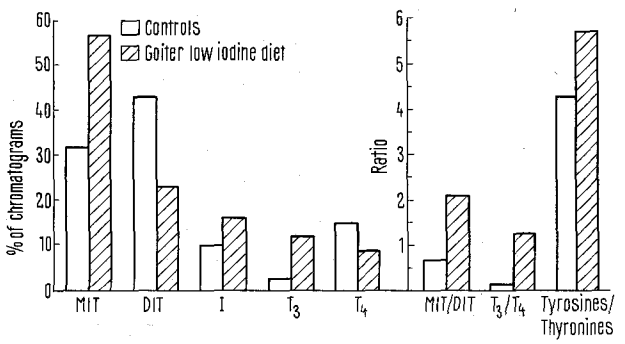

Fig. 5. Chromatographic distribution of labeled iodoaminoacids in dense rat and in goiter by low iodine diet. MIT, monoiodotyrosine; DIT, diiodotyrosine; T3, Triiodotyroxine; T4, thyroxine; MIT/DIT, ratio; T3/T4, ratio.

Discussion and conclusions. In this study, the ultrastructural changes were correlated with radioautography and biochemical disorders for a better understanding of pathogenesis of goiter. The most significant changes were extensive enlargement of the endoplasmic reticulum (RER), increased in number of colloid droplets and of dense granules, hypertrophy of microvilli and Golgi apparatus. Radioautography showed a greater avidity of these goiters for radioiodine, the developed grains were located at the peripheral colloid and intracellularly. Radiochromatograms revealed the predominance of MIT over DIT and T3 over T4. The enlargement of RER is probably related to increased protein synthesis but the possibility of a defective transport of thyroglobulin through the endoplasmic channels cannot be ignored. This enlargement of endoplasmic reticulum indicates that the cellular machinery can operate actively in goiter. Another interesting finding is the increased number of dense granules or lysosomes referred to as 'zymogen-like' granules; these contain acid phosphatase and probably are involved in proteolysis of thyroglobulin. The evidence in this report supports the argument that fine structural changes in iodine-deficient thyroids are induced by endogenous TSH-overstimulation, as well as by a lack of iodine.

Thyroglobulin iodination takes place at the cell-colloid periphery, many developed grains may also be scattered over the dense droplets and ergastoplasmic sacs. This intracellularly iodination as well as the predominance of MIT and T3 over DIT and T4 respectively, points to a homostatic cellular mechanism that works to spare the iodine and synthesize less iodinated hormones in goiters.

Résumé. Une étude corrélative concernant les modifications ultrastructurelles, autoradiographiques et biochimiques a été faite dans le goître expérimental provoqué par une carence prolongée en iode chez les rats. Il s'est produit une dilatation et une désorganisation extensive du réticulum endoplasmique, accompagnées d'une augmentation des granules denses, des gouttes colloïdales, de même qu'une hypertrophie de l'appareil de Golgi et des microvillis. L'autoradiographie met en évidence une iodination intracéllulaire.

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Failure to Produce Tumours in Cattle with 20-Methylcholanthrene and 3,4-Benzpyrene

We failed to find in the available literature[1,2] any report about the effects of chemical carcinogens like 20-methylcholanthrene (MCA) and 3,4-benzpyrene in cattle. Tumours induced in mice and rats by these carcinogens are known to possess distinct antigens[3]. In the course of an investigation designed to study the specific antigens of chemically induced tumours, 1 member each from 1 identical twin pair (female, Jersey breed) and 2 fraternal, female–female, twin pairs (one Jersey and one Friesian breed) were injected s.c., behind the left flank, with 400 mg of MCA suspended in olive oil. At the time of this injection, these animals were 4–6 months old; 315 days later, a gelatin capsule containing 250 mg of powdered MCA was implanted into each animal at approximately the same site as the original injection. One member each from 2 other identical twin pairs (female, one Friesian and one Guernsey breed) received under anaesthesia one 5 mg pellet each of 3,4-benzpyrene under the capsule of the right kidney. 10 weeks later, a gelatin capsule containing 250 mg of powdered MCA was implanted behind the left flank of these 2 animals also. These 2 animals were about one year old at the beginning of the experiment.

