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Effect of a 10 Day Decrease in Physical Activity on Circulating Angiogenic Cells

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Effect of a 10 day Decrease in Physical Activity on Circulating Angiogenic Cells

A Thesis Presented

By

GAYATRI GUHANARAYAN

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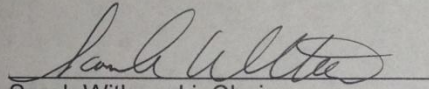
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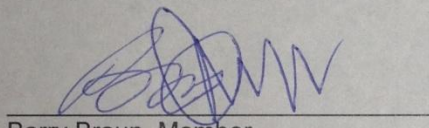
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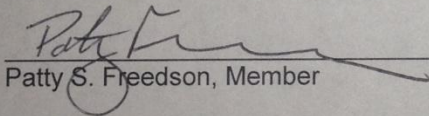
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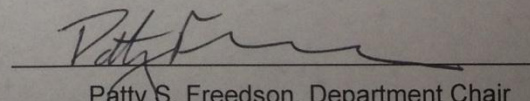
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ABSTRACT

EFFECT OF A 10 DAY DECREASE IN PHYSICAL ACTIVITY ON CIRCULATING ANGIOGENIC CELLS

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Circulating angiogenic cells (CACs) are early predictors of cardiovascular health and are inversely proportional to related outcomes. Increased number and function of CACs is seen in healthy individuals compared with individuals with cardiovascular disease (CVD). Exercise increases CAC number and function in CVD populations, through a nitric oxide-mediated mechanism. Inactivity is a growing concern in industrialized nations; it is an independent risk factor for CVD and is linked to increased mortality. The purpose of this study was to understand the effect of reduced physical activity (rPA) on two CAC populations (CFU-Hill and CD34⁺) in highly active individuals. We examined the mechanisms underlying changes in CAC function as a result of rPA with maintained energy balance. The two sub-populations of CACs responded differently to rPA. CFU-Hill CACs, decreased in number and amount of intracellular nitric oxide while CD34⁺ cells, did not change. Gene expression analyses indicated that oxidative stress-related genes did not change in CFU-Hill cells with rPA. However, correlations between CFU-Hill cell numbers, intracellular nitric oxide, and genes that are related to nitric oxide were observed. We concluded that rPA caused the observed decrease in CFU-Hill number and intracellular nitric oxide through a decrease in nitric oxide cellular availability, not oxidative stress.

TABLE OF CONTENTS

	PAGE
ABSTRACT.....	iii
LIST OF TABLES.....	vi
LIST OF FIGURES.....	vii
CHAPTER	
1. INTRODUCTION.....	1
2. LITERATURE REVIEW.....	5
2.1 Introduction.....	5
2.2 Cardiovascular Disease and Endothelial Function.....	5
2.3 Circulating angiogenic cells (CACs).....	9
2.5 Inactivity and CACs.....	17
2.6 Summary of literature review.....	24
3. METHODS.....	26
3.1 Introduction.....	26
3.2 Subjects.....	26
3.3 Experimental Set-up.....	26
3.4 Protocols.....	27
3.5 Statistical Analyses.....	33
4. RESULTS.....	34
4.1 Subject characteristics.....	35
4.2 Physical activity.....	36
4.3 Cell number.....	40
4.4. Intracellular Nitric Oxide.....	41
4.5 Gene expression.....	43
4.6 Correlations and Regressions.....	51

5. DISCUSSION	57
5.1 Reduced physical activity model.....	57
5.2 rPA response of CFU-Hill CAC.....	58
5.3 CD34 ⁺ cell response.....	62
5.5 Conclusion.....	66
 APPENDIX: QUESTIONNAIRES, INFORMED CONSENT AND PROTOCOLS	 68
 BIBLIOGRAPHY	 118

LIST OF TABLES

Table	Page
1. Names and regulatory roles of genes related to nitric oxide.....	32
2. Subject Characteristics.....	35

LIST OF FIGURES

Figure	Page
1. Different culturing techniques that lead to Early and Late Outgrowth CACs.....	11
2. CAC CFUs and Framingham Risk Score for CVD	12
3. Possible pathways by which exercise leads to repair and maintenance of an intact endothelial cell layer through CACs	12
4. Moderate, vigorous and very vigorous physical activity (MVPA) in minutes per day for baseline and rPA.....	37
5. Moderate physical activity in minutes per day for baseline and rPA.....	37
6. Vigorous physical activity in minutes per day for baseline and rPA.....	38
7. Very vigorous physical activity in minutes per day for baseline and rPA.....	38
8. Vigorous and very vigorous physical activity in minutes per day for baseline and rPA.....	39
9. Sedentary time in minutes per day for baseline and rPA.....	39
10. CD34 ⁺ cell numbers at baseline and rPA.....	40
11. CFU-Hill colony numbers at baseline and rPA.....	41
12A. CD34 ⁺ cells intracellular nitric oxide in relative fluorescence units RFUs between baseline and rPA.....	41
12B. Individual data CD34 ⁺ cells intracellular nitric oxide in relative fluorescence units RFUs between baseline and rPA.....	42
13A. CFU-Hill cells intracellular nitric oxide in relative fluorescence units RFUs between baseline and rPA.....	42
13B. Individual data for CFU-Hill cells intracellular nitric oxide in relative fluorescence units RFUs between baseline and rPA.....	43

14A. CD34 ⁺ cells eNOS, iNOS, Sirt1, Cav1 fold change at rPA, relative to baseline.....	44
14B. CD34 ⁺ cells eNOS, iNOS, Sirt1, Cav1 fold change at rPA, relative to baseline, individual data.....	45
15A. CD34 ⁺ cells Nox2, Nox4, p47phox and SOD1 fold change at rPA, relative to baseline.....	46
15B. CD34 ⁺ cells Nox2, Nox4, p47phox and SOD1 fold change at rPA, relative to baseline individual data.....	47
16A. CFU-Hill cells eNOS, iNOS, Sirt1, Cav1 fold change at rPA, relative to baseline.....	48
16B. CFU-Hill cells eNOS, iNOS, Sirt1, Cav1 fold change at rPA, relative to baseline, individual data.....	49
17A. CFU-Hill cells Nox2, Nox4, p47phox and SOD1 fold change at rPA, relative to baseline.....	50
17B. CFU-Hill cells Nox2, Nox4, p47phox and SOD1 fold change at rPA, relative to baseline, individual data.....	51
18A. Correlation of CFU-Hill colonies with CFU NOi.....	53
18B. Correlation of CFU-Hill colonies with CFU eNOS	53
18C. Correlation of CFU-Hill colonies with CFU Sirt1.....	53
19A. Correlation of CFU NOi with CFU eNOS.....	54
19B. Correlation of CFU NOi with CFU Sirt1	54
19C. Correlation of CFU NOi with CFU Cav1	55
20A. Correlation of CFU eNOS with CFU iNOS	55
20B. Correlation of CFU eNOS with CFU Sirt1	56
20C. Correlation of CFU eNOS with CFU Cav1.....	56