GENERAL PHYSIOLOGY IN ITS RELATION TO THE PROBLEM OF NEW GROWTHS.

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THE honor has fallen upon me to construct a preface to topics that are to follow—to conjure up a mist of generality out of which shall emerge clear images drawn by others. But, even vaguely, what has physiology to do with cancer? Perhaps the unwontedness of the idea may tempt you, as it has tempted me, to enquire.

By general physiology we understand the study of life—not in order to elucidate the workings of any specific kind of living form, for example, the human body or the cactus plant, but to get as near as possible to the answer to the question: What is life itself—life in its very essence, wherever and in whatever diversity it may be found? Now, the very existence of such a science implies a common process in the objects studied; else were it a task of mere curio collecting, and no science at all.

A common process reflects a common structure. Data from many directions appear to show that protoplasm is of the nature of an emulsion—at least two liquids, nonmiscible, one suspended in the other. Thus the suspended portion, or phase, is separated into minute particles tending from their surface tension to be spherical. This phase is thus dispersed, or discontinuous, whereas the phase in which it is suspended is continuous throughout. As we pass in fancy through a mass of protoplasm, however, we come eventually to a partition beyond which lies the outer world, or the interior of a further protoplasmic mass, such as nucleus, neighbor cell, etc. Thus is living material provided with a multiplicity of surfaces—surfaces of suspended particles and surfaces of partitions. Hence it is that certain physical and chemical forces especially favored by multiplicity of boundaries have come to be regarded as all-potent in the living process—by some, indeed, as the living process itself. Such forces are surface tension, osmosis, adsorption, and the electrical and chemical interactions involved in them.

If these are the essential properties of life (or, if you prefer, properties essential to life), then the conception of a simple, undifferentiated, primordial life-substance is as yet hardly tenable. For it is well demonstrated that although certain cell products, as enzymes, may act potently after the cell is crushed, the functions really characteristic of life—response, conduction, respiration, growth, etc.—all disappear with the destruction of this manifold system of surfaces and partitions. Function seems determined and limited by structure. A new morphology has thus sprung up—the minute

anatomy of the chambered cell of life. And a new physiology—the attempt to describe, measure and correlate the subtle mechanical, chemical and electrical forces occasioned by and playing upon this structure, and to trace the interactions between it and the non-living environment. Such is the field of general physiology, and such must be the source to which we must turn in our endeavors to unravel the secret of behavior of cancer cells and of all cells.

Let me therefore urgently remind you that not only to workers in cancer clinics—direct applicers of knowledge—must the world turn for light on this appalling human scourge, but also, with sympathy and all needed aid, to every investigator in the realm of living things and of the forces utilized by living things. The titles of scientific publications generally are distressing in their remoteness from human interest. Yet, I am almost tempted to say, the more remote the better. Where fundamental progress is to be made, the utilities of preconceived application are often misleading. This is particularly true of work in general physiology, where, nevertheless, every step of progress is basic to the welfare of the living creation. In this connection two dicta especially may be urged:

First, honor and aid the investigator whose whole aim is the solution of his *immediate problem*. If he had to worry about scurvy, or diabetes, or cancer, how could he arrive unerringly at the relative permeability of plasma membranes, or follow with unabated breath the wanderings of the X-chromosome! Yet to him the world looks for light in its biological, and therefore therapeutic, darkness.

Secondly, despise not the investigator's choice of material. Some of us cannot understand the significance of the mouse-tumor. Others may scorn the study of the disease of a cabbage plant. Many would turn with contempt from work done on a star-fish egg. The point we miss is this: *all success in the investigation of vital processes depends on the happy choice of material*. Certain cellular forces are common to all living things. But some cells, through accidents of arrangement or accessibility of structure, or of specialization of activity, are open to fruitful experiment in a given problem where others are not.

Thus the problems of *growth* belong to workers in widely variant material, all striving toward a common end—the questions at issue being: Why does the daughter cell resemble the mother cell—the problem of heredity; how does differentiation progress along orderly lines and end in the one predictable type of tissue?—the problem of development. And how are these bonds of order broken, and a wild or sullen mob of low-grade cells loosed from the customary tissue discipline, destined to crush or poison *in situ*, or to be carried along paths of transport to distant deeds of violence?

Would that all such anarchies of the tissues were subject to short-cut approach through the discovery of controllable parasitic causes! Yet, even if in some happy future we shall recognize a true infectious origin of human cancer, even then the fact of parasitism is only one element in the solution; so often does the existence of two organisms in an effect (*i.e.*, parasite and host) complicate rather than simplify the problem as a whole.

Let us gather the light from every star. Let us focus that light patiently as it comes. As to life in the normal cell—behold, we know not anything beyond a promising outline; but the abnormal cell must share in the growing onslaught of that knowledge.

