invariably present on the outer surface of the epidermis. We are, however, attempting to grow wheat to maturity under aseptic conditions from sterilized seed in order to obtain a small crop of grain free from contamination for comparison with normal wheat. When data for this comparison are available we will publish our detailed results elsewhere.

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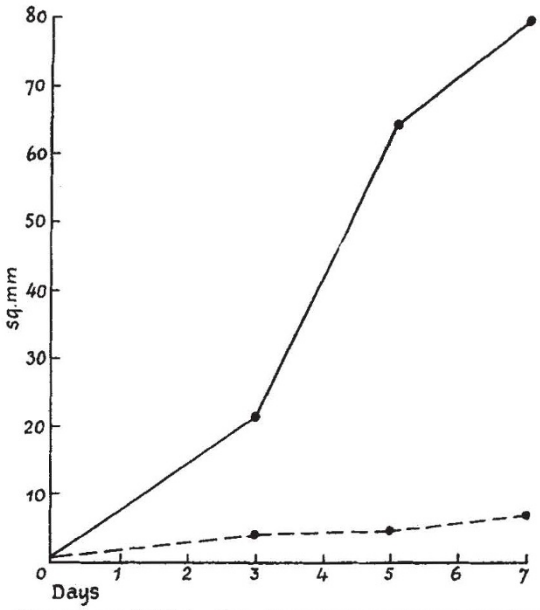
Concurrence of Growth-promoting and Growth-inhibiting Factors in Extracts of Adult Rat Tissues

IN previous papers[1] from this laboratory it was shown that saline extracts of adult tissues and organs have a marked growth promoting effect on cell colonies *in vitro*. Under given experimental conditions, the growth-promoting activity of certain adult tissue extracts is several times that of embryonic tissue extracts of the same concentration. Although most tissues and organs of the adult organism display the growth-promoting power, the activity of the extracts varies from organ to organ. It is particularly high in heart, brain and smooth muscle, and low in kidney, bone marrow and liver.

Organs of almost all species tested (dog, sheep, cow, rabbit) were found to yield active extracts[2]. Extracts of rat organs, on the other hand, are exceptional in their behaviour with regard to cell-growth activation[3]. Of rat organs and tissues, only brain and embryo tissue displayed marked growth-promoting power; extracts of all other rat organs have either no growth-promoting property or inhibit the growth of cells *in vitro*. The unequal growth-promoting power of extracts of different origin could be accounted for by either of the following assumptions: (1) that the growth-promoting principles are present in amounts varying from organ to organ and species to species; (2) that the difference in activity is due to the simultaneous presence in varying concentration of growth-inhibiting factors, which counteract cell proliferation.

Our experiments have shown that the absence of growth-promoting ability in extracts of most organs of adult rats can be explained in accordance with the second assumption. In the investigations reported below, the procedure previously used[4] by us for the partial purification of active principle from growth-promoting adult tissue extract was used. The experiments were performed with extracts of rat heart muscle, which have either no stimulating action or even inhibit cell growth. Minced heart muscle was extracted with four volumes of normal saline and this extract was precipitated with four volumes of alcohol. The precipitate obtained was then treated in a Soxhlet apparatus with acetone or petroleum-ether. The extracted material after drying was taken up in 'Tyrode'. Solutions thus obtained were added to standardized cultures of chicken fibroblasts in Carrel flasks. The growth of the cell colonies in medium containing this solution as supernatant fluid phase was compared with the growth of controls (sister halves) growing in protective medium composed of plasma diluted with 'Tyrode' 1 : 2 and covered with 'Tyrode' solution. The growth of cultures was recorded according to the method of Ebeling.



EXPERIMENT 11245 A. GROWTH OF CHICKEN FIBROBLASTS (FULL CURVE) IN MEDIUM CONTAINING SOLUTION OF ALCOHOL PRECIPITATE OF RAT HEART EXTRACT, TREATED WITH PETROLEUM-ETHER; AND GROWTH IN PROTECTIVE MEDIUM (BROKEN CURVE).

It could be shown that originally inactive rat tissue extracts are rendered active by the above treatment. Even alcohol precipitates of the extracts had slight growth-promoting activity. Subsequent treatment with petroleum-ether or acetone proved to be decisive. Petroleum-ether and acetone convert material originally inert and only slightly active after alcohol treatment into definitely active preparations.

The curves of the accompanying graph show the growth of a culture stimulated with a petroleum-ether-treated alcohol precipitate of rat heart extract compared with that of a control. These curves illustrate the optimal activation obtained, the average stimulation amounting to 450 per cent.

It may be concluded that the inability of rat tissue extracts to stimulate the growth of cells *in vitro* is due to the fact that in rat tissues (heart muscle) the growth-promoting substance is masked by the predominance of growth-inhibiting factors. The latter are probably of a lipoid nature.

Details of our experiments are being published elsewhere.

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