

(ACh) produced during incubation was assayed, with appropriate controls, on the rectus abdominis muscle of the frog.

Figure 1 shows AChE activity in the nuclei in the medial vermis of a lamb of 88 days gestation. ChAc activity in the corresponding area was 870  $\mu\text{g}$  ACh/h per g. Figure 2 shows the nuclei further laterally; in this region the ChAc activity was 1600  $\mu\text{g}$  ACh/h per g. Similar experiments on the folia showed that there, the ChAc was probably related to AChE-containing fibres in the white matter rather than to the AChE-containing Purkinje cells which are present in developing cerebellum<sup>8,9</sup>.

**Résumé.** Une méthode est décrite qui permet la mesure de l'activité de la choline acétylase dans des régions localisées de sections en congélation de cerveau embryon-

naire, activité qui est comparée à celle de l'acétylcholinesterase dans la même région sur des coupes adjacentes. Des résultats obtenus à l'aide de cette méthode sur le cervelet embryonnaire de mouton sont présentés.

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<sup>8</sup> A. SILVER, *Int. Rev. Neurobiol.* 10, 57 (1967).

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### 'Spontaneous' Occurrence of Yaba Tumor in a Monkey Colony

During the last 6 years several hundred rhesus (*Macaca mulatta*), cynomolgous (*M. irus*) and stump-tail monkeys (*M. speciosa*) were inoculated with Yaba virus in our colony<sup>1,2</sup>. With the exception of 2 instances where animals without record of inoculation developed typical tumors, no signs of contact infection occurred, even when infected and control animals were housed deliberately in the same cage. About 2 years ago, our monkey colony was moved from Buffalo, N. Y. to our Springville campus about 30 miles to the south. Initially, schedules of cleaning and sterilizing cages and rooms could not be as rigorously observed as in the old colony. Occasionally flies and mosquitoes were sighted in the rooms housing monkeys. During this period of time 11 animals without inoculation history developed tumors histologically identical to those produced by Yaba virus. Subcutaneous inoculation of cell-free filtrates from these tumors into normal monkeys produced typical tumors.

Most of the 'spontaneous' tumors occurred on hairless areas of the face, palms, and interdigital areas. Figure 1 shows a monkey with 5 tumors of the face, 1 growing into the orbit. Figure 2 shows an animal with tumor masses growing in the nostril and orbit. Autopsy revealed massive tumor invasion of the paranasal sinuses. Figure 3 demonstrates a small tumor on the mucosal surface of the lip. Figure 4 depicts a large tumor mass occupying the palate and dislocating teeth. The gross anatomy of some of these tumors resembles those published by BURKITT and WRIGHT<sup>3</sup> on BURKITT's lymphoma in African children. Yaba tumors differ, however, in histologic structure, by the electron microscopic finding of oval or brick-shaped particles, often in paranuclear position, resembling pox viruses and by a more benign course, frequently resulting in regression although at times followed by recurrence<sup>1</sup>.

The suspicion arose that virus transmission might have occurred with the aid of insect vectors. The colony was thoroughly sprayed with insecticides and strict daily cleaning and weekly autoclaving of cages introduced. The rooms were disinfected weekly with antiseptics and live steam. Strict isolation of the colony was enforced. During the last year no 'spontaneous' tumors have occurred among our monkeys. The original description of Yaba tumors by BEARCROFT and JAMIESON<sup>4</sup> followed an epidemic in a colony of rhesus monkeys housed in open pens in West Africa. If insect vectors are involved in spreading this virus under natural conditions, they

seem to be present in Africa as well as in the United States. Tumors found in the oral cavity, paranasal sinuses and orbit may argue against insect vectors. However, as seen on Figure 1, tumor masses may grow from the forehead into the orbit and, as seen on Figures 2 and 3, may originate from the nostrils and lips and grow into the sinuses or produce extensive involvement of the oral cavity. Further studies on the nature of transmission seem to be indicated<sup>5</sup>.

<sup>1</sup> J. L. AMBRUS, E. T. FELTZ and J. T. GRACE Jr., *Natn. Cancer Inst. Monogr.* 10, 447 (1963).

<sup>2</sup> J. L. AMBRUS and H. V. STRANDSTROM, *Nature* 211, 876 (1966).

<sup>3</sup> D. BURKITT and D. WRIGHT, *Int. Rev. exp. Path.* 2, 67 (1963).

<sup>4</sup> W. G. C. BEARCROFT and M. F. JAMIESON, *Nature* 182, 195 (1958).

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Fig. 1. Five tumors which appeared spontaneously on the face of a monkey. Note a large tumor growing into the orbit.



Fig. 2. Yaba tumor masses growing in the nostrils, paranasal sinuses and orbit of a monkey.

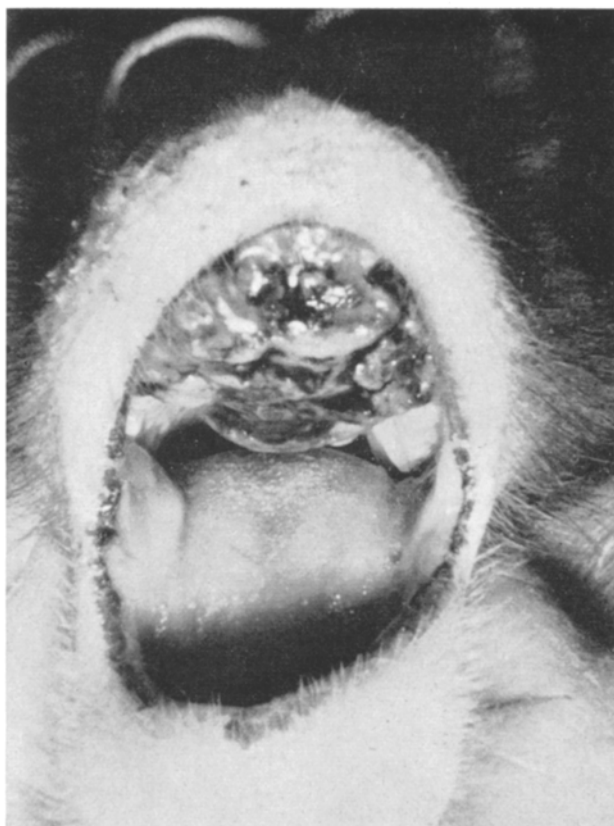


Fig. 4. Large tumor mass occupying the palate and dislocating teeth of a monkey.



Fig. 3. Small histiocytoma on the mucosal surface of a monkey.

**Zusammenfassung.** Im Laboratorium einer Affenkolonie von *Macaca mulatta*, *M. irus* und *M. speciosa*, in welchem Experimente mit Yaba-Virus durchgeführt wurden, sind 13 Fälle von spontan auftretenden Tumoren beobachtet worden. Yaba-Virus ist ein Krankheitserreger, der in empfänglichen Primaten Histiocytoome hervorruft. Es besteht kein Anhaltspunkt für eine Direktübertragung des Virus durch Kontakte. Anzeichen sind aber vorhan-

den, dass der Virus möglicherweise durch Insekten übertragen worden sein könnte.

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