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Reticuloendothelial Activity in Rats with Yoshida Sarcoma

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Abstract—*Double-tracer method using ^{131}I-labelled HSA-microspheres and* Na^{125}I *was applied for determining the proteolytic activity of reticuloendothelial system in ascitic and solid Yoshida sarcoma-bearing rats. The mean permanence time of labelled microspheres was shortened in rats with ascitic form* (0.78 days) *as well as in animals with solid form* (1.66 days) *as compared with that in intact animals* (4.53 days). *The reproducibility of the method was confirmed.*

INTRODUCTION

THE RELATION between the defensive reaction of an organism and malignant processes has been investigated during the last 20 yr [1–3]. The development of neoplastic processes depends on the functional state of RES and therefore the data on its functional activity are very appreciated. Besides the phagocytosis rate the degradation rate of digested material is an important factor for evaluation of the functional state of RES.

That is why we used small size albumen microspheres as a testing agent and a double-tracer method for determining the proteolytic activity of RES [4, 5].

MATERIALS AND METHODS

Experiments with 61 male rats of non-inbred strain Wistar, weighing about 200 g, were carried out repeatedly during 2 yr. After 1-week acclimatization, 1 ml of Yoshida ascitic sarcoma containing approximately 10^8 living sarcoma cells was implanted i.m. into the left hind leg. ^{131}I-HSA microspheres and Na^{125}I were injected i.v. 10 days after tumor transplantation in amounts of 0.3 ml containing 3.7×10^5 Bq (10 μCi). HSA-microspheres of the size less than 8 μm were prepared and labelled in our laboratories [6]. The mass of microspheres administered was of 0.43 mg/animal. Whole-body activities of both radionuclides were measured immediately after injection, after 2, 4, 8, 12, 16, 20 and 24 hr, and every day till 18 days of the experiment. The mean permanence time (MPT) of labelled microspheres in the organism was calculated from the area between the whole-body activity curves based on mathematical model described previously [5].

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RESULTS

Values of the MPT of ^{131}I-HSA microspheres in RES calculated from the data of three experiments carried out in various year seasons are presented in Table 1.

In the course of the experiment carried out in June 1976, another group of 10 rats was injected i.p. with the ascitic form of Yoshida sarcoma under the same experimental conditions. MPT value estimated in the group of 6 surviving rats was of 0.78 ± 0.55 days.

DISCUSSION

As it can be seen from Table 1, there is no significant difference either in intact or in tumour-bearing rats between MPT values obtained in experiments carried out in various year seasons.

Our experiments have shown that MPT of ^{131}I-HSA microspheres is shortened during the load of organism due to the presence of a tumour. The MPT of labelled microspheres in tumour-bearing rats (1.66 ± 0.37 days) was shorter by 63% than that in intact animals (4.53 ± 0.46 days). The shortening of MPT may be explained by unspecifically increased activity of the whole immunological system of tumour-bearing rats including the formation of proteolytic enzymes in RES.

Since HSA-microspheres are not labelled homogeneously in their whole volume, the calculated MPT describes the permanence time of their labelled part only. The permanence time of unlabelled centers cannot be estimated with the help of the method applied.

Table 1. Mean permanence time of ^{131}I-HSA microspheres in healthy and tumour-bearing rats

Date	Intact		Solid Yoshida sarcoma	
	Number	MPT ± S.E.	Number	MPT ± S.E.
March 1976	6	4.75 ± 0.87	8	1.62 ± 0.78
June 1976	10	4.41 ± 0.99	11	1.75 ± 0.76
November 1977	8	4.53 ± 0.30	8	1.57 ± 0.08
Total	24	4.53 ± 0.46	27	1.66 ± 0.37

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