All the animals were housed in a grassy paddock more than an acre in area. They were fed ad libidum with green grass, Lucien hay and crushed oats, and were regularly provided with salt lick and were subject to regular physical examination. Blood smears from these cattle were examined immediately before their exposure to the carcinogens, then once every 6 months and at the time of killing. The 2 cows which received benzpyrene pellets in their kidney were subjected to i.v. pyelography and needle biopsy of the pellet implanted kidney about 6 months after implantation of the pellets. About 1 month after the biopsy, exploratory laparotomy was performed. After the laparotomy, both these animals developed pulmonary complications; 1 of them died a week later and the other was killed after a month. The other 3 animals and their co-twins were killed 36 months after the beginning of the experiment. Autopsy was performed on all animals and tissues were examined histologically. Apart

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from bronchopneumonic changes in the lungs of the 2 cows which developed post-operative pulmonary infection and mild chronic inflammation at the site of implantation of the 3,4-benzpyrene pellets in the kidney, no change of any significance could be detected in any animal.

Subcutaneous implantation of these 3,4-benzpyrene pellets (5 mg) or injections of olive oil suspension (10 mg) of MCA from the same bottle produced sarcomas in nearly 100% Wistar rats within a period of 9 months of exposure to the carcinogens. Our findings, of course, do not demonstrate that cattle are resistant to MCA or 3,4-benzpyrene: observations for longer periods in larger groups of animals or administration of the carcinogens by other routes, and in different doses and schedules may reveal results different from those reported here[4]. Attempts to induce neoplasms in infrahuman primates have also been frequently unsuccessful[5,6].

Zusammenfassung. Fünf jungen Kälbern wurden chemische Karzinogene (20-Methylcholanthren und 3,4-Benzpyren) subkutan oder mittels implantierter Gelatinekapseln verabreicht. Die Tiere wurden 6–36 Monate lang beobachtet. In keinem der Tiere konnten signifikante Veränderungen festgestellt werden.

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Reaction of Pulmonary Macrophages to the Presence of Foreign Protein Material in the Alveoli during Metabolic Acidosis

The reticuloendothelial system in the alveolar walls is represented by a system of alveolar cells placed in the interstitial argentaffin network of the interalveolar septa. These cells enter, on various impulses, into the alveolar spaces and become free alveolar cells with the ability of phagocytosis, i.e. macrophages (BERTALANFFY[1,2]). This delivering process takes place not only after the penetrating of foreign particles into the alveoli but also under other circumstances, e.g. as described by JANSSEN[3] during protracted suffocation. Besides free alveolar cells one sometimes finds giant cells with sudanophilic cytoplasmic inclusions (in otherwise healthy individuals). The longer the interval between the beginning of suffocation and the instant of death, the more often the multinuclear giant cells with sudanophilic cytoplasmic inclusions are found.

JANSSEN[3] believes that the impulse evoking the delivering of alveolar cells and their transformation into giant cells is, in this case, lack of oxygen. This explanation contradicts VALDIVIA's[4] opinion. VALDIVIA[4] kept the experimental animals in a hypobaric chamber with the partial pressure of oxygen decreased to 50% for several weeks; in the histological preparations of the lungs of the killed animals he could not see any free alveolar cells.

In addition to oxygen starvation a number of other changes take place during suffocation: CO_2 accumulation, formation of acid metabolits of anaerobic metabolism and consequently, to a decrease of pH. Even if acidosis itself, as we have demonstrated in another report (MRÁZ et al.[5]) does not produce the delivering of alveolar macrophages, the question is whether it would not effect, in some way, the ability of the alveolar cells to free themselves on different impulses from the tissue unity.

We have studied the influence of acidosis on the delivering of alveolar cells. As the impulse evoking the delivering of the alveolar cells we have used the application of foreign material into the alveoli, in our case denaturated calf plasma (MĚLKA et al.[6]) dissolved in saline.

Material and methods. Rats of Wistar strain weighing 215–265 g were used; all the animals were anaesthetized by i.p. injection of 5% uretane solution, 1.5 ml/100 g body wt. The experimental rats were divided into 3 groups; in the first group complete metabolic acidosis was evoked, the second group was only operated on, and the third group served as controls. Acidosis was evoked by slow infusion of 1 *N* HCl by means of a catheter which was introduced into the vena renalis sinistra. The rate of pH significantly decreased on the average by 0.36 (i.e. in the midst to 7.04). Before the beginning of the infusion, the hili of both kidneys were ligated. The blood for measuring pH was taken from the catheter introduced into the arteria carotis communis sinistra. The pH was measured by means of a microelectrode (by Radiometer, Copenhagen). About 3 h after the beginning of the narcosis (i.e. the time necessary for evoking acidosis in the animals of the first group), the animals were killed by means of an i.v. injection of Pentothal in lethal dose. The lungs of each animal killed were collapsed after cutting the diaphragm. The trachea was opened and a thick transfusion needle introduced into it. 10 ml of denaturated calf plasma dissolved in saline was slowly injected into the lungs through the trachea; thus the lungs were dilated in such a way that they just filled the thorax. The solution was kept in the lungs first for 1 min and then lightly

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