AD NUMBER

AD848272

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AUTHORITY

SMUFD, d/a ltr, 17 Feb 1972

TRANSLATION NO. 2394

DATE: Jan 1969

AD848272

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DEPARTMENT OF THE ARMY
Fort Detrick
Frederick, Maryland

Translation No. T-644-1

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Title: Infectious Epithelioses and Epitheliomas (Epithelioses Infecteuses et Epitheliomas)

Journal: Annals of The Pasteur Institute (Annales de L'Institut Pasteur) 17: 81- (1903).

January 1969

The psorosperm or coccidian theory of cancer has been the point of departure for a very large number of investigations. This theory was quite popular at one time when the coccidia appeared to be the only parasites capable of proliferating the epithelial cells during their intracellular development.

Adenoma of the liver of rabbits is an epithelial form of tumor. The oviform coccidia are the type of parasites that can be studies and characterized in these epithelial tumors.

Since its initiation in 1890, we have continually followed the development of this theory and have successfully found fault with the illustrations proposed in support of the parasitic theory. We are in agreement with the Paris Congress[1] (1900) that demonstration of the parasite or parasites of cancer remains still to be made. The psorosperm of Neisser and Darier, the coccidia of Sowdakewitch, those of Sanvtchenko, and the yeast of San Felice appear to us to be unsufficiently characterized and may be explained in terms of pecularities in the structure and development of cancerous cells (endogenous cells, mucous balls, fuchsin bodies, archoplasma, and centrosomes). In a parallel manner, starting with Guarnieri, the coccidian theory of eruptive diseases has developed. In this connection, one has described parasites whose prototype is Cytorictes vaccinæ in the epithelial cells of pustules, vaccinia, variola, etc. Accordingly, the reaction of the organism is manifested by a multiplication of epithelial cells which give rise to small tumors. This theory has numerous supporters.

Certain authors, and Bose[2] in particular, have attempted to extend the question in order to prove that the intraepithelial alterations associated with

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[1] Congress of Medicine, Paris, 1900, Bacteriology Section - Borrel, The Parasitic Theory of Cancer, These Annals, 1901.

[2] Bose, The diseases of Sporozoa, Archives of Experimental Medicine, 1901.

vaccinia, variola, and sheep pox are identical to those described as coccidia in the case of cancer, and, based on this alleged* identification of parasites, Bose has attempted to establish a large class of diseases of sporozoa which includes vaccinia, variola, sheep pox, cancer, syphilis, and, without doubt, many others also.

The sporozoa of syphilis has not yet been published. We wish to recall that we have previously discussed the parasites of cancer; in the course of the present work, we will criticize the sporozoa of eruptive diseases. However, we are already able to predict that the intraepithelial elements of eruptive diseases have absolutely nothin in common with the pseudoparasites of cancer other than the fact that both occur intraepithelially. The morphologies are completely different and most certainly their origins also. Even if one assumed a parasitic nature, it would mean that they are parasites of a special type.

Furthermore, in order to compare vaccinia and cancer from this point of view, it would be very important to establish the conditions of the comparison in a precise manner: the type of cancer to be considered - Neisser or Darier type, the coccidia of Soudakewitch, yeast-coccidia, Plimmer type, or the parasites of Sautchenko? The type of eruptive disease - should one consider the parasites of Guarnieri, the giant forms of Funck, the chromatic balls of Roger in variola, or the forms that Bose has described in the blood of sheep infected with sheep pox? There are indeed too many parasites to consider and too many ill-defined characteristics: the multiplicity of works, the lack of precision in the descriptions have made a crucial demonstration impossible. If there is a parasite involved, it may have already dies and was quickly removed from the matrix of the microscopic preparation.

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* The French work used here could also have been translated as "false or dishonest". From the general tone of the text and some of the other French expressions used, this may well have been the meaning that the author wished to convey to the reader - translator.

Nevertheless, the sporozoa have remained very well known from the zoologi- point of view: they have several distinct characteristics, a fixed cellular structure, and a definite evolution which does not allow room for doubt when one sees them, when they are young, in parasitized cells.

Before affirming the presence of sporozoa, it is necessary to have parameters other than the inprecise descriptions or vague outlines. Moreover, it will be necessary, henceforth, to take into account also the experimental fact that the majority of the viruses in question can pass through filters.

More recently, it was demonstrated that it was impossible for viruses of pustulous eruption of sheep pox, of cancer, etc. to belong to some group of protozoa; we acknowledge that they are of sufficient smallness in order to be able to pass through filters (Micromonas mesnili[1]) but nothing up to the present communication warrants a parallel conclusion.

In spite of an attentive and scrupulous study of the inclusions of vaccinia, sheep pox, and cancer, we have not been able to detect characteristic phases of a coccidian parasite. Thus, this parasite, as far as we are concerned, is still very problematical: Moreover, one is able to conclude, without fear of misleading, that the great majority of intra-epithelial elements described as parasites represent something quite different; in addition to the parasitic hypothesis, other interpretations are possible.

In the course of this study, we have compared the eruptive diseases, and sheep pox in particular, with cancer - not from the point of view of sporozoa but from the point of view of anatomical lesions. We will remain more nearly to the reality of the facts in ascertaining simply that the still unknown viruses of these diseases have an action of predilection on the epithelial tissues and

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1 Borrel, Experiments on the filtration of sheep pox virus, Society of Biology, 18 January 1902.

determine, in one way or another, the production of epithelial tumors.

The action of sheep pox virus, from this point of view, is particularly interesting, and in a note to the Society of Biology (18 January 1902), we have already given a description of the extraordinary proliferation of the bronchial epithelium and the alveolar endothelium in the pulmonary pustule. These pulmonary nodules associated with sheep pox have thus far been studied very little and have been described as bronchopneumonic nodules resulting from a particular process of proliferative pneumonia.

They fully merit particular attention.

In the first part of this work, we will study the different lesions associated with sheep pox and compare them to the lesions of vaccinia, variola, molluscum contagiosum or varioliform acne, aphthous fever (foot-and-mouth disease), and also of bovine plague. In this way, we will be attempting to establish some sort of grouping of different reactions in which the reaction of the organisms with respect to the virus is manifested by the proliferation of the epithelium and formation of pustules or small epithelial tumors. From these facts, we have grouped these diseases under the general title of epithelioses.

We have discovered that four of these epithelioses are caused by viruses which can pass through filters. This has been demonstrated with foot-and-mouth disease (Loeffler), with sheep pox (Borrel), with bovine plague (Nicolle and Adil-Bey), and with molluscum contagiosum (Marx and Sticker).

The action of these small viruses on epithelial cells during these epithelioses all some comparison up to a certain point with the action of cancer virus in the so-called epitheliomas.

Experimental and anatomical-pathological studies of epithelioma of mice provided for us a means of measuring the analogies and differences which exist between sheep pox epitheliosis and cancerous epithelioma.

SHEEP POX EPITHELIOSIS

Description of The Disease

Sheep pox or ovine variola is a disease of sheep, and sheep are the only animals that are sensitive to the sheep pox virus. With regards to its clinical characteristics, the disease very closely resembles human variola.

It can easily reproduced in the laboratory by experimental inoculation. Lambs from the Paris region are particularly susceptible and the mortality rate among those inoculated is quite substantial.