
UNIT 1 EXTENDING PHYSICAL LIFE INDEFINITELY: SCIENTIFIC TECHNIQUES

Contents

- 1.0 Objectives
- 1.1 Introduction
- 1.2 Physical Immortality: A Primordial Human Longing
- 1.3 Physical Immortality: A Latent Hope or Tall Claim?
- 1.4 Physical Immortality: The Scientific Basis
- 1.5 Reflections
- 1.6 Some Quotes
- 1.7 Let Us Sum Up
- 1.8 Key Words
- 1.9 Further Readings And References

1.0 OBJECTIVES

- To show the possibility of extension of human life span.
- To see some of the scientific techniques useful for it.
- To see the theoretical possibility of overcoming physical death and longing for physical immortality. Please note that we speak only of the theoretical possibility. In reality, such physical immortality most probably will not take place.

1.1 INTRODUCTION

According to the creation myth of Konos tribes of Guinea, Sa or death existed before anything. Death is regarded as the primary creator in this tradition. Once, long time ago, there was only darkness and Sa lived there with his wife and daughter. Since he wanted something more durable he created a slushy kind of mud sea as a place to live. From nowhere appeared the god Alatangana and he decided to improve on the work of Sa. Alatangana made the slush solid and added animals and plants to it. Sa was pleased and they became friends. But when the god asked for Sa’s daughter the friendship fell apart. However, Alatangana met the girl secretly and eloped to a distant place and they produced 14 children: four white boys, four white girls, three black boys and three black girls. The children spoke different languages and the parents could not understand them.

This made them so upset that they decided to return to Sa and ask for his advice. Sa was ready to reconcile and demanded that the black and white children do not intermarry. So the different race originated. Sa demanded further: “You have stolen my only child. Now you must give me one of yours whenever I wish it. When I wish to call one of your children I must never be denied. You will know I am called by the sound of the calabash rattle in your dream.” (Lemming &

Lemming 1994: 164) So it was that death for us humans is the bride-price for Alatangana's marriage with Sa's daughter. So death is intrinsically linked to human's origin.

This simple myth explains aetiologically both darkness and life, death and birth, sex and procreation and gives justification to the races. The main focus of my article is that this intimate link between death and life may be soon broken – at least in our collective consciousness. It will have shattering consequences for our human – philosophical and religious – longing and hope.

In this unit we first study the quest for human physical immortality as a religious search. We see the emerging religious and collective movements which try to overcome death. In the next section we see the scientific basis for physical immortality. Though there is no hard “scientific” evidence for physical immortality, there are so many scientific disciplines at their cutting-edge or frontier research which indicate at least the theoretical possibility for physical immortality. In the final part we see the social or religious response to such a scenario. We conclude by affirming that such a guiding of our total destiny requires a healthy dialogue between science and society.

1.2 PHYSICAL IMMORTALITY: A PRIMORDIAL HUMAN LONGING

Though the longing for an everlasting life has been a perennial quest, we are somehow used to our physical death. Since we all take our mortality for granted, the gerontologist author Herb Bowie holds that we tend to ignore the most potent anti-ageing organ in your body – the mind! If so, then the subconscious messages we are constantly sending ourselves may be sabotaging human longevity. “Can you imagine yourself living for 100 years, 120, or even longer? If not, then you may be undermining your nutritional program by feeding yourself ‘mental junk food’ — negative programming predicting your own deterioration and demise.” (Bowie 1998)

The author exhorts that we should start feeding your mind a new food. His book, *Why Die?* speaks clearly and intelligently about the possibility of living virtually forever. By stretching the mind to accept this exciting new human possibility, we shall be conditioning ourselves to live a longer, healthier and happier life.

