

MOLECULAR METAPHORS  
TAKING ON LIVES OF THEIR OWN:  
AN INVESTIGATION OF METAPHOR  
IN THE CONCEPTUALISATION OF  
GENETICS AND IMMUNOLOGY

By: Lauren Sylvan Brom

Student Number: 9905191Y

A research report submitted to the Faculty of Arts, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Arts (by coursework and research report).

Johannesburg, 2004.

## ABSTRACT

Genetics and immunology presently hold tremendous possibilities for changing the future through their biotechnological applications. To comprehend such complex subjects metaphor is generally employed. It is my contention that as these scientific concepts are repeatedly reinforced in both scientific and mass media representations, the metaphors suffuse our conceptual system to such an extent that they are no longer recognised as metaphors. Instead, they tend to be viewed as scientific 'fact'. I have termed such pervasive metaphors, '*concept metaphors*'. I argue that the predominant concept metaphors regarding genetics and immunology are '*information coding*' and '*militarization*', respectively. Through this research, the origins of these concept metaphors as well as the extent to which they influence our current perceptions of life and health, become startlingly patent. I conclude by demonstrating how the utilisation of novel metaphors can significantly alter our conceptualisations and consequently, perceptions of these areas of molecular biology.

## DECLARATION

I declare that this research report is my own original work. It is submitted (in partial fulfilment of the requirements) for the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.

---

Lauren Sylvan Brom

\_\_\_\_\_ day of \_\_\_\_\_ 2004.

# DEDICATION

To my parents  
who provided me with a nurturing environment and genes

## ACKNOWLEDGEMENTS

I would like to gratefully thank my supervisor Nicole Ridgway for her fascinating knowledge and insights into the nature of science, when I thought I knew the science of nature. You helped me to more fully appreciate metaphors and you inspired me to liberate my mind, although initially I was not even aware that it was closed (if you'll excuse the metaphor). Thank you for your perceptive, understanding and adept supervision as well as your kindness and empathy. I realise how lucky I have been to have you as my supervisor.

I would also like to thank everyone else who helped to make my Masters such an enjoyable learning experience:

My original animation class comprising: Andrew, Carlos, Luke, Mapitsi, Nick, and Tes. Thanks for all the fun, laughter and friendship.

Christo Doherty for allowing me to join.

Angus and Phil for their animated, technical assistance.

Also Alison, Hanli, Tamiko and those in 'the next class'.

Rat for our sustained friendship and for informing me about the course.

My family, for all their love and support.

Funding for this research was appreciatively obtained from: The National Research Foundation/Department of Labour's Scarce Skills Scholarship, and the Postgraduate Merit Award from the University of the Witwatersrand.

# CONTENTS

TITLE PAGE.....	i
ABSTRACT.....	ii
DECLARATION.....	iii
DEDICATION.....	iv
ACKNOWLEDGEMENTS.....	v
CONTENTS.....	vi
1. CHAPTER ONE:.....	1
INTRODUCTION.....	1
1.1. SCIENCE SERVING SOCIETY AND SOCIETY SERVING SCIENCE.....	9
2. CHAPTER TWO:.....	14
MIND YOUR METAPHORS.....	14
2.1. THE CONCEPT METAPHOR.....	17
2.2. THE MEETING OF THE MADE UP MINDS: METAPHOR, SCIENCE AND CULTURE.....	19
3. CHAPTER THREE:.....	24
INFORMING GENETICS.....	24
3.1. METAPHORICALLY CODING INFORMATION IN POPULAR REPRESENTATIONS OF GENETICS.....	26
3.1.1. CATEGORISING GENETIC METAPHORS.....	29
3.2. A CRICK IN DOGMATIC SCIENCE.....	35
3.2.1. THE CENTRAL DOGMA.....	36
3.2.1.1. DIAGRAM 1:.....	37
THE CENTRAL DOGMA OF MOLECULAR BIOLOGY.....	37
3.3. HOW INFORMATION THEORY.....	41
INFORMED GENETIC INFORMATION.....	41
3.3.1. SHANNON AND INFORMATION THEORY.....	41
3.4. PHYSICS AND GENETICS.....	43
3.5. THE SUCCESS OF THE SECRET OF LIFE.....	47
3.6. APPROPRIATION OF INFORMATION THEORY.....	50
INTO BIOLOGY AND GENETICS.....	50
3.6.1. CYBERNETICS AND ITS CONTROL OVER GENETICS.....	55
3.6.2. INFORMATION/MATERIALITY HIERARCHY.....	58
3.7. GENETIC CONTROL.....	59
4. CHAPTER FOUR:.....	64
IMMUNE RESPONSES.....	64
4.1. THE CONCEPTION OF IMMUNOLOGY.....	68
4.1.1 ORIGINS OF THE MILITARIZATION CONCEPT METAPHOR.....	75
4.2. BODY BOUNDARIES.....	78
4.3. PRECEDENT PATHOLOGIES.....	80
4.4. MERGING METAPHORS.....	87
5. CHAPTER FIVE:.....	96
CONCLUSION AND THEORETICAL IMPLICATIONS.....	96
6. BIBLIOGRAPHY.....	110
6.1. MEDIA.....	110
6.1.1. JOURNAL ARTICLES.....	115
6.1.2. NEWSPAPERS AND MAGAZINES.....	118
6.1.3. EDUCATIONAL BOOKLETS.....	120