pulse duration 1 msec. ERGs were recorded during or immediately after the end of electrical sympathetic stimulation with the same flash parameters of the control. In 20 rabbits the comparison between the normal ERG and that obtained during or immediately after electrical stimulation of the superior cervical ganglion or trunk showed an increase in the amplitude of 'a' and 'b' waves (see Figure). The enhancement was of about 15%. This effect was evident also after removal of the cornea and lens and in the iridectomized animals. However, the sympathetic effect on ERG failed to appear when the values of the blood pressure were lower than 70 mm Hg.

In 5 animals the superior cervical ganglion was acutely ablated and the ipsilateral ERG was then recorded: under such experimental conditions, a decrease of the 'a' wave of about 17% and of the 'b' waves of about 34% occurred in comparison with the contralateral ERG. In 3 rabbits, the right superior cervical ganglion was chronically removed under Nembutal anaesthesia and asepsis. 2, 4 and 6 days after the operation, the ipsilateral ERG exhibited a decrease similar to that described after acute ablation. Other rabbits underwent chronic ligature of the right common carotid arteries. Also under such experimental conditions the stimulation of the ganglion was effective. The sympathetic influence was also visible after injection into the femoral vein of the Regitin-Ciba (α-blocking drug, 2 mg/kg), while it disappeared after injection of β-blocking drug, since a striking decrease of blood pressure occurred [12].

The sympathetic activation of ERG 'a' and 'b' waves did not depend upon the concomitant sympathetic influence on the pupil, nictitating membrane and intraocular pressure [6–10]; in particular we observed a modest increase of about 5 mm Hg of endoocular pressure within 3 or 4 sec during sympathetic stimulation. Then a slow decrease occurred followed by a slow return to normal values.

Thus the conclusion can be reached that the superior cervical ganglion can influence the ERG probably through a modification in the activity of the retinal cells. The data obtained from ablation indicate a tonic sympathetic action. This is supported also by the fact that α-blocking drug which removes the vascular sympathetic activity did not suppress the sympathetic enhancement of the 'a' and 'b' waves.

However, a circulatory component must also be taken into account, since the sympathetic effects were not present when the systolic blood pressure was low.

Riassunto. La stimolazione elettrica del ganglio cervicale superiore determina un incremento delle onde «a» e «b» dell'ERG ipsilaterale nel coniglio. L'asportazione acuta o cronica del ganglio cervicale superiore riduce l'ampiezza delle stesse onde. Tali effetti si presentano anche dopo somministrazione di α-bloccanti. Essi non dipendono dalle variazioni indotte dalla stimolazione del simpatico sulla pressione endoculare, sul diametro pupillare e sulla membrana nictitante. Ciò avvalora l'ipotesi di una influenza diretta del simpatico sulla retina.

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Histological Changes in the Intestinal Tract of Pregnant Mice Infected with Coxsackievirus B3

Infection with Coxsackievirus B3 in pregnant mice leads to fetal wastage and growth retardation with a maternal pancreatic exocrine insufficiency [1]. The signs of pancreatic damage in these animals included increased fecal nitrogen excretion, a higher rate of food intake but with reduced maternal and fetal growth, and maternal liver changes [2]. These changes resemble those reported in rodents fed low protein-calorie diets [3, 4] and in mice having an autosomal recessive mutation (*epi/epi*) characterized by a degeneration of pancreatic exocrine tissue [5].

Further changes noted in man and animals subject to protein malnutrition due to dietary deprivation or inherent digestive disorders include a degeneration and atrophy of the intestinal mucosa with an ultimate loss of absorptive capacity [6–8].

The present studies were conducted with a view to examining the possibility that protein malnutrition in mice infected with Coxsackievirus B3 may be sufficient to elicit morphological changes in the intestinal tract leading to an impaired absorption of essential nutrients which are important for normal fetal growth, as well as for maintaining good maternal health.

The experimental procedure adopted in the work is identical with that detailed previously [1]. Virus suspension (0.3 ml) was inoculated i.m. The Coxsackieviruses B3 and B4 used here were obtained from the Public Health Laboratory Service (Colindale, London, N.W.9.) and the virus suspensions shown to have a tissue culture infective dose ($TCID_{50}$) of $10^{6,85}$. Control animals were inoculated with virus inactivated by heating on a water bath at 56 °C for 30 min.

Mice were inoculated with live or heat-inactivated virus suspension on the 8th day of pregnancy and killed by cervical dislocation on the 18th day. Representative segments of liver, pancreas, stomach, duodenum, ileum, caecum and colon were fixed in phosphate buffered formalin, for histological examination. Thin sections were stained with haematoxylin and eosin, PAS with alcian blue for mucin and by the PAS technique for basement membranes.

