Abstracts

Experimental Research, Animal Tumors


From 1934 to 1936, inclusive, amounts of 0.1 to 0.15 gm. of chromium, arsenic, or cobalt were deposited in the marrow cavity of the femur in rabbits. Among 21 survivors of an epidemic no tumors were found 3 years later. For one reason or another connected with the war 9 of these animals disappeared, but of the remaining 12, 7 developed carcinomas or sarcomas after 3½ years or more, some at the site of the metal depot, others at a remote site (lungs). Some of the growths metastasized.

The author suggests that the metals must have been slowly distributed throughout the body, where they became active in traces.

A full report is promised, as well as a resumption of the investigation when favorable conditions are restored.—W. H. W.


Experiments are described of the following type: 3,4-benzpyrene in acetone was applied three times on alternate days to both flanks of a mouse; subsequently acetone was applied to the left side and croton oil in acetone to the right side. After 20 weeks, there were 5 tumors, one malignant, on the right, and none on the left side. Application of croton oil before benzpyrene also promotes the development of tumors. The author discusses (1) the results of earlier workers, (2) the part played by hyperplasia and chronic irritation in the genesis of cancer, and (3) the statistical value of comparative experiments on both sides of the same mouse “... blastic agents are likely to be missed unless a developing agent is applied at the same time. . . . The combination of croton oil with benzpyrene provides a much more delicate test than the sledge-hammer treatment of continuous painting.”—E. L. K.


Diets containing o-aminoazotoluene and p-dimethylaminoazobenzene were fed to strain C mice of both sexes. The former induced many hepatic changes, hepatomas, pulmonary tumors, and hemangioendotheliomas, whereas the latter induced only a few hepatic reactions and few hepatomas. Female mice were more susceptible than males to hepatic reactions, hepatomas, and hemangioendotheliomas induced with o-aminoazotoluene. When orally administered, this compound elicited many pulmonary hemangioendotheliomas.—Authors’ summary.


Three groups of rats were fed diets containing 3,5-cholestadiene at graded levels. No characteristic pathology of gastric or hepatic tissues, which would distinguish one experimental group from another or from the controls, was noted. Hyperkeratosis of the forestomach was rather evenly distributed among all the groups. No papillomas were found in the stomachs of the control rats, whereas 1, 1, and 3 were found in the forestomachs of rats fed the low, intermediate, and high concentrations of the hydrocarbon, respectively.

The highest level of ingested hydrocarbon appeared to exert a low-grade systemic toxicity characterized by loss in weight of the rats; all animals in this group were dead after 8 months. The animals maintained on the diet containing the intermediate level of 3,5-cholestadiene exhibited a similar reaction, but to a much lesser degree. Pellets of 3,5-cholestadiene, when implanted subcutaneously in Wistar rats and in strain C3H mice, were inert. Autopsies up to 16 months after implantation revealed intact pellets and no evidence of hyperplasia in adjacent tissues.

Dicholesteryl ether, implanted subcutaneously in strain C3H mice in the form of pellets, remained intact and caused no tissue reaction.

3,5-Cholestadiene, administered orally or subcutaneously, presented no evidence of carcinogenicity in these experiments.—Authors’ summary.


Three groups of rats were fed diets containing desoxycholic acid at graded levels for as long as 20 months without evidence of toxic effects. No characteristic pathological picture, which would distinguish one experimental group from another or from the controls, was noted in the gastric tissues.

Pellets of desoxycholic acid, implanted subcutaneously in rats, incited a temporary local tissue reaction, which subsided within 2 weeks. Autopsy of 41 animals after 13 to 16 months revealed neither gross nor microscopic evidence of neoplasia or hyperplasia. Subcutaneous implantation of pellets consisting of equal parts of the acid and cholesterol likewise led to negative results as far as tumor genesis was concerned.

Subcutaneous implantation of desoxycholic acid pellets in 46 strain C3H mice led to necrosis, sequestration, and sloughing of the pellet in most cases. Twenty-six mice that survived for 6 months showed no evidence of hyper-
plasia at the pellet site. Similar implantation of acid-
cholesterol pellets was followed by sloughing in about
half the mice. Pellets that were retained in the remainder
of the mice appeared to be completely absorbed within
35 days. These mice, autopsied 8 months later, showed
no reaction at the pellet site.

