University of Alberta

Replacement Parts:
The Fragmentation and Mystification of the Body in the Human Embryonic Stem Cell Debates

by

Laura Sikstrom 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Arts

Department of Anthropology

Edmonton, Alberta

Fall, 2002

University of Alberta

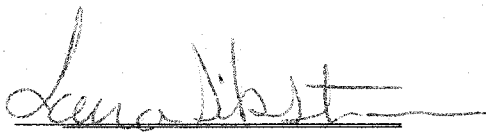
Library Release Form

Name of Author: Laura Sikstrom

Title of Thesis: Replacement Parts: The Fragmentation and the Mystification of the Body in the Human Embryonic Stem Cell Debates

Degree: Master of Arts

Year this Degree Granted: 2002



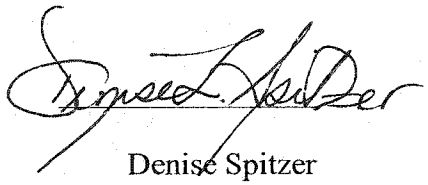
Laura Sikstrom
1911 - 1 Avenue
Cold Lake, AB
T9M-1E4

September 5, 2002

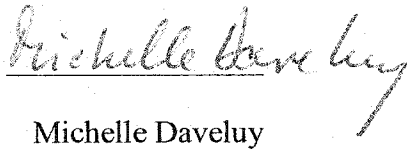
University of Alberta

Faculty of Graduate Studies and Research

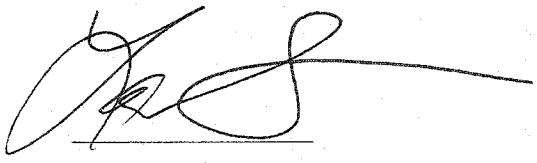
The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled *Replacement Parts: The Fragmentation and Mystification of the Body in the Human Embryonic Stem Cell Debates*, submitted by Laura Sikstrom in partial fulfillment of the requirements for the degree of Master of Arts.



Denise Spitzer



Michelle Daveluy



Laura Shanner

AUGUST 16 2002

Abstract

Developments in human embryonic stem cell technology since their derivation in November of 1998 (Thomson, et al. 1998) have opened up a new world in which a multitude of different kinds of human body components can be isolated and used for commercial, medical, and scientific purposes. Throughout the industrial world these developments have been met with varying responses that range from opposition and criticism to approval and advocacy, and in North America they have provoked a widespread public debate. The purpose of this study is to analyse the rhetoric of the debate surrounding human embryonic stem cells in Canadian and American print news media. I argue throughout this thesis that the rhetoric surrounding the hES cell debates fragments the human body into a series of "replaceable parts" while at the same time mystifying it, and imparting it with symbolic significance.

Acknowledgements

I would like to acknowledge the many people who in some way helped make this research a challenging and meaningful process. Many people have directly or indirectly encouraged, inspired and directed me and my work over the years. Therefore, it would be impossible to mention every person who has affected the outcome of this work in big or small ways so I will only attempt to mention those people who had the largest impact.

First and foremost I want to thank my supervisors Dr. Denise Spitzer and Dr. Michelle Daveluy at the University of Alberta. Both offered constructive advice on countless occasions and were tireless in their quest to make this thesis the best that it could be. We have shared many conversations in which I benefited from their knowledge, scholarship and experience. I am also indebted to Dr. Laura Shanner for her willingness to join my committee and her informed perspectives on bioethics and human embryonic stem cells.

I thank my family for their constant support, and patience throughout the many years that I have been in school. They have always encouraged my enthusiasm and curiosity about the world. I also want to thank the many other graduate students in the department who have provided editorial advice and support in many forms, such as a regular Friday morning coffee. In particular, I want to thank Lisa Wozniak, Lori Kiel, Jenaya Webb, Trish Bailey, Kim Balbaaki, and Maija Prakash for making these two years both productive and enjoyable. I am also indebted to Grant Zazula, who has always backed my

aspirations with warm encouragement and praise, sometimes forcing me out of bed on those mornings when I really did not want to type at my computer all day.

Finally, I want to acknowledge that although this thesis has been inspired by many, the flaws are entirely my own. I am restricted to my own limitations and no responsibility belongs to those mentioned above.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
AP	Associated Press
CIHR	Canadian Institutes for Health Research
CP	Canadian Press
hES	Human Embryonic Stem Cells
NBAC	National Bioethics Advisory Committee
RNA	Reuters News Agency

Introduction

Thesis Statement

Developments in human embryonic stem cell technology since their derivation in November of 1998 (Thomson, et al. 1998) have opened up a new world in which a multitude of different kinds of human body components can be isolated and used for commercial, medical, and scientific purposes. Throughout the industrial world these developments have been met with varying responses that range from opposition and criticism to approval and advocacy, and in North America they have provoked a widespread public debate. The purpose of this study is to analyse the rhetoric of the debate surrounding human embryonic stem cells (hES cells)[1] in Canadian and American print news media. More specifically, I ask how has this rhetoric been influenced by scientific and medical ways of knowing the body? Also how are hES cells culturally relative and culturally constructed in Canada and the United States? I argue throughout this thesis that the rhetoric surrounding the hES cell debates both fragments and mystifies the human body, which is reflective of a science and medicine that objectify the human body and a society that personifies it.

The data for this thesis was collected in Edmonton at the University of Alberta, from September 2001 to January 2002. The data consists of 699 news media articles from six newspapers and three magazines. The data was analysed from January to March 2002 using anthropological research methodologies that included a content, rhetorical and thematic analysis. The analysis resulted in a historically grounded and culturally relative account of hES cells.

Why Human Embryonic Stem Cells?

Throughout my personal and academic life I have had a long-standing interest in medical anthropology, and in particular, women's health issues and reproductive technologies. As an honours student at McGill University I conducted two research projects concerned with women's health issues. The first dealt with relationships and teenage pregnancy in Cold Lake, Alberta. The second project was a pilot study that was concerned with the health of female, out-of-province students at McGill University. As a result of my interest in gender and health I focused my research interests on new reproductive technologies, abortion, childbirth and fertility.

Stem cell technology and the accompanying use of human embryos for research purposes interested me for a variety of reasons. First, the human embryo research debates have been discussed in the context of the abortion debate re-opening the question: "when does life begin?" Developments in stem cell technology have disrupted and challenged people's perceptions of embryo personhood. These developments are also capable of affecting women's conceptions of their bodies, gestation, and childbirth. Hence, the study of hES cell technology is intimately tied to my previous research on reproductive technologies and women's health. Finally, the study of biotechnology in general has larger implications for the anthropological study of medicine, science and the emerging field of bioethics[2].

Thesis Objectives

The objective of this thesis is threefold: first, this thesis will analyse and compare the rhetoric surrounding hES cells in Canadian and American print news media; second, it will address the cultural construction of hES cells, highlighting the cultural biases and the cultural bases that underlie the rhetoric applied through medical, scientific and lay perceptions of the human embryo; and third, I will draw conclusions from within the theoretical framework of medical anthropology, furthering our understanding of the social, cultural and ethical aspects of hES cell research in North America and contribute to our cultural understandings of when life itself begins and ends.

This thesis will also address current theoretical issues in anthropology by asking the following questions: How are hES cells described and interpreted in Canadian and American news media? In what ways is the human body constructed in news media, and how does the media disseminate scientific knowledge? What is the general relationship between news media, rhetoric and ideology, and what are the processes by which news media reproduces or alters ideology? How do these descriptions influence and reflect North American concepts of the human body and personhood? What affect will developments in hES cell technology have on North American concepts of health and healing? How will these technological developments affect marginalized groups, such as women and the aging? Are the social determinants of health being taken into consideration? How does the study of hES cells provide an avenue for understanding the politics, economies and cultural values of North America?

This thesis is divided into five chapters. The following is an outline of each chapter.

In Chapter one, Sample and Methodology, I provide the detail of the sample and methodology I employed in my data collection and analysis, and outline some of the potential methodological limitations.

In Chapter two, Background and Theoretical Orientation, I give an outline of the biology of hES cells followed by a discussion of the debate surrounding hES cell research. This chapter also provides a summary of the literature review and describes the theoretical orientation that is used to analyse the data I collected and present in chapters three, four, and five. In addition, I analyse the rhetoric of news media, insisting on an examination of the social processes of communication as situated, interactive, motivated and asymmetrical (Gans 1980; Hackett and Zhao 1998; Herman and Chomsky 1988; Silverstone 1998).

In Chapter Three, Content Analysis, I analyse 520 newspaper articles from four newspapers to define and document the parameters of the hES cell debate. A definition of the parameters enables a discussion regarding the relevant issues to hES cell research in both Canada and the United States. This data is categorised into tables and figures that compare and contrast the relevant issues in order to analyse how, where and when hES cells are being discussed in news media. This chapter also includes a discussion of the relevant findings.

In Chapter Four, Rhetorical and Thematic Analysis, I analyse thirty newspaper articles from the sample for the content analysis in more detail by employing the methods of rhetorical and thematic analysis. This chapter

addresses the use of language and language techniques by journalists in order to persuade their audience to a certain point of view. This issue is presented within the larger context of a biomedical science that often disrupts long-standing dichotomies of nature/culture, life/death, old/young, and self/other (Lock 1995).

In Chapter Five, Conclusions, I discuss how associating hES cell technology with the genre of the "modern medical miracle stories" side-steps the bundle of economic, social and cultural issues that might otherwise challenge the developments of this technology. I also suggest possible future directions that include recontexualizing the human body, and that place the body back into its social space.

---

[1] I will use the term "hES cells" throughout the thesis when referring to human embryonic stem cells. This abbreviation is the recognized scientific abbreviation that is used widely throughout the sample articles.
[2] I follow Fox and Swazey (1984), and others (i.e. Hoffmaster 2001; Marshall 1992) in distinguishing bioethics as exclusively concerned with ethical issues driven by Western biomedicine from medical ethics or medical morality as more broadly relevant to healing systems in any culture.

Chapter 1

Sample and Methodology

In this Chapter I provide the detail of the sampling and methodology that I employed in my data collection and analysis, and outline some of the methodological limitations. This research project was designed to incorporate newspaper and magazine articles from a sample of American and Canadian news media sources. In September 2001, I obtained newspaper and magazine articles from the University of Alberta Library. With a sample of this data I conducted a content analysis of the hES cell coverage. Following the content analysis, I conducted a rhetorical and thematic analysis from a subset of the data. The analysis found various patterns of representation as well as some inconsistencies, implying that there are both similarities and differences between Canadian and American portrayals of hES cells. In order to understand the underlying context, I extended the data analysis beyond the sample articles to explore the background of the hES cell debates, and the relationship between news media, rhetoric and ideology, through a historical and contextual analysis of the news media sources.

Sample

The data is comprised of newspaper and magazine articles gathered from the following sources: the American sources included *The New York Times*, *The Washington Post*, and *Time*; English Canadian sources included *The Globe and Mail*, *The Toronto Star*, and *Maclean's*. Three French Canadian publications were also included in order to ascertain the scope of the hES cell news media

coverage in both English and French speaking Canada. The French sources included *La Presse*, *Le Devoir* and *L'Actualité*.

The goal in choosing the newspaper and magazine sources was to represent mainstream public opinion in both the United States and Canada. For instance, *The New York Times* is one of the most read newspapers in the world (Stephens 1988). *The Washington Post*, although not nationally distributed, is one of the most respected and prize winning newspapers in the United States.[1] *Time* magazine was chosen because it is the most read newsmagazine in North America.[2] A Canadian version is also published solely within Canada, the differences being the type of advertisements and an increase in Canadian content. Moreover, many of the authors of the sample articles are syndicated in newspapers that represent prevalent attitudes and values in North America.[3]

The Globe and Mail was chosen because it has been Canada's only national newspaper until the recent publication of *The National Post* in 1998. Although *The Toronto Star* is not nationally distributed it was chosen because it has the highest readership in Canada (Aldridge 2001). *Maclean's* was chosen because it is a Canadian owned and operated newsmagazine that defines itself as having a distinct Canadian focus (Desbarats 1990). Furthermore, the self-definition of these publications as *Canadian* reflects one of the main objectives of this study -- to compare American and Canadian conceptions of the human embryo and stem cells. The French Canadian sources were chosen because they address both national and regional interests (Aldridge 2001: 609).

In total, the data consists of 699 articles covering the time-span of January 1, 1999 to September 11, 2001. This period encompasses a critical and foundational interval of the public discourse surrounding hES cell research. Notably, there are no articles after September 11, 2001 on hES cells following the terrorist attack on the World Trade Centre in New York City. This period also reflects developments in public policy for hES cells in both Canada and the United States and the shift in the United States leadership with the Presidential election of George W. Bush and the more conservative Republican government.

The number of articles collected per news media source is outlined below in Tables 1, 2 and 3:

TABLE 1

Number of articles per year from the English Canadian sample.

	The Globe and Mail	The Toronto Star	Maclean's	Total
1999	15	14	1	30
2000	28	19	2	49
2001	70	47	3	120
Total	113	80	6	199

TABLE 2

Number of articles per year from the American sample.

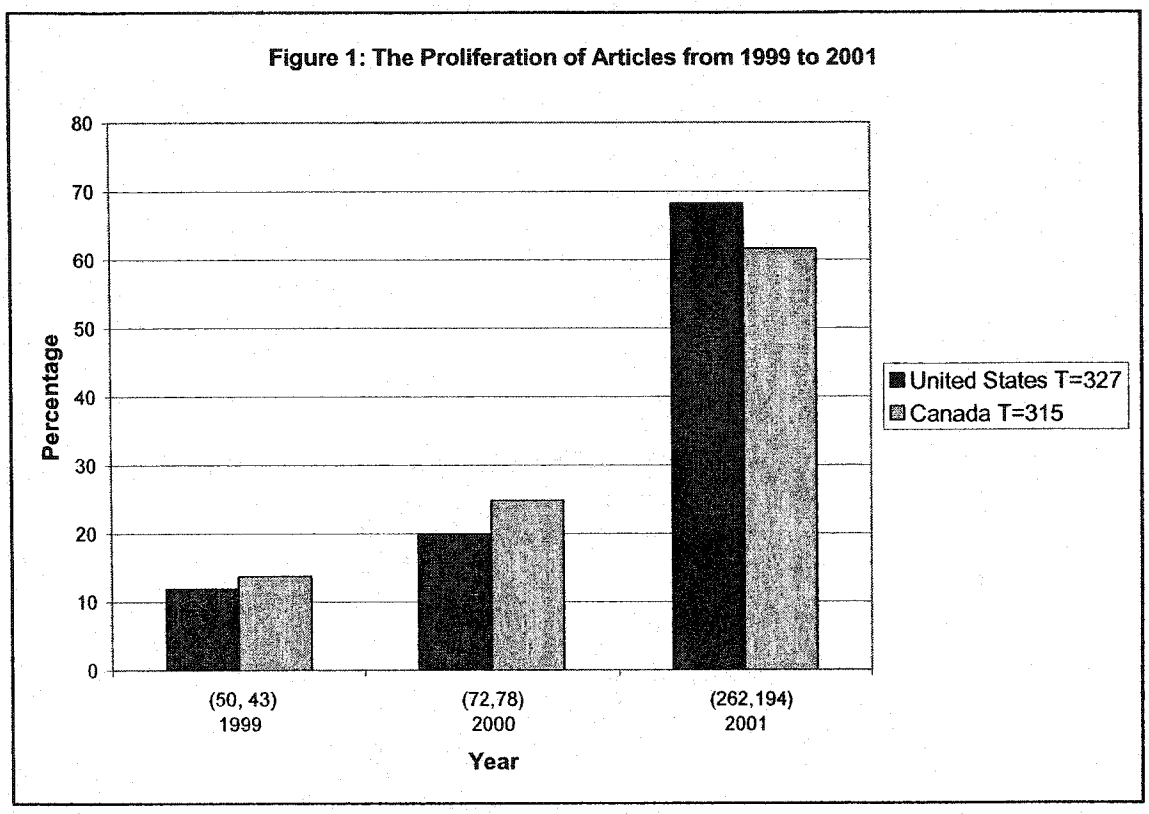
	The New York Times	The Washington Post	Time	Total
1999	18	21	11	50
2000	23	42	7	72
2001	114	109	39	262
Total	155	172	57	384

TABLE 3

Number of articles per year from the French Canadian sample.

	La Presse	Le Devoir	L'Actualité	Total
1999	10	1	2	13
2000	15	13	1	29
2001	46	28	0	74
Total	71	42	3	116

A comparison between the American and Canadian sources according to year indicates that the Canadian content comprises 45.1% (315/699) of the total compared to 54.9% (384/699) for the American content. The French content comprises 36.8% (116/315) of the Canadian content compared to 63.2% (199/315) for the English content. The sample also illustrates that the number of articles written on stem cells increased by more than three times from the year 1999 to the year 2001 (Figure 1). Therefore, in the year 2001, there was a proliferation of articles on stem cells in the American, English Canadian and French Canadian news media sources. Notably, until the year 2001 the Canadian sources published more articles on stem cells than the American sources.[4]



The sample for the content analysis is comprised of 520 newspaper articles from the American and English Canadian sources. The results of the data collection indicated that both the magazine and French Canadian articles should be excluded from this sample. For instance, the American magazine content comprised 14.8% (57/384) of the total compared to just 2.9% (9/315) for the Canadian total. Although the American magazine content is a significant portion of the total, magazines are a genre distinct from newspapers and cannot be coded and analyzed under the same guidelines. Thus, the magazines were excluded from the sample because the Canadian magazine articles could not provide any basis for comparison to the American magazine articles.

In addition, although I acquired articles from the French Canadian sources, I did not include these as part of the sample for the content analysis. In particular, over the last three decades Quebec has emphasized their cultural distinctiveness from English Canada (Aldridge 2001: 609). Thus, it was my judgment that the French language publications published in Quebec may be informed by a different cultural, religious, and historical context that I would be unable to account for in my analysis. Therefore the results of the analysis are limited to a comparison between the United States and English Canada.

The sample for the rhetorical and thematic analysis consists of a subset of data from the sample for the content analysis. The subset of the data was selected according to a judgmental sampling frame (Bernard 1995). The judgmental sampling frame followed the following guidelines: (1) any articles written by a news agency service would be excluded from the sample; (2) only articles classified as "informative" would be included; (3) the sample would consist of thirty articles in total, fifteen would be from the American sample and fifteen from the English Canadian sample; and (4) ten articles (divided equally between the two countries) would be selected for each of the following years: 1999, 2000, and 2001.

Data Collection

The data was collected with the aid of internet databases. Both the English Canadian and American sample were collected with the aid of two databases due to the fact that certain databases were more likely than others to

produce precise results. For instance, the search engine CBCA only returned thirteen articles with the keyword "stem cell(s)" for *The Globe and Mail*, but Dow Jones Interactive returned 113. Moreover, the archival tool on *The New York Times* website did not return any letters to the editor, but Dow Jones Interactive did. I used the database "Eureka" for the French sources and the search term "cellule(s) souche".

The databases returned a list of articles with the keyword "stem cell(s)" or "cellule(s) souche". I collected these articles from the microfiche collection at the University of Alberta library. I scanned each article onto a Zip disc, formatted these articles with the computer program "Adobe Photoshop" and then printed them. I discarded twelve articles for the following reasons: (1) the search had returned a false result; or (2) stem cells were not the focus of the article.

Methodology

The analytic process invoked in this research draws on the imagery of circularity, or an ongoing cycle of logging and analysing data (Ely, et al. 1991; Lindlof 1995). The basic premise is that the researcher formulates a research problem, engages in the research process, and develops tentative explanations. Then, the researcher goes back to collect new data, consult the literature again, create new or revised explanations, and in some cases redefine the problem (Bossen 1984; Ely, et al. 1991). This process continues until the task of interpreting problematic data is resolved. A similar approach proposed by Agar (1986) is based on cultural hermeneutics. Its aim is to discern and resolve

meaning. The research task involves configuring new and old data in different ways until an act or a piece of discourse is understood – thus the circularity of the form. The outcome of this process is a deeper understanding of cultures and cultural practices.

The objective of the methodology employed in this thesis was to compare and contrast cultural representations of hES cells in Canadian and American news media. I also wanted to determine the processes by which news media reproduces and alters ideology. Therefore, in order to maximize the likelihood of obtaining reproducible and usable results, a combination of independent methodologies was used. Accordingly, this thesis uses the "triangulation method" outlined by Bailey (1994) and Miles and Huberman (1994). I achieved triangulation by reviewing the existing knowledge available (literature review), employing different methods of data analysis (content, rhetorical and thematic analysis), and applying varying theoretical schemes from anthropology such as political economy, critical medical anthropology, feminism, the cultural studies of science, and media studies.

Content Analysis

Krippendorff (1980: 21) defines content analysis "as a research technique for making replicable and valid inferences from data to their context". The idea is to reduce information in a text to a series of variables that can then be examined for correlations (Bernard 1995: 339). Laitin and Gomez (1992) and Kunz and Fleras' (1998) content analyses of news media provided a guide for systematically and objectively identifying specified categories within text (Gans 1980; Ginzberg

1985; Weber 1985). The content analysis assessed the features and parameters of the hES cell debate in the news media coverage and utilized this information as a point of entry into the rhetorical and thematic analysis. The content analysis also documents the frequency of each of the relevant categories and sub-categories (Bailey 1994).

I read each of the sample articles and entered the keywords into the citation management program *Pro-Cite*. The computerization of the data enabled me to search according to keyword, author, source, country, date, and title (Bailey 1994; Weber 1985). I could also group articles into specific categories, include notes and abstracts and mark important articles. Following the initial coding process I re-read all of the sample articles and coded them according to new categories that arose during the coding process. These categories and sub-categories are included as Appendix A.

Following the coding process, I configured the data in different ways by calculating the frequencies of the categories, and made graphs and tables of the relevant findings to provide a comparative framework for making valid inferences. The frequencies were analysed according to the research goals of determining the similarities and differences in the media presentation of the hES cell debate between the United States and Canada.

Rhetorical Analysis

The rhetorical analysis assessed the point-of-view being expressed by the journalists in the sample subset. In particular, the rhetorical analysis is concerned

with the various signals a text carries that indicate whether the text should be taken as fact or treated with some skeptical distance (Kvande 2000: 312). For instance, articles where the news is presented as the journalist's own statements of facts employ rhetorical strategies to increase impressions of authenticity (Van Dijk 1991). This kind of analysis makes it possible to assess news media as a producer and bearer of cultural meaning (Kvande 2000; Patterson and Hall 1998).

Thematic Analysis

A theme is a pattern found in the information that both describes the observations and interprets aspects of the phenomenon (Boyatzis 1998: 4). A theme can also be thought of as the researcher's inferred statement that highlights explicit or implied attitudes in texts (Boyatzis 1998; Ely, et al. 1991). The themes for this thesis were initially generated from the data and refined according to theory and research. By thematically examining hES cells in the news media, some new perspectives on the connection between society, culture, and biotechnology may become visible (Boyatzis 1998; Kvande 2000).

In brief outline here is the process that I applied in the thematic analysis. In developing this process I relied heavily on Ely, et al. (1991) and Boyatzis (1998).

1. I studied and re-studied the sample articles in order to develop detailed knowledge.
2. I began to group the data under tentative categories.
3. I then selected excerpts from the articles to link the data to the categories.
4. I wrote theme statements for each of the categories, attempting to link data in and across categories.
5. I compared the findings for patterns.

Methodological Limitations

Despite the effort to maintain validity checks there are methodological limitations. For instance, although a content analysis presents what news journalists have selected, it does not demonstrate how they have selected it (Gans 1980). Moreover, for the purposes of this research, the media is interpreted to include only mainstream and English sources. Out of necessity the rhetorical and thematic analysis of news media is restricted to informative news articles. Also, it does not include editorials or letters to the editor, although these topics deserve an entirely separate study.[5] Thus, this focus may preclude contrasting points-of-views from other sources, journalists and the public.

---

[1] The Washington Post History. Electronic document, http://www.washpost.com/gen_info/history/timeline/, accessed January 15, 2002.
[2] About Time Inc. Electronic document, http://www.aoltimewarner.com/companies/time_inc_index.adp, accessed May 1, 2002.
[3] Notably, articles by Rick Weiss and Nicholas Wade were included in *The Globe and Mail* and *The Toronto Star*.
[4] Six Canadian and three American news media sources were included in the results for Figure 1 because the total readership for the six Canadian sources is equivalent to the total readership for the three American sources.
[5] Laitin and Gomez (1992) employ content and discourse analysis to examine political discourse exemplified in editorial writing as a particular speech genre.

Chapter 2

Background and Theoretical Orientation

In this chapter I contextualize the hES cell debates in the media by providing important background information. In addition, I explore the theoretical orientation that is used to analyse and interpret the data presented in chapters three, four and five. In particular, I examine the relationship between news media, rhetoric and ideology.

Background

In order to understand the underlying context, I extended the data analysis beyond the sample articles to explore the background of the hES cell debates, the biology of hES cells, and the implications for biomedicine. In addition, I provide a summary of the literature review.

What Are Human Embryonic Stem Cells?

Stem cells are cells that are present in developing and adult animals that have the ability to continually reproduce themselves (a process called "self-renewal") while maintaining the capacity to give rise to more specialized types of cells. A prominent researcher in the field states:

> The prevailing view is that among organs with self-renewal capability, resident stem cells are capable of periodically (or continuously) providing new populations of functional, differentiated cells that can replace those lost by normal physiologic turnover or even some types of catastrophic losses due to injury or disease (Okarma 2001: 4).

Some examples of this everyday process include the replacement of dead blood cells from bone marrow, and the constant regrowth of skin (Thomson, et al. 1998).

Stem cells are found at all stages of development, from human embryos to adult cells and tissues. Stem cells obtained from human embryos (hES cells) are pluripotent[1], that is they can differentiate into all specialized cells found in the human body, whereas adult stem cells are only capable of regenerating their tissue of origin (Watt 2000).[2] Adult stem cells are found in many tissues throughout the body, such as blood, brain, intestine, skin, and muscle, and are applied therapeutically in allogenic bone marrow transplantation (Okarma 2001). However, while recent reports suggest some adult stem cells from one tissue may develop into cells of another tissue, no adult stem cell has been shown to be pluripotent (Clarke 2000; Gage 2001).

There are two sources of human pluripotent stem cells. The first are hES cells that are derived from embryos at the blastocyst stage, four to five days after conception, produced by *in vitro fertilization* (IVF). To derive hES cells, the inner cell mass (ICM) of the blastocyst is isolated (destroying the embryo) and cultured with the use of mouse embryonic fibroblasts (Thomson 2001: 18). These cells were found to be able to divide indefinitely and to form cells of the three major tissue types – endoderm (which forms the lining of the digestive system, as well as cells of the pancreas and liver), mesoderm (which produces muscle, bone and blood), and ectoderm (which gives rise to the epidermal tissues and the nervous system).[3]

The second source of human pluripotent stem cells is the gonadal ridge of the aborted fetus, and is called human embryonic germ (hEG) cells (Shamblott, et al. 1998). Human EG cells have received little media attention compared to hES cells due to the fact that scientists do not clearly understand them. However, scientists argue that the pluripotentiality or the ability of hES cells to form the three major tissue types could have enormous potential in the treatment of a wide variety of diseases and illnesses (CIHR 2001; NBAC 1999).

