

stimulation with a subsequent failure. The injection of 1 mgm. of strophanthin by way of the femoral vein produces a powerful and usually acute response of the tongue. Spontaneous fibrillation of a coarse grade lasting almost an hour has been observed after the administration of this drug without nerve stimulation.

The action of digitalis bodies upon the tongue appears to be different from that upon ordinary striped muscle. Cushny¹ has pointed out that the more recent investigators find that cardiac glucosides only weaken the muscle, reduce its excitability, quicken the onset of fatigue, and finally paralyze it completely. The similarity between the pharmacodynamic effects of digitalis bodies upon both tongue and heart is an observation that further stresses certain morphologic and physiologic comparisons drawn between the two organs in a recent communication.²

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Organ Distribution of Leucocytes.

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Interest in the leucocytic participation between periphery and internal organs, dating from the early work of Goldscheider and Jacob¹ was revived by the publications of Widal² on the "hemoclastic crisis."

In our own work of this field, we were first interested in determining the participation of individual organs because of the many clinical questions so related.³ We observed a distinct balance existing between the peripheral organs and the splanchnic group (splanchno-peripheral balance).⁴ This balance is presumably one that depends on the proper functioning of the autonomic nervous system whereby peripheral vaso-constriction (leucopenia) is associated with

¹ Cushny, Arthur R., *The Actions and Uses in medicine of Digitalis and its Allies*. Longmans, Green and Co., London, 1925.

² Buchbinder, William C., *Am. Heart J.*, 1930, xci, 654.

³ Goldscheider and Jacob, *Z. für Klin. Med.*, 1894, xxv, 373.

⁴ Widal, F., *Presse Medicale*, 1920, xxviii, 893.

⁵ Müller, F. E., and Petersen, W. F., *Klin. Wschr.*, 1926, v, 53.

⁶ Petersen, W. F., Müller, E. F., and Boikan, Wm., *J. Infect. Dis.*, 1927, xli, 405.

splanchnic vaso-dilatation (leucocytosis), the leucocytes accumulating chiefly in the liver. There seems very little doubt that the accumulation of leucocytes takes place in the organs of greatest metabolic activity. This having been established, a local leucocytosis justifies the assumption of increased organ activity.

In the continuation of this particular problem, we have carried out a number of operative procedures whereby individual organs were exposed under conditions that would be associated with least vascular disturbance. Using such animals, we proceeded to bring about diametrically opposite changes in the leucocyte partition, on the one hand using intravenous injections of bacteria with a resulting peripheral leucopenia,⁵ and on the other hand producing peripheral leucocytosis by means of insulin shock.⁶ In such animals we constantly checked the partition by means of leucocyte counts of skin and liver blood.

We have found that the leucocyte count of the vessels of the muscles, lungs, heart, brain and kidney usually corresponded to the direction taken by the skin vessels, in other words, a leucopenia was present in these vascular beds when the skin was also presenting evidence of a leucopenia. Conversely, during such conditions the liver had a relative leucocytosis and with the liver were associated the pancreas, spleen, stomach and gastro-intestinal tract.

Technically, it is of importance to note that in counting the leucocytes of the vessels of the splanchnic region, distinct differences appear in the number of leucocytes following rapidly repeated counts. If, for instance, one makes a superficial cut in the liver or spleen and then takes one leucocyte count after another the second drop usually contains fewer leucocytes than the first—one may have a count of 14,000, then 8,000, and then 6,000. It is only when we make a small fresh incision each time that we get values that correspond to the first count. This technical procedure must always be observed when experiments of this type are made; needless to say, pressure or torsion or any other unusual trauma on an organ promptly changes the leucocyte count. Presumably, these rapid changes that occur with repeated withdrawal of blood from the same region are due to a very rapid reactive local vaso-constriction of the involved region.

Under the conditions described, we have found that the leucocyte count of the abdominal organs under conditions of splanchnic stimulation (peripheral leucopenia) is highest in the liver and spleen and

⁵ Müller, E. F., and Petersen, W. F., *Z. f. d. ges. Exp. Med.*, 1929, lxvi, 442.

⁶ Müller, E. F., and Petersen, W. F., *Klin. Wschr.*, 1926, v, 1025.

somewhat lower in the stomach and gastro-intestinal tract. Conversely, with a relative splanchnic leucopenia, we found the fewest number of leucocytes in the liver, while those of the spleen and gastro-intestinal tract were usually equal.

In view of the fact that the vessels of the skin are accompanied by parallel changes of the musculature, brain, kidney and mediastinal organs with an opposite orientation in the splanchnic region, we believe that additional support is given the assumption that the Widal hemoclastic crisis initiated by seemingly minor irritations is based on a profound systemic reaction, more apparent in those individuals who have an unstable autonomic status.

The balance that is found to exist between the vessels of the splanchnic region and the periphery is naturally one indication of the constantly fluctuating difference in the metabolic activities in the various organs and organ groups.