DETECTION OF EMBRYO-SPECIFIC PROTEINS IN THE BLOOD SERUM OF DOGS WITH EXPERIMENTAL SPLENITIS

A. V. Afanas'eva

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The hypothesis has recently been put forward that the resumption of production of embryo-specific proteins in mice [1] and dogs [3] after partial hepatectomy is associated with the development of reparative regeneration of the liver.

In face of published evidence that reticular hyperplasia of the liver may be produced by flow mechanical trauma to the spleen [5], in the present investigation an attempt was made to detect embryo-specific proteins in the blood serum of adult dogs during the development of experimental splenitis.

EXPERIMENTAL METHOD

To produce experimental splenitis [6], the animals were anesthetized with ether, the abdomen was opened through a midline incision, and the spleen was brought out into the wound, where it was wrapped in a sterile Kapron bag which was tied by means of a purse-string suture so as not compress the vascular bundle. The spleen was then replaced in the abdomen and the wound closed in layers.

Observations were made on two groups of dogs: intact and after partial (25%) hepatectomy. The hepatectomy was performed 1.5-2 months before theexperiment, when the left lobe of the liver was resected.

The concentrations of embryo-specific proteins in the blood serum was determined by titration in agar, using a standard test system [4]. Two test systems were used: for α_2-globulin and for α_3-globulin. The corresponding antigens were the serum of puppies on the first day of life in a dilution of 1:4 and the serum of a fetus of 7-8 weeks, diluted 1:16. In both test systems an antiserum capable of detecting only embryo-specific α_2-globulins and α_3-globulins was used [2]. The sensitivity of the method was 4.5 μg/ml for α-globulins and 0.07 μg/ml for α_3-globulins.

Embryo-Specific α-Globulins in Blood Serum of Dogs with Experimental Splenitis

Animal No.	Day after operation											
	1	2	3	4	5	6	7	8	9	10	11	12
Intact animals												
87	—	—	—	+	—	—	—	—	⊕	+⊕	—	—
88	⊕	—	—	+	—	—	—	⊕	⊕	+	—	—
90	—	⊕	+	—	—	⊕	—	—				
92	—	⊕	+⊕	—	—	⊕	—	—				
93	—	+	+	—	—	⊕	—	+				
91	—	⊕	+	—	—	⊕	—	—				
62	—	—	—	—	—	+	—	—	—	—	—	—
65	—	—	—	—	+	+	+	—	—			
Hepatectomized animals												
67	—	—	—	—	+	+	—	+	—	⊕	—	—
68	—	—	—	—	+	—	—	—	—	⊕	—	—
69	—	—	—	—	+	—	—	+	—	⊕	—	—
70	—	—	—	—	—	—	—	+	—	⊕	⊕	—
71	—	—	—	—	+	—	—	—	—	⊕	—	—

+) Embryo-specific α_2-globulin present; ⊕) embryo-specific α_3-globulin; —) embryo-specific α-globulin.

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EXPERIMENTAL RESULTS

As the table shows, embryo-specific proteins were detected in the blood serum of all the dogs during development of splenitis. In most intact animals they appeared sooner after operation (1st-2nd day) than in the hepatectomized dogs (5th-8th day). As a rule, α_2- and α_3-globulins were found in the blood serum, and none were detected in only two of the 13 dogs.

The appearance of the embryo-specific proteins in the hepatectomized dogs showed a certain periodicity: from the 5th to the 8th day after the operation α_2-globulins were found in the serum of these animals, but on the 10th day α_3-globulins were detected. No such pattern was observed in the intact dogs, for among the animals of this group both α_2- and α_3-globulins were found simultaneously in the same dog.

Comparison of the concentration of α_2- and α_3-globulins in the blood serum of the dogs with experimental splenitis shows that they α_2-globulin concentrations was much higher (17-534 μg/ml) than their α_3-globulin concentration (0.07-6.4 μg/ml). However, an increase in the concentration of both proteins took place characteristically in the course of development of splenitis and the cencentration reached its maximum on the 6th-10th day after the operation.

The results obtained showed that splenitis can be used as an experimental model for studying the mechanism of resumption of the production of embryo-specific proteins in the adult animal.

To determine more precisely the character of the hepato-lienal relationships during synthesis of embryo-specific proteins, it would be worth while comparing the production of these proteins with the morphological changes in the spleen and liver in the course of development of experimental splenitis.

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