Abstracts

Reports of Research


The ultraviolet absorption spectrum is of considerable value in the determination of the structure of aromatic hydrocarbons, including the carcinogens. The literature on this subject is reviewed, with 263 references, and 8 tables provide separate bibliographies of articles giving absorption spectrum data on each of 370 hydrocarbons.

—M. H. P.


After a review of existing knowledge of the metabolism of benzpyrene, methods are described for the separation, purification, identification, and estimation of 4 different products of the metabolic conversion. These products are designated by the symbols X1, X2, F1, and F2, and some of their properties are described.—Authors' summary.


The metabolic conversion of 3,4-benzpyrene in mice passes through a number of stages, symbolized by X1, X2, F1, and F2 according to the following sequence:

(1)  X1  →  (2)  →  (3)  →  (2')  →  (3')

Benzpyrene  →  X1  →  F1  →  F2  →  X2  →  F3

The various metabolites are characterized by their fluorescence and absorption spectra and by their chemical chromatographic properties, which suggest their chemical constitutions.

The derivatives

X1 = 8(OR), 9(OH), 8,9-dihydro-3,4-benzpyrene
X2 = 8(OR), 9(OH), 8,9-dihydro-3,4-benzpyrene
F1 = 8(OR), 3,4-benzpyrene

have not been described previously, whereas F2 is the known end product of the metabolism, 8-hydroxy-3,4-benzpyrene. After an intravenous inoculation of a finely dispersed colloid, the metabolism of 3,4-benzpyrene follows the sequence above in an approximately quantitative manner. The nature of the radicals R1 and R2 is not yet established, but they are derived from the structure of the cells with which the parent hydrocarbon and X1 come into contact. The steps (1) and (2') occur in vivo only, whereas (2) can be reproduced in vitro by a mild chemical reaction at room temperature, and (3) and (3') by stronger agents at elevated temperature.—Authors' summary.


Three groups of approximately 50 Swiss mice each were painted on the back with solutions of 1.0% methylcholanthrene 3, 6, and 9 times a week, while 2 other groups were used as unpainted controls and controls painted with pure benzene. Such tremendous amounts of methylcholanthrene produced malignant tumors a little more rapidly than smaller doses. As systemic effects of exposure to the methylcholanthrene the mice showed increased incidences of (a) inflammation in the liver, kidney, and lungs; (b) hyperplasia of the bone marrow, spleen, and lymph nodes with extramedullary myelopoesis, lymphopoiesis and erythropoiesis; and (c) leukemia. It is not known whether these changes were brought about directly by the methylcholanthrene and its detoxification products, or indirectly through lowered resistance of the host to bacterial or viral agents. These results do not conclusively support either the theory that chemical carcinogens act directly by stimulating uncontrolled cell proliferation; or by a toxic action from which some surviving cells escape by adopting abnormal growth characteristics.

Some thyroid glands had atypical acini and some parathyroids were hypertrophic and hyperplastic. These experiments do not support the idea that such changes are primarily caused by the methylcholanthrene.—Authors' summary.


Calcium determinations were carried out on juices from 14 patients with gastric tumors (10 carcinomas and 4 lymphosarcomas) and from 24 control patients. Differences in calcium could be explained on the basis of the higher acidity in the juices from control stomachs. Potassium determinations were carried out on the juices of 9 patients with gastric tumors (7 carcinomas, 2 lymphoblastomas) and of 11 control patients; no significant differences in the amounts secreted were observed. The secretion of both calcium and potassium was increased, compared with controls, in the juices of 5 patients with

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achlorhydria induced by the x-ray treatment of duodenal ulcer.

The calcium and potassium concentration of gastric juice from cancerous stomachs is not characteristic. These negative findings are in contrast to significant differences observed between nonneoplastic and neoplastic gastric (and colon) mucosa, which will be described subsequently.—Author's summary.


A new steroid, androstane-3α,11-diol-17-one, as well as several previously reported steroids, was isolated from the urine of 3 women with adrenal cortical tumors and from the urine of 4 patients with bilateral cortical hyperplasia.—H. J. C.