Desoxycholic acid, as administered in these experi-
ments, showed no evidence of carcinogenicity.—Authors' summary.

The Inhibition of Enzyme Systems by Metabolic
Products of Carcinogenic Compounds. Urease and
1944.

When azobenzene is given to rats benzidine can be
isolated from the urine (Elson and Warren), and evidence
has been obtained that 6-dimethylaminooazobenzene under-
goes a similar rearrangement to 2,4-diamino-5-dimethyl-
aamino-1,3,5-triphenyl. Both these products have a strong inhibi-
tory action on urease and succinoxidase systems. p-Phenyl-
enediamine and dimethyl-p-phenylenediamine on oxida-
tion give products that inhibit the succinoxidase system;
the rate of oxidation of the diamines seems to be related to
the amount of cytochrome c present. When the di-
amines are added to the complete system the rate of oxygen
uptake is first increased, presumably due to the oxida-
tion of the diamine by the cytochrome, and then
inhibited, often completely.—E. L. K.

Comparative Glycolytic and Respiratory Met-
abolism of Homologous Normal, Benign, and
Malignant Rabbit Tissues. With Particular Ref-
ence to the Benign Virus Papilloma (Shope) and
a Transplanted Cancer Derived Therefrom (the
V2 Carcinoma). Kidd, G. J., Wintern, R. J., and Burk, D.
[Rockefeller Inst. for Med. Research, New York, N. Y., and
National Cancer Inst., Bethesda, Md.] Cancer Research, 4:547-
553. 1944.

The data indicate that the cells of the V2 rabbit car-
cinoma possess a glycolyzing capacity which, calculated on
a dry weight basis, is about as great as that of the cells of
2 other transplanted rabbit cancers (the Brown-Pearce
carcinoma and sarcoma I of Andrews and Ahlström), and
is considerably greater than that of the benign papilloma
cells of the sort from which they originally derived. The
derived metabolic quotients, which relate glycolysis to
oxygen consumption independently of dry weight, lend
further support to the view that the metabolism of the V2
carcinoma cells is characteristic of malignant cells
generally, whereas that of the Shope virus papilloma is
characteristic of benign tumor cells and distinguishable in
certain respects from that of normal rabbit skin cells.
The differences in metabolism between the benign papil-
loma cells and the homologous V2 carcinoma cells are
the more noteworthy since the former proliferate quite
as rapidly as the latter. It remains to be ascertained
whether the metabolic differences have something to
do with the differences in the form and behavior of the
papilloma and carcinoma cells, with the failure of re-
peated attempts to procure a causative virus from the V2
carcinoma, or with antigenic differences in the sedimentable
constituents of the two sorts of cells.—Authors' abstract.

The Treatment of Postoperative Hypoprotei-
emia in Patients with Cancer of the Colon and
Rectum. Binkley, G. E., Abels, J. C., and Rhodes, C. P.
1943.

In 23 (36%) of 65 patients with cancer of the colon
and rectum hypoproteinemia, as determined by the falling-
drop method, was present. The number of patients with
serum proteins below 6.5 gm. per cent increased to
86% during the first postoperative week. Whole blood,
where there was associated anemia, and plasma were used
to combat this condition in the early stages, and later
dietary nitrogen was effective. In all but 1 of 14 of the
cases the serum protein levels were higher from 20 to
150 days after the parenteral injection of protein than
during the first postoperative week. It was more difficult
to combat hypoproteinemia in cases where there were
infections.—W. J. B.

Metabolic Studies on Patients with Cancer of
the Gastrointestinal Tract. XIV. The Effects of
High Protein Diets on the Prevention of Post-
operative Hypoproteinemia in Patients with Gas-
tric Cancer. Rasmussen, L. H., Abes, J. C., Pack, G. T.,
and Rhodes, C. P. [Memorial Hosp., New York, N. Y.]

In patients with gastrointestinal cancer, the development
of significant postoperative hypoproteinemia is an almost
uniform finding. The condition is the result of numerous
factors including the disease itself, poor liver function,
and reduced protein intake following resection of some
portion of the alimentary tract. The preoperative ingestion
of considerable amounts of protein for from 10 to 22 days
prevents the development of serious degrees of hypopro-
teinemia in patients with gastric cancer during their post-
operative periods of negative nitrogen balance. These con-
clusions are the result of nitrogen balance studies on 6
patients with carcinoma of the stomach, receiving diets
containing 101 to 196 gm. of protein daily.—M. E. H.

