

stimulating the precocious formation of spermatozoa in both immature and non-rutting adult ground squirrels (4 cases).<sup>7</sup>

The value of the present study lies principally in the fact that synthetic androsterone proved capable of stimulating seminal vesicles, prostate gland, Cowper's glands, bulbar gland, epididymis and ductus deferens in a mammal other than those previously studied.

### 8686 P

#### An Experimental Study of Cardiopericardial Adhesions.\*

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The generally accepted conclusion that pericardial adhesions play a fundamental rôle in the production of cardiac hypertrophy has been widely taught and approved.<sup>1</sup> Doubt was cast upon this established point of view by the many experimental operations on the heart and pericardium carried out during the past 12 years by Beck<sup>2</sup> and his associates. An additional reason for the study of this subject lies in the fact that the myocardium can be given a new blood supply through tissues grafted upon the heart. The Beck operation<sup>3</sup> involves myocardial adhesions and the rôle of adhesions needs critical study if coronary sclerosis is to be treated by this new surgical principle.

Twenty-six dogs were divided into 2 groups. In one group the pericardium alone was attached to the dome of either diaphragm.

<sup>7</sup> Wells, L. J., and Moore, C. R., *Anat. Rec.*, 1936 (in press).

\* Read at the Joint Meeting of the Experimental Medicine Section of the Cleveland Academy of Medicine and the Cleveland Section of the Society for Experimental Biology and Medicine at the Institute of Pathology, March 13, 1936.

<sup>1</sup> Karsner, Howard T., *Human Pathology*, 4th ed., J. B. Lippincott Co.; Krumbhaar, E. B., Pericardial disease, in *Nelson Loose-Leaf Living Medicine*, vol. IV, p. 525; White, Paul Dudley, *Heart Disease*, Macmillan Co., 1931, p. 516.

<sup>2</sup> Beck, C. S., *Surg. Gynec. and Obst.*, 1935, **61**, 407; *Arch. Surg.*, 1929, **13**, 1659; *J. A. M. A.*, 1935, **104**, 714; Beck, C. S., and Griswold, R. A., *Arch. Surg.*, 1930, **21**, 1064.

<sup>3</sup> Beck, C. S., *Ann. Surg.*, 1935, **102**, 801; Beck, C. S., and Tichy, V. L., *Am. Heart J.*, 1935, **10**, 849; Moritz, A. R., and Beck, C. S., *Am. Heart J.*, 1935, **10**, 874.

In the other group the myocardium and pericardium were attached to the diaphragm. The attachment was made well lateral to the central tendon of the diaphragm. This displaced the heart to either side. Attachment was always made so as to produce marked tension between diaphragm and pericardium. Various observations and studies were carried out on these animals over a period of 2½ years.

Signs of circulatory embarrassment were not encountered in a single instance. The response of the animals to exercise tolerance tests was normal. The observation of greatest importance was that cardiac hypertrophy was not found either grossly or microscopically.†

This is borne out by the fact that the mean heart weight to body weight ratio in our series of dogs in which the heart was displaced to the left by the attachment of the pericardium alone was 0.00713; while the mean ratio for the group in which the displacement was to the right was 0.00696. With combined adhesions and displacement to the left the mean ratio was 0.00704, and was 0.00724 with combined adhesions and displacement to the right. These are within the limits set up for heart weight to body weight ratios by Herrmann.<sup>4</sup> Microscopic sections from control animals and from animals in this series of experiments were subjected to objective observation and no significant alterations in transverse diameter were observed.

We also carried out a study of the autopsy records of the Lakeside Hospital from 1906 to 1929. In 2,600 autopsies there were 47 cases in which extensive pericardial adhesions were found. In 32 cases in which the hearts had undergone hypertrophy there was concomitant heart disease or vascular disease which in itself could account for the hypertrophy (agreeing with Chevers'<sup>5</sup> unaccepted observations in 1842). In 15 instances extensive pericardial adhesions were found associated with hearts that were either normal or even smaller than normal in size. In none of these cases in which the heart did not show hypertrophy was there vascular, myocardial or valvular disease present. Almost without exception the largest hearts were the seat of rheumatic pancarditis. (In the earlier records the terminology used for the diagnoses is at times not so clear cut as our present-day terminology.)

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† Dr. M. A. Simon of the Institute of Pathology carried out the microscopic study.

<sup>4</sup> Herrmann, G. R., *Am. Heart J.*, 1925, **1**, 213.

<sup>5</sup> Chevers, Norman, *Guy's Hospital Reports*, 15, 387; Oct., 1842.

In view of our experiments and the analysis of autopsy material, we are led to believe that pericardial adhesions *per se*—especially adhesions to the diaphragm—do not play a rôle in the production of cardiac hypertrophy.

### 8687 C

#### Further Studies on the Thermostable Antigen in Beef Cells.

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A thermostable alcohol-insoluble (B.T.) antigen has been demonstrated in beef- and sheep-erythrocytes.<sup>1, 2</sup> In order to study further the nature of this antigen the production of specific antibodies in some experimental animal was desirable. Weil<sup>3</sup> demonstrated the formation of beef- and sheep-lysins in guinea pigs immunized with boiled sheep-erythrocytes. Although Weil's work has been criticized on the ground that the thermolabile sheep-beef antigen was incompletely destroyed it now seems probable that the beef-lysins were engendered by the B.T. antigen in the boiled sheep-cells. In view of Weil's experiment, and since no B.T. antigen has been demonstrated in the guinea pig this species was selected for further study of the thermostable beef-antigen.

Guinea pigs were immunized by intraabdominal injections of 1.5 to 2.5 ml. of washed raw, boiled, or autoclaved beef-erythrocytes at 5-day intervals. Boiled cells were prepared by boiling a 25% suspension for 20 minutes. Autoclaved cells consisted of boiled cells further treated by autoclaving at 125°C. for 15 minutes. The pigs were bled from the heart and serum tested for lysins and agglutinins for beef-, sheep- and horse-erythrocytes. In the lytic tests .25 ml. of 1:20 guinea pig's complement and .25 ml. of one percent cell-suspension were added to tubes containing .5 ml. of serial dilutions of the immune serum. The degree of hemolysis was recorded after 30 minutes at 37°C. Agglutinative titers were determined by adding .5 ml. of .5% cell-suspension to .5 ml. of the serum-dilution and reading after 2 hours at 37°C.

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<sup>1</sup> Stuart, Griffin, Fulton and Anderson, *PROC. SOC. EXP. BIOL. AND MED.*, 1936, **34**, 209.

<sup>2</sup> Stuart, Griffin, Wheeler and Battey, *PROC. SOC. EXP. BIOL. AND MED.*, 1936, **34**, 212.

<sup>3</sup> Weil, *Bioch. Z.*, 1914, **58**, 257.