A new steroid, pregnanediol-3α,17-one-20, m. 219-219.5° C, considered to be a product either of an abnormal activity of the adrenal gland or of an abnormal metabolism of steroids of adrenal origin, has been isolated from the urine of a woman with adrenal hyperplasia, a woman with an adrenal tumor, a cryptorchid male, and a eu-nuchial male injected with testosterone. This compound has not been found in the urine of normal individuals or of pregnant women.—H. J. C.


Betel chewing by the natives of New Guinea, New Britain, New Ireland, and the adjacent smaller islands does not appear to elicit cancer of the mouth.—Author's summary.


Paraffin pellets containing 1 mgm. of methylcholanthrene, when introduced into the abdominal cavity of young adult male C57 mice, produced ascites in 50 days and sarcomas in all mice surviving for 90 days. The ascitic fluid, even when obtained before the development of sarcomas, produced ascites and malignant tumors when injected intra-abdominally into another series of mice of the same strain. The ascitic fluid obtained from this second series, when injected intra-abdominally into a third series of mice, again resulted in ascites and sarcomas. These tumors were transplantable by subcutaneous inoculation. Whatever the active agent may have been, it was destroyed by ether and by exposure to 90° C.—Author's summary.


Myelokentric and lymphokentric acids, present in the urine of patients with leukemia, occur as the prosthetic groups of water-soluble conjugates. These conjugates, when administered separately to guinea pigs, produced myeloid and lymphoid lesions, respectively, and a mixture of them both produced lesions of the "Hodgkin's type."—H. J. C.


The results were negative in numerous attempts to transfer human leukemias by injecting suspensions of leukemic cells derived from the blood, spleen, and lymph nodes of patients with chronic and acute myeloid and lymphatic leukemias into the subcutaneous tissues of other patients suffering from incurable diseases (cancer, heart disease) with a life prospect of less than 2 years. Results were negative also in attempts, made with whole blood, to cross-transmit chronic myeloid leukemia to patients with chronic lymphatic leukemia, and vice versa. The results are consistent with previous negative findings on the transmissibility of human leukemia, but the author suggests that more suitable recipients or a different technique might yield positive results.—J. G. K.


Continuous cultures of normal (rat) and tumor (human, rabbit, and rat) [carcinoma and sarcoma] cells maintained in roller tubes as pure strains tolerate very high concentrations of penicillin sodium (Merck) for long periods of time. The results indicate that it is possible to cultivate almost indefinitely strains of cells in plasma culture media whose supernatant fluid contains penicillin sodium in concentrations of 5,000 Oxford units per cc. Such successful cultivation apparently depends upon the character of the immediate cultural environment as well as the inherent tolerance of the cell strain. No conclusive evidence of an increased tumor cell susceptibility to purified penicillin when compared to normal cells is justified from the results obtained on continuous cultures and on primary explants of tumors produced by inoculating continuous cultures of tumor cells into animals. The toxicity of crude penicillin filtrate is much greater than that of the therapeutic penicillin sodium and is perhaps due in large part to the toxicity of the mold medium from which the filtrate is made.—Authors' summary. (J. G. K.)


By adapting a method that detects inhibitors of tumor growth it is possible to demonstrate that the action of inhibitors upon sarcoma 180 in mice can be effectively neutralized by both structurally related and unrelated substances. Neutralization by approximately equal amounts of inhibitor and antagonist was observed in the inositol—p-aminobenzoic acid, inositol—pyridoxine, and d-desthiobiotin—d-biotin experiments. Thiamin, niacinamide, α- and m-aminobenzoic acid, and leucopetin were slightly
active, if at all, in counteracting the inhibition caused by
inositol. Interference could be detected when larger doses
of some of these substances were given. While both d-
desthiobiotin and an avidin concentrate were effective
inhibitors of tumor growth, neutralization occurred when
these two materials were tested for antagonism. Impurities
in the avidin concentrate may be responsible for this
interference.—Authors' abstract.

