

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

Date: April 17, 1980

Project Title: Genetics of Thermal Acclimation, Membranes and Aging

Project No: G-32-B03

Project Director: Dr. David B. Dusenbery

Sponsor: DHEW/PHS/NIH - National Institute on Aging

Agreement Period: From May 1, 1980 Until 8/31/ April 30, 1981 (03 Year)

Type Agreement: Grant No. 5 R01 AG00942-03

Amount: \$78,178 PHS Funds (G-32-B03)
4,115 GIT Contribution (G-32-331)
\$82,293 Total

Reports Required: Annual Progress Report with Continuation Applications.
Terminal Progress Report upon Grant expiration.

Sponsor Contact Person (s):

Technical Matters

Donald G. Murphy, Ph.D.
Actg. Assoc. Director for Extramural
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National Institute on Aging
Bethesda, MD 20014

Contractual Matters

(thru OCA)

Ruth S. McClure
Grants Management Officer
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Bethesda, MD 20014

NOTE: Follow-On Project to G-32-B02 (02 Year).

Defense Priority Rating: N/A

Assigned to: Biology (School/~~Laboratory~~)

COPIES TO:

Project Director
Division Chief (EES)
School/Laboratory Director
Dean/Director-EES
Accounting Office
Procurement Office
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✓ Reports Coordinator (OCA)

Library, Technical Reports Section
EES Information Office
EES Reports & Procedures
Project File (OCA)
Project Code (GTRI)
Other C. E. Smith

SPONSORED PROJECT TERMINATION SHEETDate 1/29/82

Project Title: Genetics of Thermal Acclimation, Membranes and Aging

Project No: G-32-B03

Project Director: Dr. D. B. Dusenbery

Sponsor: DHEW/PHS/NIH - National Inst. on Aging

Effective Termination Date: 8/31/81Clearance of Accounting Charges: 8/31/81

Grant/Contract Closeout Actions Remaining:

None

- ☐ Final Invoice and Closing Documents
- ☐ Final Fiscal Report
- ☐ Final Report of Inventions
- ☐ Govt. Property Inventory & Related Certificate
- ☐ Classified Material Certificate
- ☐ Other _____

Assigned to: Biology (School/Laboratory)COPIES TO:

Administrative Coordinator
Research Property Management
Accounting
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~~Reports Coordinator (OCA)~~
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EES Public Relations (2)
Computer Input
Project File
Other _____

67 302-2003

FINAL PROGRESS REPORT

Title: Genetics of Thermal Acclimation, Membranes and Aging

Number: R01 AG 00942

Period: May 1, 1978 through August 31, 1981

P.I.: David B. Dusenbery

Organization: Georgia Institute of Technology

The basic objective of this project was to explore the interrelationships between thermal acclimation, membrane properties, and aging in the nematode Caenorhabditis elegans. The organism was selected in order to make use of special properties it possesses for the isolation of mutations that would be useful to understanding these interrelationships. Toward this end several techniques were developed that hold promise for future studies in this area and some progress was made toward elucidating the relationships.

The principle results of the project are:

1. Cold resistant strains of C. elegans were isolated. These strains have the property that when grown at 25°C they are able to chemotax at 10°C whereas the wild-type cannot. Mutants of this type have not previously been reported and they may prove to be very useful in analyzing mechanisms of cold resistance. Since they perform better than wild-type, trivial reasons for their phenotype are less likely than in the usual defective phenotype mutant.
2. Measurements of the viscosity of lipids extracted from C. elegans, using fluorescence polarization of diphenylhexatriene, demonstrated a high degree of variability between extractions. This lack of reproducibility limited the range of studies that could be carried out. However, it was demonstrated that the viscosity of lipids extracted from whole animals has a very low degree of thermal acclimation. In addition, several of the cold-resistant mutants do not show abnormalities in lipid viscosity.

3. Procedures were developed for obtaining pure populations of old nematodes using selective screening. Synchronous cultures were started with first and second stage larvae obtained by filtration on a Nitex filter. Once worms had grown to the egg bearing stage synchrony was maintained by intermittent filtering on a stainless steel 400 mesh filter. Adult worms were retained and transferred to fresh plates. If larvae contaminated the cultures, they were individually killed with a hot needle. Success requires careful attention to detail. Synchrony has been maintained without drugs for up to 21 days.
4. These procedures were used to investigate changes in the temperature dependence of locomotor activity with age. It was found that the temperature dependence of locomotor activity was altered. The activity at growth temperature and the maximum activity within the temperature range 5 to 35°C decreased with age. Furthermore, the young worms (6 days) were more active at temperatures below their growth temperature than were aged worms (14 and 19 days).
5. Instrumentation was assembled to measure total luminescence spectroscopy and used to characterize the changes in fluorescence during aging in C. elegans. The details are described in the attached manuscript. The principle points are that fluorescence generally increases with age but that fluorescence of the cuticle increases dramatically and thus this may be a good system in which to study collagen aging.

Publications in preparation:

1. Total luminescence spectroscopy of fluorescence changes during aging in Caenorhabditis elegans.
2. Extent of thermal acclimation of lipid viscosity in the nematode Caenorhabditis elegans.