THE JACKSON LABORATORY
Bar Harbor, Maine

710859

MEMORANDUM

April 15, 1965

To: ADVISORY COMMITTEE FOR BIOLOGY AND MEDICINE (ACBM), U.S. AEC

From: E. L. GREEN, DIRECTOR E. L. G.

Subj.: SUMMARIES OF RESEARCH PROJECTS, SUPPORT, AND CURRICULA VITAE

Attached are (1) brief summaries of the research projects at The Jackson Laboratory supported, in part, by contracts with the U.S. AEC and (2) curricula vitae of the principal investigators. The projects are listed below.

Contract No.	Title Principal Investigator(s)	Period	Amount
AT(30-1)-1800	Attempts to delineate inborn anemias in mice Elizabeth S. Russell and Seldon E. Bernstein	5/1/64 - 4/30/65	$ 36,662
AT(30-1)-1979	Quantitative population genetics of mice under irradiation Earl L. Green, Thomas H. Roderick, and Gunther Schlager	10/1/64 - 9/30/65	$ 47,300
AT(30-1)-2113	The occurrence of chromosomal aberrations in pre-spermatocytic cells of irradiated male mice Allen B. Griffen	6/1/64 - 5/31/65	$ 14,500
AT(30-1)-3249	Natural mutations and mutation rates in the house mouse Gunther Schlager and Margaret Dickie	6/28/64 - 6/30/65	$ 80,000
AT(30-1)-3314	Genetic control of aging and radiation-induced life shortening in mice John B. Storer	1/1/65 - 12/31/65	$ 69,225

US DOE ARCHIVES
326 US ATOMIC ENERGY COMMISSION
RG
Collection Biology of Medicine
Box 2
Folder 5

1070481

Contract: AT(30-1)-1800

Period: 5/1/64 - 4/30/65

Amount: $ 36,662

ATTEMPTS TO DELINEATE INBORN ANEMIAS IN MICE

Elizabeth S. Russell and Seldon E. Bernstein

Hereditary anemias of mice are the chief objects of investigation under this contract. These include four macrocytic anemias, three hemolytic anemias, and one transitory siderocytic anemia. New types of anemia may be studied as new mutations appear. In all cases congenic animal stocks will be produced with and without each anemia allele to facilitate study of gene action.

We will continue to study these anemias through: (a) characterization of the peripheral blood picture, (b) determinations of RBC lifespan, (c) histological and biochemical study of blood-forming tissue, (d) functional tests of the stem cell compartment, (e) analysis of reactions to radiation, (f) study of responses to erythroid stimuli, and (g) transplantation of tissue between individuals of differently affected genotypes. It is expected that these studies will contribute to a better understanding of the physiological bases of radiosensitivity, to a more specific delineation of erythroid differentiation, to knowledge of the site and nature of action of erythropoietin, and to an understanding of alternative mechanisms for maintaining erythron balance.

Additional financial support is provided by PHS grants no. HD 00254, CA 01074, and the Americal Cancer Society grant no. P 338G.

REPOSITORY 326 US Atomic Energy Commission
COLLECTION Biology of Medicine
BOX No. 2
FOLDER 5

1070482

DOE ARCHIVES

Curricula Vitae

RUSSELL, ELIZABETH S.

Born:	Ann Arbor, Michigan, May 1, 1913.
Educated:	University of Michigan, A.B., 1933; Columbia University, M.A., 1934; University of Chicago, Ph.D., 1937.
Experience:	The Jackson Laboratory, Research Associate, 1937-57, Staff Scientific Director, 1953-56, Senior Staff Scientist, 1957 - .
Publications:	In: Fed. Proc., Genetics, Science, JNCI, J. Hered., Proc. Animal Care Panel.
Interests:	Physiological genetics; hereditary diseases; mouse hematology.

BERNSTEIN, SELDON E.

Born:	Bangor, Maine, January 3, 1926.
Educated:	University of Maine, B.A., 1949, M.A., 1952; Brown University, Ph.D., 1956.
Experience:	The Jackson Laboratory, Associate Staff Scientist, 1956-59, Staff Scientist, 1959 - , Assistant Director (Training), 1963 - .
Publications:	In: Science, Transpl. Bull., JNCI.
Interests:	Physiological genetics; hematology; radiation biology.

1070483

DOE ARCHIVES

Contract: AT(30-1)-1979

Period: 10/1/64 - 9/30/65

Amount: $ 47,300

QUANTITATIVE POPULATION GENETICS OF MICE UNDER IRRADIATION

Earl L. Green, Thomas H. Roderick, and Gunther Schlager

In the experiments in progress under this contract we are concerned with two questions. What will be the effect of low and of high levels of spermatogonial irradiation, repeated generation after generation, on the genetic constitution of populations of mice? What is the genetic basis for differences in radiosensitivity of different kinds of mice?