Implications for Biomedicine

There are three important clinical and research implications of hES cell research for treatments and therapeutics in biomedicine. The first is that hES cells may be stimulated to develop into specialized cells for transplantation, called *cell replacement therapy*. This development could treat injuries and various genetic and degenerative conditions such as heart disease, neural disorders, diabetes, haemophilia, arthritis, retinal degeneration, organ failure, cancer, atherosclerosis, burn treatments, and spinal cord injuries (Okarma 2001). Second, hES cell research may provide basic biological information relating to human development, genomic imprinting and somatic cell aging that could develop into other clinical applications. Third, researchers could study the beneficial and toxic effects of new medications on hES cells that have been developed to mimic the disease processes (CIHR 2001; NBAC 1999; Okarma 2001; Thomson 2001; Weissman 2000).

Researchers have already announced some success in growing corneas, urethral sphincters, veins and bladders for humans and animals (Abraham 02/09/02). In practice, physicians are currently transplanting stem cells from umbilical cord blood in the treatment of leukaemia (Thomson 2001). The potential for these cells is now being called *regenerative medicine*, an approach that offers a new paradigm for clinical therapeutics (Okarma 2001: 3). These developments will have major implications, not only for the biomedical treatment of illness but also for the cultural construction of health and healing in North America.

The Human Embryonic Stem Cell Debate

Following the derivation of hES cells in November 1998, both the Canadian and the United States governments were politically unprepared (Thomson, et al. 1998). Neither country had any specific guidelines for researchers, research ethics boards, and funding agencies on how hES cells may be derived and used (Holland, et al. 2001). In early 1999, President Clinton asked the National Bioethics Advisory Commission (NBAC) to undertake a thorough review of issues associated with stem cell research (NBAC 1999). In August of 2000, President Clinton made his final recommendations that would allow federal funds to be used for research on human embryos in order to derive stem cells.[4] However, in August of 2001, President Bush (elected in January of 2001) overturned Clinton's ruling. In Canada, the Canadian Institute of Health Research (CIHR) undertook a similar study in the fall of 2000. The final research

guidelines that will enable Canadian researchers to conduct research on human embryos were released on March 4, 2002 (CIHR 2002).

The lack of research guidelines for the ethical use of human embryos for stem cell research purposes resulted in a high profile public debate. United States President George W. Bush made his first national address on hES cell research on August 9, 2001 to announce his decision to limit federal financing to the sixty or so cell "lines"[5] already in existence. The following excerpt from his speech demonstrates how culturally specific beliefs about the human embryo in North America have informed the debate surrounding hES cell research:

> ... Researchers are telling us that the next step could be to clone human beings to create individual designer stem cells, essentially to grow another you to be available in case you need another heart or lung or liver.
>
> I strongly oppose human cloning, as do most Americans. We recoil at the idea of growing human beings for spare body parts or creating life for our convenience....
>
> My position on these issues is shaped by deeply held beliefs.... I also believe human life is a sacred gift from our creator. I worry about a culture that devalues life.... (Bush 08/10/01)

Combined with the proliferation of news media articles regarding hES cells in the last year, Bush's address indicates that hES cell technology is a controversial issue across North America.

The debate surrounding the use of human embryos for stem cell research has arisen for the following reasons. First, the derivation of stem cells from human embryos is directly related to the debate surrounding abortion. In both of these debates Ginsburg (1989) among others (Luker 1984; Petchesky 1990; Shore 1992) report that some people argue that the moral and legal status of the embryo

should be equivalent to that of a fully-grown human being and therefore may not be destroyed for any purpose. The primary issue in the debates surrounding hES cell research is that in the process that derives stem cells from human embryos, the embryo is destroyed, and it can no longer develop into a human being. Moreover, recent reports that adult stem cells may be more pluripotent than once thought lead many people to argue that this process is now unnecessary (Holland, et al. 2001: xxxi). Thus, the questions that have defined the abortion debate such as "when does life begin?" and "what is the human embryo?" have resonated in the hES cell debates.

Second, stem cell technology encompasses cloning technology[6], human embryo and fetal tissue research, chimeras[7], xenotransplantation[8] and transplantation; all projects that are capable of disrupting long-standing dichotomies of nature/culture, life/death, old/young, and self/other. These projects were, until recently, confined to the realm of fantasy (Joralemon 1995; Lock 1995; Lock and Honde 1990; Ohnuki-Tierney 1994; Treichler, et al. 1998). Developments in hES cell technology make many North Americans feel uneasy when the dichotomies are disrupted; as Douglas (1966) long ago pointed out, things that fall outside any cultural system of classification are generally perceived as an abomination or danger. For example, Joralemon (1995) argues that there remains substantial cultural resistance to the conceptions of the body as a collection of replaceable parts that makes organ transplantation possible. Thus, stem cell technology, which will potentially stretch life past a 'normal' span, and

expand the limits of what humans may do to themselves and to human genes, human bodies, and developing human embryos, incites debate and resistance.

The status of human embryos in the stem cell debates is a topic of legitimate disagreement across many philosophical, religious and cultural approaches. In particular, these questions are largely being debated among anti-abortion activists, conservative politicians, religious leaders on the one side and liberal politicians, scientists, corporations and patient groups on the other. I argue throughout this thesis that there is a range of legitimate views that need fair representation in news media. Moreover, this debate is not only about the 'embryo', but instead reflects North America's ongoing concern with the *place and meaning of the human body* and the changing definitions of life and death (Joralemon 1995; Luker 1984). In this regard Rick Weiss, from *The Washington Post* illustrates:

> .... For many lawmakers, it is largely a question of whom they least wish to alienate: highly motivated and perhaps overly optimistic members of patient groups who believe that stem cells may soon save their lives or the lives of their loved ones, or equally passionate antiabortion activists who believe it is unethical to experiment on embryonic and fetal tissue.
>
> But for many publicly funded scientists who want to investigate the cells, the issue is a no-brainer: The nation ought to enlist their help, they say, because it is becomingly increasingly clear that it will not be easy to turn stem cells into cures (Weiss 10/09/99).

When added to this reality that should "the other side" win, one group will see the devaluation of their lives and life resources, it is not surprising that the hES cell debate has generated so much conflict and little or no consensus. Thus the debate surrounding the use of human embryos for research purposes is not only the result

of a moral or ethical stance, but a statement regarding one's vision of the world and one's role in that world.

Summary of the Literature Review

To date research on the social and cultural aspects of hES cells has been primarily done by ethicists, theologians, policy and lawmakers (i.e., see Holland, et al. 2001). This development is reflective of the lack of clear ethical and legal research guidelines for hES cells in both Canada and the United States. However, these studies have primarily focused on the religious and ethical aspects of using human embryos for research, while virtually no research has been done on the social and cultural implications of hES cell technologies (Dorff 2001; Farley 2001; Parens 2001). For instance, who will benefit from developments in hES cell technology? How are human embryos culturally constructed? How will women and other marginalized groups, such as seniors[9] be affected by this research? How does hES cell research further developments in fetal rhetoric? This development is not due to a lack of critical attention by anthropologists but because hES cells were only discovered in 1998 (Thomson, et al. 1998).

The lack of literature on hES cells in anthropology means that I rely on recent studies done by feminists, medical anthropologists, and cultural studies of science, which locate biotechnology as an emergent constellation of knowledge and power in order to contextualize hES cells within the larger theoretical framework in anthropology (Brodwin 2000; Davis-Floyd and Sargent 1997; Lock and Kaufert 1998). In particular, feminist engagements with New Reproductive

Technologies (NRTs) have set the agenda for a critical study of biotechnology (Ginsburg and Rapp 1991). Research on the routinization of fetal ultrasound, for instance, indicates that the "female body has been ideologically transformed from a benevolent maternal environment into an inhospitable wasteland, at war with the 'innocent person' within" (Stabile 1998: 172). The result has often been the development of a fetal rhetoric that represents the fetus as an autonomous, conscious agent, separating the rights of the fetus from those of the mother (Hardacre 1997; Lafleur 1992; Mitchell and Georges 1998; Walker 2002).

These studies also illustrate the importance of class, gender, ethnic and religious differences in access to and choices surrounding biotechnology (Becker 2000; Rapp 1999). For instance, Tsing (1990) argues that the discourse on fetal personhood and child protection overlap with medical preferences for a supervised birth process. These discourses build the assumption that healthy babies can be delivered only under a doctor's supervision. The criminalization of unassisted birth, which draws from each of these ideologies, illustrates how scientific and medical institutions are institutions of social control, upholding cultural assumptions about what it means to be a 'good' mother (Heriot 1996; McCormack 1999; Stabile 1998; Zola 1972). As a result, I will use the existing literature in medical anthropology on biotechnology in order to explore the cultural construction of hES cells in North American news media.

Theoretical Orientation

The major focus of my thesis is on the relationship between biotechnology, and culture. I am also attentive to the role of the news media in the reproduction and transformation of ideology.

The primary theoretical orientation for this thesis comes from medical anthropology. The basic premise of medical anthropology is that science and medicine are *cultural domains* (Good 1994). As Brodwin (2000: 3) argues "what we popularly accept as scientific facts - immutable aspects of natural worlds - are constructed in particular sites, through a handful of rhetorical devices, by people following institutional and professional agendas, and this network fits into specific political and economic regimes" (Treichler, et al. 1998). For instance, in 1968 the Harvard Brain Death Committee justified the new criterion for death – no cerebral or brain stem activity – by citing the need for standards by which to determine when resuscitative and support care should be terminated. However, an early draft of the committee's report explicitly mentioned the condition of organs for transplantation as one of its central concerns (Fox and Swazey 1992; Rothman 1991). Thus, whatever may be the "natural" or biological bases of hES cells and their biomedical applications, hES cells are seen as symbolic and cultural constructs situated within particular forms of action, and practice, within varying forms of social, economic and political organisation.

In particular, this thesis argues from a political economic perspective that takes into account class-based poverty, gender and ethnicity as well as the impact of global forces and global power relations on the lives of individuals and the

functioning of local communities (Sargent and Brettell 1996; Scheper-Hughes 1988; Wolf 1982). For instance, Farmer (1992: 263) argues that accounting for historically given conditions in Haiti that places people at risk for AIDS, such as colonialism or poverty, provides a moral reading for the source of their suffering. Thus, this perspective enables anthropologists to explore a range of national and international social, political, and economic conditions that shape the experience of health and healing (Loustaunau and Sobo 1997).

As health and healing come under increased technological control, struggles erupt over who should control the human body and define its limits and capacities (Joralemon 1995; Martin 1987; Rapp 1999). Biotechnologies make the traditional "facts of life" into matters of expert judgement and partisan debate (Davis-Floyd and Sargent 1997:10). Moreover, biotechnologies become a convenient, tangible focus for political and social contests over the nuclear family, motherhood, gender relations, and the body (Franklin 1997; Hardacre 1999; Rothman 1989; Stanworth 1987). Therefore, in order to understand the cultural impact and meaning of hES cells in the media it is necessary to examine developments in hES cell technology within the broader framework that regards medicine as a cultural system.

This research will fit within the larger theoretical framework in anthropology that focuses on the process whereby a culture shapes the way in which individuals describe what they believe and exploring how people talk and think about their world and the beginnings of human life (Martin 1996). North American concepts of hES cells, and health and healing are often embodied in

dense metaphors that serve as a form of shorthand. Nardi and O'Day (1999: 25) argue that it is important to look closely at these metaphors, because metaphors "both illuminate and obscure the relationships between people and technology." Thus, the theoretical orientation of this thesis will primarily reflect the work being done in medical anthropology and cultural studies of science in order to analyse the cultural construction of hES cells within the North American hES cell debates.

The Rhetoric of News Media

Recent media research emphasizes that there is no one-way influence between news media and ideology (Dahlgren 1998). For instance, what the public actually knows or believes about hES cells may be quite different from what the media have presented. As Woolard and Schieffelin (1994: 55) argue "notions of how communication works as a social process, and to what purpose, are culturally variable and need to be discovered rather than simply assumed." The perspective of communication as a social process (Gans 1980; Hackett and Zhao 1998; Herman and Chomsky 1988) offers a useful approach with regards to people's responses to developments in biotechnology and their representation in news media.

Throughout this thesis I use the term rhetoric in three different but compatible senses. The first is the traditional sense: rhetoric as persuasion (Burke 1955). The second is rhetoric as argument (Billig 1987) and the third is what McKeon (1987: 2) describes as the "art of structuring all principles and products of knowing, doing and making". In other words, it is the art of reproducing or

transforming ideology. Silverstone (1998: 249) argues that to apply these notions of rhetoric to the study of media, involves the consideration not just of persuasion and appeal, but also of the mutual involvement by producer and consumer, addresser, and addressee, in the structuring of experience. Thus, Silverstone (1998: 250-252) argues that an analysis of the relationship between news media and ideology must generate a view of the public both as the focus of rhetorical devices and more or less interactive with them within the rhetorics of their own socio-cultural environment. By implication, what follows is an examination of the social processes of communication as situated, interactive, motivated, and asymmetrical (Silverstone 1998).

Situated

The millions of people who read the sample newspapers each day are engaged in a shared (situated) experience (see Table 4 below). The phenomenon of the "letter to the editor", which is based on the premise that one of the main roles of news media is to offer a forum for informed debate, being the concrete expression of that engagement. More specifically, an examination of the histories and goals of the sample newspapers indicates that a consensus exists in North America regarding ethical values and behaviour in news media (see Appendix C for detailed histories and goals).

TABLE 4

Basic Data on the Four Newspapers

	The New York Times	The Washington Post	The Globe and Mail	The Toronto Star
International Sales Sunday	23,909	n/a	n/a	n/a
Total Sales Daily	1,109,371	802, 594	368,058	454,163
Total Sales Saturday	n/a	759,281	468,250	680,152
Total Sales Sunday	1,668,650	1,070,809	n/a	457,442
Readership[10] – Daily	3,000,577	1,712,300	1,007,000	1,083,000
Readership – Sunday	4,000,210	2,359,500	n/a	932,600
Readership – Saturday	n/a	1,400,000	1,031,000	1,499,000

Silverstone (1998: 249-250) argues that an *a priori* sharing of interests and culture between the addresser and addressee is integral to the relative success or failure of rhetorical devices. The first shared cultural value among the North American public regarding ethical reporting and journalism is that 'good' journalism depends on the continuing reality of 'investigative' or 'active' journalism, or "the resource-hungry highly active discovery" (Aldridge 2001: 609). According to a Canadian journalism textbook, investigative journalism should be informed, knowledgeable, independent, in-depth, interpretative, and active (McKercher and Cumming 1998: 1-3). Moreover, these values are predicated on the concept of *newsworthiness*. Newsworthiness is a term used in journalism textbooks to define the qualities that journalists look for in news. These qualities include impact, emotional appeal, conflict, timeliness, proximity, prominence and the unusual (McKercher and Cumming 1998).

Human ES cells articles are newsworthy for all of the reasons listed above. Human ES cells, with their regenerative potential could influence the lives of millions of people around the world. The articles appeal to people's emotions

with pictures of Alzheimer's patients, and articles of children being cured of leukaemia - increasing the proximity of the reader to the issues. Stem cells have also become a highly controversial topic due to the use of human embryos for research purposes. As research guidelines are debated and formulated by prominent political figures such as President George W. Bush the issue remains in people's minds. Moreover, journalists emphasise the magical and unusual characteristics of stem cells. Thus, the information in news media is not total, but selective, and predicated on journalistic standards, and methods. Moreover, the information in news media is filtered through a journalist who is situated within his or her own specific socio-cultural environment that channels their opinions, and values (Gans 1980).

The stated mottoes and goals of the news media sources indicate that news media in North America also value "objectivity" and "functionality" (Gans 1980; Hackett and Zhao 1998; McKercher and Cumming 1998). This phenomenon is illustrated in the lack of information regarding journalists and reporters and the clear division between "opinion" and "news" articles. Opinion is regarded as something slightly disreputable – safe only when segregated in editorial or caged in quotation marks (Stephens 1988: 258). As the nineteenth-century writer James Parton exclaimed, "an editorial is a man speaking to men, but the news is Providence speaking to men" (cited in Stephens 1988: 259). In particular, journalists and reporters when writing "news stories" practice value exclusion, by applying personal detachment, and in effect by disregarding the implications of the news (Gans 1980). Moreover, the newspapers' histories emphasise this issue

when they state that despite "boycotts, bribes and violence" they still chose to publish damaging articles if it was for the greatest good for the greatest number (McKercher and Cumming 1998).[11]

The functionality of news media is reflected in the expressed desire to be society's "watchdog". For example, all of the newspapers emphasise their role at some time in the past at protecting society from corrupt or immoral public servants, such as doctors, politicians or police officers. A statement of journalistic principles by the Canadian Daily Newspaper Association (CDNA) invokes this concept of public interest:

> The newspaper has responsibilities to its readers, its shareholders, its employees and its advertisers. But the operation of a newspaper is a public trust and its overriding responsibility is to the society it serves (Statement of Principles, adopted by the CDNA, 1995, quoted in McKercher and Cumming 1998).

Thus, functionality is based on the belief that certain vital functions must be performed ethically (Christians, et al. 1998; McKercher and Cumming 1998).

Significantly, ethical values for news media are culturally and historically situated. An analysis of the news media sources' histories indicates that the makeup of this consensus has changed over time. For example, one hundred years ago, news media saw nothing wrong with representing the views of one political party. Moreover, the ethical and behavioural guidelines in the United Kingdom are significantly different from those in North America. For instance, Aldridge (2001: 612) argues that in the United Kingdom the popularity of investigative journalism has faded. Thus, the rhetoric of news media operates within a taken for granted world, the world of the 'commonplace' (Silverstone

1998: 250). The 'commonplace' is both, within rhetoric, a statement of something familiar and understood (ideology), and the basis for reformulations (Comaroff 1985: 5).

Interactive

The readers, although socially and culturally situated, are active participants in the process of ideological mediation. Within this framework Murdock (1998) argues that the public operates as members of 'interpretive communities' that are situated within divisions of economic class, ethnicity, gender, religion, age groups, etc. The concept of heteroglossia (or polysemy) emphasized by Bakhtin (1984), illustrates that meaning is neither univocal nor uncontested for it is always shaped by context and dialogue. Moreover, isolating the practice of media consumption from other everyday practices (such as Internet surfing) ignores the dynamic character of interpretive activities. Thus the interpretation and negotiation of ideology in news rhetoric is an interactive process mediated by shared interests and cultural values.

Motivated

News media is a product of individual and collective conception, agency, and motivation. Journalists, editors, and reporters draw upon selective events and experiences prior to transforming them into public cultural forms of narrative. Moreover, the journalistic values of "functionality" and "investigation" do not provide any guidelines for the selection of stories or of which facts are included in

the news stories. Thus, as Gans (1980: 183) argues there exists a powerful and pervasive subjectivity in news media that is motivated by individual and collective interests and cultural values.

In particular, recent shifts in news media ownership and control have had a significant impact on the goals and motivations of news media. Squires (1993: 210), a prominent critic states, the press is "no longer an institution dedicated to the public interest, but rather a business run solely in the interest of the highest possible level of profitability" (McManus 1994; Miller 1998). Nonetheless, the social practice of news and politics, the production of cultural meaning and public policies, are not simply imposed from above (Hackett and Zhao 1998). They are constrained by the intentions or manipulations of a handful of media moguls, journalists, reporters, editors and the beliefs, and values of their audiences. Moreover, Gans (1980) argues that news media as society's "watchdog" is motivated to maintain order, warn against disorder, and act as a moral guardian, restricting and limiting people's actions, and thoughts to a certain extent. Thus, rhetoric, news media and ideology are mediated by both personal and collective motivations.

Asymmetrical

Individuals are situated within interpretive communities of the relatively powerful and the relatively powerless. For instance, Morley (1998: 233) argues that key social determinants, such as differential power between genders and age groups within familial households, affect how television viewers interpret

meaning. Moreover, the public, for all of their "interactive creativity, are still at the end of the process of production, even though in many circumstances their activities work back to redefine the product and challenge the producer" (Silverstone 1998: 252).

A critic of this perspective might argue that the public has a multitude of perspectives to choose from. Yet as the public constantly makes choices, these choices are becoming increasingly restricted as recent shifts in media ownership have limited heterogeneity. For instance, *The New York Times* is now owned by The New York Times Company, which owns fifteen other newspapers, two New York radio stations, eight network-affiliated television stations, and more than forty web-sites.[12] *The Washington Post* is owned by a diversified media and education company whose principle operations include newspapers, magazines publishing, television broadcasting, cable television systems, and electronic information systems.[13] Bell Globemedia Publishing Inc owns *The Globe and Mail*. This company also owns two television stations, and two Internet providers.[14] Finally *The Toronto Star* is owned by Torstar Corporation, which owns book publishing, interactive media, five major daily newspapers, seventy community newspapers, television stations, and the largest Chinese daily in Canada.[15] Thus, asymmetrical power relations, whether societal, economic, political or familial, establish how much room there is for interaction and creativity.

Conclusion

The hES cell debates are deeply embedded in the question raised in the abortion debates of "when does life begin?". Moreover, hES cell technology, as the harbinger of a new era of 'regenerative medicine' will have a tremendous impact on biomedicine. As a result, how Canadians and Americans conceptualize health, healing and their bodies will also be challenged. Moreover, news media provides a powerful medium for examining these developments because it not only reflects shared societal values, and North American political economic structures, but it is also capable of reproducing and transforming ideology. As a result, understanding the social processes of communication is crucial for understanding the impact of the hES cell debates in the media on the public.

Conceptualizing news media as situated, motivated, interactive and asymmetrical (Silverstone 1998) is a useful tool for understanding the relationship between ideology and the rhetorics of news media. For instance, journalists, audiences, and editors with specific agendas, and motivations of their own create news media. In particular, the recent corporatization of news media has lead many critics to argue that the very definition of news has been altered by marketing experts so that it no longer matters whether information is important, relevant or delivered in context, but only whether it is titillating, controversial or entertaining (Aldridge 2001; Klaidman 1991; Miller 1998). Thus, the interpretation of meaning from the sample articles must take into account the social processes of news media. As Nelkin (1987) argues journalists influence what we learn - and what we do not - about the scientific and technological

developments that affect the lives of millions of North Americans. Moreover, the values in the news are rarely explicit and must be found between the lines - in what actors and activities are reported or ignored and in how they are described (Gans 1980).

---

[1] Pluripotent cells can generate all cell types (not just their tissue of origin), and are capable of self-renewal but they are not capable of developing into an entire organism.
[2] Stem Cell Network Overview. Electronic Document, http://www.stemcellnetwork.ca/english/research/default.asp, accessed March 18, 2002
[3] Stem Cell Network Overview. Electronic Document, http://www.stemcellnetwork.ca/english/research/default.asp, accessed March 18, 2002
[4] The research guidelines being discussed do not apply to the private sector.
[5] An hES cell "line" is immortal and capable of unlimited developmental potential (Thomson 2001).
[6] Cloning refers to the production of a precise genetic copy of a molecule (including DNA), cell, tissue, plant, or animal. It is sometimes referred to as somatic cell nuclear transfer (SNTC). There are two types of cloning relevant to hES cells. The first is "Therapeutic cloning". This term is often used to refer to cloning of an embryo for the purpose of deriving hES cells for therapeutic application. The second and more controversial form of cloning is "Reproductive Cloning". This term is often used to refer to cloning of an embryo for transplantation into a uterus with the intent of producing offspring genetically identical to the nuclear donor (CIHR 2001; NBAC 1999).
[7] A chimera is an organism composed of two genetically distinct types of cells (NBAC 1999).
[8] Xenotransplantation involves the implantation of living cells into humans from another species when human donors are not available (NBAC 1999).
[9] When speaking of 'seniors' in this thesis I refer to the ages of 65+. The term, as I use it, refers to a stage in the life cycle, the definition of which varies both socially and culturally.
[10] 'Readership' is defined as Adults 18+. All of the data was obtained from the circulation manager at each individual paper. Data that is not included in the chart is because each paper calculates their sales and readership differently.
[11] I will return to the concept of Utilitarianism in Chapter five.
[12] New York Times Company, Electronic Document, http://www.nytco.com/company.html, accessed February 1, 2002.
[13] Washington Post Company. Electronic Document, http://www.washpostco.com/, accessed February 12, 2002.
[14] Bell Canada Enterprises. Electronic document, http://www.bce.ca/en/news/releases/bce/2001/01/09/5580.html, accessed February 10, 2002.
[15] Torstar Corporation. Electronic document, http://www.torstar.com/corporate/paper.html, accessed February 10, 2002.

Chapter 3

Content Analysis

The objective of this chapter is to document the parameters of the hES cell debate by analysing 520 articles from two American and two English Canadian newspapers. The data derived from the content analysis is presented in tables in order to document how, where and by whom, hES cells are being discussed in the newspapers. In addition, the data is categorised into figures that provide a visual representation of the findings that compare and contrast the relevant issues in order to examine the differences and similarities in the hES cell debate between Canada and the United States.

Data Analysis

The data were analysed in regards to the following: (1) the section or the setting of the article in the news media source; (2) the general character of the article; (3) the authors of the article; (4) the topics being discussed; (5) the interest groups discussed in the articles; (6) international versus domestic news; and (7) the language being used to describe human embryos and stem cells. The relevant findings and a discussion of the results follow the presentation of the data.

The Setting

The 'setting' refers to the placement of the article into a specific section of the newspaper. Common sections in newspapers include Health, Entertainment, Sports, Style/Fashion, Business/Finance, Living, and City. The location of an

article is an important technique used by editors to organise the material and attract attention. For instance domestic news is the leading section because it has the largest readership (Gans 1980). The focal point of any newspaper is the front page, giving at a glance, the day's top news stories. Most of the time, the front page also includes an index to the rest of the newspaper.

All of the sample newspaper articles were classified according to the section of the newspaper that they were in. These articles fall into six categories, most of which are self-explanatory. The first category, "Section A", refers to all the articles in what is commonly regarded as the first section of a newspaper, whose content is comprised of national and international news, the editorials, and the letters to the editor. The second category delineated in this study is the 'cover story'. This category includes all articles that were published on the front page of the newspaper. The third category of 'health' includes any articles that occur in that specialized section of the papers, which is also sometimes, called 'life' or 'science'. The fourth category of 'In-Depth' refers to a section in every newspaper that focuses on specific issues (political, medical, social) in more depth. This section is only included in the Sunday edition of each of the sample newspapers. Category five, Business, includes all articles in those sections. Category six or "other" includes articles from the sports, entertainment and style sections. These articles were placed into the category "other", as their limited frequency did not necessitate a category on their own. The results are included below in Table 5:

TABLE 5

Articles classified into six categories according to setting.

	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
Section A	64	110	63.2	98	59.3	67	70	56
Cover Story	18.6	32	16.1	25	9.7	11	5	4
Health	4.1	7	9.7	15	17.7	20	18.8	15
Focus	7.6	13	7.1	11	2.7	3	2.5	2
Business	2.3	4	3.2	5	5.3	6	2.5	2
Other	3.5	6	0.7	1	5.3	6	1.3	1
Total (N)		172		155		113		80

The General Character

All of the sample articles were coded according to the "type" of article they were. "Type" refers to the general character or structure held in common by a number of articles that could be considered one category. For instance, six of the categories including, Editorials, In-depth, Letters to the Editor, and Opinion articles are clearly demarcated within the articles text and often the table of contents. The category 'Informative' refers to a type of article identifiable from all the other categories by their apparent objectivity and distancing techniques, often classified as "news" articles. News articles are what the Oxford Dictionary defines as "information about new or interesting recent events". They are also often based on research by science or medical reporters, and they are also sometimes politically informative. These articles can be found in the Health, Life, Science, Focus and City sections of the newspaper. Although 'In-Depth' articles could also be classified as 'Informative' I have included it as a separate category because they are significantly longer than the more common informative article. Finally, the category 'News Analysis' refers to a specific type of article

that analyses the content of the news itself (Stephens 1988: 256). The results are included below in Table 6:

TABLE 6

Articles classified into eight categories according to type.

