Effects of chronic inhalation of cigarette smoke on the frequency of pulmonary tumors in mice

by

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This report deals with results obtained by the authors during the last 10 years in chronic inhalation experiments with cigarette smoke carried out on CF_1 and on Snell's mice, using two different model systems.

1. Chronic exposure of groups of CF_1 mice to continuous aged whole cigarette smoke in a smoke filled chamber.

2. Chronic exposure of individual Snell's mice in containers to puffs of fresh whole cigarette smoke or its gas phase, alternating with fresh air, imitating as closely as possible the human habit of cigarette smoking.

Chronic exposure of CF_1 mice to aged whole cigarette smoke did not show a statistically significant increase of pulmonary tumors, when compared with controls, in mice at 19-20 months of age. However, a somewhat earlier appearance of pulmonary tumors was noted in the experimental groups.

Chronic exposure of male and female Snell's mice to puffs of fresh whole cigarette smoke or to the gas phase resulted in a significant increase in frequency of mice with pulmonary tumors, especially of adenocarcinomas, when compared with controls, whereby the effect was more pronounced after exposure to the gas phase than after exposure to whole smoke. Comparison of frequencies between males and females revealed a greater increase of adenocarcinomas in males than in females, while females showed a greater increase of adenomas than the males, after inhalation of cigarette smoke. While the data suggest that pulmonary carcinogenesis in Snell's mice is enhanced after inhalation of whole fresh cigarette smoke or its gas phase, the differences in frequency between tumors in males and females support the concept that hormonal factors are also involved.

In CF_1 mice, pulmonary tumors were observed at ages less than 12 months, while in Snell's mice, pulmonary tumors were observed in controls only after 18 months of age, and in exposed mice after 15 months of age. Histologically the pulmonary tumors were adenomas, and adenocarcinomas. No case of bronchogenic epidermoid lung cancer was found either in CF_1 or Snell's controls, or in CF_1 or Snell's mice exposed to chronic inhalation of cigarette smoke.

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