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Specific Action of an Antiserum for Placental Proteins on Placenta and Normal Progress of Pregnancy

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The specific cytotoxic action of precipitins for tissue proteins has been extensively studied. Lindemann,[1] Masugi,[2] and others have demonstrated that lesions simulating glomerulonephritis were produced by injecting nephrotoxic serum into animals. Burky[3] produced lesions like those found in human endophthalmitis phacoanaphylactica by injecting rabbits with homologous lens substance. Schwentker and Comploier[4] observed that 34 of 37 scarlet-fever patients gave positive reactions to nephrotoxic serum as compared with 3 of 30 control patients, affording a possible explanation of the etiology of post-scarlatinal nephritis. Schwentker[5] produced the clinical and pathological picture of post-infections encephalomyelitis by repeatedly injecting denatured-brain emulsions into monkeys. Histological changes have been produced in the liver upon injection of antiliver sera into rabbits.

Our investigations demonstrate that the injection of an antiserum for full-term guinea-pig placentæ into pregnant guinea pigs causes them to abort.

Full-term guinea-pig placentæ were obtained directly after delivery, passed through a meat-grinder, again ground in a ball-mill, washed free of water-soluble protein and adsorbed on aluminium-hydroxide cream.[6] The placental material was then injected intramuscularly into rabbits. Blood was drawn biweekly and the sera were tested for precipitins to blood-protein. Although the finely-ground tissue had been washed free of blood-proteins to a negative precipitin-reaction, blood-protein precipitins appeared in the sera but disappeared within 2 months. This serum reacted with guinea-pig placental autolysates in a dilution of 1-1000, and with autolysates of guinea-pig liver and kidney. After removal of precipitins for liver and kidney by *in vitro*

1 Lindemann, M., *Ann. Inst. Pasteur*, 1900, **2**, 4; **14**, 49.

2 Masugi, M., *Beitr. Path. Anat. u. Allg. Path.*, 1933, **91**, 82.

3 Burky, *J. Allergy*, 1934, **5**, 466.

4 Schwentker, F. F., and Comploier, F. C., *J. Per. Med.*, 1939, **70**, 233.

5 Schwentker, F. F., and Rivers, T. M., *J. Exp. Med.*, 1934, **60**, 559.

6 Marshall, J., and Welker, W. H., *J. Am. Chem. Soc.*, 1913, **35**, 820.

absorption, the serum still reacted strongly with the placental autolysate.

A total of 8 cc of this serum in 3 doses at 2-day intervals was injected intraäbdominally into each of 6 pregnant guinea pigs. Following the last injection, abortion occurred in 5 guinea pigs, in 1-5 days and every foetus was dead. Two pregnant guinea pigs injected with normal rabbit serum did not abort.

The abortive effect of the antiplacental serum is apparently due to its effect on placental tissue. Placentæ obtained after abortion showed the following histological changes in contrast with normal placentæ obtained from the control animals. There was a definite increase in blood volume (passive congestion), spasm of the uterus, flattening of the syncitial cells, eosinophilia, and signs of necrosis of the formed elements, especially in the space between the maternal and foetal parts of the placenta (hyalinization, karyorrexis, karyolysis, cytolysis, pyknosis). No changes were found in the liver or kidney.

In the case of one of the 6 pregnant guinea pigs that had been injected with antiplacental serum, no certain knowledge exists of its abortion. That the animal may have aborted is indicated by the large loss of weight and the existence of cellular debris in the uterine cavity. Histological examination of the liver and uterus revealed definite histological changes. No lesion was found in the kidneys.

The blood sera of 2 women known to be habitual aborters gave positive precipitin-reactions with proteins prepared from full-term human placentæ.

Conclusions. An antiserum for full-term guinea-pig placentæ reacted with liver and kidney autolysates. These precipitins were removed by *in vitro* absorption. The serum still reacted strongly with placental autolysates. Injection of this serum into pregnant guinea pigs caused them to abort.