

möglichen. An ein systemisches Fungizid muß die Forderung gestellt werden, daß es die Wirtspflanze nicht schädigt, auf das Pathogen toxisch wirkt, daß es in der Wirtspflanze transportiert wird und daß außerdem sein innertherapeutischer Effekt nicht ausschließlich in einer Wuchsstoffaktivität gegenüber der Wirtspflanze und damit in einer Erhöhung von deren Eigenresistenz beruht.

Eine systemische Wirkung fungizider Stoffe konnte bisher nur in einigen wenigen Fällen nachgewiesen werden. Für TMTD (Tetramethylthiuramdisulfid)-Präparate lagen nur negative Untersuchungsergebnisse vor¹⁾, die aber ausschließlich bei Versuchen mit landwirtschaftlichen Kulturpflanzen gewonnen waren.

Eigene Freilanduntersuchungen über die Wirksamkeit verschiedener Beizmittel bei Nadelbäumen deuteten auf einen systemischen Effekt der eingesetzten TMTD-Beizpräparate²⁾. Nachfolgende in-vitro-Untersuchungen bestätigten die Annahme: Samen von Nadelbäumen wurden teils nach einer TMTD-Beizung (A), teils ohne vorherige Behandlung (B) auf feuchtem Fließpapier in Petri-Schalen ausgekeimt. Nach Abstreifen der Samenschale, die einzig im Beizprozeß mit dem

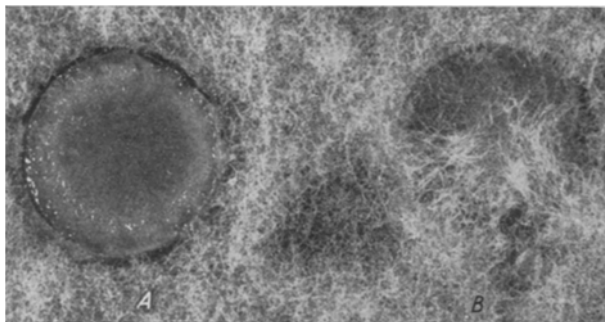


Fig. 1. Preßsaft aus Keimlingen, deren Samen mit TMTD gebeizt (Kreisfläche A) bzw. nicht behandelt waren (Fläche B)

Wirkstoff TMTD in Berührung gekommen war, wurde aus den Keimlingen der beiden Versuchsglieder Preßsaft gewonnen und in markierte Kreisflächen auf Agar-Plattengaukulturen von *Botrytis cinerea* Pers. eingetropfet. Der aus den Keimlingen der Gruppe A gewonnene Preßsaft übte einen deutlich fungiziden Effekt gegenüber *Botrytis* aus, der Keimlingspreßsaft der Gruppe B zeigte eine solche Wirkung nicht (Fig. 1).

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Eingegangen am 11. November 1958

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Ribonucleic Acid Content and Ribonuclease Activity of the Homologous Normal and Carcinomatous Epidermis in the Lizard *Lacerta agilis*

In several tissues a distinct relationship exists between the ribonuclease activity and the ribonucleic acid content. This was demonstrated for the human placenta¹⁾, the hyperplastic bone marrow of the mouse²⁾, various normal organs of the mouse³⁾ and various epitheliomas of the mouse and the rat⁴⁾. Moreover, in some solid tumours and ascites tumours⁴⁾ the carcinomatous epithelium exhibits less ribonuclease activity than the normal epithelium. The growth of the spontaneous mammary carcinoma in the C⁺ mouse and of certain experimental tumours⁵⁾, ⁶⁾ is inhibited by the exogenous ribonuclease. On the normal tissues of the host no effect whatsoever was found.

The activity of the exogenous ribonuclease on the ascites tumour cells *in vivo* and *in vitro*⁷⁾ is in the first phase characterized by a stimulation of the ribonucleic acid synthesis and an increase in the pyrimidine metabolism. Consequently, the endogenous ribonuclease activity might be related to a selective orientation of the metabolism of the ribonucleic acid.

Recently LEDOUX, BRÄNDLI and DE PAEPE⁸⁾ studied the ribonuclease activity and the ribonucleic acid content of the homologous normal and cancerous tissues of the human uterine cervix. These authors found a significant correlation between the ribonuclease activity and the ribonucleic acid

content (per unit of protein) for normal and cancerous tissues. As a rule the tumour cells contain more ribonucleic acid per unit of protein than the normal cells.

