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Anderson Nettleship (b. 1910) and Paul S. Henshaw (b. 1902), assisted by Henry L. Meyer, in 1943, issued from the National Cancer Institute a report on the carcinogenic activity of urethan (ethyl carbamate) in mice (Induction of Pulmonary Tumors in Mice With Ethyl Carbamate (Urethane). J. Natl. Cancer Inst., 4: 309–319, 1943). This finding was unanticipated in the original experiment; it emerged as an accidental discovery based upon alert observation. Multiple, pulmonary tumors were detected in 26 of 29 mice anesthetized through intraperitoneal injections of urethan, preliminary to skin exposures to X-irradiation. Strain C3H mice used in these experiments have a low incidence of spontaneous lung tumors. The possibilities of carcinogenesis by direct radiation or through scattered radiation were subsequently eliminated. Direct tests defined urethan as the carcinogenic factor.

The biochemical and physiologic action of urethan carcinogenesis has not been elucidated. Experimentation with analogs has not revealed chemical intermediates that exceed the carcinogenic capacities of urethan itself. It remains the only anesthetic agent known to possess carcinogenic activity. For several years urethan was used as a chemotherapeutic agent in leukemia and multiple myeloma, but there are no reports of carcinogenic hazards to man.

A photograph of Nettleship, taken at the time of the urethan report, appears at left. The portrait of Henshaw (right) was reproduced from a Fabian Bachrach original.

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