Metabolic Studies in Patients with Cancer of
Gastro-Intestinal Tract. XV. Lipotropic Proper-
ties of Inositol. Ables, J. C., Kupel, C. W., Pack, G. T.,

From previous studies it appears that the liver of pa-
tients with gastrointestinal cancer is infiltrated with fat,
but in 11 patients who received 8 gm. of lipocaic before
laparotomy the fat content was found to be normal. Since
lipocaic contains relatively large amounts of choline and
inositol, each of which is lipotropic, the effect of these sub-
stances was tested separately.

Supplement of either 8 gm. lipocaic, 3 gm. choline
chloride, or 1.2 gm. inositol was found to correspond to a
reduction of hepatic lipid of 51, 39, and 58% respectively.
A reduction of 50% lipid was observed when 0.28 gm.
inositol was administered 10 hours before intervention.
Since this amount is equal to the quantity of inositol
present in an effective dose of lipocaic, it is suggested
that inositol alone may account for the lipotropic prop-
erties of the crude preparation.—M. B. 

patients with neoplastic diseases yielded several homo-
for patients with lymphatic leukemia and cancer, while
gave distribution patterns that were definitely abnormal
in normal persons or from those with certain nonneoplastic
disorders.


Five patients showing postoperative hypochloremia resi-
tant to the administration of large amounts of saline solution were found to have an associated hypoproteinemina.

In those instances in which the level of serum protein was increased therapeutically, the disturbed electrolyte equi-
librium was corrected. The existence of hypoproteinemina may seriously prevent the correction of the chloride im-
balance by the administration of saline solution alone.—
M. E. H.


Abnormal Alpha Ketosteroid Excretion in Pa-

Fractionation of a-ketosteroid extracts of urines from patients with neoplastic diseases yielded several homo-
genous substances some of which were not obtained from
normal persons or from those with certain nonneoplastic
disorders.

An analysis of the relative amounts of these substances gave distribution patterns that were definitely abnormal
for patients with lymphatic leukemia and cancer, while
the pattern obtained from a patient with myeloid leu-
kemia was very similar to the pattern for normal per-
sons.—R. B.

Experimentelle Untersuchungen über Krebsau-
zeugung durch Photosensibilisierung. [Experimen-
tal Investigation on Carcinogenesis through Photo-
sensitization.] Miëscher, G. [Dermatologischen Universi-

Only one among several investigators has found that
photosensitizing agents such as hematophorphyrin or cosin increase the activity of carcinogens.

In an attempt to settle this question the author exposed
mice sensitized with anthracene, which is not carcino-
genic, to light from which the ultraviolet and heat rays
had been filtered out.

No tumors appeared, and the conclusion is drawn that
even a strong and long-continued photodynamic reaction
in the skin can be of little significance in carcinogenesis.

In the one positive result mentioned in the opening
paragraph photosensitization facilitated carcinogenesis in
some non-specific manner. In any case, there is no war-
rant at present for regarding photosensitization as a new
and specific carcinogen.—W. H. W.

La cancérización artificielle en atmosphères dif-
férentment ionisées. [The Development and Growth
of Tumors in Air Various Ionized.] Jovet, G. [Centre Anticancéreux Romand, Service des Recherches Ex-

Transplanted tumors grew and benzpyrene carcinomas
developed in rats and mice kept in an atmosphere ionized
with various preparations of radium as they did in the
controls.

Though the experiments are not yet finished they give
no support so far to the suggestion of several authors
that the ions of the atmosphere are concerned in carci-
genesis.—W. H. W.

Growth Rate and Development of Tumors In-

Measurements of growth rates of tumors induced with
ultraviolet radiation are described. The growth rates of
the gross tumors are not correlated with the time re-
quired for their appearance but are the same for early
and late appearing tumors. The growth rates are not
correlated with the age of the animals, nor with the
recess of exposure to ultraviolet radiation. Estimates
based on individual tumors show that the growth rate
does not remain constant throughout development and
do not follow the same pattern in all tumors of the
same type. Experiments to determine the effect of inter-
ruption of the schedule of exposures on development time
suggest that opposing growth and regressive processes
determine the time at which a tumor becomes established
so that it may continue to grow. The general evidence
indicates that the tumor cells do not escape and assume
their own essential proliferation rates, but that rates of
tumor growth are to a great extent dominated by the
controlling influence of the tissues.—Author’s summary.

