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Lesions in Nasal Mucous Membranes of Monkeys with Acute Poliomyelitis.

FRED W. STEWART AND C. P. RHOADS. (Introduced by Simon Flexner.)

*From the Laboratories of the Rockefeller Institute for Medical Research,
New York.*

The ease with which monkeys may be infected with poliomyelitis by nasal instillations of virus either with or without preliminary scarifications of the nasal mucosa has been known since the early experiments of Flexner and Lewis.¹ Moreover, Flexner, Clark and Fraser,² and others have demonstrated virus in the nasal secretions of human "carriers". Osgood and Lucas^{3, 4} showed the presence of virus in monkeys after the acute stage of poliomyelitis and reported finding virus in the nasal secretion of a human "carrier" 4 months after an acute attack. Kling and Petterson⁵ examined the nasal mucosae of monkeys with acute poliomyelitis and observed only acute and chronic inflammation with necrosis. No specific lesions were found.

In view of these facts, it occurred to us to examine histologically the nasal mucous membranes of monkeys dying of acute poliomyelitis to see if any demonstrable changes were evident. All the animals were inoculated intracerebrally and were etherized at various stages of the disease. We were particularly interested in nerve plexuses and ganglion cells within the nasal glands. So far, however, in a

¹ Flexner, Simon, and Lewis, Paul A., *J. Am. Med. Assn.*, 1910, liv, 1140.

² Flexner, Simon, Clark, Paul F., and Fraser, Francis R., *Ibid.*, 1913, lx, 201.

³ Osgood, Robert B., and Lucas, William P., *Ibid.*, 1911, lvi, 495.

⁴ Lucas, William P., and Osgood, Robert B., *Ibid.*, 1913, lx, 1611.

⁵ Investigations on Epidemic Infantile Paralysis. Report from the State Medical Institute of Sweden to the XV International Congress on Hygiene and Demography, Washington, 1912. Published by the Swedish Medical Institute, Nordiska Bokhandeler, Stockholm.

series of 31 diseased monkeys, no changes have been encountered in these structures. Chronic inflammatory lesions of mucous glands, infiltration of connective tissues by leucocytes, and leucocytes within the epithelium are not uncommon; one animal showed a fairly well-marked osteochondritis. It must therefore be stated that no lesions suggestive of any specific character were seen in the deeper structures of the nose. Nevertheless, in a certain number of animals the nasal mucosae themselves showed features of considerable interest. 17 of the 31 monkeys with acute poliomyelitis exhibited these lesions to a greater or lesser extent, whereas 9 control animals so far available for study have not yielded similar pictures. Briefly stated, the lesions noted consisted of isolated necroses of the epithelial cells of the respiratory mucosa. It could not be shown that the necrosis was specific for the olfactory receptor-transmitter apparatus for occasional lesions were apparently present in mucus-producing cells. The cell necroses were both superficial and deep. When superficial there was a tendency toward sloughing and the cells were encountered lying free in accumulated mucus. When deep in the epithelium no definite reactional process was apparent.

The intracellular lesion consisted of an acidophilic degeneration of the nuclear chromatin, leading to an appearance strongly suggesting inclusion bodies. The nuclei were clear, the chromatin arranged in a characteristic peripheral ring formation rather thicker and coarser than that which we have seen in cells containing the typical inclusions of other virus diseases. The central acidophilic material was single, round, or ovoid, in the form of several smaller acidophilic masses, or more irregularly fused in strands; the single acidophilic body was the most frequent finding. In cells containing these acidophilic bodies the nucleolus was occasionally detectable as a portion of the peripheral basophilic chromatin ring. No finer structure, such as further division of the acidophilic mass giving the well-known mulberry appearance to certain other inclusions, has been observed. The nature of these inclusion-like nuclear bodies is uncertain. The fact that the lesion is not constant in all of the infected monkeys, the fact that the punctate cell necroses are in scattered isolated cells may plead against a specific inclusion idea. Further study is required to determine whether these intranuclear acidophilic bodies are inclusions in a specific sense.