because the enzyme may be localized in a small fraction of the remaining volume. The figures found for the activity of the total giant fiber are, as could be expected, intermediate between those for the sheath and those for the axoplasm.

The experiments bring evidence for the high concentration of the enzyme at or near the surface of the nerve cell. They suggest that the activity of nerve cells is connected everywhere at or near the surface with the metabolism of acetylcholine and that the phenomenon is only quantitatively more important at synapses. This would explain the findings of Lorente de Nó[6] that acetylcholine can be liberated from fibers as well as at synapses and is compatible with the conclusion of Gasser and Erlanger[7,8] that conduction of nerve impulses along fibers and across synapses differs only quantitatively.

We are greatly obliged to Dr. H. B. Steinbach for the dissection of the fibers.

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FELINE PELLAGRA[1]

IN recent years, a large number of investigators have shown that nicotinic acid is essential for the health and well being of dogs,[2,3,4] pigs,[5] monkeys[6] and human beings,[7,8] but so far as we have ascertained no studies have been reported of its role in the nutrition of cats.

The present communication describes typical symptoms of nutritional deficiency in cats which are relieved dramatically following a daily oral dose of 80 to 100 milligrams of nicotinic acid.* Each of the six cats studied had lost weight and refused food. They appeared weak, sluggish, apathetic, and usually the head hung much lower than the rest of the body. They made no effort to move even when poked, and offered no resistance to hyperextension of the mouth and other physical manipulation. Examination of the oral cavity presented a peculiar yet typical appearance, characterized by an ulcerated, reddish margin in the upper part of the palate close to the midline, and a tongue that was very red over the terminal portion. Thick saliva of an extremely foul odor drooled from the mouth. Each animal had an elevation in temperature of around 3 to 5 degrees.

Within 48 hours following the administration of nicotinic acid, there was a return of appetite, subsidence of symptoms and disappearance of the oral lesions, and the temperature became normal.

The following representative case history describes the symptoms of feline pellagra and illustrates the dramatic response of an affected cat to nicotinic acid therapy.

A fourteen-month old male cat was brought to the veterinarian on August 10, 1940. For two days he had refused all food, had slept most of the time, and had remained in one place unless forced to move. His temperature was 105.8° F. The tongue was fiery red in color. The anterior border of the tongue showed an area about ¼ inch wide of ulceration and congestion. There was slight congestion and a few small ulcers in the throat. A small amount of thick saliva drooled from the mouth.

This animal was given orally 80 milligrams of nicotinic acid for two days, at the end of which time the tongue began to clear, his throat became normal and the drooling ceased. He began moving around in the cage voluntarily. By the third day, the tongue had resumed its normal color, and the cat appeared normal in every way. He drank milk and was able to eat canned food. He was dismissed from the hospital at this time, and a daily oral dose of 30 milligrams of nicotinic acid was prescribed for the next four days.

Summary. The present communication describes a deficiency disease in cats which responds promptly and dramatically to the administration of nicotinic acid.

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STRUCTURE–PROTEINS

IT is generally believed that fibrous protein molecules are found only in tissues having a mechanical function, like hair (keratin), muscle (myosin), tendon (elastin). Most of the other proteins studied have been found to be globular.

The globular shape entails a certain mobility; the rod shape an ability to form solid structures. Accord-

6 R. Lorente de Nó, SCIENCE, 91: 501, 1940.
7 H. S. Gasser, *Jour. Neurophysiol.*, 2: 361, 1939.
8 J. Erlanger, *Jour. Neurophysiol.*, 2: 370, 1939.
9 This work was made possible by a grant of the Dazian Foundation.
1 From the Department of Internal Medicine, University of Cincinnati, Cincinnati, Ohio; the Department of Medicine, University of Alabama, and the Hillman Hospital, Birmingham, Alabama: these studies were aided by a grant from Anheuser-Busch, Inc.
2 H. R. Street and G. R. Cowgill, *Proc. Soc. Exper. Biol. and Med.*, 37: 547, 1937.
3 C. A. Elvehjem, R. J. Madden, F. M. Strong and D. W. Woolley, *Jour. Biol. Chem.*, 123: 137, 1938.
4 W. H. Sebrell, R. H. Onstott, H. F. Fraser and F. S. Daft, *Jour. Nutrition*, 16: 355, 1938.
5 H. Chick, T. F. Macrae, A. J. P. Martin and C. J. Martin, *Biochem. Jour.*, 32: 10, 1938.
6 L. J. Harris, *Biochem. Jour.*, 32: 1479, 1938.
7 P. J. Fouts, O. M. Helmer, S. Lepkovsky and T. H. Jukes, *Proc. Soc. Exper. Biol. and Med.*, 37: 405, 1937.
8 T. D. Spies, Clark Cooper and M. A. Blankenhorn, *Jour. Am. Med. Asn.*, 110: 622, 1938.
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