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OCA PAD INITIATION - PROJECT HEADER INFORMATION

07/17/91

Active

Project #: E-16-M20 Cost share #: Rev #: 0
Center #: 10/24-6-R6572-3A1 Center shr #: OCA file #:
Contract#: 5 R01 HL41267-04 Mod #: Work type : RES
Prime # ~~5 R01 HL41267-04~~ Document : GRANT
Contract entity: GTRC

Subprojects ? : N CFDA: N/A
Main project #: PE #: N/A

Project unit: AERO ENGR Unit code: 02.010.110
Project director(s):
GIDDENS D P AERO ENGR (404)894-3781

Sponsor/division names: UNIV OF CHICAGO / CHICAGO, IL
Sponsor/division codes: 400 / 015



Award period: 910515 to 920430 (performance) 920630 (reports)

Sponsor amount	New this change	Total to date
Contract value	112,425.00	112,425.00
Funded	112,425.00	112,425.00
Cost sharing amount		0.00

Does subcontracting plan apply ? : N

Title: BIOMECHANICAL FACTORS IN ANASTOMOTIC INTIMAL HYPERPLASIA

PROJECT ADMINISTRATION DATA

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Sponsor technical contact Sponsor issuing office

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Security class (U,C,S,TS) : U ONR resident rep. is ACO (Y/N): N
Defense priority rating : N/A NIH supplemental sheet
Equipment title vests with: Sponsor GIT X

Administrative comments -
INITIATION OF PROJECT. CONTINUATION OF E-16-M06.

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

10/11/92

Closeout Notice Date 10/02/92

Project No. E-16-M20 _____ Center No. 10/24-6-R6572-3A1_
Project Director GIDDENS D P _____ School/Lab AERO ENGR _____
Sponsor UNIV OF CHICAGO/CHICAGO, IL _____
Contract/Grant No. 5 R01 HL41267-04 _____ Contract Entity GTRC
Prime Contract No. 5 R01 HL41267-04 _____
Title BIOMECHANICAL FACTORS IN ANASTOMOTIC INTIMAL HYPERPLASIA _____
Effective Completion Date 920430 (Performance) 920630 (Reports)

Closeout Actions Required:	Y/N	Date Submitted
Final Invoice or Copy of Final Invoice	Y	920618
Final Report of Inventions and/or Subcontracts	Y	_____
Government Property Inventory & Related Certificate	N	_____
Classified Material Certificate	N	_____
Release and Assignment	N	_____
Other _____	N	_____
Comments _____		

Subproject Under Main Project No. _____

Continues Project No. E-16-M06 _____

Distribution Required:

Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Management	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	Y
Project File	Y
Other _____	N
_____	N

NOTE: Final Patent Questionnaire sent to PDPI.

Progress Report for RO1 Grant
Biomechanical Factors in an Anastomotic Intimal Hyperplasia
May 1, 1991 - April 30, 1992

Overview

Significant progress has been achieved in our efforts to understand the hemodynamic and biomechanical factors which result in an anastomotic intimal hyperplasia. Saphenous vein and polytetrafluoroethylene (PTFE) bypass grafts have been placed in dogs and two separate and distinct types of anastomotic intimal thickening have been identified. The first is related to the anastomotic suture line and appears to be related to compliance mismatch as evidenced by greater intimal thickness in PTFE anastomosis compared to vein anastomoses. The second is on the floor of the anastomosis, remote from the suture line, and appears to be flow induced.

Analogous flow models have been produced and flow has been evaluated both qualitatively and quantitatively. Low flow velocities and oscillation of shear stress have been demonstrated on the floor of the anastomosis in the region of the flow induced intimal thickening. The adverse hemodynamic conditions and prolonged particle stasis can be eliminated by exercise flow conditions in the anastomoses. Quantitative flow visualization methodology has been perfected and automated for three dimensional particle tracking. These measurements have been validated by laser Doppler anemometry measurements.

