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23 (1201)

The postural activity of the rectus abdominis muscle of the cat.

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If we accept Sherrington's[1] view that a muscle may undergo changes in length without concomitant changes in tension as a means of preserving a certain posture or attitude of the body, we find that the rectus abdominis of the cat manifests this property in a high degree.

The animals used for experiment were etherized and a tracheal cannula inserted. The skin was incised in the median line of the thorax. The pectoral muscles of one side were then severed close to their attachments to the sternum and sternal portions of the ribs and reflected outward. The tendinous insertions of the rectus abdominis on the ribs were divided and the free upper end lifted out. A thread was tied about the tendinous end of the muscle and led through a system of small pulleys to a muscle lever. The abdominal wall was kept intact. A rise of the writing point of the lever indicated a shortening of the muscle, while the writing point fell when the muscle relaxed. The thoracic and abdominal respiratory movements were recorded by Verdin tambours connected to Crile stethographs. Small changes in the length of the rectus abdominis occurred during ordinary respiration. But if fluid, usually an *M*/8 solution of sodium chloride, was introduced into the stomach through a stomach tube passed down the esophagus, or directly into the peritoneal cavity through a hypodermic needle, the muscle promptly relaxed, the amount of relaxation being proportional to the amount of fluid introduced, and continuing until the limit of distension of the abdominal cavity was reached. This limit of distension is determined by

[1] Sherrington, *Brain*, 1915, Vol. 38, pp. 191–223.

the muscular wall and not by the skin. The relaxation occurs when fluid flows in at pressures of only two or three centimeters of salt solution, and a contraction occurs when fluid is flowing out of the stomach.

The active contraction or relaxation of the rectus abdominis in response to changes of volume of the stomach or changes in volume of intra-peritoneal fluid ceased on section of the dorsal root fibers of the spinal nerves supplying the muscle, and after transection of the spinal cord at the level of the lower cervical roots. Some change in the position of the writing point of the muscle lever occurred when the stomach was distended after each of these procedures, and even a few minutes after death, but the magnitude of the changes was much less than when the central nervous system and the afferent channels were intact. Bilateral vagotomy had no marked effect on the response of the muscle.

We regard the change in length of the rectus abdominis as a necessary result of the operation of a mechanism for maintaining the relative constancy of intra-abdominal pressure. Without such a compensatory change in length of the abdominal muscles, troublesome circulatory and visceral disturbances would arise when a change in the volume of the abdominal contents occurred. Food could not enter the stomach at such low pressures as have been reported without a corresponding change in the abdominal volume.

24 (1202)

A simple method of detecting the circulation of antigen in the blood. (Preliminary note.)

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Experience with different immunity reactions has brought in the last few years a realization of very important limitations of their usefulness. It is generally conceded that it is impossible by means of immunity reactions to differentiate between actual infection and the state of immunity following it. This difficulty