Abstracts

Reports of Experimental Research

Carcinogenic Compounds


Data from other workers indicate that (a) sarcoma can be induced in a small proportion of rats injected with hard alone, and (b) mice on the other hand are susceptible, and (c) heated domestic fats (when fed to rats) can induce stomach tumors.

Cottonseed oil heated to 350° C. for 1 hour was injected (0.5 cc.) subcutaneously into 12 mice; 6 survived more than 414 days when sarcoma appeared in one animal and in another on the 538th day. No tumors were found in 3 survivors living more than 414 days after the injection in 12 mice of oil heated for 12 hours at 110° C. Controls, 10 mice living more than 414 days after injection of unheated oil, were also negative.

Spectroscopic examination of the heated oils gave no indication of the presence of carcinogenic hydrocarbons. The long latent period in these tests suggests that either (a) absorption of the active factor is very slow or (b) that it is present in very low concentration.—I. H.


After subcutaneous injection into rats, 3,4-benzpyrene is in part excreted as a fluorescent derivative, BPX, in bile, feces, and urine. Purification by extraction, alumina adsorption, and vacuum sublimation gave a crystalline product. Solubility in alkalies suggests a hydroxy derivative, but melting point, fluorescence spectra, and alkali solubility differences, morphological and optical examination of the crystals, and seeded recrystallization (hot wire stage), indicate that BPX is not identical with 6-hydroxy-3,4-benzpyrene or with 4,6-dihydroxy-3,4-benzpyrene. X-ray crystallographic examination and density measurements suggest that the BPX molecule has the dimensions required for a monohydroxybenzpyrene and exclude a dihydroxybenzpyrene.—I. H.


Five carcinogenic hydrocarbons, (1) 3,4-benzpyrene, (2) 3,4-benzanthracene, (3) 1,2,6-dibenzanthracene, (4) chlortetracycline, (5) methylcholanthrene, and six noncarcinogenic hydrocarbons, (6) anthracene, (7) phenanthrene, (8) pyrene, (9) 9,10-dimethyl-1,2-benzanthracene, (10) 9,10-dimethyl-1,2-benzanthracene, and (11) fluoranthene, were injected separately into fowls (about 2.0 mgm. of colloid solution, intravenously). Bile from these fowls obtained via cholecystostomy fistulae was extracted with ether and examined by fluorescence spectroscopy for hydrocarbons after alumina adsorption purification. The NaOH washings of the ether extracts were examined for derivatives of the hydrocarbons.

Of the eleven hydrocarbons only (2) could be detected in the bile, but the limits of sensitivity of the technic in general have not yet been satisfactorily determined.

Examination of the NaOH washings for hydrocarbon derivatives indicated that (2), (BPX, see preceding abstract), (8), and (9) gave rise to products showing banded fluorescence spectra; (3), (4), (5), (6), (10), and (11) gave products with general fluorescence; and (1) and (7) gave nonfluorescent products.—I. H.


Twelve sarcomas were induced in 37 mice at the site of subcutaneous injection of the nonsaponifiable lipid fraction extracted from pooled noncancerous livers of persons who died with cancer. The induction time was 182 days and the percentage yield was 32.4.

An extract similarly prepared from the livers of noncancer-bearing persons had less carcinogenic activity, having an induction time of 12 months and a percentage yield of 14.3 (5 sarcomas in 35 mice). Neither of these extracts induced tumors in rats.

A benzene extract of liver from a person who died with cancer, and various fractions of such an extract failed to induce tumors at the site of injection.

Extracts of cancer tissues also did not induce tumors.

A theory for the chemical causation of cancer is outlined, and its possible relationship to the theory of chronic irritation is pointed out.—Author's abstract.


Methylcholanthrene was used to produce malignant tumors in the cottontail rabbit, a new host for this type of work. The carcinogenic agent was injected into each of 11 cottontails at 4 sites, 2 subcutaneous and 2 intramuscular, in amounts of 250 mgm. in 1 ml. of tricaprylin.

Microfilm copies of such papers here abstracted as are available Library at 25p for each complete article, not exceeding 25 pages in such manner as found most convenient. Prepayment is not requested. Remittance may be made with subsequent 10 pages or fraction thereof. Additional 10 for each additional 10 pages or fraction thereof.

Address—Medsclomfilm Service, Army Medical Library, Washington, D. C.
These animals were permitted to survive without operative interference for the duration of their natural lives. Five died before the 175th day from intercurrent infection or injury; at the time of death no histological evidence of neoplasia was found. These animals were permitted to survive without operation or injury; at the time of death no histological evidence of neoplasia was found. The remaining 6 died between the 176th and the 295th day after injection. Of this group, 2 had carcinomas, and 5 had soft-tissue sarcomas with metastases to a regional lymph node in 2 and in a single animal to the lungs, liver, and kidneys in addition. Attempts to transmit the methylcholanthrene-induced tumors by serial passage in cottontail rabbits was unsuccessful. No evidence was encountered to suggest that a virus was playing any role in the reactions observed—Authors' abstract.

