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Ninety-Day Inhalation Study in Rats, Comparing Smoke from Cigarettes That Heat Tobacco with Those That Burn Tobacco[1]

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Ninety-Day Inhalation Study in Rats, Comparing Smoke from Cigarettes That Heat Tobacco with Those That Burn Tobacco. COGGINS, C. R. E., AYRES, P. H., MOSBERG, A. T., SAGARTZ, J. W., BURGER, G. T., AND HAYES, A. W. (1989). *Fundam. Appl. Toxicol.* 13, 460–483. Eight groups of 30 male and 30 female rats were exposed 1 hr per day, 5 days per week for 13 weeks, to smoke from reference (tobacco burned) or test (tobacco only heated) cigarettes, at nicotine concentrations of 5, 15, or 30 μg/liter of air. Similar smoke concentrations of wet total particulate matter and carbon monoxide were produced in each of the test/reference comparisons. There was a pronounced depression of minute ventilation of animals in the reference groups, but not in the test animals. Blood carboxyhemoglobin concentrations were similar in animals exposed to smoke from test and reference cigarettes. Plasma concentrations of nicotine and cotinine in the test groups were higher than in the reference groups. There were no differences between the smoke-exposed groups in terms of body weight or feed consumption. At necropsy, an increase in heart weight was noted in both high exposure groups. There were notable differences in histopathology, with fewer and less-pronounced changes in the test groups than in the reference groups. Many of the histopathological responses induced in the reference groups were absent in the test groups. Overall, the study demonstrated a substantial reduction in the biological activity of smoke from the test cigarette when compared with the reference. © 1989 Society of Toxicology.

A novel concept in cigarette design is the introduction of technology which allows tobacco to be heated rather than burned (RJRT, 1988). Since the tobacco does not burn, many of the compounds produced by burning tobacco are eliminated or greatly reduced.

The objective of the study described here was to compare in the rat the biological changes observed after repeated nose-only exposure to smoke from the test cigarette, with those changes observed in animals exposed to smoke from a cigarette which burned tobacco (the reference cigarette), at comparable concentrations of nicotine in the smoke presented to the animals. Many of the inhalation studies performed with cigarette smoke in the past have based exposures on the amounts of wet total particulate matter (WTPM) presented to the animals. Since the WTPM yielded by the test cigarette is chemically very different from that yielded by the reference cigarette (RJRT, 1988), it was decided to make the comparison using nicotine, one component of the smoke that is comparable for cigarettes which burn or only heat tobacco.

The experimental design was similar to that used in other inhalation studies of ciga-

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