Most of us make the unconscious decision that we have to die. They assume that their fate is ordained by the laws of nature, or by destiny. This choice is made so early in life, and at such an unconscious level, that few people ever even challenge it. So ask the question on human immortality will shake people up. Because even to ask this question is to imply something unthinkable for many people — that death is a choice, and not a foregone conclusion. Further, most of us feel disoriented and threatened by the consideration of physical immortality as a real possibility. It is within these chilling prospects that the author introduces the concept of physical immortality.

To understand the idea of living forever, according to Bowie, we must look at two very different aspects of physical immortality. On the one hand, it is about eternity, about surviving to some unthinkably distant point in the future. On the other hand, though, it is all about choosing how to live our lives today. It is only

when we connect these two extremes, and find a way to live our lives as an unbroken continuum between these two points, that we fully achieve physical immortality. There is an element of paradox here.

This paradox is also expressed in these haunting lines from William Blake.

To see a world in a grain of sand
And a heaven in a wild flower,
Hold infinity in the palm of your hand,
And eternity in an hour. (Capra 1977: 288)

We believe that Blake was not speaking metaphorically though. In the book the author wants to talk about transforming the quality of our lives today, by focusing our attention on our own eternity. At the same time, I will be talking about actually living for hundreds and thousands of years, by focusing our attention on the quality of our lives today. The author asserts that if such a view seems like a paradox, then this is only because we view our today's and our tomorrow's as separate and unconnected.

Physical immortality is difficult, in a way, to talk about at length because it can be approached from so many different angles. Since all of these perspectives are equally valid, it is impossible to do the subject justice by discussing it in a strictly linear fashion. We can start with forever and work backwards. We can start with today and go forwards. We can talk about the fate of humanity, or we can discuss the personal feelings of one individual. No matter how we approach the subject, though, we always seem to arrive at the same conclusion: that living forever is a practical and meaningful goal.

Reaching the same conclusion from so many different starting points is reassuring in the long run, but can be a bit disconcerting at first, as we repeatedly shift perspectives. We may feel more comfortable with some approaches than with others, and so may be tempted to skip around.

Following similar lines of thought, another scholar claims that the first immortal human beings are living among us today. (Bova 2000) It is asserted by its proponents that there are men and women alive today who may well be able to live for centuries, perhaps even extend their life-spans indefinitely. For them, death will not be inevitable. Death will have to die for them!

Such immortal humans will not age. They will not become feeble and sickly. Ageing will be stopped, even reversed. One may be young and vigorous forever. Accidents and violence will not disappear, of course. People will still be vulnerable to poor judgement, bad luck and evildoers. But death from old age, death as the inescapable end of life, will become a thing of the past, a dark memory of primitive days. As the American immunologist William R. Clark put it, "Death is not inextricably intertwined with the definition of life." Just because human beings have always died does not mean that they always will die.

This same idea is reflected in the leading article of a acclaimed German weekly. (Spiegel 2000) It asserts that immortality belongs to the originary human desire (*Ursehnsucht*). It will not just redeem humanity from death but raise it almost to the level of gods. Michael Fossel, professor of Clinical Medicine in the State

University of Michigan asserts: “the most significant turn in the human history has begun. In twenty years we can stop the process of ageing and reverse biological clock.” He certainly is a super-optimist. Philipp Lee Miller of the Longevity Institute in Los Gatos, prophesies: “in a few years time 80 year olds will feel like 20 year olds and will play like teens.” This sentiment is accentuated by the New Yorker Professor Michio Kaku, who expects a tripling of life expectancy and a cessation of ageing process in a few years time.

The above longings and claims make it abundantly clear that immortality is slowly distilling into the collective unconsciousness of humanity. We shall study further the claims of immortality and see if there is any psychological and scientific basis for it.