Both virgin and breeding female C3H mice developed mammary tumors earlier when kept segregated, 1 mouse to a cage, than they did when living together, 8 to a cage.

Vaginal smears taken from virgin mice indicated that estrous cycles in the segregated animals occurred earlier, were more frequent, and lasted longer than they did in nonsegregated animals. Thus, hormonal stimulation was presumably greater in the segregated mice and could account for the earlier development of tumors amongst them.—R. B.


Spontaneous mammary carcinoma from mice of the A and C3H stocks were tested in chick embryos. The A tumor gave large growths following the primary inoculation, but the second or third yolk-sac transfer resulted in the death of the embryos after 3 to 6 days. One mammary carcinoma from a C3H female was implanted in eggs after 13 passages in mice. During the early serial yolk-sac passage the tumor was transferred at 12-day intervals, but after the eighth serial passage the tumor had to be transferred at shorter and shorter periods because of the death of the embryos. The tumor was lost in the 20th passage owing to the death of the embryos on the night of the seventh day. The increasing mortality rate of the embryos was not related to the size of the tumor.

Following the fifth serial passage in eggs the C3H mouse tumor was inoculated into mice. It grew progressively in mice of the C3H stock and their hybrids but did not give temporary growth in mice of the A stock. Following the 11th serial passage in eggs, the C3H tumor grew in the 212 line of the dilute brown stock showed progressive growth. After the regression of their tumors, the tumors was injected into mice, tumor resulted within 10 to 30 days in 6 of the 8 mice tested, which suggested the transfer of living tumor cells.—Authors’ abstract.


Among 143 mice with benzpyrene carcinomas of the skin, or spontaneous mammary carcinomas, treated with modifications of the mixture of powdered organs suggested by Vilès and de Coulon (Proc. II. Internat. Cancer Congr., 1936) the tumor was inhibited, or made to disappear, in 12% and 13% respectively.

Among 114 mice that received injections or inunctions of colchicine in addition, the inhibition was evident in 23% and 28%.

Except in those few cases where the tumors disappeared life was not prolonged, and there is no reason, therefore, to hope that the treatment might be of practical value.—W. H. W.


Certain steroids caused mitotic anomalies in tissue cultures, and growth disturbances that seemed to be related to the mitotic anomalies in malignant new growths.—W. H. W.


Chromosome sizes in normal rat organs vary to some extent with the nuclear volume, but they do not form a polymeric series by progressively doubling in volume from one tissue to another. The changes in chromosome volume are small, although often significant, and are not accompanied by changes in the number of plasmosomes carried by the diploid set of chromosomes. Since the average chromosome volume of normal rat organs does not vary in accordance with the cytoplasmic concentration of ribonucleic acid nor with the development of heterochromatin and plasmosomes, differences in chromosome size are probably not determined by differences in the quantity of polynucleotides on the chromosomes. However, the average chromosome volume is directly proportional to the total concentration of B vitamins, with the exception of inositol, reported in the literature. It is proposed that the difference in chromosome size from one normal cell type to another in rats depends on the development and activity of the euchromatin, i.e., the larger the chromosomes, the greater is the bound vitamin capacity of the organ.—Author’s abstract.


Chromosomes in hepatoma 31 and Walker carcinosarcoma 256 are of 3 sizes: small ones of about the size found in newborn rats or in adult organs poor in B vitamins; chromosomes about twice as large, that are in the majority; and chromosomes about 4 times as large. The chromosomes of double and quadruple size in the 2 cancers are probably composed of more discrete strands.
than are chromosomes of normal tissues, since in the
tumors the proportion of division figures that are
diploid is greatly exceeded by the proportion of resting
nuclei with more plasmosomes than are carried by the
diploid set of normal chromosomes. Most of the hepatoma
chromosomes are double the size of newborn or perhaps
fetal rat liver chromosomes rather than double the vol-
ume of actively functioning adult liver chromosomes.

Because of the double nature of most of the cancer
chromosomes, one-half their average volume is to be
used in assessing their synthetic activity. On this basis
the two tumors should have a low over-all rate of syn-
thesis of chromosomal products, and this is made probable
by evidence from the literature of low B vitamin content,
low activity of a number of enzymes, and a decrease in
certain metals in these and other cancers.--Author's
abstract.