**WASLEY, W. L., and RUSCH, H. P. [Univ. of Wisconsin, Madison, Wis.] INHIBITION OF THE AUTOXIDATION OF ALDEHYDES BY CARCINOGENIC CHEMICALS AND RELATED COMPOUNDS. Cancer Research, 2:422-424. 1942.**

The autoxidation of benzaldehyde and of heptaldehyde in the presence of anthracene, 3,4-benzpyrene, 1,2,5,6-dibenzanthracene, 20-methylcholanthrene, phenanthrene, dimethylnitrosourea, and hydroquinone in concentrations of M/1,000 to M/10,000 was studied in an ordinary Warburg manometric apparatus at 24°C. All these compounds except phenanthrene noticeably inhibited the autoxidation of the aldehydes. Evidence from absorption spectra indicated that the inhibition of the autoxidation of benzaldehyde by 3,4-benzpyrene involves the induced oxidation of the latter to one or more quinones.—Authors' abstract.


Certain sulfhydryl and cysteine derivatives of 1,2-benzanthracene, 10-methyl-1,2-benzanthracene and 2,4-benzpyrene (J. Am. Chem. Soc., 62:2674. 1940) have been found not to exhibit any carcinogenic activity. It is concluded that these sulfur-substituted derivatives cannot function as intermediates in the process of hydrocarbon carcinogenesis but that these or isomeric substances may possibly afford one route for the metabolic detoxification of the hydrocarbons. The observations on the thiocyanation of carcinogenic hydrocarbons support the view that the initiation of carcinogenesis by a hydrocarbon is associated with a substitution into either a meso position or an alkyl group located at such a position and involves interaction with a cell constituent containing a disulfide group. The opening of a disulfide linkage of a protein might occur by the utilization of either an active nuclear hydrogen atom or the hydrogen of a meso methyl or methylene group.—H. J. C.

**Biochemistry and Nutrition**


The transaminase activity of livers from rats fed a brown rice diet, with and without butter yellow, was determined at various intervals up to 200 days. The changes in these livers were followed by histological examination. With continued butter yellow feeding it was observed that the transaminase activity fell to one-third the initial value in the resulting tumor tissue. There was a high correlation between the transaminase activity and the days of butter yellow feeding. Dilution experiments resulted in curves which showed progressively decreasing values for transaminase activity. The dilution curves for the butter yellow tumor tissue were practically identical with those previously reported for transplanted mouse tumors. Livers from rats fed 15% yeast in addition to the rice-butter yellow diet showed normal values. The inhibitory effect on transaminase of the following metabolic intermediates of butter yellow, arranged in order of their potency, was investigated: quinone, N-methyl-p-phenylenediamine, N,N-dimethyl-p-phenylenediamine, and p-phenylenediamine.—Authors' abstract.

**Leukemia**


The oxygen consumption of the lymph nodes of mice with spontaneous and transmitted lymphoid leukemia is not significantly different from that of normal lymph nodes. The rate of aerobic glycolysis is often, but not invariably, increased; that of anaerobic glycolysis is invariably increased. The Pasteur effect is greatly increased in the leukemic as compared with the normal lymphoid tissues studied. The metabolic activity of the leukemic tissue is similar to that of malignant tumors of mice but differs from that of human and rat tumors by a lower rate of aerobic glycolysis and a slightly negative value for the fermentation excess.

In leukemic hybrids between high and low leukemia stock mice, the rate of oxygen consumption is higher and that of aerobic and anaerobic glycolysis is lower than in high leukemia stock mice. The relative significance of the percentage inheritance from leukemia-resistant and leukemia-susceptible stock remains to be determined.

In those leukemic lymph nodes which contain considerable normal tissue, the aerobic glycolysis rate of the malignant lymphocytes is higher and the anaerobic glycolysis rate is lower than in the nodes consisting almost entirely of malignant cells. With increasing age the character of the metabolism of the leukemic lymph nodes changes, the aerobic glycolysis rate increasing, the anaerobic glycolysis rate decreasing. These changes appear to be due rather to differences in the glycolytic activities of the lymph nodes themselves than to factors in the body of the host.—Authors' summary.

**Transplantation**


One hundred and eight rabbits apparently free from intercurrent disease and having each of 9 blood factor...
levels within normal limits were inoculated intratesticu-
larly with the Brown-Pearce tumor. In 90 the grafts
were successful. Among these, high eosinophile and low
blood platelet pretransplantation levels were associated
each with fewer metastases and a lower mortality than
was the case with low eosinophile and high blood platelet
values. Intermediate values of the red blood cell and
basophile pretransplantation levels were associated with
fewer metastases and a lower mortality from the neoplasm
than were extreme values. No significant correlation exi-
between the pretransplantation blood levels of the
hemoglobin, the total white blood cells, the neutrophiles,
the lymphocytes, or of the monocytes, and: (1) the inci-
dence of metastases, (2) the mortality from the neoplasm,
or (3) the number of metastatic foci developed. The host
factors which influenced the success of transplantation
were different from those which influenced its continued
growth and spread and the mortality from the neoplasm.—
Authors' abstract.