1.3 PHYSICAL IMMORTALITY: A LATENT HOPE OR TALL CLAIM?

The authors who write on this subject rightly maintain that in the quest for immortality time is on our side. The medical and biological advances that will be achieved over the next ten to twenty years will undoubtedly allow us to live long past one hundred; and the longer you live, the more knowledge that biomedical scientists glean, the farther and farther our life-span will be extended. Finally it is hoped to reach the unlimited and immortal state. Of course, most of the authors admit that very few scientists accept today that immortality is within our grasp. Even those working in the fields of cellular biology, molecular genetics and life extension have not yet faced the fact that current research has already opened the path to human immortality. That is the crucial issue. The authors of human physical immortality maintain that it is an achievable aim, an approachable goal.

A poignant case in this respect is a book. (Bowie 1998) Here we give a summary of the Book *Why Die* (Bowie 1998) The book consists of 12 parts. In the first part which deals with “The Vision” Herb Bowie offers a fictional look into the next century. This narrative focuses on one couple as they experience the possibility of living forever. The story gives a good overview of what is meant by physical immortality, and introduces many ideas that will be expanded on later in the book. The second part, “Beginnings,” includes several different chapters that, in different ways, start the discussion of living forever. Our culture has produced many different images of physical immortality, so a terminological discussion on the term ‘immortality’ is called for. The origins of the idea of immortality is traced, pointing out that the idea of living forever is not really as strange as it may first seem. One may be surprised to hear what some experts in related fields have to say on the subject. Finally, the author looks at the case of someone who decided to stick with the safety of conventional beliefs, and strongly suggest that we try something different.

Part three, “The Decision to Live,” suggests that life and death are the results of decisions we make, and not things that just happen to us. A straightforward quiz that will determine your IQ (Immortality Quotient) is given. Many forms of social conditioning prepare us to pack it in after only 70 or 80 years, and these will be pointed out. Also included here will be a discussion of the benefits that a belief in our own physical immortality can have on your life today.

Further, the next part, “How To Live Forever,” reveals what the author calls the 15 minimum requirements for physical immortality. He believes that these techniques are bound to improve your life today, and offer real hope of extending our lives indefinitely. Part five, that deals with “Feelings,” talks about the importance of recognizing and nurturing our feelings of being here forever. In this part of the book Bowie talk about what it feels like to look forward to eternity.

The next part of the book looks at the possibility of human physical immortality from a scientific perspective. It is pointed out that the physical and biological sciences have found no fundamental principles that would make immortality impossible. The author also explains why I think that the phenomenon of evolution has brought humankind to the brink of a new phase of history, in which immortality is our next logical step.

Human value systems are a subject of utmost importance to the survival of our race. So in part seven, the author explains how the idea of physical immortality can help us transform and unify these values. Life would be meaningless without other people in our lives. In part eight, the subject of “Human Relationships” is tackled. It is claimed that the decision to live forever can improve the quality of our connections to others, at a global as well as a personal level.

Almost all of us have been raised in one or more religious systems, and all of us have grown up in the shadow of religion. In part nine, the author explains how physical immortality is the next step in the evolution of religion. Seeing ourselves as living forever has a profound impact on other aspects of our individual and collective self-images, and we so talk about this in the next part of the book. Part eleven gives some examples of how the principles of living forever can be applied to other areas of life, such as parenting and bodywork. In the last part of this book (“Where to Go From Here”), the author shares some possibilities for further development of human immortality. Some concrete suggestions as to what to do next in the search for immortality are given (Bowie 1998).

So far we have seen the human longing and the hope for immortality. In the next section we shall see some scientific basis for it. We do not make any claim that there are strong scientific evidence here. Since we are dealing with the future we acknowledge that “the only thing certain about the future that it will not be as certain as we think of it.”

Check Your Progress I

Note: Use the space provided for your answers.

1) What is the difference between extending life-span and physical immortality?

9

2) Is physical immortality a primary human longing? Why?

1.4 PHYSICAL IMMORTALITY: THE SCIENTIFIC BASIS

After having a glimpse of some of the arguments for physical immortality based on our mental upbringing, we turn our attention to the “hard facts” about immortality. At the outset, it must be emphasised that science today is in no position to provide us with immortality. But there are clear indications, specially boarding on cutting edge technologies, which indicates to us that the quest for immortality is based on scientific facts. There are many ways of approaching this subject. Many fields are involved indirectly in the quest for immortality (Strout 1998).