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Mice infected with live Coxsackievirus B3 or B4 and killed on the 18th day of gestation weighed less than control animals and occasionally exhibited slightly staring coats and mild oedema of the head and neck regions. Macroscopical and histological changes noted in the liver and pancreas were similar to those described previously[1,2]. They included hepatocellular vacuolation and a degeneration and atrophy of pancreatic exocrine tissue with an infiltrate of mono-nuclear and plasma cells.

At autopsy, the stomach and upper regions of the intestinal tract of infected animals appeared normal and did not differ macroscopically from the controls. However, the ileum, caecum and upper colon appeared to be dilated and oedema of the lamina propria was identified histologically. Although the villi in the duodenum and ileum were normal in height and displayed a characteristic pattern of mucus secreting and absorptive cells, the tips of these villi were frequently swollen with the lamina propria assuming a pebble-like appearance with histological features of a lymphangiectasia as described by WHITEHEAD[9]. Mononuclear and plasma cells were present in the lamina propria in the duodenum, ileum, caecum and colon but were only slightly more numerous than in the control animals. In many instances these increases in infiltrated cells were focal. In the caecum and colon profound oedema was present with a marked dilatation of the gut lumen associated with a thinning and distension of the mucosae. Focally the mucosa was reduced to a single layer of cuboidal cells with few mucus secreting cells and poorly defined basement membrane. Occasionally this condition was accompanied by an increased number of mononuclear and plasma cells.

Previous studies in mice infected with Coxsackievirus B3 have shown that in animals infected on day 8 of pregnancy, signs of pancreatic exocrine insufficiency and protein deficiency were identified 4 days later[2]. This means that in animals killed on the 18th day, the period of nutritional stress is short and the intestinal changes of oedema and focal mucosal atrophy consistent with a short period of protein deficiency. One might expect that if these animals were examined at a later stage after infection, more severe symptoms of protein deficiency including partial or sub-total villous atrophy in the small intestine, oedema and pronounced inflammatory cell infiltration of the type reported by SHINER et al.[7] would have been noted. Lymphangiectasia which seems to be a characterisitic feature of intestinal changes in acute protein deficiency and malabsorption syndromes[6,9] was also present in these animals and would seem to be an early manifestation of the condition.

The exact implications of these intestinal changes upon the state of health of the pregnant mother or on the development of the fetuses at 18 days gestation is unclear. In view of the evidence presented that only in advanced cases of protein deficiency resulting from several months deprivation where villous atrophy is well advanced, is the absorptive capacity of the gut altered[8,10]; it seems unlikely therefore that the early intestinal changes present in these Coxsackievirus infected mice at the stage examined present any appreciable risk to the health of the pregnant mothers. One might speculate that intestinal changes of a more advanced type which may be reasonably expected, at a later stage, after infection, may have adverse effects on health of the animals and on the developmental pattern in the fetuses.

Zusammenfassung. Bei graviden, mit Coxsackie-Virus B3 infizierten Mäusen war der obere Darmabschnitt im Vergleich mit den Kontrolltieren makroskopisch unverändert. Im Ileum, Coecum and Colon ascendens war bei einer Dilatation ein Oedem der Lamina propria mit Zellinfiltrat vorhanden, während die Mucosa vereinfacht war. Ein Zusammenhang mit Pankreasveränderungen wird als möglich angenommen.

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Lysergic Acid Diethylamide Affects Blood Flow to Specific Areas of the Conscious Rat Brain

There are few neurophysiological clues to areas in the nervous system which are responsive to lysergic acid diethylamide (LSD) in spite of recent evidence of binding of this hallucinogen in the brain[1,2]. As a means of screening the various areas of the brain whose functions might be altered by such compounds we have studied the regional perfusion of the nervous system in conscious, unrestrained rats.

The utility of this approach is based upon the assumption that 1. functional and, therefore, metabolic activity determines, in large part, the flow of blood to nervous tissues[3–8] and 2. that functional changes elicited by drugs in various parts of the brain are sufficiently large so as to provoke changes in blood flow which are detectable by our method.

Materials and methods. A relatively convenient method, described elsewhere[9], was used to simultaneously measure the flow of blood to each of 10 regions in the brains of conscious, unrestrained male rats. The method is our updating of the Sapirstein indicator-fractionation technique which can utilize a number of lipid soluble isotopic indicators such as thiopental-^{14}C (unpublished observations), ^{131}I-iodoantipyrine, or as employed here, antipyrine-^{14}C. Under the conditions of these experiments, when such an indicator is administered in a single i.v. injection and the killing time is short, then the pattern of antipyrine distribution in the brain is the same as the fractional distribution of the cardiac output.

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