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Russian rabbits with the smoking habit look forward to their cigarettes and get restless without them.

TOBACCO RESEARCH

Animals Smoke—and Die

Experimental animals learn to smoke for cancer research and enjoy it, but often die before cancers develop

by Faye Marley

Men have been trying for years to teach animals to smoke—for science.

Most beasts won't, and those that do often die before the experiments—aimed at detection of cancerous and precancerous tissue changes—have gone far enough to be conclusive.

Animals used have included rabbits, dogs, hamsters, guinea pigs, monkeys, sheep, apes, mice and rats. None like to smoke at first but many soon get the habit that kills them. Now a Russian scientist reports animals that have smoked almost but not quite long enough to get lung cancer.

Prof. Georgy Georgadze, head of the experimental Cancer Laboratory at the Oncological Institute of the Georgian Ministry of Health, U.S.S.R., started his work with rabbits, but is switching to rhesus monkeys; his rabbits died too soon—of lung diseases, but not the cancer he was after. That takes more time.

Dr. Georgadze reports three stages of apparently precancerous tumor in his smoking rabbits.

(1) A stage in which the tissue retains its normal structure but the number of cells, fibers and other structural elements increases.

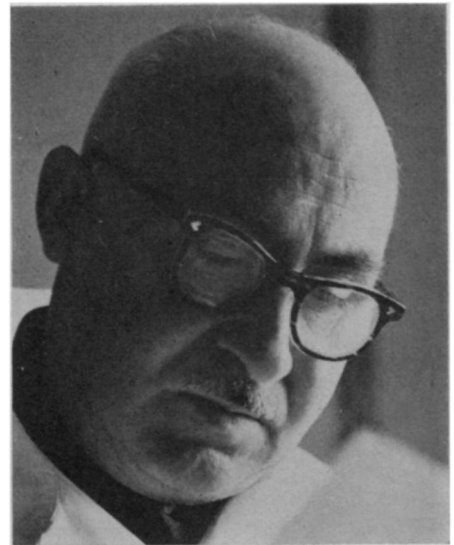
(2) A stage in which the tissues grow intensely but still retain their main structural features.

(3) A relatively benign tumor stage in which the multiplying cells look less like the initial tissue, but the modified tissue does not yet show runaway growth, or invasion and destruction of healthy tissue.

The finale of this process should be the formation of a malignant tumor, but Dr. Georgadze's rabbits perished by the end of the fourth year of the experiments, before they had reached that point.

"We believe their deaths were caused by considerable changes in their respiratory tracts," Dr. Georgadze says. "These changes were always accompanied by developing chronic interstitial pneumonia and emphysema."

The Georgian scientist's new series of experiments is with rhesus monkeys



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Research Professor Georgy Georgadze.

that live up to 15 years. With the monkeys he expects to observe all four stages in transformation of normal into malignant tissue. He cautiously admits, however, that only the experiments will show what he will find.

Dr. Hans L. Falk of the National Cancer Institute, Bethesda, Md., predicts trouble for Dr. Georgadze.

It may be possible that the monkeys in Georgia may be cleared of their parasites and common tuberculosis suf-

ficiently to make the experiments a success, he says, but at present, most monkeys have to be treated for TB, and the drug—isoniazid—itself gives them lesions that look like lung tumors, and can confuse cancer research.

Animals have been forced to smoke for science—against their better judgment—for years, but haven't yet shown cancer.

When the landmark Smoking and Health Report to the Public Health Service Surgeon General was delivered in 1964, it included a report of one experiment in which animal lung tumors had possibly been formed by smoke. That was the work of Dr. E. E. Rockey and his co-workers at the New York Medical College.

Dr. Rockey inserted cigarettes in the wind pipes of dogs after cutting a hole (tracheotomy). In this way the smoke went directly to the lungs, bypassing the nasal passages, which trap smoke with their fine hairs.

More than 10 years ago in England, Dr. P. R. Peacock reported smoking hens. At that time, apparently, only hens—and people—could be induced to smoke. The hens, he said, took the cigarette in their beaks, and seemed to enjoy the experience. But he was not able to produce cancer in the lungs or trachea.

Dr. Oscar Auerbach of the Veterans Administration Hospital, East Orange, N.J., has now started an expansive program with dogs in which he hopes chronic smoking such as occurs in humans can go on long enough to infiltrate the lungs and show cancer. He believes that the Georgian researcher is up against many problems. Dr. Auerbach has already experimented with dogs smoking through an opening in the throat.

"Several researchers have reported producing lung tumors in smoking animals," he says, "but other scientists have questioned their proofs."

In 1966, Dr. Auerbach reported his experiment with beagle dogs that got emphysema—but not cancer—from smoking 12 cigarettes a day for about a year. Like Dr. Georgadze's rabbits, the dogs died after a time. The five that lived longest had multiple white patches on the surface of their lungs with dilation of air spaces characteristic of emphysema.

Very few animals like cigarette smoke when they are first put into smoking chambers. Mice at the Roswell Park Memorial Institute, Buffalo, N.Y., turned their heads away and held their breath when they were forced to smoke. They were allowed a respite in which fresh air was given in between the smoke doses.

Dr. Georgadze said at first his rab-



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Masked monkey puffs for research aimed at effects of tobacco on lungs.

bits did not like to smoke. It was no easy matter to fit the mask on the animals' noses, but when they got used to the apparatus and the inhalation they became restless if their smoke was delayed.

Dr. Auerbach's beagles wagged their tails and jumped eagerly into their smoking box after they once learned to smoke. It becomes a habit with animals as well as humans, apparently, but does neither any good.