Production of Malignancy In Vitro. VIII. Ob-
servations on the Mitochondria and Golgi Material.
DALTON, A. J., and EARLE, W. R. [National Cancer Inst.,

Mitochondria and Golgi material were demonstrated
in both carcinogen-treated and control cultures of mouse
fibroblasts, with no differences between them that could
be related to the process of malignant transformation
in vitro. However, the orientation of the Golgi material
was found to be correlated with the growth pattern of
cultures treated with the carcinogen for different lengths
of time, being located distally (toward the periphery of
the cultures) more frequently in cells of the faster grow-
ing cultures.

Studies of mitochondria in (1) tumors arising in mice
from implants of carcinogen-treated cultures, (2) trans-
plants of spontaneous fibrosarcomas, and (3) normal fibro-
blasts, revealed no differences associated with malignancy;
but the Golgi material was hypertrophied in both types
of tumors and in the endothelial cells of host blood ves-
sels supplying them, compared with its condition in
normal fibroblasts.—R. B.

Ciliated Cells of the Thyroid of the Mouse. DUNN,

Ciliated cells were found in histologic sections of the
thyroids of C3H and A strain mice. Ten of 22 C3H
mice 10 months of age, and 5 of 25 A mice of the same
age had some of the ciliated thyroid cells. None of these
cells were found amongst 5 strain A mice, 11 weeks old,
but a number of them were present in the thyroids of
10 newborn C3H mice.—R. B.

Injection and Clearing Method for the Rabbit's
Ear. DUNN, T. B., and KESSEL, A. M. [National Cancer Inst.,

A method for use in the study of vascular structure.

Clinical and Pathological Reports

ETIOLOGY

Karzinom und Entzündung im Rahmen allgemein-
biologischen Geschehens. Der Versuch einer Syn-
these. [Carcinoma and Inflammation from the
Standpoint of General Biology. Attempt at a Syn-
A highly philosophical discussion of etiology.—W. H. W.

Grundsätzliches über den Krebs in unserer Armee.
[ Cancer in the Swiss Army.] MEYENBURG, H. v. [Uni-
versität Zürich, Zurich, Switzerland] Schweiz. med. Wchnschr.,

It is highly improbable that there is anything in military
service that predisposes to cancer. The author finds no
evidence that bodily exertion has any influence on the
growth of a malignant tumor. The question whether a
malignant growth was present at the time of enlistment,
growth of a malignant tumor. The question whether a
leading American papers on the subject. The bibliography
includes 126 titles. Since the paper is a digest of other
articles, the original should be consulted.—A. C.

RADIATION—DIAGNOSIS AND THERAPY

A Review of the Gastro-Enterologic Diagnostic
Roentgenologic Literature for the Year 1942. RIGOS,
F. J., and KIRKLIN, B. R. [Mayo Clinic, Rochester, Minn.]
Gastroenterology, 1:942-960. 1943.

The article is a fairly comprehensive survey of all
leading American papers on the subject. The bibliography
includes 126 titles. Since the paper is a digest of other
articles, the original should be consulted.—A. C.

Three and One-Half Years' Experience with the
1,000 Kilovolt Roentgen Therapy Unit at Memorial
Hospital. HOCKER, A. F., and GUTTMAN, R. J. [Memorial

The results of treatment with million volt x-rays of
315 cancer patients are tabulated. Of the total number
213 are dead. Of these, 145 were in a very advanced
stage of the disease and were treated palliatively; many
of the others presented more complicated problems than
usually seen in the radiation therapy patient. However,
in those who died, considerable palliation was obtained.
Survival rates even on the living group are not a fair
indication of the value of million-volt therapy, because,
as is usually the case when a new method of treatment is
employed, the majority of the first patients were in ad-
vanced stages of the disease. An analysis is made of
factors which should determine what types of cancer
might be expected to present better results with million
volt than with 200 kilovolt therapy.—E. H. Q.

The Treatment of Accessible Malignant Tumors
with Short Distance Low Voltage Roentgen Rays.

A review is presented of 466 cases of malignant disease
and 294 of non-malignant, treated by 40-60 kv. x-rays,
at target skin distances of 2 to 10 cm. Depth dose and
isodose charts are given for various voltage-filter-distance
combinations. Practical methods for shielding eyes and
other normal parts are discussed.—E. H. Q.