	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
Informative (News Articles)	58.1	100	46.5	72	57.5	65	61.3	49
Opinion Articles	14	24	6.5	10	17.7	20	17.5	14
Letters	9.9	17	25.2	39	9.7	11	15	12
In-Depth Articles	8.1	14	14.8	23	9.7	11	2.5	2
Editorials	9.9	17	3.9	6	4.4	5	2.5	2
News Analysis	--	--	3.2	5	0.9	1	1.3	1
Total (N)		172		155		113		80

Authorship

The sample articles on hES cells are written by a diverse group of reporters and journalists. In particular, the articles are written by specialized science, biotechnology, medical and public health reporters, as well as generalists classified as "staff writers". Moreover, a large percentage of the articles in the Canadian sources are derived from news agency services. The proportion of articles using news agency services was shown as follows: *The Washington Post* 6.4% (11/172), *The New York Times* 5.8% (9/155), *The Globe and Mail* 32.7% (37/113), and *The Toronto Star* 40% (32/80). For a detailed summary of the results, and an outline of the histories and goals of news agency services see Appendix C.

Topics

The main topics of discussion surrounding stem cells were also coded in the sample articles. These topics were divided into five categories. The first, 'research guidelines' refers to recent concerns about the current lack of a government statement or other indication of policy or procedure from both the Canadian and American governments regarding a legal and ethical course of action for hES cell research. The proportion of articles discussing research guidelines was shown as follows: *The Washington Post* 62.2% (107/172), *The New York Times* 60% (93/155), *The Globe and Mail* 38.1% (43/113), and *The Toronto Star* 33.8% (27/80).

The topic 'research guidelines' encompasses the use of human embryos and fetal tissue for research purposes. Research guidelines for the cloning of human embryos are also discussed in the sample articles. As a result the topic 'research guidelines' was disaggregated and the results are included below in Table 7:

TABLE 7

The Topic "Research Guidelines" disaggregated.

	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
R.G. For Human Embryos	79.4	85	78.5	73	67.4	29	81.5	22
R.G. For Cloning	19.6	21	21.5	20	30.2	13	14.8	4
R.G. For Fetal Tissue	0.9	1	--	--	2.3	1	3.7	1
Total (N)		107		93		43		27

The second topic, 'regeneration' refers to what stem cells can *do*. The term encompasses the uses of and practical application of stem cells and their

regenerative capabilities. The proportion of articles discussing regeneration was shown as follows: *The Washington Post* 42.4% (73/172), *The New York Times* 25.2% (39/155), *The Globe and Mail* 39.8% (45/113), and *The Toronto Star* 41.3% (33/80).

The third topic 'debate' refers to the discussion or argument pertaining to hES cells that involves opposing points. The main source of controversy is the moral and ethical implications regarding the use of human embryos for research purposes and the issues surrounding cloning. The proportion of articles discussing the debate was shown as follows: *The Washington Post* 32.6% (56/172), *The New York Times* 41.9% (65/155), *The Globe and Mail* 23.9% (27/113), and *The Toronto Star* 15% (12/80).

The fourth topic 'neutral stem cell sources' refers to the process of obtaining stem cells from umbilical cord blood or adults sources such as fat, cadavers, bone marrow, the intestine, etc., (Holland, et al. 2001). Umbilical cord blood and adult stem cell sources are often discussed as ethically neutral alternatives to stem cell research involving human embryos. The proportion of articles discussing neutral stem cell sources was shown as follows: *The Washington Post* 19.8% (34/172), *The New York Times* 10.3% (16/155), *The Globe and Mail* 15.9% (18/113), and *The Toronto Star* 26.3% (21/80). The topic "neutral stem cell sources" is disaggregated below in Table 8:

TABLE 8

The topic "Neutral Stem Cell Sources" disaggregated.

	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
Adult Cell Sources	91.1	31	93.8	15	83.3	15	85.7	18
Umbilical Cord Blood	8.9	3	6.2	1	16.7	3	14.3	3
Total (N)		34		16		18		21

The final topic, 'commodification' refers to concerns over the commoditization of human life. The term commodification refers to the process whereby an object becomes a commodity, or a product intended for exchange (Appadurai 1986). The proportion of articles addressing the issue of commodification was shown as follows: *The Washington Post* 5.2% (9/172), *The New York Times* 3.2% (5/155), *The Globe and Mail* 3.5% (4/113), and *The Toronto Star* 2.5% (2/80).

Interest Groups

The rights, causes, and claims of specific interest groups are used in reference to the five major topics. The proportion of articles discussing the specific interests of certain groups was shown as follows: *The Washington Post* 64% (110/172), *The New York Times* 69% (107/155), *The Globe and Mail* 38.1% (43/113), and *The Toronto Star* 41.3% (33/80). In addition, all of the articles were coded according to the specific interest groups discussed in the article. In most cases, two or more groups are discussed in the same article. For instance, patient advocacy groups are often aligned with scientists against anti-abortion and

religious groups. As a result, one article may have been coded for more than one interest group. All of the interest groups classified in this study are self-explanatory. The results are included below in Table 9:

TABLE 9

Interest groups classified into eight categories.

	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
Scientists	30.0	33	42.1	45	41.9	18	36.4	12
Politicians	41.8	46	41.1	44	30.2	13	21.2	7
Patients	34.6	38	23.4	25	14.0	11	27.3	9
Religious Groups	20.0	22	20.6	22	5.3	6	33.3	11
Anti-Abortion Groups	24.6	27	16.8	18	11.6	5	9.1	3
Corporations	12.7	14	19.6	21	16.3	7	9.1	3
The Aging	9.1	10	5.6	6	7.0	3	3.0	1
Celebrities	2.7	3	5.6	6	7.0	3	6.1	2
Ethnic Minorities	1.8	2	0.9	1	--	--	--	--
Women	--	--	--	--	--	--	3.0	1
Total (N)		110		107		43		33

International Versus National News

A question that arose during the classification of articles according to topic was whether hES cells were discussed within a national or an international context. As a result, all of the articles were categorised according to the country of reference in the article. For example, some articles discussed the regulatory situation in the United Kingdom, while many of the Canadian articles discussed the situation in the United States. The proportion of articles discussing hES cells in an international context was shown as follows: *The Washington Post* 5.2% (9/172), *The New York Times* 5.2% (8/155), *The Globe and Mail* 21.2% (24/113), and *The Toronto Star* 18.8% (15/80). In addition, all of the articles were coded

for the specific countries discussed in relation to hES cells. Countries that were only mentioned once have been included under the category 'other' and include Sweden, Israel, India, Italy and Germany. The results are included below in Table 10:

TABLE 10

International news coverage.

	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
United States	--	--	--	--	50.0	12	66.7	10
United Kingdom	66.7	6	62.5	5	25.0	6	6.7	1
Japan	--	--	--	--	8.3	2	26.7	4
France	--	--	--	--	8.3	2	--	--
Other	33.3	3	37.5	3	8.3	2	--	--
Total (N)		9		8		24		15

The Language

Within anthropological thought, it is commonly argued that language mediates our values and carries our ideological concerns (Sargent and Brettell 1996: 2; Lakoff and Johnson 1980). In particular, Kirmayer (1988: 57) argues that value orientations imparted in the use and choice of (metaphorical) language exerts powerful effects on the discourse of medicine. Thus, the rhetorical language used to describe human embryos and stem cells in the data have metaphorical and euphemistic value that reflect and transform Canadian and American concepts of hES cells. As a result, the words used to describe stem cells and human embryos were coded for the sample articles. The proportion of articles using descriptors for stem cells was shown as follows: *The Washington*

Post 26.2% (45/172), *The New York Times* 21.3% (33/155), *The Globe and Mail* 39.8% (45/113), and *The Toronto Star* 37.5% (30/80). The proportion of articles using descriptors for the human embryo was shown as follows: *The Washington Post* 16.9% (29/172), *The New York Times* 16.8% (26/155), *The Globe and Mail* 11.5% (13/113), and *The Toronto Star* 7.5% (6/80)

In addition, all of the specific words used to describe human embryos and stem cells were coded during the data analysis process. First, I classified fifty-nine lexical items used to describe stem cells into seven categories. Second, I classified twenty-one lexical items used to describe human embryos into five categories. The results are included below in Tables 11 and 12:

TABLE 11

Stem Cell Descriptors Disaggregated.

	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
Adaptive	46.7	21	39.4	13	35.6	16	36.7	11
Ancestral	33.3	15	42.4	14	71.1	32	66.7	20
Child-Like	28.9	13	30.3	10	42.2	19	23.3	7
Building	11.1	5	15.2	5	26.7	12	6.7	2
Magical	8.9	4	12.1	4	4.4	2	--	--
Immortal	8.9	4	--	--	2.2	1	--	--
Other	2.2	1	6.1	2	6.7	3	--	--
Total (N)		45		33		45		30

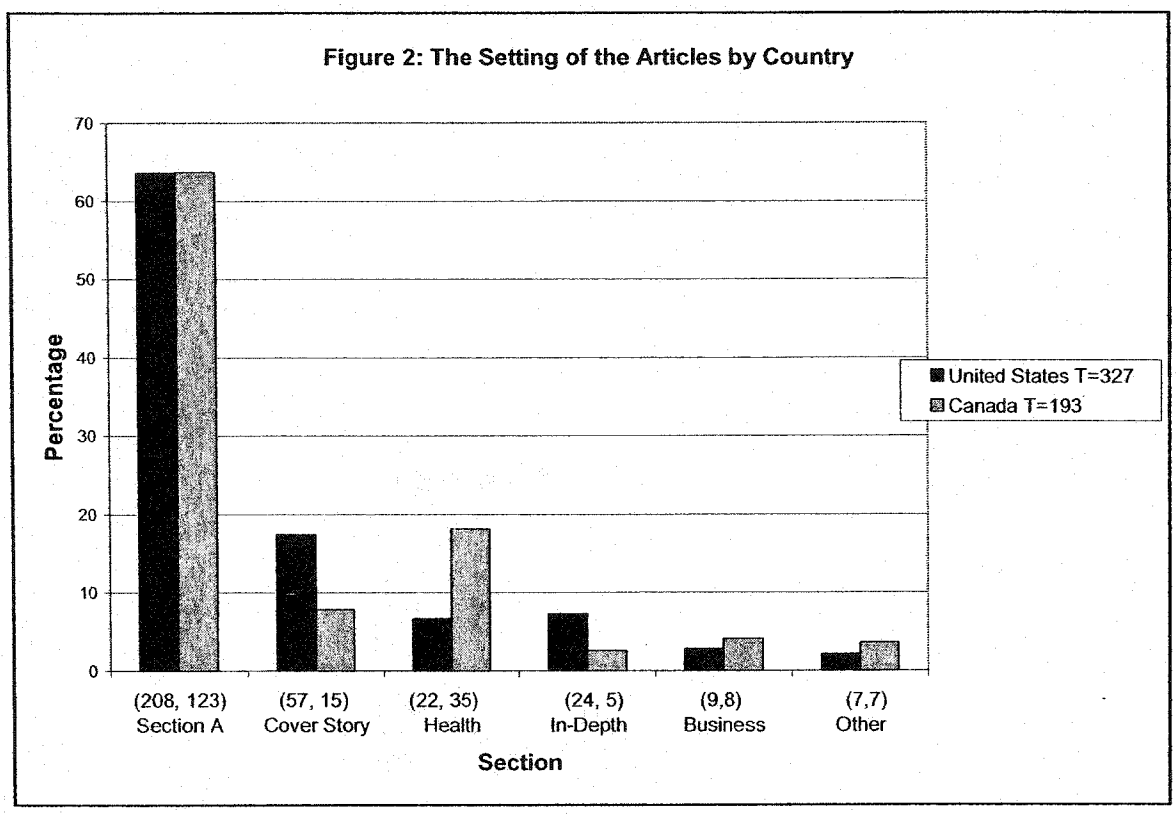
TABLE 12

Human Embryo Descriptors Disaggregated.

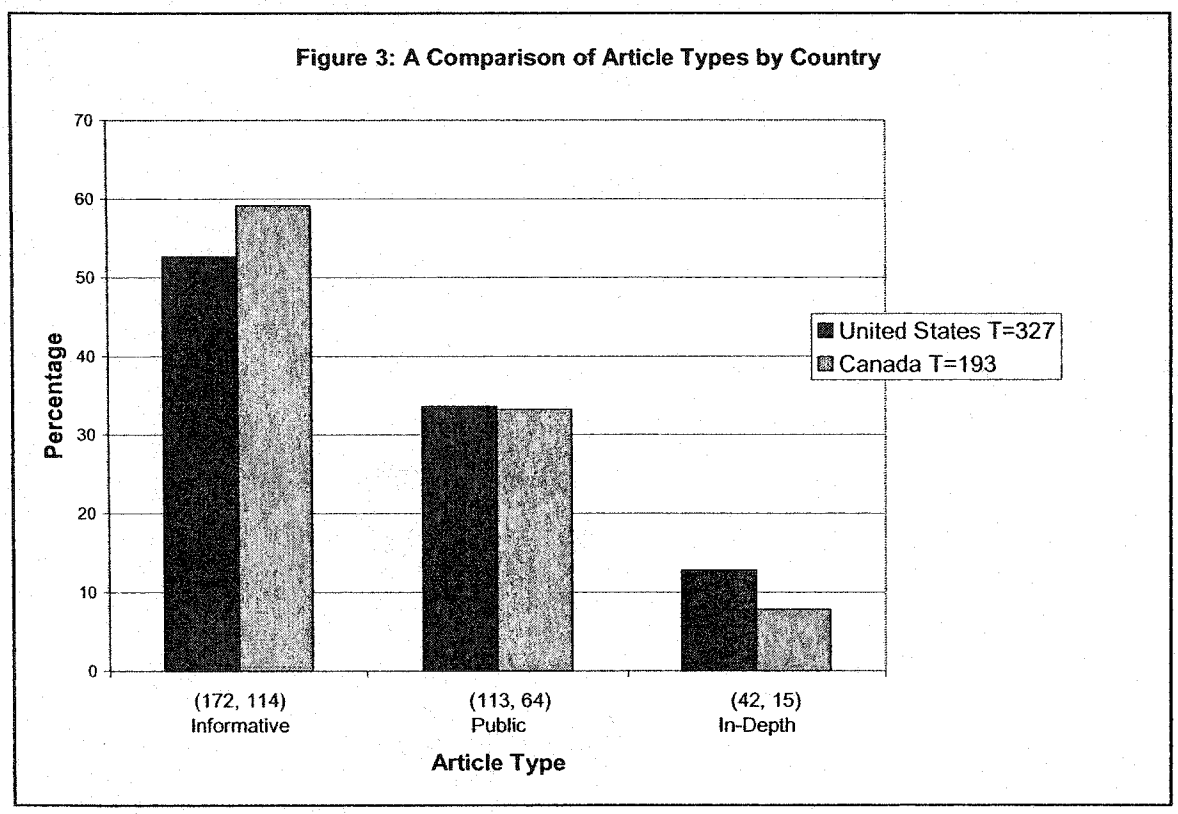
	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
Scientific	55.1	16	50.0	13	76.9	10	83.3	5
Microscopic	27.6	8	38.5	10	15.4	2	16.7	1
Blob/Clump	13.8	4	26.9	7	15.4	2	16.7	1
Hollow	3.5	1	3.9	1	--	--	--	--
Precious	3.5	1	--	--	7.7	1	--	--
Total (N)		29		26		13		6

Findings

In general, the content analysis of the sample articles suggests that, the settings of the sample articles are the same for both the American and Canadian samples (see Figure two). In both samples hES cells are primarily presented in Section A of the newspapers. Despite this similarity there are some discrepancies in the setting of the sample articles. For instance, the proportion of articles on the front page of the newspaper was shown as follows: 17.4% (57/327) for the United States and 7.8% (15/193) for Canada. Also the proportion of articles in the Health section of the newspapers was 6.7% (22/327) for the United States and 18.1% (35/193) for Canada. Moreover, the proportion of in-depth articles was 12.8% (24/327) for the American sample and 7.8% (5/193) for the Canadian sample. These results suggest that Canadians view hES cells as primarily a health related issue, whereas the higher percentage of cover stories and in-depth articles for the American sample indicates that Americans view hES cells as more controversial and thus more newsworthy.

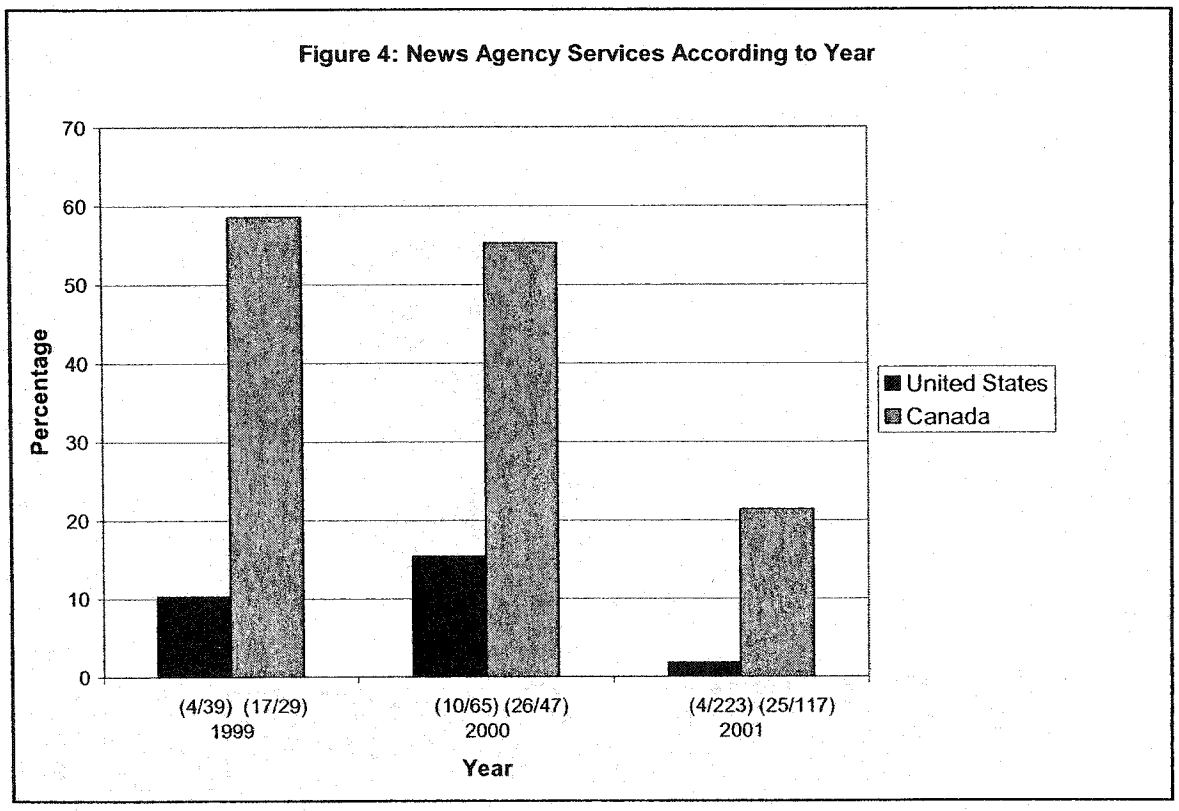


The content analysis also suggests that the general characters of both the American and Canadian samples are very similar, with the majority of the articles being informative in character. Figure three, illustrates that the proportion of informative versus in-depth articles was shown as follows: 52.6% (172/327) and 12.8% (42/327) for the United States and 59.1% (114/193) and 7.8% (15/193) for Canada. The category 'public', which consists of all the opinion articles, letters to the editor and editorials combined is consistent at 34.6% (113/327) for the United States and 33.1% (64/193) for Canada. Thus, these findings indicate that the general characters of the sample articles are consistent between the two samples.



The findings of the content analysis also illustrate that the Canadian sources made extensive use of rewritten news agency press compared to the American sources. Figure four illustrates that the news agency content for the Canadian sources was 35.8% (69/193), compared to 6.1% (20/327) for the American sample. However, both countries primarily employ the *Associated Press* and *Reuters News Agency*, although the Canadian sample also employed the news agency *Canadian Press*. The high percentage of news agency press in the Canadian content also suggests that the Canadian press places less emphasis on the hES cell debates, because the news agency press commands few resources. These results could also have a significant impact on the character and content of

the Canadian data because the news agency sources are primarily derived from foreign sources.



The major topics of discussion are also alike, with both the American and Canadian samples discussing the pending research guidelines for hES cell research, their potential medical applications and regenerative capabilities. Notably, both countries had similar results for the topic 'research guidelines', emphasising the research guidelines for human embryos with 79% (158/200) for the United States and 72.9% (51/70) for Canada. Both sources also have a small percentage of articles concerned with the issue of commodification; the proportion of articles for the United States being 4.3% (14/327) and 3.1% (6/193) for Canada. Moreover, the proportion of articles focusing on neutral stem cell

sources was 15.3% (50/327) for the United States and 20.2% (39/193) for Canada, with the majority of these articles focussing on the potential of adult stem cells.

Although the major topics of discussion were the same for the Canadian and American samples, the proportions differed. For instance, the proportion of articles discussing research guidelines versus regeneration was shown as follows: the percentage of articles focused on research guidelines for the United States was 61.2% (200/327), whereas it was 36.3% (70/193) for Canada; regeneration for the United States was 34.3% (112/327) and it was 40.4% (78/193) for Canada. Thus, this data, combined with the higher percentage of Canadian articles in Health sections suggest that the Canadian press was less concerned with research guidelines than the United States and more concerned with the uses and practical application of hES cells.

This finding is also reflected in the smaller percentage of Canadian articles focused on the debate surrounding hES cells. For instance, the proportion of articles discussing the debate was 37% (121/327) for the American sources and 20.2% (39/193) for the Canadian sources. These results are also reflected in the smaller percentage of cover stories in the Canadian sample. As Tannen (1998) argues this likely reflects a belief in news media that controversy is the most newsworthy topic of discussion. Thus, these findings indicate that the news media in Canada does not consider hES cells as controversial as in the American news media.

There was a significant difference between Canada and the United States in the number of articles discussing particular interest groups. The proportion of

articles discussing interest groups was 66.4% (217/327) for the United States and 39.4% (76/193) for Canada. This result reflects both the smaller percentage of Canadian articles focussed on the debate and hES cell research guidelines. Although the proportion of articles focussed on interest groups differed significantly, the interests of scientists, politicians, and patients were discussed most often in both samples. For instance, the proportion of articles discussing interest groups by category was shown as follows: scientists was 35.9% (78/217) for the American sample and 39.5% (30/76) for the Canadian sample; politicians was 41.5% (90/217) and 26.3% (20/76); and patients was 29% (63/217) and 26.3% (20/76) respectively. Notably, the most discussed interest groups in both the samples are also the groups that support and lobby for hES cell research.

Although the composition of the interest groups is similar between the two countries, the frequency of some groups differed significantly. For instance, 'politicians' were the most discussed interest group in the United States, but the second most discussed interest group for Canada. Moreover, the proportion of articles discussing the interests of anti-abortion groups was 20.7% (45/217) for the United States and 10.5% (8/76) for Canada. There are only three American articles that focus on the interests of ethnic minorities, whereas not one of the Canadian articles discussed this issue.[1] Also, although 'celebrities' are discussed as a distinct interest group with strong lobbying power, the discussion of celebrities is limited to their power in the United States in both samples. Thus, these results indicate that there are cultural differences between the United States and Canada in their approach to hES cells.

In general, the content analysis also illustrates that hES cells are primarily discussed within a national context in both the Canadian and American samples. The total international coverage was shown as follows: 5.2% (17/327) for the United States and 20.2% (39/193) for Canada. Despite the higher percentage of international coverage in the Canadian sample, hES cells were still discussed within a national context. The majority of the international coverage in Canada was focused on the regulatory situation in the United States in reference to Canadian developments. Notably, not one article in the American sample discusses the regulatory situation in Canada. Thus, the results indicate that Canadian news media employs American sources and events as a major source of information and comparison. This result may also be reflective of the high percentage of news agency press derived from the United States in the Canadian sample.

The value orientations imparted in the sample articles reflects an overwhelming support of hES cell research, despite the journalistic goal to report 'facts' objectively and without judgement. This widespread support is suggested by the choice of metaphors and euphemisms used in reference to human embryos and stem cells. In particular, the proportion of articles using metaphors for stem cells was 23.9% (78/327) for the United States and 38.9% (75/193) for Canada. Moreover, the metaphorical language used in the data to describe stem cells are both scientific and personifying, suggesting a movement to cast hES cells in a positive, even magical light. Significantly, the Canadian sample was far more likely to use metaphorical language for stem cells, which indicates an overall

preoccupation in the Canadian sample with the regenerative capabilities of stem cells, rather than a concern with the controversial aspects of using human embryos for research purposes.

The major barrier to human embryo research is the 'opposition', or those that regard the human embryo as a person (Gallagher 1985). The proportion of articles using euphemistic language for the human embryo was 16.8% (55/327) for the United States and 9.8% (19/193) for Canada. Thus, the euphemistic language used to describe the human embryo aim to substitute the politically, ethically and socially laden 'human embryo' with a mild, indirect, or vague term. The content analysis suggests that the Canadian press is far less likely to use a euphemistic language for the human embryo. Moreover, anti-abortion activists are identified as a major interest group in the United States, but not in Canada. This suggests that the status of the human embryo in Canada is not as considered as much of an issue for public concern.

The findings illustrate, through the reduction of information of the sample articles into a series of variables, the similarities and differences in the representation of hES cells between Canada and the United States. The parameters, or the boundaries and range of variation in the variables between the two countries are similar. The frequency of these variables diverges in some cases between the two countries, suggesting that there are different cultural, economic and political perceptions of science, health and healing, and the human body and personhood in Canada and the United States.

Discussion

The impact of current political debates regarding research guidelines for hES cells is reflected in the type, number, character and subject of the sample articles. The majority of the sample articles are concerned with either the research guidelines being proposed for hES cell research, the debate that ensues, and/or their medical application. The similarities between the hES cell articles in Canada and the United States are striking and reflect the economic, cultural and political ties between the two countries. In particular, science and medicine are both highly valued institutions, with biomedicine being the dominant treatment modality in North America. Lock (1988: 3) argues that biomedicine is "pervaded by a value system characteristic of an industrial-capitalistic view of the world in which the idea that science represents an objective and value free body of knowledge is dominant". Thus, representations of hES cells in both Canadian and American news media reflect prevailing ideological beliefs about the body and health and healing in North America (Harrison 1992).

