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Transpleural Mobilization of Clasmatocytes with Coincident Streptococcus Protection.

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In a recent article[1] we have shown that the presence of granulation tissue in the parietal pleura of the rabbit, produced by previous introduction into the pleural cavity of indifferent substances, protects the animal against many fatal doses of a streptococcus that normally causes a fatal pleurisy. The marked phagocytosis of the streptococcus by the clasmatocytes, which are the predominating cells in this granulation tissue, is regarded as responsible for this type of active resistance against our invasive microorganism. In a more general way we should regard the accumulation of these rather mobile and resistant mononuclear cells of the connective tissue, as responsible for at least certain instances of local immunity.

In the latest of our published experiments we have indicated that clasmatocytes accumulated in the parietal wall of one pleural cavity may be transferred to the other pleural cavity and there likewise protect against the streptococcus. A granulating right pleural wall was effected in a routine fashion by injecting aleuronat-starch mixture or gum arabic broth three days previously. The parietal wall of the treated cavity is from five to ten times as thick as usual, but the wall of the opposite cavity remains normal. If one injects multiple fatal doses of the streptococcus into the left untreated cavity, the rabbit, however, recovers perfectly, although sterilization of the cavity is distinctly slower than when the infection takes place on the right treated side. Histological examination at this stage of the two sides shows that the originally treated right pleura is thickened as usual but consists of myxomatous tissue in place of the densely cellular granulation tissue usually met with. The left parietal pleura is only slightly thickened but packed in between the subjacent muscle fibres are dense masses of clasmatocytes which are never normally found in such numbers or position.

The natural conclusion to be drawn from such an experiment is that the clasmatocytes that had accumulated in the granulation tissue of the right pleura were directly transported and remobilized in the left pleura under the stimulation of the local infection. Such a conclusion, however, is based on certain assumptions that it is the object of this brief communication to verify.

Tenderloo in his treatise on General Pathology has considered in some detail the overlapping of lymphatic distribution particularly of the thorax, which would render possible the migration of cells from one pleural cavity to the other; cancer metastasis from one axilla to the other, and the extension of tuberculosis from lymph nodes of one bronchial tree to that of the other side as in the cases of Ghon and Roman, are matters of record. It was more important, however, to demonstrate that in our experiment the clasmatocytes that were subsequently mobilized in the left pleural wall were those that had been collected in the right pleura and not derived from some parent source elsewhere. This we have demonstrated in the following manner: granulation tissue is produced in the right pleura and the clasmatocytes in it are selectively stained by a single injection of trypan blue. It may be shown in controls that the dye administered in this fashion stains only the locally accumulated cells in the area through which drainage takes place; the scattered cells of the visceral pleura of the same cavity, for example, are not stained.

At all events subsequent injection of aleuronat or broth in the left pleura mobilizes stained clasmatocytes in the left pleural wall, and all such cells disappear from the granulation tissue of the right pleural wall. One cannot use the streptococcus successfully in such an experiment because although the stained cells mobilize on the left side, a fatal infection, which clouds the picture, follows. This unusual result can in turn be explained by the plugging of the clasmatocytes with dye which renders them unable to fulfill their protective phagocytic function. Various other controls have been introduced as, for example, dye injection into a normal right cavity, followed by failure to find mobilized cells on the left side, and lack of protection.

These additional experiments confirm and extend our belief that the clasmatocytes which may be accumulated in a given region are responsible for a high grade of local protection against the streptococcus. Furthermore, a collection of clasmatocytes in

one region may be transferred to adjacent and possibly to more remote regions and still exercise a protective function.

[1] Gay, F. P., Clark, A. R., and Linton, R. W., *Arch. Path.*, 1926, i, 857.

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Non-Specific Activation of the Alcohol Soluble Antigen of Tubercle Bacillus.

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In a previous publication[1] it was found that the addition of commercial lecithin and alcoholic heart extract increased the potency of an alcohol extract of the tubercle bacillus as an antigen in the complement fixation reaction about ten times. The potency of certain preparations derived from the alcohol extract was increased about 100 to 200 times. Further work on this subject, although it is not yet completed, revealed the following characteristics.

An alcohol or ether extract of the tubercle bacillus and the preparations representing different stages of the purification of them, as described in our first paper[2] are activated with the addition of lecithin only if they are mixed with the lecithin in alcoholic solution and diluted together. The addition of saline suspension of lecithin to the saline suspension of the specific substance has no activating effect. Contrary to this, the preparations described later in these PROCEEDINGS[3] are activated whether the lecithin is added to the alcohol or to the saline solution of the preparations. The different behavior of the two classes of preparations toward lecithin is due, probably, to the circumstance that the substances later mentioned contain the specific substance nearly or entirely separated from the lipoids and are water soluble. In the experiments described in the first publication we examined in saline solution only the substances belonging to the second group showing strong activation, and we did not observe that the others are not activated in saline suspension.

With the bacterial substances of the first class, which are acti-