We believe that there may be a real possibility to extend the human lifespan, although it may not be infinitely. Scientists may develop new biotechnologies to slow down the body’s aging process and vastly increase the length of the human lifespan in the future. So the research is called life-extension research. Our lifespan is maximum 100 years or so, better ways to treat and cure diseases have made it possible for people to live longer on an average. But, life-extension research aims at making it possible for people to live much longer lives than we do today, not simply by treating or curing disease, but by slowing down the actual aging process itself. Some scientists estimate that we could live up to 150 years or more by intervening in the rate that we age. Also there are many possibilities that I mention below.

a) Ageing Associated with Mitochondria

The Journal *Science* (Science 2000) reports that specific changes in the mitochondria DNA (mtDNA) are associated with ageing. There are several reasons to believe that the mitochondria may be important in ageing. The mitochondria are the generators that power our cells. In performing this function they generate free radicals. Therefore changes in the mitochondria that occur with ageing are of practical interest for those who would like to extend the human life span. (Hewitt 1996)

Mitochondira are unique components of a cell because they possess DNA of their own and replicate in a manner similar to the cells in which they are found. This DNA is a remnant of the ancient forerunner of the mitochondria which was a free-living bacterium. This study, which was conducted at the California Institute of Technology focused on mutations in the region of mtDNA that controlled the replication of the mtDNA itself . It was found that specific mutations in the control region would appear and proliferate within individuals as they age. This complements prior work that demonstrated that the amount of active mtDNA declines as an individual ages. It may be that the accumulation of the mutations such as those detected in this study are the underlying cause of this phenomenon.

This study involved meticulous and laborious bench work and data analysis. Samples from over twenty individuals were assayed for multiple mutations. In some cases two samples from the same individual at different ages were processed. Certain mutations were common (57%) in older individuals (above 65 years) but absent in samples from younger individuals. In the samples taken from the same individual at different ages (longitudinal studies) the same frequency of mutations was also observed. This data indicates that specific mutations in mtDNA become more frequent with age. However, these results do not prove that these mutations are involved in ageing. Further studies will be required to determine if these mutations are related to impaired function of the mitochondria.

One concern that emerges from these experiments is related to the fact that the region being examined is involved in mitochondrial DNA replication. This means that it is possible that mutations in this region may impair or increase the efficiency of replication of the mutated mtDNA. Therefore, it is quite possible that the mutations observed in this study give rise to mitochondria that are more efficient at self-replication. This would explain the accumulation of mtDNA with these mutations with the passage of time (i.e. in older individuals) without any role in the phenomenon of ageing. (Hewitt 1996)

b) Cryonics

Cryonics is the low-temperature preservation of humans and animals who can no longer be sustained by contemporary medicine, with the hope that healing and resuscitation may be possible in the future. Ideally, cryonics would allow clinically dead people to be brought back in the future after cures to the patients' diseases have been discovered and aging is reversible. Modern cryonics procedures use a process called vitrification which creates a glass-like state rather than freezing as the body is brought to low temperatures. This process reduces the risk of ice crystals damaging the cell-structure, which would be especially detrimental to cell structures in the brain, as their minute adjustment evokes the individual's mind (Immortality 2011).

c) Cyborg or Cybernetic

A cyborg is the short form for a "cybernetic organism". It is a being with both biological and artificial parts. Fictional cyborgs are portrayed as a synthesis of organic and synthetic parts, and frequently pose the question of difference between human and machine as one concerned with morality, free will, and empathy. The term was coined by Manfred E. Clynes and Nathan S. Kline in 1960 to refer to their conception of an enhanced human being who could survive even in extraterrestrial environments.

