under the conditions mentioned, interferes with the tumor development of *D. melanogaster* (at least in two of the three stocks), showing properties which could, up to a certain extent, be compared with some mammal tumors.

In the present stage of our investigations, it is impossible to give an explanation of the results. The action of the drug could be direct on the tumoral tissue; or the effect could be indirect, through some endocrine gland of the insect or through the modification of a chain of reactions controlled by these hormones; or, last, the action could be through a general toxic effect which influences the neoplasmic growth.

We are now working on experiments designed to answer some of these questions.

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Pteroylglutamic Acid Activity of Aminopterin in *Tetrahymena geleii*[1]

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During the course of some experiments on the interrelationships of steroids with pteroylglutamic acid (PGA) in the ciliated protozoan *Tetrahymena geleii,* an attempt was made to reverse the action of the PGA analog aminopterin (4-amino-PGA). Contrary to what was expected on the basis of observations in other organisms, it was found that aminopterin possesses high PGA activity for *Tetrahymena.*

Since aminopterin replacement of PGA has never, to the authors' knowledge, been previously reported,[2] it was felt that these data are significant, in that they may help to explain the structural conditions in the PGA molecule necessary for PGA action *in vivo.* This is the basis for this preliminary report.

TABLE 1

RESPONSE OF *T. geleii* TO AMINOPTERIN*

Aminopterin added (mg%)	No PGA added	6.0 μg% PGA added
0	.036	.906
0.001	.052	.936
0.01	.780	.960
0.10	.888	.950
1.00	.960	.964
5.00	.886	.980

* Results shown represent optical densities of third serial transplant cultures.

[1] Supported by a grant from the American Cancer Society on recommendation of the NRC Committee on Growth.

[2] G. W. Kidder, of Amherst College, has kindly informed us of similar studies made in his laboratory, the results of which are now in press.

TABLE 2

COMPOSITION OF BASAL MEDIUM*

Solution B (amino acids)	14.0	ml%
Solution C (vitamins)†	6.0	"
Solution D (salts)	2.5	"
Solution E (salts)	0.6	"
Solution F (phosphates)	0.175	"
Solution J (purines and pyrimidines)	5.0	"
Glucose‡	0.5%	
Sodium acetate	0.2%	
Protogen§	2.0	
Tween 80	2.4%	
pH 7.0		

* The compositions of the solutions listed here are identical with those listed by Dewey *et al.* (*1*, 284).
† Solution does not contain PGA.
‡ Autoclaved separately and added aseptically.
§ Units/ml.

Results of a typical experiment are shown in Table 1. To obviate the possibility of PGA contamination of the aminopterin sample, the experiments were repeated with different aminopterin preparations. Results were essentially similar in all cases.

The ciliated protozoan *T. geleii* H was grown in pure culture. The base medium was essentially that of Dewey *et al.* (*1*), modified as indicated in Table 2. The organisms were grown in 50-ml Erlenmeyer flasks containing 5 ml of medium, according to the technique described by Hutner (*2*). All inoculations were made through a dilution flask containing only basal medium. Following inoculation, the flasks were kept at 25° C, and the cultures were harvested at the end of the logarithmic growth phase. Optical density of the harvested cultures was determined by the use of a Klett-Summerson photoelectric colorimeter with a green (#54) filter, following the procedure of Elliott (*3*).

From the data in Table 1, it is apparent that the addition of about 0.1 mg% of aminopterin equals the full effect upon growth of 6.0 μg% of PGA.

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3-(*p*-Chlorophenyl)-1,1-Dimethylurea—A New Herbicide

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In the course of a study dealing with materials having plant-regulating properties, 3-(*p*-chlorophenyl)-1,1-dimethylurea, a new chemical compound, has been synthesized and found to be very effective in killing many plant species. In greenhouse tests described in detail below, it has appeared particularly effective in killing both annual and perennial grasses.

[1] Acknowledgment is made to L. E. Cowart, H. E. Cupery, R. S. Johnson, G. L. McCall, W. C. Miller, B. C. Pratt, N. E. Searle, T. C. Ryker, M. B. Weed, and D. E. Wolf for their assistance in these studies.