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ABSTRACTORS.

GERARDO M. BALBONI	FRED S. HOPKINS
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SYPHILITIC DISEASE OF THE LIVER.

CARNELLI, R. (*Policlinico*, September 26, 1921, No. 39) reports in detail the case of a man 22 years of age with a large smooth rounded tumor of the liver—painless and resistant to touch. The whole liver was enlarged. The tumor had been growing for two years without pain or fever but there was progressive weakness and discomfort from the size. The Wassermann test was negative and a diagnosis of sarcoma made. A year later the patient presented himself with processes in the long bones and a suppurating lesion on the shoulder. Mercurial treatment was begun with marked improvement. The Wassermann test was positive now. Carnelli believes it was a congenital syphilitic disease of liver developing late and the bone lesions were of the late congenital type. Such congenital lesions have been known to develop as late as the age of 28.

In every case of abdominal tumor it is always well to consider syphilis and to be very cautious regarding operation. All possible laboratory tests should be made. Syphilitic disease may effect a liver already pathologic from other causes and treatment of the syphilis may induce marked improvement even though the other factors may continue to operate. It is possible to discover a syphilis even without the aid of the Wassermann test. He comments on the difficulty in distinguishing a syphilitic a malignant, or hydatid cyst or a tumor in the gall bladder or kidney region.

[G. M. B.]

CLINICAL AND EXPERIMENTAL OBSERVATIONS IN THE USE OF SALINE IRRIGATION IN THE TREATMENT OF DIFFUSE PERITONITIS.

WILLIS, A. MURAT (*Surgery, Gynecology and Obstetrics*, October, 1921), writes as follows:

The mortality in the series treated by irrigation was 16 per cent. as compared to 50 per cent. in those treated by the "get in quickly—get out quicker" meth-

od. So far as I could determine, the patients in the irrigated series were fully as ill as those in the non-irrigated, and, in my hands, I am convinced that the same high mortality would have resulted had irrigation been omitted.

Aside from the reduction in mortality, I attribute to the use of irrigation a shorter and smoother convalescence and a lessening of the importance of drainage and the Fowler posture.

In the face of this evidence, is it logical to consider that irrigation is a procedure so fraught with danger to the patient? With a full realization of the adverse views held by many, I wish to state that my clinical experience and many facts of animal experimentation indicate to me strongly that this measure is of value in the treatment of progressive diffuse peritonitis, and I am convinced that it enabled me to save patients who would otherwise have succumbed.

[E. H. R.]

PAPILLARY CYSTADENOMA OF THE OVARY

EDDMANN, J. F., and SPAULDING, HARRY V. (*Surgery, Gynecology and Obstetrics*, October, 1921) say:

Papillary cystadenoma is the most important surgical disease of the ovary. It is variously stated to occur in from 10 to 27.5 per cent. of all ovarian tumors. A large number of cases occur in patients under the age of thirty. The most probable development is from a cellular perversion of the germinal epithelium.

There is a strong tendency to bilateralism (22.2 per cent.) and local metastasis. General metastasis is not rare. Bilateral ovarian tumors demand a careful examination of the abdominal viscera and breasts.

The absence of symptoms referable to the pelvic organs is a deceptive feature of the disease. Ascites is an advanced symptom and indicates rupture, peritoneal metastasis, and often malignancy. Every woman with ascites, without a sufficient explanation in the liver, heart, peritoneum, or kidneys, should be laparotomized even though bimanual examination be negative.

Microscopically 66.6 per cent. of papillary cystadenomata are cancerous or precancerous.

Every ovarian cyst must be removed intact by abdominal section as soon as discovered.

In unilateral oophorectomy, the patient should be periodically examined.

Careless or rough handling resulting in intra-abdominal rupture, tapping to reduce the size of the tumor and the vaginal approach cannot be too strongly condemned.

Radium should be employed in cases in which the ovaries or the peritoneal implants could not be surgically removed.

[E. H. R.]

SURGICAL TREATMENT OF MEGACOLON.

DOWD, CHAS. N. (*Annals of Surgery*, October, 1921).

Dowd presents a brief but interesting article on the treatment of this rather obscure condition. In spite of the annoyances of such a procedure, he finds that the Mikulicz operation is the better procedure to use. His review of the surgical treatment is of distinct value.

[E. H. R.]

CHRONIC CHOLECYSTITIS WITHOUT STONES—DIAGNOSIS AND TREATMENT

MYER, W. (*Annals of Surgery*, October, 1921).

Myer goes to some extent into a differential diagnosis of cholecystitis with and without stones.

He refers to a statement made by A. W. George of Boston that a healthy gall-bladder does not show on an x-ray plate under ordinary conditions. Therefore, if the x-rays demonstrate a distinct outline of the gall bladder, without showing the presence of