Transforming a human into a cyborg can include brain implants or extracting a human mind and placing it in a robotic life-support system. Even replacing biological organs with robotic ones could increase life span and depending on the definition, many technological upgrades to the body, like genetic modifications or the addition of nano-robots would qualify an individual as a cyborg. Such modifications would make one impervious to aging and disease and theoretically immortal unless killed or destroyed.

Their concept was the outcome of thinking about the need for an intimate relationship between humans and machines as the new frontier of space

exploration was beginning to take place. Generally, the term “cyborg” is used to refer to a human with bionic, or robotic, implants. These mechanical parts enhance the body’s “natural” mechanisms. Some theorists cite such modifications as contact lenses, hearing aids, or intraocular lenses as examples of fitting humans with technology to enhance their biological capabilities; however, these modifications are no more cybernetic than would be a pen or a wooden leg. Cochlear implants that combine mechanical modification with any kind of feedback response are more accurately cyborg enhancements.

d) Mind Uploading or Whole Brain Emulation

Mind uploading or whole brain emulation is the hypothetical process of scanning and mapping a biological brain in detail and copying its state into a computer system or another computational device. The computer would have to run a simulation model so faithful to the original that it would behave in essentially the same way as the original brain, or for all practical purposes, indistinguishably. The simulated mind is assumed to be part of a virtual reality simulated world, supported by a simplified body simulation model. Alternatively, the simulated mind could be assumed to reside in a computer inside a humanoid robot or a biological body, replacing its brain. In theory, if the information and processes of the mind can be disassociated from the biological body, they are no longer tied to the individual limits and lifespan of that body. Furthermore, information within a brain could be partly or wholly copied or transferred to one or more other substrates, thereby reducing or eliminating mortality risk (Mind Uploading 2011).

One idea that has been advanced involves uploading an individual’s personality and memories via direct mind-computer interface. The individual’s memory may be loaded to a computer or to a newly born baby’s mind. The baby will then grow with the previous person’s individuality, and may not develop its own personality. This could be accomplished via advanced cybernetics, where computer hardware would initially be installed in the brain to help sort memory or accelerate thought processes. Components would be added gradually until the person’s entire brain functions are handled by artificial devices, avoiding sharp transitions that would lead to issues of identity. After this point, the human body could be treated as an optional accessory and the mind could be transferred to any sufficiently powerful computer. Another possible mechanism for mind upload is to perform a detailed scan of an individual’s original, organic brain and simulate the entire structure in a computer. Whatever the route to mind upload, persons in this state would then be essentially immortal, short of loss or traumatic destruction of the machines that maintained them (Immortality 2011).

Check Your Progress II

Note: Use the space provided for your answers.

1) What is the significance of cryonics?

.....

.....

.....

.....

2) What is mind uploading?

e) Stem Cell Research

Like the two sides of the coin, stem cells have both merits and demerits. It is always better to approach a thing in optimistic way. Likewise, I am going to deal with stem cells in more positively. Stem cells have the capacity to develop into all kinds of cells and also it can repair the damaged cells too. So it is used in medical field to cure the diseases like diabetes and heart disease. According to me stem cells are the pinnacle of achievement by modern science, because it cures very many diseases. Likewise it also cures some genetic problems too. Stem cells are divided and transformed into another cell to cure the damaged cell. It also can be used in cloning and can develop human arts in laboratory. Thus it helps humans to lead a long life. I feel that stem cells research paves way to the better living humanity for a long duration without diseases. Today, science has becoming the blessing in the life of many. My diseases no more control my life, but with the help of science I can construct my life and march towards a new horizon of hope

f) Cloning for Extending Life?