In continuation of these investigations we have studied the ribonucleic acid content and the ribonuclease activity of the homologous normal and carcinomatous epidermis in the lizard *Lacerta agilis*. In this lizard we observed a squamous cell carcinoma, in the precarcinomatous phase of which we found a distinct mast cell reaction⁹⁾.

In each lizard fragments of the carcinomatous skin were removed and moreover fragments from normal skin regions. The samples were homogenized in distilled water. Subsequently an aliquot was treated with 0.15 N sulphuric acid for one hour and was used for the determination of the ribonuclease activity. To determine the nucleic acids and the protein content⁸⁾ other samples were used.

As shown in Fig. 1, in which the results obtained with these samples and of the samples taken from normal lizards are summarized, there is a significant correlation between the

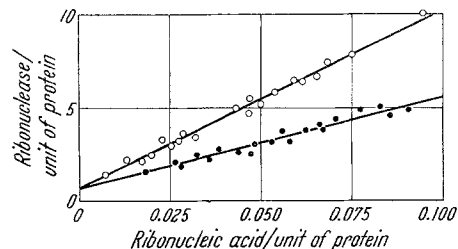


Fig. 1. Relationship between the ribonucleic acid content and the ribonuclease activity of the homologous normal and carcinomatous epidermis in the lizard *Lacerta agilis*. The ribonuclease activity was measured at pH 5.0. Upper curve: normal epidermis. Lower curve: carcinomatous epidermis. White spots: normal tissue. Black spots: carcinomatous tissue

ribonucleic acid content (per unit of protein) and the ribonuclease activity for the normal and the carcinomatous tissues.

As in the cancerous human cervix uteri⁸⁾ the correlation is different in the two cases. For the same ribonucleic acid-protein ratio in both cases, the ribonuclease activity/protein ratio is lower in the neoplastic cells.

In general, the tumour cells contain more ribonucleic acid per unit of protein than the cells of the normal tissues. They show a ribonuclease activity which is reduced to a smaller extent than in the homologous normal control cells. This suggests that the ribonuclease probably plays a certain role in the intracellular metabolism of the ribonucleic acid.

The decrease in ribonuclease activity in the carcinomatous lizard skin probably corresponds to different ribonucleic acid metabolisms in the normal and the tumour cells.

When comparing these results with the results obtained with carcinomatous material of the human uterine cervix⁸⁾, it appears that in the carcinomatous epidermis of *Lacerta* the curve of ribonuclease activity (Fig. 1) is situated on a somewhat higher level and consequently is reduced to a somewhat less small extent than in the cancerous cervix tissue. Since in the normal epidermis of *Lacerta* the curve of ribonuclease activity is situated on a somewhat lower level than in the normal cervix tissue, the difference between the normal curve in this reptilian species is smaller than both curves in the human cervix. As shown in Fig. 1, this difference is significant, however.

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Eingegangen am 10. November 1958

¹⁾ BRODY, S.: Biochim. Biophys. Acta 24, 502 (1957). — ²⁾ BRODY, S., and B. THORELL: Biochim. Biophys. Acta 25, 579 (1957). — ³⁾ LEDOUX, L., A. PILERI, F. VANDERHAEGE and S. BRÄNDLI: Nature [London] 180, 502 (1957). — ⁴⁾ LEDOUX, L., A. PILERI and F. VANDERHAEGE: Arch. int. Physiol. Biochim. 66, 122 (1958); 66, 124 (1958). — ⁵⁾ LEDOUX, L.: Nature [London] 176, 36 (1955). — Brit. J. Cancer (in press). — ⁶⁾ HADJILOV, A. A., and L. ZACHARIEVA: Naturwiss. 44, 45 (1957). — ⁷⁾ LEDOUX, L., and F. VANDERHAEGE: Biochim. Biophys. Acta 24, 340 (1957). — ⁸⁾ LEDOUX, L., S. BRÄNDLI and J. C. DE PAEPE: Nature [London] 181, 913 (1958). — ⁹⁾ STOLK, A.: Thesis, Utrecht 1950. — Proc. Kon. ned. Akad. Wetensch., C 56, 157 (1953). — Nature [London] 182, 1177 (1958). — Proc. Kon. ned. Akad. Wetensch. [London] (in press).