in a position considerably behind the main NHP band of human haemolysates run in parallel. In a few animals, however, only a faint band was seen in this position but there was a strong one at approximately the same level as the main