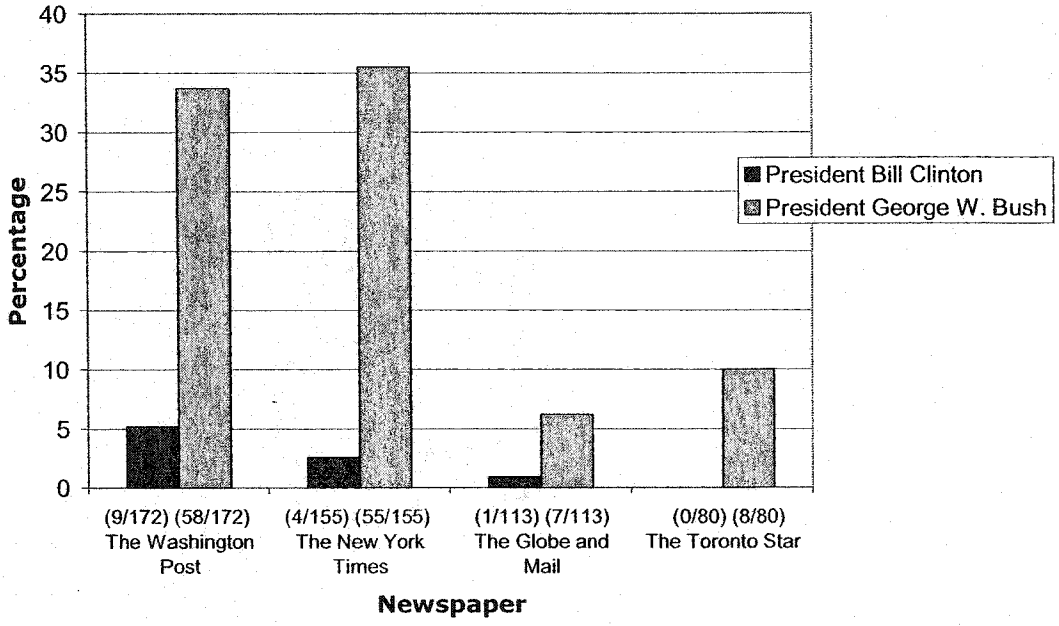
The similarities between the Canadian and the American content may also be reflective of the large percentage of news agency press in Canada. Vipond (2000) argues that economic incentive drives many Canadian news media owners to purchase cheap news material from abroad (mainly the United States), and syndicate American columnists rather than produce it themselves. For instance, the cooperative news agency *Canadian Press* buys almost all of its foreign news from the *Associated Press* and then re-writes it for Canadian consumption (Vipond 2000). The result is that 58% (40/69) of the Canadian news agency

content is derived from American sources such as the *Associated Press*, the *Canadian Press*, *Wire Services* and *Knight Ridder News*. The other 42% (29/69) is derived from *Reuters News Agency*, a British news agency service. Thus, the widespread use of foreign news agency press by the Canadian sources may have also flattened the cultural, economic and political differences between the American and Canadian representations of hES cells.

The proliferation of news media articles on hES cells in the year 2001 also illustrates the economic, political and cultural ties between Canada and the United States. One reason for the increased number of articles on hES cells is that President Bush undertook a public debate prior to overturning President Clinton's research guidelines for hES cells on August 9, 2001. For instance, President Clinton's lack of presence in the hES cell debates is reflected in Figure five, which illustrates the enormous impact that President Bush's public debate had on his presence in the media. Notably, the Canadian Prime Minister Jean Chrétien is mentioned only once in regards to hES cell research guidelines in the Canadian sample, whereas President Bush is mentioned eighteen times. Unlike the American President, the Canadian Prime Minister does not have the obligation to carry out God's will on earth. Thus, George W. Bush's public involvement in the hES cell debate is due in part to an elaborate and well-institutionalized civil religion in the United States (Bellah 1967). For instance, Bush (08/10/01) states in his National Address on Stem Cells: "I worry about a culture that devalues life and believe, as your president, I have an important obligation to foster and encourage respect for life in America and throughout the world.... God bless

America." As a result, the political ties between Canada and the United States are reflected in the impact of President Bush's public debate in both of the samples.

Figure 5: A Comparison of President Bush and President Clinton in the Articles

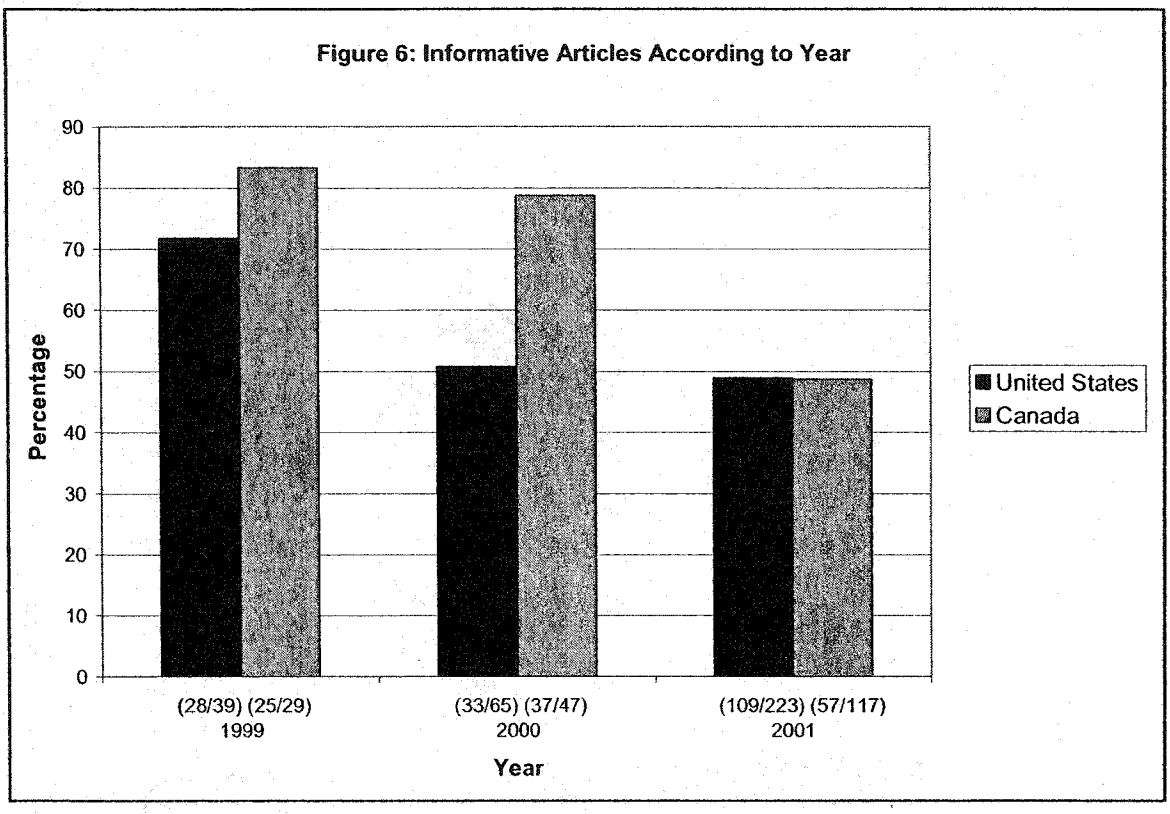


The current concern with the regulatory situation in both Canada and the United States is also reflected in the amount and character of international coverage. For instance, the total proportion of international news coverage focused on the United Kingdom in the American sources was 64.7% (11/17) and 17.9% (7/39) in Canada. This is likely because the *Human Fertilisation and Embryology Act* (HFE Act) has regulated reproductive and genetic technologies since 1990 in the United Kingdom (CIHR 2001). The HFE Act was approved following a major public debate regarding human embryo research that took place throughout most of the 1980s (Mulkay 1997).

The HFE Act provided a legal and ethical framework that enabled the United Kingdom to assess and quickly act upon the legal and ethical implications of hES cells. As a result, the United Kingdom made amendments to the HFE Act in 2000 that permits the creation and cloning of human embryos for the purpose of deriving stem cells (CIHR 2001). Thus, an outnumbered presentation of the United Kingdom regulatory system also reflects a media bias in favour of hES cell research, because the United Kingdom has the most liberal hES cell research guidelines in the world. Also, the other countries represented in the international coverage, such as Japan, Sweden, and the United States also represent the countries that have engaged expert working groups who have studied the issues, done extensive consultation, and produced legislation, regulatory frameworks and research guidelines (CIHR 2001).

A second interpretation for the increased number of articles on hES cells in the year 2001 is that as the public began to understand the potential ethical and medical implications of stem cell research, their potential importance increased, which is then reflected in the number and general character of articles published on the subject. For instance, the combined result of President Bush's public debate and the increased awareness of stem cell issues among the public are reflected in the decreased percentage of informative articles in the year 2001. The results, included in Figure six, indicate that the number of informative articles decreased from 71.8% (28/39) to 48.9% (109/223) for the United States and from 86.2% (25/29) to 48.7% (57/117) for Canada from the year 1999 to the year 2001. Thus, the data suggests that the North American public was becoming

increasingly engaged in the hES cell debate and newspapers offered a medium to express their legal, ethical and moral viewpoints.



An analysis of the sample articles indicates that public opinion regarding the use of human embryos for research purposes remains deeply divided in both Canada and the United States. The debate revolves around scientists, patient advocacy groups, corporations, liberal politicians, celebrities and the aging on one side (the pro-embryo research group) and the 'conservatives' or politicians, religious groups and anti-abortion activists on the other (the 'opposition'). The composition of the pro-embryo research group is significant for it illustrates the lobbying power of scientists and corporations and the growing connections between scientists and the business sector. For instance, Geron Corporation

funded the research by Dr. James Thomson of the University of Wisconsin-Madison, in which he first derived hES cells. As a result, Geron has exclusive rights to commercialise certain research products for applications in regenerative medicine and as tools in research products.[2] Moreover, Canadian Research Chair in Health, Law and Policy, Timothy Caulfield argues (personal communication, March 14, 2002) that politicians, who have a very large responsibility for the economic growth of their country, are very much aware of the fact that biotechnology is the largest growing economic sector in both Canada and the United States (Dibner 1994; Industry Canada 2000; KPMG 1997; Malinowski and Littlefield 1999; Niosi 2000; Procrassini 1995). Hence, the increasing connections between national economies and biotechnology will have serious implications for public health policy and research guidelines for hES cells.

The composition of the interest groups is significant for the groups that are present, but also the groups that are not. Notably, women and ethnic minorities are not considered as groups with any specific interests in the hES cell debates. This illustrates an important underlying issue, in which the premise in biomedicine is that the individual can be effectively detached from social, cultural, and familial context for purposes of diagnosis and treatment (Hamilton 1993; Sargent and Brettell 1996). For instance, in the United States and Canada over half of older women live at or below the poverty line – almost double the poverty rate of older men (Cattell 1996; CIHR 2001). This fact is significant considering that the majority of hES cell treatments will be directed at aging related illnesses due to their regenerative capabilities. Thus, the

decontextualization of health from its social determinants has lead to a failure in public health policy, and biomedicine to address the implications of gender, class and ethnicity for access to health care and status (Martin 1987; Rapp 1999).

Conclusion

The findings of this chapter suggest that the parameters of the hES cell debates differ to some extent according to country, newspaper, and even columnist. In general, the findings indicate that the Canadian press is more concerned with the regenerative capabilities of hES cells and their medical applications, whereas the American press is more concerned with the debate and research guidelines surrounding the use of human embryos for research purposes. This conclusion is supported by the higher percentage of articles concerned with the topic 'regeneration', the fewer number of 'cover stories', the higher percentage of metaphorical language used to describe stem cells, and the increased number of articles in the Health section of the newspaper in the Canadian sample. Moreover, the Canadian press is less concerned than the American press with particular interest groups, anti-abortion groups and is less likely to use euphemistic language for the human embryo. Thus, these divergent proportions for certain variables highlight cultural and political differences between Canada and the United States.

Nevertheless, the findings also indicate that there are significant similarities in the representation of hES cells in the sample articles between the

two samples. In particular, the message conveyed in the language used to describe human embryos and stem cells in both the American and Canadian sample is the same. The message is that hES cell research would lead to more control over pain, further relief from suffering, more frequent personal fulfilment and, hence, greater joy and happiness. Significantly, none of the sample articles in either of the samples (with the exception of letters to the editor written by the public) impart any negative impression of hES cell research. As a result, at the level of analysis attempted here – implicit assumptions about stem cells and the human embryo – the differences between Canada and the United States are minor.

The sample articles also suggest that there is an intensified public, political and academic interest in the emerging field of bioethics, yet it has not attracted much concern within anthropology (Lieban 1990). As Marshall (1992) argued, more attention should be directed towards understanding the social, cultural and historical determinants that shape moral questioning. This process is particularly important because the metaphorical and euphemistic language being used to describe and human embryos and stem cells suggests that there are powerful links between the language we use to describe the body "scientifically" and the cultural construction of the body (Csordas 1996; Martin 1996). Therefore, bioethics, and by extension hES cell research guidelines, are infused with ideologies regarding gender, class and ethnicity (Marshall 1992).

---

[1] The concern of ethnic minorities is that the stem cell "lines" approved by President Bush do not represent the genetic diversity of the American populace.

[2] Geron: Stem Cell Registry. Electronic Document, http://www.geron.com/print.04.00_scregistry.html, accessed December 12, 2001.

Chapter 4

Rhetorical and Thematic Analysis

In this chapter I analyse the rhetoric surrounding hES cell technology in greater detail. According to a judgmental sampling frame, thirty informative newspaper articles were selected for a thematic and rhetorical text analysis from the American and English Canadian data (Bernard 1995; Stone 1997).[1] The objective of this chapter is to explore the rhetoric surrounding the hES cell debates in Canadian and American news media by analysing both the attributes and subjects of the texts. Although the content analysis illustrated that the parameters of the hES cell debates differ to some extent between Canada and the United States, the message conveyed is similar. As a result, I will discuss the relevant themes without reference to the sample articles' country of publication.

My intention in this chapter is twofold. First, I will explore the language that is employed by journalists to persuade their audience towards a certain point of view. The rhetorical analysis will analyse the process and techniques used by journalists in order to naturalise hES cell technology. The thematic analysis will explore the media's construction of reality through the everyday language surrounding hES cell technology that is intrinsic to the process whereby people define both themselves, and their bodies.

Second, this chapter will analyse how a range of national and international social, political, and economic conditions shape sickness and healing in relation to hES cell technology. An analysis of the creation of medical knowledge and the way in which it is selectively applied can demonstrate "the manner in which

social interest becomes seamlessly incorporated in the set of tacit assumptions about reality" (Comaroff 1982: 50). This discussion will be framed within current theoretical orientations in medical anthropology that aim to understand "health issues in light of the larger political and economic forces that pattern interpersonal relationships, shape social behaviour, generate social meanings, and condition collective experience" (Singer 1990: 181).

I argue throughout this chapter that the rhetoric surrounding hES cells in the sample articles offers a serious challenge for certain aspects of self/body attachment. Technologies derived from or for hES cell research, such as cloning, organ and tissue transplantation, and chimeras, are all capable of disrupting the boundaries and meaning of the social body (Synnott 1993). As Csordas (1994) and Haraway (1991) argue transformative technologies challenge the cultural boundaries between animal and human, between animal/human and machine, and between the physical and the non-physical. This challenge is reflected in the level of public and political debate regarding the use of human embryos for stem cell research purposes. However, the data suggests that contradictory ideologies coexist, which suggests that hES cell technology may require too great a departure from the powerful symbolism of the embodied self to be wholly endorsed by the public.

Rhetorical Analysis

The primary message conveyed by journalists in the sample newspaper articles is that hES cell technology offers hope to millions of people who are

suffering from potentially treatable diseases.[2] This message of hope is often promoted by deligitimizing the beliefs of those who oppose hES cell research. This is done in the following ways: first, the opposition's arguments are disjointed and put into quotations and/or they are marginalized through other means; second, the opposition is dismissed with an argument designed to be persuasive from a scientific, statistical, and moral standpoint. In what becomes a formulaic presentation, articles begin with the opposition's argument, then a statement by the opposition in quotations, which is followed with statistics or examples that show ever-increasing numbers of potential recipients who die or suffer from conditions/diseases that could be treated by hES cell research. This is frequently followed by the argument that the shortage is unnecessary (and, therefore, even more tragic) because there are sufficient numbers of "surplus" embryos in fertility clinics that will be discarded anyways. Moreover, this argument is reinforced with rhetoric that depersonalises the human embryo.

The persuasiveness of this technique is intensified by the informative and objective aura of the 'Science/Medical Reporter'. The following excerpt from *The Globe and Mail* demonstrates these techniques:

> Highly vocal critics of the new research in the U.S. have likened the use of embryonic stem cells to the use of human skin for lampshades in Nazi Germany....
>
> "The real moral argument is whether a human life at any stage is sacred," said Moira McQueen, a University of Toronto theologian who lectures on the ethics of reproductive technology. "The law says these cells are not human.... The utilitarian point of view says these cells are being discarded anyway, so why not use them for good. But you can't just use human cells like a spare bit of fabric...."

> *Even so*, many scientists say the embryos employed are very primitive, are not implanted in a womb and could not become a living being (Foss and Fox 08/03/1999, Emphasis mine).

The use of quotations for the opposition's arguments followed by a rebuttal in the authoritative voice of the objective journalist suggests to the reader that the opposition's arguments should be regarded with sceptical distance. Moreover, these techniques delegitimize the opposition and neutralize the debate surrounding hES cells.

Marginalizing the arguments made by the opponent's of hES cell research is also an important technique used by journalists in the sample articles to neutralize the debate. If the opposition's arguments are even presented, they are discussed briefly then dismissed as outlined in the formula above. The following excerpt demonstrates this issue:

> Abortion opponents object to the fact that embryonic stem cells are derived by destroying embryos and advocate using a different class of stem cell, known as adult stem cells, which are found in various adult tissues. But adult stem cells are less versatile; none can yet be converted into the tissues needed to treat diabetes and Parkinson's (Wade 04/27/01).

This statement is the journalist's only mention of the opposition's arguments. As a result, the marginalization of the opposition over-simplifies and fragments their point-of-view.

Marginalizing and delegitimizing the opposition is then followed by statistical evidence that highlights the social and economic costs of many diseases that could potentially be cured by investment in hES cell research. For instance, the following excerpts demonstrate how journalists use statistical evidence in the sample articles in order to support hES cell research:

> There are not enough donor organs to treat the 16 million Americans who suffer from Type 1 diabetes. But if fully functional, islet-like structures could be generated from human embryonic stem cells, supply would not be a problem (Wade 04/27/01).
>
> In Canada, cardiovascular disease is the leading cause of death. About 80,000 Canadians annually die of heart disease. According to the Canadian Heart and Stroke Foundation, cardiovascular disease costs the economy about $19.7-billion annually (Picard 11/13/00).

This technique is employed as a way of demonstrating not only the humanitarian, but also the economic results of pursuing hES cell technology. Hence, journalists use these techniques in order to persuade their audience that investing in stem cell technology is a moral and economic investment, while at the same time discrediting and simplifying the opposition's arguments.

The New 'Other'

In the sample articles journalists are expending a considerable amount of effort into distinguishing between hES technology and the "New Other". The "New Other" refers to the various technologies that are associated with hES cell research such as reproductive cloning, chimeras and "human harvesting" and xenotransplantation. The public perception of these technologies as both nightmarish and celebrated threatens the federal financing of hES cell research. Sharp (2000: 287) argues that anthropological research on the human body identifying the "cyborg", as an amalgamation of human, animal, and technological parts, "challenges an often assumed human desire to protect personal boundaries and guard body integrity". Thus, in addition to distinguishing these technologies from hES cell research, journalists also posit

their argument for human embryo research against the more frightening and disrupting Other.

The headline on the cover of the Washington Post demonstrates this issue: "Embryo Work Raises Specter of Human Harvesting: Medical Research Teams Draws Closer to Cloning" (Weiss 06/14/99). The following excerpt from this sample article demonstrates the significant amount of effort that goes into defining terms and distinguishing between specific forms of hES technology:

> A team of American researchers has quietly begun to create the world's first batches of cloned human embryos, and another team has resumed its controversial cloning of embryos that are part human and part cow, according to scientists involved in the work....
>
> The two companies have started the programs to grow their own embryos, Geron Corp., and Advanced Cell Therapeutics (ACT)... are not trying to make full-grown human clones or human-cow hybrids. Rather, the goal is to use the newly cloned embryos as sources of embryonic stem cells, a recently discovered kind of cell that is thought to have the potential to treat a host of chronic ailments, including diabetes and Parkinson's disease....
>
> That uncomfortable link between stem cell research and human cloning is raising difficult questions about how to draw legal and ethical distinctions between cloning young human embryos – essentially balls of a few hundred cells – for medical research, and cloning human beings as a reproductive alternative....

Weiss frames his argument in support of hES cell research through a variety of means: first, Weiss is careful to distinguish between the disrupting and dangerous acts of reproductive cloning and cloning as a method for obtaining hES cells for the treatment of diseases and injuries. Second, Weiss makes reference to diseases that have active patient advocacy groups, and highly vocal celebrity supporters.[3] Third, Weiss juxtaposes hES cell research against the *more* controversial reproductive cloning and the creation of chimeras, in order to soften the impact of

hES cell research. Thus, through rhetorical techniques that deligitimate the opposition through a variety of means, journalists frame their arguments in order to persuade their audience that hES cell research is a "worthy endeavour" (Weiss 06/14/99).

Thematic Analysis

The thematic analysis, as a way of analysing qualitative information, explores four major themes deriving from the sample articles (Boyatzis 1998). The first theme that resonates in all of the sample articles is biological determinism. This theme refers to a reductionistic approach to health, healing and bioethics outlined in the sample articles. The second theme focuses on the process of fragmentation – or the process whereby the self and the body are separated through the reification of the body and its parts in scientific discourse. The third theme, the commodification of body parts, will focus on the trend in the sample articles to commodify hES cells through capitalistic[4] and utilitarian[5] rhetoric. Finally, I will focus on the contradictory process of personification -- the process whereby stem cells are connected to the embodied self by journalists in the sample articles through kinship and magical metaphors and ideologies. Of course, all of the research themes overlap within the sample articles. However, this approach is useful in illuminating the paradoxes that abound in the underlying themes. A summary of the research themes and the accompanying rhetoric is provided in Table 13 below:

Table 13: Summary of Research Themes

THEME	RHETORIC
1. Biological Determinism	Biology determines the meaning and character of human personhood. Disease causation is inherantly biological.
2. Fragmentation	The body is a biochemical machine that wears down with age. Human embryos are things. Stem cells are a source of replaceable parts that can be used as a repair kit to 'fix' the human body.
3. Commodification	Human ES research will provide the most benefit for the most people. Human ES cells are valuable commodities that must not be wasted.
4. Personification	Human ES cells are our ancestral predecessors and/or child-like entities that are trainable. Human ES cells are magical, and therefore researchers are magicians.

Biological Determinism

The sample articles describe and interpret hES cells, and the diseases they will potentially treat with terms based in scientific and biomedical, not social or cultural, ways of knowing the body.[6] Biological determinists argue that:

> ... Human lives and actions are inevitable consequences of the biochemical properties of the cells that make up the individual; and these characteristics are in turn uniquely determined by the constituents of the genes possessed by each individual (Rose, et al. 1984: 6).

Thus, biological determinism in the sample articles is committed to the view that biology is ontologically prior to the individual and the individual to society (Rose, et al. 1984).

The following statement by the Dean of Harvard Medical School demonstrates this development, when he suggests that "medical education may soon have to undergo radical changes as disease comes increasingly to be seen in *molecular terms*, redefining disease categories and physiological processes" (Quoted in Good 1994: 67, Emphasis mine). For instance, the data suggests that despite the wide range of varying opinions regarding the status of the human embryo journalists rely exclusively on medical and scientific definitions of personhood rooted in molecular understandings of human embryonic development. Moreover, Heriot (1996: 176) argues that defining what it means to be human in biological terms lays the groundwork for further refinement and monitoring of individuals by medical and/or scientific communities.

This development illustrates a powerful ideology within biomedicine that ultimacy resides in depth, "downward to levels that generate surface phenomena. And such deeper structures are not social or divine but ever more fundamental orders of material reality" (Good 1994: 75). For instance, biomedicine has grown increasingly less interested in models of disease, such as Alzheimer's, rooted in neuropathology in favour of models rooted in genetics (Cohen 1998). However, my goal at the moment is not to critique the biomedical institution, but to illustrate the prevalence of the ideology of biological determinism within the sample articles.

The Origins of Disease

Human ES cells are described in the sample articles as the potential "cure-all" for all of the world's diseases and chronic ailments. This development is reflective of an ideological framework that conceptualizes the origins of disease within (molecular) biology. Within this ideological framework stem cell technology is referred to as a *tool*, or a device-used-by-an-individual-to-get-something-done.[7] For instance:

> The primordial cells can give rise to all kinds of human tissue, making them potentially priceless as a *tool to repair* aging and ailing bodies" (Wade 07/02/99, Emphasis mine).
>
> Artificial joints, organ transplants, open-heart surgery – these marvels of medicine are making life better for the elderly. What's next on the horizon is the possibility of cell biology breakthroughs helping to stop or reverse the aging process itself (Crawford 03/10/00).
>
> The cells in question – human embryonic stem cells – have been hailed as a potential *universal repair material* for the human body (Flam 07/25/99, Emphasis mine).

Hence, conceptualizing hES cell technology as a *tool* mystifies the cultural, political, economic and social context in which health, healing and hES cells are embedded. Moreover, people who see hES cell technology as a tool see themselves controlling it, which also implies that society is able to predict the cultural or social outcomes of technological developments (Franklin 1990).

This conceptual framework is facilitated by the identification of the origins of all human disease and illness within the individual medicalized body. Medicalization refers to the ways in which specific behaviours and conditions become conceptualised as medical or biological "problems" (Conrad 1992; Lock and Kaufert 1998). In the sample articles, disease, like the human embryo, is

taken to be a natural or biological object, distinct from the human creation of meaning (Sahlins 1976). The result is that biomedicine is able to lay additional claim to conditions and illnesses, such as those associated with aging, due to the new developments in hES cell technology.

The diseases and illnesses that journalists discuss as possible applications of hES cell technology are extremely diverse. This development indicates that an increasing number of conditions are being identified as medical or biological "problems" within the sample articles. The potential applications of hES cell technology that are discussed by journalists have been disaggregated for the subset data and the results are listed below in Table 14:

TABLE 14

Potential Therapies for Human ES Cell Research

Potential Therapy	Total Occurrences T = 30
Organs/Tissues	20
Parkinson's	14
Diabetes	10
Coronary Disease	10
Alzheimer's	7
Cancer	6
Paralysis	5
Blindness	3
Burns	2
Muscular Dystrophy	2
Huntington's	1
Cosmetic Surgery	1
Lou Gehrigs'	1

The findings demonstrate two major points. First, many of the illnesses that are seen to benefit from advances in stem cell technology are most often associated with the chronic illnesses related to the aging process. Notably, as

Lock (1993), Young (1995) and Zola (1972) have argued the medicalization of illnesses such as aging may open new avenues for the social control of the aging and elderly in the future. Also, the prevalence of organ and tissue replacements as a major medical treatment illustrates the current concern with not only extending life, but also improving the quality of life. For instance in the sample articles one senior states: "As long as my health stays, I am happy. I wouldn't want to be chronically ill. I want to go quickly.... I want to be hit by a Cadillac and go out in style" (Crawford 03/10/00). Furthermore, these diseases and illnesses are the most common cause of death and hospitalisation in North America (Health Canada 2001; Turner 1987). Thus, the results indicate that aging is being increasingly defined as a *biomedical problem* and a sight of specified scientific knowledge and study.

