the two curves previously obtained, while the curve of extension of the quadriceps deprived of its sympathetic innervation coincides with the one obtained for this muscle when the cerebellum was intact. Obviously, the "brake phenomenon" depends in part on cerebellar impulses which are conveyed to the skeletal muscles through the sympathetic nervous system.

The component of muscle tonus which, as indicated by the curves obtained in these experiments, is mediated through the sympathetic nervous system, includes those elements of tonus which enable the muscle to develop resistance to passive displacement of a limb from a position of rest. These are the elements of tonus which tend to maintain any given posture, once that posture is imposed by voluntary effort or external force. They are closely akin to, perhaps identical with, those elements of tonus on which the "shortening" and "lengthening" reactions depend which Sherrington described and interpreted as the manifestations of plastic tonus.[2] Therefore, the results of these experiments afford quantitative evidence which supports the theory advanced by Langelaan[3] and more recently advocated by Hunter[4] and Royle[5] that plastic tonus in skeletal muscles is mediated through the sympathetic nervous system.

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The effect of the administration of thyroxin upon the surface tension of blood.

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In a previous communication[1] we have shown that thyroidectomy brings about in the course of nineteen to twenty-two days an increase in the value of the surface tension of the blood of guinea pigs. Since hypothyroidism causes this increase in the surface tension, it was of course of interest to ascertain whether

[2] Sherrington, C. S., *Proc. Roy. Soc.*, 1896, lx.

[3] Langelaan, J. W., *Brain*, 1915, xxxviii, 235.

[4] Hunter, J. I., *Brain*, 1924, xlvii, 261.

[5] Royle, N. D., *Brain*, 1924, xlvii, 275.

[1] Wilhelmj and Fisher, PROC. SOC. EXP. BIOL. AND MED., 1925, xxii, 478.

the presence of excessive quantities of thyroid secretion or hormone would have the reverse effect upon the surface tension of the blood.

We therefore fed thyroxin to normal guinea pigs. The feeding was continued over a period of three to four days, and from 1 to 1.2 milligrams were fed to each animal. The animals were bled before feeding, and again on the fourth or fifth day after beginning the feedings. Determinations of the surface tension of the blood plasma were made on both of these samples. At the same times normal animals were bled and, in order to have controls of unfed animals, they were kept under the same conditions as the ones used in the experiments.

Twenty-seven animals were fed thyroxin; of these, twenty showed a fall in the value of the surface tension of the blood which was greater than 1 dyne. The remaining seven animals showed a change of less than 1 dyne, some even showing a slight increase of the surface tension. The fall in the surface tension in the twenty animals varied from 1.9 dynes to 13.9 dynes. The average fall of surface tension between the first and second samples in all twenty-seven animals was 3.7 dynes; if we consider only those which showed a fall greater than 1 dyne, the average for these twenty is 5 dynes.

Of the seven control animals kept under the same conditions as the fed animals, six showed variations between the first and second determinations of less than 1 dyne, showing either a rise or a fall; one animal, however, showed a fall of 1 dyne. The average change in the surface tension of the control animals was a fall of .15 dynes.

We have added thyroxin directly to freshly drawn plasma in order to determine whether it was increased thyroxin content in the blood which might account for the lowered surface tension in the fed animals, but were unable to show that thyroxin had any surface active qualities.

It appears, then, from our experiments, that hyperthroidism brought about by administration of thyroxin causes a lowering of surface tension of plasma in guinea pigs, acting therefore in the opposite direction from hypothyroidism brought about by thyroidectomy. Furthermore, this lowering of the surface tension of the plasma is apparently not due to the presence in the blood of increased quantities of thyroxin.