Two groups of populations of mice are being propagated generation after generation under selected levels of spermatogonial irradiation and of inbreeding. The objective is to assess the effects, if any, of irradiation and inbreeding on several characteristics measuring biological fitness. One group of populations, called "inbred," is descended from a single pair of an inbred strain of mice. The other group, called "hybrid," is descended from four pairs, one from each of four genetically different inbred strains crossed to produce double-cross hybrids. In each group there are 12 populations with 16 mated pairs per generation. The 12 populations represent all combinations of three levels of acute X-irradiation (0, 50, 100 R) and four levels of inbreeding. Samples of these populations are studied at certain generation intervals for reproductive performance, longevity, and radiation resistance. An associated experiment is in progress on the question of genetic extinction due to spermatogonial irradiation at maximal substerilizing doses repeated generation after generation.

In the other study on the genetics of resistance to chronic whole-body irradiation, 27 inbred strains have been characterized with respect to their radiation sensitivity. These and four lines selected in both directions for radiation sensitivity are being examined for other characteristics in an effort to delineate the physiological basis for the genetic differences in radiation sensitivity.

This same project is supported in part by PHS research grant GM 07249 from the National Institute of General Medical Sciences, Public Health Service, Department of Health, Education, and Welfare.

REPOSITORY 326 US Atomic Energy Commission
COLLECTION Biology of Medicine
BOX No. 2
FOLDER 5
1070484

DOE ARCHIVES

Curricula Vitae

GREEN, EARL L.

Born:	Meadville, Pennsylvania, August 7, 1913.
Educated:	Allegheny College, B.S., 1935, Sc.D. (hon.), 1960; Brown University, Sc.M., 1937, Ph.D., 1940.
Experience:	University of Chicago, Keen Fellow, 1940-41; Ohio State University, instructor, 1941-43, associate professor, 1946-55, professor, 1955-56; A.A.F., 1943-46; U.S. Atomic Energy Commission, Division of Biology and Medicine, geneticist, 1953-55; The Jackson Laboratory, Director, 1956 - .
Publications:	In: J. Hered., Genetics, JNCI; several chapters in books.
Interests:	Population genetics; radiation genetics.

RODERICK, THOMAS H.

Born:	Grand Rapids, Mich., May 10, 1930.
Educated:	University of Michigan, A.B., 1952, B.S., 1953; University of California, Berkeley, Ph.D., 1959.
Experience:	The Jackson Laboratory, Associate Staff Scientist, 1959-62; Staff Scientist, 1962 - .
Publications:	In: Genetics, Radiation Research, Science, Cancer Research.
Interests:	Radiation genetics; quantitative genetics.

1070485

DOE ARCHIVES

SCHLAGER, GUNTHER

Born:	New York, N. Y., January 14, 1933.
Educated:	University of Denver, B.A., 1955, University of Kansas, M.A., 1959, Ph.D., 1962.
Experience:	University of Kansas, instructor, 1959-62; The Jackson Laboratory, Associate Staff Scientist, 1962 - .
Publications:	In: Anat. Rec., Drosoph. Inf. Serv., Ann. Entomol. Soc. Amer., Tribolium Inf. Bull.
Interests:	Quantitative genetics; biometrics; spontaneous mutation rates.

1070486

DOE ARCHIVES

Contract: AT(30-1)-2113

Period: 6/1/64 - 5/31/65

Amount: $ 14,500

THE OCCURRENCE OF CHROMOSOMAL ABERRATIONS IN PRE-SPERMATOCYTIC CELLS OF IRRADIATED MALE MICE

Allen B. Griffin

This contract supports investigations designed to determine the nature and extent of radiation damage to the chromosome system of pre-spermatocytic cells. Male mice have been subjected to X-ray treatment of the testes at three different radiation dosages. The treated individuals and suitable untreated controls were mated to females of standard inbred strains. All offspring sired by each male throughout the remainder of his life are being tested for the presence of chromosomal aberrations capable of producing sterility and semisterility. All sterile males and all semi-sterile lines are being analyzed cytologically.

Curriculum Vita

GRIFFEN, ALLEN B.

Born:	Corsicana, Texas, January 6, 1914.
Educated:	University of Texas, A.B., 1935, Ph.D., 1939.
Experience:	University of Texas, research associate and associate professor, 1939-45; University of Missouri, professor, 1945-50; The Jackson Laboratory, Research Associate, 1950-57, Staff Scientist, 1957 - .
Publications:	In: J. Cell. Comp. Physiol., JNCI, Proc. Nat. Acad. Sci., Ann. N. Y. Acad. Sci., Genetics.
Interests:	Radiation cytogenetics; general cytogenetics; chromosome mapping; tumor cytology.