Second, many of the potential diseases listed by journalists are not only the result the individual body's biology, or genetics, but societal, and even environmental causes. For instance, the two major causes of paralysis in the United States are motor vehicle accidents, and violence primarily stemming from gunshot wounds. Moreover, 81.6% of the individuals in the American database are male and between the ages of sixteen and thirty-one.[8] Thus, social factors, such as age, gender, and socioeconomic status are clearly social determinants of paralysis in the United States. Another example in relation to cosmetic surgery is that Synnott (1993: 75) argues that "the vast majority (87 per cent) of aesthetic procedures were performed on women [in 1990], and the proportion has remained constant over the last 10 years." Thus, references to disease causation and hES

cells as the 'tool' for curing diseases in the sample articles as *only* biological reflects North American conceptions of health and healing.

Biological determinism is a powerful ideology permeating the sample articles that reflects North American conceptions of life, death, health, and healing. The rhetoric of biological determinism is also a powerful ideology that justifies the morality of hES cell research. The sample articles routinely emphasise the materiality of the useful embryo that is in a "primitive stage" of development, (Foss and Fox 08/03/99) undermining the social significance of the human embryo. Thus, the replacement of the word 'embryo' with euphemisms such as 'embryo-like', or 'blastocyst' is, in essence, an attempt by journalists to redefine what it means to be human according to biological and scientific knowledge. Moreover, disease is conceptualized within the individual medicalized body, and hES cells are described as the ultimate tool to cure human sickness. Notably, the journalists have listed diseases and illnesses with vocal and active patient advocacy groups, which illustrate the influence of both politics and culture on health policy decisions made by both the American and Canadian governments.[9]

Fragmentation: The Body as Machine

Favoured terms in the sample articles are metaphorical and euphemistic language that strives for the objectification and depersonalisation of human embryos and stem cells. This rhetoric is integral to the naturalisation of stem cell technology and the neutralisation of the human embryo research debate.

Objectification refers to the process whereby human embryos and stem cells are presented as "things". That is, they are reified, described as mere clumps of cells, useful, and blobs, defined according to their material reality. In the sample articles the body is fragmented both metaphorically and literally through language, illustrations and through descriptions of the actual removal, reconstruction or replacement of specific body parts (see Sharp 2000: 289).

The dominant metaphor used for the fragmented body in the sample articles is that *the body is a biochemical machine.* The patient is the owner of the body-machine that is brought to the physician for repairs (Kirmayer 1988: 57). The body is an amalgamation of unrelated parts that can be replaced at will. This metaphor is developed with the following mechanisms: first, through the replacement of the socially and politically laden term "human embryo" with a mild or scientific euphemism; second, the stem cells themselves are described as a source of replaceable parts and; third through a "wear-and-tear" theory of the aging body. Significantly, the definition of a "thing" is culturally and historically specific and rooted in the social processes of constructing and validating knowledge (Borofsky 1987).

Research Guidelines and Embryology

The sample articles reveal a culturally specific contestation over the biological 'facts' of embryonic development (Franklin 1997). In each context, the precise (scientific) details of "when life begins" (or in scientific terms 'the character of fertilisation and embryonic development') become the focus of

intense scrutiny among the various interest groups. Thus, the data suggests that journalists routinely fragment human embryos linguistically into biological stages of embryonic development, arguing that the human embryos' subjectivity or humanity is directly related to its materiality or biology. It follows then, the journalists argue, that human embryos can and even should be used for research purposes because they are not even proper embryos. As a result, a prevailing theme in the sample articles is that the biology of the human embryo determines whether or not using human embryos for research purposes is ethical.[10]

Nevertheless, those opposed to hES cell research do not impart the human embryo with social significance or meaning according to scientific understandings of embryology, and argue instead that the personhood of the human embryo is inherently linked to its corporeality. This debate reflects conflicting ideologies regarding the place and meaning of science in human relations and the creation of human meaning. Moreover, the debate over the question of when life begins indicates that human embryos occupy multiple and competing categories of personhood. However, journalists adhere to the ideology of biological determinism and asign the human embryo with meaning based only on scientific and medical, not social or cultural principles.

In the sample journalists employ scientific terminology that fragments the human embryo into three subcategories. The first category is the blastocyst, which is defined as a very early stage in mammalian development, or about one or two-week post-fertilization consisting of approximately 30-150 cells in total. The second stage, the embryo, is defined as an organism in the early stages of

development; in humans, from the two-cell stage until approximately six or eight weeks, after which it is termed a fetus. A fetus is distinguished from an embryo by the fact that shows the main recognisable features of a mature human being (CIHR 2001; NBAC 1999). This distinction being made between a blastocyst and an embryo illustrates the journalist's familiarty with scientific terms and biolowy, because stem cells are obtained from human embryos at ten or twelve days post-fertilization (Okarma 2001). However, journalists imply that this distinction, which is rooted in scientific definitions and understandings of embryology and not social or cultural understandings of human embryonic personhood, is the more legitimate method for determining the morality of hES cell research.

Journalists are introducing ostensibly technical terms into the public debate as an attempt to hide what are really moral and political judgements behind an illusion of scientific objectivity. The distinction being made in the sample articles between a blastocyst and an embryo is semantic, as the definition of an embryo encompasses the blastocyst stage. This new terminology is intended to help undermine their opponents' use of the phrase 'unborn children' and to convey to the public that the potential subjects of laboratory experiments are not even 'real' human embryos.

Another example of this development is the introduction of terms such as the "pre or young embryo" to distinguish between the socially meaningful human embryo and the scientifically useful embryo being used for stem cell research.[11] The following excerpts are examples of journalists making these distinctions:

> Stem cells arise in the inner mass of the *young embryo*, which scientists call a *blastocyst*. The blastocyst is a barely visible dot, having no features of an embryo or a fetus (Abraham 08/18/01, Emphasis mine).
>
> After more than a year of quiet and careful preparation, scientists... have started a series of experiments aimed at creating cloned human embryos or *embryo-like entities* from which embryonic stem cells could be derived (Weiss 07/12/01, Emphasis mine).

Journalists are insinuating (opportunely) that life *really* begins following the blastocyst stage, because until that point it has no physical or biological features of an embryo. Nevertheless, the opponents of hES cell research maintain that life begins from the moment of conception and that it should be given the same protection as a child or an adult (Shore 1992).[12] Thus, the conflict over "when life begins" in the hES cell debates illustrates that segments of the North American public limit the power of science to impart meaning to life and death.

Journalists are not only determining the social value of human embryos according to scientific principles, but they are also defining human consciousness (or personhood) according to these categories. This development is an attempt to determine, by scientific means, the stage at which human consciousness begins. Thus, journalists often refer to the 'primitive streak', or the appearance of a nervous system as the determining factor for humanity. The following passages from the sample articles demonstrate this development:

> For those who believe, as many scientists do, that an embryo does not become a person until it is at least 14 days old, when the first evidence of a nervous system appears, experimentation on five-to 10-day-old human embryos for stem cells is a worthy endeavour (Weiss 06/14/99).
>
> The primitive streak, which appears 14 days after conception, marks the first appearance of the nervous system and the earliest possible stirrings of consciousness (Wade 07/02/99).

> After roughly 14 days, the first stirrings of a nervous system develops as a primitive streak appears down the length of the new being that will eventually grown into the spine (Abraham 08/18/01).

Thus, in the sample articles, the significance of the human embryo and the definition of when life begins is understood and defined through the discovery of traits in the physical world (genes, nervous system, brain functioning, etc.) with little or no reference to social or spiritual relationships.

The use of euphemistic language by journalists that emphasises the biological determinacy of the human embryo is used to both objectify and fragment the human embryo and therefore neutralise the hES cell debate. The fragmentation of the human embryo is accomplised through two processes. First, the embryo is conceptualised as a machine. The following excerpt demonstrates this issue:

> From the moment they were first snatched out of the *molecular machinery* of a human embryo, stem cells have become a story of extremes (Abraham 08/10/01, Emphasis mine).

Second, the embryo's lack of observable human characteristics is emphasised through the use of dehumanising descriptions. For instance:

> Scientists countered [antiabortion activists] that embryos are not "dismembered" to get stem cells because retrieval is conducted when the embryo is still a one-week old microscopic ball of undifferentiated cells, long before any organs or limbs have developed (Weiss 08/23/00, Emphasis mine).

> Within days of fertilization, these new and dividing cells form a hollow sphere (Abraham 08/18/01).

> The embryos from which the cells are derived, which at this stage are *just a tiny blob of cells*, are created in a fertility clinic procedure.... (Wade 05/24/99, Emphasis mine).

> Embryonic stem cells, taken from an embryo a few days old at the stage when it is a barely visible, hollow sphere of cells (Wade 05/27/01).

Thus, journalists are delineating new boundaries for the human embryo, fragmenting it into knowable, discrete stages. Moreover, describing human embryos as indistinct and shapeless forms, with terms such as hollow-sphere, clump and microscopic blob, illustrates a widespread advocacy by journalists for hES cell research.

Stem Cells as a Source of Replaceable Parts: The Building Blocks of Life

The language used to describe stem cells in the sample articles is similar to the language used in to describe organ transplants (Joralemon 1995). These developments represent a more general trend in biomedicine and science to fragment, or decontextualize the body and its parts from the whole. As the previous section presents, the most common metaphor of the human body compares the body to a machine like an automobile that can be "repaired" by using "replacement organs" and "replacement tissues". The following excerpts exemplify this point:

> ... doctors might be able to use the cells to create replacement tissue grown to order (Stolberg 08/17/01).

> ... these cells will lead to substantial medical benefits, possibly including the direct implantation of the cells to replace the tissues lost in Parkinson's and other diseases (Wade 05/24/99).

> The stem cells allow doctors to repair and replace damaged parts with lab-grown tissues: new brain cells for Alzheimer's and Parkinson's patients; mint-condition hearts for those with coronary disease; new nerves for the paralysed (Abraham 08/10/01).

> Doctors hope they will be able to grow a smorgasbord of replacement tissues from stem cells, for transplantation into people who need them (Weiss 10/09/99).

The metaphorical language used by journalists indicates that they would have doctors replace body parts and surfaces as easily as mechanics replace the radiator on a truck. Yet, in "normal reality, the body surfaces – the skin, the hands, the eyes, the face, the clothing – convey personhood. The interior of a person is his or her thoughts, experiences, personality" (Good 1994: 72). My point here is not only that journalists define the body in materialist terms but also that the process of reifying the body and its parts requires a significant amount of cultural "work".

The fragmentation of the human body through the use of metaphorical and euphemistic language by journalists is a powerful attempt to convince the public (and themselves) of the body's objectivity. This point is demonstrated further by metaphorical language that defines the regeneration of the body in terms of construction and design. For example:

> Researchers around the world are using stem cells – which are the *building blocks* that allow an embryo to become a fetus – to try to *rebuild* virtually every organ (Picard 11/13/00, Emphasis mine).

> In work that may literally redefine what it means to be human, scientists are teasing apart human embryos and fetuses to learn how to heal, rejuvenate and even enhance human bodies and minds – in short, to *redesign* the species from the inside out (Weiss 10/29/00).

The rhetoric in the sample articles of growing replacement parts to 'redesign' and 'rebuild' the human body reflects hopes that researchers will be able to hammer out a blueprint for building entire human organs, as if for a house.

As 'tissue engineers', researchers chemically manipulate, harness and coax stem cells for their regenerative potential. For example:

> The goal now, Gearhart says, is to learn to control this process so that one day there might be large banks of stem cells, *engineered* to avoid rejection (Flam 07/25/99, Emphasis mine).

A few teams have recently found and *reprogrammed* such cells. Like all cells, they have a *genetic blueprint* for the organism in their nuclei and it has been possible to reactivate it (Foss and Fox 08/03/99, Emphasis mine).

But embryonic stem cells should be able to generate all medically desired new tissues, once biologists can find the right natural signals to *coax* them into any desired cell type (Wade 04/27/01, Emphasis mine).

Thus, stem cells provide the 'building-blocks' or the 'repair-tool' that scientists must learn to control or manipulate in order to repair the human body/machine.

The Globe and Mail article titled "Repairing the Eye Cells of retina have regrowth potential -- U of T scientists discover 'little factories' can reproduce once they're in the lab dish", by health reporter Krista Foss, exemplifies the construction and engineering metaphor in hES cell technology. Foss outlines this development in the following quotation:

> Canadian scientists have discovered that human eyes have the building blocks to regrow the cells of their retina – a finding that could revolutionise treatment of diseased or injured eyes.
>
> University of Toronto researchers located what are known as stem cells – a master blueprint for all kinds of cells – in the thick black outline that separates the coloured iris of the eye from the white eyeball (Foss 03/17/00).

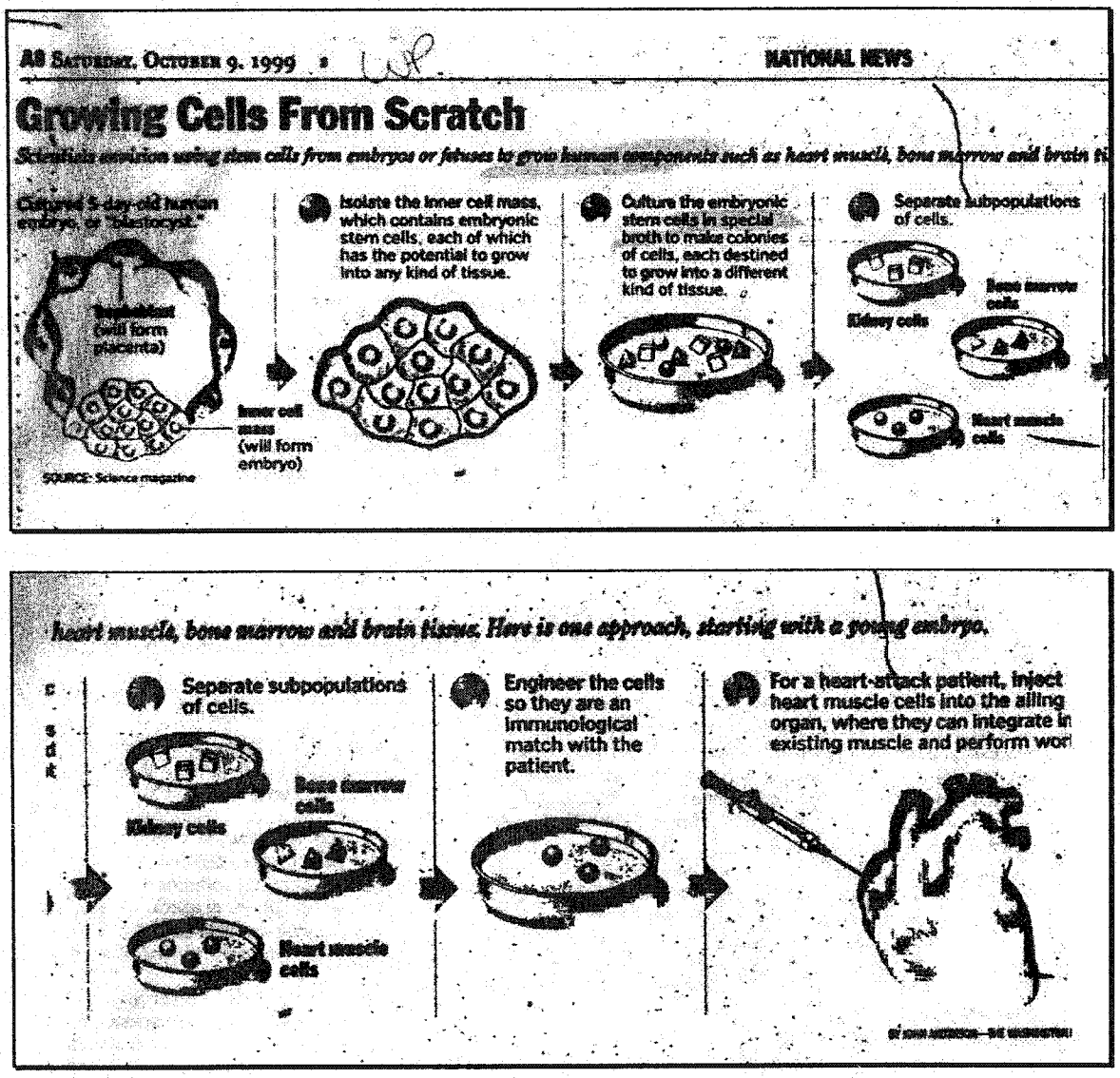
A blueprint is something that is intended to be a guide for making something else. Thus, defining stem cells as the 'master blueprint' implies that stem cells are the ultimate source of therapies and healing, defining health and illness at an even more molecular level. Moreover, this article represents a more general trend of "good news and technological improvements" in the sample articles, which illustrates the larger journalistic agenda that supports stem cell technology.

In addition, in the sample articles hES cells are isolated, detached and broken off from the rest of the human body. For instance:

> Stem cells can spontaneously metamorphose into tangles of nerves or clumps of muscle. Sometimes, *they form heart tissue that starts rhythmically beating in the Petri dish"* (Flam 07/25/99, Emphasis mine).
>
> At the Geron Corporation... scientists have already turned embryonic stem cells into heart muscle cells that *spontaneously beat in the test tube* (Pollack 05/30/00, Emphasis mine).

The objectification of the body/machine into parts is also demonstrated by the visually powerful illustrations that accompany many of the sample articles. The illustration titled "Growing Cells from Scratch" included as Figure 7 below highlights this point (Weiss 10/09/99):

Figure 7
Illustration: "Growing Cells From Scratch"



The caption reads that stem cells will be used to "grow human components" from the young embryo or "blastocyst". This statement emphasises the materiality of the human embryo. The specific cell types, kidney, liver and heart cells, are divided (fragmented) into "subpopulations" rather than a part of a whole, and also made to look like building-blocks. The illustration also states that

cells are "engineered" to match with the patient in a "special broth". Finally, the image of the human heart removed from the patient's body highlights the ultimate fragmentation of the human body into atomically useful parts.

The Wear and Tear Theory

As the previous sections demonstrate, the most common metaphor of the human body compares the body to a machine like an automobile that can be "repaired" by using "replacement organs" and "replacement tissues". The language used to describe the aging process reveals the way journalists, and by extension the general public feel about the aging body, which is most often visualised according to a theory of "wear and tear" (Cirillo 1993: 92). The following passages are examples of the wear and tear theory in the sample articles:

> Efforts are directed towards enabling people to grow new cells – possibly entire new organs – to replace the ones *breaking down due to old age* (Crawford and Lautens 03/10/00, Emphasis mine).
>
> "The fundamental concept [of regenerative medicine] is that if we learn enough about how the body regenerates itself, we can use those same mechanisms to regenerate tissues that are damaged or worn down by age," Dr. Haseltine said (Wade 04/02/99).
>
> Harnessing the power of stem cells would also mean that doctors could move far beyond patching up old or damaged body parts with used ones (Abraham 08/18/01).

This theory is based on particularly North American beliefs about aging and the body. Although this interpretation of the human body is a means for revealing many disease phenomena and providing the basis for therapeutics, it is at the same

time profoundly ideological and misleading; while metaphors are useful for channelling our thinking they also limit it (Good 1994; Nardi and O'Day 1999).

The Commodification of Body Parts

In contemporary Western thought, only physical objects or "things" and the rights or ownership, to them represent the natural universe of commodities (Kopytoff 1986). There is an implicit assumption in the sample articles that individuals should not commercialize (i.e., profit from) human embryos. Thus, the sample articles report, without criticism recent governmental research guidelines that restrict the commodification of human embryos.[13] For instance:

> The commission [The 1993 Royal Commission on Reproductive Technologies] further recommended that human embryos be procured for research only with informed consent, never sold for profit and not be used for research beyond 14 days old, after which time scientists believe the embryonic nervous system appears along with the earliest possible stirrings of consciousness (Abraham 07/08/00).
>
> The guidelines include several provisions designed to discourage anyone from donating embryos for profit or the medical benefit of relatives (Wade 08/24/00).

These concerns are also reflected in reports made in the sample articles regarding a recent investigation made by the United States government based on the claims of an anti-abortion group in the spring of 2000 that an Illinois company was selling fetal body parts, to researchers for hefty profits. The price list included fetal brains for $999 (U.S.), pituitary glands for $300 and eyes for $75 each (Abraham 07/08/00).

Journalists appear to be finding it increasingly difficult to uphold this moral stance as advances in hES cell technology have led to a dramatic increase

in the number of people for whom therapies could be a viable option in the future. Biotechnology is also a powerful and influential industry in North America. Thus, journalists frequently invoke utilitarian ideologies to support hES cell research. The following by-line demonstrates this premise: "An ethics quandary: something must be destroyed for potential gain" (Wade 07/02/99). Another example states:

> President Clinton, in a press conference yesterday, referred to the "potentially staggering benefits of this research."
>
> "I think we cannot walk away from the potential to save lives, to help people literally get up and walk, to do all kinds of things we could never have imagined," the president said (Wade 08/24/00).

This framework is also reflective of the consensus among western journalists that ethical reporting must be shaped by functionality and utilitarianism (McKercher and Cumming 1998).

Utilitarianism and Capitalist Rhetoric

A utilitarian framework follows from ideas prominent in capitalist society, such as individualism, which regards the marketplace as a governing force in our lives (Fox and Swazey 1992). For instance, the sample articles illustrate a paradoxical concern with the commoditization of hES cells, while reporting at the same time on the commercial advances made from hES cell research. Within this framework "health" and "commercialization" are intimately linked as being two interdependent forces. These ideologies are integral to the commoditization of hES cells, in which hES cells are first conceptualized as "things" of great value,

while utilitarian rhetoric is a powerful mechanism that cloaks the commercial transactions in the appealing guise of gift exchange and interdependance.

The sample articles are rife with examples of journalists who all adhere to the general premise that human life must not be commoditized yet who go on to acknowledge the potential commercial benefits of treatments derived from hES cell research. As Gans (1980: 46) argues the underlying posture of the news towards the economy is "an optimistic faith that in the good society, businessmen and women will compete with each other in order to create increased prosperity for all, but that they will refrain from unreasonable profits and gross exploitation of workers or customers". These journalists also point out that "scientific advances – notably those in biotechnology – are very much at the core of [the] nation's global dominance and economic boom" (Weiss 10/29/00). For instance:

> Even less is known about how to spur stem cells to grow with assuredness into other kinds of cells, such as insulin-secreting cells that, given the prevalence of diabetes in this country, are foreseen by Geron as the first *"blockbuster" moneymakers* (Weiss 09/09/99, Emphasis mine).

> Geron expects its first stem cell profits to come from making liver cells that pharmaceutical companies can use to test how well a drug is metabolised.... (Pollack 05/30/00).

Thus, while condemning the commoditization of human embryos, journalists routinely report on the commercial advances being made with hES cell research without criticism.

The widespread acceptance and approval of the commercialisation of hES cell products is also reflected in the lack of criticism directed towards the patenting of both the method of isolating stem cells and the stem cells themselves. For instance, Stolberg's August 17, 2001 cover story discusses patent number

6,200,806, held by Geron Corporation and the Wisconsin Alumni Research Foundation (WARF), which gives Geron exclusive rights to commercially develop stem cells.[14] Stolberg only discusses the implications of this patent within the context of its potential ability to undermine President Bush's limited research guidelines and the capitalistic rhetoric of competition or *laissez-faire*:

> President Bush's decision may have strengthened the hands of the Wisconsin group and Geron. By refusing to allow taxpayer money to finance creation of new cell lines in this country, Mr. Bush reduced the chances that scientists would derive and patent cells that might challenge Wisconsin's dominance in the field (Stolberg 08/17/01).

This development is portrayed as unproblematic due to the fact that hES cells are not human; they are things "tiny enough to fit on the tip of a sewing needle" (Stolberg 08/17/01).

'Surplus' and 'Waste' Ideologies

The commoditization of hES cells is also illustrated in the rhetoric surrounding the procurement of human embryos. In the sample articles, the argument being made in favour of hES cell research is that human embryos at the stage they are being used for stem cell research are not human and that they are being discarded anyway so why not use them for good. This argument is framed within capitalistic rhetoric of "surplus" and "waste". The following excerpts are cliché sentences that reflect this ideology:

> But at the moment, the only viable methods of obtaining the cells are to culture them from an aborted fetus, or more simply, to isolate them from a human embryo, thousands of which are "left over" from in-vitro fertilization treatments that create test-tube babies (Abraham 07/08/00).

> The NIH released ethics guidelines under which it now will fund, for the first time, experiments on human embryonic "stem" cells retrieved from spare fertility clinic embryos slated for destruction (Weiss 10/29/00).

Although the numbers of "surplus" human embryos in fertility clinics alone has not been persuasive enough to neutralize the stem cell debate, the objectification of the human embryo combined with "surplus" ideologies have been integral to the suppression of counter-ideologies.[15]

The sample articles further this rationale by making distinctions with the use of metaphorical language between the concepts of "active" and "passive" procurement of human embryos for stem cell research. I use the term "active" to refer to the creation of human embryos solely for research purposes. On the other hand "passive" procurement refers to the process of receiving "spare" human embryos from fertility clinics. For instance:

> Researchers in Virginia made the controversial announcement that they had harvested stem cells from embryos they had created solely for research, as opposed to using spare fertility clinic embryos slated for destruction as several ethics groups have recommended (Weiss 07/12/01).

These concepts have been disaggregated for the sample articles and the results are listed below in Table 15:

TABLE 15

The concepts of "active" and "passive" production disaggregated

	United States	*Canada*	*Total*
Left-over	1	4	5
Surplus	0	3	3
Spare	3	0	3
Discarded	3	1	4
Abandoned	1	0	1
Harvested	1	2	3
"Passive Procurement"	9	10	19
Custom Produced	1	0	1
"Active Procurement"	1	0	1

The results suggest that journalists are positing two forms of procurement against one another. Passive procurement of embryos is a logical and even moral act, while active procurement is described as the breaking of a medical "taboo". For example, the following excerpts indicate that the distinction has played a crucial role in the formulation of federal research guidelines in both Canada and the United States:

> In Canada, draft legislation to be debated this fall would allow scientists to harvest – and consequently to destroy – human embryos to retrieve stem cells provided that the embryos are left-over from fertility treatments (Abraham 08/11/01).
>
> The rules would permit federally financed researchers to use cell lines that were derived from frozen human embryos due to be *discarded* by fertility clinics, usually because the *owners* no longer wanted them (Wade 08/24/00).

The journalists in the sample articles are actively creating a distinction between the two types of procurement. In fact, the scientist is made to be the "hero" because he is "saving" the "abandoned" embryos for "treating and curing some of mankind's most devastating diseases" (Stolberg 08/17/01). Of note is the contradiction between the objective "leftover" embryo and the personified or "abandoned" embryo. Moreover, the use of terms such as "left-over" objectifies the human embryo, and the use of others like "owners" reinforces the North American cultural priorities of individual autonomy, and rational self-interest, a process that supports the trading, selling and patenting of hES cells and human body parts.

Personification

The previous sections showed that journalists are doing a significant amount of cultural work in an attempt to fragment and commodify hES cells. This process is integral to the neutralisation of the stem cell debate and the naturalisation of stem cell technology. Yet, contradictions persist. As journalists seemingly treat cultural dimensions of the body as unproblematic (or non-existent), they both personify and objectify hES cells. The rhetoric used by journalists reflects the widespread cultural ambivalence towards the fragmentation and commodification of the human body. Therefore, it is important not to underestimate the cultural force behind the idea that self and cells are not entirely separable, that it is not only the brain in which the "I" resides.

