

# ON THE QUESTION OF IMMUNOGENESIS IN RABBITS DURING THE GROWTH OF A BROWN-PEARCE CARCINOMA

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It has been established by the works of a number of investigators [3, 5, 6, 7, 8, 10] that in the presence of a malignant illness the immunological reactivity of the organism changes significantly. In particular, it was discovered [1, 2, 4, 9] that in the process of the growth and development of malignant tumors there occurs a depression of the protective functions of the organism. As a result of the suppression of immunogenesis in the blood of such animals a fall in the titer of normal and immune antibodies takes place, as well as a significant lowering of phagocytic activity.

However, the results of a series of clinical investigations are extremely contradictory. According to the data of some of the authors [12] a suppression of the process of immunogenesis occurs in patients stricken with cancer; in the works of other investigators [13] this is not observed.

Thus, the question of alteration in the immunological reactivity of the organism during a tumor illness has not yet been finally resolved, and requires the performance of subsequent investigations.

We studied the dynamics involved in the formation of antibodies against the microbe factor (live and killed cultures of B. prodigiosum) in rabbits, following the transplantation of Brown-Pearce tumor to their testicles.

## METHOD

B. prodigiosum,\* which exerts an inhibitory effect on the growth of certain tumors [11], belongs to the gram-negative, pigment forming, rod-shaped bacteria; these bacteria grow well on simple nutritive media. The microbe emulsion designated for the immunization was prepared in the following manner: a 24-hour culture of B. prodigiosum, growing on an agar slant at a pH of 7.2-7.4, was washed with sterile physiological saline. The rather dense microbial suspension obtained was drawn off into a separate standard test tube, and diluted with physiological saline (pH of 7.3) to a concentration of 2 billion microbes per ml, as ascertained by the state bacterial standard.

In those cases where immunization of the animals was performed with the killed culture, the method of preparation of the microbe emulsion and of dosage calculation was analogous to that described above. The microbe cells were killed by heating at 60° for 1.5 hr.

The experiments were performed on 25 sexually mature male rabbits of the chinchilla family, from 3 to 3.5 kg in weight. All of the animals were divided into 5 equal groups. The Brown-Pearce tumor was transplanted

\* The culture was obtained from the L. A. Tarasevich Central Scientific Research Control Institute for Vaccines and Sera.

# Agglutination of B. prodigiosum in the Presence of Immune Sera

Group of rabbits	Rabbit No.	Dates sera were obtained							
		March 14		March 22		April 7		April 21	
		serum dilutions							
		1 : 160	1 : 1 280	1 : 160	1 : 1 280	1 : 160	1 : 1 280	1 : 160	1 : 1 280
First	3 237	—	—	+++	+	+++	+(+)	++++	+(+)
	2 644	—	—	+++	+	+++	+(+)	++++	±
	3 294	—	—	++	+	+++	++	++++	±
	3 082	—	—	++	+	+++	++	++++	+
	2 929	—	—	++++	+(+)	++++	++	++++	+
Second	3 592	—	—	—	—	+++	+	++	—
	2 379	—	—	+++	±	+++	+	+++	+
	2 366	—	—	+++	+	++++	+	+++	+
	3 076	—	—	++	+	+++	+	+	—
	1 141	—	—	++	±	++++	+	++	+
Third	2 747	—	—	—	—	—	—	—	—
	419	—	—	—	—	—	—	—	—
	3 479	—	—	—	—	—	—	—	—
	3 155	—	—	—	—	—	—	—	—
	2 772	—	—	—	—	—	—	—	—
Fourth	2 213	—	—	++	+	+++	++	+++	++
	3 114	—	—	+++	+	+++	++	+++	+
	3 907	—	—	++	+	+++	+	+++	+
	3 376	—	—	++	+	+++	+(+)	+++	++
	2 610	—	—	+++	—	+++	+(+)	+++	+
Fifth	51	—	—	++	+	++	+	+++	+(+)
	3 488	—	—	+++	+	++	+	++	±
	86	—	—	+++	+	+++	+	+++	+
	60	—	—	++	+	+++	+	+++	+
	84	—	—	++	+	++++	++	++	+

Note: — Negative reaction; ± weakly positive; +, ++, +++, and ++++ positive reactions of various degrees.

to the testicles of the rabbits in the first, second, and third groups, using a 10% suspension in physiological saline, with a dose of 0.5 ml; no tumor was transplanted to the animals in the fourth and fifth groups. The tumor growth was noted in all the inoculated animals on the 7th day following transplantation.

Immunization of the animals was begun on the 10th day after tumor transplantation. The rabbits of the first group were immunized with the living culture of B. prodigiosum; the animals of the second group were injected with the same culture, which was first killed by heating. The animals in the third group did not undergo immunization (control 1). The fourth and fifth groups contained the uninoculated rabbits; they were immunized with the microbial culture according to the same scheme as the animals in the first and second groups (control 2).

During the experimental period from March 14 to April 8 each rabbit was injected intravenously six times with either living or killed culture material; a total of approximately 3.8 billion microbes was injected per kg of weight.

In order to carry out the serological investigation in the animals of the first 2 groups we simultaneously drew 7-8 ml of blood prior to transplantation of the tumor, before beginning the antigen injections, and on the 10th, 18th, 31st and 46th days after transplantation of the Brown-Pearce carcinoma. Blood was taken from the rabbits in the control groups at the same intervals, and in the same amount.

The titer of antibodies against B. prodigiosum in the immune rabbits was determined by the method of agglutination.

The sera were diluted with physiological saline to 1:160 and 1:1280. The agglutination reaction was set up in duplicate for all the sera obtained at any one time and under uniform conditions.

## RESULTS

Analysis of the results obtained and presented in the table shows that the titers of the immune antibodies, contained in the sera of the first and second groups of rabbits (suffering from the cancer) were essentially almost the same as the antibody titers in the animals of the fourth and fifth groups (the control animals, to whom the tumor was not transplanted). Only rabbit No. 3592 showed a later reaction, with antibody production of a low titer in response to the injection of antigen.

The data obtained indicates that the formation of immune antibodies against B. prodigiosum in rabbits hosting a transplanted Brown-Pearce tumor is of almost the same intensity as the antibody formation in healthy rabbits; apparently, this is not only dependent upon the state of the organism, but also the properties and nature of the antigenic stimulus.

## SUMMARY

This work investigated immunological reactions of an organism affected by a tumor to the administration of living and killed B. prodigiosum culture.

Experiments were carried out on sexually mature male chinchilla rabbits inoculated with Brown-Pearce tumor. The presence of immune antibodies was determined with the aid of the agglutination reaction. The experiments established that antibody formation in rabbits inoculated with Brown-Pearce tumor showed almost no difference from that found in healthy animals.

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All abbreviations of periodicals in the above bibliography are letter-by-letter transliterations of the abbreviations as given in the original Russian journal. Some or all of this periodical literature may well be available in English translation. A complete list of the cover-to-cover English translations appears at the back of this issue.

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