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**Meeting of the
Bio-Medical Program Directors
of the
United States
Atomic Energy Commission**

FEBRUARY 12-13, 1968

OPERATED BY THE UNIVERSITY OF CHICAGO
UNDER
CONTRACT AT-(11-1)-69

USAEC BIO-MEDICAL PROGRAM DIRECTORS' MEETING

Argonne Cancer Research Hospital
University of Chicago

Alexander Gottschalk, Director

February 12-13, 1968

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P R O G R A M*

Monday, February 12

9:00 A.M. Introductory Remarks
 Leon O. Jacobson, Dean
 Division of the Biological Sciences

Morning Session Stanley Yachnin, Chairman

9:05 Lipoprotein Metabolism of Cell Membranes
 Alvin R. Tarlov (pp. 58-59)

 Chromosome Studies in Pre-leukemia
 Janet Rowley (pp. 63-64)

 Study of Human Bone Marrow in vitro
 Sanford B. Krantz (pp. 61-62)

10:25 INTERMISSION

10:40 Metabolism and Pharmacological Effects of
 Lithocholic Acid
 Robert H. Palmer (p. 74)

 A Factor from Escherichia coli Required for the
in vitro Enzymatic Synthesis of the ϕ X 174
Replicative Form of Phage DNA
 Mehran Goulian (p. 95)

 Cellular Events During Primary Immune Response
in vitro and in vivo
 Frank W. Fitch (pp. 65-71)

12:00 LUNCH

*Page numbers locate abstracts--with names of senior authors and co-authors.

Monday, February 12

Afternoon Session

Paul V. Harper, Jr., Chairman

1:30 P.M.

A Theoretical Description of the Performance
of Scanning Systems

Robert N. Beck (pp. 11-16)

A Comparison of Radiopharmaceutical
Preparations

Katherine A. Lathrop (pp. 8, 9, 17, and 81)

Selenomethionine: Theoretical and Practical
Considerations

Alexander Gottschalk (pp. 1-5)

Analog Image Manipulation

Donald B. Charleston (pp. 5, 16, 21-25)

3:10

INTERMISSION

3:25

Development of High Current Capabilities in
the ACRH Linear Accelerator

Lester S. Skaggs (pp. 26-33)

Radiobiological and Clinical Implications of
High Dose Rate Electron Beam Therapy

Melvin L. Griem (pp. 36-45, 46-48)

6:00

DINNER for Visitors and Participants

*Quadrangle Club
Cocktails at 6⁰⁰
Dinner at 7⁰⁰*

1160014

Tuesday, February 13

Morning Session

Samuel B. Weiss, Chairman

9:00 A.M.

The Molecular Biology of Erythroid Differentiation
Eugene Goldwasser (pp. 49-55)

Structural Studies on Serum Lipoproteins
Angelo Scanu (p. 94)

Recent Progress in Normal and Abnormal
Purine Metabolism
Leif B. Sorensen (p. 73)

10:20

INTERMISSION

10:40

Studies on Mitochondrial Nucleic Acids
Murray Rabinowitz (pp. 87-90)

Initiation of Protein Synthesis in a Cell-Free
System of Escherichia coli
Tokumasa Nakamoto (p. 95)

Effect of Bacteriophage Infection on the
Sulfur-labeling of sRNA
Samuel B. Weiss (p. 86)

12:00 Noon

LUNCH

1:30 P.M.

General Session

Tour of Argonne Cancer Research Hospital,
Laboratories and High Voltage Equipment

1168015

ARGONNE CANCER RESEARCH HOSPITAL

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ABSTRACTS

This collection of abstracts includes summaries of work in progress, unpublished work, or work that has only recently appeared in the open literature. Some of the abstracts have not yet been formally presented to the AEC Washington Office of the Division of Biology and Medicine. It is therefore requested that the volume be treated as a privileged communication, not to be quoted in reference. — Margot Doyle, Editor.

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RADIOBIOLOGY

Radium-induced Malignant Tumors in Man

R. J. Hasterlik, C. E. Miller, and A. J. Finkel

The incidence of radium-induced malignant tumors and blood dyscrasias was related to current or pre-terminal radium burden measurements and to retrospective estimates of maximum burdens for a series of 293 persons, most of whom acquired radium burdens in the period 1918 to 1933, and were studied at the Argonne National Laboratory and Argonne Cancer Research Hospital. The 46 malignant diseases include 22 sarcomas, 16 neoplasms of the skull (principally mastoid and paranasal air cell carcinomas), and 8 leukemias and aplastic anemias. Retrospective estimates of maximum radium burdens were made by application of the appropriate power function for ingestion or for multiple injections.

The principal interest in the malignant tumor experience in the radium cases we have been examining lies in the implications that the data may have for radiation carcinogenesis, for oncogenic dose-response curves, and for the problem of maximum permissible levels for internally deposited bone seeking radionuclides. By relating the occurrence of a malignant tumor to an estimate of the maximum burden in each case, we have sought to avoid problems resulting from biological variability in the time of appearance of tumors and variations in body burdens that result from vagaries in the time of measurement.

The power function parameters used here in the function $R_{inj}(t)$ at^b are ($a = 0.30$ and $b = -0.44$) and were derived recently by an analysis of data from long term studies on 8 patients for whom suitable data are available. The lowest estimated maximum radium burden for the sarcoma cases was $6.72 \mu\text{Ci}$, and that for carcinoma of the maxilla was $1.23 \mu\text{Ci}$. The comparable value for leukemias and aplastic anemias was greater than $50 \mu\text{Ci}$. Based on the estimated maximum initial burden, these data imply at least a 12-fold margin of safety in the maximum permissible level for internally deposited radium.

(See charts on pp. 37 and 38.)

Radiobiological Experience with High Dose Rate Electrons

M. L. Griem, L. S. Skaggs, L. H. Lanzl, and F. D. Malkinson

In 1963, we reported our experience with radiation therapy using high energy electrons in a pencil beam scanning mode. This paper described the limited skin reaction observed in patient therapy with this mode of electron beam therapy. We speculated that the reason for the lack of skin reaction might be based on the possibility that the scan pattern, which was similar to that of a television raster, might resemble treatment through a grid. A second explanation of the lack of biological epidermal reaction at the surface might be postulated. A slight inhomogeneity at the surface might allow for repopulation of the basal cell layer in the skin and the partial reconstitution of the basal cells available between daily treatments. A third postulate for the lack of skin

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REMARKS

**Meeting of the Bio-Medical Program Directors
Argonne Cancer Research Hosp.
February 12-13, 1968**

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REMARKS

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