

tumors in mice painted with 1.2.5.6-dibenzanthracene plus theelin, by Perry and Ginzton, furnishes an additional suggestion concerning a possible relationship between the action of female sex hormone and hyperplastic and neoplastic processes of the bladder mucosa. Lacassagne also reported the appearance of verrucous hyperplasias at the apex of the bladder of mice treated with estrone.

Recent investigations have shown also that tumors of the kidney and renal pelvis can be produced experimentally by the introduction of the chemical agents above mentioned into this organ. The deposition of pellets of tar and concrete into the renal pelvis of guinea pigs and rabbits (Latteri) was followed by the development of papillomatous vegetations, leukoplakia and adenocarcinoma of this organ. When pellets of cholesterol containing 1.2.5.6-dibenzanthracene were placed into the kidneys of mice, renal carcinomas of the epidermoid type developed in 12 animals (Ilfeld). These neoplasms seemed to originate from the renal pelvis and had an incubation period of nine months. Fourteen additional mice treated identically showed only inflammatory lesions. The animals which had received the largest doses of dibenzanthracene developed the earliest tumors.

V. CAUSATIVE MECHANISM

The carcinogenic aromatic amines mentioned may enter the organism through three systems: the respiratory, the alimentary and the cutaneous. The majority of investigators agree that the main entrance is through the lung, because of the inhalation of these substances in the form of fumes or dust (Rehn, 1906; Oppenheimer, 1920; Nassauer, and others). The gastrointestinal tract usually is discounted as a place of resorption of major significance on account of the general precautionary measures taken by the workers in chemical factories, such as washing the hands before handling food (Leuenberger), and because of the low solubility of these compounds in water, which impairs their resorption through the intestinal mucosa. Gehrmann has pointed out justly that whenever such precautions are not taken, owing to ignorance or negligence, gastrointestinal resorption may add to the amount of these substances entering the body through the lungs and skin. A part of inhaled dust, moreover, is swallowed and thus enters the gastrointestinal tract. It seems also to be doubtful, whether the low solubility of the aromatic amines in water acts as a preventive to resorption in the intestine, as fatty substances are usually present in sufficient amounts to serve as solvents and thereby facilitate penetration into and through the mucosa. It can be shown easily that acute as well as chronic poisoning of animals can be obtained readily with oral feeding of the aromatic amines. The absence of these compounds from the feces excreted is additional proof of their effective resorption.

As all aromatic amines are soluble in lipoids they penetrate the skin rapidly, a fact which is demonstrated satisfactorily by the numerous cases of acute