

GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF RESEARCH ADMINISTRATION

Date: 4 March 1970

RESEARCH PROJECT INITIATION

Project Title: Physical Basis of Molecular Memory

Project No.: B-2021 G-41-608

Project Director: Dr. A. L. Stanford

Sponsor: Research Corporation, 405 Lexington Avenue, New York, N.Y. 10017

Agreement Period: From 1 March 1970 until 28 February 1971

Type Agreement: Grant Letter dated 16 February 1970

Amount: \$16,750

Grant Administrator

Mr. Sam C. Smith  
Vice President - Grants  
Research Corporation  
405 Lexington Avenue  
New York, N.Y. 10017

Reports Required

Informal progress and publication  
of results in professional journals.

Assigned to: School of Physics

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Other File B-2021

GEORGIA INSTITUTE OF TECHNOLOGY

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*Report File  
No B  
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RESEARCH PROJECT TERMINATION

Date: 5 March 1974

Project Title: Physical Basis of Molecular Memory

Project No: G-41-608

Principal Investigator: Dr. A. L. Stanford

Sponsor: Research Corporation

Effective Termination Date: March 1, 1974

Clearance of Accounting Charges: by March 31, 1974

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6-4-68

# REPORT OF RESEARCH CORPORATION GRANT

(Please check one)

(Submit original and one legible copy)

- Interim Report
- Terminal Report

INSTITUTION AND ADDRESS    Georgia Institute of Technology  
    Atlanta, Georgia 30332

PRINCIPAL INVESTIGATOR    Augustus L. Stanford, Jr.

PHONE    894-5245

ACADEMIC RANK AND DEPARTMENT    Professor, Physics

SHORT TITLE OF RESEARCH SUPPORTED BY GRANT    Physical Basis of Molecular Memory

STARTING DATE    1 March 1970

SUMMARY OR PRINCIPAL FINDINGS AND THEIR SIGNIFICANCE (State succinctly in language understandable to one not necessarily expert in this field. Include extent to which original goals have been realized and any changes to original plan made or contemplated.)

The experiments for which assistance from the Research Corporation was granted were briefly the following: Memory transfer experiments were conducted with rats, which a trained according to a particular paradigm to a specified criterion of success. These donor rats were sacrificed, the brains removed, and certain extracts from their brain tissue were prepared. The extract was injected into a group of recipient animals, who were then tested to determine the extent of transfer of the learned process through measurable behavioral changes. The tested recipients were compared to control groups of rats that were treated similarly to the recipient group, except that they received placebo injections (saline solutions or brain extracts from untrained rats). The effects of electric fields on the extract have been studied in an effort to determine whether or not information is carried by electrical polarization on the molecules of memory transfer. Evidence that this is the case was obtained before the Research Corporation grant became effective.

A PDP-8 computer was interfaced to a large number of individual cases as a result of the Research Corporation grant. This has permitted us to process 250 animals at a time compared to 40, the previous maximum number. Since the incorporation of the automated system, thousands of animals (both rats and mice) have been processed. Results of the early experiments, some further studies with larger numbers of animals, and new experimental procedures involving audiogenic seizure transfer have been reported in the literature (see attached reprints).

The support of a graduate student was included in the Research Corporation grant. Dr. Thomas M. Corwin, whose Ph.D. dissertation was on transfer mechanisms in mice, was the recipient of these funds.

We feel that the goals originally established when the grant was petitioned have been realized. Further, the equipment will continue to facilitate experimentation in this area for a long time hence.

**REPORT OF RESEARCH CORPORATION GRANT**

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**STUDENT PARTICIPATION** (Give names of students working on the project, their role in the research, their achievements and their career plans.)

Dr. Thomas M. Corwin conducted his graduate work on this project. Since obtaining his Ph.D., he has been teaching in the Atlanta area and continues to utilize the equipment at Georgia Tech on follow-up studies in memory transfer.

- 3. "Increased Susceptibility to Audiogenic Seizure Resulting from Injection of Brain Extract from Acoustically Primed Mice", Physiological Psychology 1, 324 (1973).

**PAPERS AND SCIENTIFIC TALKS** (Give titles and references to papers or talks resulting from the work. Attach two copies of any reprints available, if not previously forwarded.)

- 1. "Experimental Evidence for Erasure of Molecular Memory in Mammals by Electric Fields", Physiological Chemistry and Physics 2, 499 (1970).
- 2. "Evidence of Erasure of Memory in Brain Extract of Rats by Electric Fields", American Zoologist 10, 296 (1970).

**OTHER SUPPORT** (List amounts and sources—including institutional—of other contributions received or expected for this work.)

National Institute of Mental Health, \$29,253  
Georgia Tech Biomedical Research Grant, \$4,311

**EXPENDITURE OF RESEARCH CORPORATION GRANT FUNDS** (The terminal report should be approved by an authorized officer of the institution.)

a. Equipment, supplies (Itemize major expenditures) PDP-8 Computer \$10,400  
Cages, Electronic components \$2,306

b. Stipends (Academic status, rates, periods of appointment) Graduate student \$3,800  
(1 year)

c. Other expenditures (Itemize and give purpose)

Signature of principal investigator

2/27/74  
Date

Signature of authorized officer of institution (required for terminal report only)  
Milton W. Bennett, Acting Director

2/28/74  
Date

Research Administration  
Name and position of authorized officer of institution