

GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF CONTRACT ADMINISTRATION  
SPONSORED PROJECT INITIATION

Date: June 18, 1979

Project Title: Developmental - Genetic Regulation of Brain Tryptophan Transport

Project No: G-32-658

*Green card*

Project Director: Dr. James A. Diez

Sponsor: National Science Foundation

Agreement Period: From 6/15/79 Until 11/30/82 (Grant Period)

Type Agreement: Grant No. BNS-7905601, dated 6/8/79

Amount: \$85,000 NSF  
4,474 GIT (G-32-327)  
\$89,474 TOTAL

Reports Required: Annual Progress Reports; Final Project Report

Sponsor Contact Person (s):

Technical Matters

NSF Program Official  
Nathaniel G. Pitts  
Assistant Program Director, Neurobiology Program  
Neurosciences  
Div. of Behavioral and Neural Sciences  
Directorate for Biological, Behavioral and  
Social Sciences  
National Science Foundation  
Washington, D. C. 20550  
202/634-4036

Contractual Matters

(thru OCA)

NSF Grants Official  
Mr. Thomas F. Griffin  
EBS/SE Branch  
Division of Grants and Contracts  
Directorate for Administration  
National Science Foundation  
Washington, D. C. 20550  
202/632-7496

Defense Priority Rating: n/a

Assigned to: Biology (School/Laboratory)

COPIES TO:

Project Director  
Division Chief (EES)  
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Project File (OCA)  
Project Code (GTRI)  
Other \_\_\_\_\_

SPONSORED PROJECT TERMINATION SHEETDate July 12, 1983Project Title: Developmental - Genetic Regulation of Brain Tryptophan TransportProject No: G-32-658Project Director: Dr. James A. DiezSponsor: National Science FoundationEffective Termination Date: 11/30/82Clearance of Accounting Charges: 11/30/82

Grant/Contract Closeout Actions Remaining:

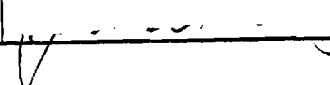
- ☐ Final Invoice and Closing Documents
- ☒ Final Fiscal Report FCTR
- ☐ Final Report of Inventions
- ☐ Govt. Property Inventory & Related Certificate
- ☐ Classified Material Certificate
- ☐ Other \_\_\_\_\_

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

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Project File  
Other Diez

<b>NATIONAL SCIENCE FOUNDATION</b> Washington, D.C. 20550		<b>FINAL PROJECT REPORT</b> NSF FORM 98A			
PLEASE READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING					
<b>PART I-PROJECT IDENTIFICATION INFORMATION</b>					
<b>1. Institution and Address</b> Georgia Institute of Technology Atlanta, Georgia 30332	<b>2. NSF Program</b> Neurobiology	<b>3. NSF Award Number</b> BNS-7905601			
	<b>4. Award Period</b> From 6/15/79 To 11/30/82	<b>5. Cumulative Award Amount</b> \$91,312			
<b>6. Project Title</b> Developmental-genetic regulation of brain tryptophan transport.					
<b>PART II-SUMMARY OF COMPLETED PROJECT (FOR PUBLIC USE)</b>					
<p>The major aim of this project was to determine whether the system which transports tryptophan (TRP) across the neuronal cell membrane shows significant physiological variation due to genotype of developmental age. TRP is the precursor of the neurotransmitter serotonin; variations in TRP availability can alter serotonin synthesis, and thereby affect the many behaviors modulated by serotonin.</p> <p>The membrane transport system for TRP was studied in synaptosomes (nerve endings) prepared from whole mouse brain; the accumulation of radioactive TRP was used to characterize the maximum transport rate (<math>V_{max}</math>) and the affinity of the carrier for TRP (<math>K_m</math>). The transport constants were measured in preparations from several strains of mice which show differing behavioral traits; developmental changes in the constants were studied from birth to sexual maturity (approx. 8 wks.).</p> <p>The major hypotheses of this study were confirmed: significant genetic differences in the <math>V_{max}</math> and developmental changes in both the <math>K_m</math> and <math>V_{max}</math> for TRP transport were identified. Attempts to find a hormonal basis for the differences were not successful.</p> <p>Experiments on the mechanism by which TRP is accumulated in synaptosomes have helped to resolve a controversy about how many carrier systems move TRP across the membrane. Our results indicate the existence of one system with relatively high affinity; the "low affinity" system which also appears in most TRP uptake studies seems to result from intra-cellular binding rather than movement across the membrane. These experiments also led to the discovery of a TRP-binding "phenomenon" in brain cell membrane fragments. This binding appears to behave much like a receptor for TRP, except that its dissociation constant (<math>K_d</math>) is relatively high (<math>1 \mu M</math>). The binding we measure could be to the carrier which transports TRP, except that it does seem to be unique to brain (we have not been able to measure it in liver, kidney, heart, erythrocytes, or platelets).</p>					
<b>PART III-TECHNICAL INFORMATION (FOR PROGRAM MANAGEMENT USES)</b>					
1.	NONE	ATTACHED	PREVIOUSLY FURNISHED	TO BE FURNISHED SEPARATELY TO PROGRAM	
ITEM (Check appropriate blocks)				Check (✓)	Approx. Date
a. Abstracts of Theses				✓	7/15/83
b. Publication Citations				✓	7/15/83
c. Data on Scientific Collaborators	✓				
d. Information on Inventions	✓				
e. Technical Description of Project and Results				✓	7/15/83
f. Other (specify)					
<b>2. Principal Investigator/Project Director Name (Typed)</b> James A. Diez		<b>3. Principal Investigator/Project Director Signature</b> 		<b>4. Date</b> 5/18/83	