Histologic Changes in the Central Vegetative
Centers of the Hypothalamus in Carcinoma as an
Indication of Vegetative Functional Disturbances.
Morgan, L. O. [Univ. of Cincinnati Coll. of Med., Cincinnati,

A histologic study was made of 5 nuclei of the hypo-
thalamus in 19 patients with carcinoma of various organs.
Extensive chromatolysis and cell destruction indicate
that all these cell groups are involved in carcinoma. The
pattern of these cell changes shows a wide range of
variation. A congenital overdevelopment of some of the
nuclei was indicated. The cell destruction that occurs
in carcinoma makes it impossible to evaluate this factor
properly. The 5 nuclei studied are regarded as constituting
a central mechanism for the control and integration of
vegetative functions. This control is mediated largely
through the autonomic and endocrine systems and in-
fuences most if not all metabolic functions. The cell
changes in the hypothalamus suggest a widespread but
variable instability or irregularity of vegetative functions
in the patient with carcinoma. This is in keeping with
the finding of numerous investigators who have made
functional studies in experimental animals or in cancer
patients.—Author's abstract.

Melanoma and Rhabdomyoma in Two Pine
Malignant melanomas occurring in a male and female
pine snake are reported. The primary tumor in the female
snake arose at the margin of one of the large pigmented
areas of the skin of the tail. Metastatic tumors were
found in the liver and the celomic cavity. In the male
snake 2 large melanomas occurred on the upper lip, and
another tumor, a typical rhabdomyoma, sprang from the
hard palate. These tumors appear to be the third or
fourth instances on record of malignant neoplasms in
snakes.—Author's abstract.

This review, with 354 references, discusses the evolution,
structure, and action of genes, the characters controlled
by genes (including cancer), the chemical nature of
chromosomes and genes, spontaneous and induced gene
mutation, and viruses and plasmagenes. Five pages are
devoted to the relationship between genes and cancer.—
M. H. P.

Clinical and Pathological Reports

Clinical investigations are sometimes included under Reports of Research

HEREDITY

Tumors in One of Homologous Twins. Hodgkin's
Disease with Primary Skeletal Manifestations.

This is a report of Hodgkin's disease in one of homolo-
gous twins, who died at 5 years of age. The surviving
twin was apparently normal 41/2 years after the onset of
symptoms in the deceased twin.—E. H. Q.

RADIATION

Skin and Lip Cancer. Slorobin, H. [Vet. Admin.,

Fractionated roentgen ray treatment, usually completed
in less than 3 weeks, was successful in 225 skin carcinomas
except for 3 recurrences, 2 irradiation ulcers, and 2 lesions
that required supplementary surgery. Of the 3 recurrences,
2 were presumably controlled by subsequent surgery, and
1 patient died of extensive squamous carcinoma of the
neck. Treatment was successful in all carcinomas about
the eye and ear. In a series of 81 patients with carcinoma of
the lip similarly treated, none showed local recurrence
2 years later, 3 developed cervical metastases, and 2 de-
veloped irradiation ulcers, which healed promptly. Of 6
patients with carcinoma of the lip treated surgically, none
had local recurrences; 1 had extensive recurrent cervical
metastases after neck dissection.—M. E. H.

The Response to Preoperative Irradiation as a
Clue to the Management of Breast Cancer. Levi,
L. M. [Los Angeles Co. Hosp., Los Angeles, Calif.] Am. J.
One hundred and thirty-one patients with breast car-
cinoma were treated with x-ray irradiation. Fifty-three
showed conspicuous regression in the size of the mass,
and of these, 29 were then subjected to radical mastectomy
with a survival rate of 45%. In the remainder of the
group in which the tumor regressed following x-ray but
surgery was not employed, the survival rate was 56%.
No consistent correlation was found between the histo-
logic appearance and the response of the tumor to radia-
tion. The results indicate that in highly radiosensitive
breast tumors, irradiation alone delays metastasis, while
subsequent surgery is prone to disseminate the disease:
the average time after treatment to the appearance of
metastasis was 16.22 and 10.77 months, respectively.—
W. A. B.

NERVOUS SYSTEM

Description of a case.—E. L. K.
Cancer Research

Reports of Research


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