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Received June 11, 1964. P.S.E.B.M., 1964, v117.

Histamine in a Transplantable Mouse Mastocytoma.* (29558)

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It has been well established by Riley and West(1) that mast cells contain histamine. High histamine values have been demonstrated in mastocytoma of various species(2, 3,4,5) and in urticaria pigmentosa(3,5,6,7, 8), the skin manifestation of human mastocytosis. Mast cell tumors, however, are rare. Three types of transplantable mastocytoma in mice have been reported(9,10,11).

The present paper reports on analyses for the histamine content in the tumor and various organs of a mouse with a transplantable mastocytoma of the third type.

Materials and methods. The primary tumor(11) arose in a (CBAxDBA/2)F_1 mouse that had been inoculated subcutaneously with leukemic tissue from a transplantable plasma cell leukemia. There was no visible growth of the inoculated material. The primary and the transplanted tumors consisted of mast cells. The ultrastructure has previously been studied by electron microscopy (12). A female mouse from the first passage in which tumor tissue had been inoculated intraperitoneally showed local growth consisting of soft, whitish, flabby tissue located to the mesentery. Eighteen months had elapsed from time of inoculation till the animal was killed.

Histamine was determined by the spectrofluorometric method(13) in dried and defatted tumor tissue and skin. Histamine was also determined in fresh skin, liver, spleen and ovary. The specimens were obtained immediately after the animal was killed and frozen at —20°C until they were analyzed. The subcutaneous fat was mechanically removed from the skin proper by knife and scissors. Defatting was carried out by shaking the minced samples twice with 15 ml of ether for one hour. The defatted tumor and skin tissue was then lyophilized for 48 hours at room temperature under a pressure of 2 mm Hg. The defatted and dried and the fresh samples were homogenized in 5 ml of 0.4 N perchloric acid using a motor-driven glass homogenizer. The homogenate was allowed to stand for 10 minutes and then centrifuged. A 4 ml aliquot of the supernatant was analyzed for histamine according to the procedure previously described(14).

Results. Table I shows the histamine content of the tumor and of the various organs of the tumor mouse. All values represent histamine base.

Comments. The histamine content of the mastocytoma induced by inoculation was high in comparison with some of the scarce

* This work was supported by grants from Mr. and Mrs. Reinholdt W. Jorck Foundation, F. L. Smidth & Co. Foundation and from USPHS Grant AM 06209-02 to Dr. Asboe-Hansen.

TABLE I. Histamine Content of Tumor and Some Organs of a Mouse with a Transplantable Mastocytoma.

Tissue tested	Histamine base (μg/g)
Dried, defatted tumor tissue	11,797.0
Dried, defatted skin	993.2
Fresh skin	355.8
Fresh liver	1.13
Fresh spleen	.59
Fresh ovary	11.41

information concerning the histamine content of mouse mastocytoma. Sjoerdsma and co-workers(5) found from 470 to 560 μg/g in Dunn-Potter tumors, Furth *et al*(10) from 0.85 to 4.2 mg/g in Furth tumors, and Gróf and Kelényi(15), in transplantable Furth tumors, from 286 to 1114 μg/g, all in fresh tumor tissue. Cass and co-workers(16) found 1700 μg histamine per g lyophilized Furth mastocytoma material.

The skin from the back area of this mouse contained 993 μg histamine per g in dried and defatted skin. In other studies by the author(17), normal values for dried and defatted mouse back skin was found ranging from 143.7 to 276.4 μg/g. This may indicate that the tumor had already infiltrated the skin. Histamine was not increased in the other organs studied. In the liver and the spleen, the histamine values were similar to those found by Gróf and Kelényi(15) and in contrast to the excessively high amount of histamine (1600 μg/g fresh tissue) found in the liver of Gróf and Kelényi's original tumor mouse(15). Thus, it seems likely that no secondary deposits of the transplantable mastocytoma were formed in the liver, spleen, and ovary.

Summary. The histamine content of the tumor and various organs of a mouse with a transplantable mastocytoma was determined according to the spectrofluorometric method of assay. The tumor was located to the mesentery. The histamine content of the tumor was 11.797 mg per g dried and defatted tumor tissue, an extremely high value. The investigated skin from the back was also rich in histamine, while the histamine content was not found high in the other organs investigated, *i.e.* liver, spleen, and ovary.

The author is indebted to Dr. Ragna Rask-Nielson, University Institute of Biochemistry, Copenhagen, for providing the specimens used in this study.

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Received June 12, 1964. P.S.E.B.M., 1964, v117.