REPOSITORY 326 US Atomic Energy Commission
COLLECTION Biology of Medicine
BOX No. 2
FOLDER 5

1070487

DOE ARCHIVES

Contract: AT(30-1)-3249

Period: 6/28/64 - 6/30/65

Amount: $ 80,000

NATURAL MUTATIONS AND MUTATION RATES IN THE HOUSE MOUSE

Gunther Schlager and Margaret M. Dickie

The investigation in progress under this contract is concerned with the estimation of the rates of natural or spontaneous mutations in 18 inbred strains of mice and six hybrids reared in the large breeding colonies of The Jackson Laboratory. Some of these strains are genetically fixed for certain recessive alleles affecting coat color so it is possible to obtain accurate estimates of the "forward" and "reverse" mutation rates at five specific coat color loci: agouti, brown, albino, dilute, and leaden. Data on over 2.5 million gene reproductions at these loci are collected annually. In addition, the scrutiny of all mice at weaning reveals many other presumptive mutations, each of which is characterized as to its inheritance. Since the beginning of this contract, 584 presumptive mutations were discovered from which 69 proved mutants were recovered. Those mutants with potential value in biomedical research are being preserved and propagated for further study and analysis.

Curricula Vitae

SCHLAGER, GUNTHER

Born:	New York, N. Y., January 14, 1933.
Educated:	University of Denver, B.A., 1955, University of Kansas, M.A., 1959, Ph.D., 1962.
Experience:	University of Kansas, instructor, 1959-62; The Jackson Laboratory, Associate Staff Scientist, 1962 - .
Publications:	In: Anat. Rec., Drosoph. Inf. Serv., Ann. Entomol. Soc. Amer., Tribolium Inf. Bull.
Interests:	Quantitative genetics; biometrics; spontaneous mutation rates.

REPOSITORY 326 US Atomic Energy Commission
COLLECTION Biology of Medicine
BOX No. 2
FOLDER 5
1070488

DOE ARCHIVES

DICKIE, MARGARET M.

Born:	Washington, Pennsylvania, January 28, 1922.
Educated:	Mount Holyoke College, B.A., 1943; University of Maine, M.A., 1946; Brown University, Ph.D., 1958.
Work history:	The Jackson Laboratory, Research Associate, 1949-57; Staff Scientist, 1957 - .
Publications:	In: J. Hered., J. Nutrition, Proc. Soc. Exp. Biol. Med., Anat. Rec.
Interests:	Genetics; mutations and endocrine tumors in mice.

1070489

DOE ARCHIVES

Contract: AT(30-1)-3314

Period: 1/1/65 - 12/31/65

Amount: $ 69,225

GENETIC CONTROL OF AGING AND RADIATION-INDUCED LIFE SHORTENING IN MICE

John B. Storer

The research in progress under this contract is designed to provide an indirect test of the somatic mutation theory of aging and radiation-induced life shortening. As a corollary to this theory we have postulated that the stability of the genetic material is itself under genetic control and that different mouse genotypes (strains) should differ in the rate of accumulation of mutations (as estimated by chromosome aberrations) with age. If this is true and if somatic mutations are responsible for senescence and death, different genotypes should age at different rates as estimated by life table analysis. We also postulate that genetically controlled differences in stability should result in differences in the incidence of radiation-induced abnormalities following a standard radiation dose. Dissimilar incidences in various genotypes should result in unequal life shortening by radiation if the somatic mutation theory is valid.

The natural rate of aging and the extent of radiation-induced life shortening in four inbred mouse strains and two hybrid generations are being determined. In addition, the incidence of chromosome abnormalities in three tissues as a function of age or of radiation exposure is being measured in mice of the same strains and hybrid lines.

REPOSITORY 326 US Atomic Energy Commission
COLLECTION Biology of Medicine
BOX No. 2
FOLDER 5

1070490

DOE ARCHIVES

Curriculum Vita

STORER, JOHN B.

Born:	Rockland, Maine, October 16, 1923.
Educated:	University of Chicago, M.D., 1947.
Experience:	University of Chicago, NIH fellow, dept. pathology, 1948-49, pathologist to toxicity laboratory, 1949-50, research asst., dept. pathology, 1949-51; Los Alamos Scientific Laboratory, staff member, 1950-52, radiobiology section leader, 1952-58; alternate leader biomedical research group, 1952-58; U.S. Army Medical Corps, Captain, 1953-55; The Jackson Laboratory, Staff Scientist, 1958-63, Assistant Director (Research), 1962-64, Senior Staff Scientist, 1963 - .
Publications:	In: Rad. Res., U.S. Armed Forces Med. Jour., Proc. Soc. Exp. Biol. Med., Ann. Rev. Nuclear Sci., Science.
Interests:	Effects of radiation; physiology of aging.

1070491

DOE ARCHIVES