During the past year we have presented our findings at nine major national and international meetings with brief publications and abstracts. One full length manuscript and book chapter have been published. Active and on-going investigations to complete the quantitative correlation of anastomotic intimal thickening and flow field measure are under way and will be completed during the next year. However, this requires that our expected animal cost will remain constant for the 04 to the 05 year. The major problem facing us this next year relates to the budget cut which will severely compromise the number of experiments that can be performed. Therefore, we are requesting that our 05 budget be increased to the 04 years level of \$223,559 in order to complete these important experiments.

Abstracts

1. Bassiouny, H.S., White, S.S., Zarins, C.K., Giddens, D.P. and Glagov, S., *Anastomotic intimal thickening in end-to-side arterial anastomoses*, Proceedings of Cardiovascular Science and Technology: Basic and Applied, II. Louisville, KY, pp. 77-78. December 2, 1990.
2. Giddens, D.P., Zarins, C.K., Giddens, E.M., Bassiouny, H. and Glagov, S. *Exercise flow affects hemodynamics of end-to-side vascular graft models*. Proceedings Cardiovascular Science and Technology: Basic and Applied, II. Louisville, KY, pp. 47-49. November 30-December 2, 1990.
3. Loth, F., Bassiouny, H.S., Jones, S.A., Giddens, D.P., Glagov, S. and Zarins, C.K., *Velocity and wall shear measurements in an end-to-side vascular anastomosis model*. The NATO Advances Study Institute on "Frontiers in Cardiovascular Engineering. December, 1991.
4. Bassiouny, H.S., Loth, F., Giddens, D.P., Jones, S., Glagov, S., Zarins, C.K., *Measurement of wall shear in an end-to-side vascular anastomosis model: correlation*

with experimental intimal thickening. Presented at the Cardiovascular Science and Technology Conference, December 1991.

5. Figueras, C., Jones, S.A., Giddens, D.P., Zarins, D.K., Bassiouny, H.S. and Glagov, S., *Relationships between flow patterns and geometry in end-to-side anastomotic grafts.* American Society of Mechanical Engineers Winter Annual Meeting. December 1991, Atlanta, Georgia.

6. Glagov, S., Bassiouny, H.S., Giddens, D.P. and Zarins, C.K., *Role of mechanical forces in the induction and composition of intimal thickening.* III International Workshop on Vascular Hemodynamics. October, 1991. Bologna

7. Tsao, R., Giddens, D.P., Zarins, C.K. and Glagov, S., *Quantitative flow visualization by particle tracking in arterial models.* July 7-12, 1991, Kyoto, Japan.

8. Giddens, D.P., Zarins, C.K., Giddens, E.M., Bassiouny, H. and Glagov, S., *Exercise flow affects hemodynamics of end-to-side vascular graft models.* Proceedings. Third USA-Chins-Japan Conference on Biomechanics. August 25-29, 1991, Atlanta, Georgia.

9. Tsao, R., Jones, S.A., Giddens, D.P., Zarins, C.K. and Glagov, S., *Quantitative velocity measurements obtained by an automated particle tracking system and validated by LDA measurements.* Proceedings. Third USA-Chins-Japan Conference on Biomechanics. August 25-29, 1991, Atlanta, Georgia.

10. Tsao, R., Jones, S.A. Giddens, D.P., Zarins, C.K. and Glagov S., *Automatic three-dimensional particle tracking in an internal flow model.* ASME Summer Conference, June 17-19, 1991, Ohio State, Columbia, Ohio.

Manuscript

1. Bassiouny, H.S., White, S., Glagov, S., Choi, E., Giddens, D.P. and Zarins, C.K., *Anastomotic intimal hyperplasia; mechanical injury or flow induced.* Journal Vascular Surgery, 1991.

Book Chapter

1. Bassiouny, H.S., Zarins, C.K., Glagov, S. and Giddens, D.P., *Hemodynamic factors in anastomotic intimal thickening.* International Symposium on Redo Vascular Surgery, June 1992.

Program Income

There is no anticipated program income from this award.