TREATMENT—RADIATION, CHEMOTHERAPY, ETC.

BOYLAND, E. [Chester Beatty Research Inst., Royal
Cancer Hosp. (Free), London] EXPERIMENTS ON THE

CHEMOTHERAPY OF CANCER. 5. THE EFFECT OF
MUSCLE EXTRACT AND ALIPHATIC BASES. Biochem. J.,
'i5:1255-1258. 1941.

Previous work (Roffo) has shown that muscle extracts
inhibit tumor growth. Muscle was acid-extracted, dialyzed,
precipitated with trichloroacetic acid, and the filtrate precipi-
tated with phosphotungstic acid for the preparation of
the bases. At each stage tests (daily oral administration; about
1/5th the lethal dose) were made on spontaneous mouse
carcinoma and on grafted mouse sarcoma M.C.D.B.I.,
using the muscle fractions, the bases likely to occur, and
related compounds (β-alanine, aneurin, arcaine sulfate,
betaine, carnosine nitrate, choline chloride, creatine,
creatine, ethanolamine, methylguanidine, trimethylamine
oxide hydrochloride, ethylenediamine hydrochloride, pu-
trescine, cadaverine hydrochloride, spermine hydrochloride,
tetradecamethylene is HD hydrochloride).

Ethanolamine and cadaverine hydrochloride were the
most effective inhibitors but were not much superior to
the "muscle extract trichloroacetic acid-soluble fraction."
These results (a) indicate that the activity of the muscle
fraction is due to a combination of factors and (b) sug-
gest some speculations on the correlation of chemical
structure and tumor growth-inhibiting capacity.—I. H.

Clinical and Pathological Reports

BREAST

CHILKO, A. J., AND QUASTLER, H. [New Rochelle Hosp.,
New Rochelle, N. Y.] DELAYED METASTASES IN CANCER

An analysis of 29 cases of recurrence after apparently
successful operation has been made, but no evidence of
qualitative difference between cases with long and short
latency was found, except that latency was shorter in cases
with rapid preoperative growth or with local metastases
at the time of operation. On comparison of cases of breast
cancer with delayed metastases compiled from the litera-
ture no trait common to all these cases was found.—
H. G. W.

LOGIE, J. W. [Univ. of Michigan, Ann Arbor, Mich.]

The relationship of cystic disease of the breast to mam-
mary carcinoma has long been a subject of controversy,
yet practical observation frequently reveals the con-
comitance of the two conditions. The criteria for the
recognition of mastopathia cystica, as applied to the present
study, included dilatation of ducts with accompanying
fibrosis; areas of "pale-celled" hypertrophy of ductal
epithelium, of the type found in the apocrine sweat glands;
papillary ingrowths, to varying degree, into cystic ducts,
and, frequently, hyperplasia of terminal ducts and acini.
Operative material from the breasts of 330 women was
re-examined. One hundred and eighteen specimens were
carcinomatous, and of these 67 showed coexisting masto-
pathia cystica. Of 212 breasts without carcinoma, 82
showed mastopathia cystica. Application of the χ² test
to these data indicated that the chance of obtaining such
a degree of concomitance, if mastopathia cystica and mam-
mary carcinoma are independent, is less than 1 in 1,000.
In practical diagnostic experience, carcinoma is frequently
found arising in areas of mastopathia cystica. This was
true of 13.5% of the cancers of the breast included in
this analysis. Upon both statistical and histopathologic
grounds a causal relationship between mastopathia cystica
and mammery carcinoma must be accepted.—Author's
abstract.

MACDONALD, J. [Los Angeles, Calif.] MAMMARY

The records of cured cancer cases of the American
College of Surgeons contain 2,636 cases the records of
5,151 5-year cures and 1,125 cases in which recurrences
or metastases developed within the 5-year period. The
age of the patients does not have as much prognostic sig-
nificance as ordinarily supposed, and cancer of the breast
at an early age warrants radical approach with as much
chance of cure as in older women. Relatives of women
with breast cancer have an incidence of breast cancer 3
times greater than the general population. Nulliparac are
more prone to develop cancer of the breast than women
who have borne children, but the prognosis is as good or
better with the nulliparac. Tumors of long duration are
no contraindication to radical treatment, for 25% of the
5-year cures were treated more than 1 year after recog-
nition of the tumor.—H. G. W.

MELAND, O. N. [Los Angeles Tumor Inst., Los Angeles,
Calif.] THE INFLUENCE OF RADIATION ON LONGEVITY

This paper based on a study of 809 followed up cases of
cancer of the breast treated by radiation with or without
surgery, leads to the conclusion that radiation plays a
dominant role in the treatment. It contributes to longevity
in all groups with the exception of group 1 in which radical
removal alone is apparently sufficient. In group 2, preopera-
tive irradiation as an adjunct to surgery increases the rate

Downloaded from cancerres.aacrjournals.org on August 30, 2017. © 1942 American Association for Cancer Research.