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REPORT

CD NO.

50X1-HUM

COUNTRY	USSR	DATE OF INFORMATION	1950
SUBJECT	Scientific - Medicine	DATE DIST.	26 Feb 1951
HOW PUBLISHED	Monthly periodical		
WHERE PUBLISHED	Leningrad	NO. OF PAGES	2
DATE PUBLISHED	Oct 1950	SUPPLEMENT TO REPORT	
LANGUAGE	Russian		

50X1-HUM

THIS IS UNEVALUATED INFORMATION

SOURCE Priroda, Vol XXXIX, No 10, pp 22-27.

BIOCHEMICAL RESEMBLANCE BETWEEN ENDOPARASITES AND MALIGNANT TUMORS

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Endoparasites and malignant tumors resemble each other in many respects by reason of similar conditions under which they grow and exist. This suggested long ago the idea in regard to the parasitic nature of tumors.

Parasitic worms which live in the intestines exhibit a pronounced anaerobic metabolism (1). They deposit in their bodies large quantities of glycogen. The accumulation of glycogen is one of the properties which they share with tumors. The tissues of both intestinal parasitic worms and cancer tumors belong to the amphibiotic euryoxybiotical-aerofermentor type (Th. Brand's terminology), i.e., they are characterized by a metabolism involving incomplete oxidations under aerobic conditions and are at the same time adapted to anaerobic conditions (2).

In 1938, H. Mauss synthesized the alkylated aminoxanthone Myracyl D, which was found to be effective both against Bilharzia and malignant tumors (3). The guanine analog Guanozolo (5-amino-7-hydroxy-1 - v - triazolo /d/ pyrimidine) synthesized by G. Kidder (4) suppresses the synthesis of nucleic acids (or, to be more precise, purine derivatives) in infusoria which are unable to convert adenine into guanine as well as in malignant tumors of mice. It is interesting that Guanozolo is an optically active compound having dextrarotatory activity.

In investigating the relative toxic effect of atebrin enanthiomorphs on various animals, the author of this article, together with O. K. Nastyukova (2) found that the majority of animals are more sensitive to levarotatory atebrin. However, the following test objects proved to be more sensitive to dextrarotatory atebrin: Erlich's adenocarcinoma (a gland cancer of mice), species of mollusks the body of which is turned in a left-handed spiral, and nematodes which live as parasites in the intestine of frogs. Thus, tissues of malignant tumors and parasitic worms are distinguished from healthy tissue and from that of non-parasitic worms by an opposite reaction to optical enanthiomorphs of atebrin.

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There are reasons to believe that the specific biological characteristics of malignant turmor tissue and parasites comprise the following elements: (1) presence of specific antigens in both malignant tissue and parasites; (2) optical inversion of the receptors of certain optically active compounds such as atebrin; and (3) peculiarities of purine metabolism in malignant tissue which are connected with the synthesis of nucleic acids, and subsequently, of nucleoproteins that are important constituents of cell nuclei. One may assume that malignacy is closely connected with alterations of the chemical properties of protoplasm, specific properties of enzymes, and possibly peculiarities of the protein carriers of enzymes.

Under the circumstances, recent work on proteins of malignant tumors which is being carried out in the USSR (5, 6, 7) assumes particular importance.

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