When Dolly was unveiled three years ago as the first cloned mammal it was as if the new millennium had already dawned. From the pages of pulp fiction and B movies came the clones with an all out media blitz which had pundits opining and scientists pontificating. On this occasion it seems that the media feeding frenzy was proportionate to the significance of the discovery. (Hewitt 1996)

One issue that was of particular interest was whether the age of Dolly’s cells would reflect their previous incarnation or did Dolly start with a *tabula rasa* like any new-born. It was soon determined that Dolly’s cells were older than sheep that had been born naturally. It had been hoped that the nuclear transfer cloning technique would be able to provide a limitless supply of cells for regeneration and repair of diseased tissues. The limited life-span of Dolly’s cells were a setback for this goal.

The April 28th, 2000 issue of science features a report indicating that Dolly’s premature frailty is not necessarily the rule when dealing with clones. On the contrary, it appears that clones can actually be younger than naturally born animals. The bearer of this joyous news is an aptly named young calf, Persephone.

The clones in this study were made by a technique that is somewhat distinct from how Dolly was produced. The cells that were used to generate Dolly and Persephone were halted at different stages of the cell cycle. Dolly was produced from cells that had temporarily withdrawn from the cell cycle into a stage referred to as G0 or quiescent phase. Persephone, on the other hand, was produced from

a cell that had divided until it could undergo no further DNA replication and encountered a roadblock at the border of G1 and S phase. Persephone’s mother cell was considered senescent. This may be the reason that Persephone is younger than she should be and Dolly is older than she should be.

The implications of the experiments with Persephone are enormous. This confirms that it is possible to produce a plenitude of cells through nuclear transfer and somatic cell cloning. These cells can be used to repair tissues that have been damaged by ageing or disease. This research has yielded a model system which enables the examination of the role that telomere length plays in ageing. It also gives rise to the more controversial possibilities of creating longer-lived human clones. Whatever future developments proceed from this discovery, it is a watershed development in ageing research and is particularly pertinent to the telomere theory of ageing.

1.5 REFLECTIONS

Right in the beginning we must assert that the search for physical immortality is still at the level of a search. Right now, we have not seen any real possibility for attaining physical immortality. At the same time, many of our technologies may be able to extend our physical life span, which is not the same as eliminating death (or physical immortality).

Such a possibility of physical immortality has deep rooted religious consequence. Religions can ignore the challenges posed by immortality only at the danger of instant self mortality. The obvious danger of such a possibility is that each one becomes so preoccupied with his own individual immortality and forgets the human community and life in general. There is a danger that the larger issues of providing justice for the impoverished, fostering of life in general and love as the most significant human value may be forgotten.

At the same time it must be reiterated that physical immortality does not render God superfluous, religion redundant and human longing unnecessary. Even in the situation of immortal humans there is scope for meaningful hope, for relevant religion and for a liberating God. At the same time Immortality necessitates a human hope that may be detached from physical death. In our ordinary understanding of human longing, death is seen as the starting point of eschatology or human hope. That view has to be given up and we need to delve deep into the “inaugurated eschatology” which theologians have taken seriously since few decades.

We still need to take death seriously. But death may not be given the supreme importance and inevitability that was it due once. So the human hope and fulfilment has to begin with this present world, with the here and now. There are of course social and existential problems like poverty and injustice which are to be tackled seriously.

It must be noted that overcoming physical death and attaining physical immortality does not solve the problem of human contingency. The issue of human finitude has to be addressed in a much wider sense. The tendency of those seeking physical immortality is to reduce human life to a physicalistic or mechanistic view point. They would stress that attainment of physical immortality – temporal

unlimitedness – necessarily leads to human fulfillment. We need to focus also on the existential and ontological contingency of human condition, not merely that of the temporal conditioning.

So even in a world of immortal human beings, human longing and hope is imperative. Hope still remains intrinsic to humans. But it is a hope based on the day-to-day experience of humans and rooted in the present day, not one aimed primarily at a later world “a pie-in-the-sky-when-you-die” type. So life, today’s precious, fragile life, has to be taken seriously. It has to be affirmed, respected and fostered in its entirety. We can hope to pay back the bride-price for Alatangana’s marriage with Sa’s daughter and life lives “full and abundant” and not necessarily temporally limited.

