# The Incidence of Lung Tumors In Albino Mice Exposed to the Smoke From Cigarettes Low In Nicotine Content

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ABSTRACT

This study is based on 36 experimental and 37 control A/Jax mice. The experimental mice were exposed to the smoke of cigarettes low in nicotine content (0.78 per cent) at the rate of twelve per day for one year. The control mice lived under the same conditions except for the smoke. The results show that the experimental mice generate 24 per cent more tumors than the controls. In a previous study, cigarettes of high nicotine content (2.09 per cent) were used and the preponderance of tumors in this experiment was 31.9 per cent. Assuming that the two kinds of cigarettes used are comparable as to ingredients except for the nicotine content, it appears that tumor production in the lungs of mice varies with the nicotine content of the cigarette.

An earlier publication[1] has demonstrated that both adenomas and carcinomas of the lung can be produced in large number by exposing mice to the smoke of standard brand cigarettes for the duration of 14 months. Since cigarettes contain a number of ingredients which may act singly or in combination as carcinogenic agents on the lung, it is obvious that the most commonly suspected ones should be studied separately and the effects evaluated. These include the nicotine content, the cigarette paper, and the arsenic in cigarettes. A study on the nicotine content in the cigarette has been completed and the results are reported in the present article.

## MATERIALS AND METHODS

The experiment was started with 73 young, sexually mature A/Jax mice. Of these, 36 served as experimental and 37 as control animals. The sexes were divided about equally in both groups. The tobacco of each cigarette used in this experiment contained 0.78 per cent nicotine by weight according to chemical analysis. The animals were first acclimated to their new surroundings; then the experimental group of mice was placed in the smoking chamber and the control mice in the control cage of the automatic smoking machine. This machine, as previously described,[1] smokes twelve cigarettes daily, one per hour. A new colony of mice, however, must be introduced to the smoke on reduced rations, one-third to one-half of a cigarette per hour for the first two days. Then the experimental mice received their full dosage of twelve cigarettes per day, except Sundays, for one year. The control mice had exactly the same environment as the experimental animals except for the smoke. Fresh air circulated through both cages continually. Food in the form of Purina pellets and water were always available. At the end of the experiment, all the animals were killed at the same time and fixed by the perfusion method. Animals becoming ill or dying during the first two months of the experiment were eliminated from the study. Two experimental mice became ill during the sixth month of the experiment. They also were killed and preserved as above. The equation was balanced by killing two

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