TABLE 1

Plant	Spray conc (%)
Tomato	0.05
Johnson grass seedlings	0.5
Established Johnson grass	3.0
Bermuda grass	1.0
Quack grass	1.0
Nut grass	3.0

The initial effect generally is leaftip dieback, beginning on the older leaves. This is followed by progressive chlorosis and retardation of growth, ending in the death of the plant. Preliminary observations in field experiments suggest strongly that 3-(*p*-chlorophenyl)-1,1-dimethylurea acts readily through the root system and is translocated upward to the leaves.

3-(*p*-Chlorophenyl)-1,1-dimethylurea was synthesized by reaction of *p*-chlorophenyl isocyanate with dimethylamine. The product melts at 169.8°–170.4° C. After crystallization from methanol, it is obtained as thin rectangular prisms which melt at 170.5°–171.5° C. It is an essentially neutral, stable substance, insoluble in water, and only slightly or moderately soluble in most organic solvents. Its solubility in acetone is sufficient for greenhouse tests such as those described here.

Preliminary toxicity tests conducted by the Haskell Laboratory of Industrial Toxicology of this company indicate that the LD_{50} of 3-(*p*-chlorophenyl)-1,1-dimethylurea by oral administration to male rats is approximately 3,500 mg/kg of body weight.

Various concentrations of 3-(*p*-chlorophenyl)-1,1-dimethylurea have been sprayed on test plants in the greenhouse, as shown in Table 1.

In these experiments, all plants used for the work were grown in 4-in. clay pots. Tomato plants, grown from seed, and Johnson grass seedlings were sprayed when 6–7 weeks old. Bermuda grass, quack grass, and Johnson grass were established from root stocks. Nut grass was established from tubers. All these established grasses were sprayed approximately 3 months after planting.

In the case of tomato plants, first symptoms appeared 3 days after spraying. The plants were dead in 7–14 days. With Johnson grass seedlings, first reaction was noted in 5 days, and the plants were dead 14–28 days after spraying. In the case of established perennial grasses, the initial response was noted in 7–10 days. Both tops and roots were killed in 2–3 months.

TABLE 2

	Age of plant at time of treatment (days)	Percentage kill at conc of	
		0.1%	0.25%
Meadow fescue	20	0	100
Wheat	12	100	100
Timothy	20	99	100
Sudan grass	20	75	99
Rye grass	29	100	100
Harting grass	29	65	100
Orchard grass	25	100	100
Prairie brome	25	65	100
Meadow foxtail	29	100	100

In another series of greenhouse experiments, a wider range of grass seedlings was sprayed with two concentrations of 3-(*p*-chlorophenyl)-1,1-dimethylurea, as shown in Table 2. The percentage kill at these concentrations is also given.

The seedlings used in this experiment were grown in flats in the greenhouse, and ranged from 2 to 6 in. in height at the time they were sprayed. In the case of most of these seedling grasses, the first symptoms appeared in 2–3 days. The percentage kill shown in Table 2 was reached 2–3 weeks after treatment.

More detailed field investigations are still in progress to determine the effectiveness of 3-(*p*-chlorophenyl)-1,1-dimethylurea against a wide variety of annual and perennial weeds. Tests are also being conducted to determine the persistence of the compound when applied in various types of soils.

Tritium in Radioautography[1]

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One of the advantages of the radioautographic technique to the biologist is its ability to localize a radioactive element or compound to a particular organ, histologic unit, or to a distinct cell group in an organism. Many labeled compounds and elements have been traced to specific zones of concentration in animal and human organs. The ultimate goal of radioautography is to identify the site of emission of the radioactive element or compound in terms of intracellular structure such as nucleus, nucleolus, cytoplasm, or mitochondria. Or, if the concentration were intercellular, the identification of areas of radioactivity as those of collagen, interstitial fluid, reticulum, or similar structures would be of considerable importance. A resolution of a few microns or less would be required for such demonstration.

Most past studies have failed to show such fine delineation. Emulsions of the required resolving power were not available. Recently, however, with the use of nuclear track plates, radioactive lines of 2.5 μ width can be distinguished, and this brings the emulsions to the intracellular level (*1*). The other factor has been the range of the emitted radiation. Even weak β-emitters such as C^{14} and S^{35} have 90- and 100-μ maximum paths, respectively, in the nuclear track emulsions. If all activity were recorded in the autograph it is obvious that the isotope would give too diffuse an image to localize the site of activity in one cell. The disadvantages of a long average path are lessened by a shorter

[1] This work was supported in part by grants-in-aid from the Atomic Energy Commission No. AT(30-1)-910.