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CHANGES IN BRONCHIAL EPITHELIUM IN RELATION TO CIGARETTE SMOKING, 1955-1960 VS. 1970-1977

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ostract To test the hypothesis that the reduction in r and nicotine content of cigarette smoke that began the 1950's should be reflected by the histologic anges in the bronchial epithelium of cigarette okers, 20,424 sections taken at autopsy from the onchial tubes of 445 men (non-lung-cancer deaths) re examined microscopically in random order. ere were 211 men who died in 1955-1960, of whom 4 smoked regularly, and 234 men who died in 1970-77, of whom 181 were regular smokers. Changes died included basal-cell hyperplasia, loss of cilia d occurrence of cells with atypical nuclei. In both periods studied these histologic changes occurred far less frequently in nonsmokers than in cigarette smokers and increased in frequency with amount of smoking, adjusted for age. Sections with advanced histologic changes in those dying in 1955-1960 occurred in 0 per cent of nonsmokers, in 2.6 per cent of those smoking one to 19 cigarettes a day, in 13.2 per cent of those smoking 20 to 39 and in 22.5 per cent of those smoking 40+ cigarettes a day. In those who died in 1970-1977 the percentages were 0, 0.1, 0.8, and 2.2, respectively. (N Engl J Med 300:381-386, 1979)

N a set of studies published some years ago,[1-3] we found that several types of histologic changes in onchial epithelium occurred far more frequently in arette smokers than in nonsmokers, increased with ount of cigarette smoking and, among cigarette okers, increased with advancing age. The same anges were found less frequently in former than in ntinuing cigarette smokers. The changes studied inded basal-cell hyperplasia, loss of cilia in some as and occurrence of cells with atypical nuclei. These histologic findings paralleled epidemiologic dings that rates of death from lung cancer are many es higher among cigarette smokers than among nsmokers, increase with amount of cigarette smok- and, among persons with the same smoking tories, increase with advancing age.[4-7] Among mer cigarette smokers, the rates decline with the gth of time since giving up the habit.[8,9]

In a later study, we had beagle dogs inhale the oke from filter-tip cigarettes and from cigarettes of e same brand but without the filter.[3] The filter moved about half of the total tar and somewhat less an half of the nicotine contained in the smoke. wer pulmonary neoplasms were found in dogs that oked filter-tip cigarettes than in those that smoked n-filter-tip cigarettes. Invasive pulmonary tumors re found only in non-filter cigarette smokers. Two of these were early squamous-cell bronchial carcinomas, the others being invasive bronchioloalveolar tumors.

In a retrospective epidemiologic study, it was found that lung cancer occurred less frequently in men who smoked filter-tip cigarettes than in those who smoked non-filter cigarettes.[9] In a prospective epidemiologic study, three groups of cigarette smokers were matched on the basis of age, current number of cigarettes smoked per day, age at which they began smoking, race, education, residence (urban vs. rural), occupational exposure or non-exposure to dust, fumes and chemicals, and past history of heart disease and lung cancer.[10] The three groups were as follows: (A), men who smoked high tar/nicotine cigarettes; (B), men who smoked medium tar/nicotine cigarettes; and (C), men who smoked relatively low tar/nicotine cigarettes. In subsequent years, death rates from lung cancer were highest in Group A and lowest in Group C.

Since 1954, when effective filters were first introduced, there has been a large and continuing drop in the tar and nicotine content of the mainstream smoke of cigarettes consumed in the United States.[11] Even non-filter cigarettes deliver considerably less tar and nicotine than those sold in previous years — this reduction being achieved by selection of tobacco, the use of homogenized tobacco and various other means. Indeed, the highest tar/nicotine brands on the market today deliver less tar than the lowest tar brand of American cigarettes on the market before 1954. Thus, everyone who has been a habitual cigarette smoker for 25 years or longer must be smoking cigarettes with

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