1.6 SOME QUOTES

“The ancient seers were not egoistic. They called the whole humanity – past, present future – *Amrutya putra*. You are all sons of immortality. Equal and eternal.” Bhagawan Rajneesh (Osho 1998: ch3).

“Mankind will postpone human ageing substantially in the future, doubling the human lifespan at least, when we have accomplished this we will be ashamed that we did not work on it much sooner.” Michael Rose, Evolutionary Biogerontologist

“The philosophy of immortality believed will produce death. That is, believed rather than practiced. Belief is past; everlasting life is an eternal daily consciousness. It is not something you did, but something you do.” Leonard Orr (Author of The Science of Everlasting Life).

Check Your Progress III

Note: Use the space provided for your answers.

1) How does cloning extend human lifespan?

2) What are some of the religious implications of physical immortality?

15

1.7 LET US SUM UP

In this unit we have dealt with the theoretical possibility of physical immortality and other technological ways of extending human life. We also saw some of its philosophical implications.

1.8 KEY WORDS

Cryonics: The practice or technique of deep-freezing the bodies of those who have died of an incurable disease, in the hope of a future cure

Cyborg: a person whose physiological functioning is aided by or dependent upon a mechanical or electronic device. Combination of Cybernetics and Organism.

Gerontology: The scientific study of old age, the process of aging, and the particular problems of old people

Mitochondria: An organelle found in large numbers in most cells, in which the biochemical processes of respiration and energy production occur.

Ursehrsucht: *Sehnsucht* (German) is human longing. *Ursehrsucht* is the deepest or primordial human longing.

1.9 FURTHER READINGS AND REFERENCES

Bova, Ben. *Immortality*. Avon Books, 2000.

Bowie H. *Why Die?: A Beginner's Guide to Living Forever*. Scottsdale: PowerSurge Pub., 1998.

Bowie, Herb. [http: www.powersurgepub.com/books\immort\Bowie why die.htm](http://www.powersurgepub.com/books/immort/Bowie%20why%20die.htm), 1999. See also URL: [http:// www.sff.net. people.benbova](http://www.sff.net/people/benbova).

Capra, F. *The Tao of Physics*, A Bantam Book, 1977.

Hewitt, Duane. *Immortality* main page: <http://www.immortality.org>. contact duane@immortality.org.

Immortality. (2011, June 2). In *Wikipedia, The Free Encyclopedia*. Retrieved 04:33, June 3, 2011, from <http://en.wikipedia.org/w/index.php?title=Immortality&oldid=432156464>

Leeming, David and Leeming, Margareth. *A Dictionary of Creation Myths*. New York/Oxford: OUP 1994.

Mind uploading. (2011, May 11). In *Wikipedia, The Free Encyclopedia*. Retrieved 04:35, June 3, 2011, from http://en.wikipedia.org/w/index.php?title=Mind_uploading&oldid=428601021

Osho, Bhagavan. (1998) *Beyond Enlightenment*, ch 3, "No other path but life." (From CD rom).

Pandikattu, Kuruvilla. "Eschatology: Arena for Creative Encounter between Science and Religion." *Jeevadhara* 29 (April 1999) 154-164.

Pandikattu, Kuruvilla (2000) "Significance of God if humans were to become immortal," *The Month* 33 (July 2000): 264-268.

Peters T (1997) *Playing God?: Genetic Determinism and Human Freedom*. Routledge, New York and London.

Science (August 15, 1997) Volume 277, Pages 955-959. See also *Cell* (August 22, 1997) Volume 90, Pages 785-795.

Science (October 22, 2000). See also <http://www.sciencemag.org>

Spiegel, Der (2000) 17/2000. URL <http://www.spiegel.de/spiegel/21jh/0,1518,73761,00.html>.

Strout, J. "Mind Uploading: An Alternative Path to Immortality." *Cryonics* (1998)19:26-30.