In the sample articles, personification, or the process where a personal nature is attributed to a "thing", is a technique employed by journalists to convince their audience (and/or themselves) of the innate suitability of using hES cells for healing. The cultural resistance to the fragmentation of the human body leads journalists to attempt to link stem cell technology to social values that are sufficiently powerful to minimise the sense of disjuncture between traditional concepts of personhood and those consistent with transplantation (Joralemon 1995: 335). Journalists are using contradictory language that personifies stem cells in order to waylay the cultural ambivalence towards the fragmentation of the body and its parts.

Kinship Terminologies

Journalists diminish the cultural resistance to using human embryos for stem cell research by using metaphorical descriptions of stem cells that incorporate them into the self. Stem cells are often referred to in kinship terms, such as ancestral, primordial, precursor, progenitor or parent cells. The following excerpts illustrate this point:

> The embryonic stem cells arise early after conception and are the *ancestral cells* for all of the body's tissue, such as muscle, bone, nerves and skin (Foss and Fox 08/03/99, Emphasis mine).
>
> These *primordial*, embryonic cells have the potential to grow into a complete human being and all its parts (Abraham 08/18/01, Emphasis mine).
>
> Embryonic stem cells are the *"mother"* cells that can develop into any part of the human body (Calamai 03/30/01, Emphasis mine).
>
> The research would be limited to the derivation of embryonic stem cells, the *primordial cells* from which all tissues and organs of the body develop (Wade 05/24/99, Emphasis mine).

Kinship terms imply an affinity or connection by blood, marriage, or adoption. Thus, kinship references in the sample articles describe stem cells as things that have existed at or from the beginning of time, reinforcing the idea that stem cells are not the disrupting "other" but our familiar kin.

The kinship terminology employed in the sample articles is also reflected in the use of terms such as "lineage" and "descendant". For instance:

With cells being shipped through the mail from lab to lab, *lineages* could easily get mixed up (Weiss 08/10/01, Emphasis mine).

> Other scientists reported a similarly astonishing *leap of lineages* last spring, when they showed that blood-related cells taken from a rat's bone marrow could give rise to liver cells (Weiss 04/24/00, Emphasis mine).

> Dr. David J. Anderson... said it was a "very important result" to have trained stem cells to form different lineages in the laboratory (Wade 04/02/99).
>
> To prove that, Thomson has injected into mice freshly grown human stem cells that are more than *300 generations removed from the parent cells* he isolated from his original human embryo (Weiss 08/09/99, Emphasis mine).

Journalists employ the term "lineage" for two different contexts in the sample articles. The first refers to specific lineages of cells; for example, liver cells may refer to one lineage. This usage of the term illustrates further the fragmentation of the human body into parts at the molecular level. The second usage of the term refers to the "lineage" or the ancestry of the actual hES cell line. The "lineage" of the cell lines being used for research purposes is crucial; a major goal of hES cell technology is to clone the patient's *own* cells so that the tissues immunologically match and reduce the chance of rejection (Weiss 10/09/99). However, the term "lineage" also personifies and personalizes hES cells, a process that is contradictory to the biologically deterministic, fragmenting, and commoditizing processes discussed above.

Congruent with this kinship terminology, stem cells are often described as having child-like characteristics. The following excerpts demonstrate this point:

> What makes the stem cells special is that they haven't yet formed into specific human cells, but are believed to be capable of "learning" how to become certain cells (Walker and Lodge 08/10/01).
>
> ... stem cells are "immunologically uneducated" – they haven't yet developed many of the antibodies present in adult blood (Hass 05/11/99).
>
> ... stem cells.... are considered "immunologically naïve" (Hass 05/11/99).

In contrast, adult stem cells are described as "the crusty, narrow-minded entities" that with recent discoveries, may be able to have "midlife career changes" (Weiss 04/24/00). This child-like imagery also reflects the idea within the scientific community of introducing young "parts" to revitalize or "kickstart" the aging body. Hence, the kinship rhetoric surrounding hES cells relies on stereotypes central to our cultural definitions of childhood, kinship and old age. The implications of these cultural and social concepts do not only affect how human bodies at different stages in the life-cycle are perceived, but how they are treated within the biomedical institution.

Magical Cells

Supernatural powers attributed to hES cells, combined with kinship ideologies in the sample articles indicate that the concept of an embodied body persists, despite reductionistic, fragmenting and commodifying rhetoric. For example, these excerpts indicate that journalists often talk about stem cells as if they had otherworldly powers.

> … diseased eyes are being treated with embryonic stem cells, *powerful master* cells that are harvested from the surplus embryos created by fertility clinics (Foss 03/17/00, emphasis mine).
>
> In public and private labs all over the globe, researchers are busy testing the *magic* of stem cells in trials with mice and humans (Abraham 08/18/01, emphasis mine).
>
> The Big Chill: Medical research seems to be on the verge of making *miracles* – eliminating deadly disease and growing replacements for human organs. But trouble looms. The raw materials for all this *potential magic* comes from a source that has the mighty anti-abortion movement up in arms (Abraham 07/08/00, Emphasis mine).

Thus, the powers of hES cells are seen to be above or beyond the established laws of nature, which contradicts the previous discussion on biological determinism and objectification. Moreover, 'magic' is defined in the Oxford dictionary as "the supposed art of influencing the course of events by the occult control of nature or of the spirits." Thus, journalists are also mystifying 'science' as something that is beyond ordinary understanding and reality. Ideologies of the body, biotechnology and stem cells are not only objectifying, illustrating a multiplicity of perspectives and ideologies in hES cell rhetoric.

As magical cells, hES cells also have magical properties – stem cells are capable of making miraculous transformations. Journalists capture the readers' imagination and refer to the researchers working in regenerative medicine as "cellular magicians" (Abraham 08/18/01), engaged in "cellular shape-shifting" (Weiss 04/24/00). For instance:

> ... more and more scientists today are performing these and other feats of *biomedical alchemy* (Weiss 04/24/00, Empasis mine).
>
> Stem cells can *spontaneously metamorphose* into tangles of nerves or clumps of muscle (Flam 07/25/99, Emphasis mine).
>
> Stem cells entice scientists with their *chameleon capabilities* (Abraham 08/18/01, Emphasis mine).

Like magicians, scientists perform feats that transform the entire nature or form of a cell. Moreover, journalists describe the self-renewing characteristic of stem cells as "immortality" (Weiss 08/09/99). As a result, journalists propose that researchers may have found the "fountain of youth" by "unlocking the secrets of life" and are now in the process of "building the time machine" that could reverse the process of aging (Crawford 03/10/00). Thus, the success of stem cell

therapies has a direct impact on North American concepts of life and death and the aging process.

Discussion

The rhetoric surrounding hES cells in the sample articles suggests that journalists support and advocate the use of human embryos for stem cell research in Canada and the United States. Journalists rely upon rhetorical structure, metaphorical and euphemistic language to minimise the ideological disjuncture that occurs between a scientific training that insists on fragmenting and commodifying the body and its parts and a public that continues to impart the body with social significance. Thus, human embryos are described as "tiny-blobs of cells" that barely "fit onto the tip-of-a-needle" and stem cells are discussed as "useful replaceable parts". These same journalists attempt, yet often fail, to diffuse or hide from others the social significance of the mind/body attachment in North America. Furthermore, peoples' beliefs about the nature of the human embryo and the human body are rooted in the concrete circumstances of their lives for "the body is not only an organic mosaic of biological entities it is also a cornucopia of highly charged symbols" (Taussig 1980: 10; Luker 1984; Synott 1993).

More specifically, their language reflects a widespread ambivalence towards the objectified body that is reflected in the use of personified rhetoric. Hence, the human body and its products may be used to represent other natural, supernatural, social, and even spatial relations. These cultural constructions of

and about the body are useful in sustaining (and creating) particular views of society and social relations (Scheper-Hughes and Lock 1987: 19). Therefore the use of kinship terms in reference to stem cells is a powerful mechanism for incorporating hES cells into the self and minimising the sense of ideological disjuncture. Also, kinship terminology such as "child-like" and "ancestral" sustains the self/other, and old/young dichotomies, reinforcing and expressing Western assumptions of a social body.

The language used to describe the human body and hES cells also conveys how North Americans think about health and healing, the aging body, biotechnology, and North America's status in the world-system (Cohen 1998). In the sample articles, the body becomes a powerful sign both of biomedicine and of imagined core values in North American culture. Thus, as journalists argue that human bodies are machines, people begin to think less about what our bodies mean, and more about what the human body is for and what can be produced from it (Rothman 1989). The result is that health and healing is only explained within the material world, a process that has mystified the underlying cause, or the "why" of illness, that is embedded in human significance and shaped by culture (Evans-Pritchard 1937)

Embedded in all of the sample articles is a representation of the world as an ontological hierarchy. Accordingly, medical education begins by entry into the human body, "viewed through the microscope, entered physically in the gross anatomy lab, seen with astounding clarity *via* contemporary radiologic imaging, or presented by master scientists, the body is revealed in infinite, hierarchical

detail" Good (1994: 72). Rooted in this process is the idea that stem cells, which are the "primordial", "original" or "primitive" cells, could be the ultimate source of material for curing human suffering and disease. This concept reinforces the idea that disease and illness are fundamentally, even exclusively biological; surface signs and symptoms of disease are only understandable with reference to underlying mechanisms at an ontologically prior level.

These assumptions about the human body have serious implications for theoretical view-points and research paradigms in biomedicine that influence the ways in which health care is planned and delivered in Western societies (Scheper-Hughes and Lock 1987). Yet, research indicates that human body parts are assigned different meanings across cultures, classes, gender and throughout history (Haraway 1976; Hardacre 1997; Martin 1987). The associated function of those parts is also culturally specific. For instance, in the stem cell debates, the fertilised human embryo is regarded by some as an unacceptable source of research and medical material, despite the widespread publicity and debate. Joralemon (1995: 350) argues that in North America, those bodily fluids and tissues the loss of which we experience in the normal course of our lives and/or are replaceable, such as blood, semen, hair and ova are the only accepted body parts for commoditisation. Thus, North American cultural beliefs regarding the body and its functions directly influence the development and interpretation of biomedical therapies.

Despite contradictory ideologies, the artificial separation of mind/self and body, the so-called Cartesian dualism, is clearly evident in the sample articles.

The mechanistic conception of the body and its functions in the sample articles proposes a fundamental opposition between spirit and matter, mind and body, and (underlying this) real and unreal (Scheper-Hughes and Lock 1987:6). Gordon (1988: 26) defines the act of making parts of nature autonomous things-in-themselves *atomism*. At its core, this conception of the body proposes that diseases are considered to have an identity separate from their specific hosts, neither social or divine, and increasingly located at a molecular level, or in the "atom" of society. Thus, rather than defining the object of medical knowledge within the social realm, such as defining Alzheimer's as a sign of family pathology (Cohen 1998), the sample articles locate disease in the individual, his/her body divided into parts which are approached as autonomous units.

The sample articles routinely associate hES cells with the genre of "modern medical miracle stories." Human ES cells are the future's "fountain-of-youth" and physicians are the "cellular magicians" capable of unlocking the "secrets of life". A critical analysis of these developments reveals the mystification of the social origins of disease wrought by the rhetoric and metaphors diffused through scientific language and terminology (Young 1982). Gish (1979) argues, among others, that efficient health care is not obstructed by the lack of technological or medical knowledge, but rather by "social systems that place low value on the health care needs of the poor" (Chavez 1986: 348). Moreover, forms of suffering derived from class, gender, racial or global power relations may be defined as illness, medicalized, "constructed as dehistorized objects-in-themselves" (Young 1982: 275. Thus, the portrayal of hES cell

technology as the "cure-all" for North American suffering side-steps the bundle of economic and social issues that might otherwise challenge the technology on grounds of health care equity (Harding 1993; Joralemon 1995).

Analysis of illness representations, from this perspective, requires a historically grounded approach capable of unmasking the dominant interests, an exposing of the mechanisms by which they are supported by authorised discourse (Good 1994). In the sample articles, the process of aging is defined as the exclusive purview of biomedical knowledge. Aging, however, recently became the site of medical knowledge for two important reasons: first, the nature and prevalence of modern disease is closely connected with the aging of modern populations; secondly, the aging of populations is seen to have a significant impact on the economic performance of modern capitalism because of the growth of the so-called dependent populations following retirement (Crown 1993; Kiefer 1987; Turner 1987). For instance, within the last century the principal causes of death have shifted from infectious diseases and high infant mortality rates, increasing life expectancy, to diseases of the circulatory system (heart attack, strokes), cancer, and diseases of the respiratory system (Turner 1987: 111). Thus, labelling aging as a physiological condition requiring medical intervention neglects the social, cultural, historical, and economic influences that both define and influence the aging process and experience.

In particular, locating the origins of disease within the individuals medicalized body frames aging and ailing bodies within a materialistic framework rather than within the social reality (and ideologies) of disease. Thus, the "gaze of

the health professionals becomes fixed upon the behaviour of the individual as structural constraints fade into the background" (Anderson 1996: 102). The result is that attention is deflected away from the social determinants of health such as aging and the associated loss of independence, competence, disenfranchisement, and poverty (Cattell 1986; Cohen 1994; Mitteness and Barker 1995; Sokolovsky 1997). Thus, as attention is deflected away from the social determinants of health, health becomes the unique responsibility of the individual. Such understandings of responsibility reinforce concepts of the social body as defined by North American society.

A critical aspect of this development in biomedicine is the intimate relationship between national and international economic growth, and biotechnology. Significantly, the process of fragmenting the human body is not only useful to a medical profession that wishes to find and treat the symptoms of disease but an approach to "the body" that complements contemporary biotechnology and genetics by fragmenting it into potentially "discrete, knowable, and potentially exploitable reservoirs of molecular and biochemical products" (Rabinow 1992: 185). For instance, Geron Corporation has exclusive rights to the commercial applications of stem cell technology, a fact that gives them considerable say over who ultimately profits and benefits from potential developments in hES cell developments. The increasing partnerships between industry and universities in biotechnology also raise important issues regarding the maintenance of scientific independence and integrity (Glass and Lemmens 1999; Krimsky, et al. 1999).

In particular, the extraordinary advancement of biotechnology in the last decade in both Canada and the United States from a research platform into commercial products, a global industry, and the focus of pharmaceutical research and development is directly related to supportive governmental policies (KPMG 1997; Malinowski and Littlefield 1999). Moreover, utilitarian rhetoric governs governmental policy on the premise that economic growth is intimately tied to the improvement in quality of life. The conviction that enhanced economic growth automatically brings with it increased prosperity and a better life for all - not only for the affluent but, in the long run, these developments will "trickle-down" to the disadvantaged - is widespread. The following statement illustrates this point:

> Public demand for these biotechnology products has created a worldwide industry that has spread across all developed nations with advanced medical science programs. Researchers on all continents are part of this dynamic enterprise because the scientific and fiscal rewards for cutting-edge technology are substantial.
>
> And the world is awaiting new developments. Chronic conditions like AIDS, cancer, hypertension, arthritis, Alzheimer's disease and asthma are at the heart of biotechnology research. In the U.S. alone, there will be around 50 million baby boomers entering the elderly age phase by 2010. Increased percentage of retirees, relative to workers, will demand an unparalleled transformation in health care and its delivery (Pellerito1999: xxxv).

Despite these advancements there is considerable evidence that these health benefits are not trickling-down to the poor, and that the quest for growth and corporate profit as in fact worsened the lives of millions of disenfranchised and vulnerable populations (Millen, et al. 2000).

The result is that representations of hES cell developments in the sample articles mask these global and national inequalities through utilitarian and

capitalistic rhetoric. Human ES cell research is presented as the "cure-all" for North America's most prevalent diseases. The irony is that 11.2 million people in the United States cannot afford enough food for their families, and 828 million people in the developing world are chronically undernourished (Millen et al., 2000: 5). Moreover, journalists as advocates of hES cell technology are also likely to benefit from developments in hES cell technology as members of the relatively affluent and privileged class in North America. Nevertheless, as Good (1994: 49) argues future developments in critical medical anthropology must not only question how illness becomes meaningful, or how reality (not simply beliefs about it) is organized and experienced but attempt to integrate historical and global perspectives with cultural analysis and ethnographic writing.

Conclusion

The rhetorical and thematic analysis illustrates that journalists in North America express a widespread advocacy and support for hES cell research. This phenomenon is reflected in both the rhetorical use of language techniques and the powerful movement to define the social significance of the human body in biological terms. In addition, the sample articles reveal a powerful ideology within North America to fragment and commodify the human body and its parts. Human embryos can be procured and stem cells used as a source of replacement body parts. Moreover as Andrews and Nelkin (1998: 540) argue, "tissue can be 'procured' – a term that is more commonly used to refer to land, goods, or the prostitutes provided for a client. Cells, embryos, or tissue can be frozen, banked,

placed in libraries or repositories, marketed, patented, bought and sold". Nevertheless, the sample articles also reveal a powerful ideology to impart significance and meaning to the human body. Journalists routinely mystify and personify the human body, recreating and reflecting North American concepts of the human body. Clearly, hES cells provide a powerful avenue for reproducing and transforming ideologies.

Rabinow (1992: 185) argues that the current conflict over the meaning of the human body emerges from the unresolved tension between two Western views: "The body as a mere thing carried by a triumphant science and technology, and the still present sense that the body and its parts are always more than things... that the 'person' is inextricably tied to the sheer materiality of the body or its parts". Hogle (1999: 23) also argues that religious and legal imagery of the body primarily in the Christian West has promoted notions of the body as a temple, as a sacred vessel or locus of sanctity, or as an inalienable being - despite the fact that the collection, use and even the sale of human remains has existed for centuries. As a result, the paradoxes that abound in the sample articles serves as a powerful illustration of the multivocality and ideological character of science (Haraway 1993).

---

[1] See Appendix D for an annotated bibliography of the sample articles.
[2] For a similar discussion on the embryo research debate in Great Britain see Michael Mulkay (1997).
[3] For instance, Michael J. Fox (Parkinson's), Christopher Reeves (paralysis) and Nancy Reagan (Alzheimer's) have been active lobbyists in support of hES cell research.
[4] Capitalism is defined as an economic system in which the means of production and distribution are privately or corporately owned and development is proportionate to the accumulation and reinvestment of profits gained in a free market.
[5] Utilitarianism is a normative theory of human conduct that is right or wrong because of its tendency to produce favorable or unfavorable consequences for the people who are affected by it.

[6] Disease refers to the biological or organic pathologies and abnormalities, involving the concept of 'curing'. Illness refers to an individual's perceptions and experiences of certain socially disvalued states, which implies 'healing'. Sickness refers to the process through which "worrisome behavioural and biological signs, particularly ones originating in disease, are given socially recognizable meanings" (Young 1982).

[7] For an in-depth discussion of the metaphor "technology as tool" see Nardi and O'Day (2001).

[8] Spinal Cord Injury Information Network. Electronic document, http://www.spinalcord.uab.edu/show.asp?durki=21446, accessed June 11, 2002.

[9] For instance, Kondracke (2001) argues that funding disparities between cancer and other illnesses has resulted in increased patient advocacy among Parkinson's and Alzheimer's groups. He goes on to state that the NIH spent 260$ for each cancer victim, whereas Alzheimer's patients get 54$ each and Parkinson's patients get 26$ each for research purposes.

[10] France provides a contrast to this biologically deterministic approach to formulating ethical research guidelines for human embryo research. For instance, France has formulated research guidelines based on what is called a 'principled' position, a position that draws on references to principles such as 'human dignity' and 'human rights' rather than debating the materiality of the human embryo (Butler 1997: 661).

[11] During the embryo research debates in Britain scientists challenged the use of such terms as "pre-embryo" on the basis that this basic claim about the nature of the early embryo was merely an alibi function (Chargraff 1987; Mulkay 1997). For instance, the editor of *Nature* called the word a 'cop-out' and suggested that it should be banned [IVF Remains in Limbo', *Nature* 327(14 May 1987), 87].

[12] Shore (1992) states that in Britain during the human embryo research debate many Catholic scholars also claimed that modern genetics and embryology confirmed their case by showing that the genetic code for an individual is present at conception. This argument was summed up by the organization Life (n.d.): "Are these tiny embryos really human beings? Yes. Advances in genetics and embryology have shown that at the fusion of egg and sperm the genetic make-up of the new individual is complete and a unique human being comes into existence.... It is ridiculous to say that the embryo is so small that it cannot be a true human being.... All of us were once like that" (Quoted in Shore 1992: 298).

[13] Both the NIH and the CIHR have made provisions that people who can donate human embryos on condition that they will receive no immediate financial or medical benefit.

[14] Patent number 6,200,806, was issued February 13, 2001 for Primate Embryonic stem cells. Geron also has patents to Human Embryonic Germ Cells, and Human Embryonic Germ Cell Line and Methods of Use, to name a few. Geron: Embryonic Stem Cells Patents, Electronic Document, http://www.geron.com/print.06.02_esc.html, accessed December 12, 2001.

[15] Scientists estimate that there are 7,000 embryos left over from IVF treatments in fertility clinics each year in Canada (Abraham 07/08/00). The number of embryos left-over in from IVF treatments in the United States is unknown because IVF has necessarily been conducted in the private sector due to a ban on the use of federal funds for embryo research (Cohen 2001).

Chapter 5

Conclusion

Throughout this thesis I have analysed the cultural, social, political and economic issues surrounding hES cell research in Canadian and American news media through a content, rhetorical and thematic analysis. The findings indicate that although there are differences in the representation of hES cells between Canada and the United States the message conveyed is the same. Moreover, the proliferation of editorials, letters to the editor, informative news articles and opinion articles in the year 2001 clearly indicates that hES cells are a matter of intense public debate in both countries. In this sense, news media provides a bridge between public and private discourse, which both reflects and transforms North American ideologies (Patterson and Hall 1998; Vipond 1997). As a result, a comparative approach addressing the cultural construction of hES cells in print news media highlighted the cultural biases and the cultural bases that underlie the rhetoric. In particular, this thesis addresses the ideological construction of scientific knowledge, which both channels and limits our way of thinking about hES cells, health and healing and the human body.

I argued throughout this thesis, through an examination of the major conflicting ideologies surrounding hES cells, that the language used in the sample articles reflects an ideological war over the meaning of the human body, and life and death, in which stem cells are a major battlefield[1]. The rhetoric used by journalists to impart information regarding hES cells demonstrates that the North American public expresses multiple and even competing ideologies regarding the

place and meaning of the human body. As Haraway (1993: 365) argues scientific discourses are "lumpy"; they contain and enact condensed contestations for meanings and practices. The result is that journalists describe hES cells as both *personalized* and *objectified* objects, both fragmenting and mystifying the human body at the same time. Therefore, journalists and reporters appear on the surface to embrace the idea of embryo-as-thing, yet underneath it, all struggle with the larger cultural constructions that personalize body parts.

Examining this everyday language allows us to identify certain metaphors that structure and reflect the way we think, talk, and act (Lakoff and Johnson 1980: 7-8). As Sherzer (1987: 295) argues language is an embodiment, a filter, a creator and recreator, and a transmitter of culture. Implicit in the rhetoric surrounding the development and use of hES cell technologies is the idea that immortality is an undeniably worthy goal, and resignation to death is a sign of weakness and defeat (Fox and Swazey 1992). Moreover, the articles included in this sample indicate a widespread support and advocacy of hES cell research by journalists. This advocacy is illustrated in the powerful movement by stem cell protagonists to naturalize stem cell technology, through the use of rhetorical structure and language. This process disguises the contradictions that inevitably arise from objectifying the human body into fragmented, commodifiable parts in order to touch immortality, however briefly (Lock 1995).

The naturalization movement is based on the tenets and assumptions of Western philosophical thought. The discussions of ethical approaches to the use of human embryos for research purposes has been sustained and reinforced by a

pervasive biological determinism, utilitarianism, and ethnocentrism (Marshall 1992). Within this bioethical framework using human embryos for stem cell research is the only moral thing to do. The basic argument is that millions of people die each year needlessly, because there are hundreds, if not thousands of "surplus" embryos in fertility clinics. These embryos are not human because they do not have the "primordial streak" that appears fourteen days after fertilization; the appearance of a nervous system being the defining factor that scientists identify for human consciousness. This rhetoric is reinforced by the dominant political and economic structure that relies on developments in biotechnology for economic growth. Moreover, these developments are troubling due to the inevitable regional and global movement of hES cell technology that could potentially be used to advance projects of social control and to subvert alternative ways of representing and treating the body (Brodwin 2000; Hartouni 1997; Heriot 1996; Martin 1998; Mitchell and Georges 1998).

The irony is that as journalists deny the legitimacy of personification and the accompanying social transformations, they nevertheless participate in the perpetuation of each. The oddest contradictions arise from a scientific training that insists on depersonalizing bodies and parts and yet simultaneously gives rise to the metaphors and rhetoric that are used to encourage the lay public to be supportive of stem cell technology (see Sharp 1995: 381). Nevertheless, scientific rhetoric has reified the body to the extent that the body itself has become a machine, a form of technology that we can use at will, and stem cells a form of replaceable parts. Moreover, hES cell "lines" are available upon the completion

of a form from the requisite institutions and the payment of a nominal fee for handling. More often, these "lines" are only available to paying research collaborators.[2] They can then be used to "pursue more knowledge, to produce more health, and to yield more profit" (Rabinow 1992: 185).

Throughout the last two centuries resistance to the fragmentation of the human body and its parts has always existed creating conflicting and overlapping ideologies (Hogle 1999). The following statement made recently by Dr. Robert Haynes at the 16th International Congress of Genetics, illustrates this conflict:

> For three thousand years at least, a majority of people have considered that human beings were special, were magic. It's the Judeo-Christian view of man. What the ability to manipulate genes should indicate to people is the very deep extent to which we are biological machines. The traditional view is built on the foundation that life is sacred.... Well, not anymore. It's no longer possible to live by the idea that there is something special, unique, and even sacred about living organisms (Quoted in Kimbrell 1993: 234).

Despite the persuasive power of biologically deterministic ideologies of the body, competing ideologies that regard the body as sacred, even magical flourish in the sample articles. Journalists also employ the use of kinship terminologies, a fact that illustrates the continued conflict over the meaning of the human body and the pervasiveness of a social body in North America.

In spite of these overlapping ideologies the biomedical institution continues to redefine the object of medical knowledge in increasingly molecular terms. This development might be sufficient to cause a reformulation of our concepts of selfhood and also transform the experience of embodiment (Csordas 1996; Kimbrell 1993). Medical anthropologists, on the other hand, are attempting to redefine the object of medical knowledge as not only biological but also social

and cultural (Scheper-Hughes 1988). As Taussig (1980: 3) argues "things such as the signs and symptoms of disease, as much as the technology of healing, are not "things-in-themselves", are not only biological and physical, but are also signs of social relations disguised as natural things, concealing their roots in human reciprocity." Hence, the biomedicalization of health and healing could have serious consequences for how disease is treated and conceptualized. Moreover, this reinforces North American ideologies of individual responsibility, shifting any public responsibility for human misfortune or poverty to the individual.

Future Directions

Medical anthropology can offer a substantive critical approach to the field of bioethics. From its vantage point, much of the recent debates in North American news media about hES cells lacks a critical – that is, any politically oriented perspective. Wolf (1982: 3) argues that "the world of humankind constitutes a manifold, a totality of interconnected processes, and inquiries that disassemble the totality into bits and then fail to reassemble it falsify reality." This holistic perspective encourages anthropologists to explore the impact of global power relations as well as the impact of an individual's social class, gender and ethnicity on access to and perceptions of health and healing (Carter 1995; Foucault 1978; Greenhalgh 1995). As a result, the hES cell debate must be framed within the larger socio-economic and cultural framework in which it is being constructed.

