

gradually disappear and, as the process of regeneration goes on, the fine tremor diminishes, first in the region about the base of the tongue and finally at the tip. There seems to be an exact parallelism between the appearance of the contractions and the wasting of the muscle, and between the disappearance of the contractions and the return of voluntary control. As yet I have had no animal under observation for more than 101 days. One animal observed for this length of time still shows slight fibrillar movements, marked atrophy and only slight voluntary control of the paralyzed side.

THEORIES OF MUSCULAR ATROPHY

In attempting an interpretation of this phenomenon, I shall find it necessary to consider the theories which have been formulated to explain the atrophy of muscle after nerve section.

1. The theory of a trophic influence of nerves on muscles is sometimes stated in such a way as to imply that there are (a) special trophic fibers contained within the nerve trunks of the spinal nerves; by some writers it is held that (b) there is a special kind of nerve impulse which regulates the nutrition of the muscle. Aside from the general fact that muscle wastes after the section of its motor nerve, there is no physiologic evidence for either the special trophic fiber or the special trophic nerve impulse.

2. On the assumption of continuity of substance of nerve and muscle tissue, the section of a part of this system might explain the atrophy which takes place in another part. Against this view is the fact that the histologic evidence shows that the nerve fibrils are separate and distinct from the muscle cells.

3. There remains the hypothesis that muscular atrophy is due to fatigue caused by fibrillar contractions, which have been described and which will be demonstrated. That the overaction of muscle may lead to a shrinkage in volume is a well attested fact. Furthermore, it may be pointed out that the specific gravity of fatigued muscles is less than the specific gravity of normal resting muscles. Also the specific gravity of atrophied muscles is less than the specific gravity of normal resting muscles.

In the clinical literature of poliomyelitis, I have been able to find only one reference to the fibrillar and fascicular contractions of the atrophied muscle. Hoffmann⁴ describes what he calls a myokymie in certain old cases of poliomyelitis.

Those leg muscles which have not wholly atrophied, show a continuous fibrillar and fascicular twitching, which in the thigh muscles simulates a muscle surging, with a twitching of the bundles at intervals; this muscle unrest is also present in the abdominal muscles (myokymie) (Die nicht geschwundenen Muskeln der Beine sind Sitz unaufhörlich sich abspielender fibrillärer und fasciculärer Zuckungen die an den Oberschenkeln besonders das Bild des Muskelwogens geben, dazwischen auch stärkere Bündelzuckungen; diese Muskelunruhe besteht ferner am Abdomen [myokymie].

Rosenow, Towne and Wheeler⁵ described fibrillar contractions in the limbs of rabbits experimentally inoculated with Rosenow's organism of anterior poliomyelitis. "The onset of later paralysis, especially in rabbits, was sometimes preceded by a fine tremor or

even definite twitching of the muscles, which later became flaccid." Similar fibrillar contractions have been observed in certain cases of central neuritis as well as in progressive muscular atrophy and amyotrophic lateral sclerosis.

25 East Washington Street.

PNEUMOCOCCUS TYPE DETERMINATION BY AVERY'S CULTURAL METHOD

EDITH A. BECKLER, S.B.

KATHERINE MARDEN, S.B.

AND

HELEN H. GILLETTE, S.B.

Bacteriologists, Massachusetts State Department of Health

BOSTON

Since the publication of Avery's¹ work on a rapid cultural method for the determination of types of pneumococcus in sputum from cases of lobar pneumonia, the diagnostic laboratory of the Massachusetts State Department of Health has used this method together with the method of mouse inoculation.

The specimens of sputum received are from hospitals and private cases in Boston. The technic employed by us is as follows: One c.c. of sputum is washed and ground in a sterile mortar with approximately 2 c.c. of broth, 1 c.c. of the emulsion is inoculated into a mouse, and the remaining cubic centimeter is inoculated into 4 c.c. of blood glucose broth in a centrifuge tube. For the mouse test, the method outlined by Blake² is used. For the cultural test, Avery's method is followed. The broth cultures are examined from time to time, and when pneumococci are abundant the precipitin test is made. The time for abundant growth varies from four to eight hours.

From a comparison of forty-eight specimens examined by both methods, we obtained checks on forty-three specimens.

FINDINGS IN COMPARATIVE TESTS

	Cultural Method	Mouse Inoculation
Type I	7	8
Type II	10	12
Type III	3	5
Type IV	28	23

Five specimens that were Type IV, according to the cultural method, were distributed among Types I, II and III.

The specimens received at this laboratory are often contaminated with saliva; but it is usually impossible to get second specimens without considerable delay, and tests are made with the ones received, though they often appear unsatisfactory. The fact that we do not have any control over the taking of specimens may account for our somewhat less successful results with the cultural method than those obtained by Avery. However, our results have been sufficiently satisfactory for us to decide to use this method when mice are not obtainable, rather than to stop the work entirely.

1. Avery, O. T.: Determination of Types of Pneumococcus in Lobar Pneumonia, THE JOURNAL A. M. A., Jan. 5, 1918, p. 17.

2. Blake, F. G.: Methods for the Determination of Pneumococcus Types, Jour. Exper. Med., 1917, 26, 67.

4. Hoffmann, J.: Ueber eine Epidemie von Poliomyelitis anterior acuta in der Umgebung Heidelbergs im Sommer und Herbst 1908 und bemerkenswerte Beobachtungen aus früheren Jahren, Deutsch. Ztschr. f. Nervenh., 1909-1910, 38, 146-166.

5. Rosenow, E. C.; Towne, E. B., and Wheeler, G. W.: The Etiology of Epidemic Poliomyelitis, THE JOURNAL A. M. A., Oct. 21, 1916, p. 1202.

Therapeutic Overdoing.—In the department of therapeutics overdoing is wrongdoing; activity here to the extent of harm is the reproach of medicine.—W. B. Konkle, M.D.