The central premise of this approach to health and healing is that the origins of disease are not only biological but embedded in social organization and social relations. Salk, et al. (1992: 655) argue that:

> ... poverty is the most basic cause of ill health and early death in our society. The poor, who are mostly women and children and disproportionately people of color, have more illnesses and die in greater numbers and earlier than people with more income and education. Many of their health problems are diseases that result from malnutrition, workplace dangers, inadequate housing, environmental pollution or excessive stress.

The rhetoric surrounding hES cells in the sample articles invalidates the social determinants of health, both local and large-scale. Thus, biological determinism, as a powerful therapeutic modality, is only one way of conceptualizing and treating health and healing.

Although a critical approach rooted in political economy that focuses on the interconnectedness of global processes is a crucial development in the study of bioethical debates, there exists another domain of human agency that I did not fully explore. The reproduction of the cultural system involves human agents constantly reinterpreting or reinforcing its form, function and meaning. As Lock and Kaufert (1998) have argued, too often are people's lives portrayed as being consumed by the new technologies. Foucault (1978) also insisted that people have the ability to choose among available discourse and practices, to use them creatively, and to reflect on them. Thus, just as the system influences the behaviour and actions of the people who are associated with it, the people also interact with the system and influence its form.

Future studies should attempt to illustrate the relationship between human agency and larger socioeconomic forces that create the setting. The result is that both "cultural concepts – the values assigned to different behaviours – and political economy – the forces creating the setting – become ingredients to, rather than external to, action, and the human agent is placed at center stage" (Greenhalgh 1995: 19). The goal of these studies should be to create new images that recontextualize the human body: that place it back into its social space. Finally, as Lock (2001) and others propose the ideological contradictions that arise from new developments in biotechnology underscore the need to research boundary objects, hybrids of nature and culture, and technohuman complexes (see Haraway 1991 and Sharp 2000).

---

[1] I use the war metaphor here because of the intensity of the polemics on both sides of the stem cell debate.
[2] Geron Stem Cell Registry. Electronic document, http://www.geron.com/print.04.00_scregistry.html, accessed December 12, 2001.

Bibliography

Abraham, Carolyn

2002 Have a Heart. *The Globe and Mail*, February 9: F1, F8.

Agar, Michael H.

1986 *Speaking of Ethnography*. California: Sage Publications.

Aldridge, Meryl

2001 Lost Expectations? Women journalists and the fall-out from the 'Toronto newspaper war'. *Media, Culture & Society*, 23: 607-624.

Anderson, Robert

1996 *Magic, Science, and Health: The Aims and Achievements of Medical Anthropology*. Fort Worth: Harcourt Brace College Publishers.

Andrews, Lori and Dorothy Nelkin

1998 Whose body is it anyway? Disputes over body tissue in a biotechnology age. *Lancet* 351: 53-57

Appadurai, Arjun

1986 Introduction: Commodities and the Politics of Value. In *The Social Life of Things: Commodities in Cultural Perspective*. A. Appadurai, ed. Pp. 3-63. Cambridge: Cambridge University Press.

Bailey, Kenneth D.

1994 *Methods of Social Research*. New York: Free Press.

Bakhtin, Mikhail

1984 *Rabelais and His World*. Bloomington: Indiana University Press.

Becker, Gay

2000 *The Elusive Embryo: How Women and Men Approach New Reproductive Technologies*. Berkeley: University of California Press.

Bernard, H. Russell

1995 *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. London: AltaMira Press.

Bellah, Robert N.

1967 Civil Religion in America. *Daedalus*, 96: 1-21.

Billig, M.
1987 *Arguing and Thinking: A Rhetorical Approach to Social Psychology*. Cambridge: Cambridge University Press.

Borofsky, Robert
1987 *Making History: Pukapukan and Anthropological Constructions of Knowledge*. Cambridge: Cambridge University Press.

Bossen, Laurel Herbenar
1984 *The Redivision of Labor: Women and Economic Choice in Four Guatemalan Communities*. Albany: State University of New York Press.

Boyatzis Richard E.
1998 *Transforming Qualitative Information: Thematic Analysis and Code Development*. London: Sage Publications.

Brodwin, Paul E., ed.
2000 *Biotechnology and Culture: Bodies, Anxieties, Ethics*. Bloomington: Indiana University Press.

Burke, K.
1955 *A Rhetoric of Motives*. New York: George Brazillier.

Bush, George W.
2001 Text of President Bush's Speech. *The Washington Post*, August 10: A12.

Butler, Declan
1997 France Reaps Benefits and Costs of Going by the Book. *Nature* 389: 661-662.

Canadian Institutes of Health Research
2001 *Human Stem Cell Research: Opportunities for Health and Ethical Perspectives: A Discussion Paper*. Ottawa: Canadian Institutes of Health Research.

Canadian Institutes for Health Research
2002 *Final Report: Human Pluripotent Stem Cell Research: Recommendations for CIHR-Funded Research*. Ottawa: CIHR.

Carter, Anthony T.
1995 Agency and Fertility: For and Ethnography of Practice. In *Situating Fertility: Anthropology and Demographic Inquiry*. S. Greenhalgh, ed. Pp. 55-85. Cambridge: Cambridge University Press.

Cattel, Maria G.
1996 Gender, Aging and Health: A Comparative Approach. In *Gender and Health: An International Perspective*. C.F. Sargent and C.B. Brettell, eds. Pp. 87-122. New Jersey: Prentice Hall.

Chargraff, Edwin
1987 Engineering a Molecular Nightmare. *Nature* 327: 199-200.

Chavez, Leo R.
1986 Mexican Immigration and Health Care: A Political Economy Perspective. *Human Organization* 45(4): 344-352.

Christians, Clifford G., et al.
1998 *Media Ethics: Cases and Moral Reasoning*. New York: Longman.

Cirillo, Leonard
1993 Verbal Imagery of Aging in News Magazines. *Generations* 17(2): 91-94.

Clarke, D.L.
2000 Generalized Potential of Adult Neural Stem Cells. *Science* 288(5471): 1660-1663.

Cohen, Cynthia B.
2001 Leaps and Boundaries: Expanding Oversight of Human Stem Cell Research. In *The Human Embryonic Stem Cell Debate: Science, Ethics and Public Policy*. S. Holland, K. Lebacqz and L. Zoloth, eds. Pp. 209-222. Massachusetts: MIT Press.

Cohen, Lawrence
1994 Old Age: Cultural and Critical Perspectives. *Annual Review of Anthropology* 23: 137-158.
1998 *No Aging in India: Alzheimer's, the Bad Family, and Other Modern Things*. Berkeley: Universsity of California Press.

Comaroff, Jean
1982 Medicine: Symbol and Ideology. In *The Problem of Medical Knowledge*. P. Wright and A. Treacher, eds. Pp. 49-68. Edinburgh: Edinburgh University Press.
1985 *Body of Power Spirit of Resistance: The Culture and History of South African People*. Chicago: University of Chicago Press.

Conrad, Peter
1992 Medicalization and Social Control. *Annual Review of Sociology* 18: 209-32.

Crown, William H.
1993 Projecting the Costs of Aging Populations. *Generations* 17(4): 32-38.

Csordas, Thomas J., ed.
1994 *Embodiment and Experience: The Existential Ground of Culture and Self.* Cambridge: Cambridge University Press.

Csordas, Thomas J.
1996 A Handmaid's Tale: The Rhetoric of Personhood in American and Japanese Healing of Abortions. In *Gender and Health: An International Perspective*. C.F. Sargent and C.B. Brettell, eds. Pp. 227-240. New Jersey: Prentice Hall.

Davis-Floyd, Robbie E., and Carolyn F. Sargent
1997 *Childbirth and Authoritative Knowledge: Cross-Cultural Perspectives*. Berkeley: University of California Press.

Dahlgren, Peter
1998 Critique: Elusive Audiences. In *Approaches to Audiences: A Reader*. R. Dickinson, R. Harindranath and O. Linne, eds. Pp. 298-310. London: Arnold.

Dening, Greg
1995 *The Death of William Gooch: A History's Anthropology.* Honolulu: University of Hawai'i Press.

Desbarats, Peter
1990 *Guide to Canadian News Media*. Toronto: Harcourt Brace Jovanovick, Canada.

Dibner, Mark D.
1994 Biotechnology in the United States and Japan and the Bridge Between. In *Innovation, Resources and Economic Growth.* A. Quadrio Curzio, et al. eds. Pp. 127-146. Berlin: Springer-Verlag.

Dorff, Elliot N.
2001 Stem Cell Research - A Jewish Perspective. In *The Human Embryonic Stem Cell Debate: Science, Ethics and Public Policy.* S. Holland, K. Lebacqz and L. Zoloth, eds. Pp. 89-94. Massachusetts: MIT Press.

Douglas, Mary
1966 *Purity and Danger: An Analysis of the Concepts of Pollution and Taboo*. New York: Praeger.

Ely, Margot, et al.
1991 *Doing Qualitative Research: Circles Within Circles*. London: The Falmer Press.

Evans-Pritchard, E.E.
1937 *Witchcraft, Oracles and Magic Among the Azande*. Oxford: Clarendon Press.

Farley, Margaret A.
2001 Roman Catholic Views on Research Involving Human Embryonic Stem Cells. In *The Human Embryonic Stem Cell Debate: Science, Ethics and Public Policy*. S. Holland, K. Lebacqz and L. Zoloth, eds. Pp. 113-118. Massachusetts: MIT Press.

Farmer, Paul
1992 *AIDS and Accusation: Haiti and the Geography of Blame*. Berkeley: University of California Press.

Foucault, Michel
1978 *The History of Sexuality*. New York: Pantheon Books.

Fox, Renee C. and Judith P. Swazey
1992 *Spare Parts: Organ Replacement in American Society*. New York: Oxford University Press.

Franklin, Sarah
1997 *Embodied Progress: A Cultural Account of Assisted Conception*. London: Routledge.

Franklin, Ursula
1990 *The Real World of Technology*. Concord, Ontrario: Anansi.

Gage, Fred H.
2001 Mammalian Neural Cells. *Science* 287(5457): 1433.

Gallagher, John
1985 *Is the Human Embryo a Person?* Human Life Institute Reports No. 4. Toronto: Human Life Research Institute.

Gans, Herbert J.
1980 *Deciding What's News: A Study of CBS Evening News, NBC Nightly News, Newsweek and Time*. New York: Vintage Books.

Ginsburg, Faye
1990 The "Word-Made" Flesh: The Disembodiment of Gender in the Abortion Debate. In *Uncertain Terms: Negotiating Gender in American Culture*. F. Ginsburg and A. Lawehaupt Tsing, eds. Boston: Beacon Press.

Ginsburg, Faye and Rayna Rapp
1991 The Politics of Reproduction. *Annual Review of Anthropology*, 20: 311-43.

Ginzberg, Effie
1985 *Power Without Responsibility: The Press We Don't Deserve*. Toronto: Urban Alliance on Race Relations.

Gish, Oscar
1979 The Political Economy of Primary Care and "Health by the People": An Historical Exploration. In *Social Science and Medicine* 13C:203-211.

Glass, Kathleen Cranley and Trudo Lemmens
1999 Conflict of Interest and Commerialization of Biomedical Research: What is the Role of Research Ethics Review? In *The Commercialization of Genetic Research: Ethical, Legal, and Policy Issues*. T.A. Caulfield, and B. William-Jones, eds. Pp. 79-100. New York: Kluwer Academic/Plenum Publishers.

Good, Byron J.
1994 *Medicine, Rationality, and Experience: An Anthropological Perspective*. Cambridge: Cambridge University Press.

Gordon, Deborah R.
1988 Tenacious Assumptions in Western Medicine. In *Biomedicine Examined*. M. Lock and D. Gordon, eds. Pp. 19-56. Berkeley: University of California Press.

Greenhalgh, Susan, ed.
1995 *Situating Fertility: Anthropology and Demographic Inquiry*. Cambridge: Cambridge University Press.

Hackett, Robert A., and Yuezhi Zhao
1998 *Sustaining Democracy? Journalism and the Politics of Objectivity*. Toronto: Garamond Press.

Hamilton, Jean
1993 Feminist Theory and Health Psychology: Tools for an Egalitarian, Woman-Centered Approach to Women's Health. In *Journal of Women's Health* 2(1): 49-54.

Haraway, Donna
1976 *Crystals, Fabrics and Fields: Metaphors of Organicism in Twentieth-Century Developmental Biology*. New Haven: Yale University Press.
1991 *Symians, Cyborgs and Women: The Reinvention of Women*. London: Free Association Books.
1993 The Biopolitics of Postmodern Bodies: Determinations of Self in Immune System Discourse. In *Knowledge, Power and Practice: The Anthropology of Medicine and Everyday Life*. S. Lindenbaum and M. Lock, eds. Pp. 364-410. Berkeley: University of California Press.

Hardacre, Helen
1997 *Marketing the Menacing Fetus in Japan*. Berkeley: University of California Press.

Harding, Sandra, ed.
1993 *The "Racial" Economy of Science: Toward a Democratic Future*. Bloomington: Indiana University Press.

Harrison, Deborah
1992 The Terry Fox Story and the Popular Media: A Case Study in Ideology and Illness. *Critical Studies of Canadian Mass Media*. M. Grenier ed. Pp. 13-28. Toronto: Butterworths.

Hartouni, Valerie
1997 *Cultural Conceptions: On Reproductive Technologies and the Remaking of Life*. Minneapolis: University of Minnesota Press.

Health Canada
2001 Leading Causes of Death and Hospitalization in Canada. Electronic document, http://www.hc-sc.gc.ca/hpb/lcdc/publicat/pcd97/, accessed January 31.

Heriot, Jean M.
1996 Fetal Rights versus the Female Body: Contested Domains. *Medical Anthropology Quarterly* 10(2): 176-194.

Herman, Edward S., and Noam Chomsky
1988 *Manufacturing Consent: The Political Economy of the Mass Media*. New York: Pantheon Books.

Hoffmaster, Barry, ed.
2001 *Bioethics in Social Context*. Philadelphia: Temple University Press.

Hogle, Linda F.
1999 *Recovering the Nation's Body: Cultural Memory, Medicine, and the Politics of Redemption*. London: Rutgers University Press.

Holland, Suzanne, Karen Lebacqz and Laurie Zoloth, eds.
2001 *The Human Embryonic Stem Cell Debate: Science, Ethics, and Public Policy*. Massachusetts: MIT Press.

Industry Canada
2000 *Pathways to Growth: Opportunities in Biotechnology*. Ottawa: Industry Canada.

Joralemon, Donald
1995 Organ Wars: The Battle for Body Parts. *Medical Anthropology Quarterly* 9(3): 335-356.

Kiefer, Christie W.
1987 Care of the Aged in Japan. In *Health, Illness, and Medical Care in Japan: Cultural and Social Dimensions*. E. Norbeck and M. Lock eds. Pp. 89-109. Honolulu: University of Hawaii Press.

Kimbrell, Andrew
1994 *The Human Body Shop: The Engineering and Marketing of Life*. SanFrancisco: HarperCollins.

Kirmayer, Laurence J.
1988 Mind and Body as Metaphors: Hidden Values in Biomedicine. In *Biomedicine Examined*. M. Lock and D. Gordon, eds. Pp. 57-94. Dordrecht: Kluwer Academic Publishers.

Klaidman, Stephen
1991 *Health in the Head-Lines: The Stories Behind the Stories*. New York: Oxford University Press.

Kondracke, Morton
2001 *Saving Milly: Love, Politics, and Parkinson's Disease*. New York: Ballantine Books.

Kopytoff, Igor
1986 The Cultural Biography of Things: Commoditization as Process. In *The Social Life of Things: Commodities in Cultural Perspective*. A. Appadurai, ed. Pp. 64-94. Cambridge: Cambridge University Press.

KPMG
1997 *Biotechnology in Canada: Poised for Growth*. Ottawa: KPMG Canada.

Krimsky, S., L.S. Rothenberg, P. Stott and G. Kyle
1999 Scientific Journals and Their Author's Financial Interests: A Pilot Study. In *The Commercialization of Genetic Research: Ethical, Legal, and Policy Issues*. T.A. Caulfield, and B. William-Jones, eds. Pp. 101-110. New York: Kluwer Academic/Plenum Publishers.

Krippendorf, Klaus
1980 *Content Analysis: An Introduction to Its Methodology*. London: Sage Publications.

Kunz, Jean Lock and Augie Fleras
1998 Visible Minority Women in Mainstream Advertising: Distorted Mirror or Looking Glass? *Atlantis* 22(2): 27-38

Kvande, Lise
2000 Screening through the Media: The Public Presentation of Science and Technology in the Ultrasound Diagnostics Controversies. In *Bodies of Technology: Women's Involvement with Reproductive Medicine*. A.R. Saetan, N. Oudshoorn and M. Kirejczyk, eds. Pp. 309-330. Columbus: Ohio State University Press.

Lafleur, William
1992 *Liquid Life: Abortion and Buddhism in Japan*. New Jersey: Princeton University Press.

Laitin, David D. and Guadalupe Rodriguez Gomez
1992 Language, Ideology, and the Press in Catalonia. *American Anthropologist* 94: 9-30.

Lakoff, G., and M. Johnson.
1980 *Metaphors We Live By*. Chicago: University of Chicago Press.

Lieban, Richard
1990 Medical Anthropology and the Comparative Study of Medical Ethics. In *Social Science Perspectives on Medical Ethics*. G. Weisz, ed. Pp. 221-239. Netherlands: Kluwer Academic Publishers.

Lindlof, Thomas R.
1995 *Qualitative Communication Research Methods*. London: Sage Publications.

Lock, Margaret
1988 Introduction. In *Biomedicine Examined*. M. Lock and D. Gordon (eds.). Pp. 1-10. Boston: Kluwer Academic Publishers.
1993 *Encounters With Aging: Mythologies of Menopause in Japan and North America*. Berkeley: University of California Press.
1995 Transcending Mortality: Organ Transplants and the Practice of Contradictions. *Medical Anthropology Quarterly*, 9(3): 390-399.
2001 The Tempering of Medical Anthropology: Troubling Natural Categories. *Medical Anthropology Quarterly*, 15(4): 478-492.

Lock, Margaret, and C. Honde
1990 Reaching Consensus about Death: Heart Transplants and Cultural Identity in Japan. *Social Science Perspectives on Medical Ethics*. G. Weisz, ed. Pp. 99-120. Boston: Kluwer.

Lock, Margaret and Patricia A. Kaufert, eds.
1998 *Pragmatic Women and Body Politics*. Cambridge: Cambridge University Press.

Loustaunau, Martha O., and Elisa J. Sobo
1997 *The Cultural Context of Health, Illness, and Medicine*. London: Bergin & Garvey.

Luker, Kristin
1984 *Abortion & the Politics of Motherhood*. Berkeley: University of California Press.

Malinowski, Michael J., and Nick Littlefield
1999 Transformation of a Research Platform into Commercial Products: The Impact of United States Federal Policy on Biotechnology. In *The Commercialization of Genetic Research: Ethical, Legal, and Policy Issues*. T.A. Caulfield, and B. William-Jones, eds. Pp. 29-54. New York: Kluwer Academic/Plenum Publishers.

Marshall, Patricia
1992 Anthropology and Bioethics. *Medical Anthropology Quarterly* 6(1):49-73.

Martin, Emily
1987 *The Woman in the Body: A Cultural Analysis of Reproduction.* Boston: Beacon Press.
1996 The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles. In *Gender and Health: An International Perspective.* C.F. Sargent and C.B. Brettell, eds. Pp. 29-43. New Jersey: Prentice Hall.
1998 The Fetus as Intruder: Mother's Bodies and Medical Metaphors. In *Cyborg Babies: From Techno-Sex to Techno-Tots.* R. Davis-Floyd and J. Dumit, eds. Pp. 125-142. New York: Routledge.

McCormack, Thelma
1999 Fetal Syndromes and the Charter: The Winnipeg Glue-Sniffing Case. In *Canadian Journal of Law Studies (CJLS)* 14(2): 77-99.

McKeon, Richard
1987 *Rhetoric: Essays in Invention and Discovery.* Woodbridge, CT: Oxbow Press.

McKercher, Catherine and Carman Cumming
1998 *The Canadian Reporter: News Writing and Reporting.* Toronto: Harcourt Brace Canada.

McManus, J.
1994 *Market-Driven Journalism.* Thousand Oaks, California: Sage Publications.

Miles, Mathew and A. Michael Huberman
1994 *Qualitative Data Analysis: An Expanded Sourcebook.* California: Sage Publications.

Millen, Joyce V., Alec Irwin, and Jim Yong Kim
2000 Introduction: What is Growing? Who is Dying? In *Dying for Growth: Global Inequality and the Health of the Poor.* J.Y. Kim, et al. eds. Pp. 1-10. Maine: Common Courage Press.

Miller, John
1998 *Yesterday's News: Why Canada's Daily Newspapers are Failing Us.* Halifax: Fernwood Publishing.

Mitchell, Lisa M.
1993 *Making Babies: Routine Ultrasound Imaging and the Cultural Construction of the Fetus in Montreal, Canada.* Ph.D. dissertation, Department of Anthropology, Case Western Reserve University.

Mitchell, Lisa and Eugenia Georges
1998 Baby's First Picture: The Cyborg Fetus of Ultrasound Imaging. In *Cyborg Babies: From Techno-Sex to Techno-Tots.* New York: Routledge.

Mitteness, Linda S., and Judith C. Barker
1995 Stigmatizing a "Normal" Condition: Urinary Incontinence in Late Life. *Medical Anthropology Quarterly* 9(2): 188-210.

Morley, David
1998 Domestic Relations: The Framework of Family Viewing in Great Britain. In *Approaches to Audiences: A Reader.* R. Dickinson, R. Harindranath and O. Linne, eds. Pp. 233-244. London: Arnold.

Mulkay, Michael
1997 *The Embryo Research Debate: Science and the politics of reproduction.* Cambridge: Cambridge University Press.

Murdock, Graham
1998 Mass Communication and the Construction of Meaning. In *Approaches to Audiences: A Reader.* R. Dickinson, R. Harindranath and O. Linne, eds. Pp. 205-217. London: Arnold.

Nardi, Bonnie A. and Vicki L. O'Day
1999 *Information Ecologies: Using Technology with Heart.* Cambridge, Mass.: The MIT Press.

National Bioethics Advisory Commission
1999 *Ethical Issues in Human Stem Cell Research.* Vol.1. Report and Recommendations. Rockville, MD: National Bioethics Advisory Commission.

Nelkin, Dorothy
1987 *Selling Science: How the Press Covers Science and Technology.* New York: W.H. Freeman and Company.

Niosi, Jorge
2000 *Explaining Rapid Growth in Canadian Biotechnology Firms.* Ottawa: Statistics Canada.

Okarma, Thomas B.
2001 Human Embryonic Stem Cells: A Primer on the Technology and Its Medical Applications. In *The Human Embryonic Stem Cell Debate: Science, Ethics and Public Policy*. S. Holland, K. Lebacqz and L. Zoloth, eds. Pp. 3-14. Massachusetts: MIT Press.

Ohnuki-Tierney, Emiko
1994 Brain Death and Organ Transplantation: Cultural Bases of Medical Technology. *Current Anthropology* 35: 233-254.

Parens, Erik
2001 On the Ethics and Politics of Embryonic Stem Cell Research. In *The Human Embryonic Stem Cell Debate: Science, Ethics and Public Policy*. S. Holland, K. Lebacqz and L. Zoloth, eds. Pp. 37-50. Massachusetts: MIT Press.

Patterson, Maggie Jones and Megan Williams Hall
1998 Abortion, Moral Maturity and Civic Journalism. *Critical Studies in Mass Communication* 15(2): 91-115.

Pellerito, Peter
1999 Industry Overview. In *Biotechnology: Law, Business and Regulation*. New York: Aspen Law & Business.

Petchesky, Rosalind Pollack
1990 *Abortion and Woman's Choice: The State, Sexuality, & Reproductive Freedom*. Boston: Northeastern University Press.

Rabinow, Paul
1992 Severing the Ties: Fragmentation and Dignity in Late Modernity. *Knowledge and Society: The Anthropology of Science and Technology* 9: 169-187.

Rapp, Rayna
1999 *Testing Women, Testing the Fetus: The Social Impact of Amniocentesis in America*. New York: Routledge

Rose, Steve, R.C. Lewontin, and L.J. Kamin
1984 *Not In Our Genes: Biology, Ideology and Human Nature*. New York: Pantheon Books.

Rothman, Barbara Katz
1989 *Recreating Motherhood: Ideology and Technology in a Patriarchal Society*. New York: W.W. Norton & Company.

Rothman, David
1991 *Strangers at the Bedside: A History of How Law and Bioethics Transformed Medical Decision Making*. New York: Basic Books.

Sahlins, Marshall
1976 *The Use and Abuse of Biology: An Anthropological Critique of Sociobiology*. Ann Arbor: The University of Michigan Press.

Salk, Hilary, Wendy Sanford, Norma Swenson, and Judith Dickson Luce
1992 The Politics of Women and Medical Care. In *The New Our Bodies, Ourselves. The Boston Women's Health Book Collective.* Pp. 651-698. New York: Touchstone.

Sargent, Carolyn F. and Caroline B. Brettell
1996 *Gender and Health: An International Perspective*. New Jersey: Prentice Hall.

Scheper-Hughes, Nancy
1988 The Madness of Hunger: Sickness, Delirium, and Human Needs. *Culture, Medicine and Psychiatry* 12: 429-458.

Scheper-Hughes, Nancy and Margaret M. Lock
1987 The Mindful Body: A Prolegomenon to Future Work in Medical Anthropology. *Medical Anthropology Quarterly*, 1(1) pp. 6-41.

Shamblott, M.J., et al.
1998 *Derivation of Pluripotent Stem Cells from Cultured Human Primordial Germ Cells*. Proceedings of the National Academy of Science (USA) 95: 13726-13731.

Sharp, Lesley A.
1995 Organ Transplantation as a Transformative Experience: Anthropological Insights into the Restructuring of the Self. *Medical Anthropology Quarterly* 9(3): 357-389.
2000 The Commodification of the Body and Its Parts. *Annual Review of Anthropology* 29: 287-328.

Sherzer, Joel
1987 A Discourse-Centered Approach to Language and Culture. *American Anthropologist* 89: 295-309.

Shore, Cris
1992 Virgin Births and Sterile Debates: Anthropology and the New Reproductive Technologies. *Current Anthropology* 33(3): 295-314.

Silverstone, Roger
1998 Television and Everyday Life: Towards an Anthropology of the Television Audience. In *Approaches to Audiences: A Reader*. R. Dickinson, R. Harindranath and O. Linne, eds. Pp. 245-256. London: Arnold.

Singer, Merrill
1990 Reinventing Medical Anthropology: Toward a Critical Realignment. *Social Science and Medicine* 30:179-187.

Sokolovsky, Jay ed.
1997 *The Cultural Context of Aging: Worldwide Perspectives*. London: Bergin & Garvey.

Squires, James
1993 *Read All About It!: The Corporate Takeover of America's Newspapers*. New York: Random House.

Stabile, Carol
1998 Fetal Photography and the Politics of Disappearance. In *The Visible Woman: Imaging Technologies, Gender, and Science*. P.A. Treichler, L. Cartwright, and C. Penley, eds. Pp. 171-197. New York: New York University Press.

Stanworth, Michelle, ed.
1987 *Reproductive Technologies: Gender, Motherhood, and Medicine*. Minneapolis: University of Minnesota Press.

Stem Cell Network
2002 *The Science of Stem Cells*. Electronic document, http://www.stemcellnetwork.ca/english/research/default/asp, accessed March 18.

Stephens, Mitchell
1988 *A History of News: From the Drum to the Satellite*. New York: Viking Penguin Inc.

Stone, Philip J.
1997 Thematic Text Analysis: New Agendas for Analyzing Text Content. In *Text Analysis for the Social Analysis: Methods for Drawing Statistical Inferences from Texts and Transcripts*. C.W. Roberts, ed. New Jersey: Lawrence Erlbaum Associates, Publishers.

Synnott, Anthony
1993 *The Body Social: Symbolism, Self and Society.* London: Routledge.

Tannen, Deborah
1998 *The Argument Culture: Moving from Debate to Dialogue.* New York: Random House.

Taussig, Michael T.
1980 Reification and the Consciousness of the Patient. *Social Science and Medicine,* 14B: 3-13.

Thomson, James A., et al.
1998 Embryonic Stem Cells Derived from Human Blastocysts. *Science* 282(5391): 1145-1148.

Thomson, James A.
2001 Human Embryonic Stem Cells. In *The Human Embryonic Stem Cell Debate: Science, Ethics, and Public Policy.* S. Holland, K. Lebacqz and L. Zoloth, eds. Pp. 15-26. Massachusetts: MIT Press.

Treichler, Paula A., Lisa Cartwright, and Constance Penley, eds.
1998 *The Visible Woman: Imaging Technologies, Gender and Science.* New York: New York University Press.

Tsing, Anna Lowenhaupt
1990 Monster Stories: Women Charged with Perinatal Endangerment. In *Uncertain Terms: Negotiating Gender in American Culture.* F. Ginsburg and A.L. Tsing eds. Pp. 282-299. Boston: Beacon Press.

Turner, Bryan S.
1987 *Medical Power and Social Knowledge.* London: Sage Publications.

Van Dijk, Teun A.
1991 Media contents: The interdisciplinary study of news discourse. In *A Handbook of Qualitative Methodologies for Mass Communication Research.* K.B. Jensen and N.W. Jankowski, eds. Pp. 108-119. London: Routledge.

Vipond, Mary
2000 *The Mass Media in Canada.* Toronto: James Lorimer & Company Ltd., Publishers.

Walker, William
2002 Fetus is a 'child,' Bush declares: U.S . move will award benefits to unborn children. *The Toronto Star*, February 1: A1, A8.

Watt, F.M., and B.L.M. Hogan
2000 Out of Eden: Stem Cells and their niches. *Science* 287(5457): 1427-1430.

Weber, Robert Philip
1985 *Basic Content Analysis*. California: Sage Publications.

Weissman, I.L.
2000 Translating stem and progenitor cell biology to the clinic: Barriers and opportunities. *Science* 287(5457): 1442-1446.

Wolf, Eric
1982 *Europe and the People Without History*. Berkeley: University of California Press.

Woolard, Kathryn A., and Bambi B. Schieffelin
1994 Language Ideology. *Annual Review of Anthropology* 23: 55-82.

Young, Alan
1982 The Anthropologies of Illness and Sickness. *Annual Review of Anthropology* 11: 257-285.
1995 *The Harmony of Illusions: Inventing Posttraumatic Stress Disorder*. Princeton: Princeton University Press.

Zola, Irving
1972 Medicine as an Institution of Social Control. *Sociological Review* 20: 487-504.

APPENDIX A

Categories and Sub-Categories for the Content Analysis

SETTING
Cover Story
Section A
Health
Science
Life
Focus
Outlook
Business
Finance
Style
Entertainment

GENERAL CHARACTER
Informative
Comment
Opinion
Letter to the Editor
Editorial
In-Depth
Essay
News Analysis
Book Review

AUTHORSHIP
Staff Writer
Associated Press
Reuters News Agency
Canadian Press
Wire Services
Knight Ridder News
Bloomberg News

TOPICS
Debate
Regeneration
Commodification
Research Guidelines
Research Guidelines for Human Embryos

Research Guidelines for Cloning
Research Guidelines for Fetal Tissue

Neutral Stem Cell Sources
Adult Cell Sources
Umbilical Cord Blood

INTEREST GROUPS

Scientists
Politicians
Patients
Religious Groups
Anti-Abortion Groups
Corporations
The Aging
Celebrities
Minorities/Race
Women

INTERNATIONAL NEWS

United States (for the Canadian sample)
Canada (for the American sample)
United Kingdom
Japan
Sweden
India
Germany
France
Italy
Israel

LANGUAGE

Stem Cell Categories:

1). Adaptive
all-purpose
chameleon-like
changeable
convertible
malleable
plasticity
pliable
pluripotent
protean
shape-shifting
undifferentiated
unprogrammed

unspecialized
morph
multi-purpose
multi-talented
occupational alternatives
versatile

2). Ancestral

ancestral
master
mature
parent
precursor
primitive
primordial
progenitor
seed
original
mother

3). Building

building-blocks
little factories
informative
master blueprint
repair-kit

4). Child-Like

basic
blank-slate
immature
infant
nursery
learning
naïve
uneducated
unformed

5). Magical

alchemy
fantastic powers
magical
magic tissue
magic seeds
magnificent
potent
miracle
mythically powerful
powerful

6). Immortal

cure-all
fountain-of-youth
immortal

life-giving

7). Other
precious
elusive

Human Embryo Categories:

1). Microscopic
tiny
tip-of-a needle
barely visible
microscopic
grain of sand

2). Blob/Clump
blobs of protoplasm
blob
clump
tiny-cluster
plain-featureless
primitive
globs

3). Scientific
embryo-like
ovasome
blastocyst
molecular machinery
pre-embryo

4). Hollow
hollow-sphere
hollow ball

5). Precious
Precious

APPENDIX B

History and Goals of the Sample Newspapers

All of the information regarding the history and goals of the sample newspapers and magazines was obtained from official web-sites. I have relied almost solely on these self-accounts of their histories as a method for understanding underlying values, goals and belief systems. As Dening (1995: 14) argues "history is all the ways we encode the past in symbol form to make a present. It is, in this sense, very vernacular. It is an everyday, every moment act. Making History is our constant cultural exercise". Thus, the histories that newspapers and magazines lay claim to be, are not only a simple reflection of the past, but highlight contemporary goals and concerns.

The New York Times – "All the News That's Fit to Print"

The *New York Times*, started in 1851, is presently one of the most read newspapers in the world. The *New York Times*[1] outlines its history as follows: Founded by Henry Jarvis Raymond and George Jones, it was then a four-page paper called the *New York Daily Times*. The *New York Times* states that its early success depended on the papers ability to "appeal to serious readers, who wanted objective coverage of the daily news".[2] *The New York Times* also states that it was one of the first newspapers to employ new investigative journalistic techniques that later became the hallmarks of American journalism (Stephens 1985: 248). For instance, *The New York Time's* reporter John Foord wrote and exposed the 'Tweed Ring'. As a result of these articles William Marcy Tweed

was tried and sentenced for defrauding New York City of millions of dollars in public works contracts. The *Time's* state that they published their findings despite advertising boycotts, bribes and threats of violence.

Following some financial difficulties, Alfred S. Ochs bought *The New York Times* in 1886, with the intention of turning it into New York's finest. In 1935 Ochs died and he reiterated his principles for the *The New York Times* in his will. These principles are as follows:

> The *Times* should be operated as an independent newspaper, entirely fearless, devoted to the public welfare without regard to individual advantage or ambition, the claims of party prejudice or predilection.... That it's news columns may continue fairly to present, without recognising friend or foe, the news of the day – 'All The News That's Fit To Print' – and to present it impartially, reflecting all shades of opinion.[3]

The *New York Times* states that these principles define and guide the paper to this day.

The Washington Post - "An Independent Newspaper"

The Washington Post was first published in 1876 by the independent-minded Democrat Stilson Hutchins.[4] Although not nationally distributed, it is one of the most respected and prize-winning newspapers in North America. First founded as a "Democratic Daily Journal," it had a circulation of 10,000 and contained four pages that cost three cents a copy. On June 1, 1933, a public bankruptcy auction was held on the steps of The Post's E Street Building and the newspaper was sold for $825,000 to Eugene Meyer, a California-born financier. *The Washington Post* states that although Meyer was not an experienced newspaperman, he had strong

convictions about publishing a newspaper. These conviction were published on the cover of *The Washington Post* March 5, 1933:

- *The first mission of a newspaper is to tell the truth as nearly as the truth may be ascertained.*
- *The newspaper shall tell ALL the truth, so far as it can learn it, concerning the important affairs of America and the world.*
- *As a disseminator of the news, the paper shall observe the decencies that are obligatory upon a private gentleman.*
- *What it prints shall be fit reading for the young as well as for the old.*
- *The newspaper's duty is to its readers and to the public at large, and not to the private interests of its owners.*
- *In the pursuit of truth, the newspaper shall be prepared to make sacrifices of its material fortunes, if such course be necessary for the public good.*
- *The newspaper shall not be the ally of any special interest, but shall be fair and free and wholesome in its outlook on public affairs and public men.*

The Washington Post states the newspaper continues to uphold Meyer's goals and values to this day, which is reflected in the motto "An Independent Newspaper" that can be found on the editorial page. Katharine Graham, the current publisher since 1973 is also Meyer's daughter.

The Washington Post also emphasizes their role in the national political scandal known as Watergate, in 1972. *The Washington Post* states that their investigation of the Watergate cases led to the eventual resignation of President Richard Nixon, for which the *The Washington Post* was awarded a Pulitzer Prize for public service.

The Globe and Mail – "Canada's National Newspaper"

A Scotsman named George Brown in Toronto founded *The Globe and Mail,* originally named *The Globe,* in 1844. *The Globe and Mail*[5] outlines their history as follows: Prior to moving to Toronto George Brown and his father ran

the anti-slavery *British Chronicle* in New York. *The Globe* began with a weekly circulation of 300, and by 1853 had a daily circulation of 6,000. The paper established itself as a political vehicle, and Brown became a dominant figure in the Reform Party in Upper Canada, and while fighting for British Union in North America became one of the Father's of Confederation.

Senator Robert Jaffray bought *The Globe* following Brown's death in 1880, and during that time it adopted the slogan of "Canada's National Newspaper". From 1936 to the present ownership and the role of publisher was passed on to a number of successors. Notably, *The Globe* merged with *The Mail and Empire* in 1936, under the new name *The Globe and Mail*. *The Mail* had been established by Conservative backers in 1872, at the urging of Sir John A. Macdonald, to counter the influence of Brown's *Globe*, and had merged with another Conservative paper, *The Empire* in 1895.

As the self-defined "national newspaper", *The Globe and Mail* states that it focused on national politics. They draw on the following examples to illustrate this emphasis: In the 1850s *The Globe* had a correspondent in Quebec City when it was the capital of the Province of Canada, and a correspondent telegraphing regular news from Ottawa as of 1867. A full Ottawa bureau followed, and in 1854, it became the first Ontario paper to open a Quebec news bureau. Beginning in 1959 with British Columbia, the newspaper established news bureaus in other regions of Canada.

The Globe and Mail's motto was selected from Junius by George Brown in 1844 and is found on the top of the editorial page. It states: "The subject who

is truly loyal to the Chief Magistrate will neither advise nor submit to arbitrary measures." The paper maintains, as Brown did when he founded the newspaper, that "only an informed public can defend itself against power seekers who threaten its freedoms". [6]

The Toronto Star – "A Paper for the People"

The Toronto Star, originally called *The Evening Star,* was first published in Toronto in 1892, and is now Canada's largest daily newspaper. *The Toronto Star*[7], outlines its history as follows: The *Evening Star* a self-styled "Paper for the People" had been created by 21 printers and four teenage apprentices who were locked out during a labour dispute at the afternoon *News*. Their aim was to publish a "serious journal" that would reflect the concerns of "working people" like themselves.

Admirers of Sir Wilfred Laurier bought *The Evening Star* in 1899 in order to support the new prime minister. They asked a rising young journalist, 34-year-old Joseph E. Atkinson to be the editor. When they asked Atkinson to run it, he agreed on two conditions: The Star would be independent of any political party and he'd be paid $5,000 a year, $3,000 in cash and the rest in shares.

The Toronto Star states that like the printers before him, Atkinson was imbued with the idea of publishing a paper for ordinary people. As a boy he had known hardship and need. His widowed mother took in boarders to support her eight children. After she died, Atkinson left school at age 14 to work in a woollen

mill. When it burned down a few weeks later, he had no job; only private charity kept him from hunger. *The Toronto Star* states that these experiences had a lasting impact on Atkinson. Extensive reading made him aware of great social changes then stirring in Britain, and along with his Methodist upbringing, his early life convinced him that liberalism was the way to a better future. As a result of these experiences Atkinson targeted the interests and cares of the "ordinary working people".

Through the paper, and as chairman of a Liberal Party advisory committee in 1916, Atkinson helped to develop Canada's modern welfare system. The *Toronto Star* states that his technique was to publish detailed articles on the social reforms in other lands -- especially in Britain -- and then to follow up with carefully reasoned editorials, pressing for similar advances at home. Long before they became law, *The Toronto Star* states that they campaigned for mothers' allowances, unemployment insurance, old age pensions and the first phases of the Canadian national health plan. *The Toronto Star* also states that despite the "deep annoyance of many businessmen", Atkinson also championed minimum wages and the rights of labour unions.

By 1913 it was Toronto's largest paper and Atkinson had become the controlling shareholder. After he died in 1948, Atkinson left *The Toronto Star* to a Charitable foundation he'd established in 1942, both to be run by trustees familiar with his policies and beliefs. His trustees were given court permission to buy the paper in 1958, after promising to uphold its long-standing traditions.

[1] The New York Times Factbook. Electronic Document, http://www.nytco.com/pdf-factbook/history.pdf, accessed March 15, 2002.
[2]The New York Times Factbook. Electronic document, http://www.nytco.com/pdf-factbook/history.pdf, accessed March 15, 2002.
[3] The New York Times Factbook. Electronic document, http://www.nytco.com/pdf-factbook/history.pdf, accessed March 15, 2002.
[4] The Washington Post History. Electronic document, http://www.washpost.com/gen_info/history/timeline/, accessed January 15, 2002.
[5] A Globe History. Electronic Document, http://www.globeandmail.ca/services/site/history.html, accessed November 19, 2001.
[6] A Globe History. Electronic Document, http://www.globeandmail.ca/services/site/history.html, accessed November 19, 2001.
[7] Honderich, Beland. Electronic document, http://thestar.com/NASApp/cs/contentserver?pagename=thestar/render&inifile=futuretense.ini&c=Page&cid=972403844690&pubid=968153964505, accessed November 20, 2001.

APPENDIX C

A Detailed Summary of the News Agency Services

News agency services are integral to modern day reporting and journalism. The data illustrates that the *Associated Press, Reuters News Agency*, and *Canadian Press* are three of the most frequently used news agency services in all of the sample newspapers. Notably, magazines do not employ news agency services. News agencies or "news wholesaling" were outcomes of the increased costs in newsgathering, and the intensifying competition to obtain news during the late 19th century. Stephens (1988) among others argue that news agencies tend to treat news as a commodity – rather than as a political weapon. It is also argued that partisanship had to be eliminated if the information was to be suitable for newspapers of all political bents and from different countries (Gans 1980; Stephens 1988). In this Appendix I will outline the history and goals of three of the most used news agency services by the sample newspapers. In addition, Table 16 below, details the frequency of each of these news agency services in the sample newspapers.

TABLE 16

Articles from news agency services.

	The Washington Post		The New York Times		The Globe and Mail		The Toronto Star	
	%	N	%	N	%	N	%	N
Associated Press	90.9	10	55.6	5	27.0	10	43.8	14
Reuters News Agency	9.1	1	33.3	3	48.7	18	34.4	11
Canadian Press	--	--	--	--	16.2	6	18.8	6
Wire Services	--	--	--	--	8.1	3	--	--
Knight Ridder News	--	--	--	--	--	--	3.1	1
Bloomberg News	--	--	11.1	1	--	--	--	--
Total (N)		11		9		37		32

Associated Press

The Associated Press[1] (AP) states that in May 1848, ten men representing six New York City newspapers began discussing the costly collection of news by telegraphy. David Hale of the *Journal of Commerce* argued that only a joint effort between New York's papers could make telegraphy affordable and effectively prevents telegraph companies from interfering in the news gathering process. To get news from the West and from abroad, Hale argued, newspapers had to work together if the public was to be served with increasingly wider coverage of the United States and the world. Today, that six-newspaper co-operative serves more than 1,500 newspapers and 5,000 broadcast outlets in the United States. Abroad, AP services are printed and broadcast in 112 countries. Worldwide, the AP serves more than 15,000 news organisations, with 3,700 employees working in 242 bureaus around the world.

AP states that its mission is to provide factual coverage to all parts of the globe for use by the media around the world. AP states that news bearing the AP logotype can be counted on to be accurate balanced and informed.

Reuters News Agency - Breaking News Around the Globe

Founded in 1851, Reuters News Agency[2] (RNA) was founded in London by Paul Julius Reuter. RNA states that the company's goals were to be "a prime source of fast, accurate and unbiased foreign news". Today, Reuters is one of the world's leading news and financial information organisation, "providing information and technology to help people around the world to make crucial decisions. Reuters is unrivalled in the scope, sophistication and amount of information it supplies to banks, the media, other businesses and private individuals".

Canadian Press

Canadian Press[3] (CP) is currently Canada's only multimedia news agency. CP states that it was first established in 1917 as a vehicle to allow distribution of The Associated Press to Canadian newspapers. During the height of the First World War, publishers were desperate to receive news of Canada's troops in Europe. CP was formed to get the news to Canadians by telegraph as well as provide bulletins from the country's capital, where many newspapers had no bureaus. Canadian publishers saw the advantages of pooling their resources, due

to the cost and challenge of covering a country like Canada, with six time zones and a small population.

CP states that its goals are to be the source that Canada's newsrooms turn to for breaking and developing news and unbiased, timely reporting on what is happening throughout Canada and around the world. CP maintains that throughout its history, "its goal has been to keep Canadians informed. CP tells people the story of their country, every day, in all forms and from all corners of the land. In the 21st century of the global village the stories of our nation are a cornerstone of who we are and will become".[4]

---

[1] AP History. Electronic document, http://www.ap.org/pages/history/origins.htm, accessed November 29, 2001.
[2] About Reuters. Electronic document, http://about.reuters.com/150/, accessed December 3, 2001.
[3] About CP. Electronic document, http://www.cp.org/english/hp.htm, accessed December 12, 2001.
[4] About CP. Electronic document, http://www.cp.org/english/hp.htm, accessed December 12, 2001

APPENDIX D
Annotated Bibliography of the Subset Sample Articles

Abraham, Carolyn

2000 The Big Chill: Medical Research seems to on the verge of making miracles—eliminating deadly disease and growing replacements for human organs. But trouble looms. The raw materials for all this potential magic come from a source that has the mighty anti-abortion movement up in arms. The Globe and Mail, July 8: A10.

Discusses the involvement of anti-abortion groups in the debate surrounding the use of human embryos for research purposes. Outlines the biology and potential benefits of hES cell technology. Examines the implications of this research for the aging, patients, and the commoditization of human life.

Abraham, Carolyn

2001a Science stirs fury and hopes of cures. The Globe and Mail. August 10: A1, A12.

Discusses the controversy surrounding the use of human embryos for research purposes. Outlines the debate and details the biology of stem cells and their potential medical applications.

Abraham, Carolyn

2001b Bush's stem-cell policy could mean brain gain for Canada. The Globe and Mail. August 11: A1, A8.

Discusses President Bush's restrictive research guidelines for human embryonic stem cell research and outlines the biology of hES cells. Examines the possibility that U.S. scientists will move to Canada to do research.

Abraham, Carolyn

2001c Medicine's Holy Grail: Stem cells could one day cure everything from Alzheimer's to heart disease. Aching joints? Damaged liver? Just grow a brand new replacement. These cellular magicians are the most seductive area of scientific research today. Carolyn Abraham tells you everything you wanted to know but were too confused to ask. The Globe and Mail, August 18: F4.

Details the biology of stem cells, their potential medical applications and recent advances. Outlines the history of stem cell research and discusses U.S. and Canadian research guidelines.

Calamai, Peter and Ron Bull
2001 Panel Urges Research on Fetuses – New treatments depend on use of stem cells. The Toronto Star. March 30: A1, A10.

Outlines President Bush's federal research guidelines for human embryonic stem cells. Discusses the debate surrounding the use of human embryos for research purposes and outlines the arguments made by the various interest groups.

Chung, Andrew
1999 Conference on Human Destiny Ignores God – Couchiching gathering focuses on science, ethics. The Toronto Star, August 9: A6.

Discusses the ethical concerns surrounding the use of human embryos for stem cell research and concludes that scientists are ignoring the concept of 'God'.

Crawford Trish and Richard Lautens
2000 Forever young? Elderly living better as well as longer as scientists tackle mysteries of aging. The Globe and Mail, March 10: LI5.

Discusses the impact of stem cell research on the aging and the possibility that scientists may have discovered the 'fountain of youth' and immortality.

Flam, Faye
1999 Birth of 'the new biology' – Stem cells may prove as important as DNA but they touch some ethical hot buttons. July 25: A1, A8.

Details the biology of stem cells and the potential of 'regenerative medicine'. Discusses the ethical concerns surrounding the use of human embryos for research purposes.

Foss, Krista and Maggie Fox
1999 Embryonic Stem Cell Research Under Fire: Use in treating disease sparks ethical concerns. The Globe and Mail, August 3: A5.

Discusses the ethical concerns surrounding the use of human embryos for stem cell research. Details the biology of stem cells for therapeutic applications.

Foss, Krista
2000 Repairing the Eye: Cells of retina have regrowth potential U of T scientists discover 'little factories' can reproduce once they're in a lab dish. The Globe and Mail, March 17: A18.

Discusses the discovery made by University of Toronto scientists that stem cells can regenerate the retina in the lab. Outlines the possibilities of curing patients with retinitis pigmentosa, a condition that affects one in every 4,000 people in Canada.

Hass, Janis

1999a Baby Bonus: A little biological Insurance. The Globe and Mail, May 11: C8.

Discusses the value of storing the cord blood following the birth of a newborn baby. Details the science of stem cells and their potential biomedical applications.

Hass, Janis

1999b How Stem Cells Save Lives. The Globe and Mail, May 11: C8.

Details the biology of stem cells and their therapeutic applications.

Picard, Andre

2000 Grow New Heart Muscle? It's possible, Canadians say. The Globe and Mail, November 13: A1, A10.

Details the biology of stem cells and the possibility of growing a new heart for heart patients. Includes statistics on the economic and humanitarian benefits of investing in stem cell technology.

Pollack, Andrew

2000 Rebuilding With Stem Cells. The New York Times, May 30: F6.

Discusses the various research projects pertaining to stem cell technology in the corporate sector.

Stolberg, Sheryl Gay

2001a Scientists Urge Bigger Supply of Stem Cells. The New York Times, September, 11: A1, A18.

Discusses President Bush's research guidelines, and discusses the arguments being made by the scientific community that the restrictions will limit the potential for developments in stem cell therapeutics.

Stolberg, Sheryl Gay

2001b Patent on Human Stem Cell Puts U.S. Officials in Bind. New York Times, August 17: A1, A16.

Discusses patent number 6,200,806, held by Geron Corporation and the implications for federal research guidelines.

Talaga, Tanya and Rene Johnston
2000 Doctoral student led research team – An eye-opener – Toronto team may have found the key to repairing eyes by growing cell to create new retinas. The Toronto Star, March 17: A3.

Discusses the discovery made by University of Toronto scientists that stem cells can regenerate the retina in the lab. Outlines the possibilities of curing people who have had traumatic injuries in their eyes.

Wade, Nicholas
1999a Recommendation is Near on Embryo Cell Research: Ethics Panel Expected to Urge End to Ban. The New York Times, May 24: A18.

The author addresses the recommendations for hES cell research guidelines proposed by the Presidential commission (NBAC 1999). Discusses the controversy surrounding hES cells in terms of the abortion debate.

Wade, Nicholas
1999b Embryo Cell Research: A Clash of Values. The New York Times, July 2: A13.

Discusses the ethical controversy surrounding the use of human embryos for research purposes. Followed by a detailed discussion of the science of hES cells.

Wade, Nicholas
1999c Discovery Bolsters a Hope for Regeneration: Technology Firm Converts Basic Cells into Bone and Cartilage. The New York Times, April 2: A18.

Discusses the concept of 'regenerative medicine' in light of recent scientific discoveries by the company Osiris Therapeutics.

Wade, Nicholas
2000 New Rules on Use of Human Embryos in Cell Research. New York Times, August 24: A1, A18.

Discusses the federal research guidelines released by the NIH that would permit the use of human embryos for stem cell research. Also discusses the reactions of various interest groups, such as scientists and anti-abortion activists.

Wade, Nicholas
2001 Scientists Report 2 Major Advances in Stem-Cell Research. New York Times, April 27: A21.

Discusses the medical and scientific potential for hES cells to treat juvenile diabetes and Parkinson's disease. Details the science of stem cells and outlines the controversy surrounding the use of human embryos for research purposes.

Weiss, Rick
1999a Embryo Work Raises Specter of Human Harvesting: Medical Research Teams Draw Closer to Cloning. The Washington Post, June 14: A1, A4.

This article addresses the efforts made by Geron and ACT to clone human embryos and create chimeras in order to develop medical treatments for a variety of chronic ailments, such as diabetes and Parkinson's.

Weiss, Rick
1999b Stem Cell Discovery Grows Into a Debate: New Field Faces Tests on Hill, in the Lab. The Washington Post, October 9: A1, A8.

The author discusses the controversial discovery of hES cells and the federal research guidelines addressing them. Also discusses the interests of various groups, such as lawmakers, anti-abortion activists, scientists, politicians and patient groups, providing a detailed description of what hES cells are and how they could potentially work to treat diabetes, Parkinson's and paralysis.

Weiss, Rick
2000a Biomedical Research Goes Where Candidates Dare Not. The Washington Post, October 29: A23.

Discusses recent biomedical advances in stem cell technology, their potential therapeutic applications, and the role of biotechnology in the global economy. Also discusses the views of presidential candidates Al Gore and George W. Bush.

Weiss, Rick
2000b In Cell 'Alchemy,' an Alternative to Embryo Studies. The Washington Post, April 24: A14.

Discusses 'cell alchemy' or the pluripotentiality of both embryonic and adult stem cells, their potential therapeutic applications, and the controversy surrounding the use of human embryos for research purposes.

Weiss, Rick
2000c U.S. to Issue New Rules for Research on Embryo Cells. The Washington Post. August 23: A1, A12.

Discusses the new federal research guidelines regarding the use of human embryos for research purposes. Examines the opinions of various interest groups.

Weiss, Rick
2001a Scientists See Growth in Field, Lament Limits. The Washington Post, August 10: A1, A12.

Discusses the restrictions made on federal research guidelines by President George W. Bush for the use of human embryos for stem cell research. Discusses the frustrated reactions of scientists to the limits, and detail the potential of hES cells for medical therapies.

Weiss, Rick
2001b Firm Aims to Clone Embryos for Stem Cells. The Washington Post, July 12: A1, A12.

Discusses the efforts made by ACT to clone human embryos for research purposes, and the debate surrounding the developments. Makes a distinction